Grammatical gender and linguistic complexity

Edited by

Francesca Di Garbo

Bruno Olsson

Bernhard Wälchli

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Part I

Introduction

Chapter 1

Introduction

Francesca Di Garbo
Stockholm University

Bruno Olsson
Australian National University

Bernhard Wälchli
Stockholm University

Grammatical gender is notorious for its complexity. Corbett (1991 : 1) characterizes gender as "the most puzzling of the grammatical categories". One reason is that the traditional definitional properties of gender – noun classes and agreement – are very intricate phenomena that can affect all major areas of language structure. Gender is an interface phenomenon par excellence and tends to form elaborate systems, which is why the question of how systems emerge in language development and change is highly relevant for understanding and modeling the evolution of gender systems. In addition, at least some of the recent literature on linguistic complexity singles out gender as a particularly opaque category type, 'historical junk' without any obvious function (Trudgill 2011 : 156) that is likely to be lost in situations of increased non-native language acquisition (McWhorter 2001 ; 2007; Trudgill 1999). Not only are its synchronic functions a matter of debate, but gender also tends to be diachronically opaque due to its high genealogical stability and entrenchment (Nichols 1992 : 142; Nichols 2003), which makes gender a core example of a mature phenomenon (Dahl 2004). However, despite the well-established connection between gender and linguistic complexity, and recent attempts to develop complexity metrics for gender systems (Audring 2014 ; 2017; Di Garbo 2016) and metrics for addressing the relationship between gender and classifiers (Passer 2016), there is not yet any collection of articles par-

Francesca Di Garbo, Bruno Olsson & Bernhard Wälchli. 2019. Introduction. In Francesca Di Garbo, Bruno Olsson & Bernhard Wälchli (eds.), *Grammatical gender and linguistic complexity*, 1–13. Berlin: Language Science Press.
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ticularly devoted to the relationship between grammatical gender and linguistic complexity.

The present two volumes are an attempt to fill this gap. They address the topics of gender and linguistic complexity from a range of different perspectives and within a broadly functional-typological approach to the understanding of the dynamics of language. Specific questions addressed are the following:

- **Measurability of gender complexity**:
  What are the dimensions of gender complexity, and what kind of metrics do we need to study the complexity of gender cross-linguistically? Are there complexity trade-offs between gender and other kinds of nominal classification systems? Does gender complexity diminish or increase under the pressure of external factors related to the social ecology of speech communities?

- **Gender complexity and stability**:
  How does gender complexity evolve and change through time? To which extent do the gender systems of closely related languages differ in terms of their complexity and in which cases do these differences challenge the idea of gender as a stable feature? How complex are incipient gender systems?

- **Typologically rare gender systems and complexity**:
  How do instances of typologically rare gender systems relate to complexity? What tools of analysis are needed to disentangle and describe these complexities?

Discussion around these topics was initiated during a two-day workshop on "Grammatical gender and linguistic complexity" that took place at the Department of Linguistics at Stockholm University, Sweden, between November 20th and November 21st, 2015. Most chapters included in this book are based on papers first presented and discussed during this workshop. However, some more authors joined in after the workshop and all contributions went through considerable modifications on their way to being included into the book. The result is a collection of 14 chapters (including this introduction), which address the questions listed above while investigating the many facets of grammatical gender through the prism of linguistic complexity.

The chapters discuss what counts as complex or simple in gender systems, and whether the distribution of gender systems across the world's languages relates to the language ecology and social history of speech communities. The contributions demonstrate how the complexity of gender systems can be studied syn-

chronically, both in individual languages and over large cross-linguistic samples, and diachronically, by exploring how gender systems change over time.

Organization of the two volumes

The book is divided into two volumes. The first volume, *General issues and areal and language-specific studies*, starts with three chapters on the theoretical foundations of gender complexity, followed by six chapters on languages and language families of Africa, New Guinea and South Asia. The second volume, *Case studies in diachrony and typology*, contains three chapters providing diachronic and typological case studies, and a final chapter discussing old and new theoretical and empirical challenges in the study of gender complexity.

The rest of this section is a roadmap providing summaries of the thirteen following chapters.

Volume 1: General issues and areal and language-specific studies

The part on theoretical foundations of gender complexity starts with the contribution by **Jenny Audring**. Building on previous work in Canonical Typology, Audring proposes that a maximally canonical gender system is one in which formal clarity and featural orthogonality reign, unperturbed by morphological cumulation and cross-category interactions. Canonical gender is also populated by well-behaved targets exhibiting unambiguous agreement, in accordance with the (transparently assigned) gender of their controllers. Alongside this hypothetical clustering of canonical properties, Audring, always building on earlier literature, establishes three main dimensions according to which the complexity of a gender system can be gauged: economy (a system with fewer distinctions is less complex than one with many distinctions), transparency (a one-to-one mapping between meaning and form is less complex than a one-to-many mapping) and independence (a system where all features are independent of each other is less complex than one where they interact). Starting from the postulate that the maximally canonical gender system should also be minimally complex, Audring examines how the canonicity parameters fare against the complexity measures, and finds that the criteria from canonicity and complexity largely converge, with economy being the glaring exception: a canonical gender system is an uneconomical one. The discussion then turns to difficulty, here understood as the speed with which the child acquires the gender system of its first language. With the premise that a gender system of maximal canonicity and minimal complexity should also be the least difficult to acquire, Audring compares the criteria for canonicity and

complexity with factors that are known to facilitate the acquisition of a gender system. The result of this comparison is general convergence between the three dimensions, again except for economy. An otherwise canonical and simple gender system will be easier to acquire if it also features lavish redundancy.

Exploring the relationship between language structures and sociohistorical and environmental factors is one of the hot topics of recent quantitative typological research. In Chapter 3, **Östen Dahl** studies whether there exists a negative correlation between the complexity of grammatical gender and community size in line with the general claim that languages with large populations feature simpler morphology than smaller languages. Gender systems presuppose non-trivial patterns of grammaticalization and complex types of encoding in inflectional morphology. In addition, contact-induced erosion and loss of grammatical gender are well documented in the literature. Yet, Dahl shows that it is very hard to find any clear-cut statistically significant correlation between gender features as documented in the *World atlas of language structures* (*WALS*) and speech community size. Similarly, gender features do not clearly correlate with any of the inflectional categories represented in *WALS*, with the exception of systems of semantic and formal gender assignment, which tend to be found in languages with highly grammaticalized nominal number marking. Dahl argues that in order to better understand the impact that language-external factors may have on the complexity of gender systems, areal and genealogical skewing in the distribution of types of gender systems and the demographic profile of speech communities need to be taken into account. Furthermore, he suggests that more elaborate classifications of gender systems than those currently available in typological databases are needed in order to identify those aspects of gender marking that are most likely to adapt to the pressure of language-external factors, as well as a shift in perspective from synchronic to diachronic typologies.

Johanna Nichols (Chapter 4) uses canonicity as a starting point for her discussion of the relative complexity of gender agreement. As in Audring's contribution, exponence of gender is non-canonical inasmuch as it departs from the structuralist ideal of biunique form-function correspondence. Nichols proposes the reasonable hypothesis that gender systems are in fact not complex in themselves. Rather, their complexity is a side-effect of gender arising primarily in languages that have already cultivated considerable complexity elsewhere in their grammars. But empirical testing of this hypothesis suggests that it must be rejected, because Nichols shows – surprisingly perhaps – that languages with grammatical gender do not display a higher degree of overall morphological complexity than languages without gender. The question is then what diachronic processes

cause gender systems to accumulate complexity over time, even when the rest of the morphological system manages to avoid increased complexification. Nichols identifies one clue to this puzzle by comparing gender to participant indexation, and, more specifically, to cases where such systems display hierarchical patterning (as when a verb form indexes the participant that ranks highest on a hierarchy such as 1,2 > 3). In Nichols' view, this is an example of a "self-correcting mechanism" that can act as a cap on complexification within indexation systems. Gender systems, on the other hand, do not have recourse to such mechanisms, because markers of gender agreement lack the referential function that participant indexes, such as pronouns, have.

The remaining parts of the first volume contain chapters on gender systems in three parts of the world: Africa, New Guinea and South Asia.

Gender systems in Niger-Congo languages are among the most studied instances of grammatical gender across the world's languages. Yet this body of research is to a large extent based on a tradition of analysis which is strongly Bantu-centered and not easily applicable to other language families within and outside Africa. The chapter by **Tom Güldemann** and **Ines Fiedler** (the first of two chapters treating African languages) seeks to overcome this limitation by proposing a novel toolkit for the analysis of Niger-Congo gender systems. The kit rests upon four notions: agreement class, noun form class, gender and deriflection, and aims to be universally applicable to the description of any language-specific gender system as well as for the purpose of crosslinguistic comparison. While the notions of noun form class and agreement class have to do with the concrete morphosyntactic contexts in which nominal and non-nominal gender marking occur, gender and declension are more concerned with the abstract, lexical, dimension of grammatical gender. By using these analytical tools, Güldemann and Fiedler dismiss the notion of noun class, which has been largely used in Niger-Congo studies and which rests on the problematic assumption that there exists a systematic one-to-one mapping between noun form classes and agreement classes. The authors demonstrate the descriptive adequacy of the proposed approach by focusing on data from three genealogically and/or geographically coherent Niger-Congo groups in West Africa: Akan, Guang and Ghana-Togo-Mountain. They show how the new method unveils some important generalizations about Niger-Congo gender systems. For instance, agreement class inventories are always simpler (or at least not more complex) than noun form class inventories, both in terms of number of distinctions and types of structures. Diachronically, this means that the systems of noun form classes can be more conservative than those of agreement classes.

The contribution by **Don Killian** (Chapter 6) discusses the gender system of Uduk, a Koman language of the Ethiopian-(South) Sudanese borderland, with special emphasis on some unusual properties of the agreement and assignment principles operating in the language. Gender agreement in Uduk is primarily realized on a set of clitics that attach to the verb, and which mark the case role and gender of a core argument that immediately follows the verb. The fact that these postverbal clitics only appear when immediately followed by the corresponding argument points to the fundamental role of adjacency in this gender system, a point also illustrated by conjunctions and complementizers, which agree in gender with the following nominal. According to Killian, gender assignment is largely arbitrary, even for the highest segments of the animacy hierarchy, where one could expect to find assignment based on salient features of the referent (such as sex). Furthermore, the irrelevance of the referent for gender assignment extends to pronouns and demonstratives, which invariably trigger agreement according to Class I. Apart from a few formal rules (targeting derived nouns), there do not appear to exist any clear-cut semantic patterns that could bring order to this unwieldy assignment system. Killian proposes that the Uduk gender is non-canonical but relatively simple – features that easily would make this gender system slip under the typologist's radar.

In the first of three contributions focusing on languages of New Guinea, **Matthew Dryer** (Chapter 7) presents an overview of gender in Walman, a Torricelli language. Gender agreement in Walman is shown in third person agreement on verbs, where the sets of subject and object affixes distinguish feminine and masculine agreement. Agreement is also found, albeit less systematically, on a subset of nominal modifiers (including some adjectives and demonstratives). Gender assignment is sex-based for humans and large animals, arbitrary for lower animals, whereas almost all inanimates are feminine, with spill-over into the masculine for some natural phenomena (which, like animates, are capable of autonomous force). Dryer presents two analytical puzzles for the description of Walman gender. The first concerns the large group of pluralia tantum nouns, which trigger invariant plural agreement instead of the standard masculine or feminine (singular) agreement. The size of this group of nouns is about twice as large as the group of masculine nouns, so if the number of members is taken as decisive for the status of a category, then the pluralia tantum category in Walman is clearly on a par with the two uncontroversial genders. The second puzzle concerns diminutive agreement. The Walman diminutive is not marked on the noun itself (unlike some more familiar derivational diminutives), rather it is realized by devoted diminutive affixes that replace the usual feminine and masculine gen-

der agreement markers. This makes the diminutive look like an additional gender value, but Dryer points to the lack of inherently diminutive nouns and the fact that the diminutive sometimes co-occurs with masculine-feminine agreement as good reasons for questioning its status as a gender value. Like other contributions to this book, Dryer's discussion is a good illustration of how interactions between gender and other categories of grammar conspire to make gender systems (as well as the task of analyzing them) more complex.

Bruno Olsson (Chapter 8) shows that the complexity of gender in a particular language can be addressed from a diachronic point of view by advanced methods of internal reconstruction in the case of a family where all but one language are yet poorly documented. The language investigated is Coastal Marind, an Anim language of the Trans-Fly area of South New Guinea. Coastal Marind gender is covert except in few nouns displaying stem-internal vowel alternation (*anem* 'man[Isg]', *anum* 'woman [IIsg]', *anim* 'people [I/IIpl]'). Olsson endorses earlier comparative research where it has been argued that vowel alternation within Anim words derives from umlaut triggered by postposed articles inflecting for gender (as they still exist in the perhaps distantly related and areally not too remote Ok languages). Through statistical analysis he identifies traces of umlaut for two classes even in non-alternating nouns. The lack of any statistical effect in a third class is explained by class shift of nouns for animals. In Coastal Marind, gender and number are intricately intertwined in an unexpected way. The joint plural of the two animate classes behaves nearly exactly the same as gender IV, one of the two inanimate classes (which do not distinguish gender). Olsson makes plausible that gender IV has originated from pluralia tantum, but since there is no semantic link anymore (no inanimate plural), it is not possible to view gender IV as plural synchronically despite systematic syncretism with the animate plural throughout a large number of different kinds of formal exponents including stem suppletion. The case of Coastal Marind thus demonstrates that a gender system can become more complex through very specific kinds of interaction with phonology, on the one hand, and with number, on the other hand.

In the traditional literature on gender, not all continents are equally well represented. New Guinea is a major area that has been notoriously underrepresented so far. **Erik Svärd** (Chapter 9) investigates gender in New Guinea in an areally restricted variety sample of twenty languages and compares it to gender in Africa and in the whole world. Unlike Africa, where gender is amply represented in the large language families, the two large families in New Guinea, Austronesian and Trans-New Guinea, mostly lack gender, but grammatical gender is attested in many small language families and isolates. As a consequence, gender in New

Guinea is diverse and more akin to the global profile of gender in comparison with Africa. Despite the diversity of gender in New Guinea, Svärd is able to identify characteristic properties of gender in New Guinea. Most languages with gender have a masculine–feminine opposition (where either member can be unmarked), and several gender targets, typically including verbs. Unlike Africa and the Old World in general, formal assignment and overt marking of gender on nouns is rare in New Guinea and in the few languages having formal assignment it is usually limited to a subset of the gender classes. However, gender assignment in New Guinea is not typically simple, since many languages have what Svärd calls "opaque assignment", which does not mean lack of assignment patterns, but rather that exceptions abound. The relevance of size and shape, the existence of multiple noun class systems, and lack of gender in pronouns are further properties characteristic of many languages of New Guinea with gender. Svärd's comparison of New Guinea and Africa concludes the part on languages in Africa and New Guinea.

In Chapter 10, **Henrik Liljegren** investigates the properties of gender systems and their complexity in 25 of 27 Hindu Kush Indo-Aryan languages. The languages under study are those for which there is enough data in published sources and/or own field data, and are examined against the background of other languages spoken in the area (other Indo-Aryan, Nuristani, Iranian, Tibeto-Burman, Turkic and Burushaski). The result is a cross-linguistic survey, which is an intra-genealogical, areal and micro-typological study, all at the same time. Despite the close genealogical relationship of Hindu Kush Indo-Aryan languages, gender systems are remarkably diverse ranging from languages with the inherited masculine–feminine distinction pervasively marked on many agreement targets in the southwest (for instance, in Kashmiri) to the Chitral languages Kalasha and Khowar in the northwest, which instead have an innovated copula-based animacy distinction. These two languages also reflect the earliest northward migration of Indo-Aryans in the region. In some languages in the southeast, the sex-based and animacy-based oppositions are combined in concurrent gender systems, and some of the languages where this is the case (Pashai languages and Shumashti) yield the highest complexity scores among Hindu Kush Indo-Aryan languages. Liljegren shows that the distribution of various kinds of gender systems has both genealogical and areal implications with different kinds of Iranian contact languages in the southeast and southwest yielding different kinds of contact effects. Liljegren traces in detail how the entrenchment of gender in this language grouping gradually declines from the southeast to the northwest. Generally in Hindu Kush Indo-Aryan, gender is stable only to the extent related lan-

guages with inherited gender are neighbors. But there are also language-internal factors. The functional load of gender is higher in languages with ergative rather than accusative verbal alignment.

Volume 2: Case studies in diachrony and typology

The study of gender complexity has been mainly focusing on synchrony so far. In Chapter 11, the first of three diachronic and typological studies, **Francesca Di Garbo** and **Matti Miestamo** demonstrate that diachrony is indispensable for a deeper understanding of the relationship of gender and complexity. They investigate four types of diachronic changes affecting gender systems – reduction, loss, expansion and emergence – in fifteen sets of closely related languages (36 languages in total) from various families and continents. In exploring how the detected types of changes relate to complexity they find that reduction of gender agreement does not necessarily entail reduction of complexity. Rather complexity can increase both in reducing and emerging gender systems, for which both partial distributions and optionality are characteristic, which are hallmarks of ongoing change involving variation. Strong regularities across the languages of the sample are identified as to how different kinds of change can be mapped onto the Agreement Hierarchy. The two opposite poles of the hierarchy, attributive modifiers and personal pronouns, can often be identified as the places of origin for both decline and rise of gender. Di Garbo and Miestamo argue that two opposite forces, syntactic cohesion and semantic agreement, are at work at the two different poles of the implicational hierarchy. In a similar vein, the two different processes involved in reduction, morphophonological erosion and redistribution of agreement, display different kinds of directions of change along the Agreement Hierarchy. Di Garbo and Miestamo consider various cases of language-internal rise of gender and contact-induced gender emergence and detect striking similarities. The cases under consideration suggest that gender in the process of emergence is non-pervasive and constrained. While gender can disseminate by means of borrowing of lexical items, emergent gender systems in borrowing languages differ in structure from gender systems in donor languages.

Traditional definitions of grammatical gender rely on the notions of noun class, agreement, and system. In Chapter 12, **Bernhard Wälchli** demonstrates that dispensing with these notions and pursuing a radically functional approach to the study of grammatical gender is possible and worth doing. The chapter is a typological investigation of feminine anaphoric gender grams (as in English *she/her*) in a world-wide convenience sample of 816 languages, and based on a corpus of parallel texts (the Bible's New Testament). The functional equivalence between

the forms extracted from the corpus in ensured by the fact that they cover one and the same search space across all languages considered. Through this methodology, which for the first time is applied to the domain of grammatical gender, the study finds instances of simple patterns of gender marking in a large number of languages for which no such constructions had been documented before. Three types of simple gender are extracted from the corpus and analyzed in the paper: non-compositional complex noun phrases, reduced nominal anaphors, and general nouns. These instances of simple gender are interpreted as incipient types of gender systems from a grammaticalization perspective. Conversely, cumulation with case in the encoding of grammatical relations is taken as a characteristic feature of complex and mature (i.e., highly grammaticalized) feminine anaphoric gender grams. After discussing the differences between simple and mature gender, the chapter concludes by proposing a functional network for the grammatical gender domain where the gram approach is reconciled with more traditional approaches based on the notions of noun classes, agreement and system.

While languages can have both gender and classifier systems, the co-occurrence of the two is quite rare and suggests that these two different types of nominal classification systems may actually be in complementary distribution with one another. In Chapter 13, **Kaius Sinnemäki** validates this claim statistically by investigating the distribution of gender and numeral classifier systems in a stratified sample of 360 languages. Complexity is operationalized as the overt coding of a given pattern in a given language, thus, in this case, as the presence of gender and/or numeral classifiers. The study's main hypothesis is that there is an inverse relationship between presence of gender and presence of numeral classifiers. The hypothesis is tested using generalized mixed effect models, which also allow for controlling for the impact of genealogical and areal relationships between languages on the distribution of the variables of interest. The results reveal a statistically significant inverse relationship between presence of gender and presence of numeral classifier systems and that the two types of nominal classification systems in addition have a roughly complementary areal distribution. Languages spoken within the Circum-Pacific region are more likely to have numeral classifiers than languages spoken outside this area, whereas the opposite distribution applies to gender. This inverse relationship also exists independently of language family and area and thus confirms the study's main hypothesis. According to Sinnemäki, these results, which should be interpreted as a probabilistic rather than an absolute universal, suggest that there exists a functionally motivated complexity trade-off between gender and numeral classifiers, whereby languages tend to avoid developing and maintaining more than

one system at once within the functional domain of nominal classification.

The concluding chapter (Chapter 14), by **Bernhard Wälchli** and **Francesca Di Garbo**, presents a wide-ranging enquiry into the diachrony and complexity of gender systems, with an emphasis on gender systems as dynamic entities evolving over time. The authors reexamine a variety of phenomena that will be familiar to students of gender, such as gender and the animacy hierarchy, assignment rules, gender agreement, and cumulative expression with other inflectional categories. But casting the net wider, the paper also examines various issues that have received less attention in the literature, and which arguably are crucial for understanding the origin, development and synchronic characteristics of gender systems, such as the introduction of inanimate nouns into sex-based gender classes, opaque assignment and the development from semantic to phonological assignment, nouns – and clauses – as targets of gender agreement, and relationships between controller and target that go beyond co-reference and syntactic dependency. Among the 12 sections of the chapter (all of which can be read independently) one could also mention an exploratory survey of accumulation of nominal marking in the NP (including markers that fall outside the realm of noun classification, such as *one* in the NP *the red one*), and a proposal for a definition of agreement that is intended to capture the fundamental asymmetry between controller and target (as the sites where gender originates and is realized respectively). These and other sections of the chapter question the solidity of some commonly made distinctions – such as that between agreement features and conditions on agreement, or the binary splits between e.g. semantic and formal assignment systems, or the assumption that the category of gender can always be distinguished from that of number – which emerge in a new guise once the dynamic perspective favored by the authors is adopted.

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Part II

General issues

Chapter 2

Canonical, complex, complicated?

Jenny Audring
Leiden University

Investigating the complexity of grammatical gender begins with the question: What are the dimensions of variation? This question is addressed by Canonical Typology, which provides us with a cross-linguistic road map of gender systems (Corbett & Fedden 2016). Compass and measuring rod are the principles of canonicity, which organise the theoretical space around a canonical center and then situate real gender systems in this space. In this chapter I compare and contrast the principles of canonicity with those of complexity, and discuss both of them in relation to difficulty. While canonicity, complexity, and difficulty are related notions, it will be argued that they are not identical: individual phenomena can be complex but canonical, or complex but not difficult. The aim of the chapter is to tease apart issues of methodology, description, and theory in order to arrive at a clearer understanding of the complexity of gender.

Keywords: gender, complexity, canonicity, difficulty, learnability, economy, transparency, independence, redundancy

1 The typology of gender

1.1 Introduction

Typologies are descriptive spaces shaped by the dimensions of cross-linguistic variation. Once laid out, such spaces can be profiled according to various theoretical aims. In the domain of grammatical gender, the best example of this method is the Canonical Typology approach (e.g. Corbett 2006 ; Brown et al. 2013 ; Bond 2019 ; Corbett & Fedden 2016 for gender). By organising the typological variation in gender systems according to the principles of canonicity, we arrive at a

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better understanding of the feature, from its most canonical manifestations at the center to the non-canonical systems at the periphery.[1]

The aim of this paper is to further explore the typological space of grammatical gender by comparing and contrasting canonicity with two other evaluative measures: complexity and difficulty.[2] The three notions appear to intersect: one might expect canonical gender systems to be the least complex, and the least complex systems to be the least difficult to acquire or use. Yet, there are theoretical reasons to assume that canonicity can imply greater complexity, and empirical reasons to believe that lower complexity does not necessarily mean lower difficulty.

The chapter is organised as follows. I first lay out the theoretical perspective taken in this chapter. This section also serves as an overview of the terminology used. Then I introduce the notion of "profiling", which means organising a typological space according to certain principles. §2 discusses the principles involved in profiling the typology of gender according to canonicity on the one hand and complexity on the other. In §3, I apply the principles to the typological space and compare the results. §4 widens the discussion to cross-linguistic evidence on difficulty in first language acquisition. §5 concludes the paper.

With regard to the three notions compared – canonicity, complexity, and difficulty – the text has an asymmetric structure: canonicity is taken as the baseline for an assessment of complexity, but difficulty is introduced independently and then linked to the other two notions.

1.2 Theoretical perspective and terminology

The theoretical perspective taken in this chapter is in line with Corbett (1991 ; 2013a ,b,c). Grammatical gender systems are understood as systems of agreement classes. This means that we follow Hockett's famous dictum that "[g]enders are classes of nouns reflected in the behaviour of associated words" (Hockett 1958 : 231) and take agreement as a definitional property of gender. Nouns serve as agreement *controllers* that determine the form and feature structure of agreeing *target* words. An example is (1) from Italian, where the definite article and the predicative adjective agree in gender with the feminine noun *pasta*.

[1]For a collection of interesting outlier systems, see Fedden et al. (2018).

[2]The terms "canonicity", "complexity" and "difficulty" are used as technical terms throughout the paper. §2 briefly outlines the relevant theory.

(1) Italian (Anna Thornton, p.c.)
la *pasta* *è* *squisit-a*
DEF.SG.F pasta(F).SG be.PRS.3SG delicious-SG.F
'The pasta is delicious.'

The syntactic configurations in which we find the agreement controller and its targets are called *domains*. The most local domain for gender agreement is the noun phrase (although, of course, finer subdivisions can be made with regard to hierarchical or linear distance within the noun phrase). Many languages, including Italian, show gender agreement in more than one domain. Larger domains are the clause (with predicative agreement targets such as verbs) and the sentence (with relative pronouns as clause-external but sentence-internal agreement targets), but anaphoric agreement can reach beyond the sentence and even span more than one turn in conversation.

The number of different agreement patterns corresponds to the number of gender *values* distinguished in a language (this is less straightforward when languages have inconsistent or mismatching agreement patterns). Gender values often have names, e.g. *feminine* or *uter*, especially in smaller systems with fewer values and when values line up with particular semantic properties. The values in larger systems are commonly labeled by numbers. Some linguistic traditions, e.g. the Bantuist literature, speak of noun classes rather than genders and distinguish numbered singular and plural classes (see example (3) below).

Nouns usually have a consistent gender value as an inherent lexical property. *Assignment rules* that regulate which noun goes with which gender are easy to identify in a number of languages, but less so in others. Such rules can refer to semantic, phonological, or morphological properties of nouns. Consider, for example, the following rules proposed for German (Köpcke 1982 : chapter 3).[3]

- Semantic assignment rule
  - Nouns denoting lexical categories are neuter (e.g. *das Substantiv* 'the noun', *das Verb* 'the verb', *das Pronomen* 'the pronoun')
- Phonological assignment rule
  - Monosyllabic nouns ending in /ʃ/ are masculine (e.g. *der Mensch* 'the human', *der Busch* 'the bush/shrub', *der Marsch* 'the march')

[3]These rules are not categorial but reflect statistical tendencies; counterexamples can be found for every proposed rule.

- Morphological assignment rules
  - Nouns that take the plural suffix *-(e)n* are feminine (e.g. *die Tür* 'the door', *die Stirn* 'the forehead', *die Flut* 'the flood')

Phonological and morphological rules are often subsumed under "formal rules" (Corbett 2013c). In addition, as defended in Audring (2017), it may be useful to distinguish between general rules that account for a large part of the noun vocabulary, and 'parochial' rules with a narrower scope.[4] This distinction cross-cuts the semantic/formal split. The German examples above represent parochial rules; they constitute a small part of a large and complex rule system.

Taken together, the number and nature of the assignment rules, the properties of the controllers, the range of values, and the behaviour of the targets in each domain can be used to broadly characterise the gender system of a language and compare it to others.

1.3 Profiling

In typologies of grammatical (sub)systems, all instances of cross-linguistic variation can be treated equally by simply cataloguing the available options. Table 1, for example, lists a selection of options for gender systems.

Table 1: Possible properties of gender systems (selection)

Controllers:	Noun, pronoun, …
Targets:	Adjectives, verbs, pronouns, articles, …
Domains:	Noun phrase, clause, …
Values:	2 gender values/ 10 gender values, …
Assignment rules:	Semantic, phonological, …

However, it might be useful to profile the typology. For example, typologists might sort the various options according to commonness or rarity. Alternatively, we might want a typology of gender to say that a gender system with nothing but pronominal targets is a non-canonical gender system – hence the persistent disagreement in the linguistic literature on whether or not English has grammatical gender.[5] Such differences can be captured by defining a "canonical" or ideal

[4]For an insightful discussion of parochial or "crazy" rules and associated theoretical issues see Enger (2009).

[5]See Wälchli (2019 [this volume]) for a different view on pronominal gender.

gender system, and then situate real systems according to their relative distance from this baseline. This is the method of Canonical Typology (Corbett 2006 ; 2012; Brown et al. 2013 ; Corbett & Fedden 2016); we will discuss it in more detail in §2 and §3.

Profiling – be it in terms of commonality, canonicity, or any other evaluative measure – organises the typological space according to certain principles and thereby enriches the description, allowing for a deeper understanding of the grammatical (sub)system in question. In the present paper, I will compare two profiles for grammatical gender, the canonicity profile and the complexity profile, and relate both to the issue of difficulty. First, however, we need to establish principles that allow us to ask which properties count as canonical or complex, and why.

2 Principles

2.1 Introduction: Principles

The method I have referred to as "profiling" creates organised typological spaces. Organisation requires principles. In this section, I will review the principles of canonicity as proposed in the literature, and then suggest a number of possible principles for complexity and difficulty (again, guided by the relevant literature).

Since the issues are themselves highly complex, the representation will be uncomfortably sketchy in places. Especially for canonicity, the reader is referred to the original sources for a more extensive motivation of the approach, for discussion, and for further examples.

2.2 Principles of canonicity

The main purpose of the canonical approach to typology is to define a linguistic equivalent of the zero on the Kelvin thermometer: an absolute calibration point in the space of possibilities (Fedden & Corbett 2015). Unlike the scale of a thermometer, however, a canonical typology is multi-dimensional. Corbett & Fedden (2016) define the calibration point for grammatical gender and the variational space around it with the help of a number of principles. Since gender is a morphosyntactic feature involving agreement, most of the principles for canonical gender systems follow from those for canonical morphosyntactic features (Corbett 2012) and canonical agreement (Corbett 2006), respectively. Corbett & Fedden (2016) present the clusters of principles in separation; in the following they will be represented jointly. In order to allow for easier cross-reference to the

source, the original numbering is retained. This necessitates a minor adjustment: Principle I for canonical morphosyntactic features appears as Principle Ia, Principle I for canonical agreement as Principle Ib. Moreover, I have added names to the principles for easier reference throughout the text.[6]

According to Corbett and colleagues, the relevant principles for canonicity are the following (after Corbett & Fedden 2016):

Principle Ia: Clarity

The feature gender and its values are clearly distinguished by formal means.

Principle Ib: Redundancy

Canonical gender agreement is redundant rather than informative.

Principle II: Simple Syntax

In a canonical gender system, the use of the feature and its values is determined by simple syntactic rules. Canonical gender agreement is syntactically simple.

Principle III: Exponence

In a canonical gender system, the feature and its values are expressed by canonical inflectional morphology.

Principle IV: Orthogonality

Canonical gender and canonical parts of speech are fully orthogonal.

Principle V: Matching Values

In a canonical system of grammatical gender the contextual values match the inherent values.

Canonical Gender Principle (CGP)

In a canonical gender system, each noun has a single gender value.

The principles are operationalised by means of criteria that specify for individual properties or behaviour whether they are more or less canonical. Greatly simplifying the complex and sophisticated account in Corbett & Fedden (2016), the principles and criteria for canonical gender say that gender

[6] All principles in this chapter are capitalised.

- should be expressed by means of affixes
- should involve dedicated and unique markers that express gender and nothing else
- should be marked consistently, regularly, and obligatorily
- is not impinged upon by syntax, lexical restrictions, or other grammatical features.

Controller and target should

- have gender and express it overtly
- have matching values (thus rendering the gender information on the target redundant).

Furthermore, there should not be any syntactic complications such as inconsistent controllers or special agreement rules for different parts of speech. In principle, all relevant parts of speech should have access to all gender values. The exception is nouns, which – canonically – should only have a single, fixed gender value.

Anticipating a more detailed discussion in §3, let us look again at Italian to see how the principles play out.[7] Example (1) is repeated as (2a); example (2b) is added for contrast.

(2) Italian

a. *la* *pasta* *è* *squisit-a*
DEF.SG.F pasta(F).SG be.PRS.3SG delicious-SG.F
'The pasta is delicious.'

b. *il* *cibo* *è* *squisit-o*
DEF.SG.M food(M).SG be.PRS.3SG delicious-SG.M
'The food is delicious.'

Italian marks gender mostly by suffixes, which are consistent, regular, and obligatory. However, some cumulative exponence occurs: the definite articles fuse stem and gender marker, and all gender markers double as number markers. Both controllers and targets distinguish two values (masculine and feminine);

[7] See Fedden & Corbett (2017 : 3) for a similar assessment.

these match across domains. The great majority of nouns have a constant gender value, and many nouns show their gender overtly. Gender agreement is redundant in most cases. Hence, the Italian gender system comes fairly close to being canonical.

Generalising, we can state that a canonical gender system is defined by formal clarity, syntactic and morphological simplicity, orthogonality to all other compatible linguistic properties, and consistency in the behaviour of all items involved. Viewed in this way, it is easy to see that canonicity involves similar considerations as complexity. Indeed, Principle II (Simple Syntax) makes explicit reference to simplicity. Turning to complexity next, we ask what principles can be brought to bear in order to identify a particular property or behaviour as more or less complex.

2.3 Principles of complexity

The literature on linguistic complexity is vast, and many sources propose principles of complexity. The following section draws on Audring (2017), a detailed study of the complexity of gender systems; the principles are inspired by earlier work, chiefly Kusters (2003), Miestamo (2008), and Di Garbo (2014 ; 2016). Here, as in most sources (with the exception of Kusters 2003), discussion will be restricted to absolute or descriptive complexity (Miestamo 2008 ; Sinnemäki 2011 ; 2014) in order to keep relative complexity, i.e. difficulty, a separate issue (for which see §4).

The most common principle applied in judging complexity is that less equals less complex. This kind of assessment can be used for properties that can be counted or measured. For example, a language with two gender values is less complex than a language with four. Other countable properties are, for example, the number of distinct forms in a paradigm or the number of allomorphs for a given grammatical formative. Following Kusters (2003), this might be called the principle of Economy (but see Miestamo 2008 ; Di Garbo & Miestamo 2019 [this volume] who call it "Principle of Fewer Distinctions") and be defined as follows:

> Principle of Economy: The more distinctions or forms a grammatical feature involves, the more complex the feature.

The principle of Economy needs to be supplemented by other principles, since not all phenomena lend themselves to quantification. For example, it might be argued that dedicated, unique markers are less complex than polyfunctional markers. This is not a matter of quantity, but a matter of mapping function to form.

Polyfunctionality comes in various guises; the most common are markers that are syncretic across gender values or that simultaneously express another grammatical feature. Examples (3) from Chichewa (Niger-Congo (Bantoid), Bentley & Kulemeka 2001) illustrate both situations.

(3) Agreement in Chichewa

a.	*mwa-muna a-kuyimba*	*a-muna a-kuyimba*
	1-man 1-sing.PRS	2-man 2-sing.PRS
	'The man is singing.'	'The men are singing.'
b.	*chi-patso chi-kugwa*	*zi-patso zi-kugwa*
	7-fruit 7-fall.PRS	8-fruit 8-fall.PRS
	'A fruit (sg.) is falling.'	'Fruit (pl.) are falling.'

The nominal and verbal prefixes in (3) express noun class as well as number: 1 and 7 are singular classes, 2 and 8 are plural classes. (3b) shows the expected situation: the markers for class 7 and 8 are distinct. In (3a) the verbal prefix is syncretic for singular and plural and hence polyfunctional (the same marker also returns as the marker of the plural class 14; Mchombo 2004 : 6).

In order to capture the intuition that polyfunctional markers are more complex than dedicated markers, we assume a principle that is well-represented in the complexity literature, the Principle of Transparency (again, I follow the terminology of Kusters 2003 ; Miestamo 2008 and Di Garbo & Miestamo 2019 [this volume] call it "Principle of One-Meaning-One-Form"). This principle states that:

> Principle of Transparency: Minimal complexity is characterised by a 1:1 mapping of meaning and form.

(3) violates this principle by showing forms with more than one function (cumulative expression of noun class and number in (3a) and (3b), syncretic markers for class 1 and 2 in (3a)). It should be noted that otherwise the Chichewa examples are remarkably transparent: they involve clearly separable prefixes which are even alliterative between controller and target in class 7, 8, and 2.[8]

Certain cases of polyfunctionality produce complex situations for which it seems justified to posit a separate complexity principle. Following Di Garbo (2014 ; 2016), I call it the principle of Independence. This principle states that:

[8]Corbett (2006 : 15) includes alliterative form as a criterion for canonical agreement.

> Principle of Independence: In the least complex situation, a grammatical feature is independent of other grammatical features or other linguistic properties.[9]

Independence is compromised when gender marking is neutralised for a part of the paradigm. Well-known examples are gender neutralisation in the plural and in the local persons. Table 2 illustrates the latter case. Ngala (Siewierska 2013 , data from Laycock 1965) distinguishes gender in all three persons of the singular personal pronouns, while in Arabic (Ryding 2005 : 298–299) only the second and the third person mark gender. Italian shows gender in the third person only.

Table 2: Gender marking in personal pronouns (singular)

Language	**Ngala (Sepik)**		**Arabic (Afro-Asiatic)**		**Italian (IE)**	
Gender	M	F	M	F	M	F
1st person	*wn*	*ñən*	*anaa*		*io*	
2nd person	*mən*	*yn*	*anta*	*anti*	*tu*	
3rd person	*kər*	*yn*	*huwa*	*hiya*	*lui*	*lei*

In Arabic and Italian we see that gender depends on another property, in this case another grammatical feature. According to the principle of Independence, this represents increased complexity because it necessitates longer descriptions of the system. The idea is the same as limited orthogonality in canonicity (Principle IV (Orthogonality) for canonical morphosyntactic features, §2.2 above): not all logically possible pairings of cross-cutting properties occur. Limitations to Independence can involve properties such as part of speech, other features such as person, number, definiteness, or case, lexical restrictions such as lack of productivity of morphological markers, or interventions from the side of the speaker for semantic or pragmatic purposes.

In contrast to canonicity, where the principles and criteria should converge on the same outcome, the three principles of complexity – Economy, Transparency and Independence – are autonomous and can lead to different evaluations. Consider again the Arabic and Italian paradigms in Table 2. From the perspective of Economy the paradigms are simpler than the paradigm of Ngala: they contain fewer forms. However, they violate Transparency by requiring a non-1:1 mapping

[9]See also Corbett (2012 : 170, 174) for related criteria for canonical features.

of features and forms, as *anaa*, *io* and *tu* have to map onto both gender values.[10] The Arabic and Italian data also show higher complexity from the perspective of Independence, since gender is not fully orthogonal with person.

The upshot is that we cannot speak of the complexity of gender as a unitary phenomenon. Rather, we can employ the three principles (and potentially others) to evaluate observable properties or behaviour. A profiled typology or "complexity space" of gender does not have a single calibration point of minimal complexity. Violations of any of the principles constitutes a more complex situation.

Note that we are only considering languages that have a gender system. Hence, we disregard the fact that having gender in the first place complexifies a language. Nor will we ask about a gender system's usefulness or functionality. Such issues are addressed elsewhere – see for example Nichols (2019 [this volume]) and Sinnemäki (2019 [this volume]).

3 Canonicity vs. complexity

3.1 Profiling

Profiling the typological space by means of the principles introduced above, we can draw up a comparison for canonicity and complexity. This will be done separately for five parameters: the controller (§3.2), the targets (§3.3), the values (§3.4), the domains (§3.5), and the assignment rules (§3.6). In each section, we will ask what properties are more canonical and what are less canonical, building on Corbett (2006 ; 2012) and Corbett & Fedden (2016).[11] Then we will evaluate the options according to the principles of complexity. For reasons of space, only a selection of properties will be discussed; see Audring (2017) for a fuller account. Please refer back to §2.2 and §2.3 for the principles.

3.2 Controller

As we saw in §2.2, the principles of canonicity lead to certain expectations with regard to properties and behaviour. For canonical controllers in gender systems,

[10] Note that we still have to do with grammatical gender here and not just with the biological gender of the speaker or the addressee. In Hebrew, which has a system similar to Arabic, addressing an inanimate entity (say, an egg rolling off the table or a misbehaving computer) would require the use of a second-person pronoun in the appropriate grammatical gender value (feminine for the egg, masculine for the computer) (Lior Laks, personal communication).

[11] Corbett & Fedden (2016 : 514–517) discuss the properties of values under the heading of "Features".

these are the following.

3.2.1 Controller: canonicity

A canonical controller is present and expresses gender overtly. This is due to Clarity as well as to Redundancy, since an explicit controller renders the agreement redundant. According to Simple Syntax as well as to the Canonical Gender Principle, the controller should be consistent in the agreements it takes and have a single, lexically specified gender value.

Systems that deviate from these expectations are less canonical. The question to explore here is whether they are also more complex. Let us consider the properties one by one.

3.2.2 Controller: complexity

While an overtly present controller may be expected throughout, absent controllers are cross-linguistically common in pro-drop languages. Consider the Spanish example in (4), where the adjective agrees with an implicit third-person controller.

(4) Spanish
está *rot-a*
be.PRS.3SG break-F.SG
'It/she is broken.'

In terms of complexity, an absent controller increases Economy because the syntagmatic structure is simpler. By contrast, it constitutes a case of higher complexity from the point of view of Transparency, since there is no form that goes with the controller function. Moreover, a controller that is absent in some cases but present in others is at odds with Independence, since its distribution is influenced by other factors, e.g. pragmatics.

Aside from their presence or absence, controllers differ in whether or not they mark gender overtly. The opposite of overt gender is covert gender; languages with covert gender express the feature only by agreement. An example for a language with overt gender is Turkana (Nilotic, examples 5a); a covert system is found in Dutch (examples 5b). Other languages may show intermediate degrees of overtness.

(5) Overt vs. covert gender

a. Overt gender (Turkana, Dimmendaal 1983 : 224)

ɛ-sikin-a	*a-ŋasep*
M.SG-breast-SG	F.SG-placenta
'breast'	'placenta'

b. Covert gender (Dutch)

vloek	*boek*
curse(C).SG	book(N).SG
'curse'	'book'

The nouns in (5a) show overt gender in the form of class prefixes. The nouns in (5b) do not provide any formal indication of gender. Covert gender is more complex from the point of view of Transparency, since covert gender involves function without form. On the other hand, overt marking involves additional morphological material and an additional locus of marking, so it is more complex from the perspective of Economy. Independence is affected when overt marking is subject to conditions. An example can be found in the Khoisan language Sandawe, where gender marking on the noun is restricted to a number of nouns referring to female persons, which constitutes a lexical condition motivated by semantics (Steeman 2011 : 57).

The next property to be considered is the behaviour of the controller with regard to its targets. According to both Transparency and Independence, nouns should be consistent controllers that trigger the same agreement on any target under any circumstance. This captures the insight that hybrid nouns such as Dutch *meisje* 'girl', which takes neuter agreement on attributive targets and (mostly) feminine agreement on others, are a complexifying phenomenon in a gender system.

According to the Canonical Gender Principle (henceforth CGP), nouns should have only a single gender value each. Thus, a language like Savosavo (Papuan, Wegener 2012), which allows for manipulation of the gender value for pragmatic purposes, constitutes a non-canonical situation (example 6).

(6) Savosavo (Wegener 2012 : 64)

Ai lo tuvi=na ko tuvi k-aughi ngai-sa
this DET.SG.M house=NOM DET.SG.F house 3SG.F.OBJ-exceed big-VBLZ
patu
BG.IPFV

'This house (M) is bigger than that house (F).', lit. 'This house (M) is big exceeding that house (F).'[12]

[12] VBLZ=verbalizing morpheme, BG=background

In the example, the noun *tuvi* 'house' is used first with masculine agreements matching its lexical gender, but later with feminine agreements; this has the effect of emphasising, diminutive-like, the smallness of the house.

Languages like Savosavo, which systematically recategorise nouns for evaluative statements about size or merit (Corbett 2014 : 123; Di Garbo 2014 : 179), are not only less canonical, but also more complex. They violate Transparency by a 1:2 mapping of nouns and genders as well as compromising Independence, as the recategorisation involves semantic or pragmatic factors.

Table 3 collates the controller properties and their evaluation in terms of canonicity and complexity. A tick indicates alignment between maximal canonicity and minimal complexity. A cross indicates canonicity but increased complexity. A dash means that a principle is not relevant. In Table 3 we see that maximal canonicity lines up fairly well with minimal complexity. An exception is Economy disagreeing with Clarity and Redundancy: more formal evidence makes for a clearer and hence more canonical gender system, but at the cost of parsimony.

Table 3: Canonicity and complexity of the controller

The controller…	**Economy**	**Transparency**	**Independence**
…is present (Clarity, Redundancy)	✗	✓	✓
…has overt expression of gender (Clarity, Redundancy)	✗	✓	–/✓
…is consistent in the agreements it takes (Simple Syntax, CGP)	–	✓	✓

3.3 Targets

The list of target properties figuring in the canonicity profiling is extensive. In the following I will restrict the discussion to a number of central properties.

3.3.1 Targets: canonicity

Canonically, the gender value of the target is redundant and depends on the gender value of the noun. This is a consequence of the principle of Redundancy, but it also touches on Orthogonality, as each target should have access to all gender values in the language. Virtually all principles demand that the target has

gender values that match those of the controller; the principle of Matching Values makes this explicit. According to Exponence, gender should be expressed by bound morphology. Moreover, the markers should be uniquely distinguishable across other logically compatible features and their values (Clarity).

3.3.2 Targets: complexity

The informativity or redundancy of the gender value on the target can be illustrated with the help of example (7).

(7) French (Françoise Kably, p.c.)

a. *elle/il* *est* *idiot-e/idiot*
3SG.F/3SG.M be.PRS.3SG stupid-SG.F/stupid.SG.M
'She/he is stupid.'

b. *tu* *es* *idiot-e/idiot*
2SG be.PRS.2SG stupid-SG.F/stupid.SG.M
'You are stupid.'

In (7a) the gender agreement on the adjective is redundant given the gender of the pronominal controller. In (7b), by contrast, the second person pronoun does not distinguish gender, so the gender value on the adjective is informative. How does the difference play out in complexity? Obviously, redundancy is a violation of Economy: it is uneconomical to express the same information twice. From the point of view of Transparency, two views are possible. In one sense, redundancy always violates Transparency since the same feature is marked more than once. In this view, the agreement targets formally realise the gender of the noun. However, it might be argued that the agreement targets themselves have gender as a contextual feature (in the sense of Booij 2006), and whatever item has a feature should mark it. This would bring (7a) in line with Transparency after all. Paradigmatically, the evaluation depends on whether one assumes that the French 2nd person pronoun is syncretic for the two gender values or does not have gender at all. The first scenario constitutes a disruption of Transparency – a single form with two functions – the second does not, as the absence of a distinct form would correlate with the absence of a feature. Finally, Independence attributes greater complexity to (7b) than to (7a) since the gender values F and M on the adjective in (7b) have to be inferred from elsewhere, e.g. from the sex of the addressee.

That targets should depend on the controller and match its values syntagmatically follows from the asymmetry of agreement. Note that this is not counted

as a violation of Independence, since it is definitional for the controller-target relation. However, any additional dependency or influencing factor constitutes higher complexity in terms of Independence. Two such scenarios deserve discussion. The first is a target having 'its own opinion' about value choice and taking on a different gender value than the controller's. A case in point is semantic agreement, for which Dutch provides examples.

(8) Semantic agreement (Dutch)
dat *meisje* *dat* *uh die* *daar* *achter* *het* *stuur*
DEM.SG.N girl(N)SG REL.SG.N eh REL.SG.C there behind DEF.SG.N wheel(N)
zat
sit.PST.3SG
'that girl who sat behind the wheel'
(Corpus Gesproken Nederlands © Nederlandse Taalunie2014)

In (8) the agreements that go with the neuter noun *meisje* 'girl' have two different values: the demonstrative determiner is neuter, while the speaker first chooses a neuter relative pronoun, then hesitates and picks a common gender form.

Semantic agreement is pervasive in Dutch relative pronouns, personal pronouns, and possessive pronouns (Audring 2006 ; 2009); the relative likelihood is in line with the Agreement Hierarchy (Corbett 1979). This behaviour makes the system more complex because it involves semantics in a place where only syntax should matter; this is the principle of Independence. Note that Economy is not affected, since there are no additional markers involved (at least not syntagmatically; for the paradigmatic situation see next paragraph). Neither does semantic agreement – strictly speaking – touch Transparency, as both form and feature value change.

The second deviation from matching values arises when certain targets are paradigmatically unable to match the controller. This happens when the target distinguishes other values than the controller. Again, Dutch can serve as an example for this deviation from the canonical situation.

Most agreement targets in Dutch distinguish two genders, referred to as common (C) and neuter (N) (Table 4). Two targets diverge from this pattern. The personal pronouns and the possessive pronouns show an additional distinction between masculine and feminine that is not available to the other targets nor, arguably, for the nouns.[13] Note that gender agreement is restricted to the singular, so only singular forms are given.

[13]Here we see an example where the agreement class approach mentioned in §1.2 runs into

Table 4: Gender agreement in Dutch

Target/ Gender	Def	Dem	Adj	Rel	Pro	Poss
c/m	*de*	*deze/die*	*-e*	*die*	*hij*	*zijn*
c/f					*zij*	*haar*
n	*het*	*dit/dat*	*ø*[14]	*dat*	*het*	*zijn*

The additional masculine/feminine split on the pronouns is a violation of the Principle of Independence, since it depends on the target type what gender values are available. Also, the choice of the pronouns requires external motivation. Again, and rather counterintuitively, Transparency is not affected, as each form viewed in isolation corresponds to a single value (an exception is the syncretism of the masculine and the neuter in the possessives which is not our concern here). From the point of view of Economy, the paradigmatic mismatch involves supernumerary distinctions, hence higher complexity.[15] Note, however, that other languages might show the reverse pattern – individual targets with fewer distinctions – resulting in lower complexity from the point of view of Economy.

The principles of canonicity not only reflect expectations about the gender value of the target, but also about its morphology. In a canonical system, "gender is realised through agreement by canonical inflectional morphology, which is affixal" (Corbett & Fedden 2016 : 509). Interestingly, the difference does not touch complexity as we have defined it here. Neither in terms of Economy, nor in terms of Transparency or Independence do we see a compelling reason to say that a bound marker is less or more complex than a free marker (this has been pointed out by Leufkens 2014). Hence, such differences do not affect our complexity evaluation.

analytical difficulties, as gender affiliation is a function of target behaviour, but the targets do not behave uniformly.

[14] The common gender adjective has the suffix *-e* and the neuter adjective is a bare stem. This formal distinction is restricted to indefinite contexts.

[15] One may argue that the reduced paradigm of the attributive targets results in lower complexity from the point of Economy. However, there is little reason to assume that Dutch nouns still distinguish three genders – speakers are no longer able to systematically distinguish masculine from feminine nouns – and the pronouns (including, surprisingly, the neuter) mostly reflect semantic rather than syntactic properties (Audring 2006 , 2009). Therefore, it makes sense to say that the pronouns show more gender distinctions than the nouns, a case of increased complexity.

More relevant for complexity is the final property considered here: the unique distinguishability of gender on the target. Here dedicated markers for gender contrast with portmanteau markers that also express other features (we have seen an example in (3)). The principle of Transparency decrees that a unique marker constitutes the least complex situation. This is in contrast with Economy, since dedicated markers make for more distinct forms. Transparency, in turn, agrees with canonicity in its preference for unique markers. Moreover, computing the form of a polyfunctional marker involves other features, which violates Independence.

Concluding this brief survey of target properties, we see that complexity agrees with canonicity for many properties (Table 5; again, a tick indicates alignment between maximal canonicity and minimal complexity, cross indicates canonicity but increased complexity, dash means that a principle is not relevant). Other properties leave complexity untouched. Disagreement is found in two cases: Redundancy and non-syncretic markers are more complex in terms of Economy. The alignment between matching values and Economy depends on the individual language situation. Note again that the 'inbuilt' dependency of the target on the controller is not counted as a violation of Independence.

3.4 Values

The values of a feature are inextricably linked to the items that carry them: the controller and the targets. Therefore, most value-related properties have already been touched on in §3.2 and §3.3, and this section can be brief.

3.4.1 Values: canonicity

Canonically, values have at least the two following properties. First, for any given controller and its targets, gender values do not vary. This is in line with Redundancy, Simple Syntax, Matching Values, and the Canonical Gender Principle, which say that target values should mirror controller values, and that controllers have gender as a lexical property. Invariance includes independence of other features and their values, as decreed by Clarity and Orthogonality. Second, gender values should form a closed class. This is due to Orthogonality: in a fully orthogonal system of lexical items and grammatical features, only the lexical items constitute an open class (Corbett & Fedden 2016 : 502–503). Again, we ask if the canonical situation is also the least complex.

Table 5: Canonicity and complexity of the target

The target…	Economy	Transparency	Independence
…has a gender value that is redundant rather than informative (Redundancy)	✗	✓	✓
…depends for its gender value on the gender value of the noun (Redundancy)	–	–	✓
…has gender values that match those of the controller and of other targets (Redundancy, Simple Syntax, Matching values, CGP)	–/✓/✗	–	✓
…has bound expression of agreement (Exponence)	–	–	–
…has a gender value that can be uniquely distinguished across other logically compatible features and their values (Clarity)	✗	✓	✓

3.4.2 Values: complexity

Gender values show variation when they are open to choice or change under the influence of other factors. We saw variable controller gender values in §3.2, example (6), and variable target gender values in §3.3, example (8). A more complex situation is found in Romanian, where gender values appear to vary between singular and plural, as the neuter gender agreements resemble the masculine in the singular and the feminine in the plural (see Corbett 1991 : 150–152 for an account in which the situation is interpreted not as a case of variation, but as a system with non-unique markers for the neuter gender).

In all cases we see a violation of the principle of Independence. Independence supports invariant gender values, as a minimally complex gender system is self-contained and does not require reference to other morphosyntactic features such as number, or to non-syntactic factors such as semantics or pragmatics. Therefore, any variation or choice makes the system more complex.

The second property can be interpreted as concerning the number of genders

values in a language. The higher this number (i.e. the closer to an open set), the greater the range of potential combinations of nouns and gender values, which makes it harder to establish orthogonality (Corbett & Fedden 2016 : 502–503).[16] In terms of complexity, fewer gender values also mean lower complexity, though for different reasons: Economy says that the simplest system has the fewest values.

Summarising, we see that the properties of the values affect complexity to a limited degree: the first affects Independence, the second Economy; the other principles are not touched (Table 6). For both properties, however, maximal canonicity coincides with minimal complexity.

Table 6: Canonicity and complexity of the values

The values…	Economy	Transparency	Independence
…do not vary for any given controller and its targets (Clarity, Redundancy, Simple Syntax, Orthogonality, Matching values, Canonical Gender Principle)	–	–	✓
…form a closed class (Orthogonality)	✓	–	–

3.5 Domains

Moving on to domains – the syntactic configurations in which agreement occurs – we can identify three criteria that contribute to higher canonicity and that can be evaluated for complexity.

3.5.1 Domains: canonicity

For domains we can state that the most canonical domain of agreement is the local domain (i.e. within the phrase containing the controller; Corbett 2006 : 21). This is due to Simple Syntax. Indeed, the greater the syntactic distance between controller and target, the more linguistic theories are inclined to exclude the relation from agreement (e.g. by speaking of "cross-reference" instead; for discussion

[16] In the earlier literature, the number of values was used as a criterion for distinguishing gender from classifier systems, with the expectation that gender values should form a "smallish" set (Dixon 1982 ; Aikhenvald 2000 : 6).

see Barlow 1991 and Barlow 1992 : 134–152, Corbett 1991 , Corbett 2001 and Corbett 2006 , and Siewierska 1999). Moreover, Clarity increases when there are multiple domains, as more domains provide better analytical evidence for the existence of an agreement system. Multiple domains are also favoured by Orthogonality, as orthogonality between words and features increases with more agreement targets and hence more domains.

Corbett & Fedden give a third criterion for canonical gender: "In a canonical gender system the gender of a noun is constant across all domains in which a given language shows agreement" (Corbett & Fedden 2016 : 517). As this ties in with the lexically specified, single gender value of the controller, the matching gender values of controller and target, and the invariance of all targets for any given controller, all of which were covered in the previous sections, we will not discuss this criterion further.

3.5.2 Domains: complexity

When we compare canonicity and complexity (Table 7), the question arises whether gender agreement within the noun phrase should also count as less complex. Interestingly, within the realm of descriptive complexity that does not consider potential issues of (processing) difficulty, none of the three complexity principles favours one option over the other. Local agreement is neither more economical, nor more transparent or less dependent that agreement elsewhere.

The second domain-related property concerns the number of domains. In a canonical world, agreement involves not one domain but several. However, neither Transparency not Independence penalise single domains, and with respect to Economy, each additional domain makes the system larger and therefore more complex. Here we see a clear case where canonicity and complexity disagree.

Table 7: Canonicity and complexity of domains

The domain…	**Economy**	**Transparency**	**Independence**
…is local (i.e. within the phrase containing the controller) (Simple Syntax)	–	–	–
…is one of multiple domains (Clarity, Orthogonality)	✗	–	–

3.6 Assignment

Gender assignment rules regulate which gender value is associated with any given noun. Canonicity has little to say about this issue.

3.6.1 Assignment: canonicity

Corbett & Fedden list a single assignment-related criterion for canonical gender, which feeds the Canonical Gender Principle: "In a canonical gender assignment system, the gender of a noun can be read unambiguously off its lexical entry" (2016: 520). The authors conclude that assignment based on semantics is the most canonical situation (see Audring 2017 : 65, footnote 22, for an argument against this position). Gender assignment based on formal properties is considered less canonical.

3.6.2 Assignment: complexity

Complexity also favours semantic assignment rules, but for different reasons. The argument goes by several steps. In §1.2 we introduced a distinction between general rules and parochial rules. While this distinction is primarily about scope, it also relates to the number of rules that are needed to account for the gender of every noun in the language: general rules cover a large portion of the noun vocabulary, so the system can operate with only a few of such rules, whereas parochial rules take care of a smaller subset of the nouns, requiring more rules overall.

Another factor that is relevant for complexity is the variety of rule types. Does a language employ only semantic rules or also formal rules, and if so, are these phonological, morphological, or both?

Complexity is minimal if rules are large in scope (necessitating only a small number of different rules) and of a single type. This is due to Economy: less rules and fewer rule types are quantitatively simpler. If we link this to the typological finding that semantic rules can occur without formal rules but not vice versa (Corbett 1991 : 64, though see Killian 2015 and Killian 2019 [this volume] on the Koman language Uduk, which arguably uses only formal rules), we end up with the situation that complexity favours semantic rules. This is the same outcome as for canonicity, but for different reasons. Table 8 summarises the overlap.

Table 8: Canonicity and complexity of domains

Assignment rules	Economy	Transparency	Independence
The gender of a noun can be read unambiguously off its lexical entry (CGP); assignment rules are entirely based on semantics	✓	–	–

3.7 Summary: canonicity vs. complexity

The comparison of properties of gender systems in terms of canonicity vs. complexity is summarised in Table 9. A number of observations can be made. First, there are various properties that are relevant to canonicity but not to complexity, or only to a single complexity principle; these are indicated by dashes. If dashes are discarded (i.e. if only ticks and crosses are considered), an interesting pattern emerges. Transparency and Independence always line up with canonicity (again, ticks indicate maximal canonicity and minimal complexity). Economy, by contrast, disagrees with canonicity in the majority of the cases. There are only three properties for which the most canonical option is also maximally simple: mismatching values involving reduced values, fewer gender values, and a purely semantic assignment system. For the latter two, however, we saw that canonicity and Economy arrived at the same preference by different arguments (see §3.4.2 and §3.6.2). Hence the alignment is even weaker than Table 9 suggests.

Hence, what we see is that canonical gender systems can be complex, which means that there are areas where complexity is expected of – perhaps even inherent to – grammatical gender. The principles most at odds are Clarity and Redundancy on the side of canonicity and Economy on the side of complexity.

Having completed the comparison of canonicity and complexity, we move on to the third issue under consideration: difficulty. §4.1 introduces difficulty and motivates the evidence selected for this paper. §4.2 identifies and discusses factors that influence difficulty in first language acquisition. §4.3 ties together the results and links them to the previous issues, canonicity and complexity.

Table 9: Canonicity vs. complexity, summary

	Property	Economy	Transparency	Independence
Controller...	...is present (Clarity, Redundancy)	✗	✓	✓
	...has overt expression of gender (Clarity, Redundancy)	✗	✓	–/✓
	...is consistent in the agreements it takes (Simple Syntax, CGP)	–	✓	✓
Target...	...has a gender value that is redundant rather than informative (Redundancy)	✗	✓	✓
	...depends for its gender value on the gender value of the noun (Redundancy)	–	–	✓
	...has gender values that match those of the controller and of other targets (Redundancy, Simple Syntax, Matching values, CGP)	–/✓/✗	–	✓
	...has bound expression of agreement (Exponence)	–	–	–
	...has a gender value that can be uniquely distinguished across other logically compatible features and their values (Clarity)	✗	✓	✓
	...does not vary for any given controller and its targets (Clarity, Redundancy, Simple Syntax, Orthogonality, Matching Values, Canonical Gender Principle)	–	–	✓
Values...	...do not vary for any given controller and its targets (Clarity, Redundancy, Simple syntax, Orthogonality, Matching Values, Canonical Gender Principle)	–	–	✓
	...form a closed class (Orthogonality)	✓	–	–
Domain...	...is local (i.e. within the phrase containing the controller) (Simple Syntax)	–	–	–
	...is one of multiple domains (Clarity, Orthogonality)	✗	–	–
Assignment	The gender of a noun can be read unambiguously off its lexical entry (CGP); assignment rules are entirely based on semantics	✓	–	–

4 Difficulty

4.1 Introduction: difficulty

In contrast to descriptive complexity, which is an absolute evaluative measure, difficulty is inherently relative: a particular structure is difficult for somebody in the context of some particular task. The experiencer can be a speaker, a hearer, or a learner, and the task can be, for instance, language processing or acquisition. The following section discusses difficulty in the context of first language acquisition. Adult second language acquisition is excluded because it increases the empirical space by many additional variables, chiefly the first language (does it have a gender system? are the systems of L1 and L2 similar?), the learner (age, motivation) and the learning context (amount of exposure, explicit instruction or not). This makes it much harder to isolate the specific factors that accelerate or delay acquisition of gender (though see Kusters 2003 for an account of relative complexity, i.e. difficulty, based on second language acquisition).

There is a wealth of literature available on first language acquisition of gender in a variety of languages. Unfortunately, the languages addressed are mostly Indo-European, with the notable exception of Gagliardi & Lidz (2014) on Tsez, and a number of studies on Bantu languages (Niger-Congo); see Demuth (2003) for an overview.

Comparison is impeded by the diversity of the studies. Differences range from who is tested (single children, groups of children), when they are tested (the ideal period lies between 2 and 8 years, but most studies cover smaller time spans), how the data is collected (in diary studies, in the lab, naturally or experimentally) to what is tested (mostly production, sometimes comprehension) and on what items (often existing nouns, sometimes nonce nouns). Methodological choices have important theoretical consequences. Comprehension can reveal abilities that are not yet apparent in production (see e.g. van Heugten & Johnson 2010), and performance on different types of item might reflect different types of learning. For example, correct use of gender with existing nouns can reflect item-based learning, while the ability to classify nonce words may indicate the successful discovery of assignment rules.

Also, there are differences in what is considered the point of successful acquisition. Correctness levels may vary between nouns and between genders, but also between agreement targets, whereby early success with targets close to the noun may reflect knowledge associated with individual lexemes or even combinations acquired as holophrases, amalgams, or chunks (MacWhinney 1978 : 59–60). Many studies adopt Brown's (Brown 1973) method of using 90% correctness as

threshold: an error rate of less than 10% means that gender has been successfully acquired.

Such difficulties notwithstanding, the various studies present some indications of the properties of a language that aid or hinder the acquisition of its gender system. These will be discussed next.

4.2 Evidence from first language acquisition

We assume that ease of acquisition is reflected in speed of acquisition: simple systems are acquired faster and/or earlier.[17] Gender systems appear to be in place around the age of three in most languages reported in the literature. For the purposes of this section, the most relevant studies are those that compare acquisition in two or more languages and report faster or slower success for individual languages (e.g. Mills 1986 ; Eichler et al. 2013) or that point out significant delays (e.g. Mulford 1985 ; Blom et al. 2008).

A review of the relevant literature yields a consensus on four general factors that influence the acquisition of gender. These can be subsumed under the terms

- Frequency
- Perspicuity
- Consistency
- Monofunctionality

Note that these factors are the result of observations rather than theoretical stipulations such as the principles used in canonicity and complexity profiling (§2 and §3). Let us consider each in turn.

4.2.1 Frequency

Frequency reflects the number of times a child is exposed to a particular item or structure. Unsurprisingly, a positive effect of higher frequency is reported in a variety of studies. Particularly for the initial stages, acquisition is described

[17] It might be desirable to distinguish fast from early acquisition, since delays can be due to maturational constraints or because one property relies on the mastery of another (and once the first property is mastered, the second is acquired fast; thanks to Bernhard Wälchli for pointing this out). However, the evidence provided by the literature – especially with regard to first language acquisition – is usually on absolute time (early/late) rather than relative time (fast/slow), so the distinction has to be disregarded here.

as proceeding in a piecemeal, item-based manner. Correct use of gender morphology may initially be tied to specific lexical items or individual agreement markers which are mastered early because they often (co-)occur in the input (e.g. Mariscal 2009 ; Szagun et al. 2007 ; Mills 1986 : 115). Conversely, patterns may be delayed because they are represented with insufficient frequency. Rodina (2014), for example, reports that Russian children have difficulties with female person names ending in *-ik* or *-ok* and with nouns such as *doktor* 'doctor' when referring to a woman. These nouns contradict morphophonological rules (their form suggests masculine gender) in favour of semantics: adult speakers strongly prefer feminine agreement in accordance with natural gender. While children master the formal rules early, the semantically motivated exceptions are discovered late because such nouns are infrequent in the input.

Frequency can affect entire gender values. A well-known case is the neuter gender in Dutch, which is acquired with an astonishing delay: children still show around 25% errors at age 7 (Blom et al. 2008 , see also Keij et al. 2012 and references there). This is due to the much lower frequency of neuter nouns in the language, plus a condition on the neuter form of adjectives that restricts its presence in the input (see footnote 14).

Generalising to gender systems as a whole, we see that frequent marking in general paves the way to early acquisition. Szagun et al. (2007) remark that nouns co-occur with articles in most contexts in German, which ensures early success in acquisition since articles are important gender cues. Eichler et al. (2013) suggest the same correlation for French. Noun class markers in Bantu appear on a broad range of agreement targets in a variety of domains and are therefore highly frequent. Acquisition studies report that they are in place by age 2;6-3 (Demuth 2003), despite the large number of classes and their low degree of semantic motivatedness. By contrast, mastery of the apparently much simpler English gender system is comparatively slow; gender errors with person names are found beyond age 4 and errors with non-persons beyond age 6 (Mills 1986 : 91, 103). The main reason is that there are few cues in the input, since agreement is restricted to pronouns.

Taken together, the evidence suggests that the difficulty of acquiring a gender system is influenced by the frequency with which the child hears the nouns in company of agreeing words. The more agreement targets there are in the language, and the higher their frequency in use, the earlier the system is detected and mastered.

4.2.2 Perspicuity

If the morphological markers are the central cues to acquisition, such cues are expected to work best when they are perspicuous and clear. Formal perspicuity can be a function of phonological weight (including stress) and relative distinctness, but also of the degree to which a gender value is expressed by a typical form. Arias-Trejo & Alva (2013), for example, report that Spanish children are able to use gender agreement as a predictor of form-meaning correspondences in novel nouns from an early age onwards; the authors attribute this to the clear presence of the suffixes *-a* (feminine) and *-o* (masculine) in the input.[18] Similarly, the feminine definite article in Italian is acquired before the masculine because it has fewer allomorphs (Pizzuto & Caselli 1992 : 514). For the complex morphological paradigms of Bantu, early and error-free acquisition is reported and explained by the perspicuity of the noun class prefixes (Demuth 2003 : 213).

Conversely, perspicuity is impeded by syncretism, especially when reaching across orthogonal features. The German definite article *der*, for example, is syncretic for nominative masculine and genitive feminine. Eichler et al. (2013) mention this factor as an explanation for the slower acquisition of German gender as opposed to French gender, the two systems being otherwise similar in complexity. A similar point is raised for Icelandic (Mulford 1985 ; Levy 1988) where noun-final *-a* and *-i* can be cues for feminine respectively masculine gender, but both endings occur in various places within the complex inflectional class system, which makes it harder for the child to discover the correlation. Here, clarity overlaps with functionality, a point discussed in §4.2.4 below.

There is interesting, though cursory, evidence that affixes might be more easily detectable than non-affixal phonological gender cues, being more perspicuous as a unit. Studies report that, in particular, diminutive affixes facilitate gender acquisition (e.g. Kempe et al. 2003 for Russian and Cornips & Hulk 2008 for Dutch).

Overall, there is a consensus in the literature that children use formal cues earlier or to better effect than semantic cues. This has been reported for Tsez (Gagliardi & Lidz 2014), French (Karmiloff-Smith 1979), Spanish (Pérez Pereira 1991), German (MacWhinney 1978 ; Mills 1986), and Russian (Rodina 2014 ; Rodina & Westergaard 2012). The only dissenting study is Mulford (1985), who finds that Icelandic children master semantic cues earlier (though see Pérez Pereira 1991 for methodological criticism). However, Icelandic may be a language in

[18] Such explanations are interpretations, and the same facts are sometimes presented as evidence for opposing views. Thus, Mariscal (2009) analyses the difference between Spanish *-a* and *-o* as "subtle" and lists it among the properties that hinder rather than help acquisition (148, 149).

which neither the semantic nor the formal cues are particularly clear, as Levy (1988) hypothesises.

Perspicuity is not necessarily tied to form. Semantic cues to gender can also vary in semantic perspicuity, i.e. salience. Importantly, what is evident or salient for the adult speaker may not be so for the gender-acquiring child. Studies show that even natural gender, which seems an obvious and straightforward semantic parameter, is not apparent in the use of gender morphology by young children (Szagun et al. 2007 for German; Rodina 2014 for Russian; Mills 1986 for English). A similar argument is brought forward by Plaster & Polinsky (2010) to refute the complex semantics suggested by Dixon (1972) and Lakoff (1987) for the gender system of Dyirbal – the proposed system would be unlearnable, since the semantic parameters would not yet be available to the child.

4.2.3 Consistency

The clearest cues to gender are also the most consistent: an ideal cue has a unique form that consistently represents a particular gender value. This holds for morphological markers as well as entire nouns. Consistency is broken by variation. For example, the female names ending in *-ik* or *-ok* discussed by Rodina (2014) contain an inconsistent cue: the suffixes normally indicate masculine gender. Yet, such nouns are mastered earlier than the *doktor*-type nouns included in the same study. It might be argued that the former represent a lower degree of inconsistency, as each individual suffixed noun is either masculine or feminine, whereas the latter show variation for every individual noun.

The basic insight for the acquisition of assignment rules is that categorial rules are the easiest to acquire (Mills 1986 : 114). Stochastic rules involving inconsistent cues are harder to figure out and appear to be learned later. The relevant parameter is sometimes called *reliability* or *validity* (MacWhinney 1978), a prominent term in the Competition Model by MacWhinney et al. (1989). Highly valid cues have high predictive power by being consistenly associated with a certain gender value.

Summing up the three factors discussed so far, gender cues work best when they are "sufficiently frequent, adequately valid and easily perceivable" (Wegener 1995 : 68 for German, translation mine). Similar statements are made for Spanish (Mariscal 2009 ; Pérez Pereira 1991) and Italian (Pizzuto & Caselli 1992 : 545). For the purposes of the present study a fourth factor, monofunctionality, is worth singling out, though it is not entirely independent of the previous three.

4.2.4 Monofunctionality

Gender markers are dedicated or monofunctional when they express gender and nothing else. However, many languages have gender markers that are polyfunctional and encode two or more properties. Shared functions are usually other features such as number or case, inflectional class, or definiteness. Any kind of polyfunctionality affects both clarity and consistency.

The clearest evidence that gender acquisition is delayed by the parallel acquisition of case is adduced for German. Eichler et al. (2013) observe that German gender is acquired later than French, Italian, or Spanish gender and attribute this to the influence of case. Bewer (2004) reports an early peak in gender correctness followed by a relapse when case starts to emerge. Conversely, Pérez Pereira (1991) notes that Spanish gender agreement markers are more transparent because they do not vary with case.

In her famous study on Icelandic, Mulford (1985) finds that gender is acquired late, with a particular delay in the discovery of formal cues. An explanation is sought in the polyfunctionality of the markers in the highly complex Icelandic inflectional class system, which obscures the correlations between the nominal suffixes and gender.

The impact of polyfunctionality on acquisition is strongest in cases where the child can be suspected of erroneously associating gender markers with other functional properties. Bittner (2002) suggests that German children might initially regard the masculine definite article *der* as a marker of subjecthood or agentivity. Dutch children appear to start out assuming that the Dutch article *de* is a definiteness marker, delaying the discovery of gender (Keij et al. 2012 ; Cornips & Hulk 2008).

Generally speaking, the earlier acquisition of formal cues reported in §4.2.2 interestingly suggests that form-form correlations might be easier to acquire than form-function correlations, especially when various functions employ the same morphological markers.

Closing this section of literature review, two sporadic observations might be worth noting. Firstly, a variety of studies indicate early mastery of agreement in local domains, with more persistent errors in the use of distant targets such as pronouns. This suggests a correlation between difficulty and domains. Secondly, and partly contradicting the previous point, Pizzuto & Caselli (1992 : 545) report tendentially better results for bound morphology over free markers in Italian, with verbal inflection being acquired before pronouns and articles. However, there is little evidence for or against this pattern in the other literature consulted. Both points, however, are in line with what might be expected from the perspec-

tive of canonicity. This brings us to the final section, which ties together the three domains of evaluation.

4.3 Summary: canonicity, complexity, difficulty

Returning to the question we set out with, we can now ask how the factors relevant to difficulty line up with those pertaining to canonicity and complexity. Table 10 summarises the alignment of difficulty on the one hand with canonicity and the three types of complexity on the other. As in the previous tables, ticks indicate alignment (minimal difficulty, maximal canonicity, minimal complexity). Divergences (minimal difficulty, lower canonicity, higher complexity) are indicated by crosses. Dashes mean no alignment since a factor for difficulty is irrelevant to canonicity and/or complexity.

Table 10: Difficulty vs. canonicity and complexity, summary

Difficulty	Canonicity	Economy	Transparency	Independence
Frequency	–/ ✓	–/✗	–/✗	–
Perspicuity	✓	✓/✗	✓	✓
Consistency	✓	–	✓	✓
Monofunctionality	✓	✗	✓	✓

Starting with frequency, we saw that difficulty introduces parameters into the discussion that are of limited relevance to canonicity or complexity: the usage frequency of nouns and agreeing elements matters only to difficulty. Syntagmatic frequency as dependent on the number of targets, by contrast, is relevant to all three evaluative measures, but in contradictory ways: canonicity leads us to expect several targets in various domains (principle of Redundancy, principle of Orthogonality), which violates Economy and potentially Transparency and therefore results in a more complex system.[19] For difficulty, more targets mean greater perspicuity, hence facilitation of acquisition.

Perspicuity, in turn, lines up with Transparency, Economy, and Independence in that a perspicuous, i.e. alliterative, form without allomorphic variants makes

[19] As noted in §3.3.2, the decision for Transparency depends on the theoretical perspective. Are agreement markers seen as redundantly realising the feature of the noun? Then agreement is always a violation of Transparency. Or do the agreement targets in fact express their own contextual feature (although the value is dependent on the noun)? In this case agreement is not necessarily non-transparent.

for the best gender cue in acquisition, as well as the most transparent and the most economical agreement marker needing the least additional specifications. Such markers are also the most canonical. Similarly, perspicuity is greater in the absence of syncretism, as is Transparency. Economy, on the other hand, might be said to favour syncretism. It might also favour markers that are unstressed or phonologically light, in disagreement with perspicuity.

Not shown in Table 10 is difficulty diverging from both canonicity and complexity in the preference for formal cues over semantic cues in the early stages of gender acquisition. This is surprising, as semantic motivations for gender are more canonical and potentially less complex.

The third factor relevant for difficulty, consistency, is clearly in line with canonicity: canonical agreement controllers, targets, and values are expected to show predictive, consistent behaviour. This is also the least complex situation according to Transparency and Independence. The Canonical Gender Principle, according to which each noun should have a single gender value, also describes the situation of least difficulty, as variation slows down acquisition.

Moving on to the fourth difficulty factor, monofunctional markers are the easiest to learn as well as the most transparent and the most independent. They are also the most canonical, as monofunctionality ensures the unique distinguishability of gender across other features. Again, this contradicts Economy, which might be said to favour cumulative markers or reduced paradigms.

A less expected outcome from the point of view of functionality is, again, that form-form relations might initially be easier to detect in the input than form-function relations, with functions being figured out at a later stage.

Finally, however, attention should be drawn to a pattern that might be expected but is not found: there is no evidence for slower acquisition of systems with higher numbers of gender values. Studies on Bantu noun class acquisition (summarised in Demuth 2003) report that agreement within the NP (demonstratives and possessives) is in place around age 2;4–2;6, then follow class prefixes on the noun (2;6–2;8 in Siswati and Sesotho, even earlier in Zulu), then verb agreement. The entire noun class system is mastered by age 3. This matches the age of successful gender acquisition mentioned for Italian and Spanish (see the summary in Eichler et al. 2013 : 556), despite the fact that these languages have two gender values while the cited Bantu languages have around seven.[20] By contrast, the acquisition of English and Dutch, which have two respectively three gender values, shows much slower progress. This indicates that the number of classes,

[20]The number is an approximation, as the Bantuist tradition counts singular and plural classes separately and includes locative classes, which leaves some room for analytical variation.

which seems such a central and obvious criterion for complexity (i.e. Economy), is in itself not at all relevant for difficulty. Here, canonicity, which ascribes no special status to the number of values, lines up better with difficulty than does complexity.

Summing up, we arrive at an interesting result. Of the three principles for complexity, Independence makes the most accurate predictions for difficulty: cross-cutting features, inter-feature syncretism, and one feature depending on another hinder acquisition, as does any compromise on consistency.

Violations of Transparency, in turn, make the system harder to acquire when there are fewer forms than functions. This holds both for the syntagmatic and the paradigmatic dimension, i.e. for syncretism as well as for cumulative exponence. However, syntagmatic transparency violations that involve overrepresented, i.e. redundantly repeated markers appears to be beneficial: redundancy increases the perspicuity of gender and thereby aids acquisition.

As in the comparison of canonicity and complexity (§3.7), Economy is the odd one out. Economy does not line up with canonicity, and violations of Economy often help rather than hinder learning. The burden of acquiring additional morphology and a greater range of agreement domains is eclipsed by the benefits in perspicuity and frequency. Even for the number of gender values no negative effect is found.

As a consequence, canonicity ends up a better predictor of difficulty than complexity. Economy, which is not a priority in canonicity, is also not a priority in difficulty. In fact, low economy with regard to syntagmatic exponence turns out to be an advantage.

5 Conclusions

In this chapter I have compared and contrasted three evaluative measures: canonicity, complexity, and difficulty. By profiling the typological space of grammatical gender in terms of canonicity and complexity, individual linguistic properties are identified as being more or less canonical, and/or more or less complex. The general result is one of agreement: maximal canonicity lines up well with low complexity and minimal difficulty. The notable exception is the principle of Economy, according to which maximal canonicity often means higher complexity.

The comparison is then extended to difficulty in first language acquisition. The result is similar: difficulty, canonicity, and complexity largely agree, with the exception of Economy. Violations of Economy can go hand in hand with maximal

canonicity and early acquisition. This means that structures may be complex but canonical and easy to learn. This is due to the central role of Clarity respectively perspicuity: systems that offer rich cues and stand out in the grammar provide the best evidence for the linguist and for the language-acquiring child.

The study demonstrates that assessing the complexity, canonicity, and difficulty of gender systems requires typological understanding as well as explicit principles for evaluation in order to arrive at a motivated and consistent judgment.

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Abbreviations

The following special abbreviations are used in this chapter:

BG	Background
C	Common gender
VBLZ	Verbalizing morpheme

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Chapter 3

Gender: esoteric or exoteric?

Östen Dahl
Stockholm University

Although grammatical gender would seem to be a paragon example of a mature phenomenon in the sense of Dahl (2004), it turns out to be hard to establish any correlation to ecological parameters that have been claimed to co-vary with other such phenomena, such as community size and degree of contact. Grammatical gender also does not seem to correlate with morphological complexity in general. Our understanding of these relationships is hindered by the areal and genetic skewings in the distribution of gender and the lack of diachronic data. To understand how the ecological factors influence the growth, maintenance, and demise of gender systems and eventually their synchronic distribution, we have to go beyond the patterns that can be found in typological data bases like *WALS*. In particular, we need to know more about the conditions under which gender systems arise and mature.

Keywords: grammatical gender, esoteric niche, exoteric niche, language ecology, morphological complexity, mature phenomenon, areal typology, community size, suboptimal transmission, semantic gender assignment, formal gender assignment.

1 Introduction: The esoteric-exoteric distinction and morphological complexity

In recent decades, many authors have suggested that there is a connection between grammatical complexity, in particular morphological complexity, and factors external to the language system, such as community size, the degree of contact with other language communities and the extent to which the language is learnt and used by non-native speakers (see e.g. the discussion in Trudgill 1983 and Dahl 2004). It appears obvious that a language with grammatical gender is ceteris paribus more complex than one without grammatical gender, but can we

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say anything about the relationship between grammatical gender and the "ecology" of the language, that is, the conditions under which it is used, learnt and transmitted to new users?

Over the last ten years, there have also been attempts to study the relationship between grammatical complexity and language ecology by quantitative methods. Thus, Sinnemäki (2009 : 138) finds in a cross-linguistic investigation that there is "a statistically relatively strong association between community size and complexity in core argument marking, measured as adherence to versus deviation from the principle of one-meaning—one form". In another study, Lupyan & Dale (2010) make a distinction between "languages spoken in the esoteric niche", i.e. languages with comparatively smaller populations, smaller areas, and fewer linguistic neighbours, and those spoken in the "exoteric niche", i.e. languages with larger population, larger area, and more linguistic neighbours. Basing themselves on data from the *World atlas of language structures* (*WALS*; Dryer & Haspelmath 2013), they list more than a dozen morphological features which they have found are more common in languages spoken in the esoteric niche:

- case markings
- ergative alignment
- grammatical categories marked on the verb
- person marking on adpositions
- noun/verb agreement
- inflectional evidentiality
- affixal negation
- morphological future tense
- remoteness distinctions in the past tense
- alienability/inalienability distinctions
- optative mood marking
- distance distinctions in demonstratives
- morphological marking of pronominal subjects

- separate associative plurals

An earlier work that also should be mentioned here is Perkins (1992), who found a negative correlation between language complexity as manifested in deictic grammatical distinctions and cultural complexity as measured by a variety of factors, including the size of communities.

2 Is grammatical gender correlated with esotericness?

In Dahl (2004), I introduced the notion of "maturity" as applied to grammatical phenomena. A grammatical pattern was said to be mature if it has a non-trivial prehistory in any language where it appears. I argued that in situations of "suboptimal transmission" of languages, mature patterns will be transmitted less easily and will tend to be reduced or eliminated. As one of "the most mature phenomena in language", I pointed to grammatical gender. The kind of gender systems we see in some of the major European languages arguably passed through a number of intermediate stages before becoming what they are today. Gender is also a category that depends on inflectional morphology and is conspicuously absent from languages that lack it, such as creoles and the isolating languages of South East Asia and West Africa. We would therefore expect gender to be among the features that have a negative correlation with language size and a positive correlation with general morphological complexity.

But it turns out to be surprisingly difficult to find any such correlation. Already Perkins (1992 : 157) points to gender in pronouns and verb affixes as lacking the clear negative correlation with cultural complexity that he finds with other grammatical features such as deictic distinctions in demonstratives. Similarly, gender is not among the features listed by Lupyan & Dale (2010) as being correlated with their esoteric/exoteric dimension. Gary Lupyan (personal communication) informs me that while no consistent relationship can be found between population and sex-based gender systems in the data from *WALS*, there is a weak positive correlation between non-sex-based gender and population, that is, the opposite to what could be expected from what has been said above.

I have made some calculations of my own on the data in the three *WALS* chapters on gender systems (Corbett 2013a ,b,c), using iterated samples of one language from each of 60 families or 100 genera, and computing the mean and median values for Pearson's r correlating those samples to the logarithm of the number of speakers of each language (using figures from the Ethnologue). This

essentially confirmed the findings of Lupyan and Dale, including the weak positive correlation for non-sex-based gender.[1]

It is questionable if any firm conclusion can be drawn from the last finding. Judging from the data in *WALS*, non-sex-based gender systems are relatively uncommon – Corbett (2013c) classifies 28 out of 112 gender systems (in a sample of 257 languages) as belonging to this type, and of these 18 are from one single family (Niger-Congo). The total number of families where languages with non-sex-based gender are found is seven, which in my view makes the number of independent cases too small to draw any conclusions.

Thus, we can conclude that it is not possible to show from the data at hand that the presence of gender – or specific types of gender – is correlated to ecological factors such as population. Rather, the evidence suggests the absence of any correlation in any direction (or possibly a very weak positive one).

3 Grammatical gender and morphological complexity

I said above that everything else being equal, a language with grammatical gender is more complex than one without grammatical gender. It does not follow, however, that gender is correlated with other kinds of complexity. In fact, Nichols (2019 [this volume]) argues on the basis of a sample of 146 languages that there is no significant difference between gender languages and genderless languages in (i) overall complexity; (ii) morphological complexity in general; (iii) degree of inflectional synthesis of the verb.

These findings can be seen as being in line with the lack of a correlation between gender and ecological factors in the sense that a connection between those factors and a large number of features involving morphological complexity has been demonstrated. On the other hand, the findings are puzzling since gender – following Corbett (1991 : 4) – is by definition realized as agreement, and agreement, or perhaps better indexation, would normally be manifested in inflectional morphology. Accordingly, gender is not found in languages traditionally classified as isolating, as noted above.

Trying to elaborate on Nichols' findings, I looked for a correlation between gender and any specific inflectional category in the *WALS* data, but did not find anything close to significance, not even with nominal categories such as case and number. Given that gender and number often go together in inflectional systems,

[1] In Dahl (2011), I reported a positive correlation (0.142) between number of genders and number of speakers in the *WALS* data. That calculation was done on the whole sample, however, and thus did not take account of possible areal and genetic biases.

the last finding is particularly puzzling. However, the situation is different if we look just at the languages that have both "semantic and formal gender assignment" and plural marking. For the 26 languages in this group for which there is also information on plural marking, 25 have a morphological plural and out of these, 23 languages mark plural obligatorily on all nouns. In other words, if a language has gender with formal assignment, it will also tend to have a highly grammaticalized nominal number system.

4 Areal and genetic skewings in the distribution of gender

What is easily seen in the *WALS* material is that there are strong skewings in the geographical distribution of gender. About two thirds of the languages with gender systems in Corbett's sample are from Africa and Eurasia; the percentage of gender languages among the languages from those continents is 59 compared to 30 in the languages from the rest of the world. Particularly striking is the distribution of languages with "semantic and formal gender assignment" (Corbett 2013c), where as many as 53 of 59 are found in Africa, Europe, and south-western and southern Asia. Furthermore, nearly all these languages belong to three large families – Afro-Asiatic, Indo-European, and Niger-Congo, which also happen to contain many languages with high speaker numbers, and the few remaining languages are either Nakh-Dagestanian or Khoisan.

In view of what was just said, it would be desirable to factor out possible areal influence from the calculations. This however meets with the problem that the ecological factors that we would like to correlate with the presence of gender are geographically skewed to the same degree, and, in fact, in a similar way. Thus, while 53 of the languages from Africa and Eurasia in Corbett's sample have more than a million speakers, there is just one such language (Guaraní) representing the rest of the world (Australia, the Pacific and the Americas). A more generous sampling would turn up a few more, but it would hardly change the general picture. Nevertheless, it is of some interest to see what happens if the languages from Africa and Eurasia are removed from the calculations of correlation. The results differ only marginally from the ones obtained from the total sample, however, and again it may be questioned if the sample isn't simply too small.

The general conclusion seems to be that it is hard to correlate gender to anything at all, at least as long as we restrict ourselves to the data in *WALS*. It would clearly be better to have a larger sample, but it is not obvious that it would help in the end, due to the heavy areal skewings we find both in gender systems and in the ecology of languages.

5 The diachronic perspective

Another problem is the limitation to synchronic data. One observation is that the clustering of gender languages in western Eurasia and adjacent areas of Africa actually grows stronger as we go back in time and the area occupied by the involved families shrinks. Levins (2002 : 252) argues that the Indo-European distinction between masculine and feminine probably arose under Semitic influence, and Matasović (2012) thinks that Indo-European may have influenced those Caucasian languages that have genders. In any case, we cannot unreservedly treat the gender systems in Indo-European, Semitic and Nakh-Daghestanian as independent developments.

In this context, it is important to remember that the probability that a given language exhibits a grammaticalized pattern will depend at least on two different parameters: the propensity for the pattern to arise and the propensity for it to be eliminated in one way or another. It has been claimed (e.g in Dahl 2004 : 199) that gender systems are very stable. What we can see in Corbett's sample is that the families in the western Old World where gender systems with formal assignment show up are very homogeneous as to the presence of gender. Looking at the languages of western Europe, one gets the impression that gender is among the last categories to go when a language undergoes general morphological simplification; thus, many Romance and Germanic languages have lost their case systems but kept gender, although in a somewhat reduced form. It is somewhat hard to generalize here however – Armenian is an example of a language which has lost gender but preserved its case system (see e.g. Kulikov 2006). It can also be difficult to decide if a category has really disappeared – there may be remnants such as the s-genitive in the Germanic languages, or there may be a renewal of a system, as in the Indic languages, where new case systems have appeared. There is no doubt, however, that a gender system may take a long time to develop but that once it has arisen, it can continue to exist for a very long time. This is bound to weaken the synchronic connection between the presence of gender and ecological factors such as population size, as a gender system may be preserved even if the external situation of the language changes. Moreover, although it is well known that gender systems tend to break down in situations of suboptimal transmission, as in creolization, we know less about the ecological conditions that favour the rise of gender systems.

6 Developing the typology of gender systems

It is thus likely that we have to go beyond synchronic typology to arrive at a fuller understanding of the relationship between gender systems and ecological factors. Detailed comparisons of developments within one and the same family (along the lines of Di Garbo & Miestamo 2019 [this volume]) may shed light on the problem. But we may also need a more elaborate typology of gender systems, for instance by taking into account in a more systematic way the domains where they operate, and also sharpen the definitions of the features currently used to classify gender systems. Thus, we saw above that the gender systems that are labeled as having "semantic and formal gender assignment" both had a specific geographical distribution and a high correlation with highly grammaticalized grammatical number. On the other hand, the classification behind this label is not fully understood. Corbett (1991 : 62) notes that in languages with formal assignment of gender, the gender of a noun is often "evident from its form", and calls this "overt gender", as opposed to "covert gender". He says that in an ideal overt system would have "a marker for gender on every noun" and mentions Swahili as an example of a system that approaches this ideal. But this raises the question of what is basic – the marker or the gender. In fact, the borderline between marking gender and being the source of it is quite thin. For Bantu languages to have overt gender it is necessary to consider the prefixes as being parts of nouns. But consider now Khasi (Austro-Asiatic), which is treated as having semantic gender assignment in Corbett (2013c). In Khasi, nouns are obligatorily preceded by a "pronominal marker". There are four such markers: *u* masculine, *ka* feminine, *i* diminutive and *ki* plural. The same elements show up as obligatory 3rd person subject markers. Nagaraja (1985 : 7) says that "[a] noun without a pronominal marker is not possible" but still treats combinations of pronominal markers and nouns as two-word phrases, in order to "facilitate the dealing with the structure of the nouns as such". If this choice had not been made, Khasi would look as having a mini-version of a Bantu noun class system, with "overt gender". We meet a rather similar problem in trying to draw a distinction between gender marking and inflectional classes, as argued in Dahl (2000), exemplified by Scandinavian definite articles, which are manifested both as independent words and as suffixes on nouns, but which vary according to gender in a uniform way wherever they occur (see Dahl 2000 for a discussion).

If we question the role of morphemes such as Bantu noun prefixes as the source of gender assignment, we may also have to reconsider the view that gender assignment is generally rule-governed. Both Killian (2019 [this volume]) and

Svärd (2019 [this volume]) argue for the significance of "opaque" or "arbitrary" gender, a possibility that has been downplayed in recent decades. It may be noted that the rise of opaque gender assignment can be seen as an indication of the maturity of a gender system, since it is likely to appear at a relatively late stage of development.

7 Conclusion

Although grammatical gender would seem to be a paragon example of a mature phenomenon in the sense of Dahl (2004), we have seen that it is very hard to establish any correlation to parameters that have been claimed to co-vary with other such phenomena. To understand how the ecological factors influence the growth, maintenance, and demise of gender systems and eventually their synchronic distribution, we have to go beyond the patterns that can be found in typological data bases like *WALS*. In particular, we would need to know more about the conditions under which gender systems arise and mature.

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Chapter 4

Why is gender so complex? Some typological considerations

Johanna Nichols
University of California, Berkeley

A cross-linguistic survey shows that languages with gender can have very high levels of morphological complexity, especially where gender is coexponential with case as in many Indo-European languages. If languages with gender are complex overall, apart from the gender, then gender can be regarded as an epiphenomenon of overall language complexity that tends to arise only as an incidental complication in already complex morphological systems. I test and falsify that hypothesis; apart from the gender paradigms themselves, gender languages are no more complex than others. The same is shown for the other main classificatory categories of nouns, numeral classifiers and possessive classes. Person, the other important indexation category, proves to be less complex, and I propose that the reason for this is that person, but not gender, is referential, allowing hierarchical patterning to emerge as a decomplexifying mechanism.

Keywords: gender, case, numeral classifiers, possessive classes, person hierarchy, referential, inflection, canonical complexity, simplification, diachronic stability

1 Introduction

There can be little doubt that gender systems are complex, and in various ways: compare the large number of gender classes in Bantu languages, the intricate and opaque fusion with case, number, and declension class in conservative Indo-European languages, the extensive allomorphy of Tsakhur gender agreement (Nakh-Daghestanian; examples below), or the semantically unpredictable genders of Spanish or French nouns. Even for Avar (Nakh-Daghestanian), which has a three-gender system with almost no allomorphy of gender markers and

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complete semantic predictability, there is a random division of verbs into those that take gender agreement and those that do not. The open question about the complexity of gender systems is why? Here I propose an answer based on two factors: one is the inexorable growth of complexity as a maturation phenomenon that can continue indefinitely unless braked by some simplification process (Dahl 2004 ; Trudgill 2011), and the other is a self-correcting measure that is available to some agreement categories but not to gender, for reasons probably having to do with referentiality.

Two different ways of measuring and comparing complexity will be used here. The first is what I will call *inventory complexity*, which goes by various names (e.g. Dahl 2004 : *resources*, Miestamo 2008 : *taxonomic complexity*, Di Garbo & Miestamo 2019 [this volume]: *the principle of fewer distinctions*): the number of elements in the inventory or values in a system, for some domain such as the number of phonemes, tones, genders, classifiers, derivation types, basic alignments, or basic word orders, or the degree of verb inflectional synthesis. Inventory complexity figures in Dahl (2004), Shosted (2006), Nichols (2009), Donohue & Nichols (2011), and many other works. It is not a very accurate or satisfactory measure of complexity, not least because it does not measure non-transparency, which is the kind of complexity that has been shown to be shaped by sociolinguistics (Trudgill 2011); but it is straightforward to calculate (though data gathering can be laborious), and appears to correlate reasonably well with other, better measures of complexity. Below I use inventory complexity to compare complexity levels of different languages for the practical reason that there is an existing database of inventory complexity (that of Nichols 2009 , subsequently expanded) which counts items across several phonological, morphological, and syntactic subsystems across 200 languages.

The other measure used here is *descriptive complexity* or *Kolmogorov complexity*: the amount of information required to describe a system. This is a better measure and captures well the non-transparency relevant to learnability and prone to be shaped by sociolinguistics, but it is very difficult to measure and compare. Here I follow Nichols (2016) in using canonicality theory (Corbett 2007 ; 2013 ; 2015; and others) as an approximate measure of descriptive complexity (though not an exact equivalent; some differences are noted below); see Audring (2017) for a similar approach. Canonicality theory is not primarily a complexity measure but a theoretical undertaking that aims at improving definitions and technical understanding of linguistic notions. It defines a logical space (for a linguistic concept or structure or system) by determining the central, or ideal, position in that space and attested kinds of departures from that ideal, and measuring

non-canonicality as the extent of departure (or number of departures) from the ideal. A central notion in defining the ideal position is the structuralist notion of biuniqueness, or one form, one function; any departure from that ideal is non-canonical. The literature on canonicality offers a good deal of work on morphological paradigms, which makes it a straightforward matter to count the number of non-canonicalities in a paradigm. I use canonicality theory partly because of the availability of this previous work and partly because it is well grounded in morphological theory (and taken seriously by theoreticians) yet applicable on its own without requiring adoption of an entire comprehensive formal framework. I survey this kind of complexity with a different database that samples morphological subsystems as sparingly as possible in order to keep the survey manageable (underway; 80 languages so far).

In what follows I illustrate descriptive complexity with some inflectional paradigms and show how much information grammars need to present (and do present) to adequately describe some of those paradigms (§2); this shows that the presence of gender in a paradigm can make it extremely complex by the inventory metric. But is it the gender morphology itself that is complex? Or is gender rather an epiphenomenon of overall language complexity, a category that tends to arise only as an incidental complication in already complex morphological systems? §3 and §4 raise and falsify the hypothesis that gender – and classification more generally – is embedded primarily in already complex languages, showing that it is gender itself that is complex. §5 compares the complexity levels of person, the other important indexation category. It appears that descriptive complexity easily becomes great in the indexation categories, and that person has recourse to self-correcting, self-simplifying mechanisms that gender lacks. More precisely, person has means of self-correction and self-simplification other than sheer reduction of inventory size or overall loss of the category – apparently unlike gender. This partly accounts for the great diachronic stability of gender systems (Matasović 2014) and in particular the remarkable stability of complexity in gender systems. The reason for the different behavior of gender and person appears to be that person, but not gender, is referential. The concluding section considers some ramifications of this claim.

2 Complexity in gender: Examples and measurement

Gender systems can be complex in themselves and also in the way that they interact with other inflectional categories. This section compares some more and less complex gender systems and proposes a way to quantify their complexity.

Examples come from the database of non-canonicality, which samples small but easily comparable inflectional subsystems from a few basic parts of grammar in order to get some view of complexity across the inflectional system: marking of A, S, O, G, T, and possessor roles on nouns; the same forms of inflectional pronouns; singular A and O marking in the most basic past and nonpast synthetic forms of verbs; inflectional classes of affixes for nouns, pronouns, and verbs; and inflectional classes of stems for all three.

The paradigms in (1)–(2) show the inflection of nouns in four grammatical cases in the singular of Mongolian (which has no gender) and Russian (which has three genders).

(1) Mongolian (Khalkha; Svantesson 2003 : 163, Janhunen 2012 : 297–298, 106–112, 66–68; Janhunen's transcription). Extension underlined.

	'book'	'year'
Nominative	*nom*	*or*
Genitive	*nom-ÿn*	*or-n-ÿ*
Accusative	*nom-ÿg*	*or-ÿg*
Dative	*nom-d*	*oro-n-d*

(2) Russian (M = masculine, F = feminine, N = neuter). Extension underlined.

	'brother' M.anim.	'house' M.inan.	'book' F	'window' N	'net' Fourth	'time' Fourth, Extended
Nom.	*brat*	*dom*	*knig-a*	*okn-o*	*set'*	*vremja*
Gen.	*brat-a*	*dom-a*	*knig-i*	*okn-a*	*set-i*	*vrem-en-i*
Acc.	*brat-a*	*dom*	*knig-u*	*okn-o*	*set'*	*vremja*
Dat.	*brat-u*	*dom-u*	*knig-e*	*okn-u*	*set-i*	*vrem-en-i*

Mongolian has only one declension class in terms of suffixes. There are some differences in suffixes (not shown), all predictable from the phonology of the stem (its final consonant and vowel harmony class). There are two stem classes: simple nouns as in 'book', and one with an *-n-* extension in certain cases, as in 'year'. In Russian matters are more complex. There are four declension classes of suffixes: those of 'brother' and 'house', 'book', 'window', and 'net' and 'time' in (2), plus a class of indeclinables not shown.[1] There is a minor class of stems with extensions, illustrated here with the *-en-* extension of 'time'. The animate and

[1]For this breakdown of the Russian declension classes see Corbett (1982). The traditional terminology deals only with declension classes of endings and not with stem classes. The first three

inanimate masculine nouns differ in their accusative allomorphs; they are largely predictable from the animacy of the referent. Further subclasses not shown here are mostly phonological and predictable from the final consonant or stress position of the stem. (Plural forms and the other oblique cases, not part of this survey, would add further non-canonicalities.)

In canonicality theory, declension classes are non-canonical because they contribute nothing; the one-form-one-function ideal is violated because a declension class has form but no function. There are two kinds of inflectional classes: those involving stems and those involving the inflectional affixes (Bickel & Nichols 2007 : 184). Traditionally recognized inflectional classes may be based on stems, affixes, or both, but I factor these out here. A stem declension class has stem change or extension which is a form without meaning; a declension class of affixes is a set of forms but the set has no meaning. The canonical situation is to have no declension classes, so Mongolian is canonical as to affixes (and nearly so as to stems) but Russian is not. On the other hand, if there are declension classes, then they should all be different, since the point of declension classes is differentiation. Affix classes should have affixes all of which are different from the affixes of other classes; each stem class should have an extension, ablaut, stress shift, or whatever that is unique to it. Here Russian declension is non-canonical because there are a number of syncretisms between classes, e.g. the *-u* dative of masculine and neuter declensions or the *-i* genitive of feminine and fourth declensions. Furthermore, within declension classes case affixes should all be different from each other, with one affix per case. Here Russian declension is non-canonical because there are many syncretisms within paradigms, such as genitive and accusative for masculine animates or genitive and dative in 'net' and 'time' in (2). A different departure from the principle of a single affix per case is the allomorphy of the accusative ending in the masculine declension: *-a* for animates but zero for inanimates. This is a split of one category into two forms, sensitive to some additional category.[2] (For the general claims of canonicality theory in this

classes are now, at least in work in English, commonly called masculine, feminine, and neuter for the noun genders prototypically or exclusively associated with their members: masculines are only masculine, feminines mostly feminine, neuters only neuter. There is no standard synchronic term for the class of 'net' and 'time'; I call it the fourth declension. Traditionally, the masculine and neuter classes have been grouped together for historical reasons: both go back to the Indo-European o-stem declension. The traditional terms are first declension (masculine and neuter), second (feminine), and third ('net' and 'time').

[2]Whether there is a category of animacy that these case forms signal, mark, etc. or they are sensitive to animacy but do not carry it as a category meaning is a thorny issue that cannot be solved here. I will speak of sensitivity to a category (or indeed a property that is not necessarily an actual category of the language) without taking a stance on the larger issue.

paragraph see Corbett 2007 ; 2013 ; 2015.)

Thus, of the forms surveyed here, while Mongolian case inflection has one morphological non-canonicality in the system, Russian has 11: the intra-paradigm syncretisms of masculine animate genitive-accusative, inanimate nominative-accusative, neuter nominative-accusative, fourth declension nominative-accusative and genitive-dative; the *-en-* extension in 'time'; the allomorphy of suffixes between animate and inanimate masculines; and the inter-paradigm syncretisms of nominative zero suffix (masculine and fourth), genitive *-a* (masculine, neuter), genitive *-i* (feminine, fourth), and dative *-u* (masculine, neuter).[3] Both languages have further non-canonicalities in parts of their noun inflectional paradigms that are not surveyed here.

The common types of non-canonicalities in inflectional paradigms are listed in (3). All depart from the ideal of one form, one function.

(3) Non-canonicalities in inflectional paradigms, and their numbers of forms and functions. 2 (+) = two or more. 0*: perhaps defectivity involves not a zero function but an actual function that is blocked from realization.

	Forms	Functions
Syncretism	1	2 (+)
Zero affixes	0	1
Fused exponence (coexponence) of categories	1	2 (+)
Allomorphy, splits	2 (+)	1
Defectivity (gaps)	0	0*

Complexity measurements for the Mongolian and Russian systems shown above are given in (4) and (5). They pertain only to singular declension; in Mongolian the plural adds no more non-canonicalities, as in the separative morphology of the language plural and case are marked by different morphemes (and the case suffixes are largely the same as in the singular), while in Russian plurality and case are coexponential, with a single suffix signaling the two categories.

[3]Since the extensions of Mongolian appear in some but not all non-nominative cases, perhaps that distribution should also be counted as a non-canonicality, giving Mongolian a total of two. The non-predictability of the Mongolian extension is greater than for Russian: it appears in some but not all non-nominative cases, while the Russian one can be analyzed as appearing in all non-nominative cases (with that pattern then overlain by the nominative-accusative syncretism, which gives an unextended stem to the accusative as well). It is, incidentally, coincidence that the extension has the same consonant in the two languages and appears in the same cases of the partial paradigms shown in (1) and (2).

(4) Inventory complexity for Mongolian and Russian singular core grammatical cases

	Declensions	*Genders*
Mongolian	1	0
Russian	5	3, plus animacy

(5) Descriptive complexity for Mongolian and Russian singular core grammatical cases. The phonological information is the description in the phonology of automatic alternations.

Mongolian noun paradigms	*Russian noun paradigms*
Display 1 paradigm, plus 1 extended	Display 5 paradigms, plus extended (2 extension allomorphs)
Access phonological information	Access phonological information
	Comment on syncretisms, allomorphy, etc.

Thus a descriptively and theoretically adequate synchronic grammar of Mongolian needs to display only two paradigms, while for Russian five must be shown. Pedagogical grammars will usually display more, and, at least for Russian, automatic phonological and morphophonological alternations involving plain vs. palatalized stem-final consonants trigger orthographic changes and are usually also included in the paradigm display. I will not attempt to measure the amount of information presented in the commentaries, notes, etc. on declension paradigms in the two languages, but at first glance it appears to be no less extensive per declension class for Russian than for Mongolian. In any event the difference of one vs. five paradigms suffices to show that more information is required for describing noun declension in Russian than Mongolian.

Russian declension is more complex than Mongolian declension because late Proto-Slavic fused into single case suffixes what had been a sequence of separate stem-forming suffixes (essentially, extensions) plus what had been a more uniform set of case endings in late Proto-Indo-European. The IE extensions had some correlation with gender, and this has tended to increase over time in the attested daughter languages, spurred in no small part by the fact that gender agreement was signalled in adjectives by shifting back and forth between what were lexical or word-formation categories for nouns: *o*-stem suffixes were used for masculine

and neuter agreement, the *a*-stem suffixes for feminine. This means that the fusion of gender into the case-number paradigms, an accident of Proto-Slavic sound changes, received support in the gender agreement paradigms of adjectives. This seems to have stabilized the system despite the non-transparency introduced by adding gender to the mix.

Now consider what makes for complexity in a gender system with no fusion of categories or markers. (6) shows the gender class markers for Ingush, a Nakh-Daghestanian language of the central Caucasus. Every noun belongs to a gender (usually covert on the noun) marked by root-initial agreement on some verbs and adjectives. Nouns and pronouns referring to male humans belong to V gender, females to J gender; this is what I will call referent-based gender assignment,[4] where gender is predictable from (in this case) the sex of the referent. In the plural both take B agreement, except that first and second person pronouns take D in the plural.[5] Other nouns are arbitrarily assigned to one or another of B, J, and D gender. Altogether there are eight gender classes consisting of singular-plural pairs, and four gender markers. The gender markers have no allomorphy (other than the split of singular B gender into D and B plurals, for which allomorphy is one possible analysis) and no fusion with other segments or morphemes, and are thus formally transparent. Semantically, as in nearly all gender systems, gender is transparently predictable (referent-based) for nouns and pronouns referring to humans but arbitrary, i.e. opaque, for others.

(6) Ingush gender markers (Nichols 2011:144)

	Singular	Plural	Examples
1st, 2nd person pronouns	*v/j*	*d*	me, you, us
3rd person pronouns (human)	*v/j*	*b*	him, her, them
male human nouns	*v*	*b*	man, Ahmed
female human nouns	*j*	*b*	woman, Easet
some animals, inanimates	*b*	*d*	ox, head
some plants, inanimates	*b*	*b*	apple, family
inanimates, some animals	*j*	*j*	wolf, fence
inanimates, some animals	*d*	*d*	dog, house

Formal simplicity vs. complexity is illustrated by the verb paradigms for Ingush and Tsakhur (another Nakh-Daghestanian language: Daghestanian branch,

[4] This is the referential gender of Dahl (2000). I use referential in a different sense; see note 14 below.

[5] In recent linguistic work on Nakh languages the genders are named for the letter name of their marker.

Lezgian subbranch) in (7) and (8). In Ingush the system is quite transparent: there is no allomorphy and no allophony of gender markers; gender agreement is always root-initial (and the proclitics in (7) are readily identifiable from their prosody, some of their segmental phonology, and the fact that they are separable, occurring in word-final positions when the verb is in second position). In Tsakhur it is quite opaque. There is a good deal of allomorphy, and this produces different patterns of syncretism: genders 1 and 4 syncretize in 'hold' but 1 and 2 in 'hang'.[6] Gender is partly prefixal and partly infixal: infixal in formerly bipartite stems, where a former prefix has entrapped the root-initial gender marker, but the bipartite structure is ancient and not synchronically transparent. In both languages some but not all verbs take gender agreement: about 30% in Ingush and a very large majority in Tsakhur. Whether a verb takes agreement or not is then highly predictable for Tsakhur but much less predictable for Ingush; in this regard Ingush is less canonical.

(7) Gender agreement in two Ingush verbs. A dot segments off the gender marker. Verbs shown in the simple present tense. (D gender is the citation form.)

	d.ouz- 'know' (kennen)	*dwa=chy=d.uoda* 'go down'
V	*v.oudz*	*dwa=chy=v.uoda*
J	*j.oudz*	*dwa=chy=j.uoda*
B	*b.oudz*	*dwa=chy=b.uoda*
D	*d.oudz*	*dwa=chy=d.uoda*

(8) Gender agreement in two Tsakhur verbs. Aorist tense. (Dobrushina 1999 : 85 with some retranscription. *qq* = geminate, *y* = high back unrounded vowel, *X* = uvular.) Dot in citation form marks insertion point and boundary between the gender marker and the pieces of a bipartite stem. In actual inflected forms the gender marker has a dot on either side.

	a.q- 'hold'	*giwa.X-* 'hang'
1	*a.q.qy*	*giwa.r.Xyn*
2	*a.j.qy*	*giwa.r.Xyn*
3	*a.w.qu*	*giwa.p.Xyn*
4	*a.q.qy*	*giwa.t.Xyn*

In Tsakhur as in Ingush, the first two genders are used of humans and are referent-based, and the last two are arbitrarily assigned. In Avar (Nakh-Daghestanian; Daghestanian branch, Avar-Andic-Tsezic subbranch), gender is formally

[6] In recent linguistic work on Daghestanian languages the genders are arbitrarily numbered.

even simpler than in Ingush (in that for Avar there are no other verb prefixes and no proclitics, so gender markers are not just root-initial but word-initial) and entirely referent-based (there are three genders: masculine, feminine, and other, a.k.a. neuter). Also, unlike Ingush, the plural gender marker is entirely predictable from the singular one. The system is smaller than that of Ingush: three genders and four gender markers for Avar vs. eight genders and four markers for Ingush. The sole non-canonicality of Avar is that not all verbs and not all adjectives take gender agreement (about half of the verbs do, thus unpredictability is maximal).[7]

To summarize this section, non-canonicality can be a good guide to complexity and makes it possible to compare relative degrees of complexity using existing and straightforward criteria. Russian noun declension is considerably more complex than Mongolian; Tsakhur gender agreement is considerably more complex than that of Ingush or Avar; Ingush gender agreement is somewhat more complex than that of Avar. I have not attempted here a calculation of absolute complexity levels based on canonicality. (For a more detailed discussion of non-canonicality as complexity measure see Nichols 2016 ; forthcoming.)

3 Are gender languages more complex overall?

A possible explanation for the evolution of gender is that it arises easily, as some kind of excrescence or emergent category and probably due to reanalysis of existing markers, in a language that is already morphologically complex and already

[7] Avar is known for rampant multiple agreement in phrases and clauses: not only verbs and adjectives but also a number of adverbs, determiners, and other forms take agreement (Kibrik 1985 ; 2003). There are three possible analyses of multiple agreement in canonicality theory: (1) Gender is unnecessary, hence non-canonical in itself, so minimizing its use is canonical. (2) Multiple agreement is neutral, as long as all targets receive the same feature values (Corbett & Fedden 2016 : 513) and agreement is obligatory (Corbett 2006 : 14–15). (3) Given that gender exists, multiple agreement is canonical in that it demonstrates exhaustiveness of features across lexical classes (Corbett 2013 : 54) and functional in that it increases consistency and identifiability of gender across different constituents and different utterances. I have no stance on this, but the sociolinguistic history of Avar may be relevant, as Avar is a spreading and inter-ethnic contact language of the type expected to undergo simplification (Trudgill 2011). In contrast, Ingush has undergone a poorly understood spread but is not an inter-ethnic or contact language, and Tsakhur is a small highland language and sociolinguistically quite isolated in Trudgill's sense (in which sociolinguistic isolation means no history of absorbing adult L2 learners; Tsakhur, like other highland Daghestanian languages, has very few adult L2 learners but is not at all isolated from contact of other kinds). If the spreading and inter-ethnic language has extensive multiple agreement, it may well be functional in some way, though canonicality and functionality are different things and not expected to coincide.

has at least some agreement as a model for gender agreement. And indeed, gender is almost never the sole inflectional category, or even just the sole agreement category.[8] If gender presupposes complexity, the synchronic result should be that when gender is disregarded languages with gender should still have higher overall complexity than languages without gender. To determine that, this section tests three hypotheses about the overall complexity of languages with and without gender. For all three I use the inventory complexity database of Nichols (2009), expanded to 196 languages with reasonably diverse genealogical and geographical distribution. It should be cautioned, though, that the database is slanted toward inflectional morphology of indexation and head marking, with better representation of categories such as person and classification than e.g. case or other categories of non-heads.[9]

Hypothesis (i): Languages with gender are more complex overall than those without gender. For this count I used the entire set of complexity measures (phonological, morphological, syntactic, lexical), excluding gender; that is, measuring complexity other than in gender. The results are shown in (9): there is no significant difference in complexity between gender languages and genderless languages. What little correlation does show up is negative, contradicting the hypothesis.

(9) Overall complexity of languages with and without gender.

	Above	Below mean complexity	
Gender	28	38	
No gender	58	78	n.s. (p = 0.18; Fisher 1-tailed)

Hypothesis (ii): Gender languages are more complex morphologically than genderless languages. This test uses the same survey except that only the morphological measures of complexity are counted. There is a significant negative correlation; see (10). Hypothesis (ii) fails, as does the null hypothesis; the finding

[8] A possible exception is the western Nakh-Daghestanian languages, including Ingush and Avar discussed here, where there is no person agreement at all, but only gender agreement. (Arguably there is also number agreement, though that is usually treated as it is in Bantu languages, with number just a matter of gender pairing between singular and plural classes.)

[9] The reason for the imbalance is historical: the morphological measures are mostly drawn from the Autotyp database (Bickel et al. 2017), for which data on NP structure and noun inflection is a more recent addition and still incomplete. This is one reason why the database is best viewed as a convenience sample of categories than as a balanced sample of categories (much less an accurate measure of overall morphological complexity or even just overall complexity of inflectional morphology).

here is that gender languages are less complex morphologically than genderless languages.[10]

(10) Overall morphological complexity of languages with and without gender. Figures in bold are above the expected values.

	Above	Below mean complexity	
Gender	15	**43**	
No gender	**60**	76	(p = 0.01; Fisher 1-tailed)

Hypothesis (iii): Gender languages have higher inflectional synthesis of the verb than genderless languages. Verb inflectional synthesis was defined as Categories per word (including roles) following the Autotyp database (Bickel et al. 2017). Again the hypothesis is falsified.[11]

(11) Overall inflectional synthesis of the verb for languages with and without gender.

	Above	Below mean complexity	
Gender	22	36	
No gender	64	75	n.s. (p = 0.19, Fisher 1-tailed)

Thus, except for gender itself, on three criteria gender languages are no more complex than others and may even be less complex. The rise of gender must be due to something other than sheer complexity, and the synchrony of gender does not require or favor overall high complexity.

4 Complexity in classifier systems: numeral classifiers, possessive classification

Perhaps systems of classification in general are complex, so that complexity is not just a peculiarity of gender. This section considers the complexity of numeral classifier and possessive classifier systems.

[10] But recall again the bias toward features of heads in the database, above in the text and note 7; to evaluate the impact of (10) it is especially important to have a balanced survey of categories.

[11] What small correlation emerges is negative. Bickel & Nichols (2013a) exclude role marking from verb synthesis; on that measure, there is a significant negative correlation, falsifying both survey and null hypotheses and suggesting that it is non-complexity that favors gender. Again (see notes 7 and 8) the result shows that a balanced morphological survey is important.

Numeral classifiers are well known from many East Asian languages, e.g. Mandarin. The systems tend to be large (50 or more in common use for Mandarin, plus many more that can be extracted from occasional occurrence in the long and varied written tradition of Chinese); the inventory complexity is therefore high. The numeral classifiers generally have independent phonological wordhood status and minimal or no sandhi, fusion, etc. and are semantically transparent, though with some flexibility as to what nouns take what classifiers (the flexibility is itself semantically motivated); therefore the descriptive complexity is low.

Elsewhere around the Pacific Rim numeral classifiers tend to be less transparent. Nivkh (isolate; Sakhalin Island and the lower Amur, eastern Siberia) has some 30 numeral classes (Mattissen 2003 gives the highest number) (moderate-high inventory complexity), in which the classifier is fused to the numeral, the combination being semi-transparent, and (at least in the recent and present situation of speech-community contraction and reduced functionality) different classifiers have different distributions: some classifiers apply only to the numerals 1–5, some to 1–5 and 10, and some to all of 1–10 (this is fairly high descriptive complexity). Yurok (Algic, northern California; Robins 1958 : 86–91) has 15 classes (moderate inventory complexity), semantically motivated (human, plant, various shapes, etc.). The classifier is inextricably and opaquely fused with the numeral, yielding a de facto system of 15 classes of numerals (high descriptive complexity). ("Several informants were aware of this complexity and would say admiringly of another speaker that he or she 'knows the numbers' or 'can count in Indian' ": Robins 1958 : 87n.)[12] The languages with numeral classifiers range from morphologically non-complex (Mandarin and other Southeast Asian languages) to morphologically complex (Yurok), with the major hotbed of numeral classifier systems found in the morphologically relatively simple languages of Southeast Asia but other languages with numeral classifiers sprinkled all around the Pacific Rim, where languages have high complexity in general. A preliminary conclusion is that numeral classifier systems can be complex in themselves but numeral classifier languages as a set are not more complex than others.

Possessive classes (Nichols & Bickel 2013 ; Bickel & Nichols 2013b) involve covert classification of nouns which becomes overt only when the noun has possessive morphology. Many languages have a distinction of two classes of nouns, usually termed alienable and inalienable. The formal difference can be as sim-

[12]Mattissen (2003) compiled the fullest list of Nivkh numeral classifiers by cross-tabulating lower figures reported in other sources. Robins compiled his list in analogous fashion from different speakers ("The table…was compiled from several informants and represents a collation of material from all of them, each accepting, though not necessarily volunteering, all the forms tabulated" [87]).

ple as obligatory possession of inalienables vs. optional possession of alienables, and the semantic opposition can be quite straightforward (e.g. kin terms and/or body parts vs. other nouns). In such a language (the most frequent type), both inventory and descriptive complexity are low. A complex system is that of Anêm (isolate, New Britain; Thurston 1982), in which possessed nouns fall into at least 20 classes marked by some simple and some composite suffixes and involving a mix of partly semantic and entirely arbitrary classification (Thurston 1982 : 37–38), very high inventory complexity. There is a good deal of syncretism between classes, and class membership is semantically unpredictable, so descriptive complexity is also high. The most complex system I have observed is that of Cayuvava (isolate, Bolivia; Key 1967), in which possessive morphemes are circumfixes with much allomorphy of both pieces and partial interdependence between the pieces. Both prefixal and suffixal parts appear to reflect person, and the suffixal part is also purely classificatory. The choice of classifier is semantically unpredictable. The set of first person singular forms is shown in (12). The inventory complexity is high and the descriptive complexity might be described as stratospheric.

(12) First person singular possessive circumfixes in Cayuvava (Key 1967).

a-	…	*-i*
		-ro
		-Ø
		-ai
i-	…	*-i*
		-Ø
ub-	…	*-i*
ku-	…	*-i*
či- ~ ič-	…	*-i*
č-	…	*-ri*

Thus possessive classification, like numeral classification, can also be quite complex, and probably no less complex than gender. The overall complexity of languages with possessive classification ranges from low (as in Polynesian languages: see e.g. Wilson 1982 for Polynesian possessive classification) to high (e.g. Anêm, whose Polynesian-speaking neighbors consider it impossible to learn; Thurston 1982 : 51).

Results of the same kinds of tests, for morphological complexity against presence vs. absence of numeral classifiers, possessive classes, or either one are shown in (13)–(15). Again none of the results are significant: languages with classification of either type are not more complex than those without. There is, however,

an interesting trend for a positive correlation of possessive classification and high complexity (14), which merits testing on a larger sample.

(13) Overall morphological complexity of languages with and without numeral classifiers

	Above	Below mean complexity	
Classifiers	14	16	
No classifiers	88	80	n.s. (p = 0.35; Fisher 1-tailed)

(14) Overall morphological complexity of languages with and without possessive classification

	Above	Below mean complexity	
Poss. classes	38	45	
No poss. classes	41	74	n.s. (p = 0.099; Fisher 1-tailed)

(15) Overall morphological complexity of languages with and without classification (numeral or possessive)

	Above	Below mean complexity	
Classification	41	45	
No classification	33	50	n.s. (p = 0.19; Fisher 1-tailed)

Overall, then, neither gender, numeral classifiers, or possessive classification appears to require or favor general morphological complexity as a diachronic prerequisite or synchronic correlate, and complex classification is not just a simple reflection of the overall complexity level of the language.

5 Complexity in person indexation

Person, like gender, is primarily an agreement or indexation category, and in fact person is the clausal agreement category par excellence. Person indexation on verbs can be quite complex, and this section compares complexity and the evolution of complexity or non-complexity in gender and person systems, arguing that complex person marking systems can develop emergent alternative analyses that are simpler while gender systems do not and apparently cannot do this.

Inventory complexity of person marking is high in West Caucasian languages such as Adyghe and Abkhaz, which index six person-number categories for three

roles, for an 18-cell total paradigm; Yimas (Lower Sepik-Ramu, New Guinea; Foley 1991) with 3 persons × 3 numbers × 2 roles (also 18), or Kiowa (Kiowa-Tanoan, U.S.; Watkins & McKenzie 1984), 3 persons × 3 numbers × 2 roles × 2 conjugation classes, plus direct/inverse marking for 17 subject-object paradigm cells (total of 53). In the West Caucasian languages transparency is high, since each argument is indexed by an unambiguous person-number marker in a separate slot, while transparency for Kiowa is low, since subject and object roles are indexed with mostly fused morphemes (see the paradigms in Watkins & McKenzie 1984 : 115–116). The Kiowa non-transparencies and the two conjugation classes are non-canonical.

A different kind of non-canonicality is found in languages such as Laz (Kartvelian, Georgia and Turkey; Lacroix 2009 : 283, Öztürk & Pöchtrager 2011 : 48), where the two arguments of transitive verbs compete for a single person prefix slot and the competition is resolved by person and role hierarchies (1, 2 > 3, A > O). See (16), especially the first two forms listed, where the prefix is first person singular, subject in the first example *b-dzirom* and object in the second *m-dzirom*. The system is non-canonical in that the same slot can mark either subject or object, and in that second person has no overt marking at all. In addition to person/number prefixes, number is also indicated by a plural affix that registers plurality of any argument (A, S, O, G) if it is first or second person, and another that indexes number for a third person S/A.[13] This is non-canonical in that a single category (plural) is marked with different formatives that have different distributions (third person subject indexation vs. non-third-person plural argument registration).

[13] I use *index* and *register* as in Nichols (1992 : 48–49): indexation copies or otherwise marks features of the argument (person, number, etc.) on the verb, while registration simply indicates the presence of an argument in the clause but does not agree with or copy features. I assume that what is called promiscuous number marking (Leer 1991) is not indexation (of number on an argument marker, because the argument is not specified) but registration (of a multiple argument, a category similar to pluractionality and easily overlapping with it: see Wood 2007 , Yu 2003).

(16) Arhavi Laz subject and object indexation paradigm. Only one argument is overt. … = root + thematic suffix. Phonological alternations not shown. (Lacroix 2009 : 283, 298, plus examples on other pages; s.a. Öztürk & Pöchtrager 2011 : 51.)

	S/A-	O- …	-S/A	Examples	
1SG	*b-*	*m-*		*b-dzir-om*	'I see him'
				m-dzir-om	'you$_{sg}$ see me'
2SG		*g-*		*dzir-om*	'you$_{sg}$ see him'
				g-dzir-om	
3SG			*-s/n/u*	*dzir-om-s*	'he sees him'
				m-dzir-om-s	'he sees me'
1PL	*b-*			*b-dzir-om-t*	'we see him'
2PL		*g-*		*dzir-om-t*	'you$_{pl}$ see him'
3PL			*-an/nan/es/n*	*dzir-om-an*	'they see him'

The argument indexation system of Tundra Yukagir (isolate, Siberia: Maslova 2003b) is even less canonical; see (17). The system is a proximate/obviative one somewhat like those of Tagalog, Algonquian languages, and others (see Bickel 2011 for this typology), in which one of the arguments is designated as proximate (usually because of topicality or a similar parameter) and the others are obviative. Verb indexation and noun case track proximate and obviative status. (The term for 'proximate' in Tagalog and Yukagir descriptions is usually *focus*.) In Yukagir, unlike other languages with obviation, a proximate argument is not required, and unlike Tagalog the proximate argument can be only A, S, or O (for Kolyma Yukagir, only A or S: Maslova 2003a). Identifying single-function forms that index person/number categories is impossible for most of the cells. Nearly every cell in (17) exhibits one or more non-canonicalities.

(17) Tundra Yukagir obviation system (Maslova 2003b : 18). Focus = proximate. S focus column constructed from other tables in Maslova (2003b) and Kolyma Yukagir (Maslova 2003a).

	Neutral transitive	O focus	A focus intransitive	Neutral	S focus
1SG	*-Ø-ng*	*-me-ng*	*-Ø*	*-je-ng*	*-l*
2SG	*-me-k*	*-me-ng*	*-Ø*	*-je-k*	*-l*
3SG	*-m-Ø*	*-me-le*	*-Ø*	*-j-Ø*	*-l*
1PL	*-j*	*-l*	*-Ø*	*-je-l'i*	*-l*
2PL	*-mk*	*-mk*	*-Ø*	*-je-mut*	*-l*
3PL	*-nga*	*-ngu-me-le*	*-ngu-Ø*	*-ngi*	*-ngu-l*

To judge from the languages surveyed here, person systems can have greater inventory complexity and greater descriptive complexity (more non-canonicalities) than gender systems. However, person systems also have simpler and more canonical analyses available than gender systems do: hierarchical structuring, in which different patterns that violate biuniqueness reduce to a single ordering principle. The Laz paradigm shown in (16) reduces to a set of signs plus two hierarchical patterns: 1, 2 > 3 and A > O (for discussion of the Pazar Laz hierarchies see Öztürk & Pöchtrager 2011 : 48). Maslova (2003b : 17, 20) reduces much of the complexity and non-transparency of (17) to the two hierarchies illustrated in (18) and (19).

(18) Tundra Yukagir obviation: Distribution of transitive markers (Maslova 2003b : 17). Bracketed comment mine.

Person of A:	A focus	Neutral	O focus
1	*-Ø-*	*-Ø-*	*-me-*
1+ other *[i.e. 1PL]*	*-Ø-*	*-j*	*-l*
Non-1	*-Ø-*		*-m(e)-*

Hierarchy: Focus > Speaker > other
Zero suffix signals that A outranks O in this hierarchy.

(19) Tundra Yukagir obviation: Person slot (the second element of the internally hyphenated forms in (17)) in the O focus paradigm (Maslova 2003b : 20).

	O neutral	O focus	
1SG	*-ng*	*-ng*	A = SAP
2SG	*-k*	*-ng*	A = SAP
2PL	*-k*	*-k*	A = 2 + 3 *[i.e. 2pl]*
3	*-Ø*	*-le*	A = non-SAP

Hierarchy: SAP > other

(20) Summary of hierarchical effects in Tundra Yukagir obviation. (Recall that focus = proximate.)

Hierarchy	*What it determines*
Obviation: Focus > speaker > other	Form of person/number markers
Role: A > O	Zero vs. nonzero suffix
Person: SAP > other	Form of second slot in person/number marker

All forms index the A (relying on hierarchies) and register an O.
Hierarchy for access to O registration: Focus > all else.

On this perspective, the Yukagir system is still less than straightforward, and it differs from better-known obviation systems in that it tracks the proximate/obviative status of the O while the others mainly track the A. But the individual morphemes are better motivated and the whole system emerges as less non-canonical than the non-hierarchical one, and thus as less complex.

A striking example comes from Alutor (Chukchi-Kamchatkan). Paradigms, too long to reproduce here, for the most basic forms are in Nagayama (2003), Mal'ceva (1998), and others; full tables are in Kibrik et al. (2004 : 639–648). The tables are not only long but complex and with dauntingly little correlation of form to function, either within or across paradigms. Kibrik (2003) reduces the forms to a basic person hierarchy of 1SG, 1PL, 2SG > 2PL, 3 for access to the A slot, the reverse for access to O, for relatively polar A and O (and additional provisions for less polar A and O), plus different cutoffs in different mood categories based in part on the speaker's control over, or ability to predict, the event.

Hierarchically based indexation (in which I also include inverse indexation) has the advantage that less information is required than for standard paradigm-

based accounts. Roles and/or person can be inferred from hierarchies rather than being fully specified. Those hierarchies are not part of the description of each paradigm; they are grammar-wide, to some extent even universal, as are cross-linguistically favored cutoff points such as 1, 2 > 3 person or S/A > O. For purposes of assessing descriptive complexity, a grammar-wide principle does not have to be specified for particular paradigms and adds no information to their description; a universal principle does not contribute information to any particular grammar.

In these respects, hierarchical indexation may well be canonical. Viewed in the proper perspective, it is not a type of paradigm but what might be called a blueprint for creating paradigms and forms. Henceforth I will use the term blueprint because it is not a precise theoretical term and because it implies an instruction or algorithm or the like rather than a structure or set of forms. (How to implement hierarchical and other blueprints in theoretical morphology is a challenge not addressed here.) The paradigm is the blueprint's output, and available evidence indicates that describing the output requires more information than describing the blueprint.

A cross-linguistically recurrent minimal hierarchical system shows up in verbs indexing two arguments, where combinations of first and second person ('I VERB you', 'you VERB me') are often opaque, or overtly mark only one of the persons, or are ambiguous or otherwise non-transparent (Heath 1991 ; 1998). This amounts to treating the participant scenario not as a pair of arguments and not even as a morphologically fused dyad but as a monad. From what is left unarticulated, plus culture-specific and universal expectations, one can infer who does what to whom; see Heath's detailed analysis. This too is a type of blueprint.

The theoretical claim of Kibrik (2003 : 376) for Alutor is that identical forms point to proximity in cognitive space, and the structure of that space is much less complex than traditional conjugation tables. This statement, and other descriptions of hierarchies, strike me as presenting a view of an alternate, simpler paradigm, but nonetheless a paradigm and not a blueprint.

Person differs from gender and other agreement and classification categories in that only person exhibits hierarchical patterning. Gender and classifiers never do, in my experience. Even in the concurrent gender and classifier system of Mian described by Corbett & Fedden (2016), where one might expect the two systems to compete for a single slot at least in some circumstances, this does not happen. Number and gender can of course be drawn into the patterning of person if they are drawn along in coexponential markers, but on their own they do not form hierarchies.

The reason for this may lie in the fact that person markers are typically, perhaps always, referential. There are three views on whether person markers are referential. One view is that person markers are always referential, not only the pronominal arguments of pro-drop languages but also the person agreement affixes of languages like English or German or Russian, where there is generally a clearly referential overt argument as well as the verbal person marker whose referentiality is at issue (Kibrik 2011). The second view is that person markers are never referential, even in pro-drop languages, but reference arises from the context and the arguments and is attributed to markers in processing or grammatical analysis (Evans 1999 ; 2003). The third view is that some person markers are referential and some are not: those variously described as pronominal arguments or cross-reference are referential while those described as agreement are not referential but are simply categories of referring NP's (Hengeveld 2012). Whichever view one adopts, it is probably safe to say that if anything is referential in verb indexation, person is. That is, in proneness to referentiality, person > other categories.

I doubt that categories other than person are ever referential. Gender, in particular, appears to never be referential.[14] Creissels (2014) shows that verbs in Avar (Nakh-Daghestanian, eastern Caucasus) are entirely ambiguous between anaphoric, unspecified, and absent readings of one or more arguments. (21) gives examples parallel to his from Ingush, where the grammar is identical in this respect. Ingush can be described as having two zero pronominals, one anaphoric and one unspecified, and the first two readings have these as A argument. The third reading has no A at all; this kind of clause, in which the A is absent but the O remains an O and is not promoted to S, is not found as a major clause type in European languages.[15] (22) shows that exactly the same readings are available to a verb that does not take gender agreement (recall from above that gender is a partial category in Ingush). This shows that gender has nothing to do with referentiality in Ingush. (No argument can be made for either Ingush or Avar

[14] I use *referential* of gender in the same way as I used it of person in the previous paragraph, so that *is referential* means 'refers' or 'can refer'. This is the usage of Kibrik (2011). It is not to be confused with the same word in Dahl's distinction (Dahl 2000) of referential gender (= my referent-based gender) vs. lexical gender. Both senses of the word are established in the literature; I chose the one having to do with a new point made here, though Dahl's term is probably the earlier one. The issue needs to be resolved; my *referent-based* is only a patch.

[15] It is not that this verb has ambitransitive (labile) valence; in Ingush this construction seems to be available to all transitive verbs and perhaps all two-argument verbs more generally. Actual ambitransitive valence of the type (A)O occurs in very few Ingush verbs (I know of only the five listed in Nichols 2011 : 466–467).

about referentiality of person, as both languages lack an inflectional category of person.)

(21) Ingush[16]

a. Anaphoric zero:
Ø yz v.iira
X_i 3sg V.killed
(I/you/he/she/they) killed him.

b. Unspecified zero:
Ø yz v.iira
UNSP 3sg V.killed
He was killed (by someone);
(Someone) killed him;
They killed him.

c. Absent A:
yz v.iira
3sg V.killed
He was/got killed.

(22) Ingush

a. Anaphoric zero:
Ø yz leacar
X_i 3sg V.caught
(I/you/he/she/they) caught him.

b. Unspecified zero:
Ø yz leacar
UNSP 3sg V.caught
He was caught (by someone);
(Someone) caught him;
They caught him.

c. Absent A:
yz leacar
3sg V.caught
He was caught/arrested.

[16] All verbs in (21)–(22) are in the witnessed past tense (a.k.a. aorist). The nonwitnessed tense (*v.iina.v*, *leacaa.v*), which is resultative and/or inferential evidential, would probably be more likely for the (c) examples.

All reviewers of this chapter, and most audiences where I have presented this part of it, raise the objection that gender is referential: it is referential in English pronouns, and gender is known to be important in reference tracking. The point merits a brief excursus. As background, saying that a morpheme or category is referential means that it refers, or carries reference, or bears a referential index. If a category is referential, the category itself is what refers, and not the word that carries that category. English pronouns certainly refer, but it is the pronoun and not its gender that is referential. English pronouns are no more (and no less) referential than those of e.g. Finnish or Turkish (languages which have no gender in either nouns or pronouns) or Ingush (which has noun gender but no pronoun gender), or for that matter French or Russian (which have gender in nouns and pronouns). The presence or absence of gender in pronouns, or whether the gender (in languages that have it) is entirely natural (as in English) or agrees with a noun antecedent (as in French or Russian), does not affect the referentiality of pronouns.

Gender has indeed often been said to be useful in reference tracking, but in fact its usefulness in this function is marginal, as human protagonists of narrative and discourse often belong to the same gender. Kibrik (2011 : 334–360) makes this claim and supports it with cross-linguistic, discourse, and experimental evidence, and also emphasizes that reference tracking is not the same as referring: reference tracking mostly has to do with disambiguating and resolving potential referential conflicts.

To summarize on referentiality, person can be referential, and perhaps person is always, and necessarily, referential; but gender is not referential.[17] Numeral classifiers and possessive classifiers are probably also not referential, but as they appear in NP's rather than on verbs the question of referentiality is less clear.[18]

I am not aware that the matter has been the subject of research, but I suggest a diachronic scenario like the following. On verbs that index two arguments, and especially when person agreement develops enough complexity and/or opacity (e.g. in fusion of forms), hierarchical patterns can arise. The most likely first step occurs when phonological change has made formerly discrete A and O person

[17] My own strong intuition is that inflected verb forms in Ingush do not refer. A context like the anaphoric one in (21a)–(22a) can make it unambiguous who performed and underwent the action, and the choice of witnessed vs. non-witnessed evidentiality categories can make clear whether the speaker knows who did what, but the verb form itself does not refer and the gender at most guides the search for an antecedent by narrowing down its possible gender.

[18] Numeral classifiers can fuse to demonstratives and those can be referential and can furthermore be accreted to verbs as indexes, but by that point they have begun to function as third person markers which also index classificatory categories.

markers opaque and universal person hierarchies step in to disambiguate, and in doing so they impose their own order. Hierarchical structure is thus an emergent pattern, and it functions not in the usual way that paradigms and sets of forms do but in a new way, as a blueprint. A blueprint is functional where complexity is high, because it reduces the complexity. The ability to function referentially seems to be critical to this emergence, perhaps because referentiality makes it possible to draw on universal hierarchies and fix 1<>2 person forms as morphologically opaque monads.[19]

The reason why gender systems can be so complex is then that they have no self-correcting mechanism like the hierarchical blueprint that might simplify them, and they are stable enough that complexity can build up over time without causing the whole system to be shed. Not only are they stable within families; the complex interaction of gender with case and number persisted in Latin, ancient Greek, late Proto-Slavic, and early Germanic, despite large spreads with absorption of substantial numbers of L2 learners, circumstances that are expected to simplify languages but did not appreciably simplify the paradigms of these languages.

The papers by Di Garbo & Miestamo (2019) and Liljegren (2019) in this volume (and also Maho 1999) show examples of gender systems simplifying, but the way in which they go about simplifying supports my point. Both papers describe changes in which closer alignment of semantics and gender classification occurs in individual words, beginning with a few words and at the extreme ends of Corbett's agreement hierarchy (Corbett 1991 : 248–259). Typically, a word referring to an animate or human but with an arbitrary gender classification begins to trigger an appropriate animate or human gender agreement marker in limited contexts (such as predicate nominal). Over time, more words and more contexts are involved, and eventually the system ends up based on animacy rather than on arbitrary classifications. The early stages, however, add complexity, as the gender agreement rules refer to contexts, create alternations and options for some words but not others, and otherwise introduce variation. Alternatively, gender can be lost when gender agreement is lost, and in the languages Di Garbo and Miestamo study, where singular and plural nouns mostly have different gender agreement markers and gender is marked not only in agreement but also on the nouns themselves, the former gender marking changes into a system of number marking. But these are all developments where gender is ultimately simplified by reduction or loss, while I am talking about complex person systems which

[19] 1<>2 is Heath's now widely used notation for opaque morphemes that are ambiguously 1>2 and 2>1 (Heath 1998).

retain all their categories and markers but in some kind of reanalysis acquire an emergent alternative analysis as blueprint-driven. For this, I believe, we have no analog in gender.

6 Stability of gender

Gender is very stable in language families (Matasović 2007 ; 2014). In Indo-European, gender – the categories, the markers, and the complex interaction with case paradigms – lasts as long as the original case endings do, so the original system is still largely in place in Baltic and Slavic and to some extent in Germanic (where parts of it are recognizable to the specialist). More precisely, gender does not outlast the original case endings – nor, usually, vice versa (though Armenian is a counterexample: see Kulikov 2006). Even when case was lost in the various Romance languages and in Macedonian and Bulgarian, the gender categories have remained and their markers continue those of early Indo-European. Whatever the reason for this stability, it means that a gender system can evolve considerable complexity without much risk that the language will abandon it or restructure it. The complexity of the Slavic gender system is simplified not by restructuring but by losing case entirely, in Macedonian and Bulgarian; this removes all the complexity that is due to cumulative expression of case with gender, discussed in §2 above. In general in Indo-European, where gender has been lost, case has generally also been lost, as in English or some Iranian languages (e.g. Persian). Loss of gender has happened in three languages and one additional dialect of Nakh-Daghestanian, a very old family (probably older than Indo-European) with about 40 daughter languages, so 10% or less of the family has lost gender. In these languages gender is not cumulative with case but is expressed only in agreement, and languages that lose gender keep case. The languages that have lost gender have histories of large spreads and contact of the kind expected to simplify languages; but not all of the languages with similar sociolinguistic histories have lost gender. The prehistory of gender in Nakh-Daghestanian is still poorly understood (though see Schulze 1998), but the complexity of gender marking in Tsakhur, discussed above, is a clearly secondary phenomenon caused by positional sound changes after the accretion of spatial prefixes entrapped the gender prefixes. Some high-contact languages have reduced the number of gender markers and categories, but gender is retained and the agreement rules function in much the same way across the family.

Neither the inventory and descriptive complexity of Nakh-Daghestanian gender, nor the descriptive complexity of conservative Indo-European languages,

nor any other gender system I am aware of, has any self-correcting mechanism like hierarchical patterning for person.

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Part III

Africa

Chapter 5

Niger-Congo "noun classes" conflate gender with deriflection

Tom Güldemann

Humboldt University Berlin and Max Planck Institute for the Science of Human History

Ines Fiedler

Humboldt University Berlin

This paper reviews the treatment of gender systems in Niger-Congo languages. Our discussion is based on a consistent methodological approach, to be presented in §1, which employs four analytical concepts, namely agreement class, gender, noun form class, and deriflection and which, as we argue, are applicable within Niger-Congo and beyond. Due to the strong bias toward the reconstruction of Bantu and wider Benue-Congo, Niger-Congo gender systems tend to be analyzed by means of a philologically biased and partly inadequate approach that is outlined in §2. This framework assumes in particular a consistent alliterative one-to-one mapping of agreement and noun form classes conflated under the philological concept of "noun class". One result of this is that gender systems are recurrently deduced merely from the number-mapping of noun form classes in the nominal deriflection system rather than from the agreement behavior of noun lexemes. We show, however, that gender and deriflection systems are in principle different, illustrating this in §3 with data from such Niger-Congo subgroups as Potou-Akanic and Ghana-Togo-Mountain. Our conclusions given in §4 are not only relevant for the historical-comparative and typological assessment of Niger-Congo systems but also for the general approach to grammatical gender.

Keywords: gender, Niger-Congo languages, agreement, noun classes, deriflection

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1 The cross-linguistic approach to gender

Gender is understood here in terms of Corbett (1991), namely as systems of nominal classification (also called categorization) that are reflected by agreement. "With about two thirds of all African languages [being] gender languages" (Heine 1982 : 190), Africa is rightly identified by Nichols (1992 : 131) as a global hotbed of this phenomenon. At the same time, the majority of African languages belong to a single language family, Niger-Congo,[1] which displays a cross-linguistically unusual type described in a particular philological tradition. The existing research bias toward this large family keeps influencing the treatment of noun classification not only in African linguistics but also in typology in general. This contribution approaches the typical gender systems of Niger-Congo from a cross-linguistic perspective by subjecting them to an analysis that is universally applicable rather than one that is biased toward the special characteristics of this language group.

As mentioned above, according to the typologically most widespread approach, gender is the intersection of two domains, namely nominal classification and syntactic agreement, as the overt expression of a feature of a "trigger" (also called controller), usually a noun, on another word as the "target". Several complications for the analysis of gender arise from Corbett's (Corbett 2006) extensive cross-linguistic survey of agreement. Notably, a language may have more than one agreement system and, more importantly for our discussion, a system sensitive to gender need not be restricted to this feature but most often also concerns others like number, person, case, etc. The features that a noun trigger transfers to a target not only relate to properties of an abstract lexical item, which are recurrently semantic. They can also concern the formal properties of the concrete word form of a given noun in the agreement context. A sound understanding of a gender system thus presupposes an exhaustive analysis of the language's agreement system regarding all its agreement features and the subsequent "subtraction" of all factors but gender. If gender is only conflated with number, which is cross-linguistically frequent, it can be conceptualized as "agreement minus number." This also holds for the Niger-Congo systems at issue here.

[1] We will not deal here with the still controversial question of the exact composition of this language family. That there is a substantial core group of genealogically related languages has been shown by Westermann (1935) with reference to gender, the very feature at issue, and the present discussion is concerned with languages that are robust members of this lineage (see Güldemann (Güldemann 2018) for a detailed recent discussion of the genealogical classification of African languages and the status of Niger-Congo in particular). While the discussion is also relevant for uncertain members of the group, we will not deal with them here.

The present contribution provides a novel analytical approach to gender. That is, we apply a strict distinction of four concepts, which are necessary whenever gender is reflected by syntactic agreement as well as nominal morpho-phonology, the latter implying some amount of what Corbett (1991) calls formal class assignment. The four notions are:[2]

a. AGREEMENT CLASS (to be abbreviated as AGR and numbered by Arabic numbers),

b. GENDER (to be occasionally labeled semantically or numbered by Roman numbers),

c. NOUN FORM CLASS (to be abbreviated as NF and represented by the capitalized exponent), and

d. DERIFLECTION (to be represented by the relevant NF set).

This approach is illustrated with the following example from the Bantu language Swahili, where agreement and noun form classes are bold-faced in both lines.

(1) Swahili (personal knowledge)

a. ***m****-toto* ***yu****-le* ***m****-moja* ***a****-me-anguka*
M(W)-child(**1**) **1**-D.DEM **1**-one **1**-PERF-fall
'that one child has fallen'

b. ***wa****-toto* ***wa****-le* ***wa****-wili* ***wa****-me-anguka*
W(A)-child(**2**) **2**-D.DEM **2**-two **2**-PERF-fall
'those two children have fallen'

The subject nouns in (1) trigger agreement on three targets: the demonstrative modifier *-le*, the numeral modifiers *-moja* and *-wili*, and the verb *-anguka* in the form of subject cross-reference. There are two different AGREEMENT CLASSES, AGR1 and AGR2, that are associated with the noun forms *m.toto* 'child (SG)' in (1a) and *wa.toto* 'children (PL)' in (1b), respectively, and they are evident from two different sets of exponents across the three relevant agreement targets, namely *yu-/m-/a-* vs. *wa-/wa-/wa-*. An agreement class in the present conceptualization is thus a set of noun forms that share an identical behavior across all agreement

[2]Since genders and deriflections also establish sets of nouns, they could also be called "gender CLASSES" and "deriflection CLASSES," respectively. We use here the short versions.

contexts of a given system and thus equals what Corbett (Corbett 1991 , Corbett 2006) calls a "consistent agreement pattern" (see this author's detailed discussion of the possible problems in establishing such an agreement class). (For schematic presentation, an agreement class is represented conventionally by the set of exponents of a single agreement target that involves the maximal class differentiation.) A crucial feature of our approach is that it is of no concern whether noun forms of one agreement class are of the same gender, number or any other feature, which differs from Corbett's approach inspired by Zaliznjak (1964). An agreement class in the present terms is thus an overt but normally conflated reflex of diverse grammatical features – in Swahili, concretely of gender and number (see below for more details about our analytical and terminological differences to Corbett's approach).

Gender (classes) are defined in line with Corbett's (Corbett 1991) cross-linguistic approach. Analytically, they are derived by abstracting from all other agreement features, which in the Swahili system is only number. The majority of Swahili nouns have a singular and a plural form so that a gender is instantiated by a particular pairing of the respective agreement classes. In (1), these are singular AGR1 and plural AGR2, which is the regular agreement behavior for count nouns of the "human" gender, which includes the nominal lexeme *-toto* 'child'. The gender of transnumeral[3] nouns outside the systems of number distinctions is accordingly discernible from a single agreement class.[4] Normally, genders as the ultimate goal of analysis here are thus classes of nouns in the lexicon. However, gender often transcends the lexicon and applies to a language's reference world more generally. That is, relevant systems can entail in addition such phenomena as nominal derivation and even the expression of grammatical relations. Swahili, for instance, also has agreement patterns (and noun prefixes) for derivational diminutives, infinitives, and various locative notions. The nominal lexeme *-toto* 'child', for example, can also occur in the gender AGR7/AGR8 for diminutives,

[3]The term "transnumeral" is used here neutrally to refer to nouns that do not partake in the normal number oppositions of a language. It must not be confused with "general number" in terms of Corbett (2000 : 9–19) which refers to a feature value in the number system as opposed to the more common singular and plural. Typically, transnumeral nouns like infinitives, locatives and non-count nouns for masses, liquids, abstracts etc. do not have different number forms, while general number is a number value that applies to nouns that have an alternative singular and/or plural variant.

[4]In general, any agreement class that only encodes gender and no other agreement feature does not require a distinction between gender and agreement class. An entire system of this kind would represent "ideal" functionally transparent gender marking, because there is a straightforward relation between one form and one meaning. However, such cases turn out to be rare cross-linguistically; they are found, for example, in Australian languages.

then appearing accordingly as *ki-toto/vi-toto* 'baby/babies'.

Example (1) also shows the intimate interaction between nominal morphology and gender in Swahili. The subject nouns as the agreement triggers also exhibit two morphologically distinct word forms rendered by prefixes, namely *m-* and *wa-*, which characterize NF *M(W)-* and NF *W(A)-*, respectively. This direct morphological reflex of gender on the noun is conventionally subsumed under "overt gender" (cf. Corbett 1991 : 44, 62–63, 117–118). That is, NOUN FORM CLASSES are established in the present approach by word forms with identical morphological or phonological properties; they represent the counterpart of agreement classes in the realm of morpho(phono)logy. As shown in the important work by Evans (1997) and Evans et al. (1998), noun form classes (called there "head classes") can have an intricate relationship to agreement classes well beyond serving potentially as their triggers.

What is called here DERIFLECTION (CLASSES) is the morpho(phono)logical counterpart of genders. They are classes of form paradigms operating over nominal lexemes and established on account of identical formal variation that needs not but often does interact with such features as gender, number, etc. Our newly coined term "deriflection" (a blend of "inflection" and "derivation") thus refers here in a more narrow sense to relevant morphology or phonology that interacts with gender. In (1) of Swahili the two prefixes on *-toto* 'child' establish a specific type of number inflection typical for human nouns, namely *M(W)-/W(A)-*, which is the pairing of a singular and a plural noun form class exponent. As with genders, deriflections in this context also entail other morpho(phono)logical phenomena to the extent these interact with the relevant nominal system.

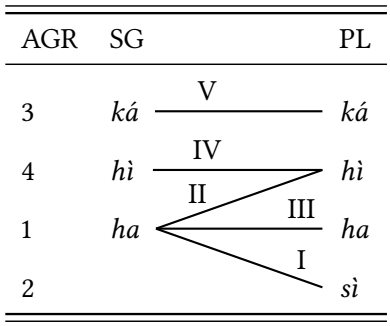
Table 1: The four concepts used for analyzing gender

Relates to	Concrete noun in a morpho-syntactic context = word form	Abstract noun in the lexicon = lexeme
Syntax	a. AGREEMENT CLASS (abbreviated as AGR and numbered by Arabic numbers)	b. GENDER (numbered by Roman numbers)
Morpho(phono)logy	c. NOUN FORM CLASS (abbreviated as NF)	d. DERIFLECTION

In general, agreement class and noun form class are concepts that relate to a noun as a word form in a concrete morphosyntactic context, while gender and deriflection refer primarily to the more abstract domain of the nominal lexicon in a given language. At the same time, agreement class and gender are both syntactically defined phenomena and thus opposed to noun form class and deriflection pertaining to the domain of morpho(phono)logy, so that the two concept pairs, although intimately related, are in principle independent from each other. The various interrelations between the four concepts are summarized in Table 1, which also repeats the different notation principles applied for them here.

Corbett's (Corbett 1991 ; 2000 ; 2006) work has served as the primary reference point from the previous typological analyses of gender and related phenomena. As is to be discussed shortly, however, our framework also departs in some important respects from this author in order to better capture aspects that have subsequently emerged regarding the cross-linguistic diversity in this domain.

The framework outlined here draws on Güldemann (2000), which dealt with gender systems in Southern African languages of the two non-Khoe families Tuu and Kx'a (both traditionally attributed to a spurious Khoisan lineage). The most important typological contribution of this work is that agreement classes in these languages are often multiply ambiguous regarding their gender and number value, unlike in many European languages, the analysis of which sets the stage for the cross-linguistic research on gender and agreement.



Note: agreement classes represented by anaphoric pronouns.

Figure 1: Agreement classes and genders in Juǀ'hoan (based on Güldemann 2000)

This can be observed in Figure 1, which displays the gender system of the Juǀ'hoan dialect of Ju, a member of the Kx'a family. The schema shows how the four agreement classes 1–4 pattern across the two number categories singular

(SG) and plural (PL) to yield five genders I–V. The numbering of classes and genders as well as their ordering in the schema are of no concern to the system: the former is an artifact of research history and the latter merely serves to yield a maximally simple representation of the system. The reader is referred to Güldemann (2000) for more details, for example, on the semantics of the genders. The only important point for the present discussion is the behavior of the agreement classes, for example, that AGR1 occurs in both number values, singular and plural, as well as in the three genders I-III. The non-sensitivity of an agreement class to number holds in Ju|'hoan for AGR1, AGR3, and AGR4. The majority of nouns falling into these classes are not transnumeral but possess different singular and plural forms. Recall from above that a system where the gender marking of nouns only involves one agreement class is as such functionally transparent (albeit typologically rare) in that agreement is here a "non-conflated" *direct* reflex of gender.

The phenomenon that agreement classes are not dedicated to a single gender and/or number is also recurrent outside these Southern African languages, including Niger-Congo. This justifies the strict descriptive and analytical separation of agreement class from any particular feature of gender, number etc. This is opposed to Corbett's (1991) approach, which, moreover, features more analytical concepts than our framework. He distinguishes on the one hand between "controller gender" and "target gender" (see his section 6.3) and on the other hand between "agreement class" and "consistent agreement pattern" (see his sections 6.2 and 6.4.5). Our approach, as we argue here, does not need all these notions, because it captures the same data by ascertaining just agreement class (= Corbett's "consistent agreement pattern") and gender (= Corbett's "controller gender") (our two additional concepts, noun form class and deriflection, are irrelevant here, because they concern the form of nouns rather than agreement and gender).

Figure 2 takes up Corbett's (Corbett 1991 : 150–152) example of Romanian adjective agreement which he uses to illustrate the necessity of his target gender notion. He states about this case that there are "three agreement classes, and there is no reason not to recognize each as a gender [= the lines labeled semantically as masculine, neuter, and feminine]"[5] as well as "two target genders in both singular and plural … [-*Ø*, -*ă* and -*i*, -*e*]." Corbett's fourth concept, consistent agreement pattern, which we would call agreement class, is not dealt with in his discussion that concerns the exponents of only one agreement context; the

[5] Although Corbett's identification of agreement class and gender is surprising, a detailed critical discussion would require a general assessment of his approach, which is beyond the purpose and limits of this paper.

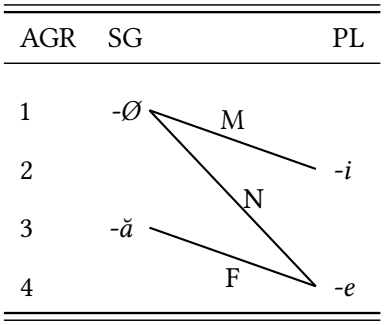


Figure 2: Agreement of adjectives and genders in Romanian (based on Corbett 1991 : 152)

notion is, however, relevant for a full description, because Romanian has more than one agreement target (see Corbett 1991 : 213–214 for further complications in Romanian neuter agreement forms). In any case, Corbett's problem is that two of the four gender-number markers on adjectives are not dedicated to a single gender, *-Ø* encoding the singular of both masculine and neuter gender and *-e* marking the plural of both neuter and feminine gender; the target gender concept seems to be invoked to solve it. However, applying the framework proposed here to the situation in Romanian, we only need to recognize three genders and four agreement classes (representing them here by the four suffixal exponents on adjectives but assuming that other agreement targets do not contradict this picture).

A picture like Figure 2 is nothing special and even in a more extreme case, such as Ju|'hoan in Figure 1, it does not require more elaborate analytical machinery. In the Ju|'hoan system, comprising five genders across two number values, *three of four* agreement classes are unspecific regarding *both* gender and/or number. As far as we can see, an additional concept like target gender restricted to a specific number category does not furnish any new and useful insight for the description of this and other gender systems. Since the present approach has also been applied with coherent results to a number of other languages with quite different and notoriously intricate gender systems (cf., e.g., Neuhaus 2008 on Krongo of the Kadu family, Güldemann & Maniscalco 2015 on Somali of the Cushitic family), we assume its wider applicability. The rest of the paper attempts to show its usefulness for the languages of Niger-Congo, the world's largest language family featuring a historically deeply entrenched gender system.

2 Niger-Congo gender systems and the philological "noun class" concept

While the noun classification systems in Niger-Congo have long been recognized as instances of grammatical gender, their special structural profile poses particular challenges to a cross-linguistically oriented analysis. To a large extent, this is due to the special morphological characteristics of gender systems in Bantu, the resulting philological tradition of analyzing them, and the considerable research bias within Niger-Congo studies toward this important subgroup (see Güldemann (Güldemann 2018 , Chapter 5) for more discussion).

The situation presented in §1 above with example (1) from Swahili is quite typical in Bantu and many other Niger-Congo languages and thus has crucially determined the philological tradition of describing their gender systems as a whole. In particular, it shows a one-to-one relationship between corresponding agreement classes and noun form classes. As seen in (1b), even the markers can be formally identical: *wa-* (or an allomorph) is the formal exponent in both NF *W(A)-* and all agreement contexts of AGR2. Such a biunique (and often even alliterative) relation between the form of the noun (representing the trigger) and any agreeing element (representing the target) is epitomized by the philological concept of "noun class". The notion of "noun class" is also behind the philological convention of a single class label by means of Arabic numbers, in opposition to our proposed distinction between agreement class and noun form class (accordingly, in (1) and subsequent Swahili examples the noun form classes are not glossed by Arabic numbers, even in cases of biuniqueness and alliteration).

The conflation of noun form classes and agreement classes is, as we argue, the reason for a major problem in the analysis of Niger-Congo gender systems. The conceptually overloaded concept of "noun class" may account in many languages for a good portion of the relevant nominal domain, to the extent that the situation is as in (1) of Swahili. However, the concept cannot completely and adequately capture an entire system, because the characteristics implied in it are not universal. Example (1a) with NF *M(W)-* and AGR1 involving *yu-/m-/a-* as its set of exponents has already shown alliteration not to be absolute. More importantly, however, the implied one-to-one relation between agreement classes and noun form classes also has crucial exceptions so that one type of class is not always predictable from the other, which is shown in the following representative examples.

(2) Swahili (personal knowledge)

a. *rafiki* ***yu****-le* ***m****-moja* ***a****-me-anguka*
Ø:friend(**1**) **1**-D.DEM **1**-one **1**-PERF-fall
'that one friend has fallen'

b. ***ma****-rafiki* ***wa****-le* ***wa****-wili* ***wa****-me-anguka*
MA-friend(**2**) **2**-D.DEM **2**-two **2**-PERF-fall
'those two friends have fallen'

Example (2) shows that Swahili nouns of the human gender, as defined by the pairing AGR1/AGR2, can also appear with other number inflections, here *Ø/MA* with *rafiki* 'friend' (see below for more discussion on prefixless nouns). That is, one agreement class goes with more than one noun form class.

(3) Swahili (personal knowledge)

a. ***m****-ti* ***u****-le* ***m****-moja* ***u****-me-anguka*
M(W)-tree(**3**) **3**-D.DEM **3**-one **3**-PERF-fall
'that one tree has fallen'

b. ***mi****-ti* ***i****-le* ***mi****-wili* ***i****-me-anguka*
MI-tree(**4**) **4**-D.DEM **4**-two **4**-PERF-fall
'those two trees have fallen'

Example (3) illustrates that one noun form class can also be associated with more than one agreement class – the reverse case of the situation illustrated in (2). As shown in (3a), NF *M(W)-* is not exclusively tied to AGR1 in the human gender AGR1/AGR2, as in (1a), but is also relevant for singular forms of lexemes like *-ti* 'tree' in AGR 3 belonging to the gender AGR3/AGR4. The matching of one noun form class with more than one agreement class equally holds for NF *MA-* in (2b), because it is also found with plural count nouns of the gender AGR5/AGR6 and with transnumeral nouns for masses and liquids.

To reiterate the point, the philological "noun class" notion inadequately implies the universality of a one-to-one trigger-target mapping, thereby silently conflating the categories of agreement class and noun form class that are in principle independent. Counterfeiting an ideal system, this concept recurrently decoys scholars into the analytical shortcut illustrated in the following.

Assume a language with gender and nominal deriflection where agreement and noun form classes display a biunique mapping. Such a situation is represented in Figure 3 (which differs from figures focusing on gender systems such as 1 and 2 above or 4 below). In both domains, the classes map over number such

that two apply to singular nouns and one to plural nouns. Such a system would allow one to predict AGR1, AGR2 and AGR3 from NF A, NF B and NF C, respectively, and vice versa – a situation that implies a strong formal assignment of agreement (see Corbett 1991 : Chapter 3).

AGR	NF	Number
1	A	SG
2	B	SG
3	C	PL

Figure 3: Full one-to-one mapping of agreement classes and noun form classes

Figure 4 shows the resulting agreement-based gender system (left side) and the deriflection system based on noun form classes (right side), which can also be inferred from each other. Here, both show convergence from two singular classes to one plural class. This predictability holds irrespective of whether the exponents in the system of agreement and nominal morphology display alliteration of the type recurrent in Niger-Congo (cf. (1b) from Swahili).

Figure 4: Gender system (left) vs. deriflection system (right) of the case in Figure 3

In reality, however, an "ideal" trigger-target mapping as in Figure 3 is never universal in a language so that the "noun class" approach harbors the risk of misleading analysis. This can be illustrated by means of a rather well-behaved attested system, like that of Ikaan (Benue-Kwa). Figure 5 shows that there is only a single exception to a complete one-to-one mapping between agreement classes and prefixal noun form classes, namely NF *O-* that is associated with AGR1 *and* AGR6. Hence, the system appears to be overall well described in terms of the

canonical unitary concept of "noun class" involving both the forms of nominal prefixes and concords on agreement targets.

AGR		NF	Number
6	*nɔ:*		SG
1	*jõ̀:*	*O-*	SG
2	*dà:*	*A-*	TN, PL
3	*dɔ:*	*U-*	SG
4	*dɛ:*	*I-*	SG, PL
5	*nɛ:*	*E-*	SG

Note: agreement classes represented by proximal demonstratives

Figure 5: Mapping of agreement and noun form classes in Ikaan (based on Borchardt 2011 : 75–78)

With such a neat mapping one may be tempted to proceed according to the discussion revolving around Figures 3 and 4 and infer the agreement-based gender system from the morphological deriflection system based on noun form classes (or vice-versa). Figure 6 shows the two systems side by side for a better comparison. For the record, the two schemas also display a class of transnumeral (TN) nouns marked by circles, which cannot be assigned clearly to a single paired pattern and thus should be recognized in terms of formal agreement as a separate gender. The nature of the various genders and deriflections, including their possible semantics, is largely irrelevant for the present topic and they are therefore not labeled or numbered – a practice also relevant later on, especially in system schemas like those in Figure 6.

The important observation from the above figure is that the single exception to a biunique class mapping in Figure 5 causes a clear structural divergence between the gender and deriflection systems, as marked by the two thick lines in Figure 6. The difference can be explained in terms of the typology for the mapping of classes across number categories originally proposed by Heine (1982 : 196–198) and elaborated by Corbett (1991 : 154–158). There are three major types in the order of increasing complexity:

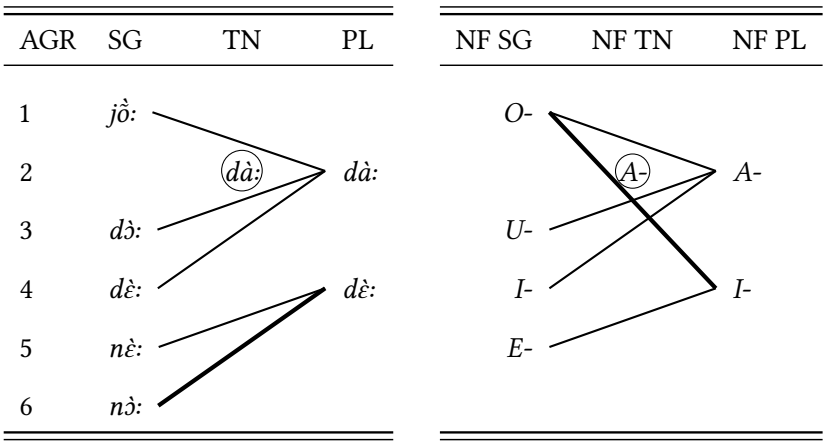


Figure 6: Gender system (left) vs. deriflection system (right) of Ikaan (based on Borchardt 2011 : 75–78)

a. PARALLEL: singular and plural classes only show one-to-one mapping.

b. CONVERGENT: at least two agreement classes in one number converge to one class in the other number.

c. CROSSED: class convergence exists in both directions.

According to this typology, Ikaan's real gender system based on agreement is of the convergent type in that the conflation of classes only goes from singular to plural, while its deriflection system based on noun form classes shows class convergence in both directions and is thus of the more complex crossed type.

In fact, the divergence between gender and deriflection system in Ikaan is almost certainly greater, because the language will have prefixless nouns (e.g., proper names, loans), which are unfortunately not treated in the available sources. These establish an additional noun form class that does not have a unique counterpart in the agreement system. Since such an additional unmarked Ø-noun form class can be expected to be virtually universal, this phenomenon alone excludes the one-to-one class mapping and hence the identity of the gender and deriflection system from a general perspective.

The divergence between gender system and "gender-like" deriflection system holds to an even greater extent in Bantu – the very language group in which the problematic "noun class" concept was developed and from where it assumed its model role for the larger family. This can be illustrated by means of Proto-Bantu for which there exists an elaborate reconstruction. Irrespective of its full

historical adequacy, the detailed information of this proto-system allows a good approximation to the original situation regarding (a) the mapping of agreement classes and noun form classes, (b) the gender system based on agreement classes, and (c) the deriflection system based on noun form classes.

Table 2: Proto-Bantu "noun classes" (conflating agreement classes and noun form classes) (based on Meeussen 1967 : 96–99)

"Noun class"	Number	AGR	Different agreement targets				NF
			CONC	NUM	SBJ	OBJ	
*2	PL	2	ba-	ba-	ba-	ba-	ba-
*1	SG	1	ju-	u- ?	u-, a-	mu-	mu-
*18	TN	18	mu-	mu-	mu-	mu-	
*3	SG	3	gu-	u- ?	gu-	gu-	
*4	PL	4	gi-	i- ?	gi-	gi-	mi-
*5	SG	5	di-	di-	di-	di-	ị-
*6	TN, PL	6	ga-	a- ?	ga-	ga-	ma-
*7	SG	7	ki-	ki-	ki-	ki-	ki-
*8	PL	8	bị-	bị-	bị-	bị-	bị-
*9	SG	9	ji-	i- ?	ji-	ji-	N-
*10	PL	10	jị-	ị-	jị-	jị-	
*11	SG	11	du-	du-	du-	du-	du-
*12	SG	12	ka-	ka-	ka-	ka-	ka-
*13	PL	13	tu-	tu-	tu-	tu-	tu-
*14	SG, TN	14	bu-	bu-	bu-	bu-	bu-
*15	SG, TN	15/17	ku-	ku-	ku-	ku-	ku-
*17	TN						
*16	TN	16	pa-	pa-	pa-	pa-	pa-
*19	SG	19	pị-	pị-	pị-	pị-	pị-

Excluding the uncertain proto-class *24, Table 2 presents Meeussen's (Meeussen 1967 : 96–99) full reconstruction of the Proto-Bantu "noun classes" which, as mentioned, conflate agreement and noun form. This framework is the outcome of specific developments in Bantu philology, without much consideration of the typological treatment of gender. Hence, it comes as no surprise that it is multiply incompatible with the cross-linguistic approach proposed here.

The divergence between the above Bantu reconstruction and our approach

concerns in particular various mismatches between the philological "noun class" inventory in the leftmost column and our analysis that involves the agreement classes in the third column (followed by four columns displaying the exponents of major targets) and the noun form classes in the rightmost column (we take over the philological class numbering 1–19 for our agreement classes, while noun form classes are simply referred to by their reconstructed prefix).

The major differences between the Bantu reconstruction and the present analysis, marked in Table 2 by shaded cells, are as follows. First, two noun form classes, namely those established by the noun prefixes *mu- and *N- have a multiple affiliation with agreement classes, the former occurring with nouns of the agreement classes *1, *3, and *18 (cf. the above discussion in connection with (1a) and (3a) from Swahili) and the latter with nouns of the classes *9 and *10. Second, two "noun classes" of the Bantu tradition that establish single-class sets of transnumeral nominals should be subsumed under a single noun form and agreement class, because they do not diverge in either nominal prefix or concord. Their difference only concerns the syntactic occurrence of the respective nominal in that "noun class" *15 comprises infinitives, while "noun class" *17 is established by the class of general locatives.[6] In general one can conclude that the traditional identification and numbering of "noun classes" in Bantu predominantly target agreement classes. As will be shown in §3, this situation no longer holds for the application of the approach to many other Niger-Congo languages, where the analysis of "noun classes" often, if implicitly, refers to noun form classes.

Later approaches to Bantu gender systems have introduced yet other conventions that may have enhanced philological comparability but blur cross-linguistic transparency. In particular, Bantuists (and some scholars like Welmers (1973 : 166) dealing with other Niger-Congo languages) make an additional "noun class" distinction of *1 vs. *1a (and possibly *2 vs. *2a). The first class of each pair comprises human nouns with the expected prefix and the latter contains prefixless kinship nouns and proper names. While descriptively adequate, this class differentiation is irrelevant for the inventory of agreement classes but more importantly hides the necessity of taking into account an additional noun form class Ø that has no unique counterpart in the agreement system (cf. the above discussion in connection with (1a) and (2a) from Swahili).[7]

[6] For the record, class *15 is most likely a grammaticalization from class *17 via the path locative > purposive > infinitive (cf. Haspelmath 1989).

[7] See Van de Velde (2006) for an extensive recent discussion of such nouns in Eton and Bantu in general. We do not follow his proposal of considering them as "genderless" nouns, because gender is defined here by agreement and their behavior in this respect clearly assigns them to the human gender.

AGR		NF	Number
X		Ø	SG, PL
*1(a)	u-, a-	*mu-	SG, TN
*3	gu-	X	SG
*18	mu-	X	TN
*2	ba-	*ba-	PL
*4	gi-	*mi-	PL
*15/17	ku-	*ku-	SG, TN
*5	di-	*i̯-	SG
*6	ga-	*ma-	TN, PL
*14	bu-	*bu-	TN
*7	ki-	*ki-	SG
*8	bi̯-	*bi̯-	PL
*9	ji-	*n-	SG
*10	ji̯-	X	PL
*11	du-	*du-	SG
*12	ka-	*ka-	SG
*13	tu-	*tu-	PL
*16	pa-	*pa-	TN
*19	pi̯-	*pi̯-	SG

Note: X = no independent class counterpart in the other class type.

Figure 7: Mapping of agreement and noun form classes in Proto-Bantu

Figure 7 shows the mapping of agreement and noun form classes in Proto-Bantu arising from Table 2 (including the additional "noun class" *1a). Overall, one-to-one trigger-target mapping as well as alliteration are salient but also have important exceptions. The different number of agreement classes and noun form classes alone, namely 18 vs. 16, implies that the gender system and the deriflection system of Proto-Bantu cannot turn out to be completely parallel. In this context, the symbol X in this and later schemas stands for the case where no unique counterpart exists for a class in the opposite class type. (The alignment between classes of different type by a horizontal or a sloping line is arbitrary in Figure 7; in the case of historically rooted alliteration, it is useful to connect such etymologically "proper" counterparts by the horizontal line, which will be done in appropriate cases later on.)

A full comparison of the gender and the deriflection systems in Proto-Bantu as reconstructed from the hypothesized "noun class" behavior is shown in Figure 8, which follows the presentation in Figures 4 and 6. In the gender system on the left side of Figure 8, at least some transnumeral noun groups marked by circles must be analyzed as establishing genders in their own right, because the respective agreement classes cannot be unambiguously associated with a single paired gender, as is the case for AGR6, AGR16, and AGR18 (AGR15/17 and AGR14 are arguably singularia tantum of two paired genders with AGR6 in the plural).

As can be expected, Figure 8 demonstrates considerable differences between the gender and the deriflection system, even more extensively than in Ikaan, despite the still considerable one-to-one alliterative mapping in Figure 7. While the gender system with 18 agreement classes is convergent in the above terms and comprises 10 paired genders and at least 3 single-class genders, the deriflection system with 16 noun form classes is crossed and involves 12 types of morphological number alternations besides 5 types of transnumeral nouns.

Similar or even more dramatic cases of divergence between the gender system and the "gender-like" deriflection system are normal in Niger-Congo, and the problems associated with the traditional "noun class" concept have been recognized in both language-specific and comparative research. The reader is referred to the revealing theoretical and methodological discussion in such studies as Guthrie (1948) for Bantu, and Voorhoeve & de Wolf (1969) and de Wolf (1971) for Benue-Congo. As a consequence, Miehe (forthcoming : 33f) explicitly states that "the marking of nouns and the concord (agreement) systems in their formal and semantic multiplicity should be considered as independent paradigms with regard to their evolution."

Nevertheless, the philological tradition is so strong that even the only approach known to us that uses the very same analytical concepts as ours yields an analysis that is far from being transparent, namely that by Sterk (1978) for the Nupoid language Gade.

Table 3 betrays hardly any difference to our outline of analytical concepts in Table 1 of §1. The only point is Sterk's overgeneralization of the singular-plural pairing of classes with count nouns in that his last line of the table prescribes the feature "pairing" for "declension" (a.k.a. deriflection) and gender, thus excluding single class patterns with transnumeral nouns.

The real drawback in his description is his complex numbering of "classes", which aims to cater simultaneously for their morphological shape and their agreement behavior. He writes (ibid.: 27):

> We are now faced with the practical problem of how to classify Gade nouns.

AGR	SG	TN	PL	NF SG	NF TN	NF PL
X				Ø		Ø
*1(a)	u-, a-			MU-	MU-	
*2			ba-			BA-
*3	gu-			X		
*4			gi-			MI-
*15/17	ku-	ku-		KU-	KU-	
*5	di-			DI-		
*6		ga-	ga-		MA-	MA-
*14	bu-	bu-		BU-	BU-	
*7	ki-			KI-		
*8			bi̯-			Bi̯-
*9	ji-			X		
*10			ji̯-	N-		N-
*11	du-			DU-		
*12	ka-			KA-		
*13			tu-			TU-
*19	pi̯-			Pi̯		
*16		pa-			PA-	
*18		mu-		X		

Note: X = no independent counterpart in the other class type.

Figure 8: Gender system (left) vs. deriflection system (right) of Proto-Bantu

Table 3: Sterk's (Sterk 1978 : 25) concepts for analyzing Gade "noun classes"

	"Prefix" = noun form class	"Declension" = deriflection	"Class" = agreement class	"Gender"
"form"	+	+	–	–
"concord"	–	–	+	+
"pairing"	–	+	–	+

Note: "..." = Sterk's (Sterk 1978) term.

> Noun stems will have to be specified both for deriflection and for gender, since the one cannot always be predicted from the other. Rather than list noun stems in the lexicon with the double marking however, it is more convenient to devise a system which classifies them unambiguously, both for deriflection and for gender, with a *single marker*. This will be done by assigning numbers to prefixes, with the proviso: not only will prefixes of differing phonological shape be assigned a different number, but even prefixes of the same shape will be given a different number if the nouns they form part of belong to different [agreement] classes. (emphasis and additions ours).

Sterk's single-marker convention, which appears to be motivated by the equally conflating "noun class" concept, is the major reason that his presentation falls short of providing a transparent picture of Gade's nominal system (cf. also Sterk's (Sterk 1976) similarly complicated treatment of the Upper Cross language Humono). Our analysis concludes that Gade has a complex deriflection system of more than 30 patterns (albeit many restricted to very few if not a single noun lexeme) based on 13 noun form classes but a relatively simple system of three productive (and two inquorate) genders based on four regular agreement classes.

Comparing the situation in Ikaan, Proto-Bantu, and Gade a potential generalization emerges: in all cases, the agreement-based gender system is simpler (or at least not more complex) than the deriflection system in size and structure – this even if the basic inventory of agreement and noun form classes shows the opposite picture, as is the case in Proto-Bantu. More data supporting this observation follow in §3 regarding other Niger-Congo languages.

The previous discussion has argued that the Niger-Congo concept and term "noun class" is highly problematic. This is compounded by the fact that the term has come to bear different meanings in Niger-Congo studies, depending on di-

verse language-specific situations. Thus, in languages that lost (most of) the inherited agreement, "noun class" may just refer to noun form classes, as in a number of Gur languages, for example, Koromfe (Rennison 1997) (see also Good 2012 : §4.2). In a parallel fashion, in the apparently rarer case of the loss of transparent noun affixes with retention of agreement, the term "noun class" tends to mean merely agreement class, as is the case to varying degrees in Wolof from Atlantic (Babou & Loporcaro 2016) and Mundabli from Bantoid (Voll 2017) (see also Good 2012 : §4.3). Finally, the discussion in §3.2 below about Akan shows that some authors even use "noun class" for deriflection (class). From a global typological perspective, yet another complication arises from the terminological tradition in other geographical areas: in Caucasian and partly Australian languages, the term "noun class" refers to gender. The same usage has been proposed by Aikhenvald (2000) for typological investigation in general, the term "gender" being restricted to sex-based agreement systems. We consider this proposal to be unfortunate because it not only diverges from Corbett's (Corbett 1991) earlier and widely accepted terminology but also disregards the fact that in Niger-Congo, the largest language family on the globe where "noun class" plays a central role, it does conventionally not refer to gender (pace the statement in some relevant studies, e.g., Kilarski 2013 : 1). In view of the multiple ambiguity of the term "noun class", covering in fact all the four analytical concepts outlined in §1, we do not use the term in any other meaning than the original philological one in Niger-Congo and employ it in quotation marks for the sake of clarity.

3 Examples for the treatment of individual Niger-Congo groups

3.1 Introduction

As was said above, the approach to Niger-Congo gender and deriflection systems in terms of "noun classes" has been and still is the rule. In the following we show that as a result analyses of individual languages and attempted reconstructions of language groups[8] often deal predominantly or exclusively with the

[8]Until now, (partial) reconstructions of gender and deriflection systems exist for relatively few of the numerous Niger-Congo groups. In addition to Bantu, we are aware of those for Gur (Manessy 1967 , Manessy 1975 ; Miehe et al. 2012), Ghana-Togo-Mountain (Heine 1968 , see §3.3), Benue-Congo (de Wolf 1971), Mbaic (Bokula 1971 , Pasch 1986), Atlantic (Doneux 1975), Non-Bantu Bantoid (Hyman 1980), Edoid (Elugbe 1983), Lower Cross (Connell 1987), and Guang (Manessy 1987 , Snider 1988 , see §3.4). In addition, comparative treatments exist on groups that are uncertain members of Niger-Congo (see Güldemann 2018) but have typologi-

system of number inflection rather than gender. We demonstrate and elucidate this mistaken approach with data from Akan (§3.2), Guang (§3.3), and Ghana-Togo-Mountain (§3.4). These geographically close but structurally sufficiently diverse Niger-Congo groups in West Africa that are commonly subsumed under the ambiguous concept of Kwa (see Güldemann (2018) for more discussion on the problematic genealogical classification) represent a convenience choice. The discussion would hardly differ by using other Niger-Congo groups and our approach has indeed been applied with the same results to other relevant languages, for example, Kisi, Wolof, Fula, and Laala from Atlantic, Miyobe from Gur, C'lela and Gade from Benue-Kwa, and Mbane from Ubangi.

We will proceed in our analysis according to the framework outlined in §1. For each language (or proto-language), we first present the agreement class system in the form of a table. This table represents each class by means of exponents in the most important agreement targets, records its behavior regarding number, and, if applicable, gives the default noun form class. We number the language-specific classes by Arabic numbers either according to the source or our own arbitrary choice; these numbers are preceded by an acronym of the language in order to avoid any facile association with the comparative Bantu~Niger-Congo system. The gender system is established on the basis of the attested mapping of these agreement classes over the relevant number categories and presented in the form of a figure. Agreement classes are represented by one maximally distinct agreement target, similar to previous schemas; genders only receive a label in systems with few distinctions and reasonable clear semantics. Salient sets of transnumeral nouns are marked as usual by circles in the structural schemas; those that cannot be assigned to a paired-class gender in a straightforward way would establish separate single-class genders. Doubtful genders, including "inquorate" ones in terms of Corbett (1991 : 170–175), that is, agreement-based sets of nouns whose small size is arguably insufficient to merit incorporation into the grammatical gender system, may be marked by broken lines or circles. This practice is at best approximate, as the available data are insufficient; notably because they usually do not give a full picture about lexical frequencies. In general, the following overviews of gender (and deriflection) patterns are "structural" systems that may have to be changed with more comprehensive information about the entire nominal lexicon of a language.

The description of the agreement and gender systems is followed by the investigation of noun form classes and the resulting deriflection system. Noun form

cally similar nominal systems such as Heibanic (Schadeberg 1981a), Talodic (Schadeberg 1981b), and Kru (Marchese 1988).

classes, which are represented by an abstract thematic element in capital letters, are also given in a table that includes their number behavior and representative sample nouns. As far as possible, we take the Ø-marked class (e.g., loans, personal names, kinship terms) into account. The deriflection system is represented in a parallel fashion to the gender system.

Finally, in order to elucidate the relationship between gender and deriflection system, we discuss the discernible correspondences and mismatches between agreement and noun form classes. These are schematized in figures similar to those given above. In doing so, we try to reflect, if appropriate, the original (alliterative) match between agreement and noun form class, which is assumed to originate in an older Niger-Congo state and whose best proxy at the present is still the relatively coherent Proto-Bantu system.

The following discussion involves at several places an assessment of Niger-Congo systems regarding a notion of complexity that differs from that focussed on in §2, which was concerned with systemic organization. In line with Di Garbo's (Di Garbo 2014 : 41, 179) first principle of absolute complexity, the characterization here ascertains a system's number of genders (and deriflections). Our evaluation is done against the background of the widely assumed Proto-Niger-Congo state, which, when modeled on Bantu, would have involved around ten or even more distinctions in both domains, as well as Corbett's (Corbett 2013) typological approach, which assigns the label "complex" to gender systems with five or more distinctions. That is, we consider a Niger-Congo system as reduced (or no longer as complex), if its inventory has been decreased to a value lower than Corbett's typological threshold for his highest degree of complexity. Note the partly misleading bias toward this typological standard, because a system with five genders like in Logba (Ghana-Togo-Mountain) is certainly reduced vis-à-vis the proto-state but still counts here as complex.

3.2 Akan

Akan is the first linguistic entity to be discussed. It is a larger language complex that is the core of a group of closely related languages called Akanic, which in turn is classified under the Potou-Akanic family (Stewart 2002). Akan's most important dialects in Ghana are Akuapem, Fante and Asante (Dolphyne & Dakubu 1988 : 57).

The evaluation of the synchronic nominal system of Akan undertaken by various authors differs considerably, and none transparently captures the full picture of a system with complex number inflection and, in some dialects, a simple animacy-based gender system. We argue that this is due to a large extent to the

problematic philological Niger-Congo tradition outlined in §2.

Earlier authors like Christaller (1875), Dolphyne & Dakubu (1988), etc. recognize nominal prefixes in Akan but do not relate these to a nominal system of the Niger-Congo type, thus failing to identify any possible grammatical aspect of "noun classes". Following Welmers' (Welmers 1971 : 4–5) short notes, Osam (1993) is possibly the first author who analyzes the nominal prefixes as vestiges of a formerly complex "noun class" system. Equally important is that the author also discusses agreement phenomena that are arguably remnants of the inherited Niger-Congo gender system. Given the focus of this paper, these need to be outlined in more detail.

For one thing, there is number agreement between nouns and a sub-group of attributive adjectives in that the latter receive a prefix in the plural. The nasal prefixes on both the trigger and the target in example (4b) suggest that there is correspondence in gender and number between the pluralized noun and the modifying adjective.

(4) Akan (Osam 1993 : 98, 87)

a. ***a****-bofra kakramba*
A-child small
'small child'

b. ***m****-bofra* ***n****-kakramba*
N-child PL-small
'small children'

The author's explanations and additional examples as that in (5) make it clear, however, that formal prefix identity as in (4b) is coincidental. Although this is not stated explicitly, the available data suggest that plural marking on adjectives is lexicalized and thus independent of the noun, so that synchronically this phenomenon does not entail gender.

(5) Akan (Osam 1993 : 98)

a. ***a****-kyen* ***n****-kakramba*
A-drum PL-small
'small drums'

b. ***n****-tar* ***e****-tuntum*
N-dress PL-black
'black dresses'

However, some Akan dialects like Fante and Bron also display verbal subject cross-reference in which the agreement with the relevant nominal referent operates according to the feature of animacy, as shown in (6) for singular number and systematized in the full picture of Table 4.

(6) Akan ((Osam 1993 : 93))

a. ***ɔ***-*bɛ-yera*
1-FUT-be.lost
's/he will be lost'

b. ***ɛ***-*bɛ-yera*
3-FUT-be.lost
'it will be lost'

Table 4: Agreement system of some Akan dialects (based on Osam 1993)

AGR	Number	Verb prefix	Semantics
AK1	SG	*ɔ-, o- = O-*	animate
AK2	PL	*wɔ-, wo- = wO-*	animate
AK3	SG, PL	*ɛ-, e- = E-*	inanimate

Note: multiple forms due to vowel harmony.

Despite the data presented, Osam's (Osam 1993 : 99–100, 102) major conclusions are that modern Akan "does not have a functioning noun class system" nor "a concordial system", whereby he presumably refers to such elaborate and productive ones as in Bantu and similar Niger-Congo groups. From a typological perspective, however, Akan dialects like Fante and Bron must be analyzed as having a gender system that is structurally of the parallel type and semantically driven by a distinction of animate vs. inanimate nouns, as shown in Figure 9.

Bodomo & Marfo (2006) is another study dealing with the nominal system of Akan. These authors explicitly contradict one of Osam's conclusions in identifying a functional "noun class system" on account of nominal affixation, which not only involves prefixes but also suffixes. As just another token of the theoretical and terminological confusion in Niger-Congo studies, "noun classes" in their terms are sets of nouns showing the same singular/plural affix pairing, that is, classes of number inflection or deriflection in the above, and for that matter common typological, approach. The authors describe a complex system of 9 "noun

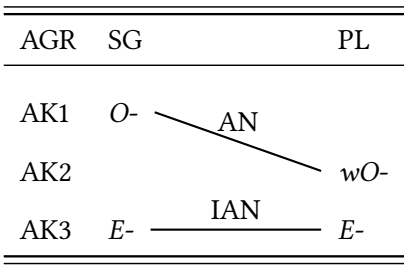


Figure 9: Gender system of some Akan dialects (based on Osam 1993)

classes" a.k.a. deriflections, which partly involve class pairs and subclasses. This is exemplified in Table 5 and schematized in Figure 10.

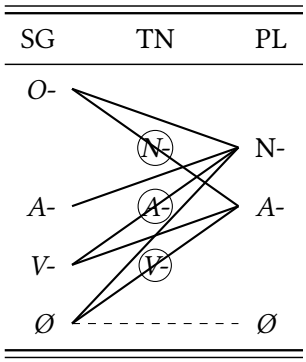


Figure 10: Deriflection system of Akan (based on Bodomo & Marfo 2006)

As can be seen in Table 5, some of the authors' "noun classes" a.k.a. deriflections, namely 5, 6 and 7, which all relate to various types of human nouns, involve suffixes in addition to prefixes. Except for the pattern 5b, these suffixes do not create deriflection types that do not already exist on account of the 5 prefix-based noun form classes. For this reason we only integrate the new Ø/Ø prefix pattern (see the broken line) in our analysis of the deriflection system in Figure 10. This system involves 8 patterns for count nouns and three for transnumeral nouns. From a structural perspective, it is a complex crossed system because all types of singular noun forms except for the *A*-class combine with the two productive plural form classes *N*- and *A*-.

As discussed above, only some varieties of Akan have a parallel system of two genders. Here, the inventory of three agreement classes is so reduced that any

Table 5: Declension system of Akan (based on Bodomo & Marfo 2006 : 214–217)

"Noun Class" a.k.a. deriflection	Example(s) Meaning	Singular	Plural
1: *V-/N-*	–		
a: *O-/N-*	'female'	*ɔ̀-bàà*	*m̀-máá*
b: *A-/N-*	'cloth'	*à-tààdé*	*ǹ-tààdé*
c: *(V)-/N-*	'time'	*ɛ̀-brɛ́*	*m̀-mrɛ́*
2: *Ø-/N-*	–		
	'mountain'	*bépɔ́*	*m-mépɔ́*
3: *V-/A-*	–		
a: *O-/A-*	'elephant'	*ɔ̀-sɔ́nɔ̌*	*à-sɔ̌nɔ̌*
b: *(V-)-/A-*	'house'	*ɛ̀-fíé*	*à-fie*
4: *Ø-/A-*	–		
	'veranda'	*bámá*	*à-bámá*
5: *(V-)/(A-)_-nʊm*	**Kinship**		
a: *V-/A-_-nʊm*	'father'	*à-gyá*	*à-gyá-nʊ́m*
	'wife'	*ɔ̀-yírí*	*à-yírí-nʊ́m*
b: *Ø-/Ø-_-nʊm*	'aunt'	*sɛ̀wáá*	*sɛ̀wáá-nʊ́m*
6: *(O)-_-ni/A-_-fʊɔ*	**Identity/occupation**		
a: *O-_-ni/A-_-fʊɔ*	'Christian'	*ò-krǐstò-ní*	*à-krǐstò-fúɔ́*
b: *Ø-_-ni/A-_-fʊɔ*	'teacher'	*tíkyà-ní*	*a-tíkyà-fʊ́ɔ́*
7: *(O)-_(-ni)/N-_-fʊɔ*	**Identity**		
a: *O-_-ni/N-_-fʊɔ*	'Muslim'	*ò-krɛ̀mò-ni*	*ǹ-krɛ̀mò-fʊ́ɔ́*
b: *O-_-Ø/N-_-fʊɔ*	'ghost'	*ɔ̀-sámáń*	*ǹ-sàmàǹ-fʊ́ɔ́*
8: *A-*	**Deverbal derivation**		
	'farming'	*à-dɔ́*	
9: *N-~V-*	**Mass**		
a: *N-*	'water'	*n-su*	
b: *V-*	'fire'	*ɛ̀-gyá*	

correspondence between these and the numerous noun form classes can only be limited. In fact, the only clear match in both form and meaning exists between AK1 with the exponent *O-* and NF *O-*; both mark (predominantly) animate singular nouns. Obviously, this situation diverges considerably from the picture involving "noun classes" of Bantu-type languages which involve both agreement and morphological form.

In summary, the Niger-Congo tradition clearly fails to capture the structures encountered in Akan. Its conceptual framework has even misled descriptive linguists, although the picture as such is not hard to understand as involving a complex, semantically sensitive deriflection system and in some dialects a far simpler agreement-based gender system steered by animacy. As for Osam (1993), he fails to clearly identify both phenomena in spite of providing most of the relevant empirical data. Bodomo & Marfo (2006 : 206), in turn, state that "An overview of … nominal morphology shows that the most appropriate criterion that can be used to set up noun classes is number – i.e. singular and plural – categorization," while "concord marking … is not a very sufficient criterion." They thus acknowledge that mainstream Akan has a system of overt noun classification by means of nominal morphology but fail to observe explicitly that this type of nominal categorization is crucially different from gender in general and the original Niger-Congo system in particular (this apart from not dealing with the animacy-based gender system in some dialects).

3.3 Guang

3.3.1 Introduction

The second language group we deal with is the Guang family, which like Akanic belongs to the larger Potou-Akanic lineage within Benue-Kwa. Guang languages are known for their elaborate nominal prefix system but are said to show little in the way of agreement.

> In all the Guang languages, singular and plural of nouns is [sic] indicated by prefixes. None exhibit concord systems, such as are found in many of the Central Togo languages [= Ghana-Togo-Mountain, cf. §3.4]. There is, however, at least a trace of number agreement between the noun and some types of adjectives in South Guang, Gichode, Krachi, and some dialects of Nchumburu … (Dolphyne & Dakubu 1988 : 82)

Most attempts to define Guang "class" systems are thus restricted to noun form classes and disregard concord (and the potentially resulting genders). Our

ongoing research aimed at a typologically informed survey of the Guang family reveals that the picture, summarized in Table 6, is in fact far more diverse.

Table 6: Overview over gender systems in Guang

Languages	Gender agreement	Number inflection
Chumburung, Foodo, Gichode, Ginyanga, Nawuri	complex	complex
Efutu, Gonja, Gua-Cherepong, Krachi, Larteh, Nkonya	reduced	complex
Dompo, Nterato, Dwang, Kplang, Nchumbulu, Tchumbuli	insufficient information	insufficient information

Table 6 shows that gender agreement is indeed strongly reduced in several Guang languages, largely to an animacy differentiation illustrated in Figure 11 with the case of Gonja, which is parallel to the situation in the relevant Akan dialects treated in §3.2. However, several languages still possess quite complex gender systems, for example, Chumburung, which we illustrate in §3.3.2.

	SG		PL
GO1	*e-*	AN	
GO2			*bo-*
GO3	*ki-*	IAN	
GO4			*a-*

Figure 11: Gender system of Gonja (based on Painter 1970)

3.3.2 Chumburung

Chumburung, according to the description by Hansford (1990: 266ff), is a Guang language with a more canonical nominal system. Its agreement system concerns both the noun phrase in the form of quantifier agreement, as in (7), and a variety of other morpho-syntactic contexts with anaphoric pronominal agreement, for example, the conjoined noun phrase in (8). Other targets of the second type of concord are pronominal forms for 'certain', 'one of', 'each, any', 'which' and demonstratives (Hansford 1990 : 184); when these are used as modifiers within a noun phrase, they do not agree with their head. A similar situation holds for verbal subject and object cross-reference and relative clauses, as in (9) (Hansford 1990 : 450). The full system of seven agreement classes is provided in Table 7.

(7) Chumburung (Hansford 1990 : 270, 201)

a. ***à**-wààgyà dìdáá **á**-nyɔ́ mɔ̀*
A-cloth(**6**) old **6**-two DEM
'these two old cloths'

b. ***ì**-wórí **í**-nyɔ́ **í**-nyɔ̀*
I-book(**4**) **4**-two **4**-two
'pairs of two books' (distributive)

(8) Chumburung (Hansford 1990 : 266)
*wààgyà gyígyíí nà **ó**-pípéé*
Ø:cloth(**1**) black and **1**-red
'a black and red cloth [lit.: a black cloth and a red one]'

(9) Chumburung (Hansford 1990 : 267, 451)
kì-bígyá ní kí í gyí sí ó
KV-side(**3**) REL **3** IPFV eat on REL
'… the side that will win'

While Hansford does not give a schematic overview of the gender system, his description of the mapping of agreement classes over number categories allows one to establish the system in Figure 12 with six paired and at least four single-class genders.

When compared to the widely assumed Niger-Congo proto-type, this complex crossed system is in several respects remarkable. This is largely a function of the nature of agreement classes. For one thing, all agreement classes occur

Table 7: Agreement class system of Chumburung (based on Hansford 1990)

AGR	Number	SBJ	OBJ	Pronominal	NF default
CH1	SG, TN	*ɔ-/o-*	*̀-*	*ɔ-/o-*	–
CH2	TN, PL	*bʊ-/ba-*	*bá-*	*bʊ-/ba-*	–
CH3	SG, TN	*kV-*	*kí-*	*kʊ-/kɪ-*	*KV-*
CH4	TN, PL	*i-/ɪ-*	*í-*	*ɪ-*	*I-*
CH5	SG, TN	*ka-*	*ká-*	*ka-*	*KA-*
CH6	TN, PL	*a-*	*á-*	*a-*	*A-*
CH7	TN, PL	*N-*	*ḿ-*	*ŋ-/m-*	*N-*

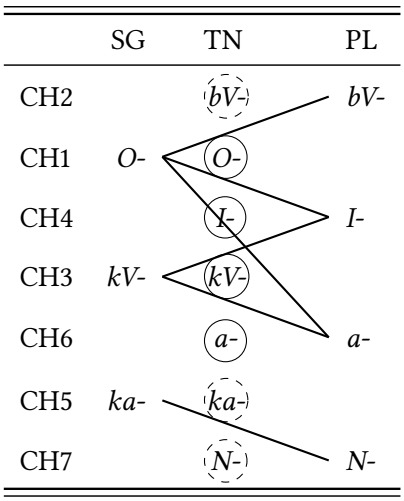


Figure 12: Gender system of Chumburung (based on Hansford 1990)

with transnumeral nouns, so that at least some are not dedicated to a single number feature. For CH2, CH5, and CH7, one may avoid positing separate single-class genders by arguing that these nouns represent special transnumeral cases, namely singularia tantum or pluralia tantum that can be associated uniquely with particular paired genders, namely CH1/CH2 and CH5/CH7. However, this solution is not possible for similar nouns in the remaining four agreement classes, because it would be an ad-hoc decision at this stage to assign these nouns to one of the two or even three paired genders the relevant class partakes in. The last fact is another non-canonical finding in the present philological context, namely that only the three aforementioned classes, CH2, CH5, and CH7, have a unique counterpart in their opposite number feature and are thus dedicated to a paired gender. Overall, Chumburung agreement classes only poorly meet the Niger-Congo expectation that "noun classes" only have one number and one gender value.

The system of seven noun form classes described for Chumburung, including the group of prefixless nouns, are exemplified in Table 8, while Figure 13 displays their mapping over number categories in the deriflection system.

Table 8: Noun form class system of Chumburung

NF	Form		Examples
Ø	–	SG	*dáá* 'elder brother', *bʊ́rí* 'voice'
		TN	*gyàbwíí* 'honey', *sáŋ* 'time'
O-	*o-/ɔ-*	SG	*ó-wúrè* 'chief', *ɔ̀-dɔ̀ɔ́* 'fishing net'
		TN	*ɔ̀-tʊ̀rí* 'morning star'
I-	*i-/ɪ-*	TN	*í-bírísí* 'evil spirit(s)'
		PL	*í-bʊ́rí* 'voices', *ì-dɔ̀ɔ́* 'fishing net', *ì-síbɔ́* 'ears', *í-bá* 'coming (PL)'
KV-	*ki-/kɪ-/*	SG	*kì-yéé* 'meat', *kì-síbɔ́* 'ear', *kí-bá* 'coming'
	ku-/kʊ-	TN	*kì-tìrì* 'poverty'
A-	*a-*	TN	*à-bání 'government'*
		PL	*á-dáá* 'elder brothers', *á-wúrè* 'chiefs', *à-yéé* 'meats'
KA-	*ka-*	SG	*ká-mé* 'stomach'
		TN	*ká-nyíté* 'patience', *ká-kyínà* 'life'
N-	*n-/m-/*	TN	*m̀-bʊ̀gyà* 'blood', *m̀-bèráá* 'law'
	ɲ-/ŋ-	PL	*ḿ-mé* 'stomachs'

The deriflection system, presented by Hansford with example nouns, comprises 7 types of singular-plural pairings, and all noun form classes also occur

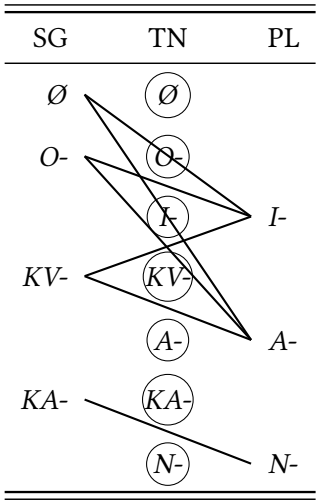


Figure 13: Deriflection system of Chumburung (based on Hansford 1990 : 156–161)

with transnumeral nouns. Although this crossed system is overall similar in structure and size to the gender system in Figure 12 with 6 paired and 4 single-class patterns, it is more complex than the latter on account of having 7 paired deriflections.

	AGR	NF	Number
	X	Ø	TN, SG
CH1	*O-*	*O-*	TN, SG
CH3	*kV-*	*kV-*	TN, SG
CH5	*ka-*	*kA-*	TN, SG
CH4	*I-*	*I-*	TN, PL
CH6	*a-*	*A-*	TN, PL
CH7	*N-*	*N-*	TN, PL
CH2	*bV-*	X	PL

Note: X = no independent class counterpart in the other class type.

Figure 14: Mapping of agreement and noun form classes in Chumburung (based on Hansford 1990 : 156–161)

The concrete differences between the systems of genders and deriflections are

due to a number of mismatches between agreement and noun form classes, as shown in Figure 14. These exist in spite of the still considerable formal correspondence between the two sets that is expected from the inherited one-to-one alliterative mapping. A predictable mismatch is the existence of the Ø-noun form class that has no independent match in the agreement system. Another difference arises from the loss of the reconstructable noun form class counterpart of CH2; the relevant nouns are found today in two other noun form classes in *A-* (a potential reflex of the expected prefix *ba- through loss of the initial consonant) and *N-*. Both points are related to another important phenomenon also found in other Guang languages; namely that the semantic criterion of animacy overrides the inherited, more elaborate formal gender assignment. That is, all human nouns irrespective of their form class prompt agreement according to singular CH1 and plural CH2 (the noun form class in *I-* is the only one without human nouns). The power of this semantic criterion can also be seen when analyzing the agreement triggered by proper nouns: all singulars agree according to CH1; all plurals referring to humans, personified animals and supernatural beings belong to CH2 while the rest follows CH4 or CH6 (Hansford 1990 : 166).

3.3.3 Proto-Guang

The "noun class" system of the Guang family has been subject to historical-comparative reconstruction independently but roughly at the same time by Manessy (1987) and Snider (1988). We discuss their results in the following before the background and in accordance with the presentation of our Chumburung analysis in the Figures 12 and 13.

As already suggested by Manessy's term "système classificatoire" (instead of "gender system"), this author takes both noun form classes and agreement in the pronominal system of some languages into account, although the latter was at his time only available for two languages, namely Nkonya (Westermann 1922 , Reineke 1966) and Gonja (Painter 1970). For all other languages, he merely had access to wordlists that only rarely contained information on agreement. A yet greater problem of his analysis is that he follows the philological approach in explicitly (ibid.: 42) conflating noun form and agreement classes into a single Guang reconstruction, given in the left schema of Figure 15.

Snider (1988) deduced the "noun class" system of Proto-Guang by looking at the noun prefixes of nine of the 18 family members without mentioning at all possible agreement forms. He observed a major difference between Northern and Southern Guang, the former being richer in noun form classes, and concluded (ibid.: 138):

> … that proto-Guang had a system at least as complex as the most complex present day Guang languages and that the southern Guang languages represent a collapsing of classes.

The system he established for Proto-Guang is displayed in the middle of Figure 15; we have added the three single-class patterns mentioned by him when discussing the individual noun form classes.

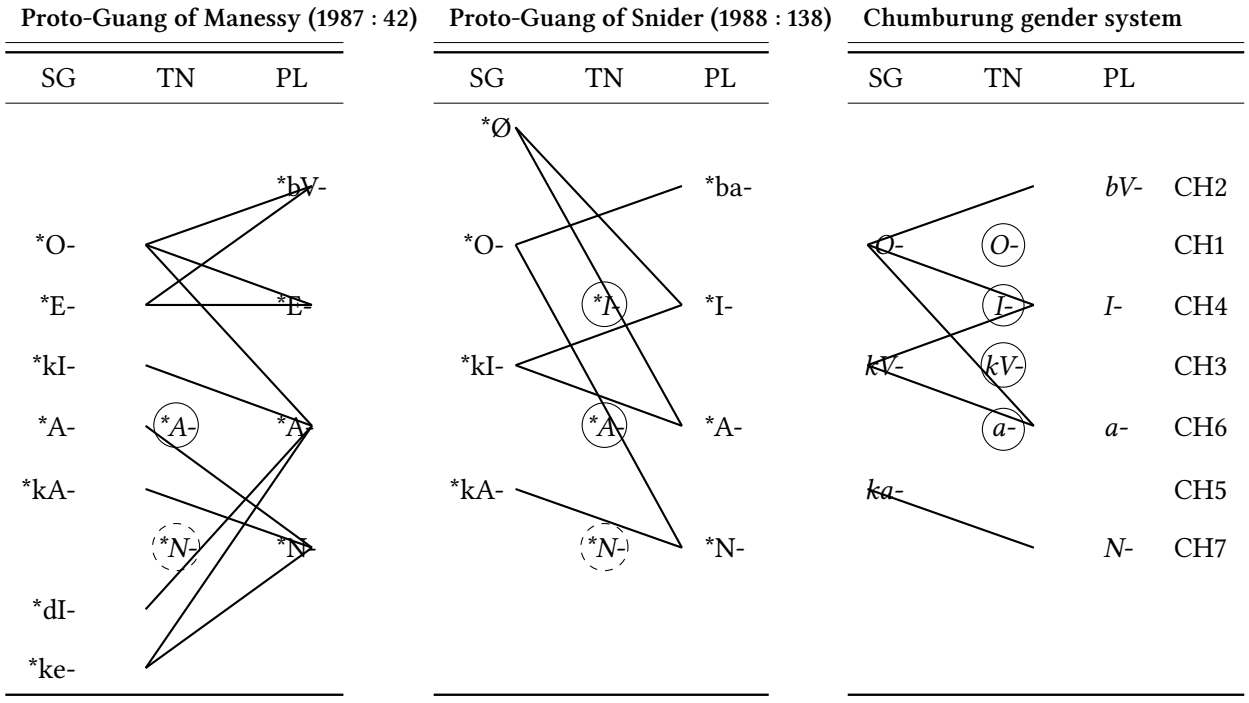


Figure 15: Noun classification systems of Proto-Guang and Chumburung

We briefly show in the following that both Proto-Guang systems in Figure 15 are biased toward the situation in other West African class languages and/or the authors' assumptions about Proto-Niger-Congo. Moreover, the primary source for the analysis are noun form classes, even though agreement classes are taken into account to some extent. This bias and the conflation of all data into a single "noun class" system causes serious errors in their reconstruction results, so that they not only differ from each other but also both fail to yield a likely approximation to either the gender or the deriflection system of Proto-Guang. The last point is evident from an inspection of the gender system in such modern languages as Chumburung (repeated from §3.3.2 on the right side of Figure 15).

The following can be observed regarding the (non)overlap between the two proto-systems. Manessy and Snider only agree on the three class pairs *kI-/A-, *ka-/N-, and *O-/bV-, all of which are also attested as genders in modern Chumburung. Both Manessy (1987 : 27) and Snider (1988 : 141) reconstruct a plural prefix *bV- or *ba-, although they observe its exceptional status in that it only occurs as such in Gonja; they claim it to belong to the proto-language because of its wide distribution in Niger-Congo as well as its attestation as an agreement form for third-person plural (animate) in a range of Guang languages.

Snider reconstructs a Ø-class but merely as part of the number inflection patterns *Ø/I- and *Ø/A- without noting that these reflect agreement-based genders that in the singular involve the old Niger-Congo class *1, as can be observed in modern Chumburung (his additional nominal prefix pairing *O-/N- is so far not attested as involving a separate gender). Although Manessy (1987) appears to capture well the behavior of the old Niger-Congo class *1, he does not posit a Ø-class for nouns. According to him, most prefixless nouns in one language show a *kV*-prefix in another language, concluding that in the proto-language such nouns did not form a "noun class" (Manessy 1987 : 20); in our view this seems to be adequate with respect to agreement while not being the case for noun forms.

Another major divergence between the two reconstructions concerns all forms in *kV*-. Snider (1988 : 147–148) reconstructs the prefixes *ka- and *kI- (representing *ki*-, *kɪ*-, *ku*-, and *kʊ*-). Manessy (1987 : 12) additionally posits *ke- (representing *ke*-, *kɛ*-, *ko*-, and *kɔ*-), assumed by Snider to be due to phonetically inaccurate data. All Guang languages only have a binary distinction of *kV*-forms in the agreement system but, due to the complexity of the vowel phonology, dispose of a wider range of relevant forms on nouns. Thus, Manessy's two class pairs based on a third *ke- do not seem to be warranted, because they are only attested in Gichode (and probably Ginyanga) as genders and deriflections in opposition to a *gI*-class, so that putative *ke- may merely be a reflex of *kA-.

Manessy's Proto-Guang reconstruction is problematic in several other respects. His pair *E-/bV- only exists as a gender and deriflection in Gonja (see Figure 11). He also posits a singular prefix *dI- (paired with plural *A-), although it is only attested in such a gender in Foodo (which was not part of Snider's language sample). Manessy includes *dI- for Proto-Guang, because there are nouns with a *lV*-prefix in some other Guang languages and the prefix is "fort commune dans les langues à classes d'Afrique occidentale et que pour cette raison nous tenons pour ancienne [very common in the class languages of West Africa and for that reason we consider to be old]" (Manessy 1987 : 41). His reconstructions *E-/E- and *A-/N- are not attested genders in any language and are also questionable as reconstructable deriflections. Finally, he fails to identify the pairing *kI-/E-.

A general conclusion about Manessy's and Snider's historical-comparative work on Guang is that their philological approach generates reconstructions that reflect the agreement and resulting gender system inadequately. In particular, their focus on noun form classes seems to result in proto-systems that are overly complex for the domain of genders.

3.4 Ghana-Togo-Mountain

3.4.1 Introduction

The Ghana-Togo-Mountain languages (formerly known as Togo Remnant) are spoken in Ghana, Togo and Benin. Besides the relevant Guang languages, they are well known within Kwa for class systems that retain both rich agreement and noun prefix patterns. Historical comparisons across these languages are complicated by their unresolved genealogical classification in that they are viewed either as a single lineage according to the traditional view or as forming at least two families according to more recent research (cf. Blench 2009 for a relevant discussion). Table 9 shows the subclassification of the languages after Hammarström et al. (2018) and the profile of their noun categorization systems according to Güldemann & Fiedler (2016).

As with Guang in §3.3, we will first present the synchronic gender system of one modern Ghana-Togo Mountain language before turning to historical approaches to the entire group.

3.4.2 Lelemi

We have chosen the Na-Togo language Lelemi (as described by Allan (1973) with a focus on the Baglo variety) as an example, because it possesses a complex gen-

Table 9: Inventory, classification and noun categorization profile of Ghana-Togo-Mountain languages

	Language(s)	Gender agreement	Number inflection
Na-Togo	Anii, Adele, Lelemi, Siwu, Sekpele, Selee, Logba	complex	complex
	Boro (†)	no information	no information
Ka-Togo	Avatime, Nyangbo, Tafi, Tuwuli, Akebu	complex	complex
	Igo, Animere	reduced	complex
	Ikposo	absent	absent

der system and it has also been included in the typological gender survey by Corbett (1991).

Lelemi nouns prompt agreement on a variety of targets such as determiners, ordinal numerals, the cardinal numeral 'one', participles, as in (10), and relative pronouns, as well as anaphoric cross-reference, as in (11). As opposed to Heine (1968 : 115), Allan's data do not provide evidence for adjectival agreement.

(10) Lelemi (Allan 1973 : 178)
kɔ̀-*làkpi* ***kɔ̀***-*dun-di*
KO-snake(**6**) **6**-kill-PART
'a killed snake'

(11) Lelemi (Allan 1973 : 240-241)

ɔ̀-*nànà*	***ɔ́***-*mɛ̀*	***ɔ̀***-*dìa*	'this man	
bà-*nànà*	***bá***-*mɛ̀*	***bà***-*dìa*	'these men	
lɛ-*tɔ*	***lɛ́***-*mɛ̀*	***lɛ̀***-*dìa*	'these houses	
a-*nimì*	***á***-*mɛ̀*	***à***-*dìa*	'this rice	
kɔ-*di*	***kɔ́***-*mɛ̀*	***kɔ̀***-*dìa*	'this cloth	
ke-*mo*	***ká***-*mɛ̀*	***kà***-*dìa*	'this farm	
n-*tɛ*	***bɔ́***-*mɛ̀*	***bɔ̀***-*dìa*	'this palm wine	
NF-x	**AGR**-this	**AGR**-be.good	…	is/are good'

Table 10 summarizes the agreement system of Lelemi. Different from Allan (1973) we posit one more agreement class, LE4, for plural nouns with a prefix *LE-*, because these display a distinct set of concord exponents, which is intermediate between that of LE3 and LE5 (cf. bold-faced elements in the table).

Table 10: Agreement class system of Lelemi (based on Allan 1973)

AGR	Number	DEM/REL SBJ/PART*	POSS	OBJ	PRO	NF default
LE1	SG, TN	*ɔ-/u-*	*ŋwa*	*ŋ̀*	*àŋu*	–
LE2	PL	*ba-/be-*	*Bana*	*mà*	*àma*	–
LE3	SG	***lɛ-/li-***	***anya***	*nì*	*àni*	*LE-*
LE4	TN, PL	***lɛ-/li-***	***anya***	***nyà***	***ànya***	*LE-*
LE5	TN, PL	*a-/e-*	*ana*	***nyà***	***ànya***	*A-*
LE6	all	*kɔ-/ku-*	*kuna*	*kù*	*àku*	*KO-*
LE7	SG, TN	*ka-/ke-*	*kana*	*kà*	*àka*	*KA-*
LE8	TN, PL	*bɔ-/bu-*	*anya*	*mù*	*àmu*	–

Note: * forms vary tonally according to grammatical context.

The gender system is not given by Allan (1973) but can be deduced from the relevant behavior of agreement classes. Figure 16 shows that it comprises 9 paired and 7 single-class patterns.

Heine (Heine 1968 : 114–115, Heine 1982 : 197–198) has also presented an analysis of the noun classification system of Lelemi with a focus on the Tetemang variety, which in turn has been reanalyzed by Corbett (1991 : 173–175) from his typological perspective on gender. Figure 17 summarizes the results, including Corbett's argument that some agreement class pairs should be viewed as inquorate genders.

The considerable divergence between the gender systems in the Figures 16 and 17 may be partly accounted for by dialect differences, given that Allan and Heine focused on Baglo and Tetemang, respectively. It is clear, however, that some differences are due to diverse analytical approaches. One crucial point is the identification of the additional plural LE4 for which Heine (1968 : 115) also appears to present evidence with the demonstrative *-mɛ* but which Corbett (1991 : 173) discards as a case of an overdifferentiated target. Another major difference in Heine's analysis of Lelemi (albeit not in his family reconstruction, see §3.4.3) is the non-recognition of single-class genders, although there are some likely candidates, notably with LE8.

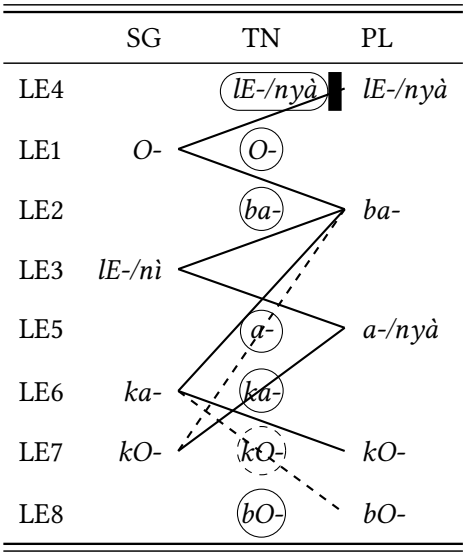


Figure 16: Gender system of Lelemi (based on Allan 1973)

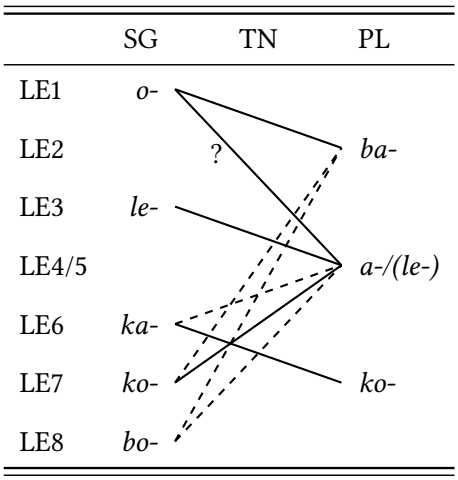


Figure 17: Gender system of Lelemi (based on Heine 1968 and Corbett 1991)

A final but important point regarding the previous analyses of Lelemi relates to the typologically oriented interpretation of the philological framework to Niger-Congo noun classification. That is, the description of Lelemi, couched by Heine (Heine 1968 , Heine 1982) in this tradition, misled Corbett (1991 : 173–175) to a confusing analysis in that he calls the language's genders inappropriately "agreement classes". That the presentation of Niger-Congo data in particular causes such problem appears to be significant, because in general this author has applied his cross-linguistic approach successfully to a wide range of structurally diverse and complex gender systems.

Turning to Lelemi's system of noun form and deriflection classes, Allan's information can be summarized as in Table 11 and Figure 18.

Table 11: Noun form class system of Lelemi (based on Allan 1973 : 97–124)[9]

NF	Form(s)		Example(s)
Ø	–	SG	*wɛwɛ* 'dog'
		TN	*sìka* 'money'; *twifɔ̀* 'Twi speaking person/people'
O-	*ɔ-/u-*	SG	*ù-culi* 'person'; *ɔ̀-gbà* 'foot'
		TN	*ù-bòja* 'blood'
BA-	*ba-/be-*	PL	*bà-wɛwɛ* 'dogs'; *bè-culi* 'people'; *bè-kùkù* 'owls'; *bè-se* 'goats'; *bà-làkpi* 'snakes'; *be-yu* 'monkeys'
LE-	*lɛ-/li-*	SG	*lì-kùkù* 'owl'; *lɛ-nimì* 'eye'
		TN	*lɛ-na* 'meat'
		PL	*lɛ̀-gbà* 'feet'
A-	*a-/e-*	SG	*è-se* 'goat'
		TN	*a-ba* 'mud'
		PL	*a-nimì* 'eyes'; *e-ji* 'trees'
KO-	*kɔ-/ku-*	SG	*kɔ̀-làkpi* 'snake'; *ku-ji* 'tree'
		TN	*ku-tu* 'soup'
		PL	*kɔ̀-bwa* 'hats'
KA-	*ka-/ke-*	SG	*ke-yu* 'monkey'; *kà-bwa* 'hat'; *ke-mo* 'farm'
		TN	*ka-na* 'porridge'
N-	*m-/n-/ŋ-*	TN	*n-tu* 'water'; *ŋ̀-kpa* 'life'
		PL	*m-mo* 'farms', *ǹ-culi* 'people (with NUM)'
BO-	*bɔ-/bu-*	TN	*bɔ-ŋwa* 'cooking'

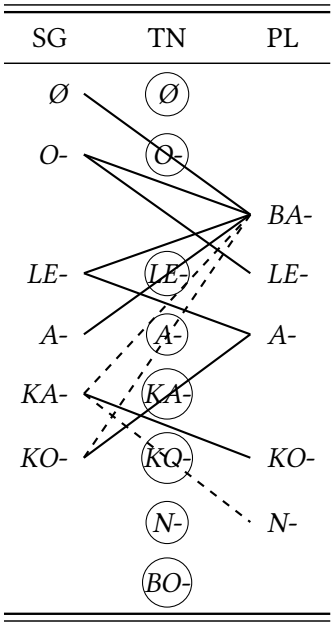


Figure 18: Deriflection system of Lelemi (based on Allan 1973 : 100)

Although Lelemi's crossed gender system is already complex, its deriflection system is yet more elaborate, due notably to an additional prefixless noun form class and another one in *N-*. It comprises 12 singular-plural affix pairings, albeit three of them inquorate. Noun form classes are remarkable regarding their number behavior in that most of them are attested with more than one number value (only *BA-* and *BO-* are restricted to plural animates and transnumeral infinitives, respectively), and three of them are even attested in both singular and plural. Most of the discrepancies between gender and deriflection are thus due to the fact that agreement and noun form classes show numerous patterns diverging from the expected biunique Niger-Congo canon, as shown in Figure 19.

3.4.3 Proto-Ghana-Togo-Mountain

The noun classification systems of Ghana-Togo-Mountain languages have been subject to historical-comparative analysis by Heine (1968). Since the very genealogical unity of the group is disputed, Heine's results are in principle controversial. In this context, however, we focus on another problem of his reconstruc-

[9]The tone marking in the table follows Allan's (Allan 1973) transcription: V́ high tone, V mid tone, V̀ low tone.

	AGR	NF	Number
LE2	*ba-*	*BA-*	PL
	X	*Ø*	SG, TN, PL
LE1	*O-*	*O-*	SG, TN
LE5	*a-*	*A-*	SG, TN, PL
LE3	*lE-*	*LE-*	SG
LE4	*lE-*	X	TN, PL
LE6	*kO-*	*KO-*	SG, TN, PL
LE7	*ka-*	*KA-*	SG, TN
LE8	*bO-*	*BO-*	TN, (PL)
	X	*N-*	TN, PL

Note: X = no independent class counterpart in the other class type.

Figure 19: Mapping of agreement and noun form classes in Lelemi (based on Allan 1973 : 128)

tion, namely that he closely follows the problematic philological approach to Niger-Congo "noun classes", which obscures a transparent treatment of gender and nominal deriflection. Heine (1968 : 112) writes:

> Ein Nominalklassensystem liegt vor, wenn
> a) Nominalklassen bestehen, d.h. die Nomina durch Affixe in Klassen eingeteilt werden,
> b) Paarigkeit der Klassenaffixe vorhanden ist, d.h. einem sg-Affix ein bestimmtes pl-Affix entspricht bzw. umgekehrt, und wenn
> c) nach einer Nominalklassenkonkordanz verfahren wird, d.h. wenn den Nominalklassenaffixen an verschiedenen grammatischen Kategorien regelmäßig zugeordnete Klassen-Zeichen entsprechen.
> [We speak of a noun class system if a) there are noun classes, that is, nouns are sorted by affixes into different classes; b) the class affixes occur in pairs, that is, a certain singular affix corresponds to a certain plural affix and vice versa; and if c) there is noun class concord, that is, if the noun class affixes correlate regularly with class exponents on different grammatical categories.]

Heine's awareness of the importance of agreement is reflected in his data presentation for single languages (ibid.: 113–123) as well as the exclusion of three languages from the reconstruction that according to him (ibid.: 276–277) no longer

display class concord, namely Ikposo, Igo, and Animere (it turns out that this holds in fact only for the first language). Nevertheless, he focuses predominantly on the nominal affix system and often conflates agreement and noun forms, which makes it hard to distinguish the two. Finally, when reconstructing the "noun class" system of the entire group (ibid.: 187–211), he almost exclusively discusses the noun affixes; only in rare, unclear cases does he resort to the role of agreement forms.

A final point, which has also been made in §3.3 regarding the comparative work on Guang, concerns the reconstruction bias toward Proto-Bantu. Heine's proto-system, schematized in Figure 20, demonstrates that the inventory and numbering of the majority of his "noun classes" are, to the extent possible, clearly modeled on and also implicitly justified (ibid.: 187) by the conflated Proto-Bantu system, whose two components were shown in Figure 8 of §2.

	SG	TN	PL	
1/3	*o-			
			*ba-	2
			*i-	4
7	*ki-			
			*bi-	8
5	*li-			
			*a-	6/10
9	*ku-		*ku-	15
13	*ka-			
		*bu-	*bu-	14
11		*N-		
12		*ti-		

Figure 20: "Noun class" system of Proto-Ghana-Togo-Mountain by Heine (1968 : 187)

Since Heine's (Heine 1968) work many studies dealing to different degrees with the noun classification systems of individual Ghana-Togo-Mountain languages have appeared. Despite the much more complete data available today it remains hard to reconstruct a robust proto-system, irrespective of the classificatory status of the group. This is because most language-specific treatments are still biased toward noun form classes and deriflections and neglect agreement, which is crucial for determining the gender system. That is, we have come

across studies for only three of the 16 languages where the agreement and resulting gender systems receive primary attention by the respective authors, namely Zaske (2007) on Anii, Essegbey (2009) on Nyangbo, and Agbetsoamedo (Agbetsoamedo 2014a , Agbetsoamedo 2014b) on Selee, while in all other descriptions this domain plays a secondary role, is overly conflated with noun form classes, or is lacking altogether.

4 Summary

We have outlined the traditional approach to the noun categorization systems of the Niger-Congo type found in a large number of African languages and argued that it is in need of revision for the sake of better language-specific synchronic as well as historical-comparative analyses. This holds in addition to the comparative bias toward the Bantu system, which tends to conceal a large part of the existing diversity across Niger-Congo languages.

One bias in the "noun class" framework is the strong focus on the affix status of class exponents. One consequence in the realm of noun form classes is the overall analytical neglect of nouns without class affixes despite their important and partly diagnostic role in the nominal system.

Another crucial problem of the current Niger-Congo approach is the stereotypical view about agreement and noun form classes in that the large majority of "noun classes" are assumed to be functionally dedicated to a specific gender and number value. As shown in the discussion of Proto-Bantu in §2, this situation is not even universal in the group that was the inspiration for this assumption. However, the degree of deviation from this hypothetical prototype can be much higher, so that this overgeneralized view should give way to a more neutral approach. In particular, this phenomenon throws a different light on the underlying number system in that the overall importance of transnumeral nouns seems to be higher than commonly assumed. That is, the data should no longer be dealt with according to a simple and universal singular-plural distinction.

The last and most important drawback of the traditional Niger-Congo framework is that its central concept of "noun class" conflates two independent linguistic phenomena associated with nouns: gender agreement between a nominal trigger and its target and deriflection reflected in morphological and/or phonological regularities of nouns. Their unified treatment has several negative effects for the current investigation of this domain. These are in particular an inappropriate focus on deriflection systems, a resulting neglect of a transparent and comprehensive analysis of agreement-based gender, and finally an impeded investigation

of the exact relationship between the two distinct components, including their complex interdependency.

The disadvantages of the "noun class" concept negatively impact the transparency and even adequacy of language-specific descriptions. In the worst case, it may be impossible to establish the inventory of a language's gender distinctions and its semantic and formal basis in spite of a lengthy treatment of "noun classes". As discussed above, this is not restricted to a case like the heavily restructured Akan treated in §3.2 for which scholars go into great detail about its classificatory morphology on nouns but fail to explicitly identify the occasional existence of an animacy-based gender system.

Synchronic descriptive problems inevitably carry over to the historical reconstruction of noun classification in Niger-Congo, as shown for the Guang and Ghana-Togo-Mountain groups in §3.3 and §3.4, respectively. The general bias toward the Bantu family aside, available proto-systems are not only unrealistic vis-à-vis the attested modern data but simply difficult to interpret linguistically in mixing distinct grammatical phenomena in a single paradigm.

Last but not least, it is hard to impossible for typologists to integrate a considerable amount of Niger-Congo data, in particular on complex systems, in cross-linguistic surveys on gender due to the intractable amalgamation of gender and deriflection. The typological incompatibility and thus "opaqueness" of many Niger-Congo descriptions deprives this research domain of interesting cases the analysis of which is necessary in order to arrive at meaningful cross-linguistic generalizations.

We venture that the cross-linguistic framework outlined in §1 is universally viable for language-specific, historical-comparative, and typological analyses. The restricted data presented here suggest several generalizations that are worth testing against a wider range of data. For example, the observation made in Güldemann (2000) that agreement classes need not be dedicated to specific gender and number values is demonstrably relevant for a much larger number of languages, and it can also be extended in Niger-Congo to noun form classes. As proposed in Güldemann (2000), the degree of this functional insensitivity of classes is reflected in the ratio between genders and agreement classes (or, for that matter, between deriflections and noun form classes). In typological comparison, this promises to serve as a good proxy for assessing basic structural differences between systems.

There is another conclusion that may turn out to be cross-linguistically significant, even though the data presented here are admittedly limited. That is, in languages with gender-sensitive noun morphology these deriflection systems are

regularly more complex, or at least not simpler, than the associated gender systems in terms of inventory as well as systemic structure as per Heine (1982) and Corbett (1991).

For Niger-Congo languages, one can assume that the two subsystems of this nominal domain were originally very similar. This suggests for this group that deriflection systems tend to be more conservative than gender systems. With respect to the former, the transfer of individual or entire groups of nouns from one to another noun form class, the merger of noun form classes, and the resulting effects on deriflections are certainly rampant in the family. However, the changes in agreement-based gender marking are recurrently even more frequent and drastic, up to the reorganization, or even loss, of the entire system.

As long as the divergences between the two subsystems of gender and deriflection are minor, they will not differ dramatically in terms of their classification of nouns into sets. However, quite a few cases in Niger-Congo are different. For example, Akan dealt with in §3.2 possesses a binary system of animate vs. inanimate gender but an elaborate deriflection system with more and different categorizing distinctions. Languages of this type inform the new topic of so-called "concurrent systems" of noun classification, as investigated recently by Fedden & Corbett (2017) but for which the authors failed to recognize the relevance of Niger-Congo. Thus, a more detailed and typologically sound investigation of some of its languages where deriflection and gender have grown apart is a very worthwhile undertaking for the future.

In summary, this paper attempts to make two major contributions to the treatment of gender. First, the linguistic analysis of Niger-Congo-type noun classification systems should be better aligned with a sound cross-linguistic perspective. The detrimental philological approach, which is of a substantial rather than merely terminological nature, is not necessitated by any linguistic structures in Niger-Congo, however quirky they may appear from a cross-linguistic view. Second, we make a new proposal for a universally applicable framework for gender systems, especially useful if gender interacts intimately with the morpho(phono)logy of nouns. The approach based on the four analytical concepts outlined in §1 could not be fully expounded here by means of a wider language sample. However, its viability has been shown for the specific gender-system profile of the important group of Niger-Congo languages. It has also been applied successfully to structurally quite different languages from such families as Kx'a and Tuu in southern Africa, Kadu and Cushitic in northeastern Africa, and yet others. Hence, we venture to review the approach to gender from a wider typological perspective in line with the present framework.

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Abbreviations

AGR	agreement class	NUM	numeral
AN	animate	OBJ	object
CONC	pronominal concord	PART	participle
D	distal	PERF	perfect
DEM/DEM	demonstrative	PL/PL	plural
F/F	feminine	POSS/POSS	possessive
FUT	future	PRO	pronoun
IAN	inanimate	REL/REL	relative
IPFV	imperfective	SBJ	subject
M/M	masculine	SG	singular
N/N	neuter	TN	transnumeral
NF	noun form class		

Arabic numbers represent agreement classes while Roman numbers represent genders.

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Chapter 6

Gender in Uduk

Don Killian
University of Helsinki

Uduk, a Koman language spoken on the border of Ethiopia and Sudan, evinces a number of unusual characteristics in its system of gender marking. Uduk has two gender classes, with agreement displayed primarily in the verbal system and adjacent case-marking particles. In contrast to related Koman languages, however, semantics play a minimal role in class assignment, unrelated to biological sex. Furthermore, as biological sex does not play a role in gender assignment in general, personal pronouns do not differentiate gender in any person. Instead, all personal pronouns are assigned to Class 1 in the same manner that nouns would be. Lastly, Uduk shows some unorthodox aspects in the way it indexes gender on verbs, using what might be considered subtractive morphology.

This article looks at the complexity and features of gender in Uduk from a typological perspective; despite some unorthodox and atypical typological features, however, the system does not appear to be complex.

Keywords: Uduk, gender, assignment, Koman, adjacency, ditropic.

1 Background

Koman languages form a small language family spoken along the borderland area of Ethiopia, Sudan and South Sudan. The family is comprised of four living languages: Gwama (Kwama) [kmq], T'apo (also known as Opo or Opuo) [lgn], Komo [xom] and Uduk (Tw'ampa), [udu]. A fifth language which is now extinct, Gule, was placed into Koman by Greenberg with relatively little data available (Greenberg 1963), and its placement in Koman is tentative.

The presence of gender distinctions on pronouns in Koman languages was noted early on, but no research until recently has uncovered any signs of a nominal grammatical gender system, which all extant Koman languages have in some

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fashion.[1] The data on Uduk presented here is based on thirteen months of fieldwork between 2011 and 2014 in Ethiopia.

2 Introduction

Gender is a noun classification strategy in which nouns are encoded to belong to a particular lexical class, which is further "reflected in the behavior of associated words." (Hockett 1958 : 231). This is commonly referred to as *agreement*, a relationship in which one element takes an inflectional form determined by semantic or morphosyntactic properties of another element. Following Corbett (2006), the element which determines the agreement is the *controller*, and the element whose form is determined by agreement is the *target*.

As the notion of agreement implies that the controller is present (cf. Corbett 2006), the term *indexation* is used instead of agreement. Indexation is defined here as the morphosyntactic realization of a controller's capacity to control a target, with the controller being either present or recoverable or identifiable in some way. This may be done inflectionally through means of an affix or clitic, but this may also occur on a broader level by use of particular constructions, as Uduk does not always index gender on targets through inflectional markers. In particular, when in object position, one class of nouns actually constrains verb paradigms, limiting the possible *subject* cross-referencing markers on the verb. Thus, it is possible to determine the gender of the object from the morphology of the verb, despite there being no affix on the verb expressing gender agreement with the object.

Many other aspects of the Uduk gender system show themselves to be unorthodox in nature. Semantic assignment exists only for a very small part of the lexicon, formal assignment (in terms of word formation rules) for another very small part, with the rest being largely arbitrary. Semantics in general play a smaller role than usual in gender assignment, and Uduk's cut-off point in the animacy hierarchy for semantic assignment is higher than simply 'human'.

Furthermore, typical typological indexation targets of gender include demonstratives, determiners, personal pronouns, relative pronouns, adjectives, verbs (Di Garbo 2014). For Uduk, the only target in this list is verbs. In addition to verbs, indexation is primarily indicated on a single clitic or particle which immediately precedes the controller, and on prepositions

[1] The Yabus dialect of Uduk appears to be an exception to this, and does not have any grammatical gender.

It is worth considering Uduk's gender system in terms of its linguistic complexity.[2] Following Di Garbo (2016 : 50), I look at three general principles governing local complexity:

Principle of Fewer Distinctions.
Everything else being equal, a grammatical domain with *n* distinctions is less complex than one with *n+1* distinctions.

Principle of One-Meaning–One-Form.
Everything else being equal, a grammatical entity with *n* forms is less complex than one with *n+1* forms.
Everything else being equal, a grammatical entity with *n* meanings is less complex than one with *n+1* meanings.

Principle of Independence.
Everything else being equal, a grammatical domain that is independent of semantic and functional properties of other domains is less complex than a grammatical domain that is dependent on *n* or *n + 1* semantic and functional properties of other grammatical domains.

In addition to the metrics proposed above, there are at least two additional factors which may play a role, arbitrariness and adjacency, although how they fit precisely remains to be determined. All of these are discussed further in §5.

3 Introduction to gender in Uduk

All nouns in Uduk, including proper nouns, are allocated to one of two possible grammatical gender classes, labeled *Class 1* and *Class 2*.

Gender in Uduk is covert, and not marked directly on nouns. Gender distinctions are seen most commonly through the presence or absence of the Class 2 clitic *à*=;[3] this marker is, however, is optional in isolation. Furthermore, if gender is indexed on a previous word in the phrase, then *à*= is not used with the noun. Vocative use also neutralizes gender distinctions in many instances. When directly addressing an individual, all personal names[4] and most Class 2 kinship terms remove *à*=; a handful of kinship terms may retain *à*= to indicate a type

[2] Linguistic complexity refers here to the amount of information needed to describe the system, following e.g. Dahl (2004) and Miestamo (2008).

[3] Transcriptions used here follow the IPA, except for <y>, which represents IPA *j*, and <j> which represents IPA *ɟ*.

[4] All personal names are assigned to Class 2, discussed in more detail in §4.

of informality. In all other known instances than these, *à=* occurs with Class 2 nouns.

Gender indexation primarily occurs on case-marking clitics or particles which immediately precede the controller. Prepositions, conjunctions, and complementizers also undergo a simple phonological alternation, depending on the gender of the noun that follows, and verbs also vary in their conjugation paradigms depending on the gender of a postverbal object. In some instances, clitics may be considered ditropic clitics,[5] phonologically attaching to the constituent which immediately precedes the clitic. However, unlike more typical situations of ditropic clitics, phonological hosts are more constrained in Uduk. Further details are discussed in §3.2 below after a general introduction to grammatical relations in Uduk.

3.1 Grammatical relations overview

Case and constituent order are intertwined in Uduk, and it is not possible to discuss one without the other. The order of constituents frequently changes, and the order of the arguments affects the way in which these are encoded.[6]

Uduk follows a verb-second pattern similar to that of some neighboring Nilotic languages. Intransitive clauses primarily use SV order, with occasional instances of VS order in specific types of subordinate clauses. Transitive clauses regularly alternate between OVA and AVO, and cannot be easily characterized as having a dominant constituent order. Other constituent orders do not occur in main clauses.

The only position in a clause in which a noun receives morphological case is the argument immediately following a verb. Other core relations are not case-marked, irrespective of whether they occur before or after the immediately postverbal position. If the postverbal argument is O, this may be indicated by an Accusative ditropic clitic which phonologically attaches onto the verb. If the argument is A, the verb is marked by a ditropic clitic indicating Ergative case.[7] Note

[5]Ditropic clitics are a type of clitic which occur before a particular lexical class or syntactic phrase functionally related to the clitic in question, but the clitics nonetheless phonologically attach to the constituent on the 'other' side instead. This host generally is structurally and functionally highly variable, and shows little functional relation to the clitic. For more details, see Cysouw (2005).

[6]The framework used here to refer to argument structure is based on a division elaborated on by Dixon (1994), in which participants of a clause are divided into core and peripheral roles. Core functions include the transitive subject (A), the intransitive subject (S), and the transitive object (O); all other participants are treated as peripheral.

[7]The Ergative case primarily indicates the subject of a transitive clause; however, in two in-

that verbs ending in vowels add a nasal suffix if the argument that follows is marked with Ergative case.

Table 1 shows the different case markers used in Uduk.[8] All case-marking enclitics are ditropic.

Table 1: Case Markers

	(Abs.)	Acc.	Ass.	Erg.	Gen.
Class 1	ø	ø	ø	*=ā*	*gì*
Class 2	*à=*	*=ā*	*=ā*	*=mā*	*=mā*

Some examples are as follows:[9]

(1) Intransitive
à=c'í *k'ūt^h-úd*
CL2=child(CL2) cough:IPFV-3SG
'The child coughed.'

(2) Transitive, AVO order
à=ɲáw *ūr-úd=ā* *t'ík^h*
CL2=cat(CL2) chase:IPFV-3SG=ACC.CL2 rat(CL2)
'The cat chased the rat.'

stances, namely relative clauses and temporal adverbial subordinate clauses, the same marker is also used with subjects of intransitive clauses as well. In these two clause types, then, Uduk would be considered as having Marked Nominative case marking rather than Ergative. All Marked Nominative examples are nonetheless glossed as ERG, however, to simplify matters. For further details, see Killian (2015).

[8] Absolutive is not used here to refer to a case encompassing S and O, but is used in a more general sense to refer to most situations in which the noun is not marked for Accusative, Associative, Ergative, or Genitive. This includes all preverbal arguments and second arguments after the verb in ditransitive constructions. Absolutive Class 2 *à=* is not used in prepositional phrases, however, and optionally in citation form. Associative is used to refer to a type of noun-noun collocations in which the second noun modifies the first in some way, typically conveying either possession or association. It is similar to the Genitive, but the relationship between the two nouns in the Associative is much broader and less defined. For further details, see Killian (2015).

[9] The underlined argument indicates the topical argument of a transitive clause.

(3) Transitive, OVA order
à=ɲáw *wŭc'=mā* *k'á*
CL2=cat(CL2) bite:PFV=ERG.CL2 dog(CL2)
'The dog bit the cat.'

3.2 Gender and case marking

As mentioned in the previous section, gender differentiations are found in case marking. Uduk encodes gender and case marking cumulatively, with a single combined morph to represent multiple features. Case is generally marked by clitics or particles immediately preceding the noun, and case markers which indicate core arguments only occur in the immediately postverbal position.

All case markers except Class 2 Absolutive *à=* and Class 1 Genitive *gì* are ditropic clitics, clitics which form phonological units with the immediately preceding element. Not all markers, however, are as bound as others, and boundedness forms something of a continuum.

Accusative Class 2 *ā* and Ergative Class 1 *ā* both form relatively tight-knit phonological units with the verb, and trigger morphophonological changes on the verb.[10] If a verb ends in a vowel, however, Accusative *ā* does behave slightly differently compared to the Ergative *ā*. Verbs ending in a vowel always add an extra *-n* to the end when occurring before Ergative case markers of either class, before Class 1 *ā* as well as before Class 2 *mā*. Accusative Class 2 *ā* on the other hand simply attaches to whatever the final consonant or vowel is, including other vowels. Associative Class 2 *ā* behaves identically to Accusative phonologically, but attaches to a noun rather than a verb.[11]

All case markers discussed except for Genitive Class 1 *gì* undergo phonological tonal alternations depending on the immediately preceding tone. This includes Accusative Class 2 *ā*, Associative Class 2 *ā*, Ergative Class 1 *ā*, Accusative Class 2 *mā*, and Genitive Class 2 *mā*. The base tone of the case marker is mid, but lowers to low when immediately following a low tone. Neither Ergative Class 2 *mā* nor Genitive Class 2 *mā* trigger morphophonological changes, however.

[10] Glottalized consonants in word-final position are unreleased. If any affixes or clitics are placed after them, they undergo a morphophonological alternation described in more detail in Killian (2015 : 48).

[11] If the first noun in the Associative construction ends in a vowel and the consonant of the second noun begins with a plosive, a homorganic nasal is used in place of *ā*. For more details, see Killian (2015 : 89).

Genitive Class 1 *gì* is not a clitic, but rather an independent particle which does not change tone or affect any consonants or tones around it.

Some simple examples of each form are given below.[12]

(4) Accusative, Class 2
k'wāní *lǒɓ-ón=**ā*** *kʰúrā*
people(CL1) play:IPFV-3PL=**ACC.CL2** ball(CL2)
'The people are playing football.'

(5) Ergative, Class 1
à=kʰúrā *lǒɓ=**ā*** *k'wāní*
CL2=ball(CL2) play:IPFV=**ERG.CL1** people(CL1)
'The people are playing (foot)ball.'

(6) Ergative Class 2
à=kʰúrā *lǒɓ=**mā*** *c'í*
CL2=ball(CL2) play:IPFV=**ERG.CL2** child(CL2)
'The child is playing (foot)ball.'

(7) Genitive, Class 1
à=nós ***gì*** *wàṭ̪íʔ*
CL2=pot(CL2) **GEN.CL1** man(CL1)
'The man's pot.'

(8) Genitive, Class 2
*à=nós=**mā*** *ɓóm*
CL2=pot(CL2)=**GEN.CL2** woman(CL2)
'The woman's pot.'

(9) Associative
à=rǐs *k'wāní*
CL2=many.PL(CL2) people(CL1)
'Very many people'

[12]Clauses with Class 1 postverbal objects are not included, as they are a special case discussed in §3.5 below.

(10) Associative
*à=rĭs=**ā*** *kúnù?*
CL2=many.PL(CL2)=**ASS.CL2** owl(CL2)
'Very many owls'

3.3 Prepositions, conjunctions, and complementizers

In addition to case marking, gender is also marked on prepositions, conjunctions, and complementizers in Uduk through a simple phonological alternation. If a preposition ends in *i*, this changes to *a* before Class 2 nouns, retaining the tone of the original vowel. If a preposition ends in a consonant or another vowel than *i*, then *a* attaches to the end of the preposition. As mentioned previously, if gender is marked on the previous element, then Class 2 marker *à* is not used.

These alternations are likely based a type of cliticization similar to case markers, but slightly more grammaticalized. Nonetheless, in occasional careful speech with *ḍàlì* 'and, but' for instance, it is possible to hear *ḍàlì à* before Class 2 nouns instead of *ḍàlà*.[13]

(11) *ràkʰ* *tā-ø* *kúʃ* *mò **í*** *mīs*
cloud(CL1) COP:PFV-3SG white MO **LOC:CL1** sky(CL1)
'The clouds are white in the sky.'

(12) *áhā* *wòl-á=ø* *yìdé* ***á*** *kʰɔ̄s*
1SG(CL1) pour:IPFV-1SG=CL1 water(CL1) **LOC:CL2** cup(CL2)
'I poured the water in the cup.'

(13) *é* *gǎm-ø=ø* *tō* *yán* ***p'éní*** *máná?*
2SG(CL1) find:IPFV-3SG=CL1 thing(CL1) DEM.PROX **from:CL1** where(CL1)
'Where did you get this thing from?'

(14) *gǎm-kā?* ***p'éná*** *Yúsìf*
find:IPFV-ERG.1SG **from:CL2** Yousef(CL2)
'I got (it) from Yousef.'

[13]Note that in the following examples, ø being marked as a clitic is just a notational choice to facilitate understanding.

(15) *áhā* *k'wār-á* ***kā*** *gălām*
1SG(CL1) write:IPFV-1SG **with:CL2** pen(CL2)
'I'm writing with a pen.'

Predicative possession constructions also index gender of the possessed noun on a preposition-like marker. Predicative possessive constructions are formed with the copula *tā* along with the particle *gì*, which becomes *gà* before Class II nouns.

(16) *wàṯí* *tā* ***gì*** *mì*
man(CL1) COP:PFV **PP.CL1** goat(CL1)
'The man has a goat.'

(17) *áhā* *tā-ná* ***gà*** *k'á*
1SG(CL1) COP:PFV-1SG **PP.CL2** dog(CL2)
'I have a dog.'

Conjunctions and complementizers are preposition-like words used to connect clauses or phrases. Similar to prepositions, the gender of the immediately following word is marked on the conjunction or complementizer by an alternation of *i* to *a* for words ending in *i*, or by adding *a* to the end of words which end in consonants or vowels other than *i*.

The most frequent of these is *kí*, or *ká* for Class 2 nouns. It is a general complementizer which occurs with many different types of complement phrases and clauses, as well as subordinate clauses.

(18) *áhā* *tʰōʃ-á* ***ká*** *ʃōk'* *mì-ɗ=ì*
1SG(CL1) think:IPFV-1SG **COMP.CL2** rain(CL2) do.AUX:IPFV-3SG=LNK
hétṯ' *kā ṯ'ámō*
rain$_{verb}$ tomorrow
'I hope it rains tomorrow.'

(19) *áhā* *tʰōʃ-á* ***kí*** *wàṯí* *mĭ-ɗ=ì*
1SG(CL1) think:IPFV-1SG **COMP:CL1** man(CL1) do.AUX:IPFV:AD2-3SG=LNK
t'ā *kí* *pʰúɗ* *mò ʃwànéʔ*
CF.AUX COMP arrive MO today
'I thought that the man would have arrived today.'

With some adverbial phrase constructions, *kī* and *kā* with mid tones are used instead of *kí* and *ká* with high tones.

(20) (Beam & Cridland 1970)
jàmàs *bŭnī* *k'ó-n* ***kā*** *rìs*
kind(CL1) POSS.3PL exist.PL:PFV-3PL **with:CL2** many(CL2)
'There are many kinds of them.'

(21) *únī dŏʃ-ón* ***kī*** *mís*
3PL stand:IPFV-3PL **with:CL1** sky(CL1)
'They stood up.'

There are three additional subordinating conjunctions: *wàkʰkí* for conditional clauses, *gòm* for reason and adversative clauses, and *mèd̚* for temporal clauses. All of these alternate according to the gender of the noun which follows in the manner described above.

(22) ***wàkʰkí*** *wàṭ̪í* *k'óʃ-ód̚=ā* *shētʰ,* *k'úpʰ*
if:CL1 person(CL1) kill:PFV-3SG=ACC.CL2 antelope(CL2), head(CL1)
tō *mí-nù* *mí=ì* *kʰál* *bwày* *cōm=á?*
thing(CL1) do.AUX:PFV-IMPRS do.AUX=LNK carry to:CL1 his.father(CL1)=Q
'If a person kills an antelope, is the head carried to the father's home?'

(23) ***wàkʰká*** *c'í* *pʰúd̚-úd̚* *mò yìl* *k'úmèd̚ pé kwārā áw̄*
if:CL2 child(CL2) reach:IPFV-3SG MO year(CL1) thirteen or
k'úmèd̚ ì pé súʔ ád̚ī *kí* *tʰél* *mí* *p'én=ì* *màʃ* *mò*
twelve 3SG(CL1) NARR begin do.PART behind.PART=LNK marry MO
'If the child reaches the year thirteen or twelve then he can start to get married.'

The only native coordinating conjunction is *d̪àlì* (Class 2 *d̪àlà*) 'and; but', and is very frequent.[14] It may coordinate clauses, noun phrases, and nouns.

(24) ***d̪àlì*** *tōntʰéʔ* *yĭsā̰* *dì-d̚* *yĭsā=yà*
and:CL1 food(CL1) NEG exist.SG:PFV-3SG NEG=NEG
'And there was no food.'

[14] Two other conjunctions borrowed from Arabic also exist: *wàlà* and *áw̄*, both meaning 'or (used to rephrase something)'. Neither term alternates according to the gender of the noun which follows.

(25) (James 1979 , The Birapinya Tree)
ḍàlà *ɓóm* *ɲǎŋ-ø=ø* *gùɓ* *ʃēmēn*
and:CL2 woman(CL2) build:IPFV-3SG=**CL1** house(CL1) alongside:CL1
bwày
road(CL1)
'and a woman had built her house alongside the road.'

3.4 Prenominal modifiers

Out of all the prenominal modifiers, two of them index the gender of the noun they modify, namely the diminutive *ārí* and its irregular plural form *ūʃí*. Both the singular as well as the plural diminutive are lexically nouns themselves, with inherent gender (Class 1). However, they alternate their final vowel according to the gender of the following noun: *í* before Class 1, and *á* before Class 2.

(26) *áhā* *mìʃ-á=ø* ***ārí*** *mì*
1SG(CL1) see:IPFV-1SG=**CL1** **DIM:CL1(CL1)** goat(CL1)
'I saw the little goat.'

(27) *áhā mìʃ-á=ø* ***ārá*** *ɲǎw*
1SG see:IPFV-1SG=**CL1** **DIM:CL2(CL1)** cat(CL2)
'I saw the little cat.'

There is one special case in regards to prenominal modifiers that should also be mentioned, one of the only instances of non-adjacent indexation of gender. When prenominal modifiers modify a postverbal A argument, the verb does not agree with the inherent gender of the modifier, but rather with the noun that the prenominal modifier is modifying.

(28) Class I Noun
à=ɓóm *mìʃ=**à*** *wàṭ̪íʔ*
CL2=woman(CL2) see:IPFV=**ERG.CL1** man(CL1)
'The man sees the <u>woman</u>.'

(29) Class I Modifier, Class I Noun
à=ɓóm *mìʃ=**à*** *ḍàn* *wàṭ̪íʔ*
CL2=woman(CL2) see:IPFV=**ERG.CL1** big(CL1) man(CL1)
'The big man sees the <u>woman</u>.'

(30) Class II Noun
wàṯí? *mìʃ=**mà*** *ɓóm*
man(CL1) see:IPFV=**ERG.CL2** woman(CL2)
'The woman sees the man.'

(31) Class I Modifier, Class II Noun
wàṯí? *mìʃ=**mà*** *ḏàn=**à*** *ɓóm*
man(CL1) see:IPFV=**ERG.CL2** big(CL1)=**ASS.CL2** woman(CL2)
'The big woman sees the man.'

Constructions of this type have only appeared in elicited circumstances, however, and speakers appeared to be somewhat reluctant to use them. Not all Uduk speakers would necessary find these grammatical; many would find them odd, at the very least, and would avoid using postverbal A arguments with prenominal modifiers.

3.5 Verbs

Finite verbs are the last target for gender indexation presented here; verbs indicate the gender of O arguments through a rather unusual fashion.

In constructions in which the O argument is Class 2 (e.g. marked with the Accusative), the A argument is cross-referenced in the same way that S would be in monovalent clauses. Verbs with a 3SG subject are marked with *-(V)ḍ*, and verbs with a 2SG, 2PL, or 3PL subject are marked with *-(V)n* on the verb.

(32) Class 2 O, 3SG person subject
wàṯí *c'íṯ'-íḍ=**ā*** *yíḍ*
man(CL1) cut:IPFV-3SG=**ACC.CL2** skin(CL2)
'The man is cutting the pelt.'

(33) Class 2 O, 3PL person subject
únī *gǎm-án=**ā*** *dàwà* *kā* *rìs*
3PL(CL1) find:IPFV-3PL=**ACC.CL2** baboon(CL2) with:CL2 many(CL2)
'They found many baboons.'

(34) Class 2 O, 2SG person subject
é *gǎm-án=**ā*** *c'í*
2SG(CL1) find:IPFV-2SG=**ACC.CL2** child(CL2)
'You have found the child.'

(35) Class 2 O, 1SG person subject
áhā *pʰī-ná=**ā*** *sū*
1SG(CL1) drink:IPFV-1SG=**ACC.CL2** beer(CL2)
'I am drinking the beer.'

Class 1 O arguments not only do not take overt Accusative marking, but they also trigger a reduction of verbal morphology. Subject cross-referencing markers on the verb for second and third person A arguments are suppressed,[15] and cross-referencing on the verb only appears with first person subjects.

(36) Class 1 O, 3SG person subject
ádī *c'íṯ'-ø=**ø*** *bùŋjè*
3SG(CL1) cut:IPFV-3SG=**ACC.CL1** cloth(CL1)
'S/he's cutting the cloth.'

(37) Class 1 O, 3PL person subject
únī *ďék'-ø=**ø*** *k'wā*
3SG(CL1) pick_up:IPFV-3SG=**ACC.CL1** bowl(CL1)
'They picked up the bowl.'

(38) Class 1 O, 2SG person subject
é *gǎm-ø=**ø*** *tō* *yán*
2SG(CL1) find:IPFV-3SG=**ACC.CL1** thing(CL1) DEM.PROX
'You found this thing.'

(39) Class 1 O, 1SG person subject
áhā *pʰī-ná=**ø*** *yìďé*
1SG(CL1) drink:IPFV-1SG=**ACC.CL1** water(CL1)
'I am drinking the water.'

[15] Under normal circumstances, it is not possible for any other element to intervene between the verb and the noun that follows. There is one instance in my database pointed out to me by a reviewer (example 23), however, in which the aspectual marker *mò* does come in between a verb and a Class 1 noun. In this instance, cross-referencing of A on the verb is actually realized, suggesting that there may be additional factors involved in the suppression of the second/third person suffix. More research is needed to determine if this is indeed the case, and if so, what those might be. This may simply be an intransitive clause, with 'year' functioning adverbially.

Examples (36), (37), and (38) are parallel to (32), (33), and (34) in structure, but with the subject cross-referencing markers on the verb suppressed.

First person subjects on the other hand do not change their cross-reference marking, irrespective of the gender of O. The only indication of the gender of O in these constructions is the ACC marker.

(40) Class 2 O, 1SG person subject
*áā mìʃ-á=**ā*** *wùlú?* *mò*
1SG see:IPFV-1SG=**ACC.CL2** tawny.eagle(CL2) MO
'I saw a tawny eagle.'

(41) Class 1 O, 1SG person subject; Beam & Cridland (1970)
*áhā mìʃ-á=**ø*** *mò* *gì*
1SG(CL1) see:IPFV-1SG=**ACC.CL1** place(CL1) GEN.REL
dĭ-n=ā *ádī*
exist.SG:IPFV-NAS=ERG.CL1 3SG(CL1)
'I know the place where he is.'

The phenomenon described above does not apply to Narrative constructions, where arguments are never cross-referenced on the verb. Narrative constructions use non-finite forms of verbs, and the only difference between Narrative constructions with Class 1 objects and Narrative constructions with Class 2 objects is the Accusative case marker.

(42) Class 1 O, Narrative construction
à=cí *kí* *k'ósh=**ø*** *wàṭí* *mò*
CL2=creature(CL2) NARR hit$_{NF}$=**ACC.CL1** person(CL1) MO
'He attacks the man.'

(43) Class 2 O, Narrative construction
á'dī *kí* *bùṭ=**à*** *c'í* *ḍàlì k'ósh=**ā*** *c'í*
3SG(CL1) NARR catch$_{NF}$=**ACC.CL2** child(CL2) and hit$_{NF}$=**ACC.CL2** child(CL2)
mò
MO
'She catches the child and beats the child.'

Note that personal pronouns have inherent Class 1 gender,[16] and the gender of a pronoun does not reflect the gender of the noun it denotes.

[16]Described more fully in §4 below.

(44) *à=kʰúrā* *lǒɓ=**mā*** *c'í*
CL2=ball(CL2) play:IPFV=**ERG.CL2** child(CL2)
'The child is playing (foot)ball.'

(45) *à=kʰúrā* *lǒɓ=**ā*** *áɗī*
CL2=ball(CL2) play:IPFV=**ERG.CL1** 3SG(CL1)
'S/he is playing (foot)ball.'

Pronominal objects also trigger indexation patterns in which second and third person cross-referencing of A is suppressed.

(46) Class 2 O, 3SG person subject
wàt̪í *k'ōʃ-óɗ=**ā*** *Rǎbì*
man(CL1) hit:IPFV-3SG=**ACC.CL2** Rabi(CL2)
'The man hit Rabi.'

(47) Class 1 O, 3SG person subject
wàt̪í *k'ŏʃ-ø=**ø*** *áɗī*
man(CL1) hit:IPFV-3SG=**ACC.CL1** 3SG(CL1)
'The man hit him/her/it.'

4 Gender assignment

Gender assignment in Uduk is largely, but not exclusively, arbitrary, with only limited connections to semantic categores such as biological sex, size, shape, and animacy. There are no distinctions based on sex, human vs. non-human, or animate vs. inanimate, and neither sex nor animacy is distinguished in the pronominal system for any person.

Nouns generally considered among the highest in the animacy scale, such as human kinship terms, do not show transparent assignment.

A list of human nouns and their gender may be found in Table 2, with little or no predictability beyond the fact that most suppletive possessive kinship terms appear to fall into Class 1.

Dahl (2000 : 101) postulates the following:

1. In any gender system, there is a general semantically-based principle for assigning gender to animate nouns and noun phrases.

Table 2: Class 1 and Class 2 human nouns

Class 1	
wàt̪íʔ	man
yàʔ	son
ɓwāhām	female sibling or parallel cousin
ɓwāʔ	daughter
āʃ	wife
jìl	sisters-in-law, recip.
kūm	his, her mother
kwān	your mother
cím	your father
cōm	his, her father
sóɓ	his, her father's sister
nà(ḿ)	niece, nephew (sister's children)
símín	father's sister
yàʃím	brother's wife; husband's brother or sister
k'wáskām	cross-cousin
k'wáskīn	your cross-cousin
all personal pronouns	
all plural derived agentive nouns	
Class 2	
à=ɓóm	woman, wife
à=kām	male sibling or parallel cousin
à=bàpá	father
à=tádʃā	mother
à=màmá	my mother, also vocative
à=kāt̪^{h}	husband
à=c'í	child (general)
à=mǎmà	father's sister
à=tāt^{h}á	mother's brother
à=ʃwákām	mother's brother
à=nàrú	mother's brother
à=ʔíyā	father's brother; brother's children
à=màrè	mother and father-in-law, for man
à=màr	mother and father-in-law, for woman
à=màséʔ	sister's husband
à=m^{w}í	sister's children (for men)
à=dìt^{h}íʔ	elderly woman, esp. father's sister
à=mòɲérù	second cousin, more distant relationship
à=ɲèrgòn	cousin (telling to third person)
all personal names, male and female	
all singular derived agentive nouns	

2. The domain of the principle referred to in (1) may be cut off at different points of the animacy hierarchy: between humans and animals, between higher and lower animals, or between animals and inanimates.

That is, by using a hierarchy such as the one found in Table 1, one can make predictions on what types of gender systems may occur, and where semantically-based principles apply. Dahl suggests that cross-linguistic cut-off points vary, but always take place below human.

1st person >	2nd person >	3rd person >	proper names >	kin
	other humans >	animate nouns >	inanimate nouns	

Figure 1: Animacy hierarchy

Semantic assignment is not predictable for human apellatives in Uduk; however, there *are* semantic areas in which predictability does occur: namely personal (and demonstrative) pronouns as well as proper names, both categories above human in the animacy hierarchy.

All personal pronouns show gender assignment in the same way that nouns do, and could be considered a lexical subtype of nouns. Demonstratives and personal pronouns are all assigned to the nominal Class 1 gender; they show no connection to the gender of a noun in anaphoric contexts, and are invariably Class 1. This is partially comparable to Jarawara (Arawan), in which "all pronouns (whatever the sex of their referent) engender feminine agreement on verbal suffixes" (Dixon 2000 : 488). Proper names on the other hand are assigned to Class 2. This generalization holds only for personal names; place names can vary. Uduk gender predictability thus appears to apply only to levels higher than human appellatives in the animacy hierarchy.

Below this cut-off point there are limited trends in semantic assignment, but the semantic groups that can be formed all have exceptions. Nouns denoting plural entities, *k'wāní* 'people', *ūpʰ* 'women', and *ūcʰí* 'children', are Class 1. Furthermore, a limited subset of nouns (primarily proper names and some kinship terms) in Uduk may appear with the Associative Plural (AP) prefix *ī-* to denote a person and additional people associated with that person; nouns marked in this way are also Class 1. This includes plurals which would otherwise be assigned to Class 2, such as proper names.[17]

[17]Note that most nouns in Uduk are not normally morphologically marked for number; the Associative Plural is one of the only means of marking number directly on a noun, and even this is only possible to use with a limited set of nouns.

Most relational nouns, nouns which are primarily used to indicate more detailed types of spatial or temporal relationships, are also Class 1. This includes nouns like *ʃēmén* 'alongside', *pˈémèn* 'end, bottom (of)', *bwàmán* 'inside, between', *bwàmbòr* 'front (of)'; a few, such as *à=pʰóʔ* 'on top of' and *à=píjè*, 'outside' are Class 2. Lastly, body parts are also more commonly found in Class 1 than Class 2.

Formal assignment in terms of word formation rules also creates limited situations in which gender assignment may be predicted. Nominalizations of Stative verbs, marked with the suffix *-gàʔ*, are invariably assigned to Class 2. Agentive nouns formed with the derivational morpheme *màn* are also assigned to Class 2. Nouns derived from verbs which use zero derivation, however, are all assigned to the Class 1 gender.

Uduk nouns tend to be fairly rigid in their assignment of gender, and few lexemes seem to have the possibility of occurring in either class. In these instances, there is no change in meaning. This includes intraspeaker variation as well as free variation within the speech of the same speakers.

There are a few instances in which homophonous nouns are assigned to different classes, e.g. *jè*, 'elephant', and *à=jè*, 'mud; type of fish', but these are purely lexical distinctions, and remain rigid in assignment.

There is a markedness relationship between the two classes. In many respects, Class 1 could be considered the unmarked, default class, particularly for less nouny nouns, such as pronouns. In addition to the lack of overt morphology in many instances, there are other signs that Class 1 is seen as the default. Conjunctions which occur before word classes other than nouns, for instance, use the same form as before Class 1 nouns. However, in other respects, Class 2 could also be considered a default. Class 2 is the default for nouns and adjective-like concepts, and a large number (although not all) of borrowed words appear to be placed into Class 2, e.g. *à=bǎsàl* 'onion', *à=bìʃkīr* 'towel', *à=màsábà* 'distance', *á=ʃábā̄gà*, 'network'.

5 Complexity

Uduk shows itself to have an atypical gender system, and it is worth investigating its complexity in more detail, and how it might compare. Di Garbo (2014 : 183) uses six features to determine the complexity of a gender system: Number of gender values, Nature of assignment rules, Number of targets, Cumulative exponence of gender and number, Manipulation of gender assignment triggered by number/countability, and Manipulation of gender assignment triggered by size.

By these features as well as some others, Uduk has a relatively simple system. There are only two genders, to which nouns are generally rigidly assigned. No manipulation is possible, and aside from the Associative Plural marker, there are no instances in which number and gender are marked cumulatively. There are three targets: case marking particles, verbs, and adpositions/conjunctions/complementizers (which all form part of a single category), and a marginal fourth in the form of the diminutive (not included here as it does not constitute a word class; see §3.4). Assignment parameters feature higher complexity, however, as assignment is partly semantic, partly formal, and partly opaque.

There were two additional criteria mentioned in §2, arbitrariness in gender assignment and adjacency, which play an interesting role in complexity, although at the moment it is difficult to see precisely how to reconcile them in terms of complexity metrics.

In nearly all instances in which gender is indexed on a target in Uduk, the gender-marked target and controller are immediately adjacent, with the target in the immediate position before the controller. This adds slightly to the descriptive complexity, as it requires an extra rule or constraint specifying this in the description.

Arbitrariness in gender assignment is even more difficult to reconcile, but an arbitrary system is likely also more complex. In principle, assignment would reach maximal complexity if each individual noun required a separate descriptive rule.

Both arbitrariness of assignment as well as adjacency require further research in general. Whether we exclude or include these as factors, however, it would appear that Uduk does have a relatively simple gender system, albeit atypical.

6 Discussion

The Uduk gender system turns out to have a number of intriguing aspects. First, the system makes heavy use of zero marking and in one instance, suppression of subject agreement morphemes to indicate the gender of an object.

Second, almost all targets of indexation are adjacent to the controller. This is not commonly remarked upon cross-linguistically,[18] and by making note of it

[18] One important exception to this is Bernhard Wälchli's work on Nalca (Wälchli 2018). Wälchli was also the one who pointed out adjacency as a relevant factor in Uduk to me, and I likely would not have noticed or remarked upon this without his input. Additionally, !Xóõ also appears to index gender only on adjacent targets; for further details, see Güldemann (2006).

here, it may encourage other linguists to explore adjacency as a factor at play in gender marking systems.

Third, personal and demonstrative pronouns control gender in the same way that nouns do. And finally, gender is not connected to biological sex or other familiar semantic categories.

As mentioned previously, the last two characteristics are connected in Uduk. Semantic predictability in Uduk occurs at higher levels of animacy than simply human. It parallels some Austronesian languages such as Tagalog and Fijian for instance, which Hockett described as having gender, although later linguists have not.

> In Fijian, /mata/ 'day' is preceded by /na/ when it is the subject of a clause, but /viti/ 'Fiji' is preceded instead by /ko/. /na/ and /ko/ are two distinct particles, not different inflected forms of a single stem. Yet the choice of /na/ or /ko/ establishes a twofold classification of all Fijian nouns and noun phrases: names of specific people and places belong to the /ko/ class, common nouns to the /na/ class. (Hockett 1958 : 230)

Even more interestingly, "…independent pronouns [in Fijian] function in many ways like proper nouns, and are frequently marked by the same marker (*ko* or *o*)" (Geraghty 1983 : 201).

A comparable system is found in Tagalog (Table 3), which could also be viewed as having a common vs. proper gender system. Tagalog additionally has distinct forms for demonstratives and each pronoun, suggesting that these are internally viewed as a third category, neither common nor proper (and different from Fijian in this respect).

In both cases, Tagalog and Fijian have a higher cut-off point in animacy than human nouns, requiring a more fine-grained approach to the animacy hierarchy. This cut-off point appears to show some parallels to Uduk. Where Fijian for instance differs from Uduk, however, is that in Uduk, proper names and personal pronouns do not occur in the same gender, and thus a proper-common gender differentiation would not be suitable as an analysis. Uduk would instead show two genders, one consisting of personal and demonstrative pronouns and other nouns, and the other consisting of proper names and other nouns.

Languages like Tagalog, Fijian, and Uduk give evidence suggesting that predictability may occur at points higher in the animacy hierarchy than previously acknowledged, although Uduk shows itself to be more complex than Tagalog or Fijian, as the gender of its nouns are generally much less predictable. By includ-

Table 3: Noun phrase markers and pronouns in Tagalog (Himmelmann 2005 : 358)

	SPEC	POSS/GEN	LOC/DAT
Common nouns	*ang*	*ng*	*sa*
Personal names	*si*	*ni*	*kay*
1SG	*akó*	*ko*	*akin*
2SG	*ikáw, ka*	*mo*	*iyo, iyó*
3SG	*siyá*	*iyá*	*kaniyá*
1DU.IN	*kitá, katá*	*nitá*	*kanitá*
1PL.IN	*tayo*	*natin*	*atin*
1PL.EX	*kamí*	*namin*	*amin*
2PL	*kayó*	*ninyó*	*inyó*
3PL	*silá*	*nilá*	*kanilá*
PROX	*itó*	*nitó*	*dito, rito*
MED	*iyán*	*niyán*	*diyán, riyán*
DIST	*iyón*	*niyón, noón*	*doón, roón*

ing Uduk as a typological point of reference, a reconsideration of possible cut-off points in the animacy hierarchy may be in order.

Abbreviations

AD1	Aspect-Directional 1	DEM	Demonstrative
AD2	Aspect-Directional 2	DIM	Diminutive
ASS	Associative	LNK	Linker
AUX	Auxiliary	MO	Aspect-mood particle
CF	Counterfactual	NARR	Narrative
CL1	Class 1 Gender	NAS	Nasal
CL2	Class 2 Gender	NF	Non-finite
COMP	Complementizer	PART	Partargument
COP	Copula	PP	Predicative Possession

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Any remaining errors are of course the author's own responsibility.

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Part IV

New Guinea

Chapter 7

Gender in Walman

Matthew S. Dryer
University at Buffalo

In this paper, I describe gender and gender-like phenomena in Walman, a language of the Torricelli family spoken on the north coast of Papua New Guinea. I discuss three topics. One of these is the two clear instances of gender in Walman, masculine and feminine. I discuss the formal realization of gender in Walman and the factors governing the choice of masculine versus feminine gender.
There are also two gender-like phenomena in Walman, namely pluralia tantum nouns and diminutive. Pluralia tantum nouns in Walman are different from pluralia tantum nouns in European languages in that what makes them grammatically plural is not their form, but the fact that they control plural agreement. What makes pluralia tantum gender-like is that there are twice as many pluralia tantum nouns in our data as there are nouns that are lexically masculine.
The second gender-like phenomenon in Walman is a diminutive category, which is coded in the same way as feminine singular, masculine singular, and plural. What makes it unlike phenomena that are normally considered instances of gender in other languages is the fact that there are no lexically diminutive nouns and any noun can be associated with diminutive agreement.

Keywords: gender, masculine, feminine, diminutive, pluralia tantum, Walman, Torricelli

1 Introduction

The goal of this paper is to give a description of gender in Walman, a language in the Torricelli family spoken in Papua New Guinea. I understand gender to denote a morphosyntactic category in a language based on a division among nouns in the language and on agreement phenomena related to this division. There are two unambiguous instances of genders in Walman, namely masculine and feminine. But there are also two other gender-like phenomena in the language, namely

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pluralia tantum nouns and a diminutive category. I will describe the first of these phenomena in some detail in this paper, discussing ways in which it is like or unlike clear instances of gender. My discussion of the diminutive category will be briefer, since it is discussed in more detail elsewhere, in Dryer (2016) and Dryer (under revision).

In §2, I provide a brief grammatical sketch, primarily describing inflectional categories that vary for gender. In §3, I describe the factors governing the choice between masculine and feminine gender. In §4, I describe pluralia tantum nouns in Walman and in §5, I briefly describe the Walman diminutive.

2 Brief grammatical sketch

This section focuses primarily on the coding of gender in Walman, along with the coding of number, person, and diminutiveness. See Dryer (in preparation) for a description of other features of Walman.

Verbs in Walman inflect for both subject and object (and in some applicative constructions, for two objects). The subject affixes are word-initial prefixes consisting of single consonants, as in (1), where the verb *mara* 'come' bears a 1SG subject prefix *m-* and the verb *nawa* 'call' bears a 2SG subject prefix *n-*.

(1) *Kum* ***m****-ara* *eni* *chi* ***n****-awa.*
1SG **1SG.SUBJ**-come because 2SG **2SG.SUBJ**-call
'I came because you called.'

Example (2) contains two occurrences of the 1PL subject prefix *k-*.

(2) *Akou* ***k****-anan* ***k****-ara* *komoru.*
finish **1PL**-go.down **1PL**-come evening
'Then we walked home in the afternoon.'

The 2PL subject prefix *ch-* is illustrated in (3).[1]

(3) *Chim* ***ch****-orou nyien?*
2PL **2PL**-go where
'Where are you (plural) going?'

Example (4) contains two occurrences of the 3PL subject prefix *y-*.

[1]Our orthography for Walman employs three digraphs, <ch> for [tʃ], <ng> for [ŋ], and <ny> for [ɲ].

(4) *Ri pelen* ***y****-anan* ***y****-okorue wul.*
3PL dog **3PL**-go.down **3PL**-bathe water
'Then the dogs went in for a wash.'

As mentioned above, there are two clear cases of gender in Walman, masculine and feminine; this distinction is realized only in the 3SG. Example (5) illustrates the 3SG.M subject prefix *n-* (again occurring twice).

(5) *Runon* ***n****-rukuel* ***n****-anan nyuey.*
3SG.M **3SG.M**-run **3SG.M**-go.down sea
'He ran to the beach.'

And (6) illustrates the 3SG.F subject prefix *w-*.

(6) *Nakol kkuk* ***w****-anan.*
house broken **3SG.F**-go.down
'The house fell down.'

There is also a diminutive subject prefix *l-*, illustrated on *lakor* 'drown' in (7).

(7) *Nyanam mon ro-l, ampa rul* ***l****-akor wul.*
child NEG tall-DIMIN FUT 3.DIMIN **3.DIMIN**-drown water
'The child is small, she will drown.'

Although the diminutive is like masculine and feminine in being restricted to singular, it involves a distinct notion of 'singular', as discussed in §5 below.

There is also a set of object affixes that occur on transitive verbs, though they occur in three different positions within the verb. The first and second person object affixes are prefixes that immediately follow the subject prefixes. These prefixes are unspecified for number and are illustrated in (8) by the first person object prefix *p-* and in (9) by the second person object prefix *ch-*.

(8) *Kum m-alma, chim ch-****p****-chami.*
1SG 1SG-die 2PL 2PL-**1OBJ**-bury
'When I die, bury me.'

(9) *Opucha mol w-****ch****-any chi?*
thing which 3SG.F-**2OBJ**-happen.to 2SG
'What happened to you?'

A reflexive/reciprocal prefix /r/ occurs in the same slot as the first and second person object prefixes, as illustrated by the verb *yrklwaro* 'they deceived each other' in (10).

(10) *Kamte-n ngo-n w-ri Walis n-aro-n nyemi kasim*
person-M one-M GEN-3PL Walis 3SG.M-and-3SG.M friend friend
*y-**r**-klwaro*
3PL-**REFL/RECIP**-deceive
'A man from Walis Island and his friend deceived each other.'

The third person object affixes are generally suffixes, though with a minority of verbs they are infixes. Examples (11) and (12) illustrate the 3PL and 3SG.M object suffixes respectively.

(11) *Kum m-ete-**y** wuel chomchom.*
1SG 1SG-see-**3PL.OBJ** pig many
'I saw many pigs.'

(12) *Ru w-lro-**n** runon.*
3SG.F 3SG.F-like-**3SG.M:OBJ** 3SG.M
'She likes him.'

The form of the third person object affixes is, with one exception, the same as the corresponding subject prefixes. For example, /n/ is the form of both the 3SG.M subject prefix, as in (5) above, and the 3SG.M object affix, as in (12). The one difference between the third person subject prefixes and third person object affixes is in 3SG.F, where the subject prefix is *w-*, as in (12), while the object affix is phonologically null, as illustrated by the form *mete* 'see' in (13) (contrasting, for example, with the presence of an overt object suffix for 3PL in the form *metey* in (11)).

(13) *Kum m-ete-**ø** chuto nyanam.*
1SG 1SG-see-**3SG.F** woman child
'I saw a young girl.'

With some verbs, the third person object affixes are infixes, as in the form *yanpu* 'kill' in (14), where the 3SG.M object affix *-n-* is an infix inside the verb stem *-apu* 'kill'.

(14) *Rim y-a<**n**>pu ampatu mon nngkal.*
3PL 3PL-kill<**3SG.M**> ground.wallaby NEG small
'They killed a big wallaby.'

Inflection for gender, as well as number and diminutiveness, also occurs on some adnominal words, including a small subset of adjectives, a subset of demonstratives and two numeral words meaning 'one'.[2] The form of affixes indicating gender, number, or diminutiveness on adnominal words is the same as those used for object affixes on verbs. In (15), for example, we find the masculine affix *-n-* as an infix in the demonstrative *panten* and as a suffix on the adjective *lapon* 'big' (here used predicatively).

(15) *Ngolu pa<**n**>ten **n**-o lapo-**n**.*
cassowary that<**M**> **3SG.M**-be big-**M**
'That cassowary is large.'

Like the third person object affixes on verbs, feminine gender is phonologically null on adnominal words, as illustrated by the feminine forms *paten* 'that' in (16) and *lapo* 'big' in (17).

(16) *Mon chi n-a<ø>ko wul **pa<ø>ten**.*
NEG 2SG 2SG-eat<3SG.F> water **that**<**F**>
'You shouldn't drink that water.'

(17) *Wako **lapo-ø** w-ara.*
boat **large**-**F** 3SG-come
'A big ship has come.'

In (18), we get a plural suffix *-y* on *lapoy* 'good'.

[2]There are five adjectives that inflect for gender: *lapo* 'large', *nyopu* 'good', *woyue* 'bad', *wwe* 'bad', and *kolue* 'short'. The meanings associated with these correspond closely to the adjectival concepts found in languages with small adjective inventories (Dixon 1977). One might expect to find adjectives meaning 'small' or 'long' in this set. The Walman adjective for 'small', *nngkal*, does not inflect for gender but does for number; the plural form is *nngkam*. The meaning of 'long, tall' in Walman is expressed by a sequence of two words *ro rani*, where *ro* exists separately as an adnominal word meaning 'piece of' and does inflect for gender, so the two word sequence (feminine *ro rani*, masculine *ron rani*) can be described as functioning as an adjective and hence as a sixth adjective that inflects for gender.

(18) *Nypeykil* ***lapo-y*** *y-an olun olun.*
tree.PL **big-PL** 3PL-be.at side side
'There are big trees on both sides of the road.'

There is no gender distinction in the plural. Note that the position of these affixes is similar to the position of corresponding object affixes in being typically suffixes (as in *lapon* in (15) and *nyopuy* in (16)), but with some words infixes (as in *panten* in (15)).

There are also two words for 'one' that inflect for gender, number, and diminutiveness, illustrated by *alpan* 'one' in (19).

(19) *Kamte-n* ***alpa-n*** *n-epin n-ara.*
person-M **one-M** 3SG.M-go.ahead 3SG.M-come
'One man came ahead of the others'

Not all adnominal words inflect. In fact most adjectives do not. For example the adjective *chapa* 'fat' is invariant, as illustrated in (20) (where the form would be a masculine form *chapan* if it did inflect).

(20) *Runon n-o* ***chapa****.*
3SG.M 3SG.M-be **fat**
'He is fat.'

Finally, the third person pronouns themselves vary for number, gender, and diminutiveness, as illustrated by the pronouns for 3SG.M, *runon,* in (20) and 3SG.F, *ru*, in (12) above.

The only morphology found on nouns is plural marking.[3] However, plural marking occurs with a relatively small number of nouns; most nouns lack distinct plural forms. The set of nouns with distinct plural forms includes most kinship terms and a few other nouns denoting humans, plus seventeen inanimate nouns. There seems little way to predict which inanimate nouns have distinct plural forms. Some are nouns denoting body parts (e.g. *kampotu* 'knee', plural *kamtikiel*). Others include *nyikie* 'piece of wood', plural *nyikiel*; *nymuto* 'star',

[3]There are a few words that might be analysed as nouns that inflect for gender, since they involve a contrast that is formally identical to gender inflection on many adnominal words. First, there is a noun *kamten* 'man' with plural *kamtey* for which we have a few instances of a feminine form *kamte* and a diminutive form *kamtel* in elicited data, but none in texts. Second, there are a few pairs of kin terms differing in that the one denoting a male ends in an /n/ while the corresponding one denoting a female lacks the /n/, like *wlapon* 'older brother of a man' and *wlapo* 'older sister of a woman'.

plural *nymteykil*; and *tomuel* 'stone', plural *tmleykiel*. The process of plural formation is fairly irregular. There are no plural forms for nouns denoting non-human animals. Whether a noun has a distinct plural form or not has no effect on agreement patterns. For nouns lacking distinct plural forms, differences in number are carried only on agreeing words. For example, what conveys the difference in number in (21) and (22) is the subject prefix on the verb (*w*- for 3SG feminine in (20), *y*- for 3PL in (22)); the form of the noun *pelen* 'dog' is the same in the two examples.

(21) *Pelen* ***w****-aykiri.*
dog **3SG.F**-bark
'The dog (female) is barking.'

(22) *Pelen* ***y****-aykiri.*
dog **3PL**-bark
'The dogs are barking.'

Among other grammatical features of Walman illustrated by the above examples is the fact that the language lacks case marking to distinguish arguments in a clause and the fact that the most frequent word order is SVO (though SOV exists as a not uncommon alternative order). Apart from the subject and object affixes described above, the only other verb morphology is an applicative suffix and a largely obsolete imperative form of verbs.

3 Principles Of Gender Assignment

In (23) is a summary of the principles governing the choice between masculine and feminine gender in Walman.

(23)
a. All nouns denoting humans and some larger animals are either masculine or feminine, depending on the sex of the referent
b. All nouns denoting inanimate objects are feminine[4]
c. Nouns denoting a few quasi-animate natural phenomena, such as *nganu* 'sun', are masculine
d. Nouns denoting most animals appear to have relatively arbitrary gender

[4] As discussed below in §3, there are many nouns denoting inanimate objects which are pluralia tantum nouns. These nouns are neither masculine nor feminine.

The first principle, given in (23a), is that all nouns denoting humans and some larger animals can be either masculine or feminine, depending on the sex of the referent.[5] For example, the noun *pelen* 'dog' controls feminine subject agreement in (24), but masculine subject agreement in (25).

(24) *O pelen tu* ***w****-ata ke?*
and dog PERF **3SG.F**-bite.2OBJ Q
'Did the dog bite you?'

(25) *Kum wuel mingrieny tu pelen* ***n****-a<y>ko.*
1SG pig meat PERF dog **3SG.M**-eat<3PL>
'My pig's meat has been eaten by the dog.'

Most nouns denoting humans are inherently masculine or feminine, but only because they necessarily denote someone who is male or female respectively. For example, in (26), the noun *ngan* 'father' controls masculine subject agreement on *nroko* 'take' while *nyue* 'mother' controls feminine subject on *wrulu* 'cut'.

(26) *Ngan* ***n****-r-oko rele, nyue* ***w****-r-ulo woruen.*
father **3SG.M**-REFL-take beard mother **3SG.F**-REFL-cut hair
'The father shaves, the mother trims her hair.'

The second principle is that nouns denoting inanimate objects are feminine. This is illustrated in (27), where *chakonu* 'road' controls 3SG.F agreement on the verb *wo* 'be'.

(27) *Chakonu* ***w****-o mail.*
road **3SG.F**-be crooked
'The road is not straight.'

This principle is also illustrated in examples above, for *nakol* 'house' in (6), for *opucha* 'thing' in (9), and for *wul* 'water' in (16).

What could be interpreted as an exception to this principle is stated above in (23c): nouns denoting a few quasi-animate natural phenomena are masculine.

[5]The only nouns denoting animals for which we have clear evidence on this are the nouns *pelen* 'dog' and *wuel* 'pig'. There are some other nouns, like *slaoi* 'rat', where some instances in our data control masculine agreement and others control feminine agreement, but we need to investigate to determine whether this alternation is governed by the presumed sex of the referent (or some other factors).

This is illustrated for *snar* 'moon' in (28), where it controls masculine subject agreement, and for *onyul* 'earthquake' in (29), where it controls masculine object agreement.

(28) *Snar* ***n****-reliel.*
moon **3SG.M**-shine
'The moon is shining.'

(29) *Kum m-rere-**n*** *onyul* *nngkal.*
1SG 1SG-feel-**3SG.M** earthquake small
'I felt a small earthquake.'

There are two other nouns of this sort that consistently control masculine agreement, namely *nganu* 'sun' and *knum* 'whirlpool, riptide'. Note that *nganu* 'sun' can also mean simply 'day' and controls masculine agreement with this meaning as well, as in (30), where it controls masculine agreement on the adnominal word *ngon* 'one', as reflected by the masculine suffix *-n*.[6]

(30) *Nganu ngo-**n*** *ru* *w-ekele-n* *chamul* *w-ru.*
sun one-**M** 3SG.F 3SG.F-pull-3SG.M Chamul GEN-3SG.F
'One day she played a flute to call her Chamul.'

There are two other nouns of this sort that can control masculine agreement, but only when they occur in idioms, not when they occur with their literal meaning. One is the noun *olokol* 'mountain', which is normally a pluralia tantum noun, controlling plural agreement, as in (31), where it controls plural inflection on *alpay* 'one' and 3PL subject agreement on the verb *yiliel* 'go towards sea'.[7]

(31) *... olokol* *alpa-**y*** *konu **y**-iliel* *Matapau.*
mountain one-**PL** only **3PL**-go.seaward Matapau
'... there was just one mountain coming down at Matapau.'

However, this noun also occurs with the verb *-oruel* 'explode' in an idiom meaning 'to thunder', as in (32), and in this idiom it controls masculine subject agreement on the verb.

[6] A chamul is a partly human, partly supernatural being in traditional Walman culture. Example (30) employs an idiom *-ekele chamul* 'to play a flute to call one's chamul'.

[7] Normally *olokol* refers to an entire mountain range, since the salient mountains near Walman-speaking villages are the Torricelli Mountains, a mountain range that is roughly parallel to the coast, where there is not a clear delineation between individual mountains. In (31), however, it is clear from the text this comes from that a single mountain is being referred to.

(32) *Olokol* ***n****-oruel.*
mountain **3SG.M**-explode
'It thundered.'

In other contexts with the verb *-oruel*, this noun triggers plural subject agreement, but in these cases, the meaning is literal rather than idiomatic, as illustrated in (33).

(33) *Olokol* ***y****-oruel.*
mountain **3PL**-explode
'The mountain exploded (i.e. a volcano).'

The second noun that controls masculine agreement in an idiom but not in its literal meaning is the noun *anako* 'sky', which combines either with the verb *-ol* 'break' or with the verb *ochoro* 'split open' as alternative ways to express the meaning 'to thunder', as illustrated with the verb *-ol* in (34).

(34) *Anako* ***n****-ol* *komoru.*
sky **3SG.M**-break evening
'It thundered in the (late) afternoon.'

Outside of this idiom, the noun *anako* 'sky' controls feminine agreement, as illustrated in (35).

(35) *Lasi* *anako* ***w****-arau* ***w****-orou* *wor.*
immediately sky **3SG.F**-go.up **3SG.F**-go high
'The sky immediately went high up.'

Although these nouns denote things that are considered inanimate in Western cultures, I characterize them as quasi-animate, since they all denote things that are associated with autonomous movement or force, something generally associated with animate beings. However, not all nouns that might be considered instances of autonomous movement or force control masculine agreement, as illustrated for *loun* 'cloud' in (36) and for *nyuey* 'sea' in (37), which are both feminine, as reflected by the 3SG subject prefixes *w-* on the verbs.

(36) *Loun* ***w****-alplo-n* *nganu*
cloud **3SG.F**-cover-3SG.M sun
'The cloud is hiding the sun.'

(37) *Nyuey* ***w****-oko-n* *n-orou* ***w****-elie-n* *n-ekiel …*
sea **3SG.F**-take-3SG.M 3SG.M-go **3SG.F**-throw-3SG.M 3SG.M-go.landward
'The sea carried him until it threw him up on the beach …'

Another noun, *chepili* 'thunder, lightning', always controls plural agreement, as in (38), where it controls 3PL subject agreement on *yol* 'break', *yanan* 'go down' and *yaypu* 'kill'.[8]

(38) *Ru* *w-ao-y* *nyiki,* *lasi* *chepili* ***y****-ol*
3SG.F 3SG.F-shoot-3PL woman.PL immediately thunder **3PL**-break
mpang, ***y****-anan,* ***y****-a<y>pu* *kamte-y* *eni* *y-a<ø>ko*
loud.noise **3PL**-go.down **3PL**-kill<3PL> person-PL REL 3PL-eat<3SG.F>
wkaray *w-aro-ø* *ngotu,* *y-alma* *mpor.*
white.cuscus 3SG.F-and-3SG.F coconut 3PL-die all
'There was lightning and immediately thunder cracked "mpang" and came down and killed all the people who had eaten the cuscus with coconut.'

The only nouns in Walman for which gender appears to be arbitrarily assigned are those denoting other animals, especially non-mammals. For example, *alan* 'red and green parrot' is masculine, as reflected by the masculine subject prefixes on the verbs *nka* 'fly' and *nekiel* 'go inland, go towards land' in (39).

(39) *Alan* *yapa* ***n****-ka* ***n****-ekiel.*
parrot that **3SG.M**-fly **3SG.M**-go.landward
'That parrot is flying inland.'

Similarly *wraul* 'toad' is feminine, as reflected in (40) by the feminine object agreement on *nete* 'see', the feminine agreement on the adjective *lapo* 'large', and the feminine subject agreement on *wekele* 'make'.

(40) *Lasi* *runon Tenten* *n-ete-****ø*** *wraul lapo-****ø*** *oluel*
immediately 3SG.M Tenten 3SG.M-see-**3SG.F** toad big-**F** nest
w*-ekele* *w-an* *kra* *nyumuen.*
3SG.F-make 3SG.F-be.at sugarcane middle
'A man Tenten suddenly saw a large toad making a nest in the middle of the sugarcane.'

[8] The first three words in (37) constitute an idiom meaning 'for there to be lightning', where the literal meaning is 'it shoots women'. Note that this idiom obligatorily has the 3SG.F pronoun *ru* as subject.

For a number of reasons, it is not really possible to demonstrate convincingly that gender is arbitrary for most animals. First, for many species, we have not actually seen instances of the animals, but depend on descriptions by speakers. Second, one can never know for sure whether there are unknown characteristics of particular animals that play a role in determination of gender (such as size, sound, or behaviour). And third, there may be roles that animals play in Walman culture and history that we are not aware of that influence gender. In general, however, native speakers do not have explanations for particular gender assignment for these nouns.

The lack of an obvious semantic basis for gender assignment for animals can be illustrated by looking at the gender of nouns denoting various species of snakes. In (41), I list the genders for the six nouns (or two-word nominal expressions) in our data denoting different species of snake.

(41) Snakes

MASCULINE	
ani konu	snake, light brown-orange-red, about a metre long, very dangerous
nayko iyoy	small snake, lives along coast, not dangerous, eats crabs
layat	type of python, very big and long, pretty patterned skin, lives in trees, not really dangerous
FEMININE	
kilekile	death adder, about a foot long, black with white dots, very dangerous
mekey	ground python, brown with white belly, not poisonous, can be very big
nyieu	very big and long, light blue and shiny, lives in bush, not dangerous to people but swallows small animals

Two obvious differences among snakes that might play a role in determining gender are size and how dangerous they are (defined by how serious their snake bite is). The list of snakes in (41) includes three pythons, which share the features of being large and not being dangerous: two are masculine, while one is feminine. Of the three smaller snakes, two are very dangerous: one of these is masculine, the other feminine. Thus neither size nor how dangerous they are provides a basis for predicting gender. There may be other factors, of course, but the most obvious ones do not seem relevant. Note that *ani konu* is literally 'male snake', so the masculine gender for this two-word nominal expression is explained by

the fact that *konu* means 'male'. In addition the first word in *nayko iyoy* is a form that looks like a form of the verb -*ako* 'eat', with a 3SG.M prefix and a 3PL object infix, while the second word (*iyoy*) is a noun meaning 'crab' so that the apparent literal meaning of *nayko iyoy* is 'he eats crabs'; thus the fact that *nayko* begins with what looks like a 3SG.M subject prefix may be relevant to the fact that this snake is masculine.

We find a similar situation with insects and similar lower animals. The list in (42) is a list of all the species of such animals in our data (excluding a few whose gender we lack data on).

(42) Insects and the like (spiders, lice, leeches, worms, centipedes, millipedes)

MASCULINE

achakol	housefly
kayikiel	fruitfly
kaimung	firefly
kanal	sago grub
melkil	bee, wasp
mile	leech
paral tkay	flying ant
ppu	small green or brown grasshopper-like creature
slmako	bluebottle fly
srnyako	beetle which comes around in evening, makes loud sound
tmpinie	worm (general term)

Feminine	
atal	scorpion
inrer	very small mosquito (hard to see, smaller than sandfly) that bites people in evening, especially in marshy areas of bush
klu	'fly which is very tiny and which makes nest in holes in wood'
krunu	centipede
nymuchuto	spider
nymulol	louse
paral	ant
pirinyue	cockroach
posur	termite, white ant (does not live in houses, builds mounds)
puseksek	a type of grasshopper that is large, brown or green, and can fly, and which make a noise like "seksek"
waykelie	millipede
woru	mosquito

The nouns listed in (42) denoting species which bite or sting humans include three masculine nouns (*melkil* 'bee, wasp', *mile* 'leech', and *paral tkay* 'flying ant') and seven feminine nouns (*atal* 'scorpion', *inrer* 'very small mosquito', *krunu* 'centipede', *nymuchuto* 'spider', *nymulol* 'louse', *paral* 'ant', and *woru* 'mosquito'), so being something that bites or stings is not a predictor of gender. Of the two species whose stings are most painful, one is masculine (*melkil* 'bee, wasp') while the other is feminine (*krunu* 'centipede', the local variety of which reportedly has an especially painful sting). Of the smaller species in (42), one is masculine (*kayikiel* 'fruit fly') while three are feminine (*inrer* 'very small mosquito', *klu* 'very tiny fly', and *woru* 'mosquito'). Nor is there any other obvious feature distinguishing the masculine nouns in (42) from the feminine nouns.

If there is any feature that correlates at least weakly with gender among other animals, it is that nouns denoting more aggressive species are somewhat more often masculine while nouns denoting less aggressive species are somewhat more often feminine. A correlation with aggressiveness seems most apparent with species of birds, listed in (43).

(43) Birds

MASCULINE

alan	red and green parrot
aron	eagle that is large and grey and white and that is found in the jungle
mmpul	hawk with reddish brown body and white head
ngolu	cassowary
semier	type of bush fowl
tarkau	osprey
tualiau	type of bush fowl, brown, small, the size of a chicken
wamol	hornbill
wawiel	crow
yiwos	very small hawk, brown, lives at coast

FEMININE

kmaynum	blue bird about the size of a chicken, has no decoration
le	bird of paradise
pinie	tiny bird, blue with white around neck
polmonu	guria pigeon
rampanyau	willy wagtail
solponyou	swallow
yup	white cockatoo

All of the nouns denoting what I believe are the most aggressive species are masculine: *nganu* ('cassowary'), *aron* (a type of eagle), *mmpul* (a type of hawk), *yiwos* (another type of hawk), *tarkau* ('osprey'), and *wawiel* ('crow').

Most of the nouns denoting aquatic animals are feminine. This includes nine out of twelve species of fish, two species of crab, crayfish, and two aquatic mammals (*alpariak* 'dolphin', *yuel* 'seal'). One of the three masculine nouns for a species of fish is the noun *wuey* for 'shark', which fits the weak correlation between aggressiveness and masculine gender. There is one noun, *nyelekel*, that can denote either of two species of snail. This noun is masculine when it denotes one species, feminine when it denotes the other species. The feminine one lives in water, while the masculine one apparently does not.

Some nouns denoting larger animals can be either masculine or feminine, but one of the two genders is the default. While it is apparently the case that the default gender is generally used when the sex of the referent is unknown, this is not always the case. For example the default gender of the noun *ngolu* 'cassowary' is masculine and although it can be feminine when the referent is female, feminine

gender is not obligatory when the referent is clearly female. In (44), for example, this noun controls masculine subject agreement on the verb, despite the fact that the semantics of the sentence implies that the referent is female.

(44) ***Ngolu*** ***n****-ikie-ø* *meten.*
cassowary **3SG.M**-put-3SG.F egg
'A cassowary has lain an egg.'

However, this noun can be feminine, as in (45), where it controls feminine object agreement.[9]

(45) *… y-e<**ø**>tiki* ***ngolu****.*
3PL-cook.over.fire**<3SG.F>** **cassowary**
'[She is still with her brothers] cooking (a) cassowary.'

There are a few other uses of masculine gender in Walman that are more unusual. For example, the noun *won* can mean 'chest', but it is far more common as part of a large number of idioms where this meaning is less evident. In its meaning 'chest', it is feminine, as in (46).

(46) *Won mnon* ***w****-o* *lapo-**ø**.*
chest 3SG.M:GEN **3SG.F**-be big-**F**
'His chest is large.'

When *won* occurs in idioms, it is masculine, as in (47) and (48), where in both cases *won* controls masculine subject agreement on the verb. The idiom in (47) for 'angry' is literally 'heart be fast'.

(47) *Ru won* ***n****-o* *kisiel prie.*
3SG.F heart **3SG.M**-be fast completely
'She is very angry.'

I gloss *won* in idioms as 'heart', not in the sense of the body part, but in a more abstract sense that could alternatively be glossed 'mind' or 'soul'. One reason that I gloss it as 'heart' is that it is clearly cognate to the word for the body part heart in a number of other languages in the Torricelli family.

[9]The possibility of feminine agreement in (45) may be due to the fact that it is the meat (i.e. an inanimate object) that is being denoted here, rather than the living bird. However we have more than one other instance in our data of a noun phrase denoting cassowary meat triggering masculine agreement.

The idiom in (48) for 'be happy' is literally 'heart follows', where the one who is happy is grammatically the object of the verb, as reflected by the 3PL object suffix on the verb. Note that the object pronoun *ri* in (48) is clause-initial; the normal word order in this and a couple of other idiomatic constructions with an inanimate subject and an animate object is OSV.

(48) *Ri won* ***n****-rowlo-****y****.*
3PL heart **3SG.M**-follow-**3PL**
'They are happy.'

In (49), *won* functions as the object of the verb in an idiom meaning 'take a deep breath' (literally 'pulls heart hard'); in this idiom, the verb obligatorily occurs with masculine object inflection, agreeing with *won*.

(49) *Kum won m-ekele-****n*** *tetiet.*
1SG heart 1SG-pull-**3SG.M** hard
'I took a deep breath.'

Another word that is feminine in its literal meaning but masculine in idioms is *puna* 'brain'. In (50), *puna* controls feminine subject agreement in its literal meaning, while in (51), it controls masculine object agreement in an idiom *-ekelen puna* 'to snore' (literally 'to pull one's brain').[10]

(50) *Kum puna* ***w****-o cheliel.*
1SG brain **3SG.F**-be hot
'My brain hurts.'

(51) *Chi n-ekele-****n*** *puna kisiel.*
2SG 2SG-pull-**3SG.M** brain fast/loud
'You were snoring loudly.'

A final instance of a word that is obligatorily masculine is the interrogative pronoun *mon* 'who', illustrated in (52). It is not possible to use a verb form *chaltawro* in (52), with 3SG.F object agreement, even in contexts where it is assumed that someone is looking for a woman, although 3PL agreement would be possible if it is assumed that more than one person is being looked for.

[10]Note that in all the examples I have discussed where a noun is a different gender in an idiom from its gender outside of idioms are cases where the noun is masculine in the idiom but feminine outside of idioms. This appears to be due to the fact that the relevant nouns denote inanimate objects outside of idioms and thus are feminine outside of idioms.

(52) *Chim ch-altawro-**n** mon?*
2PL 2PL-look-**3SG.M** who
'Who are you looking for?'

Mon thus behaves as a masculine noun.[11]

4 Pluralia tantum nouns

I analyse nouns in Walman which are always grammatically plural as pluralia tantum nouns (Corbett 2012 : 233ff; Acquaviva 2008).[12] While the category of pluralia tantum nouns in other languages is not usually considered a gender, what makes it gender-like in Walman is the sheer number of pluralia tantum nouns. In our current data, there are about twice as many pluralia tantum nouns as there are masculine nouns.[13] What this means is that apart from nouns which can be either masculine or feminine depending on the sex of the referent, every noun in Walman is masculine, feminine, or pluralia tantum. In this sense, pluralia tantum is like a gender.

In many languages, what characterizes pluralia tantum nouns is that they are plural in form (e.g., *scissors* in English). In Walman, however, what characterizes pluralia tantum nouns is not their form, but the fact that they always trigger plural agreement. An example of a pluralia tantum noun is *nyi* 'fire'. In (53), it triggers 3PL subject agreement on the verb *yiri* 'stand up, rise' and *yreliel* 'shine, for a fire to blaze'.

(53) *Nyi **y**-iri pa, nyi **y**-reliel.*
fire **3PL**-stand.up PTCL fire **3PL**-shine
'The fire rose, it was ablaze.'

[11] There is no interrogative pronoun in Walman meaning 'what'. Rather, there is an interrogative adnominal word *mol* and and the expression for 'what' is *opucha mol* literally 'what thing'. The gender of noun phrases with *mol* is determined by the gender of the noun (or the sex of the referent).

[12] Many linguists distinguish a singular expression *plurale tantum* from a plural expression *pluralia tantum*. But there is considerable inconsistency in the literature in the use of these expressions, so I avoid the expression *plurale tantum* and urge other linguists to do likewise. In this paper, I treat the expression *pluralia tantum* as grammatically similar to the words *masculine* and *feminine*.

[13] Our current data includes 81 instances of pluralia tantum nouns, but only 40 instances of masculine nouns. Since there are a number of nouns denoting animals whose gender we have not yet had opportunity to check, it is likely that the ratio of pluralia tantum nouns to masculine nouns will be less than 2 to 1.

In (54), the same noun triggers 3PL object agreement on *noysusur* 'move' and 3PL subject agreement on *yesi* 'go outside'.

(54) *Runon n-o<**y**>susur nyi **y**-esi chalien.*
3SG.M 3SG.M-move<**3PL**> fire **3PL**-go.outside outside
'He moved the fire outside.'

And in (55), the same noun triggers 3PL object agreement on the verb *kaoy* 'shoot' (here used in the sense of 'light' in 'light a fire'), as well as plural agreement on the numeral *ngony* 'one'.

(55) *Kipin k-ao-**y** nyi ngo-**ny**.*
1PL 1PL-shoot-**3PL** fire one-**PL**
'We lit a fire.'

In (56), the pluralia tantum noun *apar* 'platform, shelf, bed' triggers plural agreement on the demonstrative *payten* and 3PL subject agreement on the verb *yo* 'be'.

(56) *Apar pa<**y**>ten **y**-o rachi.*
bed that<**PL**> **3PL**-be strong
'That bed is strong.'

Just as there are semantic factors that partially account for gender in Walman, there are also semantic factors that probably account for at least some pluralia tantum nouns in Walman. Like pluralia tantum nouns in many languages, there is something about many pluralia tantum nouns in Walman that can be conceived as denoting more than one thing. In the case of *nyi* 'fire', there are multiple flames. In the case of *apar* 'bed, shelf', there are multiple pieces of wood. Other pluralia tantum nouns that denote objects that contain multiple pieces of wood include *chauchau* 'door', *salriet* 'steps', and *watakol* 'raft, coffin'. Pluralia tantum nouns that contain multiple threads (or similar material) include *chrikiel* 'net', *ranguang* 'clothes' and *kmem* 'rope for tying logs together to form a raft'. The noun *tim* 'dew' is pluralia tantum and could be construed as involving multiple drops. The noun *yikiel* 'language, story, statement, word' is pluralia tantum and one could think of most of these uses as involving multiple words.

However, there are many nouns that can just as easily be conceived of as denoting something with multiple pieces that are not pluralia tantum nouns, including *yie* 'bilum, string bag', *wuwu* 'basket made from spines of nipa palm fronds for

trapping fish', and *amen* 'type of basket made from coconut leaves, used for fishing'. Conversely, there are pluralia tantum nouns where it is less obvious that they consist of multiple instances of something, such as *nganyi* 'urine', *almat* 'fog', *ei* 'lime (white powder produced from grinding up shells, used when chewing betelnut)'. All three of these nouns are mass nouns, but mass nouns do not appear to be pluralia tantum nouns with any greater frequency than count nouns. For example, *wul* 'water' and *tantan* 'sand' are mass nouns, but are grammatically feminine (as illustrated for *wul* 'water' in (16) above by the feminine object agreement on the verb *nako* 'eat' and the feminine form of the demonstrative *paten*).

One of the more interesting classes of pluralia tantum nouns are ones denoting body parts. The majority of these nouns denote body parts that occur in pairs. However, these nouns trigger plural morphology even when only one of the two parts is denoted, as in (57), where *chkuel* 'eye' triggers plural agreement on both *ngony* 'one' and *yo* 'be'.

(57) *Chi chkuel ngo-**ny** tu y-o ngul.*
2SG eye one-PL PERF 3PL-be blind
'One of your eyes is blind.'

Other pluralia tantum nouns denoting body parts that occur in pairs include *kam* 'lungs', *kayal* 'foot', *kawa* 'heel', *kopun* 'buttock', *nyiminy* 'breast', *wi* 'palm of hand, hand not including fingers', *mkuel* 'ear', and *wili* 'shoulder'. However, some pluralia tantum nouns refer to body parts that are not normally regarded as paired, such as *repicha* 'mouth', *chpurum* 'upper lip', *saykil* 'liver', *ngoul* 'womb' and *kal* 'afterbirth'. There are also some body part nouns in Walman which occur in pairs but which are not pluralia tantum nouns; however, in each case, these are nouns that have distinct plural forms, such as *kampotu* 'knee' (plural *kamtikiel*).

Note that while pluralia tantum nouns can be conceived of as denoting things with multiple parts, they can still denote single objects, that is, single objects with multiple parts. In other words, they can be semantically singular, as reflected by the fact that they can be modified by either of two words meaning 'one' with plural inflection, as in (58) and (59), as well as (31), (55) and (57) above.

(58) *Kum ranguang alpa-**ny**.*
1SG clothing one-PL
'I have one shirt.'

(59) *Kum m-oko-y chrikiel ngo-**ny**.*
1SG 1SG-take-3PL net one-**PL**
'I brought one net.'

Some nouns are optionally pluralia tantum. For example, the noun *tokun* 'knot' can be used with singular agreement to denote a single knot, but with plural agreement to denote either a single knot or more than one knot. Some nouns are pluralia tantum with one sense, but not with another. For example, the noun *wukul* denotes either the sail of a boat or the soft bark flap of coconut tree, which is like a cloth and which is used to strain the sago dust out of the water in making sago. It is pluralia tantum with the first of these senses, but not with the second. A more complex example is illustrated by the noun *kiri*, which means either 'sago flour' or 'sago pancake'. On the first of these meanings, it is optionally pluralia tantum, while on the second it is always pluralia tantum. This is particularly interesting since it is semantically a mass noun with the first sense, but a count noun with the second; one might have expected it to be more likely pluralia tantum when a mass noun.

In the preceding section, I described a few nouns which are masculine in certain idioms but feminine outside of idioms. We are also aware of at least one case of a noun which does not occur outside of idioms, but which is feminine in one idiom but pluralia tantum in two other idioms. The word *apum* combines with *kakol* 'skin' to mean 'body', as in (60), where *loyol apum kakol wru* 'a sugar-glider's body' triggers feminine agreement on the verb *wo* 'be'.

(60) *Loyol apum kakol w-ru **w**-o nngkal-nngkal, chei*
sugar.glider body skin GEN-3SG.F **3SG.F**-be small-small tail
w-ru ro-ø rani.
GEN-3SG.F piece-F long
'A sugar-glider's body is small but its tail is long.'

However, the same word *apum* occurs in two idioms where it behaves as a pluralia tantum noun, controlling plural subject agreement on the verb. One of these idioms, *apum yo sopuer* 'to feel tired', is illustrated in (61), while the other, *apum yo mayay* 'to feel ashamed', is illustrated in (62).[14]

(61) *Kum apum **y**-o sopuer.*
1SG body **3PL**-be tired
'I am feeling lethargic.'

[14] The adjectives *sopuer* 'tired' and *mayay* 'ashamed' can also be used with the experiencer as subject, as illustrated in (i) for *sopuer* 'tired'.

(62) *Runon apum **y**-o mayay.*
3SG.M body **3PL**-be shy
'He feels ashamed.'

The idiomatic uses in (61) and (62) involve psychological states while the use in (60) does not. This is probably not a coincidence since the idioms in (61) and (62) resemble the idioms in (47) and (48), where the noun *won* 'heart' controls masculine agreement and the meaning involves psychological states.

There are also a few nouns which are singularia tantum nouns that do not appear to be mass nouns. One such noun is *woru* 'mosquito', which always triggers feminine singular agreement, as in (63), where it controls feminine singular subject agreement on the verb *wanpu* 'attack'.

(63) *Kon woru chomchom **w**-a<n>pu.*
night mosquito many/much **3SG.F**-attack<3SG.M>
'At night, many mosquitoes bit him.'

While examples like (63) are consistent with *woru* being a mass noun, the meaning of (64), where *woru* functions as object of *mkawlo* 'count', but still triggers singular agreement, implies that it is a count noun.

(64) *Kum m-kawlo-**ø** woru.*
1SG 1SG-count-**3SG.F** mosquito
'I counted the mosquitoes.'

While pluralia tantum in Walman behaves in some ways like a gender, I make no claim that it *is* a gender, though I am not aware of any strong arguments against this position. Note that if we were to consider pluralia tantum a gender, I would not be suggesting that plural is a gender, only that the forms used with pluralia tantum nouns are the same as those used for all plurals regardless of gender. A more detailed description of the kinds of nouns that are often pluralia tantum in Walman is given in Dryer (in preparation).

(i) *Kum m-o sopuer*
1SG 1SG-be tired
'I'm tired.'

We do not know if there is a difference in meaning between these non-idiomatic uses of these adjectives and the idioms in (61) and (62).

5 Diminutive

In this section, I describe the Walman diminutive, illustrated in (7) above, and discuss ways in which it is both like and not like a gender.[15] Corbett (2012 : 149) argues that the Walman diminutive is indeed a gender, though a non-canonical one. In Dryer (2016), I discuss possible reasons not to consider it a gender.

Unlike diminutives in most languages, the Walman diminutive is inflectional (rather than derivational) in that diminutive affixes occur in the same morphological positions as affixes coding gender and number. In (65), for example, we get diminutive subject prefixes on the verbs *lan* 'be at' (here functioning as a progressive auxiliary verb) and *loruen* 'cry'.

(65) *Nyanam nngkal pa* ***l****-an* ***l****-oruen.*
child small that **3.DIMIN**-be.at **3.DIMIN**-cry
'The small child was crying.'

And in (66), we get diminutive agreement on the demonstrative *palten*, on the verb *lo* 'be' and on the adjective *lapol* 'large'.

(66) *Pelen pa<****l****>ten* ***l****-o* *lapo-****l****.*
dog that<**DIMIN**> **3.DIMIN**-be large-**DIMIN**
'That puppy is large.'

All words that can inflect for gender and number can also inflect for diminutiveness.

What makes diminutive significantly different from masculine and feminine gender is that there are no nouns that are lexically diminutive, that is, there are no nouns which obligatorily trigger diminutive agreement.[16] In principle, any noun can be associated with diminutive agreement. For example, the noun *chu* 'wife' is normally feminine, but in (67), it triggers diminutive subject agreement on the verb *lalma* 'die' in the relative clause *ni lalma pa* 'who died there' modifying *chu*.

(67) *Runon n-akrowon chu ni* ***l****-alma pa.*
3SG.M 3SG.M-think wife REL **3.DIMIN**-die there
'He mourned his dear wife who had died there.'

[15] My discussion in this section is brief since I discuss the Walman diminutive in more detail in Dryer (under revision) and Dryer (2016).

[16] There is one word that may be (or may be considered) lexically diminutive that I discuss in Dryer (under revision), viz. *kamtel*, the diminutive form of *kamten* 'man'. However, as discussed in (Dryer under revision), there are reasons to consider this the diminutive form of a single lexical item rather than a distinct lexical item.

The semantics associated with the Walman diminutive is similar to the semantics associated with derivational diminutives in other languages. It can simply denote a smaller size than normal, as in (68), where it triggers diminutive object agreement on the verb *malwul* 'buy'.

(68) *Kum m-a<**l**>wul selenyue.*
1SG 1SG-buy<**3.DIMIN**> axe
'I bought a small axe.'

However, it more often denotes the young of a species, as in (65) and (66) above, or expresses endearment, as in (67) above.

Apart from the fact that there are apparently no lexically diminutive nouns in Walman, another reason for thinking that the Walman diminutive is not a gender is that one can get agreement mismatches in the sense that one target of agreement for a given controller is masculine or feminine while another target of the same controller is diminutive, suggesting that a given noun phrase can be masculine or feminine but at the same time diminutive. For example, in (69), the noun phrase *wuel woyuel* 'the naughty pig' is masculine, triggering masculine subject agreement on the verb *narul* 'run away', but at the same time diminutive in that the adjective *woyuel* 'bad' exhibits diminutive inflection.

(69) *Wuel woyue-**l** **n**-arul.*
pig bad-**DIMIN 3SG.M**-run.away
'The naughty little male pig ran away.'

The reverse is also possible, with masculine inflection on the adjective and diminutive agreement on the verb, as in (70).

(70) *Wuel woyue-**n** **l**-arul.*
pig bad-**MASC 3.DIMIN**-run.away
'The naughty little male pig ran away.'

Whether the Walman diminutive should be treated as a gender is a complex question and depends to a large extent how one interprets the question, as discussed by Dryer (2016). For more detailed description of the Walman diminutive, see Dryer (under revision) and Dryer (in preparation).

6 Conclusion

In this paper, I have described gender in Walman. The choice between the two clear instances of gender, masculine and feminine, is largely predictable seman-

tically, though this is partly due to the fact that inanimate nouns are always feminine. The only nouns whose gender is apparently arbitrary are ones denoting animals. I have also briefly described two other gender-like phenomena in Walman, pluralia tantum and diminutive. I do not take a stand here on whether these two phenomena are genders or not. My goal has simply been to illustrate ways in which they are gender-like and ways in which they are not gender-like. In the case of pluralia tantum nouns, they are more gender-like than similar categories in other languages, simply because there are so many of them. In the case of the diminutive, it is like a gender to the extent that it is coded in the same morphological positions as masculine and feminine, but not like a gender in that there appear to be no lexically diminutive nouns.

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Abbreviations

DIMIN	diminutive	PL	plural
F	feminine	PTCL	particle
FUT	future	Q	marker of polar question
GEN	genitive	RECIP	reciprocal
M	masculine	REFL	reflexive
NEG	negative	REL	relative clause marker
OBJ	object	SUBJ	subject
PERF	perfect		

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Chapter 8

The gender system of Coastal Marind

Bruno Olsson
Australian National University

The gender system of Coastal Marind (a Papuan language of the Anim family of South New Guinea; Usher & Suter 2015) is treated in relative detail in Drabbe's (Drabbe 1955) masterful grammar. The division of nouns into four genders (basically masculine, feminine and two inanimate genders) is familiar from various languages around the globe, but the morphology of exponence (gender agreement marked to a large extent by stem-internal changes on targets) is somewhat more exotic and is occasionally cited in the literature. In this paper I provide an overview of the system, combined with discussion of two issues: the origins of stem-internal gender agreement, and the wide-ranging syncretism between animate plurals and the 4th gender (the 2nd inanimate gender). I show that this 'syncretism' makes the status of the 4th gender ambiguous, since the members of this gender also could be analysed as an unusually large class of pluralia tantum. While I argue that the synchronic 4-gender analysis must be maintained for Coastal Marind, I speculate that an erstwhile grouping of pluralia tantum provided the diachronic source of the 4th gender.

Keywords: Gender, number, morphology, diachrony, Papuan languages.

1 Introduction

The idea that gender systems can become more complex (add a gender or two) through the 'reinterpretation' of some non-gender feature as signalling a gender value has a long history in linguistics (e.g. Brugmann 1891 on the origins of the Indo-European feminine gender). In this paper I show that the fourth gender of Coastal Marind could be more parsimoniously described as pluralia tantum in a 3-gender system; however, I will argue that semantic considerations ultimately force us to retain the traditional four-gender description.

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Based on its ambiguous status in Coastal Marind, I will speculate that the fourth gender in the languages of the Anim family of South New Guinea could have originated as a grouping of pluralia tantum nouns, and that subsequent changes in the agreement system and attraction of additional nouns to the emerging fourth gender could have lead to a present situation where the pluralia tantum analysis is no longer possible, resulting in a 4-gender system.

I also add further support to Usher & Suter's (2015) proposal that one of the main manifestations of gender agreement in the language – stem internal vowel alternations in agreement targets – arose from a process of umlaut triggered by postposed articles, by showing that the synchronic distribution of stem-final vowels in nouns is consistent with gender umlaut affecting a much larger part of the lexicon than just present-day gender-agreeing lexemes. The discussion is based on data from the best known Anim language, Coastal Marind (for a modern reference grammar, see Olsson 2017).

The article is structured as follows. §1.1 is a brief demonstration of the four genders of Coastal Marind. The language is placed in its areal and genealogical context in §1.2, while §1.3 provides information about some relevant structural features of Coastal Marind. §2 describes the interesting correlation between stem-final vowels and gender membership in nouns, showing that it is of limited productivity synchronically, but likely derives from an earlier system of post-nominal gender articles. §3 describes gender agreement across the clause, with emphasis on the systematic correspondence between exponents of Gender IV and the plural of Gender I/II. §4 shows that this correspondence continues in the participant indexing on the verb. This suggests an alternative analysis according to which Gender IV is an unusually large group of pluralia tantum rather than a gender of its own. In §5 I will show that the assignment of nouns to Gender III and IV is largely arbitrary, but that the occurrence in Gender IV of many nouns that are typical pluralia tantum nouns across languages is suggestive of being a remnant of such a grouping. I also show that a similar pattern occurs in Mian, a language that probably is a distant relative of Coastal Marind since the Anim and Ok families (to which Mian belongs) are likely members of the enormous Trans-New Guinean super-family. I conclude that the 4-gender analysis should be maintained for the present state of Coastal Marind, but that the pluralia tantum nouns possibly provided the source for the fourth gender.

1.1 The Coastal Marind 4-gender system

The existence of a 4-gender system in Coastal Marind is evident if one compares the form of the demonstrative *Vpe* (where *V* stands for a vowel) or the adjec-

tive *samlaɣVn* 'mid-size, neither big nor small' combined with different nouns in examples (1)–(3). As indicated by the hyphens, attributively used adjectives are compounded with their head nouns. The nouns themselves are invariant.

(1) a. *samlaɣ**e**n-patul* ***e**-pe*
mid.size:I-boy(I) I-that

b. *samlaɣ**u**n-kyasom* ***u**-pe*
mid.size:II-girl(II) II-that

'that mid-size boy/girl'

(2) a. *samlaɣ**i**n-patul* ***i**-pe*
mid.size:I/II.PL-boys(I) I/II.PL-that

b. *samlaɣ**i**n-kyasom* ***i**-pe*
mid.size:I/II.PL-girls(II) I/II.PL-that

'those mid-size boys/girls'

(3) a. *samlaɣ**a**n-da* ***e**-pe*
mid.size:III-sago(III) III-that

'that mid-size sago palm/those mid-size sago palms'

b. *samlaɣ**i**n-bomi* ***i**-pe*
mid.size:IV-termite.mound(IV) IV-that

'that mid-size termite mound/those mid-size termite mounds'

All nouns denoting male humans behave like *patul* 'boy' (in 1a) in combining with a demonstrative with the initial vowel *e-* in the singular; nouns denoting female humans (and all animals) pattern like *kyasom* 'girl' (1b) in combining with an *u-*initial demonstrative. As the examples in (2) show, these nouns exhibit a contrast in number. The demonstrative has to be *ipe* in the plural, and the adjective, which is compounded with its head noun, has the exponent vowel *i* in the final syllable of the stem.

The nouns in (3) are inanimate, and trigger different vowels on the demonstrative: *da* 'sago palm' triggers *e-*, *bomi* 'termite mound' triggers *i-*. Note that the resulting forms are homophonous with demonstratives in the preceding examples: ***e**pe* in (3a) with the demonstrative used for *patul* in (1a), and ***i**pe* in (3b) with the plural forms in (2). For (3a), the distinct form *samlaɣ**a**n* of the adjective proves that this is indeed a separate gender, although the agreement of the demonstrative happens to be homophonous with that seen in (1a). But the case

in (3b) is more difficult, since the agreement on both the demonstrative and the adjective turns out to be homophonous with the plural forms. I will return to this pervasive syncretism further below.

The four agreement classes – from now on referred to as Gender I, II, III and IV – are summarized in Table 1, as evidenced by the exponence pattern of *samlaɣVn*.

Table 1: Exponents of agreement on *samlaɣVn* 'mid-size'

	SG	PL
I	e	i
II	u	
III	a	
IV	i	

These data represent one of the most well-known gender systems in New Guinea. The Coastal Marind system of four grammatical genders has featured in prominent publications such as Corbett (1991 : 116) and Aikhenvald (2000 : 60) after having been brought to the fore in Foley's influential compendium on Papuan languages (Foley 1986 : 82–83). This attention is due to the description of the gender system provided in Petrus Drabbe's extensive grammar of the language (Drabbe 1955). Few researchers seem to have had the courage to dive deeper into Father Drabbe's sometimes quite demanding *Spraakkunst*, so one purpose of this article will be to give a more representative picture of the gender system and its manifestations, and, in particular, the syncretism between animate plurals and Gender IV. The data come from my own fieldwork on the Western variety of Coastal Marind, a dialect that is mutually intelligible with the Eastern variety described by Drabbe.

1.2 Coastal Marind in context

The varieties collectively known as Coastal Marind are spoken in ca. 40 villages along the coast of the Arafura sea and in the adjoining swampy lowlands. I estimate the total number of speakers to be around 14.000 based on government and SIL figures. The Coastal Marind land forms part of the linguistically diverse Trans-Fly area (Evans 2012 ; Evans et al. 2018) straddling the border of present-day Indonesia (where Coastal Marind is spoken) and the independent country of Papua New Guinea.

The dialect situation is complex, and it is probable that ongoing research will show that some of the varieties described in the literature as dialects are in fact distinct languages. Dialectal variation in gender would likely be an interesting area to explore, as there are differences (mainly in assignment) even between villages speaking virtually identical varieties of Coastal Marind. On the whole, however, the basics of gender and agreement are the same in all known varieties, so the data presented here (from the village of Wambi) are representative of all coastal varieties, and probably of the (less well-known) inland varieties as well.

On a higher level, gender has recently emerged as a crucial factor in the genealogical classification of Coastal Marind. Usher & Suter (2015) show that gender ablaut in nouns such as *anem* 'man', *anum* 'woman' and *anim* 'people' recur throughout a number of languages of the Trans-Fly region. This observation, in addition to a large set of lexical cognates showing regular sound correspondences, leads Usher & Suter to propose a hitherto unrecognized language family – the Anim family, named after the recurring word for 'people' – of which Coastal Marind so far is the only language for which substantial descriptive work is available. Obviously, more work on the other Anim languages – several of which are rapidly losing speakers – could provide crucial insights into the development of the Anim gender system.

1.3 Typological background

Some of the structural features of Coastal Marind are relevant to the description of its gender system. Coastal Marind displays the relatively rare combination of verb-final constituent order and massively prefixing verb inflection. Based on co-occurrence, a prefixal template with ca. 18 slots can be set up, marking notions such as tense, various aspectual distinctions, applicatives, reciprocal, various adverbial meanings ('again', 'first', 'far away', 'in contact with surface') and indexation of (roughly) actor, recipient and affected possessor; undergoer indexation is in turn marked on the verb stem by complicated alternations including pre-, suf-, in-, and circumfixal morphology.

Some of the prefixes occupying the first (i.e. leftmost) positions agree in gender with an argument, although they primarily mark grammatical distinctions other than gender (e.g. tense-aspect). The prefixes devoted to argument indexing, on the other hand, reflect person and number but are insensitive to gender (with some exceptions to be discussed later). The verb stem itself is an important site for the manifestation of gender, so the intricate stem changes will be crucial to the arguments made here.

A relatively straightforward example of how verbs are segmented is given in

(4). This verb has two prefixes, of which the first (leftmost) prefix agrees in gender with the subject (plural of Gender I/II). The stem is separated from the prefixal complex by a phonological boundary (indicated in glossing by means of a trailing hyphen followed by a blank). The formative *n-* on the stem marks it as the 1st person undergoer form, which clearly is a mismatch since there is no 1st person participant involved in the event. This idiosyncrasy is part of the reciprocal construction, and such value mismatches are not uncommon in Coastal Marind (cf. §4).

(4) *ip-enam-* *n-asak-e*
ABSC:I/II.PL-RECP- 1.U-fight-IPFV
'They are fighting.'

Nominal morphology is sparse: there is no case marking and most nouns do not show overt gender marking. The exception is a handful of nouns (mostly kinship terms) that show alternations in the stem-final vowel according to gender (see below). This marking pattern also occurs on a subset of adjectives which agree with a noun in attributive and predicative use. The majority of adjectives are invariant and fail to show agreement. Instead, the main loci of gender agreement outside verbs are demonstratives and pronominal-like words (emphatic pronouns, question words). In the next section I turn to the reflexes of gender in nouns and what they can tell us about the diachronic development of gender marking in this part of the lexicon.

2 The manifestation of gender in nouns

2.1 Overt gender

A comparison of gender agreement across different word classes confirms that the picture emerging from examples (1)–(3) above is correct. All words that show morphological alternations according to gender follow these four agreement classes, although exponents vary across the targets showing agreement, and although many targets do not distinguish all four classes. Before dealing with agreement proper, we will consider nouns displaying OVERT GENDER. Whereas such alternations are not productive in contemporary Coastal Marind, a closer look reveals that traces of a more wide-ranging system of stem-final vowel alternations can be observed. The origins of this system of overt marking can be reconstructed following Usher & Suter (2015), as will be seen later.

Table 2: Overt gender on nouns

	I SG	II SG	I/II PL	III	IV
a.	*an**e**m*	*an**u**m*	*an**i**m*	*an**e**m*	*an**i**m*
	'man'	'woman'	'people'		
b.	*nam**e**k*	*nam**u**k*	*nam**i**k*		
	'cousin (m)'	'cousin (f)'	'cousins'		
c.		*namak**u**d*	*namak**i**d*	*namak**a**d*	*namak**i**d*
		'animal'	'animals'	'thing(s)'	'thing(s)'
d.	*amnangg**i**b*		*amnangga*		
	'married man'		'married men'		
e.	*wanangg**i**b*	*wanangg**u**b*	*wanangga*		
	'boy'	'girl'	'children'		
f.	*nahy**a**m*	*nahy**u**m*			
	'my husband'	'my wife'			
g.	*eɣ**a**l*	*eɣ**u**l*			
	'somebody (m)'	'somebody (f)'			
h.	*nan**i**h*	*nan**u**h*	*nan**i**h*		
	'face (m)'	'face (f)'	'faces'		

Some nouns with overt gender marking are listed in Table 2. Gender membership is reflected by the vowel in the final syllable of the stem (referred to as the 'stem-final vowel'), and the meaning of the noun is largely predictable from the gender. Thus, the skeletal stem *anVm* (a) can be thought of as having the general meaning 'person', which is narrowed down to 'man' when assigned to Gender I (*an**e**m*), 'woman' in Gender II (*an**u**m*), etc.; the stem *nahyVm* 'my spouse' (f) (*na-* is a 1st person possessive prefix) giving 'husband' (*nahy**a**m*, Gender I) and 'wife' (*nahy**u**m* Gender II) once gender is assigned and vowels plugged into the stem.[1]

Assuming that the sets of gender forms derived from the skeletal stems are best treated as members of unitary lexemes, we can say that these lexemes are a proper subset of the nouns having REFERENTIAL GENDER (Dahl 2000), i.e. nouns that lack intrinsic gender and receive their gender value from the referent at

[1]Note that 'overt gender' only applies to nouns for which there is at least one other noun differing only in a stem-internal vowel, with a corresponding change in meaning. For example, the Gender IV noun *bomi* 'termite mound' does not have overt gender despite the presence of stem-final *i* (which is the general exponent of Gender IV agreement), since there are no corresponding nouns **bome*, **bomu* etc. to be found in the other genders.

hand. Most such nouns do not show overt gender, e.g. *ɣunaɣon* 'infant' (which takes agreement in Gender I or II depending on the sex of the referent).

The disassembly of Coastal Marind nouns into skeletal stems with inserted gender markers could appear to be a slightly misleading way of approaching the gender system of the language, since the phenomenon is fairly marginal. Only a dozen lexical items or so display the vowel alternation,[2] and many of the expected forms are irregular (e.g. plural of *wananggVb* is *wanangga* 'children', there is no plural **wananggib*) or simply non-existent (e.g. there is no plural of *eɣVl* 'somebody'). The vowel alternation seems to be complete only for the stems *anVm* and *namakVd*: in addition to the person-denoting triplet man/woman/people, the former provides the forms *anem* and *anim* for inanimate denotanda in Gender III and IV respectively, for example in some compounds denoting fruits (*ambun-anem*, a Syzygium species in Gender III), while *namakVd* apparently can be used for non-rational entities (animals, things) of all genders except the masculine I.[3]

Looking at more nouns from Gender I and II, it seems clear that the pattern of alternating vowels showing gender membership is exception rather than rule. Nouns in Gender I denoting male humans also include *patul* 'boy', *ad* 'father', *manday* 'wife's elder brother, younger sister's husband' and so on; these nouns do not participate in any alternation with corresponding plural or female-denoting nouns. Person-denoting nouns in Gender II that likewise show no trace of overt gender are *kyasom* 'girl', *nikna* 'son's wife', *ne* 'mother's brother's wife' etc.

Although overt gender is found only in a very small portion of the nominal lexicon, it should be noted that some of these nouns are high-frequency items, such as the words corresponding to the stem *anVm*, whose combined score makes them more frequent than any other noun in my corpus. Outside the noun inventory, stem-final vowel alternation plays an important role in common agreement targets such as the emphatic pronoun *anVp* ('-self'), adjectives such as *papVs* 'small' and the postposition *lVk* 'from'. This means that overt gender on nouns, and stem-final vowel alternation in general, is a common feature of Coastal Marind discourse, and obviously not as marginal as it would seem from a dictionary count alone.

[2]There are a handful of other nouns with overt gender in addition to the ones shown in the table. All of these denote humans of different age-ranks or societal roles that are more or less obsolete today, so the corresponding terms are falling out of use.

[3]In fact it seems that the stem *namakVd* 'animal/thing' can be used in Gender I: speakers reported that *namak**e**d* can be used to refer to a male, although apparently with pejorative overtones, although I have never observed this in spontaneous speech.

A central claim of the comparative work in Usher & Suter (2015) is that the vowel alternations according to gender occur in languages throughout the Anim family, and that its origins can be reconstructed. Consider the forms *aneme(a)* 'man', *anumu* 'woman', *animi* 'people' from the related language Ipiko, another member of the Anim family. Usher & Suter argue that the stem-final vowel in *anVm* and other alternating stems is a residue of an earlier system of postnominal articles marking the gender of the noun, and they reconstruct expressions such as **anem=e* 'the man', **anum=u* 'the woman', **anim=i* 'the people' (2015 : 114). In an earlier stage the noun was invariant and it was the presence of the gender article that triggered umlaut in the stem-final syllable (the shape of the invariant stem is beyond what can be reconstructed from the available data).

Usher & Suter's hypothesis is plausible, especially as it refers to a well-known process leading to stem-internal vowel alternations (cf. Germanic umlaut giving English *mouse* and *mice* triggered by an earlier plural ending **-iz*). It can be added that some alternations are likely the result of more recent derivations involving gender-marking morphology. For example, the word *wayuklu* 'girl' and its plural *wayuklik* 'girls' are probably related to the postposition 'from' which has the forms *luk* and *lik* in the feminine and plural respectively, and which seems to be the source of many deverbal nominals in Coastal Marind (see Geurtjens 1933 : 335 for the etymology; cf. *dahahiplik* 'drunkards' from *dahahip* 'become drunk (plural subject)'). However, the ultimate source of the vowel alternation in *lVk* 'from' is likely not distinct from the umlaut process giving rise to the forms of *anVm*, so the suggestion that some cases of synchronic vowel alternations are of more recent origin than the original umlaut is not intended as a counterexample to Usher & Suter, but as an indication that the alternating pattern propagated indirectly through the lexicon as a result of derivation.

2.2 Simulating the effects of umlaut in the lexicon

Given the observations of alternating nouns showing overt gender, and Usher & Suter's suggestion that the alternation came about because of umlaut triggered by a postposed article, the following interesting question arises: are there traces of umlaut also in non-alternating noun stems?

If umlaut was a regular process, we would expect it to have appeared with many nouns, as long as they were used with postposed articles. In the ideal case, all nouns in Gender I would have ended up with the stem-final vowel *e*, those in Gender II stem-final *u*, Gender III *a*, and those in Gender IV *i*. This is clearly not the case, as shown by the counts of stem-final vowels in Table 3. The table displays the frequency with which each of the five vowels of Coastal Marind occurs

in the last syllable of nouns whose gender membership has been determined. I have excluded all nouns showing overt gender from the counts, since we already know that their stem-final vowels correlate with gender membership. This is the reason why Gender I has so few members: the remaining male-denoting nouns have overt gender (e.g. *anVm*). Gender II likewise contains only a handful of female-denoting nouns, but has a higher count since it includes all names of animals.

Table 3: Distribution of stem-final vowels in nouns according to gender

	I (*e*)	II (*u*)	III (*a*)	IV (*i*)	Tot.
/i/	5	29	25	44	103
/u/	0	27	39	19	85
/e/	1	15	31	13	60
/o/	2	22	34	14	72
/a/	4	55	108	29	196
Tot.	12	148	237	119	**516**

Consider now the possibility that stem-final vowels of nouns and gender membership correlate to some degree, despite there being no one-to-one match. We are particularily interested in the vowels *e*, *u*, *a* and *i*, which Usher & Suter (2015) identify as the vowels of the proto-Anim demonstrative.[4] The vowels are given inside parentheses after their associated genders at the top of the table. We cannot test the correlation for Gender I, since there are too few nouns assigned to this category. The relevant cells for the remaining three genders have been shaded in Table 3. We now need to ascertain whether these scores could have been produced by a chance distribution of stem-final vowels, or whether they are non-random, thereby providing evidence that the umlaut pattern is found beyond the synchronically attested overt gender nouns.

To test this, I performed a simulation in which the nouns were reassigned randomly to the four genders (keeping the proportions intact), and then counted the frequency with which the vowels turned up in each gender. This procedure was then repeated a total of 200.000 times; the accumulated counts for the occurrence of the relevant vowels in Gender II, III and IV are presented in Figure 1, with the actual frequency of the vowel represented by the cross on the x-axis. The results

[4]In fact, Usher & Suter (2015 : 119) tentatively reconstruct both **a* and **o* for the proto-Anim Gender III, but the exponent *o* is rare in Coastal Marind.

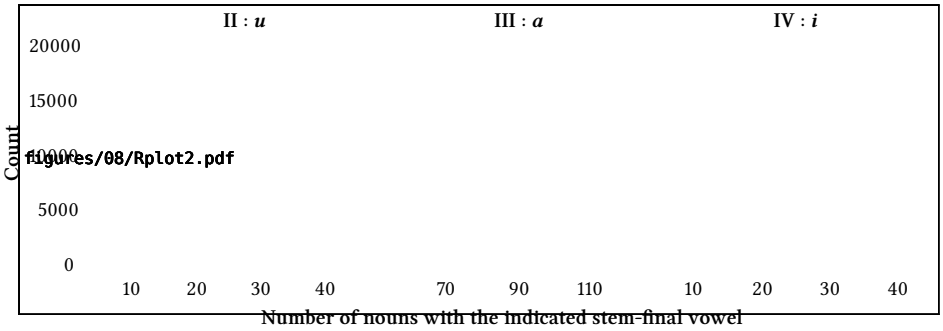

Figure 1: Actual and simulated distributions of stem-final vowels

show that two of the vowels are over-represented to a significant degree: *a* as the stem-final vowel in Gender III (z=2.40, adjusted p<0.05) and *i* as the stem-final vowel of Gender IV (z=4.65, adjusted p<0.001). These results support the hypothesis that gender umlaut affected a part of the lexicon that is larger than the set of nouns with overt gender, including many nouns of Gender III and IV.

No other positive skewings were close to statistical significance. This is somewhat surprising for Gender II, which would be expected to show a preference for *u* as the stem-final vowel (cf. the leftmost pane in Figure 1). I have no explanation for this, but it is worth noting that Coastal Marind seems to differ from other Anim languages in the uniform assignment of animals to Gender II: animals turn out to be divided between Gender I and II (the 'masculine' and 'feminine' genders) in Kuni (Edwards-Fumey 2007 : 9), Ipiko (Usher & Suter 2015 : 117, examples 16–17), and Bitur (Phillip Rogers, pers. comm.) which belong to three distinct sub-branches of Anim. A possible scenario would be that the reassignment of all animals to Gender II is an innovation present in Coastal Marind, which then would have obliterated any preponderance of *u* in Gender II as the new members entered.

3 Gender agreement

I will now consider how gender is manifested across agreeing pronominals, demonstratives and adjectives.[5] The purposes will be to give an overview of the agreement system, which contains some typologically interesting features, and

[5]There is one more type of agreement target, viz. the four postpositions *lVk* 'from', *nV* 'without', *tV* 'with' and *hV* 'like'. They are interesting for a variety of reasons, but I omit them from discussion here.

Table 4: Pronominal and demonstrative targets

Gloss	I SG	II SG	I/II PL	III	IV
'whats-his/her-name, whatchmacallit'	*ag**e***	*ag**u***	*ag**i***	*ag**o***	*ag**i***
'who/what'	*t**a***	*t**u***	*t**i***	*t**a***	*t**i***
'him-/her-/itself/themselves'	*an**e**p*	*an**u**p*	*an**i**p*	*an**e**p*	*an**i**p*
'this/these'	***e**he*	***u**he*	***i**he*	***e**he*	***i**he*

more specifically to show that the apparent syncretism noted above between Gender IV and the plural of Gender I/II is observed throughout the system. It even turns up in some unexpected places, prompting the question of whether the system is not better analyzed as comprising three genders instead of four, a possibility that will be further explored in §4, §5 and §6.

3.1 Pronominals and demonstratives

The only word classes in which agreement is found on a majority of the members are demonstratives and pronominals. Agreement on the distal demonstrative *Vpe* was seen in (1)–(3) above; some more examples of agreeing targets within these categories are in Table 4. While the small set of personal pronouns in Coastal Marind (*nok* 'I, we' *oɣ* '2SG', *yoɣ* '2PL') show no gender distinction, gender agreement is pervasive across other pronominal-like elements such as question words (e.g. *tV* 'who, what' *Vn* 'where, which') and the polyfunctional word *agV*, which has among its uses that of a placeholder 'whats-his/her-name' (referring to a person) or 'whatchamacallit' (referring to a thing).[6] Note that, in contrast to the various unpredictable exponents of Gender I and III, the exponents of Gender II (*u*) and Gender IV (*i*) are constant across all targets, with the latter showing homophony with the I/II plural in all four items.

[6]Forcing speakers to choose a gender for words meaning 'who, what?' that refer to some unknown entity might seem counter-intuitive since the gender of the referent must be unknown in many cases (since there is no clear semantic basis for Gender III and IV); cf. European languages restricting gender agreement to attributive 'which' (e.g. Russian *kotoryj* 'which (masc.)' etc.) while pronominal 'who' lacks agreement (e.g. Russian *kto* 'who'). Gender agreement on placeholders appears more common, especially in placeholders of phrasal and/or pronominal origin such as English *whatchamacallit* etc.

Table 5: Gender agreement on adjectives

Gloss	I SG	II SG	I/II PL	III	IV
'light (weight)'	*ak**e**k*	*ak**u**k*	*ak**i**k*	*ak**a**k*	*ak**i**k*
'short'	*dahwag**e**s*	*dahwag**u**s*	*dahwag**i**s*	*dahwag**i**s*	*dahwag**i**s*
'thin'	*halah**e**l*	*halah**u**l*	*halah**i**l*	*halah**a**l*	*halah**i**l*
'sharp'	–	–	–	*yaɣay**a**ɣ*	*yaɣay**i**ɣ*
'dull'	–	–	–	*ɣandaɣ**a**l*	*ɣandaɣ**i**l*
'old, ancient'	*tanam**e***	*tanam**u***	*tanam**i***	*tanam**a***	*tanam**i***
'strong'	*tag**e***	*tag**u***	*tag**i***	*tag**a***	*tag**i***
'ripe'	–	–	–	***e**ho*	***i**hu*

3.2 Adjectives

Coastal Marind adjectives are similar to nouns in that both classes lack the luxuriant inflectional possibilities of verbs. The main morphosyntactic feature distinguishing adjectives from nouns seems to be the lack of inherent gender. A small subclass of adjectives (13 members are known in the Western dialect) agree in gender, some of which are shown in Table 5. Other adjectives are invariant (e.g. *yaba* 'big', *ndom* 'bad', *waninggap* 'good'). The patterns of exponence largely follow those familiar from nouns with overt gender, with agreement marked by means of changes in the stem-final vowel, except for *VhV* 'ripe' which shows a unique pattern of vowel height harmony. Note that some of the adjectives are semantically incompatible with animates, whence the dashes in the table.

The forms of agreeing adjectives are much more regular than nouns with overt gender: Gender I and II consistently have /e/ and /u/ as their exponents, and their plural indicated by /i/; for inanimates, Gender III is largely indicated by /a/, while the pattern of homophony between the I/II plural forms and the Gender IV forms is observed again.

A remarkable exception from these regularities is the adjective 'small', whose forms are given in Table 6. This adjective is noteworthy for two reasons. First, it is the only word in the language that distinguishes singular and plural for Gender III and IV. This is done by means of the suppletive stems *isahih* and *wasasuɣ*, neither of which bear any phonological resemblance to the singular stem *papVs*. Following Corbett (1991 : 168) we can say that 'small' is OVER-DIFFERENTIATED since

it distinguishes a feature (number of inanimates) which is absent elsewhere in the system. However, one could also argue that 'small' does not show true agreement for gender, because the stems involved are suppletive. This is the approach taken by Durie (1986 : 362), who – speaking of verbal number suppletion – argues that "suppletive stems select for rather than agree with the number of their argument". Either way we look at it, 'small' has to be marked as an exceptional item, and does not detract from the generalization that number as a nominal category is restricted to the animates, e.g. the members of Gender I and II.

Table 6: Gender agreement on 'small'

	I	II	III	IV
SG	*pap**e**s*	*pap**u**s*	*pap**e**s*	*pap**i**s*
PL	*isahih*	*isahih*	*wasasuɣ*	*isahih*

Second, the stems used for 'little' in the plural are *isahih* and *wasasuɣ*, of which the former (which is also used as a noun meaning 'children, young of animals') is used not only for animates, but also for plural of Gender IV. This would be quite surprising if the syncretism between I/II plural and Gender IV noted so far (e.g. the demonstrative *ipe* covering I/II plural and IV) were merely a case of accidental homophony. Below we will see other cases where syncretisms between I/II plural and IV suggest a more profound relationship between the forms.

4 Agreement and participant indexing on verbs

The morphology of the Coastal Marind verb is complicated, and nominal gender plays a role within three of the inflectional sites of the verb: in a set of gender-agreeing prefixes, in the person indexing reflecting an UNDERGOER argument, and, somewhat marginally, in the indexing of the ACTOR argument of the verb. The gender-agreeing prefixes are the most straightforward, and behave largely like the non-bound agreeing items that we have seen so far. I will give some examples of gender agreement on the verb below. I contrast gender AGREEMENT with bound person marking on the verb, which I refer to as INDEXING. I will show below that these two phenomena behave quite differently in Coastal Marind, so it is convenient to make the terminological distinction between agreement and

indexing in the description of the Marind verb.

Several inflectional prefixes are sensitive to the gender of some argument of the verb, although their main function lies in some other domain (e.g. tense-mode-aspect) so it is not appropriate to call them 'gender prefixes'; rather, they are prefixes of which a sub-string happens to show agreement in gender. Let us take the prefix *Vp-* 'ABSconditive' as an illustration. Simplifying matters drastically, we can say that this prefix is used when the speaker is drawing attention to some present state-of-affairs that is unavailable to the addressee, either because her attention is on something else, as in (5), or because she made a previous statement contradicting the state-of-affairs that actually holds, as in (6). The question of what argument of the verb controls the gender agreement in the prefixes is complicated, and I will not explore it here. Suffice to note that it is the (intransitive) subject in (5) that is the controller, whereas the Gender I agreement in (6) corresponds to the male recipient-like participant (other constellations would behave differently).

(5) (Addressee standing facing away:)
kosi-awe *up-Ø-* *kwayita!*
small-fish(II) ABSC:II-3SG.A- be.swimming.inside
'A little fish is swimming in there!'

(6) (Reply to "You should talk to him!", female speaker:)
ep-ak-o- *lay-e!*
ABSC:I-1.A-3SG.DAT- talk-IPFV
'I am talking to him!'

Morphologically these prefixes are straightforward, since they have the same forms as the distal demonstrative *Vpe* (betraying a historical relationship), minus the final *-e*. The same holds, for example, for the continuative prefix *anVpand-* which most likely derives from the emphatic pronoun series *anVp* (cf. Table 4). Gender agreement in the prefixal complex then seems to be of relatively recent origin, resulting from the integration of free demonstrative and pronominal elements into the verb. Once more, the syncretism between the Gender I/II plural and Gender IV that was encountered in the nominal targets recurs in the prefixal agreement, so the Absconditive prefix *ip-* would be used with an animate plural controller, or with a noun from Gender IV. However, gender of verbal arguments triggers more dramatic alternations elsewhere in the verb, as we will now see.

I refer to bound person markers on the verb as participant indexing since they express person/number of participants of the verb directly – there is no need to

say that the affixes in (7) 'agree' with some ellipsed or covert argument in the clause.

(7) *no- ɣ-amuk-e*
1.A- 2SG.U-kill-IPFV
'I'm going to kill you.'

There are also frequent mismatches ('disagreement') within person indexing of a type that is not found in the gender agreement. For example, many intransitive verbs use a suppletive stem with plural subjects, with the additional quirk that actor indexing then is obligatorily 3SG instead of 3PL. Compare the regular verb *dahetok* 'return', which employs the expected 3PL indexing, with the suppletive stem *nayam* 'come (plural subject)' (cf. *man* 'come (singular subject)').

(8) *na- dahetok*
3PL.A- return
'They returned.'

(9) *a- nayam*
3SG.A- many.come
'They came.'

For this reason I prefer to maintain a terminological distinction between agreement and indexing in the description of Coastal Marind. I use agreement about the prefixes whose shape reflect gender and which apparently derive from relatively recently incorporated pronominal elements, while indexing is used for the markers that primarily code person/number of various argument roles, and often require construction- or verb-specific rules for their description (as in the case with the suppletive verbs above). Having established this, we are now ready to explore how gender is manifested in person indexing on the verb.

Let us start by the indexing of undergoer participants. Since we will be concerned with the difference between animate and inanimate undergoers, the discussion will be restricted to 3rd person forms (1st and 2nd person are always animate). Undergoer indexing is realized by means of intricate changes in the verb stem, and is mainly pre-, in-, or suffixing depending on the conjugation class. I will not attempt to segment the verb stems in the interlinear examples below into morphemes; the morphological details are not of interest here.

Consider the verb 'put on a string', which has the following forms when the undergoer is animate:

(10) a. *awe* *ah-* *laleh!*
fish(II) IMP- string:3SG.U
'String one fish!'

b. *awe* *ah-* *lalah!*
fish(II) IMP- string:3PL.U
'String many fish!'

With inanimates from Gender III, a different stem *lalig* is used (11). Recall that no number distinction is made for inanimates, so *lalig* can be used for one or several pieces of meat, fruits, or other inanimate entities as long as they are in Gender III.

(11) *muy* *ah-* *lalig!*
meat(III) IMP- string.inanimate
'String the piece(s) of meat!'

With undergoers from Gender IV, however, the stem used with animate plurals, i.e. the 3PL stem *lalah*, is used (12). As in the previous example, there is no number distinction, so the cardinality of *baba* (a kind of grass, seeds of which are used for necklaces) has to be inferred from context.

(12) *baba* *ah-* *lalah!*
Job's Tears(IV) IMP- string:3PL.U
'String the *baba* seed(s)!'

It is remarkable that Gender IV nouns trigger the use of verb stems otherwise used for 3d person animate plurals, since gender agreement is not manifested elsewhere in person indexing. No distinction is made between Gender I and II, and inanimate stems such as *lalig* generally look like separate lexemes rather than inflectional forms of the verb. Some more examples of alternations are given in (13).

(13) Stem alternations according to undergoer

a.	'wrap'				
	Animate	3SG:	*ambeh*	3PL:	*ambah*
	Inanimate	III:	*ambam*	IV:	*ambah*
b.	'rub (bodypart)'				
	Animate	3SG:	*hwahwetok*	3PL:	*hwahwituk*
	Inanimate	III:	*hwahwid*	IV:	*hwahwituk*
c.	'eat'				
	Animate	3SG:	*aheb*	3PL:	*hi*
	Inanimate	III:	*yi*	IV:	*hi*
d.	'become'				
	Animate	3SG:	*win*	3PL:	*in*
	Inanimate	III:	*ay*	IV:	*in*

Such verbs differ in the degree of similarity between the different stems, but all employ the same stem for Gender IV undergoers as for 3PL animates. There seem to be no exceptions to this pattern, so if a verb is semantically compatible with both animates and inanimates, then the 3PL/IV stem sharing occurs, regardless of how the remainder of the paradigm is structured. Note also that there is no morphological resemblance to the agreement patterns that we observed for nominals: with the exception of stems like *hwahwituk* 'rub many animates' (e.g. when scaling fish) or 'rub a Gender IV-item' (e.g. a knee, *mig*), which shows the high vowels /i u/ associated with gender agreement (e.g. *ihu* 'ripe:IV'), the vowel alternations seen within the nominal domain are absent. I take this to confirm that gender agreement and participant indexing are two quite distinct phenomena in Coastal Marind, and that they have different histories, which renders the conflation of animate 3PL and Gender IV across the two systems the more remarkable.

Finally, let us consider other types of participant indexing on the verb. There are three varieties of indexing, all realized by prefixes, in addition to the indexing of undergoers by means of stem alternations. These are indexing of actor, seen in examples (7)–(9) above, plus indexing of a recipient-like participant, and what can be described as affected possessor of an argument of the verb. I will not provide examples of the latter two, because inanimate arguments filling recipient- and possessor-like roles are extremely rare in the corpus, and it is not clear whether these indexing mechanisms interact with the gender membership of inanimate arguments. The data from actor indexing are more interesting, so let us have a look at it to see whether Gender IV nouns trigger 3PL indexing in this domain.

Sentences with inanimate nouns functioning as semantic agents are also ex-

ceedingly rare in my corpus, since argument NPs headed by such nouns mostly fill patient-like roles. I have made several attempts to elicit sentences in which various things belonging to Gender IV are in violent contact with an animate undergoer (such as fruit falling from a tree, hitting a bystander), i.e. verbs that usually provide a good frame for testing all person/number combinations of agent and patient. Speakers were consistent in reporting that only 3SG actor indexing is compatible with IV agents, as in (14).

(14) *saleɣ* *a-* *n-asib*
inflorescence(IV) 3SG.A- 1.U-hit
'The coconut inflorescence (fell and) hit me.'

If this were the whole story, agent indexing would finally provide an environment where Gender IV nouns were distinguished from animate plurals. However, the generalization only seems to hold for the transitive agent-patient configuration: a small number of examples of agentive intransitives in my corpus, such as *esol* 'make noise' (15), unambigously show 3PL actor indexing IV nouns (this has also been confirmed in elicitation).

(15) *yaba-mesin* *i-pe* *t-i-k-at-n-* *esol-e*
big-machine(IV) IV-that GIV-IV-PRS-PRSTL-3PL.A- make.noise-IPFV
'The generator is making noise.'

Not even actor indexing is immune to the IV-as-animate-plural pattern, then. I take the difference in indexing between (14) and (15) to reflect semantic restrictions on what participants may be indexed on the verb, so that the inanimate coconut inflorescence in (14) is not enough of an agent to be properly indexed (with actor indexing then defaulting to 3SG, which is also the default for avalent verbs). The verb *esol* 'make noise' is less picky and admits its sole argument to be fully indexed, thus giving the 3PL prefix. (Recall that agreement is insensitive to number of inanimates, which means that ex. (15) is equally fine referring to one or more than one generator.)

Whatever the explanations for the subtleties of person indexing turn out to be, the data presented above are roughly consistent with the main point of this and the previous section: in all contexts where Coastal Marind, by various grammatical means, distinguishes between gender, number and animacy, nouns of Gender IV systematically pattern with plurals of Gender I and II. This is quite strange given the fact that inanimates do not show grammatical agreement according to their referential cardinality in the language (cf. example (3) above), which makes

it difficult to claim that Gender IV should be considered 'fixed plural' nouns (pluralia tantum) instead of a gender. Below I will show that some tendencies in the assignment to Gender IV also are consistent with the pluralia tantum analysis, because they involve nouns that are pluralia tantum cross-linguistically. However, I will argue that this can at most be regarded as suggesting a diachronic relationship with pluralia tantum nouns, and that synchronically we must reject the description of the Gender IV nouns as pluralia tantum (§6).

5 Assignment and pluralia tantum as a possible origin for Gender IV

The basic principles behind the assignment of nouns to the four genders were given above: male humans are Gender I, female humans and all animals are Gender II, while inanimates are mostly in Gender III with a (large) residue in Gender IV. I do not believe that there are any clear semantic rules for deciding which of the inanimates go into Gender IV, but there are some tendencies. The only semantic fields that are completely restricted to Gender III seem to be abstracts (e.g. *mayan* 'language, issue, problem' *sal* 'taboo'), names of places and geographical features (*milah* 'village', *mamuy* 'savannah'), and various intangibles (*matul* 'shade', *usus* 'afternoon'). Other large semantic fields such as bodyparts and flora are split between Gender III and IV, with very few obvious subdomains assigned to one or the other (flowers is a subdomain that seems to belong to Gender IV). Artifacts are also divided between III and IV, with the only discernible patterns being that almost all bodily decorations are in Gender IV (*segos* 'rattan girdle', *himbu* 'feathered hairdress'), as well as most recently introduced technology (airplanes, ballpoint pens, diesel generators).

Looking closer, we can see that some of the domains that Koptjevskaja-Tamm & Wälchli (2001 : 630) identify as typically including pluralia tantum show overlap with the members of Gender IV. These domains are: VARIOUS HETEROGENEOUS SUBSTANCES ("with many subdivisions", e.g. Lithuanian *putos* 'foam'), corresponding to Coastal Marind IV nouns such as *ndalom* 'foam', *ndakindaki* 'bioluminescence', *kangging* 'layer of crushed seashells on the beach' and *katal* 'money'[7]; ARTIFICIAL OBJECTS WHICH ARE CLEARLY INTERNALLY COMPLEX (e.g. En-

[7]The noun *katal* has a primary use as a Gender III noun, then with the meaning 'stone'. South New Guinea is almost completely devoid of stones, and it is extremely unlikely that one encounters two or more naturally occurring stones at the same occasion. The Gender IV noun 'money', on the other hand, usually occurs in collections of more than one rupiah banknote. This is an interesting case of cross-classification seemingly involving a difference in plurality.

glish *trousers*), corresponding to Coastal Marind decorations and modern technology in Gender IV; DISEASES "[that] manifest themselves as multiple visible symptoms/spots" (e.g. English *measles*), corresponding to names of skin diseases in Coastal Marind, which all turn out to be in Gender IV, such as *kambi* 'tinea imbricata', *dapadap* 'tinea versicolor' and *apupin* 'pimple'.

While suggestive, these findings do not form any consistent pattern. The overlap is not found with other pluralia tantum domains such as names of festivities in Coastal Marind (e.g. German *Weihnachten* 'Christmas'), and there are numerous exceptions, e.g. some artifacts that clearly qualify as internally complex (e.g. *kipa* 'net') are in Gender III rather than IV. It is also clear that – even allowing for some semantic latitude – the majority of nouns in Gender IV do not fit into any of Koptjevskaja-Tamm and Wälchli's categories. I have found no reason why some names of trees are in Gender III, others in Gender IV, and it seems unlikely that plurality should have anything to do with the classification. Similarly, while it is conceivable that many bodyparts in Gender IV are somehow 'plural' (e.g. *put* 'feather', *tatih* 'hair', *tiwna* 'gums', *halahil* 'lungs') there are plenty that are not (*ambay* 'uvula') and some bodyparts seem quite plural but belong to Gender III (*lul* 'fur'). As pointed about by an anonymous reviewer, however, most languages with pluralia tantum have a fairly idiosyncratic assignment to the class, so the lack of consistency can hardly be an argument *against* the possibility of Gender IV being related to pluralia tantum.

If we consider there to be at least some tendency for 'pluralia tantum concepts' to be in Gender IV, this situation could be seen as consistent with a diachronic scenario where Gender IV started out as a class of pluralia tantum, but then acquired new members through some unknown (analogical?) process, resulting in a large, semantically heterogeneous residue gender, with a small core that still reflects the 'plural semantics' of the original pluralia tantum grouping. This scenario is only plausible if (pre-)proto-Anim (as-opposed to present-day Coastal Marind) had a number distinction among inanimate nouns, since this would be required for inanimate pluralia tantum nouns to come into existence. Also, we would expect to find some other Anim language that has been more conservative in this regard, and maintains a clearer semantically plural basis for the cognate fourth gender. Unfortunately, there is no systematic data on gender available from other Anim languages to see whether such semantics can be associated with Gender IV, nor is there any indication that proto-Anim had a number distinction among inanimates. For now this hypothesis remains purely speculative, and it can only be evaluated once there is more data on gender systems in other subbranches of Anim. Still, I believe it is worth spelling out this hypothesis, since it

has the merit of providing an explanation to the recurrent pattern of homophony between Gender IV and animate plurals, as well as the surprising phenomenon of the suppletive plural stems triggered by all Gender IV nouns.

Interestingly, a striking parallel to the Coastal Marind case is found in the Ok family, located in the New Guinean highlands. The Ok languages are probably very distant relatives of Coastal Marind and the other Anim languages as both families are proposed members of the large Trans-New Guinea phylum (Fedden 2011 ; Usher & Suter 2015). I believe that the Ok data support the idea that the similarities between the fourth gender of Coastal Marind (and other Anim languages) and what is described as pluralia tantum nouns in other languages are not coincidental, and perhaps that a diachronic relationship between these categories is plausible.

The best described Ok language, Mian, has a 4-gender system distinguishing Masculine, Feminine, and two inanimate genders – this is the same division as in the gender systems of the Anim languages.[8] The exponents of Masculine and Feminine resemble the ones found on demonstratives in Coastal Marind (Fedden 2011: 170, Usher & Suter 2015: 118): the Mian Masculine article *=e*, the Feminine *=o*, and M/F plural *=i* correspond to Coastal Marind Gender I *epe*, Gender II *upe* and Gender I/II plural *ipe* respectively. The phonological similarities might be due to chance, however, and I am not aware of any other evidence that the gender systems of the two families are cognate. Neuter 1 (the third gender) differs from the Coastal Marind inanimates in distinguishing singular and plural (SG *=e*, PL *=o*). The most interesting gender is the fourth ("Neuter 2") which is invariant for number, and shows homophony with the plural of Neuter 1 (SG/PL article *=o*).

It is interesting that both Coastal Marind and Mian have one gender that shares their exponents with plurals, but note that the pattern of syncretism is different (homophony with inanimate plural in Mian, but with animate plural in Coastal Marind), and could have arisen by chance since both languages have relatively few vowels to choose from (5 in Coastal Marind, 6 in Mian). Speaking against accidental homophony is the fact that even in cases where several paradigm slots are filled by unpredictable gender exponents, Neuter 2 invariably patterns with the plural of Neuter 1 (Fedden 2011 : 178–179).

A further argument against the possibility of chance homophony between the Mian Neuter 2 and the plural of Neuter 1 is the fact that the nouns that are as-

[8]Sebastian Fedden (pers. comm.) adds the caveat that little is known about the gender systems of other Ok languages, so we do not know how representative the Mian system is for Ok in general. More descriptive work will be necessary for a fuller picture of the similarities and differences between the Anim and Ok gender systems.

signed to Neuter 2 match the pluralia tantum domains listed by Koptjevskaja-Tamm and Wälchli quite well – better than the Coastal Marind Gender IV nouns do. Assigned to Mian Neuter 2 we find: places (e.g. *bib* 'village, place'), heterogeneous substances (e.g. *difib* 'rubbish', *monî* 'money'), body decoration (e.g. *amún* 'hole in nosetip'), various abstracts and temporal nouns (e.g. *am* 'day'), illnesses (e.g. *klō* 'ringworm'), various artifacts (e.g. *itó* 'tongs', *aiglas* 'glasses') and bodyparts, most of which seem to consist of multiple parts (e.g. *abó* 'testicles', *amuntêm* 'intestines, belly', *wanáan* 'feather').[9]

Fedden does not consider the alternative analysis according to which the Neuter 2 nouns are pluralia tantum nouns belonging to Neuter 1, and I will not pursue that issue here.[10] However, I interpret the parallelism between Coastal Marind Gender IV and Mian Neuter 2 as further evidence that the connection between fixed plural and fourth gender in Coastal Marind is no coincidence, as this pattern would not arise independently in the two languages by chance. At this stage it is impossible to tell why the gender systems of Ok and Anim share these similarities. The two families are most likely related as members of the Trans New Guinea stock, but this relationship is extremely distant and must go long back in time. There is at present no evidence that the gender systems were inherited from some common ancestor, although this would account for the similarities in the gender exponents mentioned above. One could also speculate that the gender systems evolved in parallel at a time when speakers of Ok and Anim languages were in closer contact, but more research remains to be done before we can say anything about the contact between these ancestral populations.

Regardless of whether the similarities between Ok and Anim are the result of common inheritance or contact, it seems to me that the simplest explanation is that both the Anim fourth gender and the Mian Neuter 2 developed from pluralia tantum nouns, which explains e.g. the use of suppletive agreement targets in Coastal Marind and the fact that many of the Mian Neuter 2 nouns (and some of the Gender IV nouns in Coastal Marind) have meanings that are found among pluralia tantum cross-linguistically. This hypothesis can be tested only through more descriptive and comparative work on the two families. Even if it is correct, it would still remain to be shown in detail how a 3-gender system with a large number of pluralia tantum nouns can develop into a 4-gender system lacking number distinction in inanimates, as in present-day Coastal Marind.

[9] One instance of cross-classification is striking: Mian *bém* 'worm' (masculine gender) can also mean 'noodles', and then belongs to Neuter 2; cf. Coastal Marind *alalin* 'tapeworm' (Gender II), meaning 'noodles' in Gender IV.

[10] The reader is referred to Corbett et al. (2017).

6 The synchronic analysis of Gender IV

Having suggested that the Coastal Marind Gender IV originated as a pluralia tantum class, we now need to address the synchronic status of Gender IV. Should we maintain the 4-gender analysis, or opt for the more economical 3-gender analysis according to which the members of the former fourth gender are Gender I or II nouns that just happen to be lexically specified as plural? I believe that this is an important analytical question – not a mere question of which labels to stick where – since the two possible descriptions result in wildly different systems in terms of assignment.

The literature contains some discussion of the possibility of analyzing pluralia tantum as a separate gender, in various languages. Corbett (2012 : 233–239) provides instructive discussion of such suggestions for Cushitic, Chadic and Russian, and argues that the pluralia-tantum-as-gender analysis is untenable for all the proposed cases (i.e., the opposite of the established descriptions of Coastal Marind and Mian). For example, Zaliznjak (1964) proposed to describe Russian pluralia tantum nouns such as *sani* 'sledge(s)' as making up their own gender, since they form a unique agreement class within the system. Corbett (2012 : 237–238) points out that the same analysis applied to Bosnian/Croatian/Serbian would produce no less than three extra genders, since this three-gender system (as opposed to Russian) has separate plural forms for each gender, each of which contains pluralia tantum that would be reanalyzed as separate genders. This is unacceptable, so Corbett rejects the analysis for Russian as well.

On a more general level, Corbett argues that pluralia-tantum-as-gender analyses are misinformed, since "the special behaviour which creates the extra agreement class is not *gender* but *number*" (Corbett 2012 : 238; emphasis in original). According to Corbett, proponents of pluralia-tantum-as-gender analyses mistakenly think that since pluralia tantum nouns need to be lexically specified for a morphosyntactic value (in this case number), they are just like other nouns – which are also lexically specified, for gender – and therefore belong to a gender of their own. Instead, the correct way is to treat them as exceptionally specified for number, and leave the gender system as it is. I interpret Corbett's remarks as a principled stance against analyses claiming that pluralia tantum nouns make up a gender.[11]

In spite of Corbett's reservations, I prefer to maintain the Drabbian analysis

[11] In fact, Corbett says explicitly that this is what he means: "Having not accepted Zaliznjak's careful and considered analysis of certain Russian pluralia tantum nouns as an additional gender value, I am even less ready to entertain other less convincing proposals along similar lines." (p. 238).

of Gender IV as a gender, and not as pluralia tantum of Gender I or II, although I concede that the morphosyntactic evidence for this analysis is somewhat nebulous. We saw that the exponents of Gender IV agreement are identical to the ones marking the plural of Gender I and II, no matter how irregular the alternations of the relevant target are. Verb stem alternations indexing undergoers likewise treat Gender IV and plurals of I/II identically, despite being seemingly unrelated to the agreement patterns of demonstratives and other categories in the non-verbal domains. The only domain where Gender IV nouns do not always pattern with I/II plural is actor indexing (and, possibly, recipient and possessor indexing) on verbs; however, I suspect that this reflects some general constraint against inanimates filling such participants roles, so the diagnostic role of these constructions is unclear.

But consider the consequences of abandoning the gender analysis in favour of the pluralia tantum analysis. If the members of Gender IV are considered pluralia tantum, they would make up an unexpectedly large portion of the lexicon. Assuming that the currently available numbers (Table 3) are representative of gender membership, one out of five nouns would be pluralia tantum. This seems strange from the European perspective, but sheer frequency can hardly be a decisive argument. More seriously, the system of semantic assignment (males in I, females and animals in II, inanimates in III and IV) would break down, since we would have to claim that Gender I and II contain a fairly random mix of animates and inanimates (all of which happen to be pluralia tantum), with non-pluralia tantum inanimates confined to Gender III.

The resulting system would also be typologically odd in the way it fails to align with the Animacy Hierarchy (Smith-Stark 1974 , Corbett 2000 : 55ff.). The hierarchy states that if there is a difference in the availability of a number distinction between e.g. animates and inanimates, then it will be animates that make the distinction and inanimates that lack it. Corbett (2000 : 59) cites Coastal Marind as an example of a language with a clear split between animates (which trigger singular/plural agreement) and inanimates (which make no distinction according to number). In the new system, we would have to say that number is relevant for a fifth of the inanimates, although these happen to be lexically specified for plural only.

I take these consequences to be unacceptable, so the 4-gender analysis must be preferred. This comes at the price of not adhering to a strictly morphosyntactic approach to the identification of genders in Coastal Marind, because the formal facts alone do not provide clear evidence that the four-gender description is to be preferred over a three-gender description with a large number of pluralia tantum.

7 Conclusion

Besides the descriptive contribution of this paper (most of which can be extracted, with some effort, from Drabbe's grammar), I consider the main points to be (1) the evidence that Usher & Suter's (2015) suggestion that overt, stem-internal gender marking originated from umlaut also explains patterns in the distribution of stem-final vowels of invariant nouns within Gender III and IV; and (2) the description of the ambiguous status of the nouns in Gender IV, which led me to speculate that an earlier 3-gender system was extended into a 4-gender system, and that the 4th gender originally was a grouping of pluralia tantum nouns. As mentioned above, the idea that gender systems can be extended through the reinterpretation of a non-gender feature as gender is not new, and if the suggestions based on Coastal Marind data are correct, the Anim languages (and the distantly related Ok family) would provide a clear case where a gender system became more complex because of a very specific type of interaction with number.

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Abbreviations

A	Actor	PL	Plural
ABSC	Absconditive	PRS	Present
DAT	Dative	PRSTL	Presentational
GIV	Givenness marker	RECP	Reciprocal
IMP	Imperative	SG	Singular
IPFV	Imperfective	U	Undergoer

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Chapter 9

Gender in New Guinea

Erik Svärd
earlier Stockholm University

The present study classifies gender systems of 20 languages in the New Guinea region, an often neglected area in typological research, according to five criteria used by Di Garbo (2014) for African languages. The results show that gender in New Guinea is diverse, although around half of the languages have two-gendered sex-based systems with semantic assignment, more than four gender-indexing targets, and no gender marking on nouns. The gender systems of New Guinea are remarkably representative of the world, although formal assignment is underrepresented. However, the gender systems of New Guinea and Africa are very different. The most significant difference is the prevalence of non-sex-based gender systems and gender marking on nouns in Africa, whereas the opposite is true in New Guinea. Finally, four typologically rare characteristics are singled out: (1) size and shape as important criteria of gender assignment, with large/long being masculine and small/short feminine, (2) the co-existence of two separate nominal classification systems, (3) no gender distinctions in pronouns, and (4) verbs as the most common indexing target.

Keywords: agreement, grammatical gender, indexation, New Guinea, Papuan, typology.

1 Introduction and background

Most typological research on gender has focused on languages in Eurasia, Africa, Australia, and the Americas. Less researched is the region of New Guinea containing as many as one sixth of all languages of the world. In recent descriptions languages of New Guinea of highly variable genealogical affiliation have been shown to exhibit many unusual gender systems. This is important for the study of gender as gender systems are often very stable and not prone to borrowing. However, little has been done to survey the diversity of gender in New Guinea.

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The purpose of this paper is to counteract this issue by investigating 20 New Guinean languages, both Papuan and non-Papuan, for which gender has been described and to compare their gender systems in an areal and a typological perspective. Specifically, the research questions are:

- How is grammatical gender expressed in a diverse sample of 20 languages of New Guinea?
- How do the gender systems of New Guinea compare with other geographical areas (notably Africa) and the world as a whole?
- Are there any phenomena in gender which are unique to or surprisingly common in the languages of New Guinea?

In order to investigate this, five criteria are used to classify the gender systems of New Guinea. The distribution of values of these criteria are then compared with the world in general and Africa in particular.

1.1 Defining gender

Hockett (1958 : 231) defines gender as "classes of nouns reflected in the behavior of associated words". In other words, gender is conceived of as noun classes triggering agreement. The idea of gender as based on the behavior of associated words is reflected in the focus on agreement, which Corbett (1991 : 4) calls the determining criterion of gender. In order to define gender, Corbett presents Steele's (Steele 1978) description of agreement:

> The term *agreement* commonly refers to some systematic covariance between a semantic or formal property of one element and a formal property of another. For example, adjectives may take some formal indication of the number and gender of the noun they modify.
> (Steele 1978 : 610 as cited in Corbett 1991 : 105)

According to Corbett, agreement is an asymmetric relationship between the controller (i.e., the element determining agreement, e.g., subject noun phrase) and the target (i.e., the element whose form is determined by agreement) (Corbett 2006 : 4). Importantly, Corbett adopts a 'canonical approach': that is, the basis for Corbett's discussion are those 'canonical' instances which are best and clearest but not necessarily the most frequent (Corbett 2006 : 9). Canonical agreement can be summarized as follows (adapted from Corbett 2006 : 9):

- the controller is present, has overt expressions of features, and is consistent in agreement, and its part of speech is not relevant;
- the target has bound expression of agreement, obligatory and regular marking which is doubling the marking of the noun, has a single controller, and its part of speech is not relevant;
- the domain in which agreement occurs is local, and it is one of multiple domains.

More recently, Di Garbo (2014 : 8) gives a few examples illustrating the fact that in many languages both pronouns and noun phrase-internal targets do not presuppose a syntactic antecedent or controller. In order to counter this, Di Garbo (2014) uses the term *indexation* instead, following Croft (2001 ; 2003 ; 2013) and Iemmolo (2011). In this definition, indexation is used to refer to grammatical strategies signaling (i) lexical and grammatical properties of nouns, and (ii) semantic properties of NP referents, which are independent of the presence of any overt syntactic antecedent (Di Garbo 2014 : 8). Following Di Garbo, the following terms are used in this study (adapted from Di Garbo 2014 : 8):

- *indexing target* or *index* refers to entities with inflectional morphology signaling gender;
- *syntactic antecedent* refers to the NP indexed by the pronominal target;
- *indexation trigger* or *trigger* refers to the entities that activate the use of a certain indexation pattern in a given discourse domain.

Despite the difference in terminology, the end result of both agreement in Corbett (1991) and indexation in Di Garbo (2014) is the same, with both being cover terms for the same linguistic feature. Since this is mainly a typological study, its purpose is to be comparable with earlier and future typological research on gender without relying on theoretical concepts which are as yet not widely accepted. However, since indexation is gaining ground, it is embraced in this chapter.

1.2 Gender research on New Guinea

Although gender has not been extensively researched in New Guinea, the region shows much promise for exhibiting a high variety of gender systems. The New Guinea region is home to approximately 1,200 languages belonging to around three dozen language families spoken in an area smaller than 900,000 km^2, which

makes it the most linguistically diverse region in the world (Foley 2000 : 357). Nevertheless, there are two dominating language families: the Austronesian family, spoken in the coastal areas, and the Trans New Guinean (TNG) family, which is concentrated to the mountainous inland. The Austronesian and the TNG languages comprise around 300 languages each and typically do not show gender, although there are some important exceptions (Foley 2000 : 358–363). Thus, gender is lacking at least in approximately half of the languages of New Guinea. As for the remaining languages, gender is found in the West Papuan, Sko, and Sepik languages, as well as several isolates such as Yava, Burmeso, and Kuot (Foley 2000 : 371).[1] Gender is also present in Torricelli and Lower Sepik-Ramu languages, but as parts of larger and more complex systems of noun classification (Foley 2000 : 371). It also occurs in some isolated cases in the TNG family, such as Nalca (Mek) (Svärd 2013) and the Ok languages, e.g., Mian (Fedden 2011), and in very few Austronesian languages, including Teop (Oceanic) (Mosel & Spriggs 2000). By counting these gendered languages based on the numbers given by Foley (2000), gender in New Guinea can be estimated to occur in at least 120 languages of different families and isolates. The genealogical diversity suggests that gender may be highly diverse in New Guinea.

However, Foley suggest that gendered languages of New Guinea have some features in common, including the presence of gender assignment based on specific criteria of size and shape, as well as the presence of languages with two separate systems (Foley 2000 ; Svärd 2015 : 8–9). Combined with the observation that gender in New Guinea is concentrated in languages with high genealogical diversity, this suggests that gender may be highly diverse in New Guinea.

2 Method and data

The sampling method used in this study is a *variety sample* (Bakker 2012). Rather than trying to represent the real population of languages as would be achieved by a probability sample, the sample is constructed such as to achieve the largest variety of results in regard to the chosen feature entirely omitting languages lacking the feature.

In this study, the sample is restricted to New Guinea as delimited by Foley (2000 : 357), including New Guinea proper as well as surrounding islands. First and foremost, the sample includes only languages with gender. Secondly, the languages were chosen from as many families as possible, as far as the availability

[1] Foley (2000 : 371) also mentions the Sulka language of New Britain, but there are no indications of a gender system in the grammar by Tharp (1996).

of material permits, while still accounting for variation within families if there were reasons to do so, primarily based on the information by Foley (2000) and others.

Table 1 lists the languages of the sample together with family, genus, ISO code, and source, together with a map of the languages shown in Figure 1. The names primarily follow Glottolog, except for Motuna (Glottolog: Siwai), where I follow Onishi (1994). Also, the Glottolog form Warapu is used despite Barupu occurring in Corris (2005). Furthermore, language families and genera are based on Glottolog, so that a genus in the table below does not always agree with the genus for the same language in *WALS*.

Table 1: The language sample. The en dash indicates no grouping or that the language is itself the closest node to the family node.

Family	Genus	ISO	Language	Source
Austronesian, Oceanic	Nehan-North Bougainville	tio	Teop	Mosel & Spriggs (2000)
Isolate	–	gpn	Taiap	Kulick & Stroud (1992)
Isolate	–	bzu	Burmeso	Donohue (2001)
Isolate	–	kto	Kuot	Lindström (2002)
Left May	–	amm	Ama	Årsjö (1999)
Lower Sepik-Ramu	Lower Sepik	yee	Yimas	Foley (1991)
Ndu	–	mle	Manambu	Aikhenvald (2008)
North Bougainville	–	roo	Rotokas	Robinson (2011)
Sepik	–	aau	Abau	Lock (2011)
		sim	Mende	Hoel et al. (1994)
Sko	–	skv	Skou	Donohue (2004)
		wra	Warapu/Barupu	Corris (2005)
South Bougainville	–	siw	Motuna/Siwai	Onishi (1994)
Torricelli	–	avt	Au	Scorza (1985)
	Arapesh	ape	Bukiyip	Conrad & Wogiga (1991)
	West Palai	van	Walman	Brown & Dryer (2008)
Trans-New Guinea	Mek	nlc	Nalca	Svärd (2013); Wälchli (to appear)
	Ok-Oksapmin	mpt	Mian	Fedden (2011)
		opm	Oksapmin	Loughnane (2009)
West Papuan[2]	–	ayz	Maybrat	Dol (2007)

figures/09/Simple/fig1.png

Figure 1: The geographical locations of the languages in the sample labeled with ISO codes

The main sources of data used in this study are reference grammars, which are listed for each language in Table 1 above. However, many descriptions do not mention the language as having a gender system if gender only occurs in pronouns, so it was also necessary to examine the sections on pronouns. If the available descriptions for a language neither mentioned gender nor showed it directly in the section(s) about pronouns or in glossed examples, the language was not considered as eligible for the sample.

In order to make the languages of the study typologically comparable, the study employs five classificatory criteria used by Di Garbo (2014) to classify the gender systems of Africa, viz.,

- Sex-based and non-sex-based gender systems.
- Number of genders.
- Gender assignment.
- Number of gender-indexing targets.
- Occurrence of gender marking on nouns.

[2]More recent studies suggest that the traditional West Papuan Phylum is probably not an accurate genealogical grouping, but instead consists of as many as seven unrelated language groups (Dol 2007 : 5). Since the exact position of Maybrat in such a regrouping is unknown to the present author, West Papuan is kept here as proxy to a genealogical family.

Di Garbo also uses other classificatory criteria in order to investigate the interactions of gender and number, and gender and evaluative morphology. However, this study is not aimed to directly investigate these interactions, and thus only the criteria above were chosen.

An important advantage of adopting Di Garbo's approach is that this makes the results for New Guinea directly comparable with Africa as for the selected criteria. In addition, since the first three criteria are the same as the ones used in the *WALS* chapters by Corbett (Corbett 2013a ,b,c), much of the results is comparable to a worldwide sample. In order to illustrate the distributions, maps were created using the Interactive Reference Tool of the *World atlas of language structures* (*WALS*)[3] using ISO codes and coordinates from Glottolog.

3 Overview of gender characteristics

In the following sections, the distribution of values of the criteria mentioned in §3 are presented and discussed. Each criterion is discussed with the values shown in a table, followed by some examples of the feature in the sample. In §4, these results are discussed from a typological perspective.

It is important to point out that five languages of the sample were found to have two separate systems of noun classification. As will be discussed in §5.2, only Burmeso exhibits two equivalent gender systems, whereas the other four rather distinguish between gender and noun classifiers. For this reason, the two gender systems of Burmeso will be combined for the purpose of comparison in this chapter, although the values assigned to the separate systems will be given in parenthesis whenever applicable.

3.1 Sex-based and non-sex-based gender systems

Following Di Garbo (2014 : 62), each gender system is classified as either sex-based or non-sex-based based according to the typology by Corbett (2013c). Sex-based are those where the gender assignment is based at least partly on natural gender, which often surfaces as masculine-feminine distinctions. Consequently, non-sex-based gender systems are those where gender is not based on natural gender. However, according to Corbett (2013c), all non-sex-based systems are based on some notion of animacy.

As shown in Table 2 and Figure 2, sex-based systems are by far the most common ones, with 19 of 20 languages having natural gender as their semantic core.

[3]See http://www.eva.mpg.de/lingua/research/tool.php.

Only the sole Austronesian language Teop exhibits a non-sex-based system.

Table 2: Sex-based and non-sex-based gender systems in the sample

Sex-based or non-sex-based	**No. of lgs.**	**%**	**Language**
Sex-based	19	95%	Abau Ama Au Bukiyip Burmeso Kuot Manambu Maybrat Mende Mian Motuna Nalca Oksapmin Rotokas Skou Taiap Walman Warapu Yimas
Non-sex-based	1	5%	Teop
Total:	20	100%	

Sex-based gender systems present some difficulty in assigning nouns denoting inanimate referents. Non-sex-based systems, i.e., systems based on animacy, can potentially assign every noun according to animacy alone. However, sex-based systems do not by definition have any specific way of assigning nouns that refer to objects without natural gender. Thus, based on how inanimate nouns are assigned gender, the sex-based gender systems in the sample can be further divided into three groups where inanimates are assigned to

1. one of the sex-based genders,

figures/09/Simple/fig2.png

Figure 2: Sex-based and non-sex-based systems. Colors indicate: sex-based (blue) and non-sex-based (red).

2. both of the sex-based genders based on other criteria, or
3. one or more other non-sex-based genders.

As will be discussed in §3.2, almost half of the languages in the sample (9 of 20) have only two genders, both of which are sex-based. Thus, since option 3 is only available in languages with more than two genders, almost half of the languages in the sample assign inanimate nouns to one of the sex-based genders.

Assigning inanimates to only one of the two genders occurs e.g., in Mende (Sepik), where gender is distinguished only in second and third person singular pronouns. For animate referents, the form of the pronoun is determined by the sex of the referent, while inanimates are usually referred to with the feminine forms (Hoel et al. 1994 : 17). An example of this is shown in (1), where *Max* (male name) (1a) and *Lusi* (female name) (1b) occur with the masculine and feminine pronoun forms respectively, and the inanimate *masiji* 'hair' (1c) is referred to with the feminine form. Mende has thus a distinction masculine vs. other.

(1) Mende (Sepik) (Hoel et al. 1994 : 19, 31, 46)

a. *Max wasilaka ri-a*
M. big 3SG.M-INTEN
"Max is big."

b. *Lusi kava awu-n u-nda sir-a*
L. bad[4] fight-OBJ do-HAB 3SG.F-INTEN
"Lusi is a good fighter."

c. *masiji-n tivi unak si horngo-ku-a*
hair-OBJ tie so.that.not 3SG.F loosen-FUT-INTEN
"Tie the hair so that it won't loosen."

Assigning inanimates to both sex-based genders based on other criteria is more common in the sample. In most languages, the assignment of inanimates is based on semantic criteria, most commonly on the criteria shape and size (see also §5.1 below). One such a language is Abau (Sepik), where three-dimensional or long or extended objects, as well as liquids are masculine, whereas two-dimensional, flat or round objects with little height as well as abstract entities are feminine (Lock 2011 : 47). Thus, *su* 'coconut' (round), *now* 'tree' (long), and *hu* 'water' (liquid) are masculine, while *iha* 'hand' (flat) and *hne* 'bird's nest' (round with little height) are feminine (Lock 2011 : 48–50). In a language such as Abau, this is very much based on the speaker's perception. This can be seen in (2); when referring to the tree from which he makes the paddle (2a), *youk* 'paddle' is masculine, since the tree is long and not at all round or flat. However, when referring to the actual paddle (2a), which has the salient features of flat and round, the feminine form is used.

(2) Abau (Sepik) (Lock 2011 : 50)

a. *Ha-kwe youk se seyr.*
1SG.SBJ-TOP paddle 3SG.M.OBJ cut
"I cut the 'paddle' tree."

b. *Ha-kwe youk ke lira.*
1SG.SBJ-TOP paddle 3SG.F.OBJ see
'I see the paddle.'

The third type of sex-based systems is one where inanimates are assigned to genders other than sex-based ones. Naturally, this can only occur in languages with more than two genders. An example of a language with such a system is Nalca (TNG, Mek) (Svärd 2013 ; Wälchli 2018). Nalca has five main genders: masculine, feminine, neuter, default, and non-noun. As shown in (3), these are apparent in a set of case marker hosts following the NP, which constitute the only

[4]When used with the habitual -*nda*, *kava* 'bad' functions as an intensifier (Hoel et al. 1994:31).

indexing target in Nalca. The masculine and feminine genders are used exclusively for nouns denoting male and female humans respectively. Inanimates are divided between the neuter and default genders: the neuter contains all nouns of the phonological structure (C)V (including at least one noun denoting humans, *me* 'son, child'), while most inanimate nouns belong to the residual default gender. The default gender also contains some gender-neutral nouns denoting humans, most of which are plural, e.g., *nang* 'people'. The non-noun gender is used e.g., with adverbs, locatives, and despite its name the nominalizer *-a'*. It is also used when gender is switched off, in which case nouns still trigger agreement but due to syntactic phenomena agree with the non-noun gender.[5] In the examples below, both the neuter *si* 'name' and the masculine name *Zakheus* 'Zacchaeus' are shown in (3a), the feminine *genong* 'mother' in (3b), the default (DEFAULT) *pik* 'way' in (3c), and the two non-noun (NNOUN) constructions in (3d). The first instance of non-noun gender in (3d) is due to the intervention of the quantifier *nauba* 'many' between *nimi* 'men', which belongs to default gender, and the case marker host, whereas the second is due to the nominalizer *-a'*.

(3) Nalca (TNG, Mek) (own examples)

a. *alja si ne-ra Zakheus be-k u-lu-m-ok*
3SG.GEN name N-TOP Z. M-ABS be-IPFV-PST.3SG
'a man called by name Zacchaeus' (Lk 19:2)[6]
lit. 'his name was Zacchaeus'

b. *Nadya genong ge-ra heknya do?*
1SG.GEN mother F-TOP who Q
'Who is my mother?' (Mk 12:48)

c. *Na bi-nim-na pik e-ra ugun-da ella*
1SG go-FUT-PRS.1SG way DEFAULT-TOP 2PL-TOP knowledge
u-lu-lum …
be-IPFV-PRS.2PL
'And you know the way where I am going.' (Jn 14:4)

d. *… nimi nauba a-ra seleb longo-m-ek-a'*
men many NNOUN-TOP already assemble-PRF-PST.3PL-NMLZ

[5]The concept of switching gender on and off is an extremely rare phenomenon and goes well beyond the bounds of this study. For a comprehensive description of the Nalca gender system and discussion on switching gender on and off, see Wälchli (2018).

a-k *eib-ok*
NNOUN-ABS see[PFV]-PST.3SG
'… he saw the large crowds…' (Mt 6:34)
lit. 'he saw that many men had assembled'

Finally, the only non-sex-based gender systems in the sample occurs in the Austronesian language Teop, which has two genders (I and II) with two subgenders for the first gender (I-E and I-A, reflecting the form of the singular article preceding nouns. The genders and the nouns that belong to them are:

- *Gender I-E*: Contains all proper names, kinship terms, and nouns denoting pets or humans with a particular communal or important social status (Mosel & Spriggs 2000 : 334–335).
- *Gender I-A:* Contains most nouns and can be considered the unmarked gender (Mosel & Spriggs 2000 : 336–338).
- *Gender II:* Contains names of plants and their parts (but not fruits), objects made of plant material, invertebrates without legs, and many mass and abstract nouns (Mosel & Spriggs 2000 : 338).

This is strikingly similar to the noun classification system found in Siar (Frowein 2011 ; not in the sample), spoken on the opposite coast. Siar does not have a true gender system, since it only shows gender on articles preceding nouns and thus does not exhibit indexation.[7] However, nouns are still assigned according to a system of nominal classification similar to Teop:

- *Proper*: Contains mostly names, kinship terms and other nouns closely related to humans and culture such as professions (Frowein 2011 : 104–105).
- *Common 1*: A very heterogenous residual class, consisting of all nouns not in the proper or common 2 genders (Frowein 2011 : 108).

[6]The overwhelming majority of data available in Nalca consists of a translation of the New Testament. The English translation used is the American Standard Version, whereas the glossings and literal translations were devised by the present author. For a description and discussion of the methodology, see Svärd (2013) and Wälchli (to appear).

[7]In this study, a word is only considered an indexing target if it has a functional load other than expressing gender and number. The reason for this is that otherwise languages such as Siar, which has a set of markers preceding only nouns, would be considered as having gender. Such a system would be difficult to separate from a system showing noun classification only on the noun itself, i.e., without indexation.

- *Common 2*: Contains semantically marked nouns, including entities that are smallish or individuated from a greater mass, but also other semantic types; some examples are insect, birds, other smallish animals, plants and parts of plants, tools, loanwords, geographic locations, some meteorological phenomena, groups and sets, and ordinals (Frowein 2011 : 105–107).

Teop and Siar thus clearly display the differences between a gender system and a simpler noun classification system according to the criteria of gender used in this paper.

3.2 Number of genders

The second criteria concerns the number of genders in a language, based on Corbett (2013a). Each language is assigned the value two, three, four, or five or more genders (see Table 3 and Figure 3). The majority of the languages have only two genders, in all cases sex-based. Only one, Mian, has four genders. Of the remaining languages, three languages have three genders, whereas the remaining five languages have five or more genders, viz., Nalca (5), Motuna (6), Burmeso (9 > 3/6),[8] Yimas (around 12), and Bukiyip (18 genders).

In contrast to the previous criterion, it is more difficult to identify subgroups based on values of the number of genders; e.g., the languages with three genders are very different from each other. Nevertheless, some of the languages have the following specific characteristics of

1. two genders where one is unmarked,
2. three genders consisting of masculine, feminine, and neuter, or
3. very large systems.

More than half of the languages with two genders have one which is unmarked, all of which are sex-based. Consequently, in these languages, either the feminine

[8]Burmeso has two gender systems, with three genders belonging to the first system and the other six belonging to the second system (see §5.2).

[10]Onishi (1994) states that Motuna has six genders: masculine, feminine, diminutive, local, manner, and dual-paucal. However, the author does not elaborate on gender assignment, and I have been unable to satisfactorily conclude that the dual-paucal is truly a gender, which Onishi states. However, all form a complementary and mutually exclusive system, with separate identifiable markers and where a word may take only one gender.

[10]Burmeso has nine genders in total: three belong to the first gender system, whereas six belong to the second.

Table 3: Number of genders in the languages of the sample

Number of genders	No. of lgs.	%	Languages
Two	11	55%	Abau Kuot Manambu Maybrat Mende Oksapmin Skou Taiap Teop Walman Warapu
Three	3	15%	Ama Au Rotokas
Four	1	5%	Mian
Five or more	5	25%	Nalca (5) Motuna (6)[9] Burmeso (9 → 3/6)[10] Yimas (~12) Bukiyip (18)
Total:	20	100%	

figures/09/Simple/fig3.png

Figure 3: Number of genders. Colors indicate: two (blue), three (green), four (yellow), and five or more (red).

or the masculine gender is unmarked. An example of such a language is Maybrat (West Papuan), which has the conveniently named genders masculine and unmarked (i.e., non-masculine) (Dol 2007 : 89). Thus, nouns denoting male humans (or in some cases other male animates) are masculine, whereas all others (including those denoting females) belong to the unmarked gender. This is shown in (4). In (4a) 'old' indexes 'his father', in (4b) 'his mother', and in (4c) 'big' indexes 'house'.

(4) Maybrat (West Papuan) (Dol 2007 : 90)

a. *y-atia* ***y-anes***
3M-father **3M**-old
'His father is old.'/'his old father'

b. *y-me* ***m-anes***
3M-mother **3U**-old
'His mother is old.'/'his old mother'

c. *amah* ***m-api***
house **3U**-big
'The house is big.'/'the big house'

However, not all such languages use the masculine gender as the marked one. Languages where the masculine is marked are Warapu (Sko), Maybrat (West

Papuan), Mende (Sepik), and Taiap (isolate), whereas the feminine is marked in Skou (Sko). It is also marked in Ama (Left May), which has three genders: masculine, feminine, and compound. However, the situation is more complex in Ama, both because there are three genders, and because the feminine also includes e.g., some non-female animates (Årsjö 1999 : 68).

Except for Ama, which is mentioned above, the three-gendered systems belong to the second type, since all have masculine, feminine, and neuter. While this implies that inanimates are found only in the neuter gender, all languages assign some inanimates to the masculine and feminine genders as well, with or without sex-based motivation. For example, in Rotokas (North Bougainville), inanimate objects associated with male culture (such as hunting or warfare) and long, thin objects are masculine (see also §5.1), whereas most inanimates are assigned either to the feminine or to the neuter genders (Robinson 2011 : 46–48).

The third and final type is languages with very large gender systems, viz., Bukiyip (Torricelli, Arapesh) and Yimas (Lower Sepik-Ramu, Lower Sepik). These are markedly different from all other languages in the sample. The most immediate difference is of course the vastly larger number of genders. Bukiyip has as many as 18 genders (Conrad & Wogiga 1991 : 8–10), while Yimas has around a dozen genders, with Foley (1991 : 119) distinguishing 10 and Phillips (1993 : 175) as many as 16. All other languages in the sample have six genders or fewer. The Bukiyip genders and their indexing forms are shown in Table 11 in §3.5. The most important feature of these two gender systems is that both have semantic-formal assignment and gender marking on nouns. These two factors, which are uncommon in the sample, are undoubtedly related to the subsistence of their large systems.

Finally, a highly interesting case is Burmeso, which is the only language in the sample with two gender systems. The first system has three genders (masculine, feminine, and neuter), each with an additional subgender for inanimates, whereas the second system has six genders (I–VI). The exact nature of the gender systems and their interaction will be discussed further in §5.2.

3.3 Gender assignment

The third criterion concerns gender assignment and contains two values (see Table 4 and Figure 4), viz., semantic, or semantic and formal.

As can be seen in Figure 4, the majority of languages in the sample have semantic assignment. However, there are major differences between the various semantic systems as to their complexity. As mentioned in §3.1, Mende (Sepik) has an extremely simple system of gender assignment, where all nouns denot-

Table 4: Systems of gender assignment in the sample

Gender assignment	No. of lgs.	%	Language
Semantic	16	80%	Abau Ama Au Burmeso Manambu Maybrat Mende Mian Motuna Oksapmin Rotokas Skou Taiap Teop Walman Warapu
Semantic and formal	4	20%	Bukiyip Kuot Nalca Yimas
Total:	20	100%	

ing human or sometimes animate males are masculine while all other nouns are feminine.

In Rotokas (North Bougainville), however, the situation is more complex. Rotokas has three genders: masculine, feminine, and neuter. Both the masculine and the feminine gender contain nouns denoting male and female referents respectively, but complexity arises for inanimates. The masculine gender contains many inanimate objects, which are often associated with male culture or which are long or thin (Robinson 2011 : 46). The feminine gender also contains many inanimate objects, some of which are tools or related to water, but many which have no apparent semantic or formal criteria at all (Robinson 2011 : 47). Finally,

figures/09/Simple/fig4.png

Figure 4: Systems of gender assignment. Colors indicate transparent semantic (blue), semantic and formal (red), and semantic and opaque (yellow).

as expected, many inanimate nouns belong to the neuter gender (Robinson 2011 : 48).

Thus, while a learner of Mende is easily able to guess the correct gender of any noun, a learner of Rotokas is hard-pressed to guess the correct gender of an inanimate object. Even if there are rules, many of these are probably not tacitly known. Furthermore, even if the rules for gender assignment can be explicitly stated, the system may still be opaque if the rules are not general or have numerous exceptions. One example is Manambu (described further below), where gender assignment sometimes carries the notion of large size, so that larger animals are masculine and smaller animals feminine. However, insects are masculine despite their small size.[11]

It is therefore possible to further split the systems with semantic assignment into two: transparent semantic vs. semantic + opaque (Figure 5), where opacity signals the inability of the researcher to find any clear semantic or formal criteria for gender assignment. It is possible that a language may have semantic + formal + opaque assignment, but no such system was clearly identified in the sample.

[11]It is of course possible to imagine various explanations why insects are not feminine, e.g., perhaps are they are not regarded as animals. However, this only further illustrates the reason for not regarding Manambu gender assignment as transparent. Although there certainly is a general pattern of size distinctions for gender assignment in Manambu, it is merely a pattern and not a rule.

This thus gives rise to three types of gender assignment: transparent semantic, semantic and formal, and semantic and opaque (Table 5).

Table 5: Types of semantic assignment of gender assignment in the sample

Gender assignment	No. of lgs.	%	Language
Transparent semantic	8	40%	Au[12] Maybrat Mende Motuna Oksapmin Taiap Walman Warapu
Semantic and formal	4	20%	Bukiyip Kuot Nalca Yimas
Semantic and opaque	8	40	Abau Ama Burmeso Manambu Mian Rotokas Skou Teop
Total:	20	100%	

Since all languages have some form of semantic assignment, the most basic system is necessarily one where all nouns are assigned their genders based on few and clear semantic criteria. Mende has already been mentioned above and is exemplified in (1) in §3.1. However, semantic systems can be more complex

[12]It is not explicitly stated, but Au (Scorza 1985) appears to have a simple semantic system where nouns denoting human males are masculine, human females are feminine, and the rest are neuter. However, this is complicated somewhat by masculine and neuter agreement being homophonous in the singular.

while still retaining transparent semantic criteria, e.g., via a larger number of gender distinctions. One example is Motuna (South Bougainville), which has six genders: masculine, feminine, diminutive, local, manner, and dual-paucal (Onishi 1994 : 68–69). The forms of gender indexation in Motuna in are shown in Table 6.

Table 6: Gender indexation forms in Motuna (adapted from Onishi 1994 : 70)

	Demonstrative	Article	Adjective/ classifier/ kinship term endings	Possessor/ local NP endings	Verbal endings
Masculine	*ong*	*hoo/shoo*	*-ng*	*-ng*	*-ng*
Feminine	*ana*	*tii*	*-na*	*-na*	*-na*
Diminutive	*oi*	*tii*	*-ni*	*-ni*	*-ni*
Local	*owo*	*ti*	–	*-no*	*-no*
Manner	–	*tiwo*	–	–	*-nowo*
Dual-paucal	*oi*	*tii*	–	*-ni*	*-(n)i*

In Motuna, animate referents are assigned gender based on their natural gender; this also includes nouns associated with mythical characters such as *raa* 'the sun' and *hingjoo* 'the moon', which are assigned the gender of their character (Onishi 1994 : 70). Animals are most commonly masculine, but can be assigned the feminine gender if emphasizing that the referent is a female. On the other hand, the majority of inanimate nouns are masculine, but can be treated as diminutive when emphasis is placed on their small size. This includes nouns which signify smallish things, e.g., *irihwa* 'finger' or *kaa'* 'young tree' (Onishi 1994 : 71). Nouns with spatial or temporal meaning are inherently local gender. The manner gender contains only two nouns. Finally, the dual-paucal gender can be used also when the speaker does not want to specify the gender of a sentential topic (Onishi 1994 : 71).

In contrast to the transparent semantic criteria in Mende and Motuna above, many languages have much more complex systems. If gender assignment is neither semantically transparent nor apparently formal, it is classified as being opaque, with Rotokas having already been mentioned at the beginning of this section. Another example of such a language is Manambu (Ndu), which exhibits the fairly common feature of gender assignment based on size and shape (see §5.1). Man-

ambu has two genders, masculine and feminine, and in general gender assignment appears to follow semantic criteria. However, these are far from transparent:

1. Humans are assigned gender based on their sex, except nouns denoting small children, which can be assigned gender based on size (Aikhenvald 2008 : 116–117).

2. Higher animates are assigned based on their size and natural gender: larger animals are masculine, whereas smaller animals are feminine, except when the sex of the referent is known. Furthermore, nouns denoting young animals are feminine (Aikhenvald 2008 : 117).

3. Lower animates such as insects are masculine. However, if the lower animate has a certain shape, it is assigned gender based on shape; thus, *gwaːs* 'turtle' is feminine, since it is round, while *mu* 'crocodile' is masculine since it is long (Aikhenvald 2008 : 117).

4. Inanimates are assigned gender based on their size and shape: long and/or large objects are masculine, whereas small and/or round objects are feminine. Thus, *vœy* 'spear' is masculine, since it is large, but it is feminine if referring to small spears or shotguns (Aikhenvald 2008 : 117).

5. Natural phenomena are assigned gender based on whether they are complete or not: if they are uncompleted or if completeness is not emphasized, they are feminine; otherwise, they are masculine (Aikhenvald 2008 : 118). Thus, *gaːn* 'night' is feminine, unless it implies complete darkness, as is *gəl* 'cloud' if there are only a few but masculine if they cover the whole sky. Other natural phenomena are assigned gender based on their shape: e.g., 'rainbow' is masculine since it is long, whereas 'sun' is feminine since it is round; unless it is really hot, in which case it becomes masculine to reflect its intensity (Aikhenvald 2008 : 119).

6. Mass nouns and nouns covering 'extent' follow complex patterns. In general, they are assigned gender based on extremity, so that smaller quantities are feminine, whereas larger quantities are masculine (Aikhenvald 2008 : 119–120). However, nouns denoting manner, language or voice, or time span are feminine; except for *nabi* 'year', which is masculine because it is very long (Aikhenvald 2008 : 119).

There are in fact further assignment rules, but the important point is that rules of gender assignment are not semantically transparent. It is especially important to note that it is difficult to ascertain whether there are any rules or merely patterns. That is not to belittle the observations or to claim that the researcher, in this case Aikhenvald, has made anything wrong. Instead it illustrates the difference to transparent semantic systems, where all gender assignment rules are easily identifiable and apply to all nouns, whereas in opaque systems there are certainly some patterns that can be identified, but exceptions abound.

While it is easy to become amused by the seemingly arbitrary gender assignment rules, one important thing should be noted. In a language such as Manambu, gender has a very important pragmatic function, since it is available as a tool for the speaker to use when emphasizing certain features, not least in jokes:

> As a joke, a man can be referred to with feminine gender, and a woman with masculine gender, depending on their 'shape' and 'size'. A smallish fat woman-like man can be treated as feminine, e.g. *numa du* (big.FSG man) 'fat round man'. And a largish woman can be ironically referred to with a masculine gender form, e.g. *kə-də numa-də ta:kw* (DEM.PROX-M.SG big-M.SG woman) 'this (unusually) big woman'. (Aikhenvald 2008 : 121)

The final category consists of the four languages with both semantic and formal assignment: Nalca is skewed towards semantic assignment, Kuot applies semantic and formal assignment roughly equally, and Bukiyip and Yimas favor formal assignment. For example, among the five genders in Nalca (see §3.1 above), only the neuter is formal, but very much so since it contains only (but all) nouns of the phonological structure (C)V (Wälchli 2018). In comparison, only three of the 18 genders in Bukiyip (see Table 10) are semantic (masculine, feminine, and mixed or unspecified), whereas all others are morphological (Conrad & Wogiga 1991 : 8). The same is true for Yimas, where three genders are semantic, while the others are based on phonological criteria (Foley 1991 : 119).

3.4 Number of gender-indexing targets

Following Di Garbo (2014 : 66), the number of gender-indexing targets is given the value of one, two, three, or four or more. The results are shown in Table 6 and Figure 5, while each type of indexing target is shown in Table 7. The identification and counting of gender-indexing targets was based on the general guidelines used by Di Garbo (2014 : 66), where the following general categories were used to identify targets: pronouns, adjectives, demonstratives, verbs, numerals, copulas,

complementizers, and adpositions. However, no detailed analysis has been made of different subtypes of these groupings, so the results should be understood only as showing general patterns.

Table 7: Number of gender-indexing targets in the languages in the sample

Number of gender-indexing targets	No. of lgs.	%	Languages
One	4	20%	Ama Mende Nalca Oksapmin
Two	4	20%	Warapu Burmeso Skou Teop
Three	2	10%	Au Taiap
Four or more	10	50%	Abau Bukiyip Kuot Maybrat Manambu Mian Motuna Rotokas Walman Yimas
Total:	20	100%	

figures/09/Simple/fig5_new.png

Figure 5: Number of gender-indexing targets. Colors indicate: one (blue), two (green), three (yellow), and four or more (red).

As the Tables 7 and 8 show, more than half of the languages in the sample have more than four gender-indexing targets. There are also some general patterns to be found in Table 8:

- If a language has four gender-indexing targets, they always include pronouns and demonstratives, and almost all such languages include verbs and adjectives, with Abau (Sepik) being the exception.
- If a language has three gender-indexing targets, they include verbs and pronouns.
- If a language has two gender-indexing targets, they mostly include verbs and to a lesser extent pronouns.

[13] 'Pronoun' here denotes a word with general pronominal uses (i.e., as constituting an individual noun phrase), whether it belongs to the language-specific category of pronouns or demonstratives. In comparison, 'demonstrative' only refers to attributive forms.

[14] Burmeso adjectives are targets in the first gender system whereas verbs are targets in the second system.

[15] Kuot has no independent third person personal pronouns (Eva Lindström, p.c.). However, demonstratives are used with pronominal functions (see also Footnote 19 below).

[16] 'True pronouns' in Yimas exist only in the first and second person without gender (Foley 1991 : 111). The third person is instead expressed with a set of deictics, which show gender and are most commonly used as free pronouns in narrative discourse (Foley 1991 : 113). Therefore these forms are considered pronouns for comparative purposes.

Table 8: Distribution of gender-indexing targets in the languages of the sample

Language	Pronouns[13]	Verbs	Demonstratives	Adjectives	Numerals	Prepositions	Case hosts
Abau	W		X		X		X
Ama		X					
Au	X	X		X			
Bukiyip	X	X	X	X			
Burmeso		X		X[14]			
Kuot	X[15]	X	X	X		X	
Manambu	X	X	X	X			
Maybrat	X	X	X	X			
Mende	X						
Mian	X	X	X	X			
Motuna	X	X	X	X	X		
Nalca							X
Oksapmin	X						
Rotokas	X	X	X	X			
Skou	X	X					
Taiap	X	X	X				
Teop				X	X		
Walman	X	X	X	X	X		
Warapu	X	X					
Yimas	X[16]	X	X	X	X		

- If a language has only one gender-indexing target, the target could be anything (e.g., verbs, pronouns, or even case marker hosts).

Based on the likelihood of a gender-indexing target appearing in a language, it is possible to arrange the distributional tendencies into tentative hierarchies, where the leftmost target is the most typical target while the rightmost target is the least common one. If one target is present in a language, every target to the left is present as well. That is, if a language has only one target, it is likely to be the leftmost one, whereas if a language has five it should include every part of the hierarchy. There are three tendencies:

- pronouns > verbs > demonstratives > adjectives > numerals (holds for 14

out of 20 languages)

- verbs > adjectives > pronouns (3/20)
- other (3/20)

It is also interesting to note that among the ten languages with four or more indexing targets, all except Abau follow the first hierarchy. There is therefore an additional pattern, whereby a gender system with many indexing targets is expected to follow the first hierarchy. In comparison, four of the six languages of the other two categories have two gender-indexing targets or less, with Au having three targets and Abau four.

The languages not describable in terms of the first and second hierarchies are all very different and require some explanation. One example is Nalca (TNG, Mek), which only shows gender on markers functioning as case marker hosts following the NP. These carry the meaning of gender, case, and demonstrative, of which at least the first two mostly occur together. Some of the most common forms are shown in Table 9. Examples were given in (3) in §3.1 above, the first of which is repeated in (5).

Table 9: Some of the most of most frequent forms of case marker hosts words in Nalca.

Case	masc. *be-*	fem. *ge-*	neuter *ne-*	default noun *e-*	non-noun *a-*
Topic	*bera*	*gera*	*nera*	*era*	*ara*
Topic dem.	*benera*	*genera*	*nenera*	*enera*	*anara/anera*
Absolutive	*bek*	*gek*	*nek*	*ek*	*ak*
Abs. dem.	*benyek*	*genyek*	*nenyek*	*enyek*	*anyek*
Gen./ergative	*bedya(')*	*gedya(')*	*nedya(')*	*edya(')*	*adya(')*
Gen./erg. dem.	*benedya*	*genedya*	*nenedya*	*enedya*	*anadya*
Comitative	*beb*	*geb*	*neb*	*eb*	*ab*
Com. dem.	*benyeb*	*genyeb*	*nenyeb*	*enyeb*	*anyeb*
Equative	*beneso(')*	*geneso(')*	*neneso(')*	*eneso(')*	*anaso(')*
Benefactive	*bemba*	*gemba*	*nemba*	*emba*	*amba*

(5) Nalca (TNG, Mek) (own example; repeated from 3a)
alja si ***ne-ra*** *Zakheus* ***be-k*** *u-lum-ok*
3SG.GEN name **N-TOP** Z. **M-ABS** be-IPFV-PST.3SG
'a man called by name Zacchaeus' (Lk 19:2)
lit. 'his name was Zacchaeus'

Another interesting example is Teop (Austronesian, Oceanic). In Teop, gender is visible on a set of articles preceding nouns, adjectives, and numerals. Two examples of markers preceding adjectives and numerals, respectively, are shown in (6).

(6) Teop (Austronesian, Oceanic) (Mosel & Spriggs 2000 : 330, 328)

a. ***a*** *inu* ***a*** *beera*
ART.I.SG house **ART.I.SG** big
'the big house'

b. ***o*** *buaku* ***o*** *hoi*
ART.II.SG two **ART.II.SG** basket
'the two baskets'

However, since these articles do not carry any other functional load, they do not satisfy the criterion that an indexing target must express something other than gender and number. Instead, Teop is analyzed as having two targets, viz., adjectives and numerals, which form a unit with the preceding article. On the other hand, the articles preceding nouns are analyzed as overt gender marking (see §3.5).

3.5 Occurrence of gender marking on nouns

The final criterion concerns the occurrence of gender marking on nouns (see Table 10 and Figure 6), following Di Garbo (2014 : 69). Gender marking on nouns is of course not considered indexation, but it is a common feature e.g. in African languages and most certainly a characteristic trait of many gender systems.

Most languages of the sample (17 of 20) do not have overt gender marking, with Bukiyip, Teop, and Yimas being the only exceptions. In both Bukiyip and Yimas, gender is shown on nouns via suffixes; the Bukiyip noun suffixes are given in Table 11. Both languages are unusual in the sample by their having many noun classes (18 in Bukiyip, around a dozen in Yimas), many gender-indexing targets (both four or more), and semantic-formal assignment. In fact, these features are

Table 10: Occurrence of gender marking on nouns in the sample

Gender marking on nouns	No. of lgs.	%	Language
Yes	3	15%	Bukiyip Teop Yimas
No	17	85%	Abau Ama Au Burmeso Kuot Manambu Maybrat Mende Mian Motuna Nalca Oksapmin Rotokas Skou Taiap Walman Warapu
Total:	20	100%	

probably tightly interconnected with the overtness of gender. The combination of many genders and morphological gender assignment appears more common when noun classes are overtly distinct.

On the other hand, Teop (Austronesian, Oceanic) has a very different kind of marking. As mentioned above, Teop has a set of articles which obligatorily precede nouns, adjectives, and numerals. Thus, the latter two are indexation, while the articles preceding nouns are considered overt marking. The forms of the markers are shown in Table 12.

Note that Teop has two genders, one of which is divided into two subgenders. The reason for them not being separate gender is that the distinction is kept only

figures/09/Simple/fig6.png

Figure 6: Occurrence of gender marking on nouns. Colors indicate: yes (blue), and no (red).

Table 11: Bukiyip noun classes and noun class suffixes (adapted from Conrad & Wogiga 1991 : 10)

Class	Glossing	Example		Noun suffix	
		singular	plural	singular	plural
1	betel nut	*búb*	*búbús*	*-b/n*	*-bús*
2	village	*wabél*	*walúb*	*-bél*	*-lúb*
3	feces	*dewag*	*dewas*	*-g/-gú*	*-s/-as*
4	woman	*élmatok*	*élmagou*	*-k*	*-ou/-eb*
5	banana	*apam*	*apas*	*-m/-bal*	*-s/-ipi/-bal*
6	moon	*aun*	*aub*	*-n/-nú*	*-b*
7	man	*élman*	*élmom*	*-n/-nú*	*-m*
8	child	*batawiny*	*batawich*	*-ny/-l*	*-ch/-has*
9	leaf	*chuwup*	*chuwus*	*-p*	*-s*
10	mosquito	*aul*	*auguh*	*-l/-ny*	*-guh*
11	dog	*nobat*	*nobagw*	*-t/-tú*	
12	sago leaves	*lohuhw*	*lohulúh*	*-hw*	
13	road	*yah*	*yeh/yegwih*	-V_1h	-V_2h
14	box	*kes*		*-s*	*-s*
15	small pig	*buligún*		*-gún*	*-gún*
16	garden	*yawihas*		*-has*	*-has*
17	personal names			-	-
18	place names			-	*-gún*

Table 12: Gender marking in Teop on articles preceding nouns (Mosel & Spriggs 2000 : 322)

	head (SG)	head (PL)	target (SG)	target (PL)
Gender I-E	*e*	*o*	*a*	*o*
Gender I-A	*a*	*o*	*a*	*o*
Gender II	*o*	*a*	*o*	*a*

on the articles preceding nouns, and never on the articles preceding adjectives and numerals. Thus, since overt gender marking cannot constitute gender as it is not indexation, Teop only has two genders.

This is very similar to the related Austronesian language Siar (not in the sample), which also has articles preceding nouns (Frowein 2011). However, the Siar articles are not used in other contexts, so the absence of indexation renders Siar genderless. Nevertheless, a pronoun can be placed before e.g., an adjective, which is similar to the use of the Teop article. However, pronouns in Siar do not show any gender distinctions. The difference between Teop and Siar in this regard is shown in (7) and (8), respectively.

(7) Teop (Austronesian, Oceanic) (Mosel & Spriggs 2000 : 326)
a *inu* ***a*** *rutaa*
ART.I house ART.I small
'the small house / the house is small'

(8) Siar (Austronesian, Oceanic) (Frowein 2011 : 206)
Ép *rumai* ***i*** *mètèk.*
ART.CO1 house 3SG new
'The house is new.'

Finally, some languages have overt marking in some cases or at least something resembling it. One example is Kuot (isolate), where some nouns belong to various declension classes (as defined by noun endings), which in turn belong to a certain gender (Lindström 2002 : 176). Another example is Rotokas (North Bougainville), which has noun suffixes expressing both number and gender (Robinson 2011 : 41). However, these are not always present: in (9a), *aveke* 'stone' has a feminine singular suffix, but in (9b) it remains unmarked.

(9) Rotokas (Robinson 2011 : 42)

a. *riako-va* ***aveke-va*** *peka-e-vo* *uva rakoru*
woman-SG.F **stone-SG.F** turn.over-3SG.F-IPST and snake
keke-e-vo *uva kea-o-e* *oisio uo-va*
look.at-3SG.F-IPST and mistake.for-3SG.F-IPST as eel-SG.F
'The woman turned over to the stone and saw a snake but mistook it for an eel.'

b. *kaveakapie-vira* ***aveke*** *tovo-i-vo* *uva kove-o-e*
insecure-ADV **stone** place-3PL-IPST and fall-3SG.F-IPST
'They placed the stone insecurely and it fell down.'

Since gender marking on nouns is not always present, Rotokas cannot be said to have obligatory overt marking.

4 Typological comparison

This section compares the results of this study with previous research on Africa and the world as a whole. The data on Africa is from Di Garbo (2014), which used the same five criteria of this study to investigate a variety sample of 100 languages. The data on the world as a whole is based on the three *WALS* chapters on gender by Corbett (2013a ,b,c). These three *WALS* chapters correspond to the first three classification criteria of this study. Unfortunately, the remaining two have no corresponding *WALS* data, rendering the final two criteria comparable only for New Guinea and Africa.

Some care had to be taken when comparing the results, since the samples are of different types. Whereas this study employs a variety sample, Corbett uses a proportional sample (of 257 languages) (see §2). Di Garbo also uses a variety sample (of 100 languages) although with some differences, most importantly the inclusion of 16 non-gendered languages as well as being intentionally genealogically skewed. To make the data comparable, languages without gender have been omitted from Corbett's and Di Garbo's samples in this section, leaving 112 languages for Corbett and 84 for Di Garbo.

Classification criterion 1: Sex-based and non-sex-based gender systems (§3.1). In the sample of this study, sex-based systems are by far more common, with only Teop (Austronesian, Oceanic) having a non sex-based system. In comparison, in Di Garbo's (Di Garbo 2014 : 63) sample, 48 languages (57%) had sex-based gender systems and 36 languages (43%) non-sex-based gender systems. In Corbett's

(2013b) sample, 84 languages (75%) have sex-based systems and 28 (25%) non-sex-based. A comparison of the percentage distributions is shown in Figure 7.

figures/09/fig7.png

Figure 7: Sex-based and non-sex-based systems in New Guinea, Africa and the world

Sex-based systems are more common in all samples, although even more so in the sample from New Guinea. According to Corbett's (Corbett 2013b) data, non-sex-gender systems are actually uncommon in most regions, being found primarily in the Niger-Congo languages of Africa, which account for the vast majority of non-sex-based systems in the sample. More specifically for Africa, in most cases only one system occurs in an entire family: this is true e.g., for the Bantu, Mel, and North-Central Atlantic families, which together account for 33 of the 36 non-sex-based gender systems in Di Garbo's sample. It is therefore not surprising that the non-sex-gender systems are relatively common, since 31% of the gendered languages (26/84) in Di Garbo's sample are Bantu languages.

An interesting discussion about the differences between sex-based and non-sex-based systems is presented by Luraghi (2011), who argues that they have different diachronic origins, with non-sex-based systems originating from the grammaticalization of classifiers and sex-based systems from agreement from different morphosyntactic behaviors of groups of nouns. Since sex-based systems are more common, it is thus not surprising that they are the primary ones in New Guinea. It is likely not a coincidence that the only non-sex-based gender system

of the sample is found in an Austronesian language, a family remarkably devoid of gender but abounding with classifiers.

Classification criterion 2: Number of genders (§3.2). In the sample of this study, eleven languages (55%) have only two genders, three languages (15%) three genders, one language (Mian; TNG, Ok-Oksapmin) (5%) four genders, and the final five languages (25%) five genders or more. In Di Garbo's (Di Garbo 2014 : 65) sample, 42 languages (50%) have only two genders, seven languages (8%) three genders, one (Ju|'hoan; Kxa) (1%) four genders, and the final 34 languages (40%) five genders or more. In Corbett's (Corbett 2013a) sample, 50 languages (45%) have only two genders, 26 languages (23%) three genders, 12 languages (11%) four genders, and the final 24 (21%) five genders or more. A comparison between the percentage distributions is shown in Figure 8.

figures/09/fig8.png

Figure 8: Number of genders in New Guinea, Africa and the world

The distributions in all three samples are similar to a large extent, with two-gender systems being present in around half of the languages. In Africa, large systems are much more common than in New Guinea or the world as a whole. However, this may once again be because of the sample. As mentioned before, 31% of the languages present in Di Garbo's (Di Garbo 2014) sample are Bantu languages, all of which have very large gender systems. In the sample of this study, however, the rather large Torricelli and Lower Sepik-Ramu families, which according to Foley (2000 : 372) have large systems, are represented only by Bukiyip and Yimas respectively (i.e., 10% of the sample). It is thus very probable that the

similarities between the distribution numbers of genders in New Guinea and Africa actually are greater than indicated here.

Classification criterion 3: Gender assignment (§3.3). This criterion is less straightforward to compare, since this study uses three values (transparent semantic, semantic and formal, and opaque), whereas Di Garbo (2014) and Corbett (2013c) use only two (semantic, and semantic and formal). For the purpose of this comparison, the languages of the purely semantic and semantic + opaque groups are added somewhat tentatively into a semantic group. While this may appear misleading, it is important to note that the researchers investigating these languages considered them as having semantic gender assignment and no traces of formal assignment rules have been identified by the present author. Indeed, both languages exemplified in Corbett (2013c), Bininj Gun-Wok (Gunwinygic; northern Australia) and Russian, would be considered opaque using the values of this study.

In the sample of this study, 16 languages (80%) exhibit semantic gender assignment, whereas only four languages (20%) show semantic and formal assignment. In comparison, in Di Garbo's (Di Garbo 2014 : 67) sample, six languages (7%) have semantic assignment, 76 languages (90%) semantic and formal assignment, while the remaining two languages (2%) have unknown assignment (disregarded in Figure 9). In Corbett's (Corbett 2013c) sample, 53 languages (47%) exhibit semantic assignment, and 59 languages (53%) semantic and formal assignment. A comparison between the percentage distributions is shown in Figure 9.

As can be clearly seen in Figure 9, in New Guinea, semantic assignment is by far more common, while it is by far the most uncommon form of gender assignment in Africa, including of course the Bantu languages. In the world as a whole, the ratio is more or less equal. Thus, New Guinea and Africa both represent two extremes while the world as a whole is more average. However, according to Corbett (2013c), semantic and formal assignment is mostly found in the Indo-European, Afro-Asiatic, and Niger-Congo families, which together represent a large amount of the languages of the world.

It is not surprising that semantic and formal assignment appears more often in Di Garbo's and Corbett's samples than in New Guinea, since no family is represented with more than three members in this study. Bukiyip (Torricelli, Arapesh) and Yimas (Lower Sepik-Ramu, Lower Sepik) both belong to rather large families, so it is possible that a proportional sample would show that semantic and formal assignment indeed is more common than it appears here. Nevertheless, it is interesting that it occurs in few families, both in New Guinea and the world, which Corbett (2013c) relates to these systems necessarily being older.

figures/09/fig9.png

Figure 9: Gender assignment in New Guinea, Africa and the world

As argued by Luraghi (2011), this implies that most gender systems of Africa are old. Exclusive semantic assignment is however found in both older and younger systems, and thus it cannot be claimed that the predominance of semantic assignment indicates that those systems are young. Interestingly, semantic and formal assignment is found in Nalca (TNG, Mek), which has a very young gender system (Wälchli 2018).

Classification criterion 4: Number of gender-indexing targets (§3.4). In the sample of this study, four languages (20%) have only one gender-indexing target, another four languages (20) two targets, two languages (10%) three targets, and the final ten languages (50%) four or more targets. In Di Garbo's (Di Garbo 2014 : 68) sample, five languages (6%) have only one gender-indexing target, 16 languages (19%) two targets, 28 languages (33%) three targets, and finally 33 languages (39%) four targets or more. No data was available for the remaining two languages. A comparison of the percentual distributions is shown in Figure 10.

Four or more gender-indexing targets is the most common number in both samples, accounting for slightly less than half of all languages. Furthermore, systems of only two targets account for around a fifth of the languages in both samples. As for the two remaining values, the relationships are the opposite: systems of three targets are common in Africa but rare in New Guinea, whereas one-target systems occur in a fifth of the New Guinean languages but only 6% of the African languages. However, once again it is probable that these differences

figures/09/fig10.png

Figure 10: Number of gender-indexing targets in New Guinea vs. Africa

are largely due to larger families with more mature gender systems being better represented in Di Garbo's (Di Garbo 2014) sample, while languages from smaller families with possibly less mature gender systems constitute a large part of the sample of this study.

Classification criterion 5: Occurrence of gender marking on nouns (§3.5). In the sample of this study, three languages (15%) have overt gender marking, whereas the remaining 17 (85%) do not. In Di Garbo's sample 69 languages (82%) have overt gender marking and 15 (18%) do not. A comparison between the percentage distributions is shown in Figure 11.

As the figure shows, there is a major disparity between the presence of gender marking on nouns in New Guinea and Africa. In New Guinea, overt gender marking is rare and occurs in only three languages in the sample, whereas in Africa it occurs in the vast majority of languages.

There is an interesting correlation between this distribution and the one of gender-assignment shown in Figure 4. Thus, semantic assignment without gender marking on nouns is the norm in New Guinea, whereas semantic and formal assignment with gender marking on nouns is the norm in Africa. This correlation is hardly coincidental. A gender system with assignment based on formal criteria benefits greatly from overt gender; in an exclusively semantic system however, obligatory overt gender has no function in gender assignment.

figures/09/fig11.png

Figure 11: Occurrence of gender marking on nouns in New Guinea vs. the world

To summarize, it can be confidently stated that the gender systems of New Guinea and Africa are very different. Much of this depends on the hegemony of Bantu languages in Africa (as represented by Di Garbo's sample), which makes the distribution of values much less diverse than in the sample of this study. Nevertheless, the most important differences are (1) the prevalence of semantic and formal assignment and overt gender in Africa, while the exact opposite is true in New Guinea, and (2) as the observation that non-sex-based genders are much more common in Africa. This clearly shows that the two regions have gender systems of very different types. Reasons for this definitely include sample size and technique, but it also suggests that the gender systems of New Guinea may have different diachronic origins.

As for New Guinea in relation to the world as a whole, the above data and figures show that the distribution of values of the three classification criteria is rather similar in New Guinea and the world. In fact, most of the smaller differences can probably be accounted for by sample size. Nevertheless, the main conclusion is that the languages of New Guinea seem to be remarkably representative of the languages of the world, but another study with a proportional sample from New Guinea would elucidate this further.

5 Special characteristics

In this section, four characteristics of the gender systems of New Guinea are highlighted, two of which reflect characteristics mentioned by Foley (2000), viz., gender assignment based on size and shape, and the occurrence of two separate gender systems. The other two, viz., no gender distinctions in pronouns and gender marking on verbs, pertain to two typologically uncommon characteristics. Although these do not occur in all languages of the sample, they are found in geographically and genealogically distant languages and are all characteristic of the region.

5.1 Size and shape

Four languages in the sample (20%) share the property of having size and shape as important criteria for gender assignment. While gender assignment in many languages may carry some form of size- or shape-based rules, the rules discussed here all share the feature that nouns denoting tall, long, or thin objects are considered masculine, whereas nouns denoting short, thick, or round objects are feminine. In addition, they are all core assignment criteria. The languages in the sample exhibiting this feature are: Abau (Sepik), Manambu (Ndu), Skou (Sko), and Taiap (isolate). Their rules based on shape and size are shown in Table 13.

Table 13: Gender assignment rules based on size and shape in the sample

Language	Masculine[17]	Feminine
Abau	- large - three-dimensional - long and extended	- small - two-dimensional (i.e., very thin) - round with little height
Manambu	- large - long	- small - round
Skou	- large - long, thin	- small - round, squat
Taiap	- large - long, high, thin	- small - round, stocky

[17] 'Non-feminine' in Skou.

In these four languages, size and shape are important criteria for gender assignment. One example mentioned in §3.1 above is Abau, which has two genders: masculine and feminine. Humans, along with spirits and domesticated animals, are assigned gender based on their sex, whereas abstract entities are feminine (Lock 2011 : 47). However, animals and concrete inanimate objects are assigned their gender based on shape and size. Large, three-dimensional, and/or long and extended objects are masculine, while small, two-dimensional (i.e., very thin), and/or round objects with little height are feminine (Lock 2011 : 47). Thus, *su* 'coconut' (three-dimensional), *now* 'tree' (long), and *hu* 'water' (liquid) are masculine, while *iha* 'hand' (flat) and *hne* 'bird's nest' (round with little height) are feminine (Lock 2011 : 48–50).

It is important to distinguish systems such as the ones above from diminutives. In some languages, diminutives constitute separate genders, such as in Motuna (South Bougainville) (Onishi 1994 : 68–69). However, the four languages above show the peculiar characteristics that (1) size and shape function as assignment criteria for the masculine and feminine genders, and (2) they constitute opposing criteria, and (3) they show the same pattern of large/long vs. small/round.

In the sample, size and shape constitute important gender assignment criteria in only these four languages, but similar systems are present in other languages. Rotokas exhibits some similarities with these gender assignment rules in two ways. Firstly, one class of nouns belonging to the masculine gender consists of inanimate objects associated with male culture, but also includes long or thin objects. However, no comparable feminine gender assignment rule has been found. Furthermore, this is appears to be only a peripheral gender assignment rule. Secondly, Rotokas has a set of classifiers based on shape and size, classifying nouns based on their being round, narrow, or long. While this is not related to any masculine-feminine opposition, it nonetheless bears some resemblance to these systems.

Another interesting example is Mian (TNG, Ok). Mian has four genders, viz., male, female, neuter 1, and neuter 2, none of which has gender assignment rules resembling those of size and shape (Fedden 2011 : 171–176). However, around 50 verbs require the use of a classificatory prefix, which has two functions: firstly, it encodes the direct object of transitive verbs and the subject of intransitive verbs, and secondly it classifies it according to characteristics of the referent, viz., sex, shape, and function (Fedden 2011 : 185). This classification system, which is separate from the gender system, includes classes for e.g., long or flat objects, and in some cases overlaps with the gender system (e.g., some neuter 1 nouns are included in the masculine class. A table illustrating the overlap between the

two systems is shown in Table 14.

Table 14: Overlap between the gender and verb prefix classes of Mian (adapted from Fedden & Corbett 2017 : 34). Cells with examples show the attested combinations.

	Masculine	Feminine	Neuter 1	Neuter 2
M-classifier	man, boy, boar	–	sleeping bag, plate, mosquito net	–
F-classifier	–	woman, girl, sow	–	house, steel axe, money
Long	–	–	tobacco, eating implement, bush knife	–
Bundle	–	–	string bag, plastic bag	–
Covering	–	–	blanket, band aid	–
Residue	–	tortoise, scorpion	cassowary egg, plane, hat	–

Assigning genders based on shape and size is not very common in the languages of the world (Aikhenvald 2000 : chap. 11). Outside of New Guinea, it occurs e.g., in some Afroasiatic languages, such as Oromo and Amharic, Central Khoisan, and Cantabrian Spanish (Aikhenvald 2000 : 277; Heine 1982 : 191). However, size as an assignment criterion is widespread in Africa, where it e.g., occurs in diminutive and augmentative genders as reported by Di Garbo (2014). An example is in Tonga, where 'boy' (noun class 1) can shift to the diminutive noun class 12 to highlight smallness:

(10) Tonga (Bantu) (Di Garbo 2014 : 147; from Carter 2002 : 21)

a. *mu-sankwa*
CL1-boy
'boy'

b. *tu-sankwa*
CL12-boy
'small boy'

As for New Guinea, its prevalence specifically in the Sepik area has led Aikhen-

vald (2008 : 113) to suggest that gender assignment based on size and shape may actually be an areal feature of the Sepik area. Indeed, all four languages in this sample found to have such systems are spoken in or near the Sepik area: Abau (Sepik) and Manambu (Ndu) are spoken inside it, while Skou (Sko) and Taiap (isolate) are spoken in relatively adjacent areas. Another oft-cited example is Alamblak (Bruce 1984 ; not in the sample), also a Sepik language of the same area, which has a system similar to that of Manambu (Aikhenvald 2008 : 112).

Thus, gender assignment according to size and shape appears to be an areal feature, since it occurs in a wide area and in languages of different families. This gives rise to an important question. Why would a system of gender assignment be areal when gender is such a stable and not easily borrowed feature? Although this is far beyond the scope of this study, there are some hints that this may be part of a larger cultural classificatory system (i.e., perceptual, not linguistic). The reason for such a possibility is that besides occurring in and around the Sepik area, there are other New Guinean languages where nouns are grouped based on size and shape with other nouns denoting male or female referents, even when there is no gender system. This is most apparent in the TNG languages of the central highlands; nouns in these languages can be categorized by the type of stance verb they occur with, so that males or large, long, or tall objects occur with 'stand', whereas women or small, short, or round objects occur with 'sit' (Foley 2000 : 372). An example of such a language is Enga (Engan; New Guinea Highlands; not in the sample), which has seven different stance verbs, including *katengé* 'stand', which is used for referents considered tall, large, strong, and/or powerful such as 'men', 'house', and 'tree', and *pentengé* 'sit', which is used for referents considered small, squat, horizontal, and/or weak such as 'woman', 'possum', and 'pond' (Aikhenvald 2000 : 158–159; Rumsey 2002). Thus, it appears that the perception of large, long, or tall objects being related to males and/or masculinity, and small, short, or round objects being related to females and/or femininity is a characteristic of New Guinea that extends beyond gender systems or the Sepik area.

5.2 Two separate systems of noun classification

In most gendered languages, gender constitutes a single system where each noun is assigned to a single class which is reflected in the form of indexation targets. However, there are also languages with two separate systems, both of which appear to constitute or be related to gender systems, but which occur with different types of targets. Thus, in such a language each noun is assigned to not just one class, but to two different classes. In the sample of this study, five languages have

such systems (see Table 15).

Table 15: Languages in the sample with separate gender and noun class systems

Separate systems	No. of lgs.	%	Language
Yes	5	25%	Abau
			Burmeso
			Mian
			Motuna
			Rotokas
No	15	75%	Ama
			Au
			Bukiyip
			Kuot
			Manambu
			Maybrat
			Mende
			Nalca
			Oksapmin
			Skou
			Taiap
			Teop
			Walman
			Warapu
			Yimas
Total:	20	100%	

Even in the small sample of this study, the two separate systems range from languages with two more or less equally complex systems (i.e., with similar numbers of forms and uses) to languages where one system is more complex whereas the other is much less so. In order to retain the typological comparability of the results, a distinction has been made between systems of gender and systems of noun classifiers. However, it should be stated that there is a thin line between the two and they most certainly constitute two edges of the same continuum. Following these, four of the five languages with two systems of noun classification can be argued to exhibit one gender system and system of noun classifiers,

whereas only Burmeso has two systems which both satisfy the conditions for gender systems. In the first system, Burmeso has three genders (masculine, feminine, and neuter), appearing as adjectival agreement suffixes (11a), which are further divided into two subgenders (animate and inanimate), each depending on the plural agreement marker (Donohue 2001 : 105–106). However, in the second system (which Donohue calls a noun class system), Burmeso has six genders (I–VI), which occur in verbal agreement prefixes (11b) (Donohue 2001 : 101). In addition, there are three words which take both kinds of agreement: *-aysa-* 'one', *-akasu-* 'all', and *-asna-* 'white' (11c).

(11) Burmeso (isolate) (Donohue 2001 : 105, 109, 100)

a. *Da de koya bek-**abo**.*
1SG 1SG.POSS grandfather good-M.SG
'My grandfather is well.'

b. *Da mibo **j**-ihi-maru.*
1SG banana V.SG-see-TPST
'I saw a banana.'

c. *Sunam **n**-asna-**b**.*
axe.SG III.SG-white-M.SG
'(The) axe is white.'

As expected from the number of genders being different, the two systems use different assignment rules. Both systems are sex-based with importance clearly put on sex and animacy, but none of them have only transparent semantic rules: e.g., 'wind' is neuter/III, 'rain' masculine/IV, and 'star' masculine/III) (Donohue 2001 : 103–107). A comparison of the overlap of the two systems is exemplified in Table 16, showing how members are assigned to both systems.

Table 16: Comparison between genders and noun classes in Burmeso (adapted from Donohue 2001 : 108). As in the source, the subgenders of the masculine, feminine, and neuter genders are shown.

Class	Masculine	Feminine	Neuter	M inanimate	F inanimate	N animate
I	male humans (most birds, animals etc.) 2SG PRO	(birds of paradise) pigeons sago garden	sea	neck	–	sea wound
II	1SG PRO	female humans	nose ear eye	–	small goanna	string shapes sago rinser (lower)
III	axe papaya ground bird	–	(some small animals) bench	papaya rattan mountain lake (all tubers) upper sago trough female child	goanna	–
IV	head, flesh, feces, finger, elbow, sun, cloud, rain, sand, mud	–	–	–	–	–
V	–	–	(arrows)	banana	–	–
VI	–	–	–	coconut	–	–

Near the other end of the spectrum lies Rotokas (North Bougainville). Rotokas has three genders, viz., masculine, feminine, and neuter, which appear e.g., in pronouns, demonstratives, adjectives, and verbs (12a) (Robinson 2011). However, Rotokas also has noun classifiers, which consist of two different sets. The first set consists of four classifiers; these distinguish between shape and size, and importantly occur on both attributive (12b) and predicative modifiers of the classified noun (Robinson 2011 : 50).

(12) Rotokas (North Bougainville) (Robinson 2011 : 149, 50)

a. *Pita vaio ora Kariri ava-**si**-ei voka-sia*
P. DL.ANIM and K. go-**3DL.M**-PRS walk-DEP.SEQ
'Peter and Kariri are going for a walk.'

b. *gorupasi **isi** rutu karuvera **isi** aio-a-voi*
strong CL.**round** very Singapore CL.**round** eat-1SG-PRS
'I am eating a really strong Singapore fruit.'

The other set of classifiers, which has more members and have collective meanings, occurs following, or instead of, the classified noun (Robinson 2011 : 51). Interesting to note is that classified nouns become neuter in regards to gender agreement (Robinson 2011 : 53).

Abau also exhibits a clear noun classifier system (Table 17). There are two genders in Abau, masculine and feminine, which follow opaque gender assignment rules and appear in e.g., pronouns and demonstratives. However, the numerals 'one', 'two', and 'three' do not agree with this system, but instead take one of twelve prefixes based on semantic criteria of the referent. However, the same noun can be used with different numeral classifiers in order to indicate a specific referent, so that e.g., *su piron* 'one coconut' refers to the whole coconut palm and not just the fruit, since class 5 signals long objects, while *su kamon* 'one coconut' is used when referring to just the fruit, since class 2 does not carry the semantic feature of length. It is thus evident that this system of noun classifiers is not lexically determined by the noun itself and thus not a gender system.

Mian has a similar albeit different system. In Mian, there is a set of verbal classificatory prefixes which are divided into six classes (Table 18). These prefixes are used only for around 50 verbs, the vast majority of which refer to forms of object manipulation, movement, and handling (Fedden 2011 : 172). Once again, this is clearly not a full-fledged gender system, but rather a classifier system.

Finally, Motuna is a particularly interesting case since its secondary system lies near the boundary between genders and noun classifiers. Besides its gender

Table 17: Numeral classifiers in Abau (adapted from Lock 2011 :57)

Class	Characteristics	One	Two	Three
1	Human beings; spirits	*pru-eyn*	*pru-eys*	*pru-ompri*
2	Non-human	*ka-mon*	*k-reys*	*k-rompri*
3	Small objects with some volume	*na-mon*	*na-reys*	*na-rompri*
4	Flat surface objects; experience nouns	*si-rom*	*s-eys*	*s-ompri*
5	Long, relatively thin objects	*pi-ron*	*pi-reys*	*pi-rompri*
6	Geographical locations	*u-mon*	*u-reys*	*u-rompri*
7	Flat objects with hardly any volume	*i-mon*	*i-reys*	*i-rompri*
8	Certain type trees	*li-mon*	*li-reys*	*li-rompri*
9	Bundles of long non-cut items	*ein-mon*	*ein-deys*	*ein-rompri*
10	Temporal	*leik-mon*	*leik-reys*	*leik-rompri*
11	Bundles of long cut items	*hnaw-mon*	*hnaw-reys*	*hnaw-rompri*
12	Part of a long object	*houk-mon*	*houk-reys*	*houk-rompri*

Table 18: Classifiers in Mian (adapted from Fedden 2011 : 172)

Class	Characteristics	Verbal classificatory prefixes	
		Singular	Plural
1	Masculine	*do(b)-*	*do(l)-, dl-*
2	Feminine	*om-*	
3	Long object	*to(b)-*	*tebe(l)-*
4	Bundle-like object	*go(l)-*	*gule(l)-*
5	Flat object	*gam-*	*geme(l)-*
6	Residue class	*o(b)-*	*o(l)-*

system (described in §3.3), Motuna has another noun classification system consisting of 51 different classifiers, which are visible in the forms of adjectives, verbs, participial clauses, articles, demonstratives, possessive pronouns, and numerals (Onishi 1994 : 162–163). Thus, as for indexation, the system is very reminiscent of a gender system. However, the classes are not lexically determined, meaning that the same noun may occur with various classifiers depending on the referent. Furthermore, as expected for a noun classifier system, the classifiers refer properties such as size, shape, type of vegetable, and collectives (e.g., 'bundle', 'packet'). Thus, *moo* 'coconut' can occur with classes 4 *-mung* 'plant/fruit/nut/egg/things made of plant/coin' (> 'coconut (nut/tree)), 5 *-ri* 'nut with hard shell' (> 'coconut'), 6 *-mo'* 'bunch of nuts' (> 'coconut'), 13 *-ri'* 'round object' (> 'coconut'), and 30 *-ita* 'half/side' (> 'half coconut shell') (Onishi 1994 : 166–167). Therefore, this system in Motuna is a system of noun classifiers, not genders.

Despite the small size of the sample used in this study, the proportion and the geographic and genealogical spread of languages with two separate systems of nominal classification indicate that the phenomenon is rather common and widespread in New Guinea. Besides the languages of this study, two of which are mentioned by Foley (2000 : 373), viz., Burmeso and Motuna, similar systems have been noted in the Sepik languages Iwam, Wogamusin, and Chenapian, which together with their relative Abau (which is included in this sample) suggest that this is a feature of the Sepik family (Lock 2011 : 46). However, it does not appear to be common outside of New Guinea, with similar systems occurring only in a few Indic, Dravidian, Iranian, and some Arawak languages (Aikhenvald 2008 : 185).

5.3 No gender distinctions in pronouns

According to Greenberg's (Greenberg 1963 : 90) 43rd Universal, "[if] a language has gender categories in the noun, it has gender categories in the pronoun[18]." However, this generalization is not reflected in the languages sampled for this study, where four languages do not exhibit gender in pronouns (see Table 19).

As seen in the above table, almost a quarter of the languages in the sample have no gender distinctions in independent pronouns. In comparison, only two

[18] 'Pronoun' is here understood as 'independent pronoun'.

[19] As in §3.4, the demonstratives in Kuot and Yimas with pronominal functions are here understood as pronouns for the purpose of typological comparison, just as the present author would do for the Latin *is*, *ea*, and *id*, regardless of the proper language-internal analysis. Nevertheless, if they should rather not be regarded as pronouns, the point of this section would be even stronger.

Table 19: Occurrence of gender distinctions in independent pronouns in the sample

Gender in pronouns	No. of lgs.	%	Language
Yes	16	80%	Abau Au Bukiyip Kuot[19] Manambu Maybrat Mende Mian Motuna Oksapmin Rotokas Skou Taiap Walman Warapu Yimas[19]
No	4	20%	Ama Burmeso Nalca Teop
Total:	20	100%	

languages (Mende and Menya) have gender distinctions solely in pronouns.

While these results are interesting, the phenomenon can be found in other languages as well. This can be investigated by comparing two *WALS* chapters, viz., Corbett's (Corbett 2013a) chapter on number of genders and Siewierska's (Siewierska 2013) on gender distinctions in independent pronouns. These chapters do not share the same sample, so Corbett's sample consists of 257 languages, whereas Siewierska's contains 378 languages. Of these languages, 188 occur in both samples, 74 of which have gender systems. Of these remaining 74 gendered languages (which of course should not be assumed to be representative of anything), a surprising 15 languages (20%) do not show gender distinctions in independent pronouns. Coincidentally, this is the same ratio as in New Guinea as shown in Table 18 above. Thus, it is clear that Greenberg's statement is not universal, although it certainly is a common pattern.

5.4 Gender indexation on verbs

According to Greenberg's 31st Universal, "if either the subject or object noun agrees with the verb in gender, then the adjective always agrees with the noun in gender." That is, if the verbs are indexing targets, so are adjectives. However, this generalization is not reflected in the distribution of values of the fourth classification criteria in the languages sampled for this study (see Table 8). Three of the 15 languages with gender marking on verbs show no indexation on adjectives.

The results are even more striking when compared with Bybee (1985). In her survey of fifty languages, only 16% of the languages showed gender in verbs (Bybee 1985 : 18). However, in the sample of this survey, 75% of the languages have gender marking on verbs, with Ama even having it as the only indexing target. Verbs thus seem to be more prototypical indexing targets than adjectives in the sample of this study, and it would be interesting to conduct further studies on this with a larger and worldwide sample.

6 Conclusions and further studies

The languages of New Guinea show remarkable diversity in grammatical gender, but there are still common patterns. Except Teop (Austronesian, Oceanic), all languages in the sample have sex-based gender systems. More than half of the languages have only two genders, and only Bukiyip (Torricelli) and Yimas (Lower Sepik) have very large systems, with 18 and around a dozen genders respectively. In the vast majority of the languages, gender assignment is semantic. Half of the

languages have four or more indexing targets, most commonly pronouns and verbs. Gender marking on nouns is rare and occurs in only three languages in the sample. The typological comparison suggests that the genders systems of New Guinea are remarkably representative of the world. Sex-based gender systems are more common in both New Guinea and the world, and the ratio of numbers of genders are very similar, with the rate of occurrence of the values being two > three ≥ five or more > four genders. Semantic and formal gender assignment occurs in slightly more than half of the languages of the world, while it is much more uncommon in New Guinea. The gender systems of New Guinea and Africa are very different. This depends largely on the numerous Bantu languages, which make the languages of Africa whole less diverse than the sample of this study. The most significant difference is the prevalence of non-sex-based gender systems and gender marking on nouns in Africa, whereas the opposite is true in New Guinea. This suggests that they may have different diachronical origins.

Four special characteristics have been found in the gender systems of New Guinea, none of which are typologically common. Firstly, four languages of the sample share the property of size and shape as important criteria for gender assignment. In these languages, nouns denoting large and/or long objects are masculine, whereas small and/or short items are feminine. This characteristic is also shared with many African languages. Secondly, five languages of the sample have two separate nominal classification systems. In these language, each noun is assigned to two classes which are reflected in different indexing targets, although only Burmeso exhibits two equivalent gender systems whereas the other rather distinguish between genders and noun classifiers. Thirdly, four languages in the sample have no gender distinctions in pronouns, which according to Greenberg's 43rd Universal should not occur. Finally, verbs are the most common gender-indexing targets in the languages of the sample, which is uncommon. In three languages of the sample, verbs are indexing targets while adjectives are not, which contradicts Greenberg's 31st Universal.

Future studies should consider more languages and be proportional, as well as aim at investigating how the gender systems of New Guinea may affect the theory of gender. There are also more specific areas of study that would benefit from further research. Firstly, the special characteristics discussed in this study could benefit from more research. One example is gender assignment based on size and shape, which appears to be a feature of the Sepik area. However, Skou (Sko) and Taiap (isolate) are spoken outside of the immediate area, and similar distinctions have been found in non-gendered languages of New Guinea. It would thus be interesting to investigate the actual geographical distribution of such

systems. Also, the inclusion of the criterion of manipulability of gender assignment as used in Di Garbo (2014) would probably further improve the comparison between gender in New Guinea with Africa.

It would also be interesting to investigate features not discussed in this study. One such feature is pluralia tantum, i.e., plural nouns with no or only an unusual singular form (Koptjevskaja-Tamm & Wälchli 2001 : 629), for which there are indications that it may be relevant for gender. This can be seen in Ama (Left May), which has a separate compound gender containing nouns denoting referents with many parts, e.g., heaps, piles, and mass nouns (Årsjö 1999 : 68). For a discussion of pluralia tantum in languages of New Guinea see also Olsson (2019 [this volume]) and Dryer (2019 [this volume]).

Future studies could also investigate the diachrony of gender in New Guinea. Some languages of New Guinea have been found to have diachronically young gender systems, including Nalca (TNG, Mek) of the sample of the present study, and the prevalence of sex-based systems suggest that many gender systems in New Guinea have diachronic origins different from e.g., the non-sex-based gender systems of Africa.

Abbreviations

I, II, III etc.	gender I, II, III etc.	INTEN	intensifier
ANIM	animate	N-	non-
C	common gender	NNOUN	non-noun gender
CL	classifier	PRO	pronoun
CO1	common gender 1	RED	reduplication
DEFAULT	default gender	SEQ	sequential
DEP	dependent (verb)	TPST	today's past/hodiernal past
DL	dual	U	unmarked gender
HAB	habitual		

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Part V

South Asia

Chapter 10

Gender typology and gender (in)stability in Hindu Kush Indo-Aryan languages

Henrik Liljegren
Stockholm University

This paper investigates the phenomenon of gender as it appears in 25 Indo-Aryan languages (sometimes referred to as "Dardic") spoken in the Hindu Kush-Karakorum region – the mountainous areas of northeastern Afghanistan, northern Pakistan and the disputed territory of Kashmir. Looking at each language in terms of the number of genders present, to what extent these are sex-based or non-sex-based, how gender relates to declensional differences, and what systems of assignment are applied, we are arriving at a micro-typology of gender in Hindu Kush Indo-Aryan, including a characterization of these systems in terms of their general complexity. Considering the relatively close genealogical ties, the languages display a number of unexpected and significant differences. While the inherited sex-based gender system is clearly preserved in most of the languages, and perhaps even strengthened in some, it is curiously missing altogether in others (such as in Kalasha and Khowar) or seems to be subject to considerable erosion (e.g. in Dameli). That the languages of the latter kind are all found at the northwestern outskirts of the Indo-Aryan world suggests non-trivial interaction with neighbouring languages without gender or with markedly different assignment systems. In terms of complexity, the southwestern-most corner of the region stands out; here we find a few languages (primarily belonging to the Pashai group) that combine inherited sex-based gender differentiation with animacy-related distinctions resulting in highly complex agreement patterns. The findings are discussed in the light of earlier observations of linguistic areality or substratal influence in the region, involving Indo-Aryan, Iranian, Nuristani, Tibeto-Burman, Turkic languages and Burushaski. The present study draws from the analysis of earlier publications as well as from entirely novel field data.

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Keywords: Afghanistan, animacy, complexity, Dardic, gender pervasiveness, Indo-Aryan, Kashmir, non-sex-based gender, Pakistan, sex-based gender.

1 Introduction

At the very northern fringe of the Indo-Aryan world (approximately what lies north of the 34th parallel) we find a group of languages that historically and culturally are somewhat outside the sphere of the main Indo-Aryan languages of the subcontinent (Masica 1991 : 20–21). Geographically this group is wedged in between Iranian on its western side and Tibeto-Burman on its eastern side, and even if not immediately adjacent, the distance to the Turkic belt of Central Asia is negligible at its farthest extension. This extremely mountainous and multilingual region (see Figure 1), which I henceforth will refer to as the Hindu Kush (although it strictly speaking is only partly overlapping with the Hindu Kush mountain range, while also overlapping with the Karakoram and the westernmost extension of the Himalayas), lies where the territories of Afghanistan, Pakistan and India-administered Kashmir meet. Apart from the languages and genera already mentioned, this region is also home to Nuristani, a third, but numerically small, branch of Indo-Iranian (Strand 1973 : 297–298), and to the isolate Burushaski.

The languages in question have been subject to a great deal of debate (Strand 2001 : 251), as to whether they are truly Indo-Aryan, constitute a genealogical unit of their own, or represent (perhaps along with the Nuristani languages) a transitional group between Indo-Aryan and Iranian. A term frequently used collectively for these languages is "Dardic". However, few modern linguists cling to this term as anything else than a convenient umbrella term for a group of languages that are characterized – but not equally so – by a few salient retentions from previous stages of Indo-Aryan (Morgenstierne 1974 : 3), but also have some contact-related developments in common (Bashir 2003 : 821–822). Contact in that case includes mutual contact between the various Indo-Aryan linguistic communities as well as significant contact with adjacent communities belonging to other genera (Liljegren 2017). This non-committal line is also taken here regarding this grouping, but in order to avoid a stronger interpretation of "Dardic" than warranted, the term is abandoned in favour of Hindu Kush Indo-Aryan (HKIA) (Liljegren 2014 : 135; Heegård Petersen 2015 : 23), again without any claim of classificatory significance in the traditional sense. While the region for quite some time has been referred to as particularly interesting in terms of areality and language contact (Emeneau 1965 ; Skalmowski 1985 ; Masica 1991 : 43; Masica 2001 : 259), and a number of features have been suggested as characteristic (Bashir 1988

: 392–420; Bashir 1996 ; Bashir 2003 : 821–823; Èdel'man 1980 ; Èdel'man 1983 : 35–59; Fussman 1972 : 389–399; Tikkanen 1999 ; 2008; Baart 2014 ; Toporov 1970), relatively little detailed and systematic areal-linguistic research has been carried out so far.

figures/10/map1.pdf

Figure 1: The Hindu Kush-Karakoram region with languages plotted (see Table 1 for an explanation of the 3-letter codes)

As for the ancestral nominal system, evidenced in Old Indo-Aryan as well as in Middle Indo-Aryan, it encompassed three gender values: masculine, feminine, and neuter. In the Indo-Aryan world in general, these three values are only preserved in the modern languages in the southern part of the Subcontinent, whereas a simplified two-value system (masculine vs. feminine, mainly as a result of neuter collapsing with masculine) dominates the large central and western parts, while such distinctions have altogether vanished in the northeast (Masica 1991 : 217–223). That there is a somewhat unexpected distribution and display of grammatical gender in the languages at the northern and western frontier of Indo-Aryan (viz. the Hindu Kush) was pointed out by Emeneau (1965 : 68–71) already half a century ago, but apart from Morgenstierne's (Morgenstierne 1950 : 19–20) tabulation, no systematic attempt has to my knowledge been made to account for gender distribution and manifestation across HKIA. This study tries to rectify that by showing the results of a survey of the following gender-related features – partly inspired by a number of contributions to *WALS*, the *World atlas of language structures* – for each HKIA language for which there is data:

- The presence and number of gender categories (as evidenced by agreement

patterns), and their basis, whether sex-based or non-sex-based (Corbett 2013a ,b).

- The pervasiveness of gender, i.e. how gender is manifested in each language system in terms of (the types and numbers of) indexed domains.
- The assignment criteria at work: whether semantic or semantic-formal (Corbett 2013c).
- The presence and manifestation of pronominal gender (Siewierska 2013).

In the process of discussing and summarising these results, particularly in terms of the relative complexity of these systems, and in the light of areal patterning, a micro-typology of gender in HKIA emerges:

- The inherited sex-based system is largely preserved, but has disappeared in two of the languages at the Northwestern fringe of the Hindu Kush and is possibly eroding in a few other languages spoken in the same part of the region.
- An animacy-based system (almost exclusively marked on copulas or copula-based verbal categories) is characterizing a number of the region's westernmost languages; in some cases it co-exists with a sex-based system; in others it occurs instead of a sex-based system or has contributed to a restructuring of the system as a whole.
- Gender is deeply entrenched (reflected in more target domains) in the East, i.e. in the languages spoken in areas contiguous with the main Indo-Aryan belt, whereas such pervasiveness is fading out toward the West.
- The results also suggest a weaker tendency toward semantic transparency in the gender systems in the North and a reinforcement of formal assignment, along with object agreement, in the South.

2 Hindu Kush Indo-Aryan and other languages in the region

Today, there are 27 distinct HKIA languages, i.e. languages identified as "Dardic" by the language catalogue Ethnologue (Lewis et al. 2015), spoken in the region, the great majority of them on Pakistani soil or in areas of Kashmir now under Pakistani control. At least six clusters of related languages can be identified, mainly

going with Bashir (Bashir 2003 : 824–825) and the classification used in Glottolog (Hammarström et al. 2018), although the definitive placement of a few of the individual languages is still pending (Dameli, Tirahi and Wotapuri-Katarqalai). All HKIA languages are presented in Table 1, roughly according to their geographical distribution, from west to east in a crescent-like fashion (see Figure 1). No attempt has been made here to represent relatedness below the level of these six groupings.

Some of these groupings are tighter, i.e. internally less diverse, than the others, a reason why they sometimes are treated as single languages with a number of dialects rather than as groupings of separate languages. That especially applies to Kashmiri, Shina and Pashai. The relatedness between the two Chitral group languages, Khowar and Kalasha, is also apparent from a number of features that single these two out from the rest of HKIA. The latter two were assumed by Morgenstierne (1932 : 51) to represent the first wave of Indo-Aryan settlers moving in from the lowlands in the South.

If we, for the sake of simplicity, define the Hindu Kush region as the window between the longitudes 34 and 37 N and the latitudes 69 and 77 E, another 25 languages are spoken here. At least four other languages (or continua), traditionally described as belonging to sub-branches of Indo-Aryan with their geographical centres outside of the Hindu Kush region, are also at home in the Hindu Kush region, or their geographical extension overlap to a considerable extent with it: Hindko [hno], Pahari-Pothwari [phr], Gojri [gju] and Domaaki [dmk]. As for Hindko and Pahari-Pothwari, they can be regarded as part of a Punjabi macrolanguage extended far beyond the region, and as such they represent the closest main Indo-Aryan neighbour of HKIA. Gojri is the language of nomadic or seminomadic Gujurs, spoken in pockets throughout the region and beyond. The closest linguistic relatives of Rajasthani Indo-Aryan Gojri is, however, to be found at a considerable distance from the present region, deep into the main belt of Indo-Aryan. The closest relatives of Domaaki are likewise to be found in the plains of North India. Domaaki, however, is interesting from an areal point of view; as the language of a small enclave of musicians and blacksmiths surrounded by locally dominant speaker groups of Shina and Burushaski, it has during its 200–300 years in the area acquired a number of features typical of HKIA (Weinreich 2011 : 165–166).

A number of the surrounding languages in the West are Iranian. Pashto [pbu] and Dari [prs], the two representing two completely different branches of Iranian, are both important lingua francas in parts of the region and well beyond. It is essentially the standard or literary type of Eastern Persian used in Afghanistan

Table 1: Hindu Kush Indo-Aryan languages (with 3-letter ISO codes and the areas and countries where they are spoken), arranged in subgroupings

Group	Language	code	Area (Country)
Pashai	Northwest Pashai	[glh]	Kabul, Kapisa, Konar, Laghman, Nurestan (Afg)
	Southwest Pashai	[psh]	Kabul, Kapisa (Afg)
	Southeast Pashai	[psi]	Nangarhar, Laghman (Afg)
	Northeast Pashai	[aee]	Konar, Nangarhar (Afg)
Kunar	Shumashti	[sts]	Konar (Afg)
	Grangali	[nli]	Konar, Nangarhar (Afg)
	Gawarbati	[gwt]	Konar (Afg), Chitral (Pak)
	Dameli	[dml]	Chitral (Pak)
Chitral	Kalasha	[kls]	Chitral (Pak)
	Khowar	[khw]	Chitral, Gilgit-Baltistan (Pak)
Kohistani	Tirahi	[tra]	Nangarhar (Afg)
	Wotapuri-Katarqalai	[wsv]	Nurestan (Afg)
	Gawri (Kalami)	[gwc]	Upper Dir, Swat (Pak)
	Torwali	[trw]	Swat (Pak)
	Indus Kohistani	[mvy]	Kohistan (Pak)
	Gowro	[gwf]	Kohistan (Pak)
	Chilisso	[clh]	Kohistan (Pak)
	Bateri	[btv]	Kohistan (Pak)
Shina	Sawi	[sdg]	Konar (Afg)
	Palula	[phl]	Chitral (Pak)
	Kalkoti	[xka]	Upper Dir (Pak)
	Ushojo	[ush]	Swat (Pak)
	Kohistani Shina	[plk]	Kohistan (Pak)
	Kundal Shahi	[shd]	Jammu & Kashmir (Pak)
	Shina (Gilgiti)	[scl]	Gilgit-Baltistan (Pak), Jammu & Kashmir (Ind)
	Brokskat	[bkk]	Jammu & Kashmir (Ind)
Kashmiri	Standard Kashmiri	[kas]	Jammu & Kashmir (Ind), Jammu & Kashmir (Pak)

that is referred to as Dari, while various names occur in reference to regional or local varieties, such as Tajik in north-eastern Afghanistan and neighbouring Tajikistan; some of those may very well be considered languages in their own rights, e.g. Hazaragi [haz]. Most of the other Iranian languages (all very distantly related to either Pashto or Dari) are relatively minor, with a local scope only; in Afghanistan, Parachi [prc], Munji [mnj], Sanglechi [sgy], Ishkashimi [isk] and Shughni [sgh]; in Pakistan, Yidgha [ydg], basically a dialect of the same language as Munji; in Pakistan and Afghanistan as well as in adjacent areas of Tajikistan and China, Wakhi [wbl] is spoken.

All of the five to six Nuristani languages are spoken in a geographically confined area in Afghanistan's Nurestan Province, close to the Pakistan border (with some spill-over into adjacent Chitral): Kati [bsh], Kamviri [xvi] (more correctly a dialect rather than a separate language from the aforementioned), Waigali [wbk], Ashkun [ask], Tregami [trm], and Prasun [prn]. Two Turkic languages are spoken at the northern periphery of the region: Uzbek [uzs] and Kirghiz [kir]; and in the East two with each other closely related Tibeto-Burman languages are found: Balti [bft] and Purik [prx]. The already mentioned language isolate Burushaski is spoken in the extreme North of Pakistan's Gilgit-Baltistan region.

3 Sample and data

The sparsity of data points in large-scale typological enterprises such as *WALS* stresses the need for different selectional criteria when it comes to areal-typological or micro-typological studies. For instance, three of the *WALS* features (30A, 31A, 32A) that deal with gender include in their 257-language sample only five of the languages spoken in the Hindu Kush (Burushaski, Kashmiri, Kirghiz, Pashto and Uzbek), and of them only one (Kashmiri) is a HKIA language (Corbett 2013a ,b,c). For the feature surveying pronominal gender (44A), the corresponding figures are 2 (Burushaski and Kashmiri) and 1 (Kashmiri), respectively, in a world-wide 378-language sample (Siewierska 2013).

It was therefore the aim of this survey to draw data from as many as possible of the 27 above-mentioned HKIA languages rather than trying to identify and justify a smaller sample. That posed some challenges as the quality and amount of documentation vary greatly from language to language. However, by combining available published descriptions with my own field data from a variety of languages in the region, it has been possible to find out which are the main characteristics and values (as presented in §1) for as many as 25 of them. I saw a definite need to exclude Gowro and Chilisso, due to lack of adequate data, but

this should probably not distort the overall picture in any significant way, since the preliminary analysis shows that both of these languages are relatively closely linked to Indus Kohistani (Bashir 2003 : 874). The addition of unpublished field data was particularly important concerning the under-researched languages Bateri, Kalkoti and Ushojo. In Table 2, the sources of information for each language have been specified.

4 Gender Categories and their basis

The first question to be asked is whether gender is at all a distinctive feature, and, if it is, also how many genders there are in the language. Here I align myself with the view that membership in a particular gender category in contrast with one or more other such categories in the language in question is inherent to a noun but has to be evidenced by grammatical contrasts outside the noun itself, for instance in the form of adjectival or verbal agreement (Corbett 2014 : 89–90; Hockett 1958 : 231–233; Greenberg 1978 : 50). Another relevant question to ask is whether the gender system is based on, or primarily linked to, biological sex or to something other than sex. Surveying the languages in our sample, we find (Table 3) that all of them (possibly except for some dialects of NW Pashai)[1] display gender distinctions, one way or the other.

As can also be seen in Table 3, the basis for such distinctions is not the same for all of the languages. In the great majority of the languages, in 23 out of 25, the gender system, as it is mirrored in agreement, is clearly sex-based, having (at least) a two-way, female vs. male, differentiation at its core (as in many other Indo-Aryan languages in general), as seen in example (1) from Ushojo, where 'boy' in (a) triggers masculine verb agreement, and 'girl' in (b) triggers feminine agreement. This masculine–feminine differentiation also extends into the inanimate realm: 'wind', in (c), is assigned feminine, and 'coldness', in (d), is assigned masculine gender.

[1]The preliminary analysis of my own data, from three NW Pashai locations (Sanjan, Alasai and Alishang) indicates the presence of sex-based adjectival gender agreement throughout, whereas clear evidence of animacy-based differentiation is lacking in these particular varieties. While those findings have guided the present treatment, Morgenstierne's (Morgenstierne 1967 : 150–151, 173–176) study suggests a great deal of dialectal variation within NW Pashai both as far as the presence/absence of sex-based and animacy-based gender are concerned.

Table 2: Data sources for Hindu Kush Indo-Aryan

Language	Sources
Northwest Pashai	(Morgenstierne 1967 : 143–203); own data
Southwest Pashai	(Morgenstierne 1967 : 45–142)
Southeast Pashai	(Morgenstierne 1967 : 251–297; Lehr 2014); own data
Northeast Pashai	(Morgenstierne 1967 : 205–249); own data
Shumashti	(Morgenstierne 1945)
Grangali	(Bashir 2003 : 837–839; Grjunberg 1971)
Gawarbati	(Morgenstierne 1950); own data
Dameli	(Morgenstierne 1942 ; Perder 2013); own data
Kalasha	(Heegård Petersen 2015 : 35–49; Bashir 1988); own data
Khowar	(Bashir 2003 : 844–849); own data
Tirahi	(Morgenstierne 1934b ; Grierson 1927 : 265–327)
Wotapuri-Katarqalai	(Buddruss 1960)
Gawri (Kalami)	(Baart 1997 ; 1999); own data
Torwali	(Lunsford 2001 ; Bashir 2003 : 864–869; Grierson 1929); own data
Indus Kohistani	(Hallberg & Hallberg 1999 ; Bashir 2003 : 874–877; Lubberger 2014); own data
Bateri	(Hallberg & O'Leary 1992 : 207–225, 249–251); own data
Sawi	(Buddruss 1967 ; Liljegren 2009 : 43–48); own data
Palula	(Liljegren 2016); own data
Kalkoti	(Liljegren 2009 : 43–48; Liljegren 2013); own data
Ushojo	(Decker 1992); own data
Kohistani Shina	(Schmidt & Kohistani 2008); own data
Kundal Shahi	(Rehman & Baart 2005); own data
Shina (Gilgiti)	(Bailey 1924 ; Degener 2008 : 13–65; Radloff & Shakil 1998 : 183–192); own data
Brokskat	(Ramaswami 1982 ; Sharma 1998)
Standard Kashmiri	(Koul 2003 ; Verbeke 2013 : 175–211); own data

Table 3: The presence of gender (sex-based, non-sex-based) in Hindu Kush Indo-Aryan

Language	Number of genders	Sex-based gender	Non-sex-based gender
Southwest Pashai	4	✓	✓
Southeast Pashai	4	✓	✓
Northeast Pashai	4	✓	✓
Shumashti	3–4	✓	✓
Dameli	3	✓	✓
Kalasha	2		✓
Khowar	2		✓
Northwest Pashai	2	✓	
Grangali	2	✓	
Gawarbati	2	✓	
Tirahi	2	✓	
Wotapuri-Katarqalai	2	✓	
Gawri (Kalami)	2	✓	
Torwali	2	✓	
Indus Kohistani	2	✓	
Bateri	2	✓	
Sawi	2	✓	
Palula	2	✓	
Kalkoti	2	✓	
Ushojo	2	✓	
Kohistani Shina	2	✓	
Kundal Shahi	2	✓	
Shina (Gilgiti)	2	✓	
Brokskat	2	✓	
Standard Kashmiri	2	✓	

(1) Ushojo (Own data)

a. *ek* ***phoó*** *asíl-**u**, se seekel-aá yáa áal-**u**.*
one boy(M) be.PST-M.SG 3SG.NOM bicycle-LOC going come.PFV-M.SG
'There was a boy, he came riding on a bicycle.'
(USH-PearStoryAH:001)

b. *ek* ***phuí*** *... seekal-aá yáa mušíin tarapayá áal-**i**.*
one girl(F) bicycle-LOC going to.near in.direction come.PFV-F.SG
'A girl... came in his direction, riding on a bicycle.'
(USH-PearStoryAH:012)

c. *axeér* ***oóš*** *čóku bíl-**i**.*
finally wind(F) quiet become.PFV-F.SG
'Finally the wind gave up.' (USH-NorthwindAH:007)

d. *maáti* ***šídal*** *bíl-**u**.*
1SG.DAT coldness(M) become.PFV-M.SG
'I feel cold [lit. Coldness came to me].' (USH-ValQuestAH:060)

In two of the languages, Khowar and Kalasha, both belonging to the Chitral group, sex-based differentiation is entirely lacking, but in each case, we instead find a two-way differentiation based on animacy, where animate nouns (including humans and higher non-human animals) are treated differently from inanimate nouns by some agreement targets. For instance, the present actual copula verb used in locational predication in Khowar have different third person singular and plural agreement forms for animate and inanimate, respectively. That is illustrated in example (2) with the two plural forms. (The corresponding singular forms are ***asúr*** and ***šer***.) The copula, in its various forms, is also used as an auxiliary participating in some tense-aspect formations.

(2) Khowar (Own data)

a. *dúr-a* ***roy*** ***asúni***.
house-LOC people(AN) be.PRS.ACT.3.AN.PL
'There are people in the house.' (KHW-PredFA:011)

b. ***kitáb*** *ma dúr-a* ***šéni***.
book(INAN) 1SG.GEN house-LOC be.PRS.ACT.3.INAN.PL
'The books are in my house.' (KHW-PredFA:009)

A few of the dialects of NW Pashai may also lack sex-based gender distinctions (Morgenstierne 1967 : 150–151); in those cases we do not have conclusive

information on the presence of animacy distinctions. In another few languages, in Dameli and Shumashti (both Kunar languages) and in several of the Pashai varieties, animacy differentiation occurs, not instead of but in addition to sex-based differentiation. However, there are reasons to regard these as two separate features (with two values each) that affect different parts (or sub-domains) of the language system, a situation that Dahl (2000 : 581–582) refers to as "parallel combinations of gender distinctions". Only marginally do the feminine–masculine and animate–inanimate distinctions make use of the same agreement target; in Dameli, that happens in non-verbal predication, which results in a three-way differentiation at the most: animate masculine vs. animate feminine vs. inanimate, as shown in example (3). Apart from the specific domain of non-verbal predication in Dameli, it is a two-way masculine vs. feminine distinction that is upheld in most other parts of its grammar. It is not unlikely that a similar situation holds in Shumashti, although the data available is too scanty to draw any firm conclusions.

(3) Dameli (Own data)

a. *i* ***mač*** *mruy* ***thaa****.*
PROX.AN man(M) hunter be.PRS.3M.SG
'This man is a hunter.' (DML-ValQuestHM:070)

b. ***poši*** *koki* ***thui****.*
cat(F) asleep be.PRS.3F.SG
'The cat is asleep.' (DML-ErgSurvHM:013)

c. ***bum*** *šukisan* ***daru****.*
ground dry be.PRS.3SG.INAN
'The ground is dry.' (DML-ValQuestHM:068)

In Pashai (at least in SE, SW and NE), animacy and sex-based gender agreement do co-occur in one and the same clause and with one and the same referent, see the SE Pashai example in (12). That results in a four-way distinction (masculine/animate, masculine/inanimate, feminine/animate vs. feminine/inanimate).

This naturally leads over to the topic of our next section: agreement targets and the general pervasiveness of gender.

5 Agreement targets and the pervasiveness of gender

In line with the view that grammatical gender and the number of gender categories is evidenced in agreement patterns, I will use the number of agreement

targets as a (somewhat crude) measure of what I call gender pervasiveness (Table 4). Here, it will be necessary to look at sex-based distinctions (masculine vs. feminine) apart from non-sex-based (animate vs. inanimate). This is not to say that they need to be regarded as two entirely separate phenomena, but rather to underscore a general observation that sex and animacy in most cases operate at different levels and affect separate (and only peripherally overlapping) subsystems or parts of the language systems under investigation. It will be possible to make some overall generalizations along relatedness lines, although I will also point out some important variation within lower-level genealogical groupings, and for some of the languages I will also elaborate further on the relative pervasiveness within the target categories. While pronominal gender is indicated in Table 4 it will not be discussed until §7 (A tick-mark within parentheses indicates that agreement is restricted to copula verbs or copula-derived auxiliaries; a question mark after a tick-mark indicates a possible but non-conclusive presence of a gender target.)

Starting with Kashmiri, gender is very pervasive throughout its system, including adjectives, adnominal demonstratives and possessive phrases in nominal modification as well as verbs showing agreement in gender with one of its arguments. Person, number and gender are often conflated in a complex manner, and distinctions are, at least partly, expressed non-linearly, i.e. by vowel modification or palatalization. As for adjectival inflection, see example (4), gender distinctions are upheld in the singular as well as in the plural.

(4) Standard Kashmiri (Koul 2003 : 915)

a. *n'uul* *kooṭh*
blue.M.SG coat(M)
'a blue coat'

b. *niil* *kooṭh*
blue.M.PL coat(M)
'blue coats'

c. *niiǰ* *kəmiiz*
blue.F shirt(F)
'a blue shirt'

d. *niiǰ-i* *kəmiiz-ɨ*
blue.F-PL shirt(F)-PL
'blue shirts'

Table 4: Agreement targets for gender (sex-based, animacy-based) in Hindu Kush Indo-Aryan

Language	Gender targets									
	Sex-based					Animacy-based				
	verb	*adj*	*dem*	*poss*	*pron*	*verb*	*adj*	*dem*	*poss*	*pron*
Standard Kashmiri	✓	✓	✓	✓	✓					
Shina (Gilgiti)	✓	✓	✓		✓					
Brokskat	✓	✓	✓		✓					
Kundal Shahi	✓	✓								
Kohistani Shina	✓	✓			✓					
Ushojo	✓	✓			✓?					
Palula	✓	✓	✓		✓					
Kalkoti	✓	✓								
Sawi	✓	✓								
Indus Kohistani	✓	✓		✓						
Gawri (Kalami)	✓	✓		✓						✓
Torwali	✓	✓						✓?		
Bateri	✓	✓								
Tirahi	✓	✓		✓						
Wotapuri-Katarqalai	✓	✓								
Gawarbati	✓	✓		✓						
Grangali		✓								
Shumashti	✓	✓				(✓)				
Dameli	✓	✓		✓		(✓)		✓		✓
Southwest Pashai	✓	✓				(✓)				
Southeast Pashai	✓	✓				(✓)				
Northeast Pashai	✓	✓				(✓)				
Northwest Pashai	✓	✓				(✓)?				
Kalasha						(✓)				
Khowar						(✓)				

In Kashmiri, gender agreement is part of the paradigm of all major verbal categories apart from the future tense. As in Indo-Aryan in general, gender differentiation became part of the verbal paradigm as participial forms were introduced and proliferated as carriers of core tense-aspect categories during the Middle Indo-Aryan stage (Pirejko 1979 : 481–482; Klaiman 1987 : 61–64). In a development associated with that, the transitive subject ended up non-nominatively coded while the verb (reinterpreted as part of a finite verb construction) agreed with the nominatively coded direct object (Masica 1991 : 341–346). This was the establishment of a split ergative system still in existence in various versions in many Indo-Aryan languages, including many HKIA languages (Liljegren 2014).

Gender is generally also very pervasive in the Shina group, although it varies between the individual languages. None of them manifest gender agreement in possessive modification. In Gilgiti Shina, Brokskat and Palula, adjectives, adnominal demonstratives and verbs are targets of gender agreement, whereas it is limited to adjectives and verbs in the rest of the languages classified as Shina. The pervasiveness of gender within the verbal paradigms vary to a great extent, and is partly related to considerable differences in verbal alignment patterns. Gilgiti Shina and Kohistani Shina, the two varieties that together constitute "Shina proper", are characterized by consistent accusative verbal alignment in combination with ergative case marking (see example 5). A number of Shina enclaves farther to the West, instead show an aspectual split between ergatively aligned clauses in the perfective (see example 6), in which the verb agrees in gender and number with the direct object, and accusatively aligned clauses in the non-perfective. In Shina proper, gender agreement is largely conflated with person-marking, whereas in the Western varieties, gender- and number-inflected verb forms (based on participles) have largely replaced person-inflected forms.

(5) Gilgiti Shina (Own data)
ro ***baál-se*** *khiṛkí* *phuṭ-eég-**u**.*
REM.M.SG boy(M)-ERG window(F) break-PFV-3M.SG
'The boy broke the window.' (SCL-ValQuestAH:025)

(6) Palula (Own data)
phoo-á ***darúṛi*** *phooṭéel-**i**.*
boy(M)-OBL window(F) break.PFV-F
'The boy broke the window.' (PHL-ValQuestNH:025)

In addition to the categories surveyed in this section, gender agreement in Palula is also extended or copied to e.g. adjuncts in predicatively used adverbial

phrases. In (7), the scalar modifier *bíiḍ-* 'much' agrees with the feminine noun head of the subject.

(7) Palula (Own data)
asíi ***iskuúl*** *bi asaám the bíiḍ-**i** dhúura hín-**i**.*
1PL.GEN school(F) also 1PL.ACC to much-F distant be.PRS-F
'Our school is also very far away for us.' (PHL-OUR:016)

In none of the Kohistani languages are adnominal demonstratives targets of gender marking. On the other hand, gender differentiation is part of possessive modification in at least two of the languages. Examples are provided from Indus Kohistani in (8).

(8) Indus Kohistani (Lubberger 2014 : 62, 82)

a. *zà̃ĩ* *bakàr*
1PL.POSS.F goat(F)
'our goat'

b. *zà̃ã* *baá*
1PL.POSS.M house(M)
'our house'

Manifestation of gender in the verbal paradigm is not necessarily much less pervasive than in the languages of the Shina group, but it tends to be more challenging in terms of description. It is to a greater extent non-segmental in Kohistani than in Shina. A case in point is the Kohistani language Gawri (a.k.a. Kalam Kohistani) which historically has lost most of its gender-specific endings (both on the nouns themselves and on their agreement targets) as well as its suffixing plural or case-marking. It has, however, up to a point, preserved the distinctions themselves in the form of vowel modifications and/or distinct tonal patterns, as can be seen in example (9).

(9) Gawri

a. Inflection of nouns (H=high tone, LH=low to high, HL=high to low, L=low) (Baart 1999 : 36)

SG.NOM		PL.NOM/SG.OBL/PL.OBL		
šaak	H	*šääk*	HL	'piece of wood' (M)
dätär	LH	*dätär*	L	'cooking frame' (M)
naar	H	*neer*	HL	'root' (F)
därin	LH	*därin*	L	'ground' (F)

b. Gender and number agreement on adjectives (Baart 1999 : 19; p.c. Muhammad Zaman Sagar)

raan poo	*rään lukuṭor*
good.M.SG boy	good.M.PL boy.PL
'good boy'	'good boys/children'
reen bire	*reen likiṭeer*
good.F girl	good.F girl.PL
'good girl'	'good girls'

c. Gender and number agreement on verbs (conflated with aspect marking) (Baart 1999 : 19; p.c. Muhammad Zaman Sagar)

poo bäč-an-t	*lukuṭor bäč-än-t*
boy go-IPFV.M.SG-PRS	boy.PL go-IPFV.M.PL-PRS
'The boy is going.'	'The boys are going.'
bire bäč-en-t	*likiṭeer bäč-en-t*
girl go-IPFV.F-PRS	girl.PL go-IPFV.F-PRS
'The girl is going.'	'The girls are going.'

While masculine agreement forms are clearly distinguished from feminine agreement forms, whether inflectionally or by vowel alternation, in all of the major tense-aspect categories in Gawri and Torwali, a high degree of levelling seems to have taken place in Indus Kohistani, and most likely in Bateri, too. In Indus Kohistani and Bateri, transitive verbs (or at least most of them) are invariant in the simple past (i.e., there is no agreement with any of the arguments), and in addition, the application of the ergative marking of the transitive subject is variable. In Bateri, a nominative vs. ergative contrast is possibly missing altogether with full nouns, as evidenced in example (10).

(10) Bateri (Own data)

a. *yak muuṣ as-**uu**.*
one man(M) be.PST-M.SG
'There was a man.' (BTV-PearStoryMB:001)

b. *muuṣ ḍaaṇ sand-id.*
man(M) stick make-PST
'The man made a stick.' (BTV-ValQuestMB:085)

In the Kunar group, the targets of sex-based gender differentiation are adjectives, verbs, and, in the case of Gawarbati and Dameli, possessive modifiers. The sentences in (11) illustrate some of those agreement patterns in Gawarbati: possessive and verbal (copular) agreement with a feminine noun in (a), possessive agreement with a masculine noun in (b), and adjectival and verbal agreement with a feminine noun in (c). Verbal agreement that takes gender into account is rather restricted in Gawarbati; it occurs only with intransitive verbs, and for third person singular. As seen in (b), the transitive subject in the past (perfective) is ergatively marked, while verbal agreement is accusatively aligned.

(11) Gawarbati (Own data)

a. *woi ṭekura-an-**i** **awaaz** then-**i**.*
PROX.SG boy(M)-POSS-F voice(F) be.PRS-3F.SG
'This is a boy's voice.' (GWT-NPhonNU:071-4)

b. *ṭekuri-e kitaab-an-**a** **faṭaa** daal-us.*
girl-ERG book(M)-POSS-M leaf(M) tear-PST.3SG
'The girl tore the page from the book (lit. the book's leaf).' (GWT-ValQuestAS:032)

c. *pol-**i** **ṭekuri** hans-**ui**.*
small-F girl laugh-PRS.3F.SG
'The little girl laughed.' (GWT-ValQuestAS:057)

As already mentioned in §4, an added distinction between animate and inanimate occurs in Dameli and Shumashti. While animacy influences lexical or constructional choices on various levels of Dameli, the only purely paradigmatic contrasts that depend on animacy values are those of the copula verb (Perder 2013 : 121–125), as illustrated above in example (3), and of demonstratives. However, it is highly uncertain whether the inanimate copula is at all used as an auxiliary in verbal predication in any of the tense-aspect categories in Dameli. More interestingly, Perder (2013 : 51–55) observes what seems to be an ongoing restructuring of the entire gender system, a point we will return to in the next section when discussing assignment criteria.

In Pashai, sex-based gender is again relatively pervasive, although limited in its manifestation to adjectives and verbal agreement. As in Dameli, there is an additional layer of animacy-based differentiation in the verbal paradigm. Lehr (2014 : 255) describes (for SE Pashai) how the masculine vs. feminine distinction is upheld throughout the past and perfective parts of the verbal paradigm, a contrast that is present in first, second as well as in third person. The additional

animate vs. inanimate distinction, on the other hand, is limited to the verbal system (Lehr 2014 : 256–257), occurring only in non-verbal predication and in the (participial-based) present perfect category. The three sentences in (12) are all examples of the present perfect: the main verb agrees in person with the subject, in sex-based gender with the object, and the auxiliary agrees in sex-based as well as non-sex-based gender and person with the object.

(12) SE Pashai (Lehr 2014 : 290, 297)

a. *pari-y kel-aa kaṭ-ee=šeer-a ne-l-aw-aa-e*
Pari(F)-OBL boy-M cot-OBL=head-LOC sit-TRZ-STV.PTC-M-POSS.3SG
aas.
be.AN.M.PRS.3
'Pari has seated the boy on the cot.'

b. *miy maada-y doa be ka-w-aa-e*
DEM.SG.OBL woman-OBL prayer(M) too do-STV.PTC-M-POSS.3SG
š-i.
be.INAN.PRS-3
'This woman has made a prayer.'

c. *mam pelek meez-ee=šeer-a ǰe-w-i-m*
I cup(F) table(F)-OBL=on-LOC place-STV.PTC-F-POSS.1SG
š-i.
be.INAN.PRS-3
'I have placed the cup on the table.'

Finally, both of the two Chitral group languages, Khowar and Kalasha, entirely lack any sex-based gender in their agreement patterns. Grammatical differentiation between animate and inanimate nouns is manifested, but only in the verbal paradigm. It occurs in those verbal categories that are constructed with a copula-based auxiliary, such as in the Kalasha example in (13): here, the animate as well as the inanimate forms occur, each along with the main verb 'hit'. Kalasha expresses animate vs. inanimate differentiation in five of its nine main tense-aspect categories (Bashir 1988 : 60–72), but because of its consistent accusative alignment with subject agreement (as compared to the pattern of direct object agreement in Pashai), the frequency of inanimate marking is in effect rather low. A similar situation holds for Khowar (Bashir 1988 : 123–133). Thus, the centrality of the animacy contrasts that these tense-aspect systems allow for could in fact be questioned.

(13) Kalasha (Heegård Petersen 2015 : 250)
gheri tya-y ***a-aw****=e,* *tasa* *ek bab-as*
again hit-PFV.PTC AUX.AN.ACT-3SG=when 3SG.REM.OBL a sister-OBL.SG
gułin-a tya-y ***š-iu****.*
lap-LOC hit-PFV.PTC AUX.INAN-PRS/FUT.3SG
'When he hit [the ball] again, it was hit into her sister's lap.'

It seems that whereas sex-based gender generally is deeply entrenched in the languages that have it, and is clearly evidenced in many of its inflectional paradigms, the non-sex based type of gender differentiation that we saw examples of in a few of the languages, is indexed in considerably fewer domains and is thus affecting, in each case, a rather limited realm of the language system. The question remains open as to whether those contrasts should be seen as instances of mere (lexical) co-occurrence restrictions, instead of truly grammatical contrasts. We may also regard the occurrence of animacy distinctions in these languages as examples of overdifferentiated targets (Corbett 1991 : 168–169), probably more so in the languages with parallel combination of distinctions (Dameli, Shumashti and the Pashai varieties) than in the languages with non-sex based distinctions only (Khowar and Kalasha).

6 Assignment criteria

Determining assignment criteria for gender in individual languages is a less straightforward matter, even for much more well-known languages with large corpora available. For this reason, the following is only meant as a very tentative assessment, and the results of the assessment is therefore not reduced to a simple table representation. Although the focus will be on the languages for which there is a more comprehensive description in place, it remains beyond the present investigation to lay down precise assignment rules for any of these.

For all the languages that have a sex-based two-term system, i.e. the large majority of HKIA, gender is with high consistency assigned according to natural sex as far as nouns denoting humans and other higher animates, particularly domestic animals, are concerned. Below this cut-off point between higher and lower animates (or possibly between animates and inanimates), semantics is a much less reliable indicator, although some outstanding semantic properties beside sex will be mentioned in connection with the discussion of individual languages. But it also seems clear that formal (i.e. non-semantic) criteria do play a non-trivial role in some of the languages in assigning inanimate and lower animate nouns to

the masculine and feminine classes, respectively. In a historical perspective, the present two-term systems is the result of the masculine and the neuter categories of the former three-gender system having merged (Masica 1991 : 221). This, however, is not mirrored in a totally unbalanced feminine to masculine ratio, as might be expected. Instead, there is a relatively even distribution; in Palula, there were 58 per cent masculine and 42 per cent feminine nouns in a database comprising about 1,300 nouns, and in a Gawri list of 2,000 nouns, the percentages were 60 and 40, respectively (Baart 1999 : 82), and inanimates and lower animates of both genders are numerous.

Although there are plenty of examples in Kashmiri of feminine nouns derived from masculine nouns by means of various semi-regular phonological processes (such as stem vowel diphthongization or fronting) these correlations between characteristic phonological features and one or the other gender are mainly restricted to higher animates: *guur* 'milkman' vs. *guuər* 'milkwoman'; *koṭ* 'boy' vs. *kəṭ* 'girl'; *kɔkur* 'rooster' vs. *kɔkir* 'hen'; *mool* 'father' vs. *məǰ* 'mother'. However, the nominal inflectional patterns of the language (see Table 5) also predict gender to a large extent. Most non-nominative case forms, for instance, have endings that are typical for masculine vis-à-vis feminine nouns (with a great deal of syncretic *i* occurring in the paradigms of feminine nouns, contrasting with differentiating forms in the paradigms of masculine nouns), often accompanied by stem alternations (with vowel fronting or palatalization in the feminine forms).

Table 5: Sample Kashmiri nominal paradigm (Koul 2003 : 909)

	'boy' M		'girl' F	
Case	SG	PL	SG	PL
NOM	*ləḍkɨ*	*ləḍkɨ*	*kuur*	*koori*
DAT	*ləḍkas*	*ləḍkan*	*koori*	*kooren*
ERG	*ləḍkan*	*ləḍkav*	*koori*	*koorev*
GEN	*ləḍki*	*ləḍkan*	*koori*	*kooren*

In the Shina group, many of the languages have sizeable subclasses of masculine and feminine nouns with gender-typical endings, mostly *o/u/a* with masculine nouns, and *i* with feminine nouns. But again, similar to what was noted regarding Kashmiri, there is a considerable overlap between nouns with such overt gender markers and biological sex. Brokskat, a Shina language which otherwise has few overt phonological characteristics related to one or the other gender, makes use of two Tibetan-derived suffixes, *-pa/-po* and *-ma/-mo* to indicate the

sex of some higher animates (see Table 6). To what extent these suffixes are used with inherited vocabulary is not clear.

Table 6: Masculine–feminine higher animate pairs in Brokskat (Ramaswami 1982 : 38–39; Sharma 1998 : 56–58, 80)

Masculine		Feminine	
rgəl-po	'king'	*rgəl-mo*	'queen'
bäg-pa	'bridegroom'	*bäg-ma*	'bride'
bya-po	'rooster'	*bya-mo*	'hen'
əbs	'horse'	*əspi, rgun-ma*	'mare'
byo	'boy, son'	*mole*	'girl, daughter'
dudo	'grandfather'	*dede*	'grandmother'
čhatalo	'he-goat'	*aav*	'she-goat'
laanto	'ox'	*gooli*	'cow'

However, for many consonant-ending nouns below the threshold for sex-based assignment, i.e. between higher and lower animates, assignment seems to a large extent arbitrary in Shina languages. Although there are clearly discernible declensional classes in e.g. Kohistani Shina, Palula and Sawi, these are not in all cases directly mapped to one or the other gender. In Gilgiti Shina, a language where declensional differences are less clearly identifiable, there are fewer formal clues to gender assignment, and in Brokskat, where there are few phonological clues and a relatively uniform inflectional pattern, the arbitrariness seems even more noticeable as far as nouns low on the animacy scale are concerned. It is in fact likely that gender assignment in these languages to a varying extent is an intricate interplay of overlapping semantic, morphological and phonological factors, not altogether different from what we find in e.g. German (Corbett 1991 : 49).

Let us take Palula as an example in terms of such a complex interplay of different assignment criteria. Starting with nominal morphology (see Table 7), Palula has three major declensional classes, characterized by plural formation with *-a*, *-i* and *-m*, respectively. The *m*-declension consists exclusively of feminine nouns (all of which end with gender-typical *i* in their singular form), whereas *a*-declension consist to 79 per cent of masculine nouns, and the *i*-declension to 70 per cent of feminine nouns. In addition, there are two minor declensions (together representing 10–15 per cent of all nouns), both exclusively masculine.

However, the amount of arbitrariness within the two "gender-divided" declen-

Table 7: Palula noun declensions

Decl	SG NOM	SG OBL	PL NOM	PL OBL	Relative size	M/F
a-decl	*púustu* 'skin (M)'	*púust-a*	*púust-a*	*púust-am*	large (~50%)	79/21
i-decl	*baát* 'word (F)'	*beet-í*	*beet-í*	*beet-íim*	large (~25%)	30/70
m-decl	*ṭíki* 'bread (F)'	*ṭíki*	*ṭíki-m*	*ṭíki-m*	large (~13%)	0/100
ee-decl	*alučá* 'plum (M)'	*alučá*	*aluč-eé*	*aluč-eém*	small (~8%)	100/0
aan-decl	*ḍaakú* 'robber (M)'	*ḍaaku-á*	*ḍaaku-aán*	*ḍaaku-aanóom*	small (~5%)	100/0

sions is further reduced by taking phonological clues into account (see Table 8). About a third of the nouns in the *a*-declension have for Palula gender-typical endings in their nominative singular forms (mainly masculine nouns in *u*, and feminine nouns in *ái*). A typical property of many *i*-declension consonant-ending nouns that are assigned feminine gender is that they have a second-mora accented *aá* which very often is subject to a process of umlaut (> *ee*) in its inflected forms (with affixes involving *i*). This is also characteristic of a good number of loan words. This is not to say that there are no exceptions to these correlations between certain vocalic properties and one of the two genders, but they are indeed few.

Another sizeable group of *a*- and *i*-declension nouns (although partly overlapping with those having gender-typical phonological properties) are assigned gender semantically. Primarily that is by biological sex for nouns referring to humans and higher non-human animates. Word pairs referring to male and female, respectively, which have a common lexical root are frequent (see Table 9), especially in the realm of kinship. For most higher animates, the masculine is the default, and for those that have a feminine counterpart, the latter is a marked form (often part of the *m*-declension and ending in *i*), i.e. the one used only when a specification of sex is called for. However, in a few cases, the reverse holds, e.g. with 'fox' and 'cat'. The semantic relationship between masculine 'goat kid' and its feminine counterpart 'goat (generic)' is again different.

Apart from this relatively straightforward correlation between sex and grammatical gender, there is another (but obviously related) correlation, namely be-

Table 8: Gender-typical phonological properties in Palula

Masculine			Feminine		
C**u**#	*ṭómbu* 'trunk', *ṣúuṛu* 'hole', *rúulu* 'tear', *púustu* 'skin', *príiṇṣu* 'flea', *báabu* 'father', *báatru* 'irrigation lock', *bháaru* 'load'	*a*-decl	C**i**#	*šúṛi* 'ladder', *ṭíki* 'bread', *šišáki* 'ogress', *phéepi* 'father's sister', *nóki* 'beak', *múṭi* 'arm', *lúuṭi* 'ball of yarn', *béeǰi* 'heifer'	*m*-decl
C**oó**#	*rhoó* 'song', *phoó* 'boy', *paṇoó* 'slipper', *muuṣoó* 'elbow', *baḍiloó* 'male descendant of Badil', *haṇoó* 'egg'	*ee*-decl, *a*-decl	C**íi**#	*rhootašíi* 'morning', *rhaíi* 'footprint', *phaaṭuríi* 'butterfly', *açhíi* 'eye', *balíi* 'roof end', *bíi* 'seed'	*a*-decl
C**á**#	*ṭeeká* 'contract', *lambá* 'flame', *alaaqá* 'area', *alučá* 'plum', *çaṇẓá* 'torch'	*ee*-decl, *i*-decl	C**ái**#	*ṭookrái* 'basket', *puṭái* 'piece of meat', *mulái* 'radish', *bhraaǰái* 'sister-in-law'	*a*-decl
C**aá**#	*saaraá* 'wilderness', *raaǰaá* 'ruler', *paalaá* 'leaf', *aaghaá* 'sky', *bhalaá* 'evil spirit', *čoolaá* 'speech, style'	*i*-decl, *ee*-decl	C**aá**C#	*aaṣaáṛ* 'apricot', *salaám* (pl. *saleemí*) 'greeting', *oombaár* (pl. *oombeerí*) 'canal inlet', *baát* (obl. *beetí*) 'word'	*i*-decl

tween relative size or power and gender, primarily applied to lower animates and inanimates (as exemplified in Table 10). In these cases, the derivation of feminine nouns could be described as a type of diminutive formation. The similarity in kind is more approximate and less predictable than with the previously exemplified higher animate pairs.

Leaving Palula and the Shina languages for now, some of the languages of

Table 9: Masculine–feminine higher animate pairs in Palula

Masculine		Feminine	
ǰáanu	person	*ǰéeni*	female person
saaróoṇu	woman's sister's husband	*saaréeṇi*	wife's sister
phoó	boy	*phaí*	girl
móomu	mother's father	*méemi*	mother's mother
káaku	older brother	*kéeki*	older sister
khaamaád	owner, husband	*khaaméedi*	female owner
práaču	guest	*préeči*	female guest
phóopu	father's sister's husband	*phéepi*	father's sister
kučúru	dog	*kučúri*	female dog
baçhúuṛu	young calf	*baçhúuṛi*	young female calf
karáaṛu	leopard	*karéeṛi*	female leopard
iṇç	bear	*íṇçi*	she-bear
luumóo	male fox	*luumái*	fox
púšu	tom-cat	*púši*	cat
kakóok	chicken	*kakuéeki*	hen
čhaál	goat kid	*čhéeli*	goat

the Kohistani group also have overt phonological markers, similar to the ones in the Shina group. In Indus Kohistani, *i*-endings are associated with a group of feminine nouns, and in Bateri some masculine nouns end in *-o/-u* and some feminine nouns in *-a/-ã*, although in both of these cases, that pattern is relatively restricted and perhaps primarily relevant for feminine nouns derived from masculine nouns denoting humans, particularly applied to male–female pairings in the kinship systems of these languages. Due to historical loss of final vowel segments, the corresponding correlations in Gawri and Torwali are often only preserved in stem vowel alternations and tonal contrasts, resulting from assimilation prior to apocope. In Gawri, there is a strong correlation between feminine gender and the vowel qualities [i] and [e], and a corresponding correlation between masculine gender and the qualities [a], [æ], [o], and [u].

In the Kunar languages, there are no obvious declensional differences (plurality is for instance normally left morphologically unmarked, and case marking has little allomorphy), and nouns that have gender-typical endings are relatively few

Table 10: Masculine–feminine lower animate and inanimate pairs in Palula

Masculine		Feminine	
phútu	fly	*phúti*	mosquito
khaláaṛu	large leather bag, made from skin of a he-goat	*khaléeṛi*	small leather bag, made from skin of a she-goat
ṣúuṛu	hole	*ṣúuṛi*	cap
angúṛu	thumb, big toe	*angúṛi*	finger, toe
aḉhibáaṛu	eyebrow	*aḉhibéeṛi*	eyelashes
angóor	fire	*angeerí*	charcoal

(*a*-ending masculine nouns in Dameli, Gawarbati and Shumashti; *i*-ending feminine nouns in Dameli and Gawarbati; *i*-ending or *ik*-ending feminine nouns in Shumashti) and, like in many of the other groups, nouns with these overt phonological "markers" often participate in masculine–feminine pairings where the latter term is derived from the former, not seldom applied to humans or domestic animals. Although needing a more systematic study, there is evidence suggesting that Dameli is drifting away from formal-semantic gender assignment toward purely semantic gender assignment, as strict masculine vs. feminine gender assignment is becoming restricted to nouns above the cut-off point between higher and lower animates. This is for instance manifested in the native speaker inconsistency that Perder noted while eliciting the gender of inanimate nouns (Perder 2013 : 54), along with an observed pattern of a default application of masculine gender agreement between verbs and inanimate subjects (Perder 2013 : 111). Together with the already mentioned observations regarding animacy-related distinctions, it seems like we are witnessing a development in Dameli from a partly formal assignment system with two sex-based grammatical genders to a system by which gender is assigned entirely along semantic lines. In most parts of the system with a contrast between a feminine class consisting of female higher animate nouns and a masculine class with all the remaining nouns, and in a restricted part of the system (with the copula verb as target) a three-way contrast between higher animate males, higher animate females and the rest. The grammatical animate-inanimate distinction in Dameli is, as far as has been observed, altogether missing in Gawarbati, leaving it with a two-way distinction and with assignment principles along the same lines as described for many of the Kohistani and Shina languages. Although the scanty material available does not give

us any firm evidence, the Shumashti copula forms that Morgenstierne (1945 : 255) presents us with (*in-e* 'is M', *in-i* 'is F', *šuu-e* '(it) is') suggests an actual four-way differentiation, although we can only assume that a hypothetical inanimate feminine form (**šuu-i* '(it) is F') simply is missing in the data.

The patterns observed for most parts of the already covered groupings can also be seen in Pashai. Here, too, there are certain endings associated with one or the other gender. In SE Pashai, for instance, *-i* or *-ek* is typical of feminine nouns and *-aa* of masculine. While the feminine *i*-ending is found with many inanimate nouns, there are many regular alternations involving gendered pairs where the masculine form with *-aa* contrasts with a feminine form with *-ek*. But again, there are numerous nouns that are either masculine or feminine that have none of these overt phonological markers. Nor is there much in terms of declensional differences. The only clear distinction in plural marking is instead related to humanness or animacy. The choice of copular and auxiliary forms is, like in Dameli, entirely governed by semantics. This gives us in effect a system of two sex-based genders, masculine and feminine, each with two sub-genders, animate and inanimate.

The assignment in the languages of the Chitral group, which are entirely void of any sex-based distinctions, goes only along semantic lines, where the auxiliary-use in the verbal paradigms reflects an animate vs. inanimate distinction. Certain local case markers only occur with inanimate nouns and not with animate nouns (Heegård Petersen 2006 : 53; Bashir 2003 : 844). This, however, cannot be considered a primary assignment criterion.

7 Pronominal gender

A separate issue, but also necessary to mention in the context, is the presence of pronominal gender distinctions in Hindu Kush Indo-Aryan. In pronominal gender (see Table 4) we find some interesting differences, partly going along sub-classification lines. Even in this case, it is more instructive to differentiate between sex-based distinctions and non-sex-based (i.e. animacy-based) distinctions. Interestingly, so far, no combination of the two (in the same domain) has been noted for any individual language. Note, that only personal pronouns (or demonstratives used as third person pronouns) have been taken as diagnostic in this case.

Only in two of the subgroups do we find evidence for differentiating personal pronouns for masculine and feminine referents (including non-human animates and inanimates), in Kashmiri and in at least four of the Shina languages. These

languages all have a two-term system, a masculine third person pronoun contrasting with a feminine, so that even reference to inanimates makes use of one of the two according to their grammatical gender. The differentiation is limited to singular reference and third person, whereas the same term is used for masculine plural and feminine plural alike. Gender is also neutralized in some of the case forms. For instance, Kohistani Shina (14), has separate feminine (a) and masculine (b) ergative pronouns for perfective transitive constructions, whereas there is only one third person singular form used in non-perfective transitive constructions (c) or in intransitive clauses (d).

(14) Kohistani Shina (Schmidt & Kohistani 2008 : 181, 217, 247, 224)

a. ***séso*** *asóṛ ṭíki d-eég-i.*
3F.SG.ERG.PFV 1PL.DAT bread give-PFV-3F.SG
'She gave us food.'

b. ***sési*** *ráaty-oo kom th-áa-o.*
3M.SG.ERG.PFV night-ABL work do-PFV-3M.SG
'He worked all night.'

c. ***ses*** *dõṓçhi ágo çiç-eé táam th-úu.*
3SG.ERG.IPFV tomorrow headshawl embroider-CV complete do-FUT.3F.SG
'She will finish embroidering the headshawl tomorrow.'

d. ***sa*** *ruleé b-eé boǰ-áa-n-i.*
3SG.NOM disguise be-CV go-IPFV-AUX.PRS-3F.SG
'She goes (there) disguised.'

Within the Shina group, there are four different patterns (Table 11). In Gilgiti Shina and in Brokskat, both nominative and ergative have distinct masculine and feminine forms. In Kohistani Shina (as illustrated above), this distinction is upheld in the (perfective) ergative but is neutralised in the nominative (and elsewhere). In Palula, the opposite holds, and it is in the nominative that gender is differentiated whereas it is neutralised in the ergative (and elsewhere). In Sawi, Kalkoti, Kundal Shahi, and possibly in Ushojo, no pronominal gender differentiation is made at all. Kashmiri, the only other HKIA language that makes pronominal gender distinctions, displays the same pattern as Gilgiti Shina does.

Pronominal differentiation related to animacy is found in a few individual languages belonging to different subgroups. Different pronouns for animate and

Table 11: Pronominal third person gender distinctions in Shina languages

	Nominative		Ergative	
	Masc.	Fem.	Masc.	Fem.
Gilgiti Shina	*ro*	*re*	*ros*	*res*
Kohistani Shina	*sa*		*sési*	*séso*
Palula	*so*	*se*	*tíi*	
Sawi	*see*		*ti*	

inanimate reference, respectively, are used in Gawri, as in example (15), in Dameli, and possibly also in Torwali.

(15) Gawri (Baart & Sagar 2004 : 35, 52)

a. ***ääs*** *sä äsẽẽ duu isaal yeeš.*
3SG.OBL.VIS.AN with 3SG.VIS.POSS.F two women come.PFV.F.PST
'Both his wives had also come with him.'

b. *abdul häq-ẽẽ* ***än*** *mäy ɣärääz nããt.*
Abdul Haq-POSS.F 3SG.OBL.VIS.INAN in interest is.not
'For Abdul Haq, there is no interest in it.'

Curiously such a distinction is not found in the two languages, Kalasha and Khowar, that otherwise make the most systematic use of animacy distinctions in their agreement patterns. For the latter, see example (16).

(16) Khowar (Own data)

a. *awá* ***ho*** *mar-ít-am.*
1SG.NOM 3SG.DIST.OBL kill-PST.ACT-1SG
'I killed him.' (KHW-PronDemAA:010)

b. *tu* ***ho*** *paš-ís-an-a.*
2SG.NOM 3SG.DIST.OBL see-2SG-PRS/FUT.SPC-Q
'Can you see that? [the speaker pointing to an object a few feet away]' (PronDemAA:018)

8 Gender complexity

Based on the findings in §4–§7, a cautious attempt is made at measuring the relative complexity of the gender systems in HKIA, guided by the complexity metric as laid out by Di Garbo (2016), based on the three following dimensions of complexity: the number of values, the number and nature of assignment rules, and the amount of formal marking, as previously proposed by Audring (2014). In order to arrive at a more significant internal differentiation between the HKIA languages than would otherwise be the case, the metrics were slightly adjusted (Table 12) as compared to Di Garbo's. Di Garbo's features related to manipulable assignment and cumulative exponence, were for instance not taken into account here, partly due to non-applicability to the languages of my sample, partly due to unavailability of comparative data. In the case of the values dimension, a language with four or more genders receives the maximum score (instead of those with 5 or more), and in the case of indexation domains, a language with five or more targets receives the maximum score (instead of those with 4 or more). It is therefore important to note that the scores are primarily intended to provide a relative (i.e. sample-internal) measure (min=0, max=1) rather than being comparable in a wider cross-linguistic sense.

Table 12: Gender complexity metric (as applied to HKIA)

Complexity dimension	Values	Score
Number of genders	Two genders	0
	Three	0.5
	Four or more	1
Number/nature of assignment rules	Semantic or formal	0
	Semantic + formal	1
Number of target domains	One target domain	0
	Two	0.25
	Three	0.5
	Four	0.75
	Five or more	1

This metric has been applied to each of the HKIA languages, resulting in the ranking displayed in Table 13. For some of the languages, the number of genders (see Table 3) varies between dialects or is not entirely clear from the descriptions available. In those cases, the highest number in a range was used in the

calculation. As for the number of target domains (see Table 4), no differentiation was made between sex-based and non-sex-based agreement. To counter a too literal interpretation of the individual complexity scores, the languages have been grouped into three complexity categories: those scoring between 2/3 and 1 were categorized as languages with HIGH gender complexity; those scoring between 1/3 and 2/3 as MEDIUM gender complexity languages; and those between 0 and 1/3 as LOW gender complexity languages.

Table 13: HKIA languages ranked for complexity

Rank	Language	Complexity score	Complexity category
1	SW Pashai	0.75	High
1	SE Pashai	0.75	
1	NE Pashai	0.75	
1	Shumashti	0.75	
2	Kashmiri	0.67	
3	Gawri	0.58	Medium
3	Indus Kohistani	0.58	
3	Brokskat	0.58	
3	Palula	0.58	
3	Shina (Gilgiti)	0.58	
4	Tirahi	0.50	
4	Torwali	0.50	
4	Dameli	0.50	
4	Gawarbati	0.50	
4	Ushojo	0.50	
4	Kohistani Shina	0.50	
5	NW Pashai	0.42	
5	Bateri	0.42	
5	Wotapuri-Katarqalai	0.42	
5	Kalkoti	0.42	
5	Kundal Shahi	0.42	
5	Sawi	0.42	
6	Grangali	0.33	Low
7	Khowar	0.00	
7	Kalasha	0.00	

In the high complexity category we find three of the four Pashai languages and Shumashti, i.e. the only languages in our sample where we may (although far from conclusively) speak of four genders, or rather systems in which animacy and sex-based differentiation overlap, and Kashmiri, the latter a two-gender system characterized by a high number of target domains. At the other extreme, that is the low complexity category, we find Khowar and Kalasha, the only two languages in our sample with a purely semantic two-way (animate-inanimate) differentiation, as well as Grangali, a masculine-feminine-gender language characterized by having only a single agreement domain. The remaining 17 languages are all of medium complexity according to this metric.

However, it is important to point out that there are other (less measurable) factors, not included in the present metric, that contribute to the overall complexity of individual gender systems, such as the interplay between different assignment criteria (briefly mentioned in §6), declensional differences that do not map directly onto gender distinctions, and the conflation of gender and other grammatical categories (e.g. number and case).

9 Distribution and areal-linguistic implications

The findings presented above enable us to present at least some general tendencies in the geographical distribution of gender properties (See Figure 2).

First, a sex-based gender system with the two values masculine and feminine, is the default for Hindu Kush Indo-Aryan. Such a system is found throughout the region, from east to west. However, two exceptions were noted, Khowar and Kalasha, where sex-based differentiation is lacking altogether, both situated at the northwestern periphery of the Hindu Kush region, representing the ultimate frontier of Indo-Aryan in general. Furthermore, it is in an adjacent area to those two languages that we find Dameli, a language where sex-based gender is described as being on the retreat. In at least some dialects of NW Pashai, another language spoken in the western-most part of Hindu Kush, sex-based gender may be altogether absent. Non-sex-based gender, or more specifically gender distinctions that have a contrast between animate and inanimate at their core, are also represented in the region, but only clearly so in the western part of the region. Two of the languages with such a basis are, again, Khowar and Kalasha, and in a few other languages – most prominently in varieties of Pashai – spoken in the vicinity of the former two, an animacy-based system overlaps with a sex-based system, although the targets for such gender distinctions are often kept distinct.

Second, gender is generally deeply entrenched in those languages that have

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Figure 2: Gender bases in HKIA languages

a sex-based system. Especially in Kashmiri and Shina, i.e. the languages mainly spoken in the eastern part of the region, gender agreement is displayed with a wide range of targets. In a number of those languages, it is intertwined with person agreement in their verbal morphology, and we also noted some examples of gender agreement being extended to further targets. Kashmiri and some of the Shina languages have gender agreement with demonstratives, and it is only in these languages that we also find sex-based pronominal gender. Gender in some of the Kohistani languages, spoken in the central part of the region, is almost equally pervasive. However, the lack (or loss) of direct object agreement in a few of those languages and the subsequently lower frequency of gender agreement with noun phrases low in the animacy hierarchy, may in the long run weaken the masculine–feminine differentiation in parts of the vocabulary where sex plays no role in assignment. Accusative verbal alignment along with relatively few agreement targets, is probably in some ways related to the erosion of sex-based gender in the Kunar languages in the western part of the region.

In Kashmiri, Kohistani and Kunar, possessive modifiers are frequently targets of gender agreement. Pashai, at the western extreme, shows a diverse picture when it comes to gender pervasiveness. As mentioned before, gender may be altogether lost in some varieties (at its western periphery), whereas in e.g. SE Pashai, where direct object agreement in parts of the paradigm co-occurs with subject agreement in transitive clauses, such distinctions are frequently

displayed also for inanimates. The grammatical pervasiveness of animacy-based gender is nowhere near the pervasiveness of sex-based gender, and its targets are almost invariably restricted to copula verbs and auxiliaries. The (split-)ergative pattern with object agreement in SE Pashai is possibly a factor that may point to a higher frequency of actual and potential contrasts in animacy being expressed than in the solidly accusative languages Khowar and Kalasha.

Third, when it comes to assignment criteria, the usual pattern for the sex-based systems is one of straightforward semantic assignment for humans and higher animates and a combination of various factors (semantic, morphological and phonological) involved in the assignment of gender for lower animates and inanimates. In the animacy-based systems or sub-systems, geographically almost exclusively found at the western end of the region, semantics is the sole criterion. It also seems likely that a shift from largely non-semantic gender, such as the one in most of the Indo-Aryan languages, to largely semantic gender, is taking place in Dameli (and possibly also in Shumashti).

As already noted, speakers of Hindu Kush Indo-Aryan languages are and have been in contact with speakers of a number of other languages spoken in the region. Let us therefore take a look at these other languages and genera, in order to relate the above findings to areality beyond Indo-Aryan.

Other Indo-Aryan languages. In all four of the region's non-Hindu Kush Indo-Aryan languages (Hindko, Pahari-Pothwari, Gojri and Domaaki) we find a sex-based two-term system typical of Indo-Aryan (Rehman & Robinson 2011 ; Weinreich 2011 ; Kogan 2011 ; Losey 2002 : 105–201). Apart from the obvious semantic assignment of humans and other higher animates according to biological sex, lower animates and inanimates are found in the masculine and feminine classes alike. Like in many of the HKIA languages, at a minimum, a sub-set of nouns have overt phonological markers, and at least in Gojri and Domaaki, there is a certain co-variation between gender and declensional class membership. All four languages display gender agreement with adjectives and verbs, and in addition adnominal demonstratives agree in gender in Gojri and Domaaki, and possessives in Gojri. Only Gojri shows evidence of pronominal differentiation. There are no targets of any non-sex-based agreement in any of these languages, and no observed pronominal differentiation related to animacy.

These languages are (apart from the small Domaaki enclave in the far North) mainly spoken in the southeastern part of the region, and conform in all major aspects to the pervasive sex-based gender patterns found in the HKIA languages in the same part of the region, i.e. Kashmiri and various Shina and Kohistani varieties. It is fair to assume a high level of prolonged language contact between

at least Kashmiri and one or more of the languages of the Punjabi continuum, whether known as Pahari, Pothwari or Hindko, and possibly also between some of the eastern Kohistani languages and Hindko. However, in most of the areas where there is some overlap between speakers of HKIA and speakers of other Indo-Aryan languages, there is no clear dominance relationship, perhaps with Hindko-dominated parts of Pakistan-held Kashmir as an exception (Rehman 2011 : 219). Both Gojri and Domaaki are examples of low-status languages vis-à-vis almost any other language communities that they have been in contact with (Losey 2002 : 2–4; Weinreich 1999), and in spite of some intra-regional variations related to the relative socioeconomic status of the Gujar community (Hallberg & O'Leary 1992 : 98–99, 143–144), there is no evidence of any significant influence exerted by Gojri on any of the HKIA languages.

Iranian languages. Iranian languages are predominantly found in the western half of the outlined region. They belong to different groupings, and their presence, and relative influence, in the area are of very different time depths. Of the nine Iranian languages represented, only three – Pashto, Shughni and Munji/Yidgha – display a sex-based gender system of some kind (Bashir 2009 ; Èdel'man & Dodykhudoeva 2009a ,b; Kieffer 2003 ; 2009; Morgenstierne 1938 : 110–167; Robson & Tegey 2009 ; Skjaervø 1989 ; Windfuhr & Perry 2009). In Munji/Yidgha, gender as a whole is probably in radical decline. In Shughni, the gender categories show evidence of having restructured as to form a system of semantic classes rather than primarily being assigned on the basis of sex. Only in Pashto, which is also the language in the closest long-time contact with Indo-Aryan, do we find a two-term system akin to the typical Indo-Aryan one, with adjectives, verbs and adnominal demonstratives as agreement targets, and a certain co-variation between gender and declensional membership. Pashto and Shughni are the only Iranian languages in the sample that express pronominal gender. The rest of the region's Iranian languages have long lost the sex-based gender systems (masculine–feminine–neuter and masculine–feminine) that characterised their proto-languages (Skjaervø 2009b : 71; Skjaervø 2009a : 204; Yoshida 2009 : 288; Durkin-Meisterernest 2009 : 242–243). Although animacy distinctions are not part of agreement morphology, animacy does play a role in various forms of Persian, as certain plural allomorphs are found almost exclusively with animate nouns (Windfuhr & Perry 2009 : 431), and animacy or humanness, along with register, also governs pronominal choices (Windfuhr & Perry 2009 : 435).

It is notable, that it is exactly in the transitional area between Iranian and Indo-Aryan, i.e. in the western-most part of the region, that we find both a number of Iranian languages without gender and those HKIA languages and dialects

that have either lost sex-based gender altogether or are in the process of shifting away from a primarily sex-based system to a system where animacy distinctions are becoming grammaticalized alongside an existing sex-based system. The gender-reduced systems are found primarily in the northwest, and the systems with overlapping sex-based gender and animacy in the southwest. There is possibly a correlation between gender-preserving Pashto being the most influential language of wider communication in the southwest and the retention of a masculine–feminine contrast in e.g. most Pashai and Kunar varieties. This is in contrast with the Chitral languages, which show evidence, in many parts of their language systems, of long-standing and far-reaching contact with gender-reduced Iranian languages in particular, and with a larger Central Asian contact zone in a more general sense (Bashir 1996 : 176–177). Of particular interest is the now historical but crucial contact between speakers of HKIA Khowar and Iranian Wakhi. While Wakhi of today is the less influential of the two in areas where they overlap, the relationship was most likely of a symmetrical kind in a remote past, as evidenced in cross-borrowing of basic vocabulary (Morgenstierne 1936 ; Morgenstierne 1938 : 441–442; Bashir 2007 : 208–210). Different varieties of gender-less Persian, whether literary Persian, Dari or Tajik, have also had a significant (and recent) impact on the languages of Chitral and adjacent areas across the Afghanistan border in the northwestern corner of the Hindu Kush region, as a learned language and a lingua franca.

Nuristani languages. In three of the five Nuristani languages we find a two-term system of the Indo-Aryan type: in Waigali (Degener 1998 : 39–91), Ashkun (Morgenstierne 1929 ; Morgenstierne 1934a ; Morgenstierne 1952 ; Buddruss 2006 ; Grjunberg 1999) and Kati/Kamviri (Strand 2015 ; Èdel'man 1983 : 59–71), whereas its presence in Prasun is doubtful (Morgenstierne 1949 ; Buddruss & Degener 2017 : 69). The available data for the remaining language, Tregami, is insufficient to draw any conclusions from (Morgenstierne 1952). Only Kati/Kamviri displays pronominal gender differentiation.

Although there is evidence for Nuristan and the Nuristani languages as an ancient centre of small-scale diffusion (Liljegren & Svärd 2017), Nuristani stands in most aspects, especially in more recent times, at the receiving end of contact-induced change, especially from Iranian Pashto and Persian (Degener 2002 : 103). As far as gender is concerned, the possible erosion of it in Prasun may be attributable to the same areal influences from adjacent and influential gender-deprived Iranian languages, as was already suggested above in regard to the HKIA Chitral languages.

Turkic languages. There is a general absence of gender distinctions in Turkic

languages, whether as overt markers of nouns or as an agreement feature (Kornfilt 2009 : 530). Neither are there any pronominal distinctions in those languages. That is equally true of the two Turkic languages, Uzbek (Boeschoten 1998) and Kirghiz (Kirchner 1998), spoken by populations at the northern periphery of the Hindu Kush region.

There is no present-day overlap, or at best marginally so, between any of the HKIA communities and any of the relatively nearby Turkic-speaking groups. However, it has been suggested that at least the northern-most fringes of the Hindu Kush together with the Pamirs and perhaps a larger region to the North form a contact area (Èdel'man 1980 ; Payne 1989 : 423), or alternatively a transit zone between South and Central Asia (Tikkanen 2008 : 253), and it is not wholly farfetched to consider Turkic as a component of it. Bashir (1988 : 402–421) points out several grammatical features (e.g. inferentiality), primarily in Kalasha and Khowar, with Turkic as their ultimate source, either mediated by certain Iranian Pamir languages or the result of a Turkic substrate. Besides, as Johanson (2013 : 104) remarks, the role of Turkic in the massive gender loss in Iranian at large is yet to be fully explored.

Tibeto-Burman languages. Similar to what was said about Turkic, gender in its canonical sense is not a feature generally present in Tibeto-Burman. That is also largely true of Purik, a Tibeto-Burman language spoken at the south-eastern periphery of the region, although there are traces of derivational morphemes indicating male or female sex (Zemp 2013 : 118–127). In closely related Balti (Bielmeier 1985 : 81; Read 1934 : 4), the other Tibeto-Burman language represented in the region, we find to a larger extent such markers, postposed to some nouns denoting humans or other animates, signalling the sex of the person or animal referred to: *po* or *pho* for male, and *mo* or *ngo* for female (see Section for formally and functionally similar markers in Brokskat). This type of sex marking or gender marking on the nouns themselves, without any reflexes in agreement patterns, should not be confused with grammatical gender as we have defined it here. In the same vein, an entirely semantically transparent pronominal differentiation can be made in Balti between human male, *kho*, human female, *mo*, and everything else (or when the sex is unknown), *do* (Read 1934 : 12–13; Bielmeier 1985 : 76).

It is primarily the Shina languages in the East that show traces of interaction with Tibeto-Burman (unless we along with Tikkanen (1988 : 305) open up for the idea that some of the peculiarities of Kashmiri vis-à-vis other Indo-Aryan languages might be attributed to an ancient Proto-Tibetan or Sinitic substrate). Presently, only some groups of speakers of Gilgiti Shina type varieties in Baltistan

and the Brokskat community can be said to stand in any such direct and significant contact relationships, and it is only in the latter case that Tibetan plays the role of an influential donor language. It seems likely that the relationship has been more symmetrical in the past, alternatively that we would have to assume a major Tibetan substrate in the eastern Shina-speaking area. That would for instance explain agent-marking (as well as some of its formal reflexes) in Gilgiti as well as in Kohistani Shina (Liljegren 2014 : 162–163; Bailey 1924 : 211; Hook & Koul 2004 : 213–214). In the realm of gender, however, Tibeto-Burman contacts do not seem to have led to any loss or restructuring in adjacent HKIA language, although we lack substantial information on gender assignment in Tibetan loan vocabulary in Brokskat. The continued (and perhaps strengthened) use of overt sex-marking for higher animates in Balti, and not in Purik, seems to point to Shina influences on Balti, and not the other way around.

Burushaski. In the northern part of the region, in close proximity to Indo-Aryan Shina, Indo-Aryan Khowar and Iranian Wakhi, the language isolate Burushaski is spoken. Burushaski has four genders, which makes it the language with the largest number of genders in the entire region. Although the number of differentiating values differs greatly from one part of the grammar to another, or from one target to another (including demonstratives, numerals, verbs, possessives and to some extent adjectives), there is a maximum four-way differentiation between human masculine (HM), human feminine (HF), and two non-human categories that traditionally have been given the labels X and Y (Willson 1996 : 8–9; Berger 1998 : 33–34). Somewhat simplified HM is human male, HF is human female, X is non-human animate, and Y inanimate. However, in reality the relationship between the genders X and Y is not quite as straightforwardly related to animacy; X includes not only animals but also fruit and other count nouns, whereas Y is the gender of abstract notions and mass nouns, but also includes e.g. trees and buildings (Yoshioka 2012 : 32–33). Burushaski displays verbal agreement in gender and number with the subject as well as with the direct object of transitive clauses, as can be seen in example (17), the first by means of a suffix and the latter by means of a prefix.

(17) Burushaski (Willson 1996 : 17)
hilés-e dasín-mo r toofá-muts píiš ***ó-t-imi***.
boy-ERG girl-OBL.F to gift(X)-PL.ABS present 3PL.X-do-3SG.HM.PST
'The boy presented gifts to the girl.'

Gender is also pronominal, but in that case HM and HF are normally neutralised, whereas X and Y both have distinct forms of pronominally used demonstratives

(Berger 1998 : 81–82).

As Burushaski represents one of the oldest, possibly the very oldest surviving, linguistic layer in the Hindu Kush region,[2] it is particularly interesting from an areal point of view. While occupying a very modest territory today, the precursor of Burushaski, or other, perhaps (but not necessarily) with Burushaski closely related languages, in all likelihood had a wider geographical scope before the advent of Indo-Iranian languages. It has been suggested that such substratal influence underlies some features found across Iranian, Indo-Aryan and Burushaski (Tikkanen 1988 ; 1999; Bashir 1988 : 408–420; Èdel'man 1980). Bashir in particular attributes the gender development in the Chitral languages to Burushaski rather than to Iranian, emphasizing the emergence of animacy-based contrasts. Along the same lines, Payne (1989 : 423), mainly referring to Èdel'man's proposed convergence area, attributes the shift from formal-semantic to "purely" semantic assignment in Iranian Pamir languages to a substratum related to or similar to Burushaski, with special reference to a strikingly similar four-way differentiation in Iranian Yazghulami (female human, male human, animal and inanimate), a language situated in today's Tajikistan, only marginally outside the Hindu Kush region as defined here.

10 Conclusions

We are now in a position to summarise and draw some overall conclusions regarding the presence and distribution (geographically and subclassification-wise) of various gender properties in Hindu Kush Indo-Aryan (see Figure 3).

There are two types of gender systems in the HKIA languages. A fairly typical New Indo-Aryan sex-based two-gender system is present in the majority of the HKIA languages, and in five of the six subgroups. However, it is curiously missing altogether in the two Chitral group languages, Khowar and Kalasha, both spoken in the northwestern corner of the region. Here, instead, a two-way animacy-based gender differentiation is in place. Furthermore, these two types of gender systems are combined in another few HKIA languages, all of them found in the same part of the larger region, more or less adjacent to the Chitral languages. In one of the latter languages, Dameli, the inherited sex-based gender system is most likely subject to an ongoing process of erosion, and grammaticalized

[2] As pointed out to be by Johanna Nichols (p.c.), this makes perfect sense in terms of linguistic geography: a language isolated along different rivers at the highest inhabitable level is almost certainly the earlier one in and has been cut off in its former lower reaches by uphill spreads of other languages.

animacy-distinctions have emerged, although largely in complementary distribution with remaining sex-differentiation. In many of the varieties of Pashai, the western-most extension of HKIA, an animate–inanimate differentiation serves as a sub-gender distinction within the main masculine–feminine division.

As for the entrenchment of gender, we observed important differences between the sub-groups, forming a slight decline in pervasiveness moving from East to West. However, there is also a correlation between the presence of object agreement and the reinforcement of formal gender assignment (particularly applicable to inanimate nouns), with object-agreeing languages clustering in the South, while such HKIA languages are lacking altogether in the North. As for the pervasiveness of animacy-based gender, it was similarly suggested that its functional load is higher in systems with ergative verbal alignment (such as in Pashai) than in those with a purely accusative system (such as in the Chitral group), the latter a subject for more refined, preferably corpus-based, studies. Sex-based pronominal gender is a typical Eastern feature, exclusive to Kashmiri and the Shina group, whereas the evidence for animacy-based pronominal gender is scanty and does not allow for any further generalizations.

The weight that different assignment criteria have varies from language to language, and is a topic for which more detailed language-specific studies are needed. At a general level, there is a correlation between primarily sex-based gender and semantic-formal assignment criteria, on the one hand, and a correlation between animacy-based gender and more straightforward semantic assignment criteria, on the other hand. While gender in Indo-Aryan in general often involves declensional differences (Masica 1991 : 219), this is not a general tendency in the HKIA languages.

As far as overall complexity is concerned, a few of the HKIA languages stand out, either as being of higher than average complexity or of lower than average complexity. Languages of the first kind are primarily found in the southwesternmost part of the region; these are a handful of languages in which sex-based and animacy-based gender overlap while their targets remain largely distinct. In a single language, Kashmiri, spoken in the south-easternmost part of the region, high complexity is instead related to a high number of target domains. The languages of the second kind are those two (Kalasha and Khowar) in which gender is exclusively animacy-based, and another language (Grangali) in which agreement has been reduced to a single target domain.

The geographical distribution of gender properties within HKIA is clearly parallel to cross-genera distribution within the region. Adjacent to the main (non-HK) Indo-Aryan continua to the Southeast as well as to Pashto in the South, one

figures/10/map3_2.pdf

Figure 3: Gender complexity in HKIA languages

of the more important gender-preserving Iranian languages, is where we find the most pervasive sex-based gender systems in HKIA. At the other end, i.e. the Northwest, the gender-less or gender-reduced HKIA languages are bordering with the larger Iranian-dominated region of West and Central Asia, where sex-based gender is a rare or eroding feature, in its turn adjacent to the Turkic belt of inner Asia where gender is altogether lacking. This patterning is clearly in line with Nichols' (Nichols 2003 : 303) characterization of gender as a stable feature, but only as long as related languages with inherited gender are geographically clustered. We can thus expect to find that languages that have lost this feature are indeed neighbours of one another or are surrounded by non-related languages. This makes sense if we consider Morgenstierne's (Morgenstierne 1932 : 51) hypothesis that the common ancestor of the two "sex-less" languages Khowar and Kalasha represents the earliest northward migration of Indo-Aryans into this region. For a prolonged period this language must have been a relatively minor component in an area where non-Indo-Aryan (perhaps Burushaski-related, or now entirely lost) languages dominated (Tikkanen 1988 ; Parpola 2002 : 92–94), at the time isolated from the rest of the Indo-Aryan varieties from which today's HKIA languages derive. It is also fair to assume that groups of speakers of some of those other languages shifted to a Khowar-Kalasha-type language once it became a more influential element in its new environment.

Perhaps, but not necessarily, related to this is the presence of animacy-based,

or other semantically highly transparent, gender, in the North and Northwest, the Burushaski one being an obvious example. While animacy-based lexical differentiation with areal manifestation very well could be the result of borrowing, it is harder to imagine such a scenario for the copula or auxiliary agreement patterns in Shumashti and in the Chitral and Pashai languages (the forms themselves also reflecting a common source); instead we have to posit either very old substratal effects, or an internal development reinforced by similar differentiations already in place in neighbouring, and at the time influential, languages. The Dameli inanimate copula form is interesting as it bears no resemblance to the forms in the other HKIA languages (cf. examples (2), (3), (12) and (13)); instead it seems to have been recruited from inherited vocabulary (Morgenstierne 1942 : 138). This topic, however, deserves a great deal of more detailed research, also taking data from the Pamir region (to the North of the Hindu Kush) into account.

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Abbreviations

ABL	ablative	H	human	PTC	participle
ABS	absolutive	INAN	inanimate	Q	question marker
ACC	accusative	IPFV	imperfective	REM	remote
ACT	active	LOC	locative	SG	singular
AN	animate	M	masculine	SPC	specific
AUX	auxiliary	NOM	nominative	STV	stative
CV	converb	OBL	oblique	TRZ	transitivizing suffix
DAT	dative	PFV	perfective	VIS	visible
DIST	distal	PL	plural	X	class X (gender in Burushaski)
ERG	ergative	POSS	possessive		
F	feminine	PRS	present	1	first person
FUT	future	PROX	proximal	2	second person
GEN	genitive	PST	past	3	third person

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Part VI

Diachrony and typology

Chapter 11

The evolving complexity of gender agreement systems

Francesca Di Garbo
Stockholm University

Matti Miestamo
University of Helsinki

This paper proposes to integrate the diachronic dimension to the typological study of gender complexity, and focuses on the morphosyntactic encoding of gender distinctions via agreement patterns. After investigating the processes of language change that foster the reduction, loss, expansion and emergence of gender agreement in a sample of fifteen sets of closely related languages (N= 36 languages), we discuss how gender agreement systems in decline and on the rise pattern in terms of complexity. We show that declining and emerging gender agreement systems may exhibit increase or decrease in complexity and discuss how this relates to the fact that they represent transitional stages between absence of gender and full-fledged gender systems. In our analysis, we make use of typological implicational hierarchies in the domain of agreement as a tool to account for diachronic variation and for the patterns of simplification/complexification in the agreement systems of the sampled languages.

Keywords: agreement hierarchy, agreement redistribution, gender emergence, gender expansion, gender loss, gender reduction, morphophonological erosion, complexification, simplification

1 Introduction and key notions

Within the last decade, pioneering research on the complexity of grammatical gender has contributed to identify a number of dimensions along which gender

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systems may vary in complexity (see Audring 2014 ; 2017 ; Di Garbo 2016 for gender-specific complexity measures[1]), and to apply these dimensions of complexity variation to research on the typology of gender systems within specific language families and areas of the world (Di Garbo 2016). The approach followed in these studies has been predominantly synchronic. In this paper, we argue that integrating the diachronic dimension to the typological study of gender complexity is essential to understand how gender systems vary in complexity (i.e., along which dimensions of the proposed metrics) and how this variation is distributed crosslinguistically.

We investigate the evolution of complexity in the domain of grammatical gender by using a diachronic approach to the study of linguistic diversity in line with Greenberg (1978a). Greenberg addressed possible pathways of change between different types of structures and languages and argued that there would likely be a diachronic connection between all language types in a typology in the sense that change from any given type to any other type would be possible. This diachronic route would not always be direct, but rather mediated by other types, and the relative stability of the different types would differ, with some types qualifying as *stable, persistent*, and others as *unstable, transitional*. In this paper, we describe the patterns of language change whereby complexification and simplification in gender systems take place, explore possible functional explanations to the unfolding of these changes, and show how these explanations are ultimately grounded in well-known implicational tendencies in the typology of gender systems. In addition, by operationalizing gender complexity as a dynamic, evolving variable, we explore the relationship between the complexity and stability of gender systems.[2] The questions we attempt to answer are:

- Which complexities are most stable in the domain of grammatical gender?
- Which other aspects of gender complexity are more likely to change?
- To what extent can we identify complexification or simplification in the processes of emergence and expansion of gender on the one hand, and reduction and loss of gender on the other?

[1] In addition, see Passer 2016 for a discussion of gender complexity in comparison with other nominal classification strategies; and Leufkens 2015 for a discussion of grammatical gender in the context of a general model of complexity and transparency in grammar.

[2] On the stability of gender systems see the pioneering large-scale typological investigation by Nichols 1992 as well as the more recent overview by Nichols 2003 . For a study of the diachrony and stability of grammatical gender in the Indo-European family, see Matasović (2004).

Following Miestamo (Miestamo 2006b ; Miestamo 2008) we define complexity in absolute, theory-oriented, objective terms, paying attention to the number of elements in a system and connections between these. In an information-theoretic perspective, complexity can ultimately be reduced to description length: of two entities, for instance two grammatical systems, the less complex one is the one whose shortest possible description is shorter. In other words, the simpler entity can be compressed into a smaller space without losing information. This approach also aligns with complexity theories outside linguistics and thereby allows linguistic complexity to be viewed in a cross-disciplinary perspective as well. The notions of cost and difficulty of processing and learning are related to complexity, and some authors, such as Kusters (2003), take a relative, user-oriented, subjective approach, equating complexity with cost and difficulty. In a user-oriented approach, those aspects of language that increase processing load and learning difficulty are defined as complex. Dahl (2004) and Miestamo (Miestamo 2006b ; Miestamo 2008) discuss some obvious problems with the cost- and difficulty-based approach and point out that it is important to keep the notions of complexity and difficulty apart. However, to what extent and in what ways complexity and difficulty are correlated is a highly interesting question. We believe that keeping these notions apart is a prerequisite for adequately addressing this issue.

Miestamo (Miestamo 2006a ; Miestamo 2008) proposes two principles by which grammatical complexity can be measured:

- The Principle of Fewer Distinctions, which, paying attention to grammatical meaning, defines as less complex a grammatical system in which, other things being equal, fewer semantic/pragmatic distinctions are made grammatically.

- The Principle of One-Meaning–One-Form, which, paying attention to the relationship between meaning and form, defines as less complex those systems and structures in which, other things being equal, each meaning is expressed by one form and each form corresponds to only one meaning.

Violations of these two principles increase complexity.

To take some examples, by the Principle of Fewer Distinctions, a gender system with two grammaticalized gender distinctions is less complex in this respect than a gender system with, say, five grammaticalized distinctions. By the Principle of One-Meaning–One-Form, we can identify a higher degree of complexity in a gender system system in which: (a) the formal expression of one or more genders is

combined with other categories in one morpheme (fusion, multiple exponence); (b) one or more gender distinctions are expressed with multiple/discontinuous morphemes (fission); (c) the markers of one or more gender distinctions show two or more variants (allomorphy); and/or (d) the markers of some gender distinctions are identical in some grammatical contexts (syncretism).

While the Principle of One-Meaning–One-Form can handle the relation between meaning and form relatively exhaustively (relevant subcriteria need of course to be defined and refined), the Principle of Fewer Distinctions only covers parts of complexity on the level of meaning. Things get more complicated when we look at the interaction between different functional domains (e.g., gender and number). Dahl (2004) discusses the notion of choice structure, i.e. the dependency of available choices on choices made earlier (cf. also the notion of dependency hierarchies by Aikhenvald & Dixon 1998). To take an example from the domain of grammatical gender, in many languages gender distinctions are available only in the singular domain, but are neutralized in the plural. This is, for instance, the case in Russian (Indo-European, Slavic). In order to account for interactions between functional domains and their effect on the complexity of individual domains, Di Garbo (2014 ; 2016) proposes the Principle of Independence. This principle defines as less complex those systems and structures which, other things being equal, are *independent* of other systems and structures. Under the Principle of Independence, a gender system whose formal realization is dependent on number distinctions is more complex than a gender system which is not constrained by number distinctions.

The three principles, the Principle of One-Meaning–One-Form, the Principle of Fewer Distinctions, and the Principle of Independence, are all operationalized in the gender complexity metric proposed by Di Garbo (2014 ; 2016), as well as in the discussion of gender complexity and canonicality by Audring (2019 [this volume]).[3] In this paper, we will be especially concerned with the way in which morphosyntactic and semantic properties of reducing and emerging gender systems may be accounted for as violations of one of these principles.

The paper is organized as follows. §2 presents some of the parameters along which gender systems may vary, and the sampling method followed in the study. In §3, attention is given to the factors that explain synchronic variation in the domain of gender agreement and to the extent to which these can be mapped on diachronic change, too. Reducing gender agreement systems are presented in §4

[3] Audring (2019 [this volume]) uses a different terminology for the Principle of One-Meaning–One-Form and the Principle of Fewer Distinctions. In her own terminology, these are the Principle of Transparency and the Principle of Economy, respectively.

whereas §5 focuses on emerging gender agreement systems, and §6 on expanding gender agreement systems. In §7, we discuss how changes in the domain of gender agreement affect the complexity of gender systems. Concluding remarks are given in §8.

2 The evolution of gender complexity

In this paper, we explore synchronic distributions of types of gender systems among closely related languages, and, based on these synchronic distributions, we try to infer how gender systems change through time becoming more or less complex. We draw our observations from a sample of fifteen language sets. Each set consists of two to three genealogically related languages. In addition, the sample includes one isolate within the Austronesian family, Chamorro, and one mixed language, Michif. The total number of languages is 36. The map in Figure 1 illustrates the geographic distribution and genealogical affiliations of the sampled languages. A list of the sampled languages can be found in Appendix 8.

figures/11/VolumeSample1.pdf

Figure 1: The language sample

The data set studied stems from a larger project on the sociohistorical correlates of the evolution of gender complexity led by Francesca Di Garbo (for details, see Di Garbo (forthcoming)). The diachronic processes examined in the study are somewhat biased towards instances of contact-induced change, even though

language-internal developments are also discussed. While the pace and nature of these developments may thus be specific to the type of contact situation in which they unfold, we believe that the data set under study offers insights of rather general relevance with respect to the diachrony of gender marking systems. Data were collected based on a questionnaire (Di Garbo 2015), as well as on consultation of reference grammars and language experts.

Typological research on grammatical gender systems has mostly focused on three broad domains of analysis:

- Number of genders
- Number and/or type of gender assignment rules
- Formal marking through agreement patterns.

We argue that these domains of synchronic variation can also be used to investigate how gender systems change through time. However, we suggest that any change in the number of gender values or the number and nature of gender assignment rules must ultimately hinge on variation and change in the domain of agreement patterns, that is, in the morphosyntactic encoding of gender distinctions. For instance, a gender value is lost when the corresponding gender agreement patterns fall out of use. Similarly, changes in the nature and distribution of gender assignment rules are reflected by the gender agreement patterns that the nouns affected by these changes trigger in discourse. For instance, we know that a former masculine noun is re-analyzed as neuter if patterns of neuter agreement are selected when the noun is used. Thus, we argue that studying synchronic and diachronic variation in patterns of gender agreement enables us to make generalizations about variation and ongoing change in the number of genders and/or the nature of the gender assignment rules that languages have. This suggestion aligns with recent observations in the literature on gender complexity where complexity in the domain of gender agreement has been shown to interact with complexity at the level of gender values and assignment rules (Audring 2017 ; Di Garbo 2016).[4]

We explore simplification and complexification of gender systems by focusing on reducing, emerging and expanding patterns of gender agreement. The sample languages are thus selected so as to represent instances of (1) reduction, (2) loss, (3) emergence, and (4) expansion of gender agreement. These are then compared with instances of retention or lack of gender agreement as attested in closely

[4]For instance, Di Garbo (2016) shows that manipulable gender assignment tends to presuppose rather pervasive gender agreement systems in the languages of her sample.

related languages. Naturally, loss, reduction and expansion presuppose the pre-existence of a gender system within the relevant language sets, whereas emergence of gender presupposes absence of gender within the relevant language sets. The data in Table 1 and the map in Figure 2 illustrate how the patterns of change in focus are distributed within the languages of the sample.[5]

figures/11/Patterns_sample.pdf

Figure 2: Distribution of patterns of change

[5]For language classification we follow the Glottolog (Hammarström et al. 2018).

Table 1: Patterns of change attested in the languages of the sample

Family by macroarea	Language	Pattern of change
AFRICA		
Bantu		
	Kinshasa Lingala	Reduction
	Makanza Lingala	Expansion
Ghana-Togo-Mountain		
	Selee	Retention
	Igo	Reduction (near loss)
	Ikposo	Loss
AUSTRALIA		
Gunwinggu		
	Kunwinjku	Retention
	Kundjeyhmi	Reduction
	Kune	Loss
EURASIA		
Khasian		
	Khasi	Expansion
	Lyngngam	Retention
	Pnar	Expansion
Basque		
	Standard Basque	Lack
	Lekeitio Basque	Emergence
Balto-Slavic		
	Latvian	Retention
	Tamian Latvian	Loss
Greek		
	Modern Greek	Retention
	Pontic Greek	Reduction
	Rumeic Greek	Reduction
	Cappadocian Greek	Loss
EURASIA		
Insular Celtic		
	Irish	Reduction
	Irish (Ros Much)	Retention
North Germanic		
	Elfdalian	Retention
	Karleby Swedish	Reduction
	Standard Swedish	Reduction

Table 1, continued

Family by macroarea	Language	Pattern of change
EURASIA		
Northwestern Iranian		
	Eshtehardi	Expansion
	Kafteji	Expansion
	Kelasi	Loss
Lezgic		
	Archi	Retention
	Aghul	Loss
	Udi	Loss
Thebor		
	Shumcho	Emergence
	Jangshung	Emergence
NORTH AMERICA		
Mixed Language		
	Michif	Expansion
PAPUNESIA		
Chamorro		
	Chamorro	Emergence
Mek		
	Nalca	Emergence
	Eipo	Emergence

It can be hypothesized that gender agreement systems in decline represent instances of reducing complexity, while gender agreement systems on the rise or under expansion represent instances of increasing complexity. A further possible hypothesis is that gender agreement systems on the rise or in decline are less complex than the more pervasive systems that they are moving towards or away from. We will come back to these hypotheses in §7 and evaluate them against our data.

3 The evolution of gender complexity in the domain of agreement

Starting with pioneering work by Corbett (1979 ; 1991), a great deal of research has focused on unraveling constraints on the distribution of gender distinctions on different types of agreement targets. This research has shown that certain agreement targets (e.g., personal pronouns) are more likely than others (e.g., attributive modifiers) to index semantic rather than grammatical properties of nouns. In the terminology proposed by Corbett (1979 ; 1991), this is known as an opposition between *semantic* and *syntactic* agreement patterns. Preferences towards semantic or syntactic agreement per type of agreement target are captured in the form of an implicational hierarchy, which is known as the Agreement Hierarchy. The Agreement Hierarchy – illustrated in (1) – was first proposed by Corbett (1979) and is further discussed in Corbett (1991 ; 2000 ; 2006). It expresses the likelihood of semantic agreement to occur with different types of agreement targets as well as the degree of syntactic cohesion between agreement targets and their controllers.

(1) The Agreement Hierarchy (adapted from Corbett 2010)
- Semantic Agreement
  attributive > predicate > relative pronoun > personal pronoun
- Syntactic Cohesion
  attributive < predicate < relative pronoun < personal pronoun

The directions of the arrows – ">" or "<" – stand for different directionalities in the two main chains of implications entailed by the hierarchy. The first row indicates that semantic agreement on any of the targets to the left implies the presence of semantic agreement on the targets to the right, with attributive modifiers being the least likely candidate for semantic agreement. The second row indicates that syntactic cohesion between nouns and any of the targets to the right of the hierarchy implies at least the same level of syntactic cohesion with any of the targets to the left, with personal pronouns being the agreement targets with the loosest syntactic integration to nouns. These hierarchical effects are connected with the fact that pronouns tend to be linearly more distant from their antecedents (low syntactic cohesion) as compared, for instance, with definite articles (high syntactic cohesion), which tend to occur linearly closer to the controller nouns.[6] Pronouns are therefore more prone to index semantic properties of the discourse referent rather than lexico-grammatical properties of nouns,

[6]Different types of agreement targets may occur within the noun phrase (articles, quantifiers,

such as grammatical gender. Mismatches between the agreement patterns associated with different types of targets are especially likely to occur when the controller nouns are *hybrid nouns*. In the case of gender, these are nouns whose inherent gender assignment is in conflict with their semantics. A classic example is the German noun for 'girl', *Mädchen*, which is grammatically neuter, but denotes a human entity. Let us consider the types of gender agreement mismatches attested in German with the noun *Mädchen*.

(2) German (Indo-European, Germanic; Corbett 1991 : 228)
Schau dir dieses Mädchen an, wie gut sie/es Tennis spielt
look you this.N girl at, how good she/it tennis plays
'Look at this girl, see how well she plays tennis'

The example shows that while gender agreement within the noun phrase (i.e., on the demonstrative) can only conform to the lexical gender of the noun (*dieses*, N), with the personal pronouns, speakers can choose between feminine and neuter agreement. Feminine agreement indexes the fact that the discourse referent is female (as in *sie*, F); neuter agreement indexes the fact that the noun for 'girl' is grammatically neuter (as in *es*, N).[7] Conflicts between "semantic" and "syntactic" agreement can be also understood in terms of mismatches between *referential* and *lexical* gender, as these terms are used by Dahl (2000) (see also the study of the evolution of gender marking in medieval English by Siemund & Dolberg 2011).

There are at least two ways in which the Agreement Hierarchy can be used to describe synchronic variation in gender complexity, one pertaining to the types and number of attested agreement domains, and one pertaining to the type and number of preferred agreement patterns per domain. Concerning type and number of attested agreement domains, a language that exhibits gender agreement in all the agreement domains represented along the hierarchy is, in this respect, more complex than a language that, other things being equal, has agreement in fewer domains. This is, for instance, the way in which the amount of gender agreement or gender indexation is treated in the metric proposed by Di Garbo (2016).[8] Concerning type and number of preferred agreement patterns, a lan-

numerals etc.) and further hierarchical effects between such targets cannot be excluded. This, however, falls outside the scope of the present investigation.

[7] Corbett 1991 : 228 further mentions that the older the age of the young woman that is being talked about, the more likely it is for speakers to use feminine agreement.

[8] For some observations on possible implicational tendencies constraining which agreement domains are more likely to be targets of gender marking in a sample of 20 languages from New Guinea see Svärd (2019 [this volume]).

guage in which gender agreement is only syntactic with all agreement targets is, in this respect, less complex than a language that, other things being equal, exhibits variation between syntactic and semantic agreement at any point along the hierarchy. For a broader discussion about the use of typological implicational hierarchies as cross-linguistic measures of complexity, see Miestamo (2009).

In this paper, we explore the extent to which not only synchronic, but also diachronic variation in the domain of gender agreement can be mapped onto the Agreement Hierarchy (for an overview of the role of the Agreement Hierarchy in the diachrony of nominal classification see also Seifart 2010). With respect to types and number of agreement domains, we find that, in the languages of our sample, both the rise and the decline of gender agreement tend to start off from the agreement domains at the two opposite ends of the Agreement Hierarchy, i.e., either from attributive modifiers or from personal pronouns and/or other type of anaphoric constructions, such as light nouns with anaphoric functions (for the latter, see also Wälchli 2019 [this volume]). With respect to types and number of preferred agreement patterns per domain we find that, in the languages of the sample, at least the decline and loss of gender agreement tend to be directional, and that the attested lines of directionality are reminiscent of the two opposite pulling forces described by the Agreement Hierarchy: syntactic cohesion between controllers and targets, and spread of semantic agreement. However, we make no claims about the universality of these tendencies, and we do not exclude that, in languages other than those sampled for this study, diachronic change in the morphosyntax of gender agreement occurs on other types of agreement targets first. Finally, while we argue that the hierarchy is a useful tool to *describe* tendencies in how gender marking systems change, we make no claims about it having a *predictive/explanatory* value concerning the spreading of such changes. On the contrary, we argue that explanations should be sought in the realm of those functional pressures that are reflected in the hierarchy.

In Section 4, we focus on reducing gender agreement systems; emerging gender agreement systems are discussed in Section 5 whereas the expansion of gender agreement patterns is treated in Section 6.

4 Reducing gender agreement systems

4.1 Attested processes of change

In our data, the reduction and, in some cases, the loss of gender agreement result from two distinct diachronic processes: (1) *morphophonological erosion* and (2)

redistribution of agreement patterns.

By morphophonological erosion we refer to the wholesale patterns of change that lead to the loss of inflection. Sound changes (e.g., changes in stress patterns resulting in the loss of word-initial or word-final segments) can cause loss of segmental morphology, which ultimately determines the neutralization of previously overtly coded grammatical distinctions and the overall restructuring of inflectional paradigms. This process is also known in the literature under the label *deflection*. Within the domain of nominal morphology, morphophonological erosion often affects gender marking along with the marking of other nominal inflectional features, such as number and case, which are frequently cumulatively encoded with gender. It has been suggested (see Priestly 1983 for Indo-European; Audring 2009 for Germanic languages) that, when morphophonological erosion affects the encoding of gender distinctions, the word classes that are likely to lose gender marking first are the nouns themselves (in case of overt gender systems), followed by the agreement targets that are more adjacent to nouns, i.e., adnominal modifiers, such as definiteness markers, demonstratives, adjectives and numerals, with definiteness markers generally being yet more stable than, say, numerals or adjectives. Personal pronouns (both dependent and independent) are more likely to retain the encoding of gender distinctions as a means to signal semantic properties of the discourse referents. In other words, under morphophonological erosion, gender agreement is more likely to be retained on those agreement targets where it is most functional to reference tracking and reference identification, i.e. demonstrative and/or personal pronouns. These may then tend to inflect based on semantically transparent principles of gender assignment (animacy and/or biological gender). In English, for instance, the encoding of gender distinctions underwent massive erosion as part of a general weakening of inflectional morphology. As a result of this deflection process, gender marking was lost on all of the agreement targets (as well as on nouns) except for the personal pronouns, which nowadays signal the biological gender of discourse referents, and for the relative pronouns which make a distinction of the human/non-human type (Curzan 2003).

By *redistribution of agreement*, we refer to the process whereby one of the several agreement patterns available in a language (for instance, the neuter) starts being used with nouns that would normally trigger agreement in other genders (for instances, with nouns that are semantically inanimate, but grammatically masculine or feminine). If the redistribution of one agreement pattern comes to affect all agreement domains, and to effectively replace all the other competing agreement patterns independently of semantic or morphological properties of

the controller nouns, then gender distinctions become neutralized. In many of the cases attested in our sample, the redistribution of agreement patterns appears to be at least initially semantically motivated: semantic oppositions generally pertaining to the domain of animacy start affecting the criteria according to which certain nouns trigger gender agreement on at least some targets. In general, the higher the number of nouns involved in the restructuring of the assignment criteria, the higher the chance that the overall gender assignment rules of a language may change. Similarly, the higher the number of agreement targets that align with the new assignment criteria, the more reasons to speak of an increase or decrease in the number of gender distinctions. For instance, when the semantic agreement patterns that are being redistributed are based on animacy, their generalization to all agreement targets may eventually lead to a bipartite, animate vs. inanimate, type of gender system, where gender assignment is semantically predictable. This is for instance the case of the Bantu language Kinshasa Lingala, in which all productive agreement targets index the animacy of the noun, whereas the nouns themselves retain prefixal remnants of the old, no longer productive system of gender distinctions (Maho 1999 : 130–132; Meeuwis 2013 : 28–29). In other cases, the most frequent (default) pattern of gender agreement is the one that takes over. This is for instance the case of Tamian Latvian (Indo-European, Balto-Slavic), where the masculine agreement pattern has replaced nearly all instances of feminine agreement leading to loss of grammatical gender. The redistribution of agreement patterns is ultimately a process of analogical levelling: the gender agreement system of a language is restructured on the basis of the more semantically motivated and/or more frequent agreement pattern, which gradually spreads at the expenses of others.

Table 2 illustrates the distribution of patterns of reduction and loss of gender agreement within the languages of the sample, and specifies whether these are due to morphophonological erosion, redistribution of agreement, a combination of both, or whether the exact pattern of change cannot be inferred based on the data at our disposal. For each of the relevant languages, the table also specifies if directionality applies, and if the distribution of a given pattern of change is at any rate semantically motivated. Given the limited size of our sample, the analysis proposed here is merely qualitative and we draw no generalization based on the relative frequencies of the observed patterns of change. Examples for each of the possible scenarios are discussed in Section 4.2, 4.3 and 4.4.

Table 2: Morphophonological erosion and redistribution of agreement in the languages of the sample where gender agreement reduction and loss are attested

	Languages	Directionality	Semantics
Morphophonological erosion	Standard Swedish	YES	NO
	Kelasi	Not clear	NO
Redistribution	Cappadocian Greek	YES	YES
	Pontic Greek	YES	YES
	Rumeic Greek	YES	YES
	Irish	YES	YES
	Kune	Not clear	No data
Both	Igo	YES	Not clear
	Karleby Swedish	Not clear	Partially
	Kinshasa Lingala	YES	YES
	Tamian Latvian	Partially	Partially
Not clear	Aghul	–	–
	Kundjeyhmi	–	–
	Lezgian	–	–
	Udi	–	–

4.2 Reduction and loss by morphophonological erosion

In Standard Swedish, the opposition between masculine and feminine gender is only retained in the inflectional paradigm of the independent third person pronouns (see Table 3), but has been lost elsewhere.[9]

Table 3: Personal Pronouns in Standard Swedish

	M	F	PL
Nominative	*han* 'he'	*hon* 'she'	*de* 'they'
Genitive	*hans* 'his'	*hennes* 'her'	*deras* 'their'
Accusative	*honom* 'him'	*henne* 'her'	*dem* 'them'

The Masculine and Feminine singular forms of the third person pronouns are

[9]In written language, a masculine suffix *-e* may still sometimes be used on adjectives to mark masculine agreement.

used to signal the biological gender of human and other animate referents.[10] With non-animate entities, the demonstrative pronouns *den*, Common Gender, and *det*, Neuter Gender, are used instead, and the choice between the two is based on the lexical gender of nouns. In sum, in the pronominal domain, Standard Swedish has a four-way gender distinction: Masculine, Feminine, Common, Neuter, with a split between animate and inanimate referents governing the distribution of these gender values. Within the domain of adnominal modification, Swedish distinguishes between a Common and a Neuter Gender only: *en person* 'a person' (Common Gender), and *ett hus* 'a house' (Neuter Gender). Historically, the Common Gender is the result of a merger between the Feminine and Masculine genders. Many nonstandard varieties of Swedish, as well as many other Scandinavian varieties, retain a tripartite gender system. Tripartite gender systems were found all over Scandinavia before the standard varieties with a bipartite gender system, such as Danish and Swedish, started spreading.[11] One of the Swedish dialects which still retains a fully productive tripartite gender system is Elfdalian, spoken in the Swedish region of Northern Dalarna by approximately two thousand people.[12] In Elfdalian, the opposition between Masculine, Feminine and Neuter gender runs productively through the whole agreement system. A tripartite gender system of the type retained by Elfdalian is also attested in Old Swedish texts.[13] The Masculine-Feminine merger in the domain of adnominal modification appears to be due to a combination of various morphophonological processes, such as the erosion and loss of the masculine *-er* ending in the inflectional paradigm of strong adjectives, the loss of the masculine suffix *-r* before the definite suffix in the nominative form of the noun, and the loss of final consonant length in the inflectional paradigm of the definite suffixes (Duke 2010 : 652–654). Finally, pervasive reduction in gender agreement domains is attested in Karleby Swedish, the variety of Swedish spoken in the town of Karleby, located in the Finnish region of Ostrobothnia.[14] Gender agreement reduction in

[10] During the last decade, a biological gender-neutral form, *hen* has been introduced. Its frequency of use has rapidly increased, both in written and spoken Swedish discourse.

[11] Before the spread of the standard languages, bipartite gender systems were only attested in Denmark, southern Sweden, the Mälaren valley in Sweden, and pockets of Norway where varieties heavily influenced by Danish were spoken (Östen Dahl, personal communication).

[12] Data from Åkerberg (2012), as well as from Östen Dahl, personal communication.

[13] The use of the Masculine and Feminine pronouns with inanimate antecedents continued in the written language until the nineteenth century, even though this distinction was lost in all other domains of nominal inflection and no longer maintained in spoken use (Östen Dahl, personal communication)

[14] It is worth mentioning that, contrary to Karleby Swedish, some other Ostrobothnian varieties of Swedish display quite conservative gender systems (for more details see Huldén 1972 : 40–

Karleby Swedish is best described as an instance of both morphophonological erosion and agreement redistribution. It is therefore discussed in Section 4.4.

Loss of gender in Kelasi, a Northwestern Iranian language of the Tatic subbranch, is also the result of a process of morphophonological erosion. Stilo (to appear) proposes a historical-comparative analysis of gender loss in Kelasi whereby the decline of gender marking is explained as originating from the domain of noun inflection. In Kafteji, a closely related language spoken at a distance of twelve kilometers from Kelasi, gender distinctions are still retained. However, in Kafteji, overt marking of gender on nouns is dropped when nouns are used in a generic sense or as citation forms, and gender is never marked on agreement targets when these occur in isolation. Based on this comparative evidence, Stilo (to appear : 27) hypothesizes that, at some point in the history of Kelasi, gender marking became increasingly optional and "went through gradual stages of erosion by becoming more and more rarely used in speech", to be finally dropped in all domains of encoding. Even though the individual stages of this process of erosion are not known, nouns – "the crucial locus of gender in the grammar" of Kelasi (Stilo to appear : 27) – are viewed as the word class from which the decline of gender marking originated. This is why we classify Kelasi as an instance of gender loss by morphophonological erosion.

The reduction and loss of gender inflections as a result of a more general erosion of nominal morphology are widely attested across different genera of the Indo-European language family. See Audring (2009 : chapter 9) for an overview of patterns of gender reduction and loss across Germanic languages; Priestly (1983) for a broader overview of the Indo-European language family, and, in particular, of pronominal relics of the neuter gender in Romance (e.g., Italian, French) and Baltic (e.g., Lithuanian) languages.

4.3 Reduction and loss by redistribution of agreement

Gender reduction and loss as a result of the redistribution of agreement patterns are widely attested in our sample. In this section, we discuss a selection of the attested cases.

The Asia Minor Greek dialects are a group of Greek varieties that are or, prior to the 1923 population exchange between Greece and Turkey, used to be spoken in Turkey. Karatsareas (2014) identifies five main dialects within the Asia Minor Greek cluster: Cappadocian, Pharasiot, Pontic, Silliot, and Rumeic. While

50) However, it is perhaps unsurprising, that the near loss of gender distinctions is attested in the northernmost corner of the Swedish speaking area of Finland.

the first four varieties were spoken in different areas of modern Turkey, Rumeic is the variety spoken by the Greek inhabitants of Mariupol, Ukraine, and can be considered as the historical descendant of the Pontic spoken by Greek settlers in Crimea.

Due to their long-lasting history of isolation from mainland varieties of Greek, and, partially, to a history of prolonged contact and bilingualism with Turkish, the Asia Minor Greek dialects exhibit a wealth of grammatical innovations among which a significant reorganization of the gender agreement and gender assignment patterns. This is attested in all Asia Minor Greek varieties but Silliot, which rather retains a conservative system similar to the one attested in Standard Greek and in other Modern Greek varieties outside the Asia Minor area (Karatsareas 2014 : 83). Examples (3), (4), (5), and (6) illustrate the innovations attested in the domain of gender agreement and gender assignment in four out of the five groups of Asia Minor Greek dialects. We present data from the dialects that display renewed gender systems and compare them with equivalent structures in Standard Greek, where these innovations are not attested.[15]

In Pontic, example (3), the inanimate feminine noun for 'door' triggers neuter agreement with agreement targets non-immediately adjacent to nouns. In the corresponding Standard Greek sentence, agreement is feminine with all targets.

(3) a. Argyroúpolis Pontic (Indo-European, Greek; Karatsareas 2014 : 79)
i *pórta* *(…) móno ímoson* *óran* *estéknen*
DEF.F.SG door.F.SG (…) only half.N.SG hour.F.SG stay.PST.3SG
anixtón
open.N.SG
'The door would stay open for only half an hour'.

b. Standard Greek (Indo-European, Greek; Karatsareas 2014 : 80)
i *pórta* *móno misí* *óra* *émene* *anixtí*
DEF.F.SG door.F.SG only half.F.SG hour.F stay.PST.3SG open.F.SG
'The door stayed open for only half an hour.'

In Pontic, the criteria of gender assignment are reorganized based on the animacy of the noun: semantically inanimate, but grammatically masculine and feminine nouns are to a large extent treated as neuter. This semantic reorganization is reflected at the level of agreement: semantic (neuter) agreement with inanimate

[15]Notice that the Standard Greek examples reported by Karatsareas (2014) can be either full or partial translations of the corresponding example in one of the Asian Minor Greek dialects.

masculine and feminine nouns is attested on all agreement targets but prenominal definite articles, which instead agree with the grammatical gender of the nouns (i.e. they take masculine or feminine inflection).

In Rumeic, example (4), the pattern of semantic agreement observed in Pontic is generalized to all targets: the inanimate noun for 'winter' (which is masculine in Standard Greek) triggers neuter agreement with all agreement targets.

(4) a. Rumeic (Indo-European, Greek; Karatsareas 2014 : 79)
tu ko mas to ʃumós en xlísku
DEF.N.SG POSS.N.SG 1PL.GEN DEF.N.SG winter.N.SG be.PRS.3SG tepid.N.SG

'Our winter is tepid'.

b. Standard Greek (Indo-European, Greek; Karatsareas 2014 : 80)
o ðikós mas o çimónas
DEF.M.SG POSS.M.SG 1PL.GEN DEF.M.SG winter.M.SG
'our winter'

In Rumeic, the gender system has been restructured based on semantic grounds: male entities are assigned to the Masculine Gender, female entities to the Feminine and inanimate entities to the Neuter.

A different path is taken by Pharasiot and Cappadocian, where the redistribution of the neuter gender agreement pattern leads to a more pervasive erosion of the gender system. In Pharasiot, as illustrated in example (5), the animate noun for 'woman' (feminine in Standard Greek) triggers neuter agreement with all targets but the definite article adjacent to the noun.

(5) a. Pharasiot (Indo-European, Greek; Karatsareas 2014 : 79)
férinke adʒíno i néka xortáre
bring.PST.3.SG DEM.DIST.N.SG DEF.F.SG woman.F.SG herb.PL
'that woman used to bring herbs.'

b. Standard Greek (Indo-European, Greek; Karatsareas 2014 : 80)
ecíni i jinéka
DEM.DIST.F.SG DEF.F.SG woman.F.SG
'that woman'

In Pharasiot, the neuter agreement has been generalized to all nominal types (animate and inanimate) and the semantic opposition between animate and inanimate entities has been neutralized. Only the agreement targets that are most

adjacent to nouns retain agreement with the original grammatical gender of the noun (in this case with the Feminine).

Finally, in Cappadocian, example (6), the neuter agreement pattern is generalized to all nouns, irrespective of animacy and type of target (the noun for 'wall' is masculine in Standard Greek).

(6) a. Axó Cappadocian (Indo-European, Greek; Karatsareas 2014 : 79)
t spitçú ta ndix(u)s xtizména
DEF.SG.GEN house.SG.GEN DEF.PL wall.PL built.PL
'The walls of the house (are) built.'

b. Standard Greek (Indo-European, Greek; Karatsareas 2014 : 80)
i tíçi ine xtixméni
DEF.M.PL wall.M.PL be.PRS.3PL built.M.PL
'the walls are built'.

In Cappadocian, pervasive redistribution of the neuter agreement pattern has led to complete gender loss, whereby agreement patterns only index number distinctions, in this case that the noun is plural.[16]

Using internal reconstruction, historical data, and data from contemporary varieties of Pontic spoken in Greece, Karatsareas (2014) shows that two main orders of facts account for the rise and spread of semantic agreement in Pontic. On the one hand, the triggers of semantic agreement are nouns at the bottom of the Individuation Hierarchy (Sasse 1993), that is, inanimate mass and abstract nouns that are grammatically assigned to the masculine or feminine genders. These are typical instances of hybrid nouns, i.e., nouns whose denotational semantics is in conflict with their grammatical gender assignment (these nouns denote inanimate entities, but are grammatically masculine or feminine). On the other hand, according to Karatsareas' reconstruction, the spreading of semantic agreement starts from the personal (and demonstrative) pronouns. In Pontic, the sole agreement targets that are left untouched by these redistribution patterns are those that are most adjacent to nouns, i.e., prenominal definite articles. Rumeic is the only Asia Minor Greek dialect where semantic agreement has become generalized to all nouns and targets leading to a gender system which is still tripartite (Masculine, Feminine, Neuter), but in which assignment rules and agreement patterns are entirely semantic. Conversely, in Pharasiot and Cappadocian, the generalization of the neuter agreement pattern to human nouns has paved the way

[16]Feminine and masculine agreement survive in the singular form of definite articles preceding nouns only in the Delmesó, Potámia, and Sílata varieties of Cappadocian (Karatsareas 2014 : 97).

for a more pervasive erosion of gender marking.[17] This process of erosion has turned into complete loss in (varieties of) Cappadocian only. The loss of gender in Cappadocian Greek is seen by Karatsareas (2014 : 99) as reasonably connected with the fact that, among all Asia Minor Greek varieties, this is the one with the longest and tightest history of contact and bilingualism with Turkish. A summary of the patterns of agreement redistribution attested in Pontic, Rumeic, and Cappadocian Greek is given in Figure 3.

figures/11/AMG.pdf

Figure 3: Neuter Agreement in the Asia Minor Greek dialects

Semantically motivated redistribution of gender agreement patterns also occurs in contemporary varieties of urban Irish as documented by Frenda (2011). In these non-standard varieties of Irish (which Frenda classifies as "non-native"), masculine agreement is increasingly used as the default agreement pattern for grammatically feminine nouns denoting inanimate entities. The redistribution is very pervasive in the domain of personal pronouns where the gender assignment system appears to be largely based on an opposition between "female referent" (marked by the Feminine Pronoun) and "everything else" (marked by the Masculine Pronoun). In the domain of adnominal modification, controller nouns that are grammatically feminine but semantically inanimate still trigger femi-

[17] A similar development is attested in some more recent varieties of Pontic, where at least human nouns denoting female referents systematically trigger neuter agreement (Karatsareas 2014 : 96–97).

nine agreement (this is attested in 88% of the examined cases; see Frenda 2011 : 17, Figure 1).

In sum, the data from our sample suggest that patterns of agreement redistribution tend to be constrained by the syntactic cohesion between controller nouns and agreement targets. Those agreement targets that are most adjacent to nouns are the ones that are affected last by the spreading of innovations.

4.4 Combined and unclear cases

In some cases, both morphophonological erosion and agreement redistribution are attested in one and the same language, albeit not necessarily as the result of co-occurrent patterns of change. One such case is Igo, a Ghana-Togo-Mountain language of the Kwa subfamily of the Atlantic-Congo family, spoken by approximately 6.000 people (Gblem-Poidi 2007). In general, the Ghana-Togo-Mountain languages represent an ideal test case for an intragenealogical study of the diachrony of gender systems and their evolving complexity (for a historical-comparative overview, see also the contribution by Güldemann & Fiedler 2019 [this volume]). Some languages within the family, such as Sɛlɛɛ (Agbetsoamedo 2014) and Siwi (Dingemanse 2009), display very productive gender systems characterized by a high number of (non-sex-based) gender distinctions, pervasive agreement and overt marking of gender on nouns. Some other languages (e.g., Animere) present heavily eroded and completely semanticized systems of gender assignment and gender agreement, whereby gender assignment and agreement are animacy-based, and traditional noun class marking on nouns is retained merely as a means of marking singular/plural distinctions. Finally, a few other languages, such as Ikposo (Soubrier 2013), have lost gender completely and retain relics of the extinct gender marking system only on nouns. Igo provides us with an example of a system in transition from animacy-based gender distinctions (of the Animere type) to complete loss of gender (of the Ikposo type). Gblem-Poidi (2007) argues that the original gender system of Igo consisted of eleven non-sex-based genders whose distribution paralleled the eleven pairings of singular and plural nominal prefixes still in use in the language. Nowadays, however, in formal registers of Igo,[18] only an animate/inanimate type of distinction is marked on the agreement targets. It can thus be assumed that this animacy-based gender system is already an eroded system, and that this process of erosion may have occurred through the spreading of semantic, animacy-based agreement. Al-

[18] Those in use in the literacy program and in the New Testament Translation (Honorine Gblem-Poidi, personal communication).

beit preferred in formal registers and still in use among the older generations, the animacy-based gender system of Igo is described by Gblem-Poidi (2007) as under threat, highly eroded in the speech of middle-aged speakers, and practically unused by the younger speakers. The ongoing loss of gender distinctions in Igo is the result of the erosion of segmental gender morphology. Gender agreement morphemes are omitted in actual discourse while their tonal patterns are retained in the form of floating tones that encroach upon the immediately following tonal segments. Interestingly, in spoken use, the former animate gender agreement markers (*ù-* and *bù-*) are resumed and reanalyzed as nominal number markers, whereby *ù-* marks the singular with both animate and inanimate nouns, and *bù-* the plural, but only with animate nouns. Example (7) shows overt plural marking with animate nouns and zero marking with inanimate.

(7) Igo (Niger-Congo, Kwa, Ghana-Togo-Mountain; Gblem-Poidi 2007 : 59)

a. *bégù lɔ̄ bù ɖā wūlū*
children DEF PL PROG.SBJ dry.out
'The children are losing weight'.

b. *ātī lɔ̄ ɖàā wūlū*
trees DEF PROG.SBJ dry.out
'The trees are dying out'.

Based on the data at our disposal, it is not possible to determine whether the loss of segmental gender marking affects all agreement targets at once or is gradually spreading from one agreement domain to the other.

Another instance of pervasive reduction of gender agreement morphology which seemingly results from a combination of morphophonological erosion and agreement redistribution is Karleby Swedish. In this variety of Swedish, gender distinctions have been lost on all agreement targets except for the definite articles (immediately adjacent to nouns) and the demonstrative and personal pronouns. These retain a tripartite distinction between Masculine, Feminine and Neuter gender. The masculine and feminine forms are however used only when the controller noun denotes human beings; in all other cases only one form (the Neuter) is used both in the domain of definite and indefinite articles and with demonstrative and anaphoric pronouns (Huldén 1972 ; Hultman 1894). It is reasonable to think that this superimposed animacy-based distinction (whereby only nouns denoting humans trigger a masculine/feminine distinction) might have spread from the domain of anaphoric pronouns (where, for instance, it is also found in Standard Swedish) to the definite articles.

In the Tamian dialects of Latvian, loss of gender marking is also the result of a complex interplay between morphophonological erosion and agreement redistribution. According to the recent comparative study by Wälchli (2017), the loss of short vowels in final syllables caused the neutralization of the opposition between masculine and feminine gender in the accusative plural of nominal paradigms. The neutralization pattern later extended to the demonstratives. This paved the way to several processes of redistribution that led to the gradual generalization of masculine agreement to other types of targets (for instance, past participles and predicative adjectives), but never to all instances of gender agreement. As underscored by Wälchli (2017), and contrary to what suggested in previous literature (Rudzīte 1980), the unfolding of these developments varies substantially across different Tamian varieties and cannot be subsumed under one unitary model of change.

For three of the sampled languages, Kundjeyhmi (Central Gunwinyguan), Aghul (Lezgic), and Udi (Lezgic), the patterns of change behind the reduction and loss of gender agreement patterns cannot be fully inferred based on the data at our disposal.

4.5 Reducing gender agreement systems: summary

In our data, the reduction and loss of gender agreement can be described as the result of two distinct processes: morphophonological erosion and redistribution of agreement. We also found evidence for some directional effects in the way in which these developments spread. The morphophonological erosion of gender inflections tends to spread from nouns to those agreement targets that are syntactically more adjacent to nouns (i.e., adnominal modifiers). Conversely, the redistribution of agreement patterns affects anaphoric pronouns (i.e., the agreement targets that are least adjacent to nouns) first. In our sample, these directional effects are attested across different language families and different types of gender systems, which makes it reasonable to hypothesize that they may respond to more general, possibly universal, tendencies in language change. Furthermore, we believe that these directional effects are due to two distinct types of functional constraints: the syntactic cohesion between agreement targets and their controllers, on the one hand, and the sensitivity of agreement targets to semantic properties of discourse referents, on the other hand. The higher the syntactic cohesion (e.g. with definite and indefinite articles), the lower the sensitivity to referential properties, and vice versa (personal pronouns have looser syntactic cohesion with nouns and are therefore more sensitive to semantics). We suggest that the Agreement Hierarchy, a generalization over observed tendencies in the

distribution of syntactic and semantic agreement, makes it possible to detect and describe the connection between these two opposite tendencies. This is because, as also outlined in §3, the two ends of the scale, attributive modifiers and personal pronouns, represent instances of highest and lowest degree of syntactic cohesion, and lowest and highest likelihood of semantic agreement, respectively. In §7 we discuss how these different diachronic developments pattern with the evolution of gender complexity.

5 Emerging gender agreement systems

The literature on the rise of grammatical gender is vast, and cannot be reported here in detail. Broadly speaking, two opposite scenarios have been proposed in order to account for the origin of grammatical gender systems. According to the first scenario, the development of classificatory strategies precedes the rise of gender agreement patterns. Gender systems originate from classifiers and classificatory nouns that grammaticalize as agreement markers and, eventually, as gender markers on nouns (Greenberg 1978b ; Corbett 1991). According to the second scenario, the development of agreement precedes the development of classificatory distinctions. Nichols (1992 : 139–142) argues that the development of classificatory distinctions encroaches on preexisting (person and/or number) agreement patterns whose distribution may be based on covert, in the sense of not morphosyntactically realized, animacy distinctions or on other highly cognitively salient types of distinctions. Against this background, the debate on the origins of grammatical gender systems has focused on a diverse variety of gendered language families, such as Indo-European (Matasović 2004 ; Luraghi 2011), Atlantic-Congo (Greenberg 1978b ; Williamson 1994), Eastern Nilotic (Heine & Vossen 1983), or on individual languages such as the Boran language Miraña (Seifart 2005) or the Southern Daly language Ngan'gityemerri (Reid 1997).

In this section we focus on the hitherto understudied semantic and morphosyntactic properties of young, non-mature (in the sense of Dahl 2004) gender systems. Two main types of young gender agreement systems are brought to attention in this volume: (1) emerging gender systems that result from the grammaticalization of light nouns, such as the noun for "woman", as generalized anaphoric devices (see Wälchli 2019 [this volume]) and (2) emerging gender systems that result from the rise of marginal agreement patterns in the domain of adnominal modification, which we discuss in this section. In line with the tendencies also observed for the decline and loss of gender agreement, the two types of emerging gender agreement systems discussed in this volume appear to flag the agreement

domains at the two opposite ends of the Agreement Hierarchy (the attributive domain and the anaphoric domain). Neither of these systems, however, originates from classifiers or pre-existing agreement patterns.[19]

While it is impossible to predict whether these emergent patterns of gender agreement will develop into more grammaticalized types of systems, we believe that they offer a unique insight into the rise of complexity in the domain of gender marking as well as into its stability and transmissibility. In the languages of our sample, the emergence of gender agreement in the domain of adnominal modification can result either from language-internal developments or from language contact. These two cases are discussed separately in the remainder of this section.

5.1 Language-internal development of gender: Nalca

Nalca is a Mek language of the Nuclear Trans New Guinea family spoken in the Highlands of Tanah Papua. The gender system of Nalca is described by Wälchli (2018), both from a synchronic and diachronic perspective. Nalca has a sex-based gender system, with five gender distinctions and semantic and formal (phonological) assignment; gender distinctions are not overtly coded on nouns and the sole targets of gender agreement are a set of function words, which, beside marking gender, also work as case and deictic marking hosts. The gender markers of Nalca and their respective labels are given in Table 4.

Table 4: Gender in Nalca

Gender	Marker
Masculine (some human males)	*be-*
Feminine (some human females)	*ge-*
Neuter/nouns with Consonant + Vowel phonotactic structure (CV), 'the thing(s) that…'	*ne-*
Default Noun	*e-*
Default Phrase (locative, adverbs)	*a-*

Gender agreement in Nalca is noun phrase internal and strongly tied to linear adjacency between controller nouns and agreement targets. When the adja-

[19]The emergence of gender agreement from the grammaticalizion of classificatory light nouns is studied, for instance, by Grinevald & Seifart (2004) and Seifart (2005), with a special focus on Amazonian languages.

cency condition is not fulfilled, or when the controller noun is not preceded by attributive adjectives (which favor the expression of gender), inherent gender distinctions are neutralized and the agreement pattern triggered on the case/deictic host is that of the Default Phrase gender *a-*, which is typically used with non-prototypical controllers. This illustrated in (8).

(8) Nalca (Mek; Wälchli 2018)
me: *a-ra* *gelelinga* *sovb-vka*
child(N) NN-TOP unnoticed enclose.in.netbag-CVB
bo-ba-lam-e:k. *Nauba me:* *ne:-ra al-biyvk.* *Me:k*
carry-go-HAB/IPVF-PST.3PL. big child(N) N-TOP 3SG-alone. small
me: *ne:-ra sovb-vka*
child.N N-TOP enclose.in.netbag-CVB carry-go-HAB/IPVF-PST.3PL.
'They carried the boy away secretly in a netbag. A big boy went by himself. A small boy they carried in a netbag.'

The Nalca noun for 'child' *me:* is Neuter (it has a CV type of phonotactic structure). However neuter agreement is marked only when the noun is accompanied by the attributive modifiers for 'big' and 'small'. When it occurs on its own, as in the first of the three sentences exemplified in (8), the Non-noun gender agreement *a-* is selected.

Wälchli (2018) describes gender in Nalca as a recent innovation within Mek languages. The gender markers of Nalca have cognates in all related Mek languages, but in none of these languages are these markers part of a system of classificatory distinctions in paradigmatic opposition with each other. In Nalca, an emergent system of nominal classification has resulted from a complex array of multiple, independent patterns of language change. The onset of this evolutionary process is the reinterpretation of a uniqueness/saliency marker targeting the top end of the Animacy Hierarchy (*bi-*) as an agreement marker in opposition with *a-*, probably marking non-uniqueness and low animacy (Wälchli 2018). This type of system is attested in the neighboring languages Eipo and Una, where high degree of animacy are flagged by the marker *bi-*.

5.2 Contact-induced gender emergence

Contact-induced gender emergence presupposes borrowing of agreement patterns, a phenomenon which is argued to take place only in the context of prolonged contact between two or more speech communities, presupposing child bi-/multilingualism (Thomason & Kaufman 1992 ; Thomason 2001 ; Trudgill 2011).

The three languages discussed in this section – Chamorro (Austronesian), Lekeitio Basque (Basque), Shumcho (Sino-Tibetan) – fit this scenario in that: (1) they show instances of borrowed gender agreement, (2) they are spoken in a situation of intense and prolonged contact with the languages from which the agreement patterns are borrowed.

We begin our overview of contact-induced gender systems with Chamorro, an independent branch within the Austronesian family, spoken in the Northern Mariana Islands. If borrowed patterns of gender agreement are excluded, in Chamorro, nominal classification is restricted to a small set of classifiers, which are almost exclusively used in possessive constructions. Definite articles vary depending on the information structure status of the nominal they modify (they are sensitive to focus), and there is no gender marking on personal pronouns nor noun-phrase internal agreement, apart from optional multiple plural marking (Stolz 2012 : 111). Contact between Chamorro and Spanish starts on an occasional basis during the 16th century, it reaches its apex during the Spanish colonization (between the 17th to end of the 19th century), before it starts declining with the advent of the US occupation, and terminates after World War I. The emergent gender system of Chamorro is described in detail by Stolz (2012). Sex-based gender distinctions manifested through agreement on adnominal modifiers emerged in the language as a result of borrowing of nouns and property words from Spanish. The gender system of Spanish is based on a masculine vs. feminine type of opposition with a combination of semantic, morphological and opaque assignment rules. In Chamorro, the Spanish gender assignment rules are reanalyzed into a predictable system of semantic assignment. Agreement with human female controllers is marked by *-a* (Spanish feminine agreement) while human male controllers, as well as any other type of controller nouns, trigger *-o*/*-u* agreement (Spanish masculine agreement). This is illustrated in example (9).

(9) Chamorro Feminine (a) and Non-Feminine (b) Gender (Austronesian; Stolz 2012 : 123)

a. *Ma-nobena-na-ye i mi-milagros-a na Bithen.*
PASS-novena-RED-REF DEF RED-miraculous-F LINK Virgin

'A novena is being conducted for the abundantly miraculous Virgin'.

b. *desde antitites na tiempo esta gof bunit-u na siuda i*
since RED:before LINK time already very nice-NF LINK town DEF
ya Hagåtña.
TN Hagåtña

'A very long time ago, Hagåtña was a very pretty town already'.

In (9b) the Spanish-borrowed noun for town, *siuda*, triggers non-feminine agreement. However its correspondent in Spanish, *ciudad*, is grammatically feminine. Gender assignment in Chamorro is thus predictable based on semantic properties of the controller nouns, and does not fully comply with the assignment rules of the donor language. The Chamorro corpus used by Stolz (2012) reveals 300 pairs of words that are sensitive to the distinction between Feminine and Non-Feminine gender. These can be both property words and nouns. Semantically, they cover a wide range of meanings from physical properties to character traits, from names of professions to kinships, ethnonyms, and young animals with sexual dimorphism (Stolz 2012 : 117). Of these gender-sensitive lexical items, the property word *bunitu/a* 'pretty, nice, handsome' is the most frequent token for the encoding of sex-differentiation and agreement. With respect to the productivity of gender marking on nouns, Stolz (2012) finds that Spanish derivational rules for the encoding of gender distinctions on nouns may in some cases extend to Chamorro and English nominal stems as in *dander/a* 'male/female musician' from the Chamorro verb stem *dandan* 'to play music', and in *apostero/a* 'male/female upholsterer' from the English noun *upholsterer*. With respect to the productivity of gender marking outside nouns, adjectival adnominal modifiers borrowed from Spanish may index Feminine Gender when modifying a Chamorro noun denoting a female entity. However, the only set of words that are morphosyntactically suited to mark agreement are adnominal modifiers of Spanish origin. Finally, not all Spanish loanwords are sensitive to gender distinctions and there is a considerable amount of intra-speaker and regional variation as to which words are part of the system of gender distinctions and which are excluded; the range of this variation is still to be studied. In sum, Chamorro displays a semi-productive sex-based type of gender system, where gender assignment is semantically predictable and the only targets of gender agreement are a subset of property words borrowed from Spanish. While the system originated through prolonged and intense contact with Spanish, the evolution of gender agreement in Chamorro grammar and usage continues beyond the disappearance of Spanish as a local contact language, and follows patterns of development that do not completely overlap with those of the donor language.

Lekeitio Basque is another example of a genderless language in which marginal patterns of nominal gender marking and gender agreement have intruded through the borrowing of a (small) set of nouns and property words from Spanish, and are used to index semantic properties of discourse referents. Lekeitio Basque is a variety of western Basque spoken in Lekeitio, a town located in the province of Bisqay, within the Spanish Basque Country. According to Hualde et al. (1994

: 1–2), Basque is the preferred language of interaction among Lekeitians, even though Lekeitio is a largely bilingual town, with the majority of speakers having an active command of both Basque (standard and local variety) and Spanish. In addition, the authors report that, even though Standard Basque is the official language of instruction, the local variety is generally preferred to the standard language in everyday communication outside the class environment as well as in formal registers of communication (e.g., communication from the mayor and other local authorities, at church). In Lekeitio Basque, *-a* is used to express reference to female entities, whereas *-o* is used for males. Similarly to the Chamorro case, the borrowed gender suffixes appear both on borrowed nouns, where they qualify as a word formation strategy for the overt coding of natural gender distinctions, and on borrowed modifiers, where they qualify as an instance of gender agreement. Examples of borrowed nouns and modifiers with overt gender distinctions are: *enano/a* 'dwarf'; *álto/a* 'tall'; *alúmno/a* 'student'; *tónto/a* 'stupid, silly', *txúlo/a* 'arrogant' (Hualde et al. 1994 : 108–109). Interestingly, gender marking on nouns and adjectives is also extended to Basque lexemes: *gixájo/a* 'poor man/poor woman'; *sorristo/a* 'lousy'; *txotxólo/a* 'stupid, short witted' (Hualde et al. 1994 : 109). Finally, when gender-sensitive adjectives are used as a base to derive verbs, gender markers are retained. In such cases, gender is marked through a suffix occurring between the root and the derivational suffix, leading to a pattern of affixation which is unknown to Spanish morphology. This pattern is shown in example (10).[20]

(10) Deadjectival verbs indexing natural gender in Lekeitio Basque (Hualde et al. 1994 : 109)
morenotu = 'to become tanned (a male)' < *moréno* 'dark (male)'
morenatu = 'to become tanned (a female)' < *moréna* 'dark (female)'
majotu = 'to become handsome (a male)' < *májo* 'handsome (male)'
majatu = 'to become handsome (a female)' < *mája* 'handsome (male)'

Contact-induced emergence of gender agreement is also attested in the Thebor (Bodic, Sino-Tibetan) language Shumcho, spoken in the Kinnaur district of Himchal Pradesh in the Indian Himalaya, a highly multilingual area at the crossroads between Bodic and Indo-Aryan languages, where Hindi is the language of administration and mass media. In general, natural gender distinctions in Shumcho are encoded lexically; there is no morphological gender marking on nouns

[20] An alternative analysis of the patterns illustrated in (10) is, of course, that the gender-differentiating adjectives are stored as independent lexical items.

and no gender agreement on adjectives and verbs. However, there exist a number of nouns and adjectives for which gender distinctions can be marked suffixally (-*a* = masculine; -*e* = feminine), e.g. *šara/e* 'beautiful', 'young person'; *laṭa/e* 'deaf, dumb', 'deaf/dumb one'.[21] In the majority of cases, these words are of clear Indo-Aryan origin, other cases are less clear. Whenever gender-sensitive adjectives modify nouns denoting humans, gender must be marked, independently of whether the head noun is of Bodic or Indo-Aryan origin (Christian Huber, personal communication). With non-human animates and inanimate nouns gender-sensitive adjectives are invariably feminine. In naturally occurring discourse, however, speakers may sometimes choose to index the biological gender of animals, especially if they feel emotionally attached to them (Christian Huber personal communication; Huber 2011 : 76). Some instances of masculine/feminine gender distinctions of the type attested in Shumcho are also found in Jangshung, the other Thebor language included in our sample, as well as in almost all West Himalayish languages; their origin is often connected with loanwords from neighboring Indo-Aryan languages (Christian Huber, personal communication). The distribution and spread of these marginal gender marking systems in the languages of the area are, however, still poorly investigated.

In sum, the three instances of borrowed gender agreement patterns attested in our sample and discussed in this section share a number of characteristics both at the morphosyntactic and semantic level:

1. They result from borrowing of nouns and adjectives, which lead to the emergence of instances of nominal gender marking and of gender agreement patterns, respectively.

2. They are noun-phrase internal.

3. They have purely semantic assignment rules: whatever the gender assignment rules of the donor language, the borrowed agreement patterns are used to signal semantic properties of nouns, and, typically, natural gender distinctions.

Finally, the productivity of these borrowed gender agreement patterns varies a great deal in native speakers' usage and from language to language.

[21]Gendered adjectives can also be used as nouns, in the absence of an overt nominal head (Christian Huber, personal communication).

5.3 Emerging gender systems: summary

The number of languages examined in this section is too small to formulate any valid generalization on crosslinguistic properties of young gender systems with gender agreement restricted to the domain of adnominal modification. Yet, a couple of remarks can be made on what appear to be recurrent properties of such systems.

Firstly, all four languages examined exhibit non-pervasive gender agreement, which is restricted to one type of target only (case marking hosts in the case of Nalca, borrowed adnominal modifiers in the case of Chamorro, Leiketio Baque, and Shumcho). In all four languages, then, the syntactic cohesion between controllers and targets is maximal, and, in the case of Nalca, also tied to a rather rigid principle of linear adjacency.

Secondly, in all four languages, gender marking is *conditional* rather than *absolute* in the sense that it is constrained by (1) syntactic properties of noun phrases, whereby gender agreement occurs only if the target and the controller noun are adjacent to each other, as in Nalca, or (2) lexical restrictions, whereby only borrowed adjectival modifiers can agree in gender, as in Chamorro, Lekeitio Basque, and Shumcho.

Crosslinguistic similarities between the examined systems are even more striking in the case of contact-induced gender systems. As mentioned before, in the languages examined in this section, emergent gender agreement patterns result from lexical borrowing. Gender marking patterns are transferred along with borrowed nominal and adjectival stems, and the assignment principles that underpin their use in the donor languages are reanalyzed. The resulting assignment systems in the recipient languages are purely semantic in that they especially target the encoding of natural gender distinctions with human (or highly animate) referents. This is suggestive of a possible hierarchical tendency whereby semantic gender assignment rules are preferred to mixed types (semantic and formal) of assignment rules, even if the donor language has both semantic and formal rules. Finally, in the cases examined here, the recipient languages are not genealogically related (apart from Shumcho and Jangshung); they belong to language families that are typically genderless and that, prior to contact, display agreement in other grammatical domains (such as number or person).

It remains to be seen whether the similarities between the three contact-induced emerging gender systems are due to the fact that the donor languages themselves (Spanish, Indo-Aryan languages) have rather homologous, and in fact, genealogically related, gender systems, or whether these similarities speak of more general tendencies with respect to the kind of gender agreement systems that can emerge

as a result of language contact (e.g. only semantic, only noun-phrase internal etc.). Only a larger crosslinguistic survey could tackle this question. However, what the instances of contact-induced gender emergence examined here suggest is that borrowing should be counted as a possible source scenario for the rise of gender systems crosslinguistically.

In §7, we will address how the emergent gender systems surveyed here pattern in terms of complexity.

6 Expanding gender agreement systems

In our sample, the expansion of gender agreement systems is attested under three different scenarios: (1) through the extension of gender marking to new agreement domains via grammaticalization processes (as in the Northwestern Iranian languages Kafteji and Eshtehardi, and in the Khasian languages Pnar and Khasi); (2) as a consequence of contact between languages with different types of gender systems (Michif); and (3) as a result of language planning and standardization (Makanza Lingala). The three scenarios are briefly surveyed in the following.

While the erosion and loss of gender distinctions is not uncommon within Northwestern Iranian varieties (as we observed with the Kelasi case discussed in Section 4.2), in some languages of this group new patterns of gender agreement have grammaticalized in the domain of verbal morphology. In Kafteji, for instance, all tense forms of the intransitive past verb stems inflect for gender in all three singular persons. In Eshtehardi, gender inflection in the domain of verbal morphology is somewhat less pronounced. While intransitive past verbs and copula verbs inflect for gender in the third person singular, only copula verbs inflect for gender even in the first and second person singular. According to Stilo (to appear), the construction through which gender agreement expanded to these domains of verbal inflection is: "Participle$^{M/F}$ + Copula". This construction consisting of participial forms inflecting for gender, followed by copula verb forms, later grammaticalized into a new type of synthetic perfect retaining the gender inflection of the original participial form. The marking of gender distinctions on these recently grammaticalized verb forms is thus directly connected with the source constructions from which these forms originate. The extent to which gender distinctions are marked on verbs across the three person values varies across languages (Stilo to appear : 29).

When compared with each other, the Khasian (Austroasiatic) languages Lyngngam, Pnar and Khasi display a continuum of increasing gender agreement domains. Lyngngam has a pronominal gender system, with gender distinctions

marked on personal pronouns and deictic pronominal bases. In Pnar and Khasi, pronominal and deictic markers are used as pre-nominal gender clitics, which mark gender within the noun phrase. In Khasi, the encoding of gender distinctions has also extended to the verbal domain. According to Anne Daladier (personal communication) the pervasiveness of gender agreement and the degree of predictability of assignment rules in these three languages are inversely correlated: the higher the number of agreement targets, the less semantically transparent the gender assignment rules. The distribution of gender agreement systems across the three Khasian languages included in the sample is illustrated in Figure 4. These observations should be tested on a wider set of languages within the family.

figures/11/Khasian2.pdf

Figure 4: Expansion of gender agreement within Khasian

Michif (scenario 2) is a nearly extinct mixed language originated through intense contact and multilingual practices between female Cree speakers and male French speaking fur trade workers (thoroughly described by Bakker 1997). As a result of these intriguing dynamics of language contact and transmission, the lexicon and morphosyntax of Michif are split into two: nominal lexicon and mor-

phosyntax are French-based while verbal lexicon and morphosyntax are Cree-based. Accordingly, Michif has two co-existing gender systems, with two different systems of gender assignment – sex-based and animacy-based – that manifest themselves through a sharp division between gender agreement within the noun phrase and gender agreement on verbs (with the exception of demonstratives, which comply to the verb-phrase agreement pattern). The noun-phrase gender system is taken from French, while the verb-phrase gender system is based on Cree. These unique split system of gender agreement is illustrated in (11) where the controller noun for 'mare' triggers feminine agreement within the noun phrase and animate agreement on the verb.

(11) Michif (Mixed Language, Canada and US; Bakker 1997 : 87)
la *žyma:* *ki:aja:w-e:w* *æ̃* *pči* *pulæ̃*
DEF.AN.F.SG mare PST-have-TA.3→3[I] INDEF.AN.M.SG little foal
'The mare had a foal.'

The last instance of expanding gender agreement systems in our sample is Makanza Lingala (scenario 3). In this variety of Lingala, non-sex-based, arbitrary gender distinctions (and corresponding gender agreement patterns) were reintroduced during the standardization process that the language underwent between 1901 and 1902 under the influence of the Scheutist missionaries, who wanted to create an official language that looked more like a 'proper Bantu language'. Kinshasa Lingala, which is nowadays the most widely spoken variety of Lingala and which did not undergo the standardization process attested in Makanza Lingala, exhibits a heavily reduced gender system where gender distinctions and gender agreement patterns are exclusively animacy-based. This reduced gender system is the result of the pidginization and creolization processes that are at the very origins of the history of Lingala, which is the historical descendent of the Bangala pidgin, developed at the Bangala state post on the northwestern banks of the Congo River (for more details on the history of different varieties of Lingala and their gender systems see Bokamba 1977 ; Di Garbo 2016 ; Meeuwis 2013).

To summarize, our data suggest that the patterns of change through which languages may acquire more domains of gender inflection tend to be rather heterogeneous and language-specific. However, the limited number of cases examined here does not allow us to formulate any far reaching generalization on the dynamics of gender agreement expansion. While this calls for further investigation, patterns of gender agreement expansion will not be discussed further in the remainder of the paper.

7 How simple/complex are gender agreement systems on the rise and/or in decline?

In §2, we brought up two hypotheses about the complexity of gender systems. Firstly, in viewing the complexity of gender as an evolving variable, instances of gender systems in decline could be considered as reducing complexity and instances of gender systems on the rise/under expansion as emerging/increasing complexity. Secondly, both reducing and rising gender systems could be expected to show less complexity than their full-fledged counterparts. The data presented in this paper do not, however, support these hypotheses. In this section, we show that many of the processes of reduction and emergence of gender agreement attested in our data contribute to increase the complexity of gender systems as matched against the proposed measures of gender complexity.

Starting with reducing gender agreement, we suggest that especially in those cases in which patterns of reduction only affect sub-parts of the agreement system, whether as a result of morphophonological erosion or of redistribution of agreement, this cannot be described as a straightforward simplification process. In Standard Swedish, for instance, the merger between the Masculine and Feminine genders in the domain of noun-phrase internal agreement gave rise to: (1) a sex-based, referential system of gender assignment, which is active only in the domain of pronominal agreement and for nouns that denote entities at the top end of the animacy hierarchy (humans and, occasionally, higher animals); (2) a non-sex-based, semantic and formal type of gender assignment system, which is active through agreement in the domain of adnominal modification. When mapped onto the model of gender complexity proposed by Audring (2017), this split in the type of classificatory distinctions that agreement targets are sensitive to qualifies as an increase in gender complexity, as illustrated in (12). (The symbol "<" here, as well as in (13), (14) and (15), reads as "less complex than".)

(12) Split agreement system and gender complexity (adapted from Audring 2017)

Matching values (between targets) < Mismatching values (between targets)

This effect can be analyzed as a violation of the Principle of Independence in that the type and number of gender distinctions available in a language vary depending on the type of agreement targets that inflect for gender. Mismatching gender values across different types of targets need to be separately specified

in the description of a gender system, which leads to an increase in description length and thus in complexity.

Similarly, we saw that the redistribution of agreement is usually triggered by the reanalysis of the gender assignment of hybrid nouns. In the Asia Minor Greek dialects, for instance, the critical items are nouns that are grammatically masculine or feminine, but semantically denote inanimate entities. In some Asia Minor Greek varieties (such as Pontic), the ongoing reanalysis of the gender assignment rules associated with these nouns is reflected through mismatching agreement patterns whereby targets adjacent to nouns retain syntactic agreement and non-adjacent targets agree semantically. In Audring's model of gender complexity, hybrid nouns qualify as a "complexifying phenomenon in a gender system" because they engender mismatches in the agreement patterns that they control. This is schematized in (13) and (14).

(13) Hybrid nouns and gender complexity (Audring 2017)

Consistent controller < Hybrid controller

(14) Semantic agreement and gender complexity (Audring 2017)

Targets do not have a choice in value < Targets have a choice in value

When, due to mismatches between grammatical gender and semantic properties of hybrid nouns, agreement targets have a choice in value, these choices need to be specified in the description of a gender system. This increases the description length of the system, and thus its complexity.

Conversely, when the reduction, loss or semantic reanalysis of gender agreement patterns are more pervasive, this usually results in an uncontroversial simplification of the gender agreement system. Under morphophonological erosion, this is for instance the case of English, where sex-based gender distinctions are only preserved on third personal and possessive pronouns and index purely semantic distinctions.[22] Under agreement redistribution, this is the case of Rumeic Greek, where the gender system has become completely semanticized. Nouns denoting male entities are masculine, nouns denoting female entities are feminine, and nouns denoting inanimate entities are neuter.

Moving on to the emergence of gender agreement, the young gender systems examined in this paper also exhibit some features of high complexity when mea-

[22]On the use of the pronouns 'he' and 'she' with inanimate referents in varieties of American and Australian English see Pawley (2004).

sured against the dimensions proposed by Audring (2017). We observe that, under contact-induced gender emergence, only a subset of lexical items within a given word class (nouns and/or adjectives) is sensitive to gender distinctions. For instance, in Chamorro, only property words borrowed from Spanish can inflect for gender and there is a great deal of intraspeaker variation as for how productively gender agreement is used. Similarly, in Nalca, where the emergent gender system is the result of a language internal development, gender marking is also not fully productive, and can be switched off whenever certain syntactic conditions within the noun phrase are not met. Low productivity and optionality in gender marking count as complexifying factors according to Audring (2017): they introduce variability in the gender agreement system of a language as a result of lexical and/or grammatical idiosyncrasies that are, in fact, independent of gender.

(15) Low productivity and gender complexity (Audring 2017)

Gender marking is obligatory < Gender marking is optional

Gender marking is fully productive < Only a subset of lexical items per agreement target mark gender

When gender is not fully obligatory or fully productive, specifying explicitly under which circumstances gender marking occurs adds to the system's description length, which means higher complexity.

Conversely, the emergent gender systems examined in this paper are rather simple with respect to domains of gender agreement, given that they all display one agreement target, which in all cases examined is confined to the domain of adnominal modification.

Reducing and emerging gender systems represent transitional stages between the *absence of gender* and *full-fledged gender systems*, two rather stable stages in the history of individual languages and language families. These transitional stages are to a large extent associated with phenomena that, we think, increase gender complexity as a side-effect of ongoing language change. In the case of gender reduction, we observed, for instance, a pervasive occurrence of mismatching agreements, which is due to the fact that innovations (a) do not immediately reach all available agreement targets, but rather spread gradually across agreement domains; and (b) do not immediately affect all controller nouns, but rather those with ambiguous semantics (that is, hybrid nouns) first. Under gender emergence, gender agreement tends to be non-obligatory and thus non-frequent. Therefore the main factors underlying increased complexity in reducing and

emerging gender systems are partial distributions and optionality, which are ultimately connected to ongoing variation and change.[23] While we hope to have shown that some crosslinguistically recurrent patterns can be associated with these systems in transition, we think that their relative stability is harder to generalize over and depends on the interplay between internal and external dynamics of change, the understanding of which falls outside the scope of this paper.

8 Concluding remarks and prospects for future research

We consider the main contribution of this paper to be bringing diachrony in focus in the typological study of gender complexity. We hope to have shown that investigating closely related languages enables us to formulate empirically grounded diachronic inferences about the decline, rise and expansion of gender agreement, as well as about how these dynamics of change affect the complexity of gender systems. In particular, we found that both gender agreement patterns in decline and gender agreement patterns on the rise feature properties of increased complexity when assessed against existing gender complexity metrics. We suggested that emerging and declining patterns of gender agreement represent transitional stages between two poles: genderless languages and full-fledged gender agreement systems. These poles often appear as less complex than the transitional stages, as represented in our sample. Whether this can be generalized over all cases of emerging and declining gender systems is a hypothesis that should be tested on a larger data set and, possibly, with the support of quantitative methodologies.

We think that one additional contribution of this paper is to have shown that implicational hierarchies can be used as schemas for investigating complexity variation across languages in a meaningful way, not only at the synchronic level (as previously suggested by Miestamo 2009), but also diachronically. In this respect, we found that, in the languages of our sample, the agreement domains at the two opposite ends of the Agreement Hierarchy, attributive modifiers and personal pronouns, often function as the place from which processes leading to both the rise and the decline of gender agreement begin. Furthermore, our data suggest that at least the reduction and loss of gender agreement tend to be directional in nature, and that the type of directionality at stake is predicted by whether loss and reduction are due to morphophonological erosion or redistribution of agreement patterns.

[23] This has also been pointed out to us by Jenny Audring.

We hope that these results may spark further research on the relationship between the complexity of gender systems and other well-known implicational universals in the domain of gender marking, such as the series of implicational universals on the availability of gender distinctions in the plural as opposed to the singular (e.g., Universal 37), or in pronouns as opposed to nouns (e.g., Universal 43), formulated by Greenberg (1963). We believe that this line of research is particularly promising to shed new light on synchronic and diachronic interactions between gender and other grammatical domains, and their effect on the complexity of gender systems.

Finally, one important question that is left out from this paper is whether there are any external factors that contribute to explain why and under which conditions gender agreement systems complexify or simplify. Even though many of the instances of change discussed in this paper clearly involved language contact as a causal factor, the question of the relationship between the evolution of gender agreement systems and language ecology was not addressed systematically here. Thus the answer to this question must be left to further studies. Our impression so far is that gender agreement patterns – whose evolutionary dynamics we have tried to unravel in this paper – might be a better match for the study of the sociolinguistic correlates of gender complexity than, say, sheer number of genders and/or type of assignment systems. Patterns of gender agreement directly hinge on inflectional morphology, which has so far been one of the main foci of research in testing the effects of social structures and language ecologies on the rise and transmissibility of linguistic complexity.

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Abbreviations

3	3rd person	M	masculine
3→3	3rd person animate obviative	N	neuter
AN	animate	NF	non-feminine
CVB	converb	NN	non-noun gender
DEF	definite	PL	plural
DEM	demonstrative	PROG	progressive
DIST	distal	PST	past
F	feminine	RED	reduplication
GEN	genitive	SBJ	subject
INAN	inanimate	SG	singular
INDEF	indefinite	TA	transitive animate verb
IPFV	imperfective	TOP	topic
HAB	habitual	TN	toponym
LINK	linker		

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Appendix

The sampled genealogical units are listed by macroarea and higher levels of classification are mentioned, if applicable. (Q) indicates that, for any particular language, data have been collected through full questionnaire responses; (p.c.) stands for personal communication (i.e., data collected through consultation of language experts but no full questionnaire response).

Family by macroarea	Language	Glottocode	Source
AFRICA			
Bantu (Atlantic-Congo)			
	Kinshasa Lingala	ling1263	Bokamba (1977) Meeuwis (2013)
	Makanza Lingala	ling1269	de Boeck (1904); Bokamba (1977) Meeuwis (2013)
Ghana-Togo-Mountain (Atlantic-Congo)			
	Selee	sele1249	Agbetsoamedo (2014)
	Igo	igoo1238	Gblem-Poidi (2007); p.c.
	Ikposo	ikpo1238	Soubrier (2013); Ines Fiedler (p.c.)
AUSTRALIA			
Gunwinggu (Central Gunwinyguan, Gunwinyguan)			
	Kunwinjku	gunw1252	Evans (2003)
	Kundjeyhmi	gunw1252	Evans (2003)
	Kune	gunw1252	Evans (2003)
EURASIA			
Khasian (Austroasiatic)			
	Khasi	khas1269	Anne Daladier (p.c.)
	Lyngngam	lyng1241	Anne Daladier (p.c.)
	Pnar	pnar1238	Anne Daladier (p.c.)
Basque			
	Standard Basque	basq1248	Hualde & de Urbina (2003)
	Lekeitio Basque	bisc1236 (Bisqay)	Hualde et al. (1994)
Balto-Slavic (Indo-European)			
	Latvian	latv1249	Balode & Holvoet (2001); Anna Kalnaca (p.c.)
	Tamian Latvian	latv1249	Balode & Holvoet (2001) Koptjevskaja-Tamm & Wälchli (2001) Thomason (2015)
Greek (Indo-European)			
	Modern Greek	mode1248	Karatsareas (2009 ; 2014)
	Pontic Greek	pont1253	Karatsareas (2009 ; 2014) (Q)
	Rumeic Greek	mari1411	Karatsareas (2009 ; 2014)
	Cappadocian Greek	capp1239	Karatsareas (2009 ; 2014)

Continued

Family by macroarea	Language	Glottocode	Source
EURASIA			
Insular Celtic (Indo-European)			
	Irish	iris1253	Frenda (2011)
	Irish (Ros Much)	conn1243	Frenda (2011)
North Germanic (Indo-European)			
	Elfdalian	dic (ISO)	Åkerberg (2012), Östen Dahl (Q)
	Karleby Swedish	oste1241	Hultman (1894); Huldén (1972)
	Standard Swedish	swed1254	Duke (2010); Mikael Parkvall (Q)
Northwestern Iranian (Indo-European)			
	Eshtehardi	esht1238	Stilo (to appear); Yarshater (1969)
	Kafteji	kaba1276	Stilo (to appear); p.c.
	Kelasi	kaba1276	Stilo (to appear); p.c.
Lezgic (Nakh-Daghestanian)			
	Archi	arch1244	Michael Daniel, Nina Dobrushina (Q)
	Aghul	aghu1253	Nina Dobrushina (Q)
	Udi	udii1243	Nichols (2003);Wolfgang Schulze (Q)
Thebor (Bodic, Tibeto-Burman)			
	Shumcho	shum1243	Huber (2011), Christian Huber (p.c.)
	Jangshung	jang1254	Huber (2011), Christian Huber (p.c.)
NORTH AMERICA			
Mixed Language			
	Michif	mich1243	Bakker (1997)
PAPUNESIA			
Chamorro (Austronesian)			
	Chamorro	cham1312	Stolz (2012)
Mek (Nuclear-Trans-New-Guinea)			
	Nalca	nalc1240	Wälchli (2018)
	Eipo	eipo1242	Wälchli (2018)

Chapter 12

The feminine anaphoric gender gram, incipient gender marking, maturity, and extracting anaphoric gender markers from parallel texts

Bernhard Wälchli
Stockholm University

The aim of this paper is to carry out a typological study of feminine anaphoric gender grams (such as English *she/her*) in a large world-wide convenience sample of 816 languages and based on a strictly procedural definition. The investigation pursues a radically functional approach where the functional equivalence of the forms under study is assured by exploring an identical search space in parallel texts (translations of the New Testament) in all languages of the sample. This is the first large scale typological study of grammatical gender based on parallel texts, and a large part of the paper is devoted to methodological aspects. The study shows that gender has a functional core like any other grammatical category, and that it can at least partly be studied without resort to the notions of noun class, agreement and system. The results show that a large number of languages possess simple forms of gender, often representing incipient gender from a grammaticalization perspective. The paper discusses how simple gender differs from more mature and genealogically more stable forms of anaphoric gender. Finally the feminine anaphoric gram type is considered in its wider context, reconciling it to the traditional global approach focusing on the notions of system, noun class and agreement.

Keywords: feminine gender, anaphora, anaphoric pronouns, grams, grammaticalization, grammatical relations, functional domains, constructional islands, cue validity, maturity, parallel texts

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1 Introduction

The traditional definition of gender ("Genders are classes of nouns reflected in the behavior of associated words"; Hockett 1958 : 231) rests on the notions of noun class and agreement. With the exception of classifiers, for which noun classes are crucial as well, these notions do not figure in the definitions of other grammatical categories. This makes gender stand out among grammatical categories as very specific by definition. In this paper it is argued that it is also possible to address gender as any other grammatical category by defining it as "Grammatical category expressing meaning X", where X can be feminine, masculine, animate and inanimate, given that the most widespread meanings in gender are animacy and sex (Dahl 2000 : 101; Corbett 1991 : 68; Luraghi 2011), at least as far as anaphoric gender is concerned.[1] In order to make clear that this paper mainly deals with gender marking in anaphoric contexts, I will use the term "anaphoric gender". The question of how grammatical gender is defined is highly relevant for assessing the complexity of grammatical gender.

Noun classes and agreement are complex phenomena. Accepting the traditional definition of gender as the only option would mean to take for granted that grammatical gender is complex by definition. In order to assess the complexity of grammatical gender empirically it is indispensable to explore the possibility of simpler alternative definitions. Linguists nowadays often understand "gender" and "noun class" as full synonyms. This may be appropriate for the study of gender within noun phrases, but does not do justice to the use of gender in the anaphoric domain, which is the topic of this paper.

The major aim of this paper is to show that gender has a functionally motivated semantic core that can be considered in abstraction from the notions of noun class and agreement. This is done by formulating a procedural definition of feminine anaphoric gender which is so explicit that it can be implemented in a computer program in order to extract certain feminine gender markers from parallel texts (here translations of the New Testament). Feminine is chosen for practical reasons. It is easiest to address in this particular corpus (see §2.2).

The underlying idea is that grammatical categories can be captured in terms of

[1] One of the first things I was ever taught in linguistics is that gender and sex are absolutely not the same thing and, since my department found me highly suitable for teaching numerous courses in discourse studies, sociolinguistics, and pragmatics and intercultural communication, I am quite familiar with gender studies and the notion of performative gender. However, the approach pursued in this paper focuses exclusively on the semantic core of feminine and masculine grammatical genders and here the gross simplification that sex is the core meaning of masculine and feminine gender grams has proven to be very useful in practice.

GRAMS. A gram is a grammatical item in a particular language with specific form and specific meaning and/or function (Bybee & Dahl 1989 ; Dahl & Wälchli 2016). Grams can be considered in abstraction from the language-specific systems they are part of. For instance, perfect and progressive can be investigated in abstraction from tense and aspect systems. For gender grams this means that the units of research are feminine, masculine, animate and inanimate, rather than gender systems. Virtually all gender systems are sensitive to the meanings sex and/or animacy (whereby different segments of the animacy hierarchy can be affected). It is true that gender in many languages also comprises other meanings, such as size and shape, and these other meanings are very important for the study of gender as systems. With the gram approach, however, it is possible to address the semantic core areas and to study them cross-linguistically, without having to consider the entire gender systems. A strength of the gram approach is its selectivity. Only salient semantic core uses are considered and compared cross-linguistically. A gram necessarily has a semantic core, but not all of its uses need be semantically motivated. The gram approach focuses on the semantic core of grammatical categories and investigates to what extent grams across different languages share their semantic core, put differently, cluster to cross-linguistic gram types. In order to find out whether a language has a gram reflecting a cross-linguistic gram type, it is sufficient to consider the prototypical uses of a gram type.

Focusing on the semantic core means focusing on those uses of a grammatical category where it is most transparent semantically. We know, among other things, from Corbett's (1991, chap. 8) study of the Agreement Hierarchy that gender use tends to be most transparently semantic in third person anaphoric pronouns. According to Audring (2009), all pronominal gender systems (where gender is restricted to pronouns) are semantically organized, which further supports the view that gender is most semantic in anaphoric use.

A feminine gender gram – in its prototypical use – is a grammatical element picking up reference to a female human, such as the English third person singular pronominal forms *she* and *her* exemplified in (1). (1) is one of 74 parallel corpus passages that are used as a search space for feminine anaphoric gender grams in this paper.

(1) English (Indo-European; Matth. 15:26–27): gender marking on free pronouns
But he answered: "…" But ***she*** *said: "…"*

What I have said so far may suggest that this is a paper about gender in per-

sonal pronouns such as English *she* (see, e.g., Audring 2009), but the search space is much broader. In many languages the functional equivalent to she and her in English is an affix on verbs and/or adpositions as in (2) from Garifuna.

(2) Garifuna (Arawakan; Matth. 15:26–27): gender marking on bound pronouns and prepositions
*Ába **l**-aríñagun Jesúsu **t**-un: "…" Ába **t**-aríñagun: "…"*
and 3SG.M-say Jesus 3SG.F-to and 3SG.F-say
'But he answered: "…" But she said: "…" '

Third person pronouns and affixes for third person have in common that they are REDUCED REFERENTIAL DEVICES in terms of Kibrik (2011; ch. 3), who calls them FREE and BOUND PRONOUNS. In (1) from English the gender marking is located in free pronouns, but in (2) from Garifuna and (3) from Ama it is in bound pronouns (pronominal affixes). While Garifuna has bound pronouns indexing subject, Ama has bound pronouns indexing absolutive (S, O and R[ecipient]). Hausa in (4) marks pronominal gender mainly on aspect words, a kind of auxiliary that is preposed to the verb, but also has optional free pronouns.

(3) Ama (Arai/Left May; Matth. 15:26–27): gender marking on bound pronouns (S, O only)
*[…] no-na-ni imo na i-**so**-ki, Isiso mo. Ulai*
that-FOC-here talk FOC say-O.3SG.F-REM.PST Jesus TOP but
*no-na-ni nukonu mo na **imo**-ki, "…"*
that-FOC-here woman.SPEC TOP FOC say[O3SG.M]-REM.PST
'But he answered ("**to her**"): "…" But she said ("**to him**"): "…" '

(4) Hausa (Afro-Asiatic; Matth. 15:26–27): gender marking on aspect words
***Ya** amsa **ya** ce: "…" Sai **ta** ce: "…"*
3SG.M answer PST.3SG.M say then PST.3SG.F say
'But he answered: "…" But she said: "…" '

However, even if we consider affixes on verbs to be bound pronouns following Kibrik, the search space is not restricted to pronouns. Many languages have anaphoric forms intermediate between nouns and pronouns, for which I will use the name "GRAMMATICAL ANAPHOR" in want of a better term. Third person pronouns are, of course, also grammatical and anaphors, but since pronoun and third person pronoun are established terms, there is little risk of confusion. A grammatical anaphor is illustrated in (5) from Kiribati. Kiribati has a personal

pronoun not distinguishing gender (*e* 3SG), but there is also the "person demonstrative" (Trussel 1979 : 176) *neierei* 'that woman', which is a noun phrase and displays the word order of a full noun phrase (VOS), but is different from the full demonstrative noun phrase *te aine arei* [ART woman DEM.DIST] 'that woman' and does not contain the noun *aine* 'woman'. Kiribati *neierei* (70 times in the N.T.) mostly translates to 'she' and can also pick up reference to *teinaine* 'girl' and *tina-* 'mother' whereas *te aine arei* (13 times) [ART woman DEM.DIST] translates to 'the woman'.

(5) Kiribati (Austronesian, Micronesian; Matth. 15:27): grammatical anaphor
Ao e taku ***neierei*** *...*
and 3SG say **that[DIST].woman**
'But she said: "..." '

Grammatical anaphors, such as Kiribati *neierei* 'that[DIST].woman', are less grammaticalized than pronominal gender markers such as English *she*. Grammatical anaphors tend to be INCIPIENT GENDER MARKERS, nouns on their way to be grammaticalized to pronominal indexes.

One possibility of interpretation is to argue that pronominal gender is more MATURE than non-pronominal gender in anaphors. Mature phenomena imply some sort of non-trivial historical development (Dahl 2004 : 2; Trudgill 2011). Pronouns often differ from nouns in being suppletive according to grammatical relation. English *she* (subject) and *her* (object, indirect object, possessor) illustrate this point. Nouns are not entirely precluded from suppletion according to grammatical relation, but such suppletion in nouns is rare. Free and bound pronouns, however, usually display some sort of suppletion and/or neutralization according to grammatical relation. In Ama (3), gender is distinguished in S, O and R, but not in A. Suppletion or neutralization in pronouns can be viewed as a feature of complexity and a feature of maturity.

Another possible interpretation is that gender cumulating with case (grammatical relation), as it often occurs in free and bound pronouns, is a different kind of phenomenon. Wälchli & Di Garbo (2019 [this volume]) argue following Nichols (1992 : 142) that agreement (and notably agreement in case and number) often triggers noun classification rather than vice versa. Put differently, at least in some instances, gender originates from case, and gender then tends to exhibit particular cumulation patterns with case from its very origin. While, following the second interpretation, cumulation and/or neutralization in certain grammatical relations might be incipient within gender, it is still mature in the sense of grammaticalization, as the development of gender then draws on preexistent

grammatical categories (case, number and person).

In this paper I will extract feminine gender grams from translations of the New Testament (N.T.). Translations of the N.T. are parallel texts, and parallel texts allow us to define a semantic core in a very simple manner as a set of aligned passages. The N.T. comes segmented in chunks slightly larger than sentences (so-called verses), which is why no sentence alignment has to be made. The N.T. is translated into many languages and many translations are available electronically. Working with unannotated translations from many languages has the advantage that larger samples than usual can be used and that the dependence on individual grammar writers' reporting or not reporting relevant characteristics is reduced. The most important advantage, however, is that working with automatic extraction forces us to formulate a fully explicit PROCEDURAL DEFINITION of the wanted category, which is then applied in exactly the same way to all languages considered. In particular, the heuristic potential of automatic extraction is invaluable. The automatic device is naive and does not have any preconceived opinions about what kinds of markers should be included or not. In this particular study, this has helped me find various non-mature gender grams which have been overlooked in the gender literature so far, such as Kiribati (5).

The procedural definition of the feminine gender gram will be discussed in more detail in §2. It has essentially two components: (a) finding markers associated with a semantic core in a FUNCTIONAL DOMAIN (Givón 1981) and (b) filtering out markers which are also associated with other semantic cores (notably masculine gender and female light nouns such as 'woman', 'girl' and 'mother'). Despite differences concerning parts of speech (pronouns, verbs, auxiliaries) and grammatical relations (A, S, R, O) exhibiting or not exhibiting feminine gender, all languages exemplified in (1–5) mark feminine gender in the same context in the parallel text corpus. The markers all occur in the same functional domain. Nothing in the procedural definition is in any way related to the notions of noun class and agreement. This means that if the endeavor is successful, it is possible to define feminine anaphoric gender grams in abstraction from the notions of noun class and agreement.

What does all this mean for the understanding of gender? Corbett's Agreement Hierarchy is evidence that there is a semantic pole (anaphors) and a syntactic pole (NP-internal agreement) in gender. Traditional research focusing on noun classes and syntactic agreement considers the syntactic pole to be basic. This culminates in the Canonical Approach to gender, which focuses on gender values of nouns and considers redundant gender marking and local agreement domains to be canonical (Corbett & Fedden 2016). In this paper I argue that a shift of perspec-

tive is possible where semantic and referential gender in anaphora is the primary concern of grammatical gender, whereas syntactic, lexical and redundant gender is secondary.

The following sections are structured as follows. §2 motivates and formulates the procedural definition of the feminine anaphoric gender gram and §3 discusses its practical implication in the parallel text corpus and reports the results. §4 elaborates on the distinction between mature and non-mature grams and how it is related to grammatical relations. §5 focuses entirely on those non-mature gender grams that are non-pronominal and arguably incipient anaphoric gender markers. Finally, §6 discusses how the functional approach developed in this paper can be connected to the traditional system perspective on gender and §7 concludes this paper.

2 A procedural definition of the feminine anaphoric gender gram

2.1 Overview

This paper focuses on a domain where gender is most obviously used semantically and which is easiest to address by automatic extraction in the N.T. corpus. In §2.2 I am going to discuss why feminine is easiest to address. I will then discuss why feminine anaphoric can be viewed as a functional domain which can be defined as a set of passages in the parallel text corpus (§2.3). The next step is to discuss what makes markers of feminine gender differ from other markers closely associated with the feminine anaphoric functional domain (§2.4). This will allow us to formulate a procedural definition of the feminine gender gram which is sufficiently elaborate for the purposes of this paper. Finally, based on the notions of cue validity and constructional islands, §2.5 discusses why anaphoric gender grams in most languages are accessible without previous familiarity with the entire language system.

2.2 Why feminine, why singular and why anaphora?

We know from Corbett's Agreement Hierarchy that the semantically most transparent use of gender is found in third person anaphoric pronouns. However, this does not mean that grammatical gender has the function of reference tracking

in discourse.[2] Within anaphoric use, the descriptive content of gender is most active in contrastive use in implicit or explicit focus (Bosch 1988 : 227; Seifart 2018 : 25), and contrastive use ('but she') is represented in the clauses selected for the extraction from the corpus as in (1). Since gender is often neutralized in the plural (even though this is no strict universal, see Plank & Schellinger 1997), the search space is restricted to singular. The most widespread meanings in gender grams are animacy and sex. Sex is easier to identify than animacy, since animacy comes in many different forms in grammatical markers, not only as gender feature, but also as condition on gender (Corbett 2006 , chap. 6) and is, among other things, also involved in the choice of case or adposition in differential object marking (Croft 2003 : 166). This leaves us with masculine (singular) and feminine (singular) as possible choices. In the N.T. corpus, feminine is the much easier choice. Reference to male beings is strongly overrepresented in this text, which makes it difficult to distinguish between third person masculine and third person in general in automatic extraction. A further complication in this particular text is that the distinction between male and deity is fuzzy, which, in many languages, calls for specific solutions where this distinction is relevant in grammar. Thus, feminine singular in the anaphoric domain is clearly the easiest option to choose.

2.3 Feminine anaphoric as a functional domain

Defining feminine anaphoric gender as a functional domain in parallel texts means identifying a set of passages where this function is expressed recurrently across all translations of the text. Such a passage is Matthew 15:27, which has been illustrated from various languages in Section 1 and which is for convenience repeated here in English in (6).

(6) English (Indo-European; Matth. 15:27)
*But **she** said: "…"*

Saying that (6) reflects the feminine anaphoric functional domain abstracts from the fact that this passage is related to another passage earlier in the text given in (7). In (7), the referent of the anaphor in (6) is introduced in the form of an indefinite noun phrase.

[2] According to Kibrik gender is used as a deconflicter in reference tracking in an "opportunistic way" Kibrik (2011 : 359). Languages rely on referential aids to various extent and some languages without gender such as Navajo (Na-Dene) are more strongly inclined to use reduced referential devices than some languages with gender such as Archi (Nakh-Daghestanian) (Kibrik 2011 : 336).

(7) English (Indo-European; Matth. 15:27)
And behold, ***a Canaanitish woman*** *came out from those borders...*

Another way to put it is that anaphors tend to be coreferent with full noun phrases introduced earlier in the text, which is not strange given that anaphora "is the phenomenon whereby one linguistic element, lacking clear independent reference, can pick up reference through connection with another linguistic element" (Levinson 1987 : 379). However, this does not mean that all anaphora have explicit antecedents with which they are exactly coreferent, as illustrated in (8).

(8) Anaphors without explicit antecedent (Hintikka & Kulas 1985 : 98):
A couple was sitting on a bench. ***He*** *stood up and* ***she*** *followed* ***his*** *example.*

Not only pronouns, but even full NPs can be used in anaphoric function, and third person pronouns and full NPs have very similar properties in anaphoric function as shown, in (9). Pronominal anaphors and definite NPs can both be used to make attributions of gender and neither of them requires a syntactically explicit antecedent, but they are both definite expressions.

(9) Pronouns and full NPs in anaphoric function (Hintikka & Kulas 1985 : 98):

a. *The teacher addressed the children.* ***He/The man*** *was stern.*
b. *A couple was sitting on a bench.* ***He/The man*** *stood up and* ***she/the woman*** *followed* ***his/the man's*** *example*

However, when assembling a set of passages expressing feminine anaphoric in a parallel text corpus, it is possible to abstract from the fact that most anaphors have NP antecedents and that a lexical item in the NP can determine the gender value in a way that goes against the core meaning of gender.

2.4 Filtering out markers of feminine gender grams from the feminine anaphoric functional domain

All languages have some anaphoric expressions in the feminine anaphoric domain, but not all expressions are grammatical expressions and not all grammatical expressions are feminine. The anaphoric expressions in the feminine anaphoric domain can be nouns, such as 'woman' or 'girl', or they can be pronouns not distinguishing gender. This is both illustrated in (10) from Turkish with the noun *kadın* 'woman' and the general third person pronoun *o* 'he/she'.

(10) Turkish (Matth. 15:24–27)
İsa, *«…» diy-e cevap ver-di. Kadın ise yaklaş-ıp, «…»*
Jesus say-CVB answer give-PST3 woman however approach-CVB
diyerek […]. İsa o-na, «…» de-di. Kadın, «…» de-di. «…»
say-CVB Jesus 3SG-DAT say-PST3 woman say-PST3
'But **he** [=Jesus] answered and said, "…" But **she** [=the woman] came […] saying, "…". And **he** [=Jesus] answered (to **her**) and said, "…". So **she** [=the woman] said, "…" '

It is thus not all expressions in the functional domain of picking up reference to female humans that instantiate feminine gender. If we extract the forms which are associated with the feminine anaphoric domain, which can easily be done by means of collocation measures (see §3), the recall will be too large. Put differently, many nouns, such as Turkish *kadın* '(a/the) woman', and general anaphoric pronouns, such as Turkish *o* 'he/she', will be extracted as well. One way to account for this is to define the search domain very narrowly by excluding such contexts where many languages use nouns instead of pronouns. But cross-linguistic and stylistic differences in the use of nouns, pronouns and zero anaphors are so large that a restrictive search domain is not sufficient.

The solution which is chosen here is to filter out expressions such as Turkish *o* 'he/she' and *kadın* '(a/the) woman'. By subtracting forms associated with anaphoric masculine and anaphoric in general, we can make sure that none of the extracted forms is third person masculine or third person general. Expressions for 'woman' have their own functional domain, which only marginally overlaps with the feminine anaphoric. Notably they also contain non-anaphoric uses, such as (7), where languages such as English have an indefinite article. Lexical nouns are not restricted to anaphoric uses, but can occur both in definite and indefinite uses. By subtracting all forms associated with the functional domain '(a/the) woman' from the set of forms associated with the feminine anaphoric we can make sure that none of the extracted forms means '(a/the) woman'. The same procedure can be applied to a few other critical lexical domains, such as 'girl' and 'mother'. Nouns are an open word class. Hence, the number of potential female lexical domains is potentially infinite. However, there is no need to care about rare lexical domains. It is sufficient to address the most frequent ones: 'woman', 'girl', 'mother', and 'daughter'. This is sufficient for the particular parallel corpus used. If in another parallel corpus another female lexical domain would be particularly frequent, it would have to be included in the filter as well. Filters must be adjusted to particular parallel corpora. However, their content can be described

in general terms in the procedural definition: "frequent female lexical domains".

Filtering out all forms that might be associated with a lexical domain, we can also make sure that the remaining set of forms consists exclusively of grammatical markers. This does not restrict the set to pronouns. Grammatical anaphors, such as *neierei* in Kiribati (5), will still be included.

What has been said above, results in the procedural definition for feminine anaphoric gender grams given in (11):

(11) Procedural definition of feminine anaphoric gender markers:

a. Extract all markers picking up reference to female humans
b. unless they can also be used to pick up reference to male humans, and
c. unless they express frequent female lexical domains (such as 'woman', 'mother', 'girl', and 'daughter')

The concrete implementation of this definition is discussed in §3.

2.5 Constructional islands and cue validity

The approach implemented in this paper rests on the assumption that markers expressing a grammatical or lexical meaning X can be viewed as constructional islands with high cue validity. I take these terms from the literature on first language acquisition (Tomasello 2003 : 113). In general terms, constructional islands can be defined as utterance-meaning pairings, where one part of the utterance, the marker, is constant, such as in the set: ***more*** *milk*, ***more*** *grapes*, ***more*** *juice*. The marker has high cue validity, if it is sufficiently distinct from all other markers in the language and if it can be immediately recognized without any previous analysis of the morphology of a language, simply as a continuous sequence of sounds (a word form or a continuous segmental morph without allomorphs).

The notions of constructional island and cue validity can be directly applied to parallel text corpora, where a constant meaning can be defined as a set of passages in which a meaning is instantiated. In written corpora we have to take continuous sequences of characters instead of phonemes. All word forms and all continuous substrings of words are candidates for markers that are directly accessible without any previous analysis of the language system. Constructional islands with high cue validity can be detected in the corpus without any knowlegde about the structure of a language and without any resort to parts of speech, grammatical or lexical categories, paradigms or systems.

My assumption is that if a language has a feminine anaphoric gender gram, there will usually be at least one marker with high cue validity. Not all markers will have high cue validity, so the extraction will not be complete. But the approach will be sufficient in most cases for finding out whether or not the language has a feminine anaphoric gender gram. For this purpose, it is sufficient to find one marker if there is more than one.

Put succinctly, if there is no gram, no marker is detected, if there is a gram, at least one of its markers is extracted.

There may be languages where the cue validity of anaphoric gender grams is low, where gender is highly integrated in grammatical systems. These may be cases where the marker is short (just a single phoneme within words of a particular word class) and often neutralized or where the marker is zero (as opposed to a non-zero masculine marker). However, my assumption is that in the vast majority of languages, feminine gender grams have high cue validity and can be viewed as constructional islands, at least to some extent.

3 Extracting feminine gender grams from parallel texts

3.1 Sample, data, and procedure

The sample consists of 816 languages (listed in Appendix A and B) and is not stratified. It simply contains the languages for which I happened to have an electronic version of the New Testament available when I started this work, and, as in other work based on Bible translations, some areas, in particular North America and Australia, are strongly underrepresented. The texts are not annotated. Some texts which are not in Roman script have been Latinized, but differences in writing systems have very little impact on the extraction procedure. Where the writing system is relevant, this is discussed below. For a few languages, more than one translation has been used (a total of 858 texts). The differences within languages are not reported, since in most cases the results were largely constant within a language,[3] but this does not change the fact that the translations represent particular varieties (doculects), and in a few cases there may be intra-language variety that has not been detected. In one case, Uduk, feminine anaphors have been deliberately created by missionaries (see §5.1), but language planning is an issue only for few languages of the sample, which is why it is not excessively discussed in this paper.

[3] There are some minor differences as in German where the form *ihr* [3SG.F.DAT] is not extracted in some texts.

While the theoretical notion of procedural definition of a category type (11) is very general, there are several practical details in the extraction process that can be adjusted and must be adjusted (see below). As is usually the case in typological investigations, there is no gold standard. It is not known what the result is going to be before the investigation has been carried out. Hence, the automatic extraction must be complemented by an evaluation by means of grammars and other reference material. However, since grammatical gender is known to be genealogically stable in many language families, it was very useful to have a large number of languages from a few large families in the sample. I expected feminine anaphoric gender to be lacking in most languages of the following families: Austronesian (134 lgs.), Niger-Congo (127 lgs.), Trans-New Guinea (90 lgs.; except Ok-branch known to have gender), Quechuan (25 lgs.), Sino-Tibetan (24 lgs.), Uto-Aztecan (18 lgs.), Turkic and Uralian (17 lgs.), and to be present in most languages in the following families: Indo-European (50 lgs.; except for some Indo-Iranian languages and Armenian known to lack gender), Arawakan (17 lgs.) and Tucanoan (13 lgs.). This means that for roughly two thirds of the sample there was an expected result and the details of the extraction mechanism (set of verses included in the search space, filters, how to compare a filter with the search space, see below) could be adapted in a process of trial and error until the outcome largely matched the expected result. In practice, the most difficult thing was to avoid extraction of forms in languages without anaphoric gender grams, so it is very important that the sample contains a large number of such languages (Appendix B). This means that only about a third of the languages of the sample had to be checked manually with grammars and other reference material. Hence, due to its genealogical stability, gender is an exceptionally favorable domain for a typological investigation based on parallel texts with many languages.

In the course of investigation it then turned out that in several dozens of languages the results yielded other forms than just the expected third person free and bound pronouns even after the necessary practical adjustments in the algorithm. At closer introspection, it became clear that many of these languages had incipient anaphoric gender; put differently, anaphoric gender that is so simple that it has not figured prominently in the literature on gender so far, which traditionally focuses on complex cases of gender. This made it necessary to devote a large part of this paper to languages with incipient gender (§5) and these languages also turned out to be typical exceptions to the expected genealogical stability of gender. The rest of the unexpected forms could be accounted for as various types of systematic errors due to the naive mechanic nature of the extraction algorithm (§3.3).

3.2 Extract all markers picking up reference to female humans

The starting point for the extraction of feminine gender from the N.T. parallel corpus is the procedural definition in (11).

First, the algorithm extracts markers picking up reference to female humans, based on collocation with a set of contexts where feminine anaphoric gender occurs.

In parallel texts meaning can be equated with a set of contextually embedded situations where the markers encoding that meaning (which are language-particular form classes) are expected to occur (Wälchli & Cysouw 2012 : 672). In order to identify the situations across translations into different languages, the texts must be aligned with each other on a level coming close to sentences (sentence alignment). The N.T. is aligned in verses and verses are often somewhat larger than sentences, but verse alignment comes close to sentence alignment. Extraction is much easier if the texts are also word-aligned, but here I use only verse alignment which is a crude approach.

For the sake of simplicity it is assumed that a marker is either a word form or a morph (a continuous part of a word form; in concrete terms, any continuous sequence of characters in a word form). This makes it possible to explicitly define the set of potential markers as all word forms and all continuous sequences of characters within word forms.

The easiest way to design a search domain is to take one or several SEED GRAMS (Dahl & Wälchli 2016), forms from particular languages where it is known that they more or less accurately instantiate a gram. Such forms are the third personal singular feminine personal pronoun forms in English (*she/her*) or in Scandinavian languages (Swedish *hon/henne/hennes*). The English forms *she* and *her* occur together in 292 verses in the N.T. (American Standard translation). An extraction of potential markers is nothing else than a list of the word forms and character sequences (approximating morphs) that collocate best with the search space above a certain threshold with an appropriate collocation measure. If these 292 verses are used as a search space, an extraction of collocating forms will contain many of the wanted markers, but it will also contain many forms that should not be extracted (boldface in Table 1).

A good extraction must meet two conflicting criteria. There should be as many correct extracted forms as possible (high recall), but there should also be as few wrongly extracted forms as possible (high accuracy). Since the majority of languages in the sample lack feminine gender grams, high accuracy is not as trivial as it might seem at first glance.

There are three ways improve accuracy: (i) We can use a higher threshold, but

Table 1: Word forms and morphs best collocating with English *she+her*

Language	Forms	Gloss of forms in boldface
Turkish	**kadın**	'woman'
Swedish	hon, henne, hennes, **kvinna**	'woman'
English	her, she, **woman**	'woman'
Koine Greek	αυτης, αυτη, >σα#<, **γυνη**, **η**	'woman', DEF.NOM.SG.F
Estonian	**naine**, **ta**, **tema**	'woman', 3SG, 3SG.EMPH
Tok Pisin	**meri**, **en**, **maria**	'woman', 3SG, 'Mary'
Indonesian	**perempuan**, >**nya#**<	'woman', POSS.3SG

Here and elsewhere the notation >x< will be used for morphs and # is used for word boundaries.

this is no good solution, since it has devastating effects on the recall. (ii) We can filter out wrongly extracted forms, since they can be grouped according to certain meanings which we can search for as well, such as 'woman' or general third person singular. (iii) We can reduce the search domain, so that the conflicting meanings are removed from it.

After many attempts I have decided to use a combination of (ii) and (iii). Probably it would be possible to work with the 292 verse search space and filtering, but I have not managed to design the filters such that the extraction is optimal. In the best attempt, there are in comparison to the extraction reported here wrongly extracted forms in 33 more languages and 10 languages are lost. The larger the search space, the more sophisticated the filters have to be. In larger search spaces there are simply more meanings represented and there is more that can go wrong.

In the extraction reported in this paper I have used a subset of 74 clauses as search space. The clauses have been selected manually, but more important than which clauses are selected is the simple fact that the set has about that size. If smaller sets are chosen it is increasingly more difficult to extract short bound morphemes, such a Garifuna >#t-< in (2). Explicit marking of word boundaries by a character makes peripheral morphs more salient and easier to extract.

The following criteria have been used to select the 74 clauses.

(i) Include verses where feminine anaphoric gender is instantiated several times, for instance, as in (12):

(12) Two of 76 verses in of the trigger domain (given in the English Lexham translation)
42015009 (=Luke 15:9) And when **she** has found it, **she** calls together **her** friends and neighbors, saying, 'Rejoice with me, because I have found the drachma that I had lost!'
44016015 (=Acts 16:15) And after **she** was baptized, and **her** household, she urged us, saying, "If you consider me to be a believer in the Lord, come to my house and stay." And **she** prevailed upon us.

(ii) exclude long verses (where many other meanings are expressed);

(iii) exclude clauses containing words for 'woman' in most texts;

(iv) exclude most verses where feminine anaphoric gender is contrastive ('but she'), because many texts have nouns for 'woman' there;

(v) exclude verses with 'Mary', so this proper name need not be filtered, and

(vi) exclude (as far as possible) clauses with masculine anaphoric contexts (in fact, this cannot be strictly implemented, because masculine anaphoric contexts are omnipresent in the text).

This results in a set of 74 verses[4] two of which have been illustrated in (12). Choosing the verse (or sentence/clause) as unit of alignment has an important consequences for the extraction of gender. It is not easily possible to distinguish between different grammatical relations, since the same verse often contains the feminine gender gram in various functions. This is notably true of reflexive possessors (as in *she calls together* ***her*** *friends*) where even the clause is too large as a unit of alignment. Thus, the extraction applied here is not helpful in deciding which grammatical relation a marker encodes; only that it is some sort of

[4] 40001019 (i.e., 40 1:19 or Matth. 1:19; Matthew is the 40th book in the Bible), 40002018, 40008015, 40009025, 40012042, 40014008, 40014011, 40015023, 40015027, 40026012, 41005042, 41006024, 41006025, 41006028, 41007030, 41010004, 41014005, 41014006, 41014008, 42001029, 42001035, 42001036, 42001057, 42001058, 42001061, 42002006, 42002007, 42002036, 42002037, 42002038, 42007013, 42007035, 42007038, 42007047, 42008054, 42008055, 42008056, 42010040, 42010041, 42011031, 42013012, 42015009, 42018005, 42020031, 43004013, 43004016, 43004026, 43008005, 43011023, 43011033, 43011040, 43012007, 43019027, 43020014, 43020017, 44005008, 44005009, 44005010, 44009037, 44009040, 44012014, 44016015, 44016019, 44019027, 45007003, 45009012, 45016002, 46007028, 54005010, 58011031, 59002025, 66002021, 66002022, 66021011.

feminine gender marker. The classification of markers according to grammatical relations in Appendix A has therefore been made manually with the help of reference grammars.

Furthermore, it needs to be pointed out that the N.T. is a text where feminine anaphoric gender is strongly underrepresented. Together with the considerable number of verses that have been excluded, this results in a quite small search domain, less than 1% of the text. However, there are enough examples in the text for a mostly correct automatic extraction of frequent feminine gender grams, even if this sometimes means that only some, not all, markers of a feminine anaphoric gender gram are extracted. Extraction works quite well, despite the fact that the algorithm used here is crude. This testifies to the high cue validity of feminine gender markers. Put differently, in most languages identifying feminine gender grams is not particularly complex and does not presuppose any knowledge about gender systems.

The algorithm goes through all candidates and checks which of them matches best with the trigger domain according to a collocation measure (here T-score as defined by Fung & Church 1994 is used) above a certain threshold. The threshold is determined empirically so that no or few incorrect forms appear. In order to demonstrate that this can be done in slightly different ways, two different thresholds have been applied: t=3.4 and t=3.19. The higher threshold prevents the first entirely wrong form to be extracted (Buglere *chku* [arrive:PFV] 'arrived'). However, with the higher threshold we also lose three languages with a feminine gender gram: Kabyle, Angami Naga and Owa (Owa is actually a borderline case, see 5.4), but there are also a large number of arguable errors among the 44 forms that are not extracted with the higher threshold. Since many errors are very interesting from a methodological point of view, I have chosen not to use only the higher threshold, which would probably have been the most reasonable thing to do for an optimal extraction. Forms only extracted with the lower threshold are given in curly braces in Table 2 and in Appendix A.

Although Indo-European languages have been the starting point for determining the distribution, it is rather languages from other families that have the best extraction values (the top three are Carapana *cõ*, Kaingang *fi* and Akateko *ix* (see Table 2).

3.3 Filtering out conflicting meanings

While the procedure described in §3.2 yields the correct result for most languages with anaphoric gender, the recall is too large in languages where anaphoric gender is lacking. The kind of forms wrongly extracted fall mainly into two semantic

Table 2: Selected languages where feminine anaphoric gender markers have been extracted

Language	Extraction	T-value of first form
Akateko (knj)	[ix]1	7.682
Ama (amm)	[isoki]1	4.113
Carapana (cbc)	[cõ]1 [>upo#<]2 [>ñupõ#<]3 [>mo#<]4	7.738
English (eng) [amstd]	[her]1 [she]2	7.2
Garifuna (cab)	[>#t<]1	6.008
Hausa (hau)	[ta]1 [>ta#<]2	5.309
Kaingang (kgp)	[fi]1	7.636
Latvian (lav)	[viņai]1 {[>usi<]2 }	4.152
Owa (stn)	{[kani]1 }	{3.191}
Zapotec, Miahuatlan (zam)	{[xa']1 }	{3.310}

groups:

(i) Indexes for third person singular not distinguishing gender. Forms expressing third person singular in general without making a gender distinction also collocate with feminine gender.

(ii) Words for 'woman', 'girl/daughter', and 'mother'. This is surprising at first glance since most texts in Indo-European languages of Europe do not contain instances with 'woman' in the smaller search domain of 74 verses and too few for 'girl/daughter' and 'mother' to be extracted. These "errors" reflect the fact that many translations into languages without feminine anaphoric gender use words for 'woman' in contexts where languages with feminine gender use forms such as *she* and *her*, as in (10) from Turkish. For determining whether a language has feminine anaphoric gender, the procedure must be refined so that such forms are not extracted.

If forms collocating with the feminine third singular also include some forms for third person singular general and some forms for 'woman' and other general feminine nouns, extraction must take this into account by excluding forms which have a better correlation with third person singular masculine and with 'woman', 'girl' and 'mother'.[5] The best way of doing this would be to define sets of verses

[5]To identify better correlations is not trivial since T-score values with larger search domains

for all conflicting meanings as carefully as for feminine anaphoric gender. Here, a cruder approach is used where these conflicting domains are simply represented by some characteristic instances in particular languages (Table 3).

Table 3: Filters in the extraction of feminine gender grams

Masculine filter (relates to (11b))	English *he* [2347 verses], English *him* [1836 verses], English *he/him/his* [3570 verses], English *said to him* [164 verses]
'Woman' filter (11c)	English *woman* [54 verses], Xaasongaxango *muso* 'woman' [39 verses] Yau (yuw) *owi* 'woman, grandmother' [1953 verses]
'Mother' filter (11c)	English *mother* [76 verses]
'Girl' filter (11c)	Nalca *gelma* 'girl, daughter' [40 verses], Upper Pokomo *mwanamuke* 'girl' [41 verses]
'Child' filter	Tok Pisin *pikinini* [743 verses]

(i) *The masculine filter*: For excluding general third person use, a form is not extracted if it correlates better with at least one of the following sets: (a) English *he*, (b) English *him*, (c) all uses of anaphoric masculine singular in English together (*he*, *him* and *his*), and (d) all uses of *said to him*. These four distributions all serve the same purpose, but conflicting forms can have different extensions, so all four of them are needed. Together they constitute the masculine filter.

(ii) *The 'woman', 'mother' and 'girl' filters*: For the exclusion of lexical feminine meanings, a form is not extracted if it correlates better with at least one of the following sets: (a) the English singular form *woman*, Xaasongaxango *muso* 'woman', and Yau *owi*, which is an instance of a very extensive use of

are generally higher than with small domains. Since there happen to be roughly two kinds of sizes of domains (smaller than 164 and larger than 742, see Table 3), it is for practical reasons possible to apply a very crude solution by dividing all values of the larger domains by two before comparison. If this correction is not applied, a considerable number of feminine gender markers, for instance those in Kuot and Paumarí, are filtered out.

a word for 'woman' occurring also in the co-compound *owi amna* [woman man] 'people' (Sarvasy 2014 : 104), (c) English *mother*, (d) Nalca *gelma* 'girl, daughter', (e) Upper Pokomo *mwanamuke* 'girl'. This is to make sure that the basic meaning of an extracted form is not 'woman', 'mother' or 'girl' and only incidentally also occurs in the anaphoric domain. Several forms are needed since the semantic extension of words can vary (in some languages 'daughter' and 'girl' is expressed by the same word, in others by different words).

After this is done, a smaller problem area remains which is presented here directly with the remedy resolving it:

(iii) *The 'child' filter*: In a few languages a word for 'child' is extracted. This is because children, child bearing, giving birth to children happens to collocate with the search domain in the N.T. This is solved by removing all forms that collocate better with Tok Pisin *pikinini* 'child' than with the search domain. This is a practical complication that is so specific that I have not included it in the more abstract procedural definition in (11).

To paraphrase the whole procedure in a simple way: a feminine singular anaphoric gender marker is any form that collocates with the feminine singular anaphoric gender domain unless it rather means third person singular in general, 'woman', 'mother', 'girl, daughter', or 'child'. Put differently, forms collocating with the feminine anaphoric singular gender must pass the masculine, 'woman', 'girl', 'mother' and 'child' filters before it is likely that they really represent the feminine anaphoric gender gram.

If the larger search space of English *she+her* is used, further filters have to be added, notably 'wife', 'husband' and 'Mary' filters. There are also complex adjustments required for comparing T-score values with search spaces of different magnitudes.

3.4 Unexpected extracted forms and whether they are errors

Since there is no gold standard, extracted forms were checked with grammars and dictionaries. Checking revealed that after markers with conflicting meanings have been removed by filtering, there remain some unexpected extracted forms which could be considered errors. However, almost all "errors" are highly interesting in that they are somehow associated with the meaning of the feminine anaphoric gram. They fall into five types:

(a) anaphoric (demonstrative or definite) forms of a word for 'woman',

(b) demonstrative pronouns,

(c) person name markers (determiners or titles), mostly female person name markers,

(d) gender markers within noun phrases, and

(e) the masculine gender form by female speakers,

Finally, four occasional forms for 'woman', third person singular personal pronouns, and an entirely occasional verb form meaning 'arrived' escaped filtering with the lower threshold.

(a) *Anaphoric (demonstrative or definite) forms of a word for 'woman'*: In South Tairora the form *nraakyeva* [*nraakye-va* 'woman-DEM'] is extracted, because the naive algorithm cannot recognize that it contains *nraakye* 'woman' and should therefore be removed by the 'woman' filter. In South Tairora demonstrative NPs are formed by a free demonstrative, *mwi*, *mwa*, or *mwatai* in the N.T. text, followed by a noun with an obligatory *-va* suffix (Vincent 2010 : 584). The form *nraakyeva* has the correct distribution since it only occurs in the feminine anaphoric domain; it is not a general form for 'woman' and passes therefore the 'woman' filter. This error thus derives from the fact that the algorithm applied here does not have the capacity to segment word forms into morphemes. Extracted forms with the same kind of error include Sabaot *(:)cheebyoosyaanaa* 'this woman', Endo *cheepyoosoonoonēē*, Ayautla Mazatec *chjunbiu*, Safeyoka (Wojokeso) *a'musi*, Umbu-Ungu *ambomo*, and Rawa *barega* (see Appendix A IV). Several similar forms are slightly below the lower threshold for extraction, such as Low Tarahumara (*muki-ka* 'woman-EMPH') and Auhelawa (*waihiuna-ne* woman-DEM/DEF'). Also Ama *nukonu* [woman.SPEC] (see (3)) sorts here, with an irregular form of the specifier (suffix *-ta* in other nouns; Årsjö 1999 : 92); however, this form is not extracted.

Generally, a demonstrative or definite form of 'woman' tends to be extracted whenever the demonstrative or definite marker is synthetic. This kind of error is particularly instructive because it shows us how anaphoric gender markers may emerge. Expressions for 'that woman' may qualify as anaphoric gender markers to the extent that the noun and demonstrative have become opaque. This is exactly what has happened in languages with

non-compositional complex NPs such as Japanese (see §5.2). The errors made by the computer derive from the fact that more forms are opaque for the computer than for humans.

(b) *Demonstrative pronouns*: Since complex expressions of 'that/the woman' are common feminine anaphoric expressions, it is not entirely unexpected that demonstratives and articles are occasionally wrongly extracted. This happens in several Trans-New Guinea languages: Mountain Koiali *ke-u* [that-SUBJECT] (Garland & Garland 1975 : 428; in the N.T. in *keate keu* 'woman that', *ma keu* 'girl that'), Folopa *kale* 'the' (Anderson 1989 : 85; in *kale so[-né]* 'the woman[-ERG]'), Fore *kana-* 'this mentioned one, the aforementioned' (Scott 1989 : 45), and Awa *mi* 'that' (Lowing & Lowing 1975) (Appendix A VI). I have not tried to add a demonstrative filter because demonstratives are too different in their distribution from each other and there is no point in adding filters that remove just one or two problematic cases.

(c) *(Female) person name markers*: It is not uncommon for anaphoric gender markers to also be used together with person names. In a few languages the form is slightly different, thus Kiribati uses *Nei* as a female person name marker and *neierei* as anaphoric gender form. In North Halmaheran languages of the sample female names contain a form *ngo*, which combines with the general determiner *o*. A few languages in the sample have female person name markers but lack anaphoric gender. If the language at the same time happens to use many person names in the anaphoric domain, the person name marker can be wrongly extracted (Appendix A III). This is the case for Iraya *bayi* (probably a shortening of *babayi* 'woman'), Uab Meto *bi*, Satere-Mawe *mana*, and Huave *müm*.

(d) *Gender markers within noun phrases are special cases of (b) and (c)*: demonstratives or extended person name markers that happen to bear NP-internal gender. In a sense these are not errors, since the forms mark feminine gender, but they mark feminine gender only NP-internally with common nouns and person names. This holds for Abau (*sokwe* [DIST.DEM.F.OBJ]; Lock 2011 : 87), where there are also correctly extracted anaphoric forms, and for Kadiweu, Mocoví, and Nalca.

The Guaicuruan languages Kadiweu and Mocoví have so-called local classifiers (standing, sitting, lying, coming, going, absent; Sándalo 1997 : 62) in attributive demonstratives, which combine with masculine and feminine

gender markers. In both languages only the form with the 'going' classifier is extracted: Kadiweu *nag-a-jo* CLOSE-F-going and Mocoví *a-so'-maxare* F-GOING-PRO (Appendix A VI).

Nalca (Mek, Trans-New Guinean) has developed a gender system from person name markers (Wälchli 2018), and the female person marker *ge-* grammaticalized from *gel* 'woman' has extended also to some female kinship terms and the word for 'woman'. The extracted form is the topic form *ge-ra* [F-TOP], which occurs in the search domain 15 times with female person names, 12 times with *gel* 'woman' and twice with two different words for mother (Appendix A III). In the whole N.T. this form is only used once anaphorically, but not within the search domain.

It is not unexpected that some NP-internal non-feminine anaphoric gender forms, as in Abau, Kadiweu, Mocoví, and Nalca, are extracted by the algorithm, because, as far as anaphoric NPs occur in the search domain, they have the right distribution and are not filtered since they are both dedicated to feminine and non-lexical.

Some languages have derivational noun suffixes in female nouns, such as Parecis *-halo*, Esperanto, and Iraqw *o'o* (Mous 1992 : 63). The Iraqw form is not extracted, the Esperanto form is eliminated by the 'woman' filter and the Parecis form is eliminated by the 'girl' filter.

(e) *Masculine gender for female speakers and second person feminine*: Kayabi (Tupian) distinguishes both speaker and referent gender (see §4). The verses of the search domain happen to contain a considerable number of quotations from female speakers which are basically useless for the extraction of the feminine gender gram. While the quotations do not do any harm for most languages, for Kayabi they cause with the lower threshold the error that *kĩã* 'M 3SG (female speaker)' is wrongly extracted. Also due to direct speech in the search domain is the extraction of Mwaghavul *yi*, a form for second person feminine reference, even this only with the lower threshold.

Finally, the most problematic wrongly extracted forms are four forms that escaped filtering. But three of them are extracted only with the lower threshold t=3.19. One form for 'woman' Ama *iní* 'woman' escaped filtering (Appendix A V). General third person pronouns in two Zapotecan languages were wrongly extracted (Appendix A VII). In Chichicapan Zapotec *bi* is opposed to third person respect *ba* (Benton 1975) and escapes the masculine filter, probably because Jesus is referred to with the respect form. For Chichicapan Zapotec *bi* even using the

higher threshold does not help; the T-value is high (t=5.24). Miahuatlan Zapotec *xa'* is another general anaphoric marker for third person (both masculine and feminine) that happens to have escaped filtering with masculine domains. These cases show that filtering is not always reliable, especially if forms for 'woman' and general third person singular deviate from their expected distribution in the text. Finally, as mentioned in §3.2, Buglere *chku* 'arrived' is the first fully unsystematic kind of error at t=3.39.

3.5 Languages where the automatic extraction fails to detect gender

Languages where gender is not extracted can be ordered into the following groups:

(a) There is agreement gender or there are noun classifiers reminiscent of agreement gender within the NP, but no or virtually no anaphoric gender: Limbu (van Driem 1987 : 21), Baruya, Biangai, and Mopan Maya (Contini-Morava & Danziger 2018) (for Nalca, Kadiweu and Mocoví, see §3.4 above).

(b) Gender is distinguished in pronouns, but only in the second or in the second and first persons: Basque, Paez (Jung 2008 : 136, first and second person, but not third person) and Iraqw. However, in Mwaghavul some second person singular form *yi* has been wrongly extracted, since second person with female referent often occur in direct speech in the search domain (see §3.4 (e)).

(c) There is feminine anaphoric gender, but it only covers the domain of girls or young women, the adult women domain is covered by a general human respect gender: Coatzospan Mixtec and Texmelucan Zapotec. These are removed by the 'girl' filter. The 'girl' filter is also responsible for eliminating the reduced nominal anaphor *tạhn* in Teutila Cuicatec. In Tlalcoyalco Popoloca the anaphoric forms generally correspond to specific feminine lexemes and are therefore filtered out (see §5.3) by the 'woman' and 'girl' filters. A more problematic case is Southern Puebla Mixtec, where the gender marker has many allomorphs (*-nè*, *-ne*, *-né*, *-ñá*, *-ña* F), and the only one that is detected happens to be removed by the 'woman' filter.

(d) Gender marking is restricted to a limited part of the S and P domain and the markers do not have high cue validity: Chechen, Hindi, Gujarati, and Eastern Panjabi. These are languages with feminine genders, but the anaphoric function in those languages is marginal or non-existing. In Avar only gender on free pronouns is detected.

(e) The marker is partly zero as opposed to a non-zero masculine marker: This holds for the Arawakan languages Pajonal Asheninka, Ashaninka, Caquinte, Pichis Asheninka and Nomatsiguenga. The algorithm as implemented here is simply not smart enough for recognizing zero as the marker of the feminine gender gram. The recognition of zero morphemes requests some understanding of systems or at least oppositions.

(f) Gender is too inconsistently marked to be extracted: In Iraqw (Cushitic, Afro-Asiatic; Mous 1992), masculine and feminine are not distinguished in third person free pronouns, and in affixes in verbs and auxiliaries, the markers are manifold both for the expression of subject and object (e.g., *ó'* 'she said' vs. *óo'* 'he said'). It is not possible to detect feminine marking as constructional island without previous analysis of the paradigms. The algorithm fails to detect feminine anaphoric gender in Iraqw.

(g) The dominant marker is orthographically identical with another form: Teutila Cuicatec.

The types (a) and (b) are no real errors since the algorithm only extracts feminine anaphoric gender in third person. The cases in (c) are too weakly grammaticalized or do not have general feminine gender grams, and can therefore not really be counted as errors. The cases in (d) are errors, but these are all languages where anaphoric gender has a very weak functional load. In Chechen only a small proportion of verbs have a feminine prefix *j-*[6] in S and P. In Hindi and some other Indo-Aryan languages, some verbs in some tenses have a feminine singular suffix *-ī*, not restricted to third person. The errors in (e) are due to the unsophisticated design of the algorithm that cannot recognize zero marking as a marker. All errors of the types (d), (e), and (f) concern languages where there are only bound gender markers consisting maximally of two phonemes; in most instances there is even only a single character. These are most difficult to identify.

Finally the failure in (g) is probably an artifact of the orthography not distinguishing tone, but I do not have any description of Teutila Cuicatec available to check whether te occurring 3573 times in the N.T., only a small part of which is the feminine gender marker, is a case of homonymy or undifferentiated orthography. But Cuicatec languages also have a general respect gender that makes extraction more difficult.

[6] The Cyrillic alphabet not representing /j/ with a single letter is an additional difficulty, but the extraction does not succeed even when the text is transliterated.

Using a larger search domain would be helpful for a few languages. With a search space of 293 verses mainly based on English *she/her* markers are extracted even for Paional Asheninka >#ok, >#op<, Ashanika >#o<, Caquinte >#o<, and more markers in other languages, such as Avar, >ŭ<, Tachelhit >#t<, Tamashek >#tĕ<, >#tă<, Maltese >et<, Machiguenga >#os< are extracted. (Note also that Kabyle >#te< is only extracted with the lower threshold.) However, using a larger search domain comes at the cost of more wrong forms not filtered and nine languages with non-mature feminine gender markers and Yagua not extracted. I have not managed to extract any forms in Hindi, Gujarati, Eastern Panjabi, Chechen, and Iraqw, however the extraction is designed.

Explaining away exceptions is always problematic. However, the discussion shows that there are good reasons why the algorithm misses gender in a few languages.

3.6 Cases where the automatic extraction fails to extract particular forms

It is quite astonishing that in most languages anaphoric gender markers can be identified without previous analysis of any other grammatical categories or lexemes. This means that in most languages at least some anaphoric gender markers tend to have very high cue validity and are constructional islands (item-based constructions with a constant element; Tomasello 2003 ; see §2.5) which can be considered in abstraction from most other aspects of grammar as a form-meaning relationship in the text. The only exception the extraction algorithm has to make is that it must consider the feminine anaphoric singular domain in opposition to the anaphoric masculine singular domain and to the lexical domain 'woman', however, without having acquired the grammar of how feminine and masculine gender interact with other categories. This entails that the algorithm fails to recognize cases of "diagonal" syncretism involving cumulation (Table 4). Diagonal syncretism is similar to neutralization in that a form is used for more than one category. However, the opposition is not neutralized since there is another cumulating category that keeps the values distinct. An example is the Latvian third person feminine nominative singular pronoun *viņa* 'she', which has the same form as the masculine genitive singular form. The algorithm used here excludes it, because this form is also used in the masculine singular anaphoric gender domain. The algorithm fails to recognize that there is cumulation with an entirely different category: case. Another case in point is Afrikaans *sy* 'she' which is also used for possessive masculine 'his'; only *haar* 'feminine oblique' is extracted. "Diagonal" syncretism only occurs in mature gender markers.

Table 4: Cases of "diagonal" syncretism

Latvian			Afrikaans		
	F	M		F	M
NOM.SG	***viņa***	*viņš*	3SG	***sy***	*hy*
GEN.SG	*viņas*	***viņa***	POSS.3SG	*haar*	***sy***

Interestingly, there is no language in the sample where a feminine gender gram is missed due to "diagonal" syncretism. All languages of the sample with "diagonal" syncretism also have another feminine anaphoric gender marker with higher cue validity.

Some forms are not extracted due to other cases of homonymy where the other homonymous form is much more frequent. French *la* '3SG.F.ACC' is not extracted, because this form is primarily used as a definite article outside the anaphoric gender domain.

Affixes, especially short affixes, are more difficult to extract than free forms. This holds especially of affixes restricted to object, absolutive, and/or recipient marking. In some cases the form for 'said to her' is extracted instead of the feminine recipient affix. This holds for some languages of New Guinea and South America: Ama *i-**so**-ki* [say-**O3SG.F**-REM.PST], Mian *baa-b-**o**-n-e-a* [say.PFV-BEN:PFV-**IO.3SG.F.PFV**-SS.SEQ-S.3SG.M-MED] (Fedden 2007), Bine ***jo**-ji-ge* [**ABS.3SG.F**-say-ERG.3SG] (as opposed to *je-ji-ge* [ABS.3SG.M-say-ERG.3SG] 'said to him'). In Kamasau the only form extracted is ***w**-uso* [**3SG.F**-go] 'she went' (Sanders & Sanders 1994 : 21). This is partly an artifact of the size of the search space. With larger search spaces, short bound morphs are more easily detected.

Due to the statistical nature of the algorithm, rare forms cannot be extracted since it cannot be known whether rare forms only accidentally occur in the search domain. This means in practice that forms occurring in less than eleven verses (or 15% of the search domain) cannot be extracted. This affects, for instance, contrastive subject forms, such as Welsh *hithau*, possessive forms with gender agreement, such as German *ihr-e/en/es/er* [3SG.F-AGR], demonstratives used for referents of relatively low activation (Kibrik 2011 : 327), such as Latvian *t-ā* [DEM.DIST-NOM.SG.F] and Latin *hæc*, and the Latin relative pronoun *quæ* [REL.NOM.F.SG] in non-relative use marking text coherence. Since there can be many feminine anaphoric gender markers, especially when markers are mature, there is a considerable amount of forms missed in languages with mature gender.

Gender markers for special groups of female beings, such as young women

or female deities, as they frequently occur in Mesoamerican languages, are not extracted by the algorithm. Forms for young women are mostly filtered by the lexical 'girl' filter. Other groups, such as female deities, are not represented with sufficiently high frequency in the text.

3.7 Conclusions

As can be seen in more detail in Appendix A and B, there are 629 languages in the sample lacking a feminine anaphoric gender gram and 187 languages where such a gram is attested. Furthermore, it can be seen in Appendix A that the automatic extraction fails to detect feminine gender in 18 languages (3 Indo-Aryan, 1 Nakh-Daghestanian, 1 Cushitic, 5 Tucanoan, 1 Mayan, and 7 Oto-Manguean). Wherever extraction fails, there is a good reason for it (anaphoric function for animate nouns highly restricted, very short bound or different bound affixes on verbs, zero exponence, or low degree of grammaticalization of the gram).

With one exception the wrongly extracted forms are all closely related semantically to feminine anaphoric gender and include feminine person name markers (5 lgs.), forms of a noun for 'woman' with a demonstratrive or definite affix (9 lgs.), other forms of 'woman' (1 lg.), demonstratives and definite articles (5 lgs., 2 of them distinguishing gender within the NP), and general third person pronouns (2 lgs). With the higher threshold, a feminine anaphoric gender gram is missed in 21 languages and a marker is wrongly extracted in 15 languages (all with some semantic resemblance to feminine anaphoric gender).

We can therefore conclude that almost all errors are systematic errors. Some are due to the crude nature of the algorithm that cannot segment word forms into morphemes. Some are due to the fact that some other grammatical phenomena are very closely related to anaphoric gender. Some failures are due to the fact that anaphoric gender has low cue validity in some languages. Rare forms are not detected. Throughout this section we have also seen that errors are sometimes even more valuable than correct results as they reveal where gender is particularly complex in certain ways. The procedure is highly useful as a heuristic device to check whether there are feminine anaphoric singular gender markers in a language.

4 Cumulation with grammatical relations and maturity of anaphoric gender

Once feminine anaphoric gender grams have been extracted for the languages of the sample, we can arrange the forms as they are distributed over various grammatical relations. This has been done by means of manual analysis and Table 5 illustrates the results for a few languages of the sample where there is some suppletion and/or neutralization for some grammatical relations. The languages listed in Table 5 represent different patterns of suppletion and/or neutralization and are discussed in more detail later in this section. The grammatical relations listed are A (transitive subject), S (intransitive subject), P (monotransitive object), R (recipient, indirect object), Poss1 (non-reflexive possessor or alienable possessor) and Poss2 (reflexive possessor or inalienable possessor; i.e., any less independent kind of possessor). Bound forms are indicated as affixes to the verb (-)V(-) or noun (-)N(-). See Appendix A for the whole sample. The examples in Table 5 are discussed in more detail below.

Table 5: Feminine gender grams (third person singular) in selected languages

	A	S	P	R	Poss1	Poss2
English	*she*	*she*	*her*	*her*	*her*	*her*
Belize Kriol	*shee*	*shee*	–	–	–	–
German	*sie*	*sie*	*ihr*	*ihr*	*ihr*-AGR	*ihr*-AGR
Welsh	*hi*	*hi*	*hi*	*wrthi*	*ei*+ASPIR	*ei*+ASPIR
Latin	*illa, quæ, hæc*	*illa, quæ, hæc*	*eam, illam*	–	–	–
Latvian	*viņa,* (V-*usi*)	*viņa, viņa,* (V-*usi*)	–	*viņai*	*viņas*	–
Northern Kurdish	*wê*	–	–	*wê*	*wê*	–
Hindi	–	V-*ī*	– (V-*ī*)	–	–	–
Ama	–	V-*mo*-	V-*mo*-	V-*mo*-	–	–
Au	*hɨre* / *w*-V	*hɨre* / *w*-V	V-*p*	V-*we*	AGR-*ɨre*	AGR-*ɨre*

As argued in §1, feminine anaphoric gender grams as those listed in Table 5 are mature. The markers have the function of noun phrases, but suppletion and neutralization is not characteristic of nouns. While mature anaphoric gender markers are often shorter phonologically than non-mature markers, a more reliable token of maturity is higher complexity in the sense of formal variability. The incipient anaphoric gender markers discussed in §5 are typically invariant across grammatical relations and not systematically absent from any grammatical relations (except sometimes reflexive possessor). This makes them differ from most pronominal anaphoric gender markers which exhibit cumulation and/or neutralization. English *she* (subject) and *her* (object, indirect object, and possessor) illustrate this point. Nouns are not entirely precluded from suppletion according to grammatical relation, but such suppletion in nouns is rare. Vafaeian (2013) shows that suppletion in nouns is common according to number, possession, and vocative case. In her sample of 63 languages there is only one language, Archi (Nakh-Daghestanian) with suppletion according to grammatical relation (absolutive/ergative in two nouns). Pronouns, however, and especially if bound pronouns are included, usually display some sort of suppletion and/or neutralization according to grammatical relation. In Turkish third person, for instance, the free pronoun has the stem *o* and the possessive suffix is *-i/ı/u/ü*. Pronouns can lack suppletion or neutralization according to grammatical relation, such as Mandarin Chinese *ta*[1] 's/he', but in pronouns this is the less frequent option cross-linguistically.

Anaphoric gender grams exhibiting suppletion or neutralization must have undergone some kind of grammaticalization process. They presuppose earlier stages with simpler gender grams which are more similar to nouns or have developed from markers of other grammatical categories (such as case or number). How anaphoric gender grams can develop from nouns and noun phrases will be discussed in §5 based on the languages of the sample lacking suppletion and neutralization according to grammatical roles. Suppletion and/or neutralization are not necessary properties of gender grams with a long prehistory, but since most grams extracted here with long prehistories of gender exhibit these properties, I will refer to grams lacking suppletion and neutralization as "non-mature". Figure 1 shows the distribution of mature and non-mature feminine anaphoric gender grams in the languages of the sample.

Let us now discuss the languages listed in Table 5 one-by-one:

While English has a feminine marker for all relations – *she* for subject and *her* for all other ones – Belize Kriol English (at least the N.T. version) distinguishes feminine *shee* only for S and A (subject); object *ahn* and the possessor *ih* do

figures/12/12-fig1.png

figures/12/12-fig1a.png figures/12/12-fig1b.png figures/12/12-fig1c.png

Map designed with the WALS Interactive Reference Tool by Hans-Jörg Bibiko.

Figure 1: Languages of the sample with mature and non-mature feminine gender grams

not distinguish gender. Even though there is only one form, there is different behavior across grammatical relations since the single feminine form does not occur as non-subject, where gender is neutralized in Belize Kriol English.

Agreement of possessors with head nouns is indicated by AGR in Table 5 and illustrated in (13) for German and (14) for Au. These examples show that gender indexation (boldface) and NP-internal gender agreement (arrow) can be expressed on the same word form.

(13) German (Indo-European; Mk. 3:31 ; Matth. 14:8)

a. ***sein**-e* *Mutter*
POSS.3SG.**M**-NOM.SG.F⟵ Mutter(F)[NOM]
'**his** mother'

b. *von* ***ihr**-er* *Mutter*
from POSS.3SG.**F**-DAT.SG.F⟵ mother(F)[DAT]
'by **her** mother'

(14) Au (Toricelli; Mk. 3:31, Mk. 9:21, Matth. 14:11)

a. *miye* *p-**ɨrak***
mother(F) ⟶SG.F-POSS.3SG.**M**
'**his** mother'

b. *haai* *k-**ɨrak***
father(M) ⟶SG.M-POSS.3SG.**M**
'**his** father'

c. *miye* *p-**ɨre***
mother(F) ⟶SG.F-POSS.3SG.**F**
'**her** mother'

Welsh (15) represents a special case in that anaphoric gender in possessive pronouns is marked only as a sandhi phenomenon spread to the following head noun. The third person singular masculine form *ei* causes soft mutation (among other things *m->f-*); the third person singular feminine form *ei*, however, causes aspirate mutation (no change for *m-*). This looks as if there was agreement into the wrong direction, but is simply a rather intricate case of anaphoric gender marking.

(15) Welsh (Indo-European; Matth. 14:8, Matth. 12:46)

a. ***ei*** ***f**am*
POSS.3SG POSS.3SG.**M**:mother(F)
'**his** mother'

b. ***ei*** ***m**am*
POSS.3SG POSS.3SG.**F**:mother(F)
'**her** mother'

Latin lacks gender distinctions in the dative and in the possessor (both non-reflexive *eius* and reflexive *su*-AGR). Latvian lacks a gender distinction for the direct object (*viņu* ACC.SG.M/F) and for reflexive possessors (*sav*-AGR RPOSS.M/F). In the subject, gender in Latvian is indexed not only by the free pronoun, but sometimes also in participles (*-usi* PTCP.PST.ACT.NOM.SG.F). Northern Kurdish distinguishes gender in the oblique (*wî* M, *wê* F), which covers A (ergative), R and non-reflexive possessor, but not in the absolutive (*ew* M/F) S and P relations. Hindi lacks gender in free pronouns, and in the perfective past, which I take here as the most representative form since it is used in narrative function, gender is marked on the verb (*-ī* F) only in intransitive verbs and in some transitive verbs for the

object. Ama (see also (3)) marks gender on the verb, but only for the absolutive, which, however, also covers the primary object (P and R): *ko-so-ki* [see-O.3SG.F-REM.PST] 's/he saw her' vs. *ki-Ø-ki* [see-O.3SG.M-REM.PST] 's/he saw him', *i-so-ki* [say-O.3SG.F-REM.PST] 's/he said to her' vs. *i-mo-ki* [say-O.3sg.m[7]-REM.PST] (Årsjö 1999).[8]

In all languages listed in Table 5, anaphoric gender is well entrenched, which can be seen from the fact that its marker interacts in some way with grammatical relations, either by means of cumulation or neutralization. This situation is characteristic of mature gender grams where anaphoric gender has a long history. This is opposed to incipient gender marking where the gender gram is less complex and usually only has a single form irrespective of grammatical relation and where the use of the gram tends to be optional.

All examples in Table 5 have in common that anaphoric gender marking is pronominal (whether free or bound) and has variable formal expression across grammatical relations as opposed to the invariant anaphoric gender markers of nominal origin or supposedly nominal origin discussed in §3. However, not all invariant anaphoric gender markers can be proven to have nominal origin. There are, for instance, two Tupian languages in the sample with invariant markers. KAYABI *ẽẽ* F (male speaker) M, *kyna* F (female speaker), M *'ga* (male speaker), and *kĩã* M (female speaker), distinguishing both speaker and referent gender. These markers also follow person names and animate nouns in anaphoric use. TENHARIM has *hẽa* F and *'ga* M (singular and plural), which also occur as suffixes on referring person names and animate nouns. Like in other Tupian languages the pronominal prefixes on nouns and verbs do not distinguish gender in Kayabi (Dobson 2005 : 27) and Tenharim (Betts 1981 : 17). The lack of gender markers in most Tupian languages might suggest that anaphoric gender in Kayabi and Tenharim are innovations.

However, invariant marking does not always testify to recent origin of gender. MALAYALAM (Dravidian) has the constant pronominal stem *avaḷ(-)* 3SG.F and no bound pronouns. But Old Malayalam still had subject indexes on the verb (*-ā̄ḷ* 3SG.F) (Andronov 1996 : 120). Anaphoric gender marking was thus not invariant in Old Malayalam. While all Indo-European languages and all Creole languages with anaphoric gender in the sample have variant anaphoric gender marking, the artificial language ESPERANTO has invariant marking with the constant markers

[7]The masculine form is zero except for a few relics with *-mo-* as in the verb 'say'.

[8]Some predicates are especially salient in terms of frequency in the corpus with animate participants, these are notably 'go/come/arrive' for S, 'see' for P, and 'say' for R. However, the indexes listed in Table 2 are not always equivalent in translation; for instance, not in all languages 'see' is transitive.

sxi(-) F and *li(-)* M.

Anaphoric gender can occasionally have quite unexpected sources. In YAGUA, women who have borne children are referred to by dual forms (Payne 1985 : 42) – 3DU *naada-* (often realized as *naan-*), *naadá*, 2DU *sáána-*, *saadá*. Men, however, are referred to with singular bound pronouns: 3SG *sa-* [I], *-níí* [II], 2SG *jiy-* [I], *jíy* [II].[9] In the N.T. dual forms are used as a default for adult women for whom it is not specified in the text whether they have given birth to children. Even if this is lack of gender from the point of view of the system – and Payne (Payne 1985 : 42) says explicitly that Yagua lacks gender – this is an anaphoric gender marking opposition from the point of view of language use. Anaphoric gender in Yagua hijacks another highly grammaticalized category, number. This is why the markers are mature even if they are presumably young as gender markers. Yagua is thus an example of a very specific origin of an anaphoric gender opposition which has a mature marker from the very beginning. However, since the origin of gender is often associated with case or number (Wälchli & Di Garbo 2019 [this volume]), the example of Yagua is perhaps less parochial than it seems at first glance.

To summarize: Even though there are a few exceptions, cumulation and/or neutralization testify to mature anaphoric gender marking whereas lack of cumulation and/or neutralization typically goes hand in hand with incipient gender marking. Since cumulation and neutralization can be considered to reflect an increase in complexity, this is evidence that complexity in anaphoric gender increases over time.

5 Grammatical anaphors and incipient anaphoric gender markers

5.1 Introduction

Third person pronouns (*he/she*) and full NPs have very similar properties in anaphoric function. Notably, there is very little semantic difference between a gender marked anaphoric pronouns (*he/she*) and a full definite NPs containing a light noun (a noun with a very general meaning, such as 'man', 'woman', 'thing'). This contrasts with their very different form – pronoun vs. noun – which assigns them entirely different roles in the typology of referential devices. As mentioned above, Kibrik (2011) makes a distinction between full referential devices (common nouns with or without modifiers, and person names) and reduced referen-

[9] Set II forms are used for direct objects and some intransitive subjects.

tial devices (pronouns and zero forms) and claims that it is universal: "The only truly universal opposition is that between full and reduced referential devices" (Kibrik 2011 : 42). Grammatical anaphors are intermediate referential devices in the sense that they are neither lexical nouns nor third person pronouns. However, the distinction is still clear-cut in the sense that grammatical anaphors are grammatical in the same way as personal pronouns and hence to be included when discussing gender grams. Kibrik (2011 : 123–136) discusses several of the grammatical anaphors considered here, such as Jacaltec classifiers and Japanese *kare* 'he' and *kanojo* 'she', under the heading "functional analogues" of personal pronouns.

Describing grammatical anaphors is essentially a synchronic aim. However, since grammaticalization tends to be unidirectional (Haspelmath 1999) and intermediate forms do not seem to evolve from more grammaticalized pronominal anaphoric gender markers, there is automatically also a diachronic dimension. Put differently, forms intermediate between nouns and indexes also tend to be INCIPIENT GENDER MARKERS. Intermediate forms (grammatical anaphors) keep from their lexical origin the property of distinguishing the basically lexical meanings 'woman' and 'man', but they are decategorialized from the lexical category of nouns. However, since the diachrony of grammatical anaphors often remains opaque, this is in some cases only a hypothesis. It is important to point out that incipient gender markers do not necessarily further grammaticalize to mature gender markers. It is very well possible that incipient gender markers can be lost or remain incipient. As discussed in §4, mature gender markers can develop from other grammatical categories, such as number, case or person, and need not necessarily develop from incipient anaphoric gender markers.

Grammatical anaphors have both pronominal and nominal properties. Three different subtypes are discussed in this section as illustrated in Table 6.

Table 6: Three subtypes of grammatical anaphors

Subtype	Example	Subsection
Non-compositional complex NP	Japanese *kano(-)jo* *'that(-)woman'	§5.2
Reduced nominal anaphor	Chalcatongo Mixtec *-ña* (*ñã'ã* 'woman')	§5.3
General noun	Northern Khmer *niang* 'girl; she'	§5.4

Non-compositional complex NPs differ from the other types in that they are diachronically complex (more than one morpheme). Reduced nominal anaphors differ from the other two simplex types in that they diachronically reflect reduced nouns. General nouns have the form of a non-reduced noun, but they are so extended in use that they are semantically difficult to distinguish from pronouns. What makes them pronoun-like is not their form or word class, but the fact that their use is broader than in their lexical nominal use. Put differently, general nouns have specific meaning when used as nouns and more general meaning when used as grammatical anaphors.

Two further issues need to be specified. The first one is that not all instances of incipient anaphoric gender markers reflect genuine grammaticalization developments since linguistic gender categories can be subject to deliberate language planning. As there are sometimes attempts to eliminate anaphoric gender by language planning (for instance, in Swedish, a gender neutral form *hen* has been suggested to replace *han* 'he' and *hon* 'she' and is now partly gaining ground especially in generic use; see Milles 2011 : 27), there have been attempts to implement gender distinctions in pronouns where there a none. A case in point is Uduk where the N.T. uses the noun *(a)yim* [CLASS2] 'female friend' for 'she' even though this noun does not have any anaphoric use in spoken Uduk (Don Killian, p.c.). Thus, Bible translation Uduk has a special pronominal noun whereas there are no indications of a grammaticalization of an anaphoric gender gram in spoken Uduk (for more information on gender in Uduk, see Killian 2019 [this volume]).

The second one is that the presence of a masculine grammatical anaphor does not entail the presence of a feminine form.[10] As other Mek languages, Yale (13) has a masculine, but no feminine grammatical anaphor. Yale does not distinguish gender in third person pronouns (*el* 3SG), but has a special form bone glossed 'this.man' by Heeschen (1992), which does not contain the noun *nimi* 'man', but rather looks like a demonstrative pronoun as it cumulates the expression of spatial deixis with its nominal meaning (*ane* 'this here', *ani* 'that up there', *anu* 'that down there', *bini* 'that man up there', *bunu* 'that man down there'; Heeschen 1992 : 15). All three devices, demonstrative NP, grammatical anaphor and personal pronoun, occur in example (16) and are summarized in Table 7.

(16) Yale (Mek, Trans-New Guinea phylum; Heeschen 1992 : 29)
Nimi ane *dinge,* ***bone*** *dinge dane,* ***el****-di kwaneng*
man this property, this.man property DEM:PL 3SG-GEN sweet.potato

[10] I do not know of any case of the contrary, a feminine grammatical anaphor without a corresponding masculine form.

wa-m-la=ba, na do-do de-n.
be-PRF-PRS.3SG=CONNECT 1SG take-CVB eat[PFV].PRS.1SG
'I have taken and eaten (earlier today) this man's sweet potatoes.'

While the etymology of *bone* 'this.man' is opaque, there is a second grammatical anaphor in Yale which obviously derives from a full NP: *mene* 'this.child' (*mini* 'that child up there', *munu* 'that child down there' < *me ane/ani/anu*).

Table 7: Yale third person pronouns, grammatical anaphors and demonstrative NPs

3SG	Grammatical anaphors	N DEM
	bone 'this.man'	*nimi ane/ene* 'this man'
el 'she/he'	—	*kel ane/ene* 'this woman'
	mene 'this.child'	*me ane/ene* 'this child'

This section does not discuss all languages in the sample where gender has emerged recently. Due to genealogical considerations, in some languages feminine gender must have emerged recently (all related languages lack feminine; this holds, e.g., for Northern Wè within Niger-Congo; Paradis 1983), but it is not possible to trace a non-pronominal origin of gender markers.

It should be also stressed that automatic extraction of anaphoric gender (§3) has been the dominant heuristic in identifying the relevant set of languages. Many languages discussed here are not traditionally considered gender languages and when I obtained forms in the automatic extraction I first thought that there must be some mistake in the algorithm.[11]

Some of the forms to be discussed in this section figure prominently in the literature on classifiers, especially NOUN CLASSIFIERS. This is no surprise since anaphoric use is a well-recognized function of noun classifiers in some languages. According to Aikhenvald (2000 : 87) "noun classifiers are typically used with anaphoric function". Aikhenvald discusses especially Mayan languages of the Kanjobalan branch (Jacaltec and Akateko) and some Australian languages (notably Yidiny). It is thus not unexpected that some noun classifier languages are found to exhibit anaphoric gender which does not presuppose agreement as definitional property.

[11]Since many languages also have third person singular forms not distinguishing gender they are not usually captured in Siewierska's (Siewierska 2005) typology (except Japanese where the third person singular pronoun is zero anaphor).

The literature on noun classifiers has in common with the literature on gender that it considers anaphoric use to be secondary. Noun classifiers as grammatical markers co-occurring with nouns in the same NP are not the topic of this paper, and in the same way as anaphoric gender can be considered without making reference to the notion of agreement, it can also be considered without making reference to the notion of noun classifiers.

5.2 Non-compositional complex NPs

Non-compositional complex NPs have similar uses as expressions for 'that woman/man', and sometimes they are entirely opaque, as the example from Kiribati illustrated in §1. However, non-compositional complex NPs are not usually condensed forms of 'that woman/man'; rather they contain other nouns that have been generalized to general meanings of feminine or masculine, such as 'mother' or 'elder sister' or 'body' or they contain obsolete or irregular forms of demonstrative pronouns.

English has no anaphoric non-compositional NPs, but a related phenomenon is indefinite pronouns originating from NPs, such as *somebody*. *Somebody* contains the noun *body*, but does not have the meaning that the noun *body* has. For a typology of indefinite pronouns, see Haspelmath (1997). In the languages of the sample, non-compositional complex NPs are attested in Kiribati (Austronesian), Japanese (isolate), Kannada (Dravidian), Zome (Sino-Tibetan), Golin and Chuave (Chimbu, Trans-New Guinea phylum). Anaphoric gender markers in some South American languages with noun classifiers, notably Nambikuara and in Guahiban and Witotoan languages, are highly reminiscent of non-compositional complex NPs and can perhaps be interpreted as more advanced stages of grammaticalization. Table 8 summarizes the forms of the languages discussed in this section.

Japanese *kanojo* 'she' means originally 'that woman', but it is not a reduced form of *sono onna* [that woman] 'that woman'. *Kano* is originally the attributive form of a distal demonstrative (free form *kare*) that has come out of use except in a few fixed archaic expressions such as *kare kore* 'that and this'. *Jo* is the Sino-Japanese expression for 'woman' (Ishiyama 2008 : 141). *Kanojo* and its masculine counterpart *kare* 'he' (originally 'that') were established in the Meiji period (1868–1912) in the literary movement *genbun-itchi* (unification of written and spoken language) where translations from European languages played an important role (Ishiyama 2008 : 139). There is some element of deliberate manipulation in this grammaticalization process and there is no reduction or erosion contributing to the grammaticalization of *kanojo* 'she'. The reason why *kanojo* cannot be analyzed as a compositional NP anymore is that the demonstrative *kano* has disappeared. Although *kanojo* usually is translated with 'she' it could also still be

Table 8: Languages with non-compositional complex NPs for female reference

	Index (3sg general)	Grammatical anaphor	NP 'that woman'	'woman'
Japanese	zero anaphor	*kanojo*	*sono onna*	*onna*
Kannada	*avaḷu* (F), V-*aḷu* (F)	*āke* (honorif.)	*ā strīyu*	*strīyu*
Zome	*amah*	*tuanu*	*tua numei*	*numei*
Kiribati	*ngaia, e*	*neierei*	*te aiine aarei*	*aiine*
Golin	V-*m*, V-*ngw*	*abalini*	*abal i*	*abal*
Chuave	V-*m*, V-*ngu*	*oparomi*	*opai,*	*opai*
S. Nambikuara	*te²na²*, zero, V-*la¹*	*ta¹ka³lx(ai²n)a²*[redacted]*txu¹h(a³ka³lx)ai²na²*[redacted]*na²*		
Cuiba	–	*barapowa*	*barapo petsiriwa/ yabʉyo*	*yabʉyo, petsiriwa*
Guayabero	–	*-ow, hapow*	*ampow pawis*	*pawis*
Huitoto Murui	*ie*	*naiñaiño*	*naie rɨño*	*rɨño*
Huitoto Minica	*ie*	*afengo*	*afe rɨngo*	*rɨngo*
Bora	*(i-)*	*diílle, -lle*	*áalle*	*walle*

translated as 'that woman'. In the N.T. *kanojo* competes in the anaphoric domain with *onna* 'woman' and *sono onna* 'that woman' (*suruto onna ha itsut-ta* [and woman TOP say-PST] 'So she said'; Matth. 15:27). *Kanojo* and *kare* cannot be compared to *she* and *he* in terms of text frequency (Ishiyama 2008 : 36). Japanese prefers zero anaphor as reduced referential device (Kibrik 2011 : 44). *Kanojo* also has some rather nominal uses: *kanojo wa?* [she TOP] 'Do you have a girlfriend?' (Ishiyama 2008 : 232). It can also be used as a term for address (Ishiyama 2008 : 232) which further shows that it is not a canonical third person pronoun.

KANNADA (Dravidian) has so called honorific pronouns *āke* 'that woman, she', *īke* 'this woman', which have developed from the demonstratives *ā* 'that', *ī* 'this' and *akka* 'elder sister'. The second component in *ātanu* 'that man, he', *ītanu* 'this man' (honorific) is of Sanskrit origin: *dēha-* 'person, body'. Similar forms are found in Telugu (Andronov 2003 : 171). Kannada and Telugu are the only lan-

guages I am aware of which have both gender-distinguishing third person pronouns (Kannada *avaḷu* 'she', *avanu* 'he') and grammatical anaphors.

Zome (Sino-Tibetan) *nu* and *pa* mean 'mother' and 'father' when possessed (*ka/na/a nu* [1sg/2sg/3sg mother]), but with the demonstratives *tua* 'that' and *hih* 'this' they are non-compositional complex NPs: *tuanu* 'that woman, she', *hih nu* 'this woman, she'. The corresponding nouns are *numei* 'woman' and *mi* 'man'. Rather than just pronouns and NPs there are three sets of forms in Zome: *ama(h)* 'he/she', *tuanu* 'she, that woman', and *tua numei* 'that woman'. It might be argued that *tuanu* 'that woman, she' is not sufficiently opaque to qualify as a non-compositional complex NP and is not much different from cases such as South Tairora *nraakyeva* [*nraakye-va* 'woman-dem'] that have been removed as errors (see §3.4(a)). Indeed, no form is extracted for Zome if the form is spaced *tua nu*, where *nu* 'mother' is removed by the 'mother' filter. However, Zome is different from South Tairora in that the demonstrative is written without space only in few forms where it is semantically non-compositional, it is not generally an affix. Looking more closely for non-univerbated collocations of 'that mother' in the search domain in other Sino-Tibetan languages did not yield any further cases like Zome *hih nu* 'this woman, she', which suggests that Zome is different from other Sino-Tibetan languages in the sample.

In the variety of Golin (Trans New Guinea, Chimbu) documented by Bunn (1974 : 55)) which is the same as in the N.T., the pronouns for third person plural *abalíni* 'she' < *abál inín* [woman refl] and *yalíni* 'he' < *yál inín* [man refl],[12] are not reflexive although they seem to contain reflexive markers. The variety documented by Evans et al. (2005) does not seem to have the same forms, but even this variety uses almost consistently NPs containing *abal* 'woman' or *gi* 'girl' and *yal* 'man' wherever the English translation has 'she' or 'he' as in (17) while in few cases where the reference is repeated within the same sentence there is only a bound affix for third person which does not distinguish gender.

(17) Golin (Lee 2005 : 35)
abal i takal no-m
woman top what eat-3
'What did she eat?'

In the closely related language Chuave *opai* 'woman' and *yai* 'man' are opposed to *opa-rom-i* 'woman-?-dist and *ya-rom-i/day* 'man-?-dist/prox' (Thur-

[12] The N.T. also has a few occurrences of *ibalini* (*ibal* 'people').
The documentation of Golin by Evans et al. (2005) has *yal (i) inin* 'he' [man (top) refl] only twice and in both cases *inin* can be interpreted reflexively.

man 1987) where the element *-rom-*, misleadingly glossed 'this' by Thurman, only occurs in these two non-compositional anaphoric forms.

In Southern Nambikuara (Nambiquaran) *txu¹ha²* 'woman' is opposed to *ta¹ka³lxai²na²* 'the woman, she' (*in³txa²* 'man' vs. *jah¹lai²na²* 'the man, he'). *Ta¹ka³lxai²na²* and *jah¹lai²na²* are listed as third singular feminine free pronouns by Lowe (1999 : 283) even though they contain the demonstrative nominal ending *-ai²na²* and the base can take many other nominal endings including demonstrative emphatic *-ai²li²* and indefinite *-su²* (*ta¹ka³lxu²su²* once in the N.T. for 'a woman').[13] Kroeker (2001 : 71) gives instead the forms with definite suffix (*-a²*) as third person forms (*ta¹ka³lxa²* and *jah¹la²*). There is also a third person form *te²na²* not distinguishing gender, which is used mostly in generic contexts where gender is not specified. Nambikuara has a large set of noun classifiers including *-a³ka³lx(i³)* feminine and *-(j)ah¹lo²* masculine which are always followed by nominal endings. These classifiers are placed at the end of NPs following adjectives and relative clauses. Thus, example (18) is one noun phrase. I interpret *Ta¹ka³lx(ai²n)a²* and *jah¹l(ai²n)a²* as non-compositional complex NPs.

(18) Southern Nambikuara (Rev. 17:18)
txu¹ha² ta¹ka³lx-a² *ĩ²-in¹-ta³ka³lx-ai²na²*
woman woman[ANA]-DEF see-2SG-F-DEM
'the woman whom thou sawest'

In Guahiban and Witotoan languages feminine anaphoric and masculine forms consist of demonstratives with classifier suffixes which can perhaps be considered opaque grammaticalized forms of non-compositional complex NPs.

Guahiban languages use demonstratives with classifier suffixes as special anaphoric forms. Guayabero differs from Cuiba and Guahibo in that the forms have become bound indexes on verbs, which suggests a higher degree of grammaticalization. Cuiba (Guahiban) has the demonstratives *ba(ra)po-wa*, *po-wa* [this-F, that-F] and *ba(ra)po-n*, *po-n* [this-M, that-M]. Machal (2000 : 237) lists the proximal <*bajapowa/bajaponü*> as personal pronouns, Merchán (2000 : 589) the distal *powa/pon*; neither source mentions the forms *barapowa/barapon*. In the N.T. mainly the forms *ba(ra)powa/ba(ra)pon* are used anaphorically – both longer and shorter forms very much in similar contexts – often also preposed to person names in anaphoric use. *Powa/pon* are mostly used NP-internally as a relative

[13]Note, however, that even the free forms for first and second person have the demonstrative and emphatic noun suffixes *txai²na²/txai²li²* 'I', *wxãi²na²/wxãi²li²* 'you', but they do not take the definite and the indefinite endings.

clause introducer. The suffixes *-wa* F and *-n* M make part of a larger set of classifier suffixes. Merchán (2000: 589) lists eight other inanimate suffixes, which do not seem to occur with demonstrative stems, however. Attributive demonstratives usually lack classifier markers. For the closely related language Guahibo, de Kondo (1985, 1: 15) gives *pówa̱* F and *pónë̱* M as personal pronouns (which are, however, used only in relative function in the N.T. and rare) and the forms with proximal circumfix *ma̱-je* and distal prefix *baja-* as demonstratives (de Kondo 1985, 2: 49). In the N.T. *barapova* is the dominant feminine anaphoric form; *mapovaje* is mainly used for 'this woman', a combination of demonstrative and *petiriva* woman (*bajarapova petiriva*) is attested only once; for definite uses of 'woman' the demonstrative with the feminine classifier suffix is preferred in proximal or distal form. Guayabero, a third Guahiban language, is different in that F *-(p)ow* and M *-(p)on* are used as bound indexes on verbs if there is no NP subject (they are two of at least nine third person markers, including various diminutive and neuter forms, see Keels 1985: 79, 86) and have become the major anaphor in the subject relation rather than the demonstratives *japow* and *japon*. According to Keels (1985: 79), subject and object indices can be combined on the same verb, but in the N.T. the object is usually expressed by the full pronoun *japow/japon*. The tendency to reduce subject markers more often than object markers can be seen as a first trait of maturity in Guayabero anaphoric indexes.

The special anaphoric form in Huitoto Minica (Witotoan) *afengo* 'she, that woman' (masculine *afemɨe*) consists of the demonstrative *afe* 'that' and the feminine noun classifier *-ngo* (masculine *-mie*) and is opposed to the noun *rɨngo* 'woman' (*ɨima* 'man') (Minor et al. 1982). The demonstrative can also combine with the noun: *afe rɨngo* 'that woman', *bie ringo* 'this woman'. The numeral for 'one' can combine both with the noun *daa ringo* 'a woman' and the classifier *daango* 'a woman' (rare). There is also a third person singular pronoun *ie* not distinguishing gender which is predominantly used in possessive function. Huitoto Murui is structurally very similar, except that the feminine classifier has various forms (*-ño, -ñaìño*) and is freer in combining with different pronominal stems (*naì-ñaìño* DEM.DIST-F, *baì-ñaìño* DEM.VIS-F, *bi-ñaìño* DEM.PROX-F, *i-ñaìño* 3SG-F). However *i-ñaìño* 3SG-F is rare and never used as a pronominal form (it is rather a free form of the classifier suffix). The most dominant anaphoric form is the distal *naìñaìño* 'she; that/the woman'. It is a matter of debate how closely related Bora and Huitoto are, but as far as the domain discussed here is concerned, the structural parallels are very strong. The major difference is that the Bora classifiers are not restricted to nouns and nominalizations but have extended to indexation on verbs, which is why Bora *-lle* 'F' and Muinane *-go* 'F' are much more fre-

quent than Huitoto Minica *-ngo*. A special property of the Bora text is that the noun for 'woman', *walle*, is very rare in the N.T.; it is used almost exclusively in generic contexts. Almost the whole range of the nominal domain is covered by the classifier suffix *-lle*. With numerals, the classifier is used: *tsáápille* 'one/a woman'. The possessive prefix for third person *i-* does not distinguish gender.

Non-compositional complex NPs tend not to be genealogically pervasive. They pop up occasionally in most different language families, except in Guahiban and Witotoan where we also encounter the most mature exemplars. It can be assumed that non-compositional complex NPs originate from transparent complex NPs when one of their parts becomes opaque or as they acquire a non-compositional meaning. However, the nominal origin is a hypothesis as far as Kiribati and the South American languages are concerned, where the etymology of the forms cannot be traced.

5.3 Reduced nominal anaphors

While the non-compositional complex NPs discussed in §5.2 are found in a wide range of language families, the reduced nominal anaphors in the sample all come from Mesoamerica and almost exclusively from one family, Otomanguean. Table 9 lists examples from six Otomanguean examples, where reduced nominal anaphors occur in subject and reflexive possessor roles.

Reduced nominal anaphors in Otomanguean are both more grammaticalized and less grammaticalized than non-compositional complex NPs discussed in §5.2. They are rather highly grammaticalized in that they quickly increase in token frequency as they extend to all grammatical relations including reflexive possessors. However, they tend to remain more restricted in use semantically. There can be separate forms for young humans, as in San Miguel Mixtec, and often there are separate forms for human respect and for deities.

In some languages the nominal origin of the reduced forms can clearly be traced. This is most obvious in Tlacoyalco Popoloca (Stark 2011). Although Tlacoyalco Popoloca has a third person pronoun *je'e* not distinguishing gender there is a large number of short forms of nouns with anaphoric use (termed "short pronouns" in Stark 2011 : 3). The most common include *xii* 'man[SG]' (anaphoric *xa*) and *nchrii* 'woman[SG]' (anaphoric *nchra*). Example (19) illustrates a plain noun *janna'a* 'mother' and its corresponding anaphoric form *jan*:

Table 9: V-subject and N-reflexive possessor in 'and she (=the girl) brought it to her mother' (Matth. 14:11) in selected Otomanguean languages with anaphoric gender

Tlalcoyalco Popoloca	*co jehe xan joanjo* ***xan*** *ngain janné* ***xan*** and 3 child gave **child[ANA]** give mother **child[ANA]**
San Miguel Mixtec	*te máá-**i**, ni̱ jancha̱ka-**i** nuu̱ náa̱-**i*** and self-YOUNG COMPL gave-YOUNG to mother-YOUNG
Tepeuxila Cuicatec	*ní* ***tá^{n}'ā*** *mii^{n} ní ca'a* ***tá*** *chɛɛcu* ***tá*** and **woman.F** there/DEF ? COMPL:give:3 **F** mother **F**
San Martín Itunyoso Triqui	*ni̱ naga'ui'* ***ún'*** *ra'a nni* ***ún'*** and gave **F** to mother **F**
Chiquihuitlan Mazatec	*ca-sua* ***na*** *naa rë* ***na*** COMPL-give **F** mother POSS **F**
Amatlan Zapotec	*nu lee* ***me*** *m-zaaya lo xnaa* ***me*** and FOC **F** COMPL-give to mother **F**

(19) Tlacoyalco Popoloca (Stark 2011 : 4)
Naa ***janna'a*** *jian anseen* ***jan*** *ixin rinao* ***jan*** *kain*
one mother fine heart mother[ANA] because loves mother[ANA] all
xe'en ***jan.***
children mother[ANA]
'A mother has a good heart because she loves all her children.'

Some condensed anaphoric NPs are reminiscent of noun classifiers ("pronouns that echo a prefix"; Stark 2011 : 4) and some uses are compatible with a noun class with agreement interpretation as when animals take the pronoun *ba*. However, anaphoric noun formation is productive and applies even to Spanish loanwords (*guitaarra*, anaphoric *guitarra*).

Tlacoyalco Popoloca *nchra* 'woman[ANA]' is so specific in its meaning that it can hardly be considered a grammaticalized feminine gram. It has the distribution of a word for 'woman', and other female nouns have other anaphoric forms.

All MIXTEC languages have clitic anaphoric gender markers usually following their head (following a verb for subject and object, following a relational noun

for oblique and following a noun for possessor) which mostly have the phonological structure CV (see Macri 1983 for a survey of several Mixtec languages) and are much more strongly grammaticalized than Popoloca anaphoric nouns. Unlike first and second person, there are no full free forms for third person clitics, or rather the corresponding full free forms are nouns. Chalcatongo Mixtec (Macaulay 1996 : 139) has the following six sets (in parentheses the nouns corresponding to the reduced nominal anaphors): masculine *-ðe* (*čàà* 'man'), feminine *-ña* (*ñã'ã* 'woman'), polite, older *-to* (*to'ò* 'older person'), supernatural *-ža* (*í'a*, *íža* 'god'), *-tɨ* animal, and *-ži* (no related noun, *žii* is 'male'). The clitics are usually not tenacious (i.e., they are dropped if there is an explicit NP), unless the NP preposed to the verb is a topic (Macaulay 1996 : 140). A way to supplete the missing full forms needed for contrastive purposes is to add the clitic to the emphatic form *máá* 'self' (Macaulay 1996 : 106, see also Table 4 above). The meaning of Mixtec genders is much more general than those of Tlacoyalco Popoloca genders. But 'girl, young women' is often covered by the child gender in many Mixtec languages (see Table 9 for an example from San Miguel Mixtec). In Coatzospan Mixtec, feminine gender is of limited use since there is a general adult respect human gender *ña* that does not distinguish men and women. "[T]he use of a specifically masculine or feminine noun or pronoun to refer to an adult is usually considered disrespectful" (Small 1990 : 406).

Reduced nominal anaphors or forms reminiscent of reduced nominal anaphors can also be found in Cuicatec (Bradley 1991), in Chiquihuitlan Mazatec (Capen 1996 ; but not in three other Mazatec languages included in the sample), and in Triqui (see Table 9).

Most Zapotec languages have some forms that are intermediate between nouns and third person pronouns. Feminine is not always a salient category though, because many Zapotec languages have a special respectful form used for both genders, especially for women by men speaking. In Texmelucan Zapotec respect is used for deity, respect human in women's speech and respect feminine in men's speech (Speck 1972 : 290). Texmelucan Zapotec has masculine (*yu*, *-y*), feminine (*fiñ*, *ñi*, *-ñ*), respect (*mi*, *-m*), animal (*ma*, *bañ*) and neuter (*ñi*, *-ñ*), which occur both in fuller and more reduced forms. As shown in (20), masculine and feminine can be modified by adjectives, numerals, and demonstratives, which makes them look rather like nouns, but they can even be reduced subject indexes on verbs.

(20) Texmelucan Zapotec (Speck 1972 : 32)
Benu sac ***fiñ*** *feñ* *nu* *gusht* *ni* ***yu*** *feñ* *ze´* *lugaar ze´* *nu*
if not.be 3F young COMP please PP 3M young that place that COMP

cyiiñ ***yu***, ***yu*** *ze´* *neñ* ***yu*** *nu* *zu* *tub* ***ñi*** *ca* *zi´l* *na tub*
POT:live **3M** **3M** that hear **3M** COMP POT:stand one **3F** where only be one
ranch nu *zet, ze´ a´* *yu´* *lo* *nap* ***yu-ñ***, *orze´ uz* ***yu***
ranch COMP far but NEG PROG.be.in face good **3M-3F** then father **3M**
gzuu *nez* ***yu*** *i´ñ* ***yu*** ***yu*** *feñ* *ze´* *nu* *cha-y* *cha*
POT:CAUS:stand trail **3M** child **3M** **3M** young that COMP POT:go-**3M** POT:go
gwii-y ***fiñ*** *mñaa ze´* *ben a gyet* *lagy* ***yu-ñ***.
POT:see-**3M** **3F** woman that if Q POT:descend liver **3M-3F**

'If there are no young women who appeal to the young man at the place where he lives, but if he hears that there is one at some ranch or another that is far away, but if he doesn't know her well, his father will send his child, the young man, to go see if he likes her or not.'

For Mixtepec Zapotec, Hunn et al. (n.d. : 11) list fourteen categories of third person pronouns, twelve of which refer to persons and only one of which is a reduced form (C-*á*, V-*w* inanimate). Their use depends on the speaker as is quite common across Zapotec: e.g., *nîip*, *nîib* is used by men for a young man and by women for a man of their age or younger. Several categories refer to men and women of lesser respect. *Zhó* <zho> 'person of minor respect, group of people' is used, for instance, in the N.T. for the Samaritan (Lk. 10:33). Shifting use depending on speaker attitude is not easily understandable in terms of noun classes, but well in-line with the idea of anaphoric gender.

Gender is more strongly grammaticalized in **Southern Rincón Zapotec**, where the familiar forms lack a gender opposition and respectful forms distinguish masculine and feminine (Earl & de Earl 2006 : 363). While the feminine consistently has the form *-nu* (free form *lë-nu*), the masculine form varies (free form *lë-'*): *blé'i-**në'**=nu* [COMP.saw-3SG.**M**.RESP=3SG.F.RESP] 'he saw her', *blé'i-nu=**në'*** [COMPL.see-3SG.F.RESP=3SG.**M**.RESP] 'she see him', *cati' blé'i-**në' lë'*** [when COMPL.see-3SG.**M**.RESP 3SG.**M**.RESP] 'when he saw him', *rë-'-nu* [CONT.say-3SG.**M**.RESP-3SG.F.RESP] 'he said to her'. The allomorphs cannot be clearly ascribed to different grammatical relations, however: *-(ë)'*, *-në'*, and *-lë'* all occur in direct object function. Aside from familiar (*-bi'*), feminine respect, and masculine respect, there are also forms for animal (*-ba*) and neuter in the third person singular.

The only non-Otomanguean language to be discussed in this section is Todos Santos Mam (Mayan). Mam has a set of twelve human classifiers which are reduced forms of nouns, non-compositional forms, or pronominal nouns (common noun *txiin* 'young woman' CL *txin*; *xu7j* 'woman' CL *xu7j* 'woman', CL *xuj* 'old woman (respectfully); *yaab'aj* 'grandmother' CL *xhyaa7* 'old woman'; Eng-

land 1983 : 158). While their use in Northern and Central Mam is mostly restricted to one occurrence per clause, Todos Santos Mam has extended them even to reflexive possessors as in (21).

(21) Mam Todos Santos (40014011)
*[…] bix e xi' t-k'o-'n-tl-**txin** t-e*
and ? go/DIR ERG.3-SG-give-DIR-again-CL.girl POSS.3SG-to
*t-txu-**txin**.*
POSS.3SG-mother-CL.girl
'and she (=the girl) brought it to her mother'

Note that both the ergative subject (A) and the reflexive possessor are indexed twice in (21), by the suffixed anaphoric gender marker and by the general third person singular prefix *t-*.

5.4 General nouns

General nouns have the form of a non-reduced noun, such as 'woman', 'girl' or 'wife', but because of their extension in use they are difficult to distinguish from pronouns. In the sample general nouns occur in four Mayan languages: Jacaltec, Akateko, Ixil Nebaj and Chuj, in Northern Khmer, and perhaps in the Austronesian language Owa.

It may be seem strange at first glance that general nouns can be extracted by the algorithm since they have the same form as lexical nouns whose domains of use are applied as filters in the algorithm. The reason they can be extracted is that their use as general nouns is so pervasive that it is quite different from what the use of a lexical noun would be if everything is taken together.

The same JACALTEC form *ix* 'woman' is used all the way from the nominal low activation domain up to the top pronominal domain. *Naj* 'he (non-respected, non-kin)' is a reduced nominal anaphor (*winaj* 'man'). *Ix* 'woman; she (non-respected, non-kin)' and *naj* 'he' belong to the set of noun classifiers and are notably used with thematically salient NPs in referential anaphoric function (Craig 1986 : 267; Aikhenvald 2000 : 323). There are no free third person pronominal forms except classifiers. Example (22) illustrates the non-respect feminine classifier *ix* 'woman' in non-reflexive possessor and subject function and the non-respect masculine classifier *naj* 'man' as a noun classifier in the anaphoric NP with a person name:

(22) Jacaltec (Matth. 14:8)
Y-al-ni *is-mi'* *ix* *t-et* *tato*
ERG.3-say-DETRANS POSS.3-mother CL.woman/F 3-to COMPL
ch-is-k'an *ix* *is-wi'* *naj* *Juan;*
INCOMPL-ERG.3-ask CL.woman/F POSS.3-head CL.man/M John
'Her mother said that she should ask for John's head.'

However, it is not the entire top activation domain that is covered by the general nouns. Reflexive possessors lack general nouns. Grinevald Craig (1977 : 159), who describes the phenomenon in detail, calls this "noun classifier deletion under identity of reference". Diachronically classifiers are not deleted from reflexive possessor function; rather they have never been expanded to that domain. Note that reflexive possessor even includes co-reference with object as shown in (23) ("no constraint on the controller NP", Grinevald Craig 1977 : 152).

(23) Jacaltec (Lk. 7:15)
y-a-ni-co *Comam* *naj* *t-et* *is-mi'.*
ERG.3-give-DETRANS-DIR CL.male.deity CL.man/M 3-to POSS.3-mother
'and he gave him$_j$ to his$_j$ mother'

The wider extension of possessive prefixes even to obligatory use with prepositions (*t-et* 3SG-to) testifies to their higher degree of maturity. Not all noun classifiers in Jacaltec (Day 1973 : 125) are general or reduced nouns.

For Akateko, which is closely related to Jacaltec, see Zavala (1992). In Nebaj Ixil, which is only distantly related to Jacaltec and Akateco within Mayan, the nominal and general uses of *ixoj(e)* 'woman' and *naj* 'man' differ in that the former have a preposed determiner *u*. Thus, from the point of view of the whole NP the general forms could also be considered to be reduced forms. *Chuj 'ix* 'woman' also arguably sorts here, although it is not as easily extracted as the forms in the other three Mayan languages.

In NORTHERN KHMER (Austro-Asiatic) the noun used prominently in the high activation domain is ⊠⊠⊠⊠ *niang* 'girl' rather than ⊠⊠⊠⊠ *srej* 'woman'. ⊠⊠⊠⊠ *niang* 'girl' also occurs as a term of address and it has probably become a special pronominal form by extension from deictic second person use to anaphoric third person use. Special pronominal nouns are a feature of Southeast Asia. Vietnamese has a general human special pronominal noun *người* for adult human beings, which is also used as a noun classifier, but Vietnamese lacks a general feminine anaphoric noun.

Owa (Austronesian) *kani* 'she, the woman, that woman; wife', which is just above the lower threshold for extraction, is difficult to classify. One possibility is to interpret it as a general noun with the specific meaning 'wife', but it is not clear to me whether the nominal meaning 'wife', restricted to use with following possessor, is the original one. Mellow's (Mellow 2013 : 273) dictionary analyzes *kani* as "pronoun", but the form is not listed in the grammar's pronoun section, where just the general third person singular form *ngaia* is given (Mellow 2013 : 7). As elaborated below, there is some evidence that *kani* might contain the female person name article *ka-*, but personal pronouns can also have articles, although most pronouns are in the i-class. Owa distinguishes five different genders in noun-phrase-initial articles listed here in their cumulative forms with coordination/comitative *mi*, where there are most clearly marked and distinguished: male person names *m-o*, female person names *mi-ka*, some nouns beginning in *e-* (mostly kinship terms, phonologically assigned) *m-e*, location nouns, some pronouns and the word *kare* 'child' *m(-)i*, and default *mi-na* (see also Mellow 2013 : 26). The male and female person name classes are extended to some common nouns, especially kinship terms, but not 'father' and 'mother', which are e-class, and to the pronoun 'who' (mostly in the male form *mo o-tai* 'and who?'). The male counterpart of *kani* 'she, the woman, that woman; wife' usually co-occurs with the male person name article *o* as *o wani* 'he, the man, that man, husband', which suggests that *kani* is a condensation of **ka-wani* (compare also *o goana* 'brother' vs. *ka goana* 'sister', *na goana* 'friend(s), sibling(s)'), especially also because all traditional Owa names have the female person article fused as a prefix *ka-* (Mellow 2013 : 20). In the N.T. *kani* is i-class in some instances (object *ki kani*; *mi kani* could also be interpreted as lack of article following *mi* 'and'), perhaps in phonological analogy to *kare* 'child' or in functional analogy to pronouns. In the automatic extraction *kani* is only extracted because there is no 'wife' filter. Whatever the origin of *kani*, it is a grammatical anaphor, but it remains unclear whether of the subtype general noun or the subtype non-compositional NP, which suggests that these two subtypes are not neatly different.

There are no examples with 'mother' as a general noun, but Zome, discussed in §5.2 comes close to it.

5.5 Conclusions

The three subtypes of grammatical anaphors discussed above reflect different parameters of grammaticalization that tend to behave differently in different nonmature anaphoric gender grams as summarized in Table 10. The definitional properties, marked with asterisks in Table 10, relate to different parameters. Hence,

the types are not strictly opposed to each other, so that some forms, such as Zome *tuanu* (§5.2) and Owa *kani* (§5.4) can have properties characteristic of various subtypes. In reduced nominal anaphors (§5.3) the grammaticalization of form (reduction) is most advanced, which goes together with a high text frequency, whereas generalization can be almost absent as in Tlacoyalco Popoloca. In general nouns (§5.4), generalization is the relevant factor of grammaticalization whereas formal reduction is absent. Non-compositional complex NPs (§5.2) can have low text frequency, as Japanese *kanojo*, unlike reduced nominal anaphors. The degree of decategorialization from nouns varies greatly. In most cases, grammatical anaphors retain at least some properties of nouns.

Table 10: Different properties of the subtypes of grammatical anaphors

Subtype	Complex	Opaque	Reduced	Frequent	General
Non-compositional complex NP	+*	+	−/+	−	+
Reduced nominal anaphor	−	+	+*	+	−
General noun	−	−	−	+/−	+*

The grammaticalization of grammatical anaphors is gradual for general nouns, while there is a more categorial border for reduced nominal anaphors and for non-compositional complex NPs (for the latter to the extent they are opaque). General nouns are not distinct in form from lexical nouns and generalization must have gone a long way before the markers escape filtering by the lexical noun their form instantiates.

6 Reconciling the gram approach with the system perspective

In the previous sections I have shown that it makes perfect sense to consider feminine anaphoric singular markers as a gram type (dedicated markers with a particular grammatical meaning, prototypically instantiated in a particular functional domain), and a typology of feminine singular anaphoric gender grams in a sample of 816 languages has been presented, which abstracts away from viewing gender as a system phenomenon resting on the notions of noun class and agreement. However, it is undeniable that gender values form systems and that – even if not always canonical noun classes and canonical agreement – at least some kind of noun-class-like and agreement-like phenomena are crucial for the

understanding of gender. The question thus arises as to what the gram approach can contribute to a better understanding of gender systems and of noun-class-like and of agreement-like phenomena in gender.

All gram types are alike in that they are markers instantiating a grammatical meaning X. However, beyond this common ground, different gram types may have different properties, and this is how they may become engaged in complex grammatical structures of particular kinds.

Feminine singular anaphoric gender grams are special in that they almost always are engaged in an opposition to another gram type, masculine singular anaphoric gender grams. This is no strict universal though. In §5.1 we have seen that Yale and some other Mek languages only have masculine anaphoric grams without parallel feminine anaphoric grams. However, Yale and other Mek languages are quite exotic in this respect. Oppositions are nothing strange for gram types. Most tense and aspect grams have some kind of oppositions. Perfect grams, for instance, are opposed to narrative (Dahl & Wälchli 2016 : 327), but this does not make every perfect gram to be opposed to a narrative gram. Within the realm of aspect it is certainly perfective and imperfective that are most inclined to engage in a pair of oppositions and, not unexpectedly, perfective and imperfective grams are usually the core of aspect systems.

In the extraction of feminine anaphoric gender grams, I have made practical use of the opposition to anaphoric masculine by using the anaphoric masculine as a filter. I have not been able to design an implementable procedural definition of feminine gender grams that can dispense with filters. Filters are kinds of oppositions and oppositions are the building blocks of systems. Here it is important to point out that the filters that have been used are semantic domains rather than language specific structural elements. Put differently, semantics predestines the feminine anaphoric gender gram type for structural oppositions. However, feminine anaphoric gender grams are not only engaged in one kind of opposition, they are generally and necessarily engaged in two kinds of oppositions: (i) to masculine and (ii) to nominal lexical domains for the designation of female referents, the most important ones being 'woman', 'girl', 'mother', and 'daughter', and these are also indispensable as filters in the procedural definition.

What makes feminine anaphoric and masculine grams grammatical from a semantic point of view is their virtual restriction to anaphoric use. Nouns, even nouns that are typically used to designate individual items, such as *mother*, *sun*, and *god*, can be used non-anaphorically: *a mother*, *a sun*, *a god*. Unlike lexical nouns, anaphoric grams are not only dedicated to anaphoric use, they also tend to be more general than lexical nouns. They are almost always in a hyperonymic

relation to lexical nouns (see also Seifart 2018). This can also hold when an anaphoric gram is not syntactically a pronoun as in Kiribati where *neierei* 'this woman' picks up reference to a range of female nouns. The least general feminine anaphoric grams we have encountered in Oto-Manguean languages (§5.3), most markedly in the extreme case of Tlacoyalco Popoloca, where "short pronouns" are an open set.

As soon as anaphoric grams are "hyperonymic", they are noun-class-like, since they collocate with a set of hyponymic nouns. The Tlacoyalco Popoloca "short pronoun" for animals is already reminiscent of a noun class, whereas the "short pronouns" for 'woman', 'mother', and 'girl' mainly correspond to particular lexical domains (this is why Tlacoyalco Popoloca is filtered out in the automatic extraction). Here it is important to emphasize the difference between "noun class" and "noun-class-like". English, *she/her*, for instance, is noun-class-like. In practice, *she* and *her* tend to pick up reference to such nouns as woman, wife, girl, and mother etc., but that does not make feminine gender strictly lexical in English.

At the same time, the anaphoric character of "picking up reference" makes anaphoric grams agreement-like, which does not mean that anaphoric gender is agreement. It is important to emphasize the difference between "agreement" and "agreement-like". The agreement-like character of anaphoric grams derives from their semantic properties, it is not a syntactic process. However, due to the similarity of agreement and agreement-like anaphors, anaphoric gender grams are highly compatible with agreement phenomena and can be integrated in agreement systems, even though anaphors are essentially semantic, as they can pick up reference from the context without syntactic antecedents.

Furthermore, anaphoric grams are special in that they tend to form chains (multiple occurrences of the same gram, often in different grammatical relations and in free or bound encoding).

In the previous sections we have seen that feminine gender grams entertain close relationships to other grammatical and lexical categories. Considering the closer neighborhood of the feminine anaphoric gender gram type we may speculate about what might be possible next steps for expanding the gram approach to gender and related phenomena. Aside of masculine singular and both feminine and masculine plural and dual forms, the most promising candidates for gram types are female and male person name markers and feminine and masculine NP-markers. These have been occasionally extracted as errors in the present investigation, so it might be possible to formulate procedural definitions that focus on these phenomena specifically and view them as gram types.

7 Conclusions

Grammatical gender is usually considered to be highly complex and it is traditionally defined in terms of agreement and noun classes, which are both complex phenomena. Thus, one way to explore whether gender might be simpler than commonly believed is to try to approach it without reference to the notions of agreement and noun classes. In this paper feminine anaphoric gender has been approached by way of a procedural definition which, when implemented in a computer program, extracts feminine gender markers from a parallel text corpus. This procedural definition does very well without any reference to agreement or noun classes suggesting that these notions are entirely dispensable at least for one important core domain of gender. It was also found that many anaphoric gender markers have high cue validity which suggests that they are not particularly complex. The notions the procedural definition relies on are those of functional domain and gram type which have proven to be useful for many other grammatical category types, suggesting that gender may be less puzzling among grammatical categories than commonly believed.

While there is a long research tradition of investigating particularly complex gender phenomena, less effort has been devoted to uncover simple gender. Thus, it has gone largely unnoticed in typology that there are many languages with non-pronominal anaphoric gender markers which are intermediate between full noun phrases and pronouns (grammatical anaphors). Non-pronominal anaphoric gender is less stable diachronically than pronominal anaphoric gender and can sometimes be proven to be very young. Gender in grammatical anaphors is therefore important for understanding how gender can develop diachronically. However, the low complexity of anaphoric gender also invites for deliberate manipulation as in the case of the Uduk New Testament where a feminine gender was created by missionaries.

Unlike non-pronominal anaphoric gender, pronominal gender is usually highly mature. This is reflected in the widespread suppletion and neutralization according to grammatical relations in pronominal gender, which are features of complexity synchronically even in languages such as English and Belize Kriol English where gender is commonly believed to be simple.

Finally, this paper has shown that parallel texts are highly useful for the study of grammatical gender. They help shift the focus of attention to the most functional aspects of gender and away from more idiosyncratic properties. Parallel texts also show that gender is not an isolated phenomenon, but has often very similar functions as, for instance, light nouns. Hence, to uncover the functions of

grammatical gender it may be useful to consider it together with other linguistic categories, including non-grammaticalized ones, which have similar functions. Grammatical anaphors which are often not recognized as gender markers in the descriptive literature can effectively be recognized as incipient gender markers in parallel texts.

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Abbreviations in glosses

1	first person
2	second person
3	third person
A	transitive subject
ABS	absolutive
ACC	accusative
ACT	active
AGR	agreement
ANA	anaphoric
ART	article
BEN	benefactive
CAUS	causative
CL	classifier
COMP	complementizer
COMPL	completive aspect
CONT	continuative aspect
CVB	converb
CONNECT	connective
DAT	dative
DEF	definite
DEM	demonstrative
DETRANS	detransitive
DIR	directional
DIST	distal
DU	dual
E	ergative
EMPH	emphatic
ERG	ergative
F	feminine
FOC	focus
GEN	genitive
INCOMPL	incompletive aspect
IO	indirect object
M	masculine
MED	medial
N	noun
NEG	negation
NOM	nominative
O/O	(direct) object
P	monotransitive object
PL	plural
PFV	perfective
POSS	possessive
Poss1	inalienable or non-reflexive possessor
Poss2	alienable or reflexive possessor
POT	potential aspect
PP	preposition
PRF	perfect
PRO	pronominal
PROG	progressive aspect
PROX	proximal
PRS	present
PST	past
PTCP	participle
Q	interrogative particle
R	recipient/indirect object
REFL	reflexive
REL	relative
REM.PST	remote past
RESP	respect
RPOSS	reflexive possessive
S	intransitive subject
S	intransitive subject
SEQ	sequential
SG	singular
SPEC	specific noun
SS	same subject
TOP	topic
V	verb/vowel
YOUNG	gender for children or young people

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Appendix A: Languages in the sample with anaphoric gender and the automatic extraction from parallel texts

>x<: morphemes, #: word boundary

I. Languages with a mature feminine anaphoric gender gram [128 languages]

Table 11: Languages with a mature feminine anaphoric gender gram

Language	Extracted form	A	S	P	R	Poss1	Poss2
Kannada (kan)	>aḷu#<, āke, ākege	V-aḷu, avaḷu, āke(yu)	”	avaḷannu, ākeyannu	avaḷige, ākege	avaḷa, ākege	-
Tamil (tam)	>□□□#<, □□□□, □□□□□	avaḷ, V-āḷ	”	avaḷ-ai	avaḷ-iṭum/ukku	avaḷ-atu	-
Albanian, Gheg (aln)	ajo, saj	ajo	”	-	-	saj	-
Latvian (lav)	viņai, -usi	viņa, tā, (V-usi, V-dama)	”	-	viņai	viņas	-
Lithuanian (lit)	ji, jai, ją, >usi#<	ji, (V-usi, V-dama)	”	ją	jai	jos	-
Breton (bre)	he, dezhi	hi	”	anezhi	dezhi	he	”
Welsh (cym)	hi, iddi, wrthi	hi, hithau, iddi	”	hi, hithau	wrthi, iddi	ei+ASP	”
Norwegian, Bokmål (nor)	hun, henne	hon	”	henne	”	hennes	-
Danish (dan)	hun, hende	hon	”	hende	”	hendes	-
Swedish (swe)	hon, henne	hon	”	henne	”	hennes	-
Faroese (fao)	hon, hana, henni	hon	”	henni	hana	hennara	-
Icelandic (isl)	hún, hana, hennar, henni	hún	”	henni	hana	hennar	-
English (eng)	her, she	she	”	her	”	”	”
English, Middle (enm)	hir, sche	sche	”	hir	”	”	”
German, Standard (deu)	sie, ihr	sie	”	”	ihr	ihr-AGR	”
Alemannic (swg)	sie	sie	”	”	ihr	ihr-AGR	”
Afrikaans (afr)	haar	sy	”	haar	”	”	”
Dutch (nld)	haar, zij	zij	”	haar	”	”	”
Saxon, Low (nds)	ää, see, äare	see	”	ää	”	äar-AGR	”
Greek (ell)	της, αυτήν	εκείνη	”	την	της	της	”
Greek, Koine (grc)	αυτης, αυτη, αυτην	η, εκεινη, V-ουσα	”	αυτην	αυτη	αυτης	”
Gujarati (guj)		-	V-ī	V-ī	-	-	-
Panjabi, Eastern (pan)		-	V-ī	V-ī	-	-	-
Romani, Sinte (rmo)	joi, li, late, lat, lakro	joi, koi	”	lat	late	lakr-AGR	-
Romani, Vlax (rmy)	lake, woi, la	woi	woi, V-i	la	lake	lak-AGR	-
Hindi (hin)		-	V-ī	(V-ī)	-	-	-
Marathi (mar)	□□□□, □□, □□□□	tine, tī /V-ī / -	tī /V-ī	ti-lā / V-ī / -	ti-cyā	-	
Kurdish, Northern (kmr)	wê	wê	-	-	wê	”	-
Latin (lat)	eam	illa, quæ, hæc	”	eam, illam	-	-	-
Romanian (rmo)	ea	ea	”	(o)	ei	”	-
Italian (ita)	ella	ella, essa	”	la	le	-	-
French (fre)	elle	elle	”	la	-	-	-

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Table 11 – *Continued from previous page*

Language	Extracted form	A	S	P	R	Poss1	Poss2
Catalan-Valencian-Balear (cat)	ella	ella	”	la	-	-	-
Spanish (spa)	ella	ella	”	la	-	-	-
Portuguese (por)	ela	ela	”	a	-	-	-
Russian (rus)	>ла#<, она, её, ей	она, V-ла	”	её	ей	её	-
Ukrainian (ukr)	вона, >ла#<, її, неї, їй	вона, V-ла	”	її	їй	її	-
Bulgarian (bul)	й, тя, я	тя	”	я	й	-	-
Slavonic, Old Church (chu)	ей, ю, ея	она	”	ю	ей	ея	-
Croatian (hrv)	joj, ona, >la#<	ona, V-la	”	je	joj	-	-
Czech (ces)	>la#<, jí, ji, její	ona, V-la	”	ji	jí	její	-
Polish (pol)	>ła#<, jej, ją, ona	ona, V-ła	”	jej	”	její	-
Avar (ava)	гьей, гьелда, гьелъ	гьелъ	гьей / й-V / -	”	гьелда	гьелъул	-
Chechen (che)		-	-	- / j-V	-	-	
Tachelhit (shi)	nttat	t-V, nttat	”	=tt	-	-	-
Kabyle (kab)	>#te<	te-V	”	=ṭ	-	-	-
Tamasheq (taq)	>tăt<	tĕ-V	”	=tăt	-	-	-
Bana (bcw)	ngəta, nzə	ghənzə / -	V-ta, ghənzə	”	ngə-ta	N-ta, N nzə	N-ta
Gude (gde)	ki, kya	kya	”	ka ki	”	N-tə	-
Dangaléat (daa)	>iit<, >ti#<, ta	ta / te-V			V-t	(not mother)	
Hausa (hau)	ta, >ta#<	ta V, ita	”	V ta	mata	N-ta	”
Mwaghavul (sur)	wura, ɨra, nwura, yi	wura	”	wura	nwura/wura	ɨra	”
Somali (som)	>eed<, >say#<	t-V, V-tay/say, iyada	”	-	-	N-eed	”
Iraqw (irk)		V-eer, V-VC, V-VVn	”	various	-	-	-
Dawro (dwr)	>aaddu#<, izo, izi, iza	iza, V-aaddu	”	izo	izo		
Gamo (gmv)	>adus#<, izis, izo	iza, V-us	”	izo	izos, izo	izi	-
Gofa (gof)	>u#<, iyo	iya, V-asu	”	iyo	iikko		-
Wolaytta (wal)	>su#<, o	a, V-aasu	”	o	iyyo, o	i	-
Kafa (kbr)	>an#<, >qqa#<	V-an	”	- ?	- ?	- ?	-
Maltese (mlt)	>ha#<	V-et	”	? -h/-tu	V-ha	N-ha	”
Amharic (amh)	>ačə<, >əwamə#<, >atə#<	V-ač	”	V-at	”	N-wa	”
Jur Modo (bex)	lâko, ’bënï	lâko	”	nï	zï-nï	bënï	N-nï
Belize Kriol English (bex)	shee	shee	”	-	-	-	-
Hawaiian Pidgin (hwc)	her, she	she	”	her	”	”	”
Burarra (bvr)	achila, >#ji<, >ny-<	-	jiny(u)-V	jiny(u)-V	achila	acha	”
Galela (gbi)	muna, ami, >#mo<, >mi<, munaka	mo-V, muna	”	-mi-V	munaka	ami	-

Continued on next page

Table 11 – *Continued from previous page*

Language	Extracted form	A	S	P	R	Poss1	Poss2
Tabaru (tby)	>#mo<, muna, gumuna, ’ami, mi, ngo	mo-V, (gu)muna ?	”	-mi-V	munaka	ami	-
Tobelo (tbl)	münanga, >#mo<, >#ami<, ngo	mo-V, münanga	”	-mi-V	munangika	ami	-
Rotokas (roo)	oira, >aev<, oirare	V-o-, (oira)	”	oira	oira-re	oira	”
Qaqet (byx)	qia, qi, ara, ki, kia	qia	”	qi	”		
Kuot (kto)	>ieng#<, iang	i-	”	V-ieng	o-	ieng	”
Yawa (yva)	mo	m-V / mo	m-V / mo / r-V	r-V	r- /rai	ama	”
Ama (amm)	isoki	-	V-so-	”	V-so-	-	-
Ambulas (abt)	léku, lat, >lé<	lé	”	lérét	?	léku	”
Iatmul (ian)	>lɨ#<, lɨla	lɨ, V-lɨ	”	lɨ	lɨ		
Kwoma (kmo)	siina, sii, siiti, siita	sii	”	siina	”	siiti	”
Kwanga (kwj)	tini	ti	”	tini	”	ti	”
Mende (sim)	si, simu, sirin	si(mu)	”	sirin	”	sihi	”
Yessan Mayo (yss)	te, tene, teri	te	”	tene	”	”	”
Abau (aau)	hoko, hoke, sokwe	hok(we)	”	hoke/ke	”	hoko	”
Sepik Iwam (iws)	saeya, saiir	saeya	”	saiir	”	”	”
Mufian (aoj)	>kw<, ako’w, >’w<, >ko<	kw(a)-V / ako’w	”	V-’w	-akw	N -kw/’w	”
Bumbita Arapesh (aon)	okwok, kwape, nakripok, >#k<	kw(a)-V, okwok	”	V-k	okwudok	okwokwik	”
Bukiyip (ape)	>ok<, >#kw<, >#ku<	kw(a)-V, okwok	”	V-k	-p-ok	okwokwik	”
Kamasau (kms)	wuso	w-V, <q>	”	stem inflection	-w	wung	-
Au (avt)	hɨre, >ɨwe#<, >#we<, >iye#<	hɨre / w-V	”	V-p	-we	AGR-ɨre	”
Olo (ong)	ne, >ene<	ne / n-V	”	V-(e)ne	”	pene	”
Yonggom (yon)	yu, >uun<, >een#<	V–een / yu(-mbed)	V–een / yu	V-end- / yu	”	yu	”
Bimin (bhl)	>u#<, >koum<, >ui#<, ulo, um, wangei	V–((e)l)u	”	wa-/w-/we-/um-/wam-V	”	um-	-
Faiwal (fai)	uka, >mam<, >#wak<, nadule, ulum, um	?	?	u-V	”	ulum	”
Mian (mpt)	o, baabonea	V—o	”	wa-V	V-bo	o	”
Ngalum (szb)	u, ua, >du<, >ukhe<, uede	?	?	?	?	u	”
Telefol (tlf)	>lu#<, tal	V-nulu	”	u-V		umi	”
Bine (bon)	jojige	-	Co-	”	”	-	-
Paumari (pad)	>’ihi#<	-	V-’i-hi	”	”	-	-
Garifuna (cab)	>#t<	t-V	”	-, tugía	t-un	t-N	”
Wayuu (guc)	shia, sümüin	s/sh-V	”	shia	sü-müin	sü-N	”
Piapoco (pio)	>#u<, úa	u-V	”	úa	u-lí	ú-N	”
Yucuna (ycn)	>#ru<, >#ro<	ru-V, V-yo ?		rucá	ro-jló	ru-N	”

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Table 11 – *Continued from previous page*

Language	Extracted form	A	S	P	R	Poss1	Poss2
Ignaciano (ign)	>#su<	-, su-V, esu	”	esu	”	su-N	”
Trinitario (trn)	esu, >#s<	-, mue-V	”	esu	?	sa-N	”
Asheninka Pajonal (cjo)		o-V	”	V-ro	V-ro	Ø-N	”
Ashaninka (cni)		o-/Ø-V	”	V-ro	V-ro	Ø-N	”
Caquinte (cot)		o-/Ø-V	”	V-ro	V-ro	o-/Ø-N	”
Asheninka, Pichis (cpu)		o-/Ø-V	”	V-ro	V-ro	o-/Ø-N	”
Machiguenga (mcb)	irorori	o-/Ø-V, iroro(ri)	”	V-ro	V-ro	o-/Ø-N	”
Nomatsiguenga (not)		o-/po-/Ø-V	”	V-ro	V-ro	o-/Ø-N	”
Apurina (apu)	oa, >#o<, >aro<	o-/Ø-V	”	V-ro	V-ro	o-/Ø-N	”
Yine (pib)	>#t<, wala, chinro	t-V, wala	”	V-Lo	V-Lo	t-N	”
Chiquitano (cax)	ɨmo	V-tɨ	”	ɨmo	ɨmo	ni-N-x-Ø/ IRREG	”
Cacua (cbv)	mi, mit, caántdih, miíh	mit, caántboó	mi	mi, caántdih	caántdih	mi	”
Yagua (yad)	>#nanu<	nan- / -	nan-/ naada / -	naada / -	nan- / -	-	-
Ticuna (tca)	>#ngi <, >#iya<	?	?	?	?	?	?
Tsimane (cas)	mọ’, je’	mọ’	”	V-’ / mọ’	V-’	mọ’	”
Cubeo (cub)	ɵ̃re, >jaco<, õ, õi	V-(a)co /V- / õ	”	ɵ̃-re	”	jí-N	”
Waimaha (bao)	cõ, cõre, >upo#<, >go<, >mo<, >rico<	V-Co / cõ	”	cõ-re	”	cõ	”
Tuyuca (tue)	coo, >go#<, coore	V-Co / coo	”	coo-re	”	coo	”
Desano (des)	igo, igore, >go<, >mo#<, >po#<,	V-gõ/mo / igo	”	igo-re	”	igo	”
Siriano (sri)	igo, igore, >yupo#<, >mo#<, >deo#<, igoya	V-gõ/mo / igo	”	igo-re	”	igo	”
Barasana Eduria (bsn)	so, sore, >mo#<	V-Co / so	”	so-re	”	so	”
Macuna (myy)	iso, isore, >yijo#<	V-Co / iso	”	isore	”	iso	”
Carapana (cbc)	cõ, >upo#<, >ñupõ#<, >mo#<	V-Co / V- / cõ	”	cõ	”	cõ	”
Tatuyo (tav)	co, >upo#<, cõre	V-wõ / co	”	(cõre) co V	co	co	”
Piratapuyo (pir)	>icoro<	ticoro / V-?	”	ticoro-re	”	ticoro	”
Tucano (tuo)	koô, koôre, >ko#<, >go<, niîwõ, >mo#<	V-Co / koô	”	koô-re	”	koô	”
Koreguaje (coe)	>mo#<, repao, repao’te, >si’ko#<, chikona	V-mo / repao	”	repao-‘te	”	repao	-
Siona (snn)	>go<, >si’co<	V-Co / bago	”	bago-ni	”	bago	”
Chipaya (cap)	na, >inćha#<, näźa, näkiś, näki	V-inćha / V- / näki	na	”	näkiś	näźa , ź-N	”

II. Languages with a non-mature feminine anaphoric gender gram [59 languages]

Table 12: Languages with a mature feminine anaphoric gender gram

Language	Extracted form	Remarks
Esperanto (epo)	sxi, >#sxi<	*sxi-n* ACC, *sxi-a*-AGR POSS
Malayalam (mal)	avall, avallodu, avalle	*avall* NOM, *avall-e* ACC, *avall-odu* INST
Japanese (jpn)	kanojo	*kano-jo* PROX-woman
Wè Northern (wob)	ʋ, ʋa’	*ʋ-a(‘)* POSS, object *ʋ(‘)*, -‘ intransitivizer, also after object pronouns (Paradis 1983)
Uduk (udu) [artificial variety of Bible translation]	yim, ayim	*yim* ‘female friend’ (noun)
Zome (zom)	tuanu	*tua-nu* DIST-mother, *hih nu* PROX mother
Naga, Angami (njm)	{süpfü}	*sü-pfü* DEM-F
Khmer, Northern (kxm)	⊠⊠⊠⊠	*niang* young female person
Kiribati (gil)	neierei, nei	*neierei* F.DIST, *Nei* female person name marker
Owa (stn)	{kani}	*kani* ‘that woman; wife’
Naasioi (nas)	teni, tenie	*teni-e* ERG
Ankave (aak)	i’	*i’* F
Chuave (cjv)	oparomi	*opa-rom-i* woman-?-DIST
Golin (gvf)	abalini	*abal-ini* woman-REFL
Oksapmin (opm)	uh, uhnong, uhe, {urhe}	*uh* F, *oh* M, *uh-nong* ACC, *uh-e* GEN, *urhe* REFL.GEN (M *orhe*)
Chuj (cac)		*’ix* woman, noun classifier for woman
Jacaltec (jac)	ix	*ix* woman, noun classifier for woman
Akateko (knj)	ix	*ix* woman, noun classifier for woman
Ixil, Nebaj (ixi)	ixoj	*ixoj(e)* woman
Mam, Todos Santos (mvj)	>xuj#<	*xuj* ‘old woman’, *txin* young woman, *te-* to
Cuicatec, Teutila (cut)		*tạhn* full form, *te* reduced form
Cuicatec, Tepeuxila (cux)	tá, tá^{n}’ā, ta	*tá^{n}’ā* full form, *tá/ta* reduced form
Mixtec, Atatlahuca (mib)	ña	*ña* F
Mixtec, Ocotepec (mie)	ña	*ña* F

Continued on next page

Table 12 – *Continued from previous page*

Language	Extracted form	Remarks
Mixtec, San Miguel (mig)	>-ñ<	*-ña* F
Mixtec, Peñoles (mil)	>-a^{n}#<	*-a^{n}* F
Mixtec, Pinotepa Nacional (mio)	ña	*ña* F
Mixtec, Southern Puebla (mit)		*-nè*, *-ne*, *-né*, *-ñá*, *-ña* F
Mixtec, Coatzospan (miz)		*tún* F (girls), adult respect *ña*
Mixtec, San Juan Colorado (mjc)	ña	*ña* F
Mixtec, Silacayoapan (mks)	ñá	*ñá* F
Mixtec, Yosondúa (mpm)	ña	*ña* F
Mixtec, Tezoatlan (mxb)	>án#<	*án*, *-án* F
Mixtec, Jamiltepec (mxt)	ña	*ña* F
Mixtec, Diuxi-Tilantongo (xtd)	>-ña<	*-ña*, F *nuu* 'to'
Triqui, Copala (trc)	no'	*no'* F
Triqui, San Martin Itunyoso (trq)	ún'	*ún'* F
Popoloca, San Marcos Tlalcoyalco (pls)		*nc̈ha* 'woman[ANA]', *xan* 'child, child[ANA]'
Mazatec, Chiquihuitlan (maq)	na	*na* F
Zapotec, Ozoltepec (zao)		*nzaa* girl
Zapotec, Quioquitani Quieri (ztq)	me	*me* F
Zapotec, Rincon (zar)	>nu<	*-nu* F
Zapotec, Southern Rincon (zsr)	>nu<	*-nu* F
Zapotec, Santo Domingo Albarradas (zas)		*-m* F
Zapotec, Lachixio (zpl)	>nchu#<	*-nchu* F

Continued on next page

Table 12 – *Continued from previous page*

Language	Extracted form	Remarks
Zapotec, Amatlan (zpo)	me	*me* F, *xaa* HONOR
Zapotec, Texmelucan (zpz)		*fiñ*, *ñi*, *-ñ* F, *mi*, *-m* RESPECT
Cuiba (cui)	barapowa	*barapowa*, *bapowa*
Guahibo (guh)	bajarapova	*bajarapova*, *barapova*
Guayabero (guo)	>ow#<	V-*ow*, N-*ow*, free form *japow*
Kaingang (kgp)	fi	*fi*
Rikbaktsa (rkb)	atatsa, >tatsa#<	*atatsa* 3SG.F, *-tatsa* F
Nambikuara, Southern (nab)	ta¹ka³lxai²na²	*ta¹ka³lx-ai²na²* F-DEM, *ta¹ka³lx-a²* F-DEF
Kayabi (kyz)	ẽẽ, {kĩã}	*ẽẽ* F (M speaker) M, *kyna* F (F speaker), M *'ga* (M speaker), and *kĩã* M (F speaker)
Tenharim (pah)	hẽa	*hẽa* F
Muinane (bmr)	diigoco, >go<	*-go* F
Bora (boa)	>lle<	*-lle* 'F'
Huitoto, Minica (hto)	afengo, {aféngona}	*afe-ngo* DIST-F
Huitoto Murui (huu)	>ñaiñ<	*nai-ñaiño* DIST-F, *bi-ñaiño* PROX-F

III. Languages with feminine person name markers, wrongly extracted [6 languages]

Language	Extracted form	Remarks
Uab Meto (aoz)	{bi}	*bi* N, with feminine person names
Iraya (iry)	bayi	*bayi* N, with feminine person names
Huave (huv)	{müm}	*müm* 'mother' used with feminine person names
Satere-Mawe (mav)	mana	*mana* N, with feminine person names
Nalca (nlc)	gera	*ge-ra* F-TOP, also with feminine person names

IV. Languages with wrongly extracted demonstrative/definite forms for 'woman' [9 languages]

Language	Extracted form	Remarks
Sabaot (spy)	:cheebyoosyaanaa	*cheebyoosya* 'woman'
Endo (enb)	cheepyoosoonoonēē	*cheepyooso* 'woman'
Mazatec, Ayautla (vmy)	chjunbiu	*chjun* 'woman'
Djambarrpuyngu (djr)	{miyalknhany}	*miyalk* 'woman'
Safeyoka/Wojokeso (apz)	a'musi	*a'mu* 'girl'
Fasu (faa)	{hinamoamo}	*hinamo* 'woman', *-amo* "referent subject"
Umbu-Ungu (ubu)	ambomo	*ambo* 'woman', *-mo* 'the'
South Tairora (omw)	nraakyeva	*nraakye* 'woman', *-ve* DEM
Rawa (rwo)	barega	*bare* 'woman', *-ga* DEF.SG

V. Wrongly extracted forms for 'woman' [1 language]

Language	Extracted form	Remarks
Awa (awb)	iní, mi	*iní* 'woman[ABS]'; *mi* 'that'

VI. Wrongly extracted demonstratives and articles (without or with gender) [5 languages]

Language	Extracted form	Remarks
Mountain Koiali (kpx)	{keu}	*ke-u* [that-SUBJECT]
Folopa (ppo)	kale	'the'
Fore (for)	kana	*kana-* 'this mentioned one, the aforementioned'
Kadiweu (kbc)	naǥajo	
Mocovi (moc)	aso'maxare	*a-so'-maxare* F-GOING-PRO

VII. Wrongly extracted general third person forms [2 languages]

Language	Extracted form	Remarks
Zapotec, Miahuatlan (zam)	{xa'}	*xa'* 3 M/F, *mza'* girl
Zapotec, Chichicapan (zpv)	bi	*bi* 3 M/F, *ba* 3.RESPECT

VIII. Entirely wrongly extracted forms

Language	Extracted form	Remarks
Buglere (sab)	{chku}	*chku* arrive.PFV

Appendix B: Languages in the sample without any feminine anaphoric gender gram [629 languages]

Phyla or families and ISO 639-3 codes Languages with only wrongly extracted forms (Appendix A III-VII) are included and underlined.

Creoles and artificial languages

Creoles (12/14): acf, bis, djk, hat, kri, mbf, mfe, pis, rop, srm, srn, tpi

Artificial languages (0/1)

Eurasia

Altaic (10/10): aze, bxr, kaa, kaz, krc, kum, tat, tur, uzb, xal

Basque (1/1): eus

Dravidian (0/3)

Indo-European (10/50): awa, hif, hns, hye, mai, ory, oss, pes, prs, tgk

North Caucasian (1/3): tab

Korean (1/1): kor

Japanese (0/1)

Uralic (7/7): est, fin, hun, kpv, mhr, myv, sme

Africa

Afro-Asiatic (7/24): gnd, hig, meq, mfh, mfi, mif, pbi

Niger-Congo (126/127): acd, adj, ann, anv, atg, bam, bav, bba, bfd, bib, bim, biv, blh, box, bqc, bss, bud, bwq, bwu, cce, cko, cme, csk, cwt, dgi, dnj, dop, dts, dug, dyo, dyu, ewe, fal, fub, fuv, gbo, gej, gkn, gng, gog, gur, gux, guz, hag, hay, heh, izr, jbu, kao, kbp, ken, kez, kik, kin, kki, kkj, kma, kng, knk, kno, kub, kus, las, ldi, lee, lef, lem, lia, maw, mcu, mda, men, mfq, mnf, mnk, mos, muh, myk, mzk, mzm, mzw, ncu, ndz, neb, nfr, nhu, nim, nko, nnw, nso, ntr, nya, nyf, nyy, old, ozm, pkb, rim, sbd, sig, sil, sld, sna, soy, spp, sus, swh, swk, tbz, tem, thk, tik, toh, tum, vag, wmw, wol, vun, xho, xon, xrb, xsm, yal, yam, yor, zul

Nilo-Saharan (14/15): avu, bjv, dik, dip, dje, enb, kyq, lwo, mfz, mur, nus, shk, spy, udu

East Asia and Southeast Asia

Austro-Asiatic (2/3): bru, vie

Austronesian (132/134): aai, ace, adz, agn, aia, akb, alp, aoz, ban, bbc, bcx, bdd, bhp, bku, blz, bnp, bpr, bps, btd, bth, bto, bts, btx, bug, buk, bzh, ceb, cha, dad, dob, dww, fij, gfk, gor, haw, hil, hla, hnn, hot, hvn, iba, ifb, ifk, ifu, ilo, ind, iry, itv, jav, jvn, kbm, khz, kne,

krj, kud, kwf, kzf, lcl, lcm, leu, lew, lid, ljp, mad, mah, mak, mbb, mbt, mee, mek, mhy, min, mlg, mmo, mmx, mna, mnb, mog, mox, mpx, mqj, mri, msm, mta, mva, mwc, mvp, mwv, nak, nia, nij, npy, nsn, pag, pam, plt, pmf, ppk, prf, pse, ptp, ptu, pwg, rai, rro, sas, sbl, sda, sgb, sgz, smk, sml, smo, snc, sps, sso, sun, swp, sxn, tbc, tbo, tgl, tpz, tte, twu, urk, uvl, war, wuv, xkl, xsi, zlm

Hmong-Mien (1/1): mww

Sino-Tibetan (22/24): acn, ahk, bgr, cfm, cmn, cnh, cnk, cnw, csy, ctd, czt, grt, hlt, kac, kyu, lhu, lif, mhx, mwq, nan, pww, taj

New Guinea and Australia

Australian (3/4): djr, gvn, wim

East Bird's Head (3/3): mej, mnx, mtj

East Papuan (2/6): sua, yle

Geelvink Bay (1/2): bvz

Karkar-Yuri (1/1): yuj

Arai (Left May) (0/1)

Sepik-Ramu (2/10): msy, sny

Torricelli (0/6)

Trans-New Guinea (79/90): aey, agd, agg, amn, aom, apz, aso, auy, awb, bbr, bef, big, bjr, bmh, bmu, boj, byr, dah, ded, dgz, faa, for, gaw, gdn, ghs, hui, imo, iou, ipi, kgf, kjs, kmh, knv, kpf, kpr, kpw, kpx, ksr, kue, kyc, kyg, mcq, med, mhl, mlh, mlp, mps, mux, naf, nca, nii, nlc, nop, nou, nvm, okv, omv, ppo, rwo, sll, snp, soq, ssd, ssx, sue, tim, ubu, waj, wer, wiu, wnc, wnu, wsk, xla, yby, yli, yut, yuw, zia,

West Papuan (0/3)

North and Mesoamerica

Algic (1/1): ojs

Eskimo-Aleut (2/2): esk, kal

Hokan (1/1): chd

Huavean (1/1): huv

Iroquoian (1/1): chr

Mayan (23/28): acc, acr, agu, caa, cak, chf, cke, ctu, hus, hva, ixl, kek, lac, mam, mop, mvc, poh, toj, ttc, tzj, tzo, tzt, usp

Mixe-Zoque (8/8): mco, mir, mto, mxp, mxq, mzl, poi, zos

Na-Dene (3/3): caf, crx, gwi

Oto-Manguean (36/63): amu, azg, cco, chq, chz, cle, cnl, cnt, cpa, cso, ctp, cuc, cya, maa, mau, maz, ote, otm, otn, otq, vmy, zab, zac, zad, zai, zam, zat, zav, zaw, zpc, zpi, zpm, zpq, zpu, zpv, zty

Totonacan (5/5): tku, toc, too, top, tos

Uto-Aztecan (18/18): azz, crn, hch, ncj, ncl, ngu, nhe, nhg, nhi, nhw, npl, ntp, ood, pao, stp, tac, tar, yaq

South America

Arauan (0/1)

Araucanian (1/1): arn

Arawakan (3/17): ame, pab, ter

Aymaran (1/1): ayr

Barbacoan (4/4): cbi, cof, gum, kwi

Cahuapanan (1/1): cbt

Camsa (1/1): kbh

Candoshi-Shapra (1/1): cbu

Carib (7/7): ake, apy, bkq, car, hix, pbc, way

Chibchan (8/8): bzd, cjp, con, gym, kvn, sab, tfr, tuf

Choco (3/3): emp, noa, sja

Guahiban (0/3)

Harakmbet (1/1): amr

Jivaroan (3/3): acu, hub, jiv

Macro-Ge (4/7): apn, mbl, txu, xav

Maku (1/2): mbj

Mataco-Guaicuru (2/3): kbc, mzh,

Nambiquaran (0/1)

Paez (1/1): pbb

Panoan (7/7): cao, cbr, cbs, kaq, mcd, shp, yaa

Peba-Yaguan (0/1)

Quechuan (25/25): inb, qub, quf, qug, quh, qul, qup, quw, quy, quz, qvc, qve, qvh, qwh, qvi, qvm, qvn, qvo, qvs, qvw, qvz, qxh, qxn, qxo, qxr

Tacanan (3/3): cav, ese, tna

Ticuna (0/1)

Tol (1/1): jic

Tsimane (0/1)

Tucanoan (0/13)

Tupi (10/12): gnw, gug, gui, gun, gyr, kgk, mav, myu, srq, urb
Urarina (1/1): ura,
Uru-Chipaya (0/1)
Waorani (1/1): auc
Witotoan (0/4)
Yanomam (1/1): wca,
Yuracare (1/1): yuz
Zaparoan (1/1): arl

Chapter 13

On the distribution and complexity of gender and numeral classifiers

Kaius Sinnemäki
University of Helsinki

This paper surveys the occurrence of gender and numeral classifiers in the languages of the world and evaluates statistically whether there is a complexity trade-off between these two linguistic patterns. Complexity is measured as overt coding of the pattern in a language, an approach that has been shown earlier to provide a reliable first estimate for possible trade-offs between typological variables. The data come from a genealogically and areally stratified sample of 360 languages. The relationship between gender and numeral classifiers in this data was researched by constructing Generalized Linear Mixed Models. According to the results a significant inverse relationship occurs between the variables independently of genealogical affiliation and geographical areas. The distributions are explained functionally by economy, that is, the tendency to avoid using multiple patterns in the same functional domain.

Keywords: gender, numeral classifiers, language universals, complexity trade-off, description-based complexity, mixed effects modeling, economy, distinctness, language contact

1 Introduction

In the past 35 years there has been an increasing amount of cross-linguistic research on gender, and more broadly on noun classification (e.g., Dixon 1982 ; Corbett 1991 ; Aikhenvald 2000 ; Audring 2009 ; Kilarski 2013 ; Di Garbo 2014). However, much of this research has been qualitative and not many researchers have focused on noun classification from a statistical typological perspective.

Earlier work on noun classification systems suggested that languages might not have both classifiers and gender as separate categories (e.g., Dixon 1982).

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Later work has revisited these claims and more languages have been found which use both gender and classifier systems (e.g., Aikhenvald 2000). For instance, Palikur (Arawakan) has gender and additionally five different classifier systems, including numeral classifiers. The examples in (1) illustrate the co-occurrence of gender and numeral classifiers in noun phrases.

(1) Palikur (Arawakan; Aikhenvald & Green 2011 : 411)

a. *paha-p-ru* *tino*
one-NUM.CLF:ANIM-F woman
"one woman"

b. *paha-p-ri* *awayg*
one-NUM.CLF:ANIM-M man
"one man"

However, while the co-occurrence of both gender and classifiers is possible in languages, it is relatively rare for a language to have both types of noun classification (Corbett 2013). It seems therefore possible that classifiers and gender occur in roughly complementary distribution across languages. If so, such complementary distribution would amount to evidence on a possible complexity trade-off in the domain of noun classification. While complexity trade-offs have been researched and discussed recently in various grammatical domains, the results have mostly proven to be negative: trade-offs occur far less often than has been thought earlier (e.g., Shosted 2006 ; Miestamo 2009 ; Nichols 2009 ; Sinnemäki 2008 , Sinnemäki 2011 , Sinnemäki 2014a , Sinnemäki 2014c).

My aim in this paper is to research the relationship between gender and classifiers to find out whether they interact in particular ways across languages in terms of complexity. For the purpose of this paper I sample numeral classifiers because they are the most common type of classifier system in the languages of the world (Aikhenvald 2000 : Ch. 4). Data is drawn from a genealogically and areally stratified sample of 360 languages. The data comes partly from the databases of Gil (2013), Corbett (2013), and Nichols (1992) and is supplemented by my own extensive data collection and analysis. To assess statistical tendencies in the data I use generalized mixed effects modeling (see Jaeger et al. 2011 and Bentz & Winter 2013 for recent applications to typological data). Mixed effects modeling provides a way of modeling the effects of genealogical inheritance and areal diffusion as random factors and so doing justice to the observation (e.g. Nichols 2003) that rates of language change may vary across language families and geographical areas.

The rest of the paper is organized as follows. §2 presents my approach to language complexity. §3 describes the analysis of gender and numeral classifiers (§3.1), the statistical methods (§3.2), and the data (§3.3). §4 presents preliminary results (§4.1) as well as the results of the main hypothesis testing (§4.2). §5 discusses explanations and §6 concludes the paper. Appendix 1 and 2 at the end of the paper provide additional information about statistical modeling and about the data and sources.

2 On language complexity

A critical question in language complexity research is what approach should be taken to complexity.[1] In recent cross-linguistic research language complexity has been approached in basically two different ways that are briefly introduced here.

First, it has been argued, most notably by Kusters (2003 ; 2008), that the notion of complexity should be tied with language usage, hence usage complexity, or difficulty. In this approach the complexity of different structures, such as the agreement classes of gender, are based on their on-line difficulty in language use or possibly on the time it takes to acquire them in first or second language acquisition (Kusters 2003).

Second, many scholars have argued instead that complexity should be kept separate from difficulty (Dahl 2004 ; Miestamo 2008 ; Sinnemäki 2011). In this approach, the formulation of complexity is based on the number and variety of the parts of the grammatical description and the interactions between these parts. The main reason for this delimitation of complexity from difficulty is that usage complexity inevitably raises the context-sensitive question "difficult to whom" and the different user-based criteria do not necessarily lead to the same complexity measurement. The speaker, the hearer, the first language acquirer, and the second language learner do not all find the same linguistic patterns easy or difficult (see Miestamo 2008 ; Sinnemäki 2011 for details). As in my earlier writings in this area, I maintain that a typological approach to complexity is most feasibly done from this perspective, which I call description-based complexity (Sinnemäki 2014b). Description-based complexity should also be applied to local domains instead of attempting to measure overall complexity of language (Sinnemäki 2011).

There are different pros and cons in these two approaches and I refer the reader to Miestamo (2008), Kusters (2008), and Sinnemäki (2011) for earlier debate.

[1] This section is largely based on Sinnemäki 2014b : Section 9.2.

One further issue, however, deserves mention here. It has been pointed out that these approaches have not been well-connected to complex systems theory and have rather focused on the enumeration of complexity in terms of constituents or rules (Andrason 2014). What actually makes a system complex in complex systems theory is not the number of parts or rules but a number of different aspects of the system: that it is open, non-linear, emergent and adaptive, to name a few (see Kretzschmar 2015 for further details). My aim in this paper is not the enumeration of complexity as such but to use the notion of linguistic complexity to evaluate what is a central goal in language typology, namely, to find the ways in which linguistic patterns may interact with each other (Bickel 2007). This interaction may be seen as an adaptive process of different linguistic patterns (see §5). In this sense, my approach combines aspects of the complex systems theory with description-based complexity.

Although my aim here is not the enumeration of complexity, it is necessary to say a few words about the basis of measuring complexity. I follow here Gell-Mann and Lloyd's (Gell-Mann & Lloyd 2004 : 387) proposal that complexity be defined as effective complexity of an entity, that is, "the length of a highly compressed description of its regularities" (see also Dahl 2004 for an application of effective complexity to linguistics). Effective complexity is a way of focusing on the set of regularities of a system, that is, on the minimal description of its structure. In other words, complexity may be measured as the compressibility of the system's regularities. When applied to grammatical systems this means that the more patterns a linguistic entity contains, the longer (or the less compressible) description is required to capture these regularities, and hence, the greater is the complexity of that system.

As an example, compare the numeral classifier system in Pnar (Khasian; Austro-Asiatic) with that of Thai (Kam-Tai; Tai-Kadai). Pnar has three general classifiers used when enumerating count nouns: *ŋut* for classifying people (2a), *tḷli* for classifying non-humans (2b), and *ta* for classifying weeks (2c) (Ring 2015 : 124–125, 361–362).[2]

(2) Pnar (Khasian; Austro-Asiatic; Ring 2015 : 362)

a. *ki=ni tɔʔ ki san ŋut ki=kʰɔn jɔŋ ka*
PL=PROX be 3PL five CLF.HUM PL=child GEN 3SG.F
"these were her five children"

[2]Note that Pnar has gender as well, while Thai does not (see Appendix 2).

b. *ɛm ŋ̩ŋiaw tl̩li ki=kʰlo kn̩taŋ ha ʤwaj*
have seven CLF.NHUM PL=forest special/holy LOC Jowai
"there are seven sacred groves here in Jowai"

c. *ar ta jaw ha-den ka tʰɔʔ ja tɛ ka*
two CLF.WK week LOC-back 3SG.F write BEN NVIS 3SG.F
"after two weeks (we) sign it (the agreement)"

A grammatical description of Pnar numeral classifiers and their usage takes no more than a couple of pages including examples. In Thai, however, there are about 80–90 numeral classifiers (although some of them are archaic) (Iwasaki & Ingkaphirom 2005 : 74) and much research has been done on their semantics, structure, and acquisition (e.g., Hundius & Kölver 1983 ; Gandour et al. 1984 ; Inglis 2003). In addition, numeral classifiers in Thai express a range of functions, namely, individuation, singulative, definiteness, and contrast (Bisang 2009). This kind of interaction between different linguistic systems certainly increases description length, and thus also complexity (Sinnemäki 2014b). In Pnar, no evidence has yet been presented of this type of complexity in the system of numeral classifiers (Ring 2015 : 360–368).

From the viewpoint of complexity, it is thus clear that the system of numeral classifiers requires greater length – and is consequently more complex – in Thai as compared to Pnar. Effective complexity can thus be applied to estimating grammatical complexity yet without using compression algorithms but instead linguists' descriptive tools, as in the discussion of numeral classifiers in Pnar and Thai above (see also Miestamo 2008 ; Sinnemäki 2014b).

In Sinnemäki (2011) I argued that the notion of complexity can be broken down into various types (see also Good 2012). In Sinnemäki (2014b) I further suggested that focusing on the number of parts, or even the sheer presence vs. absence of a linguistic pattern in a language, is a feasible starting point for studying whether particular typological variables may interact with one another in terms of complexity. In that paper I showed that there is an inverse statistical relationship between rigid word order and case marking in core argument marking. In this paper I apply the same approach to the domain of noun classification. My hypothesis is that to determine whether there is a complexity trade-off between gender and numeral classifiers, the most productive place to start from is to analyze the presence vs. absence of these variables in a language.[3] I call this

[3]Note that when focusing on overt coding the differences between usage complexity and the description-based complexity practically disappear: compared to the presence of a distinction the absence of a distinction is both simpler from the perspective of grammar description and

approach "complexity as overt coding" (Sinnemäki 2014b). I assume that overt coding is more complex than its absence, since overt coding requires a longer minimal description than its absence. To count the number of genders or numeral classifiers would demand more effort and data, but the result might not add much new information concerning their interaction compared to binomial coding of the variables.

3 Method and data

3.1 Definitions

Gender and classifiers are generally considered different types of noun classification. A typical way has been to treat them as opposite ideal types on a continuum, gender being the more grammaticalized, more rule-governed and less semantic in nature, while classifiers have been considered as less grammaticalized, less governed by grammatical rules, and more semantic in nature (Dixon 1982 ; Serzisko 1982 ; Corbett 1991 ; Aikhenvald 2000 ; Passer 2016a). However, intermediate cases have always existed which are difficult to classify as either classifier or gender systems. Languages such as Miraña (Boran) are particularly striking examples, their noun classification system showing properties of both gender and classifier systems (Seifart 2005). For these reasons the dichotomy between gender and classifiers has been rejected especially in the canonical typology approach (e.g., Corbett & Fedden 2016), which rather uses a variety of factors for defining one canonical type and then determines the ways in which for instance gender and classifiers may conform to or deviate from this canonical type according to various factors. However, rejecting the typological distinction between gender and classifiers is unnecessary, since intermediate cases can be analyzed as deviations from prototypical ideals for gender and classifiers, the prototypes being different endpoints of the same continuum of grammaticalization (Passer 2016a). In this view, languages like Miraña can be analyzed as similar to the noun class systems in Niger-Congo languages albeit at an earlier or intermediate stage of grammaticalization (Grinevald & Seifart 2004).

For the current purpose I treat gender and numeral classifiers as two separate linguistic patterns and analyze the borderline instances on a case by case basis. As for gender I follow the general tendency in the literature to define it as an agreement class, that is, a language has a gender system only if agreement on other syntactic constituents reflects nouns of different types (e.g., Corbett 1991 :

easier from the perspective of the user as well (Sinnemäki 2009 : 127–128).

4–5; Nichols 1992 : 124–125). This formulation subsumes under gender two broad types of phenomena. First, it includes the Romance-type gender, as in (3), that has only a handful of distinctions in the gender system, most commonly masculine (3a) and feminine (3b).

(3) French (Romance; Indo-European; author)

a. *un garçon*
INDF.M boy
"a boy"

b. *une fille*
INDF.F girl
"a girl"

Second, gender here also includes systems of noun classification found in many African and some Papuan languages, often called noun classes. Noun class systems are here defined as a subtype of gender systems that have four or more agreement classes instead of the common two or three based on sex or and/or animacy. These systems may have more than a dozen agreement classes, not always clearly motivated semantically. In Mufian (Torricelli), for instance, different suffixes on the noun and adjective as well as prefixes on the verb reflect the noun class of different types, as in Table 1 (Alungum et al. 1978). Different sets of affixes exist for singular and plural.

Table 1: A set of noun classes in Mufian (Alungum et al. 1978 : 93)

Class	Example (sg)	Gloss	noun suffix	adjective suffix	verb prefix
1	*bol*	'pig'	*-l*	*-si*	*l-*
2	*éngél*	'name'	*-ngél*	*-ngili*	*g-*
3	*nalof*	'tooth'	*-f*	*-fi*	*f-*
5	*batéwin*	'child'	*-n*	*-ni*	*n-*
…					
17	*kos*	'course'	*-s*	*-si*	*s-*

A language may also express gender-like distinctions on just the noun but not on any other constituent. For instance, in Petalcingo Tzeltal (Mayan) some nouns may be marked with different noun prefixes, *x-* and *j-* which appear in complementary distribution and if used for person's names, *x-* is used for women's

names (4a) and *j-* for men's names (4b) (Shklovsky 2005 : 20).[4] Because there is no agreement marking on syntactic constituents reflecting the different noun types, this pattern in Petalcingo Tzeltal and similar instances in other languages (whether the markers are affixes, clitics, or isolating formatives) were not counted as examples of grammatical gender and were left outside of this research.

(4) Petalcingo Tzeltal (Mayan; Shklovsky 2005 : 20)

a. *me x-Martaj-e chˆa way nax x-kˆot*
DET x-Marta-CLT two sleep only ICMP-arrive
"Marta only stayed two nights."

b. *ta s-pat s-nah te j-Laloj-e*
PREP POSS:3-back POSS:3-house DET j-Lalo-CLT
"At the back of Lalo's house."

As for numeral classifiers, I define them following Gil (2013), which is my main data source on numeral classifiers. Almost all languages use additional linguistic items to assist enumerating nouns of low countability, as in English *two* ***pints*** *of beer*, *three* ***glasses*** *of water*, or *five* ***pounds*** *of sand*. These additional items are often called mensural classifiers or measure words (e.g., Grinevald 2002 : 260–261; Her 2012). Many languages, however, use such additional linguistic items even when enumerating nouns of high countability, such as books, fingers, bananas or the like. Such items are classified as numeral classifiers if they occur with countable nouns when enumerated using numerals. The function of the classifier is then to "divide the inventory of count nouns into semantic classes, each of which is associated with a different classifier" (Gil 2013). An example is given below from Mandarin Chinese (Sinitic; Sino-Tibetan). The enumeration of the noun *rén* 'person' in (5a) is obligatorily accompanied by an additional item *ge*, while the enumeration of the noun *fēijī* 'airplane' is accompanied by another additional item, namely *jià* (5b) (Li & Thompson 1981 : 104). These items are here called numeral classifiers.[5] Quite typically these items can also occur in constructions with demonstratives, as in (5c), but it seems to be somewhat rarer for them to occur with other constituents (see Aikhenvald 2000 : 206–220).

[4]The marker *-e* at the end of many noun phrases in Petalcingo Tzeltal is a determiner enclitic (Shklovsky 2012 : 127) that apparently participates in marking the definiteness of the noun phrase. Glossing (e.g., of the *x-* and *j-* prefixes) follows the sources. Note that in the source the hat (ˆ) symbol marks the preceding consonant as an ejective.

[5]Her (2012) proposes a mathematical criterion to distinguish numeral classifiers from measure words. A numeral classifier necessarily has value 1, while a measure word does not.

(5) Mandarin Chinese (Sinitic; Sino-Tibetan; Li & Thompson 1981 : 104–105)

a. *sān ge rén*
three CLF person
"three people"

b. *wǔ jià fēijī*
five CLF airplane
"five airplanes"

c. *nèi tiáo niú*
that CLF cow
"that cow"

Two further issues need to be mentioned in analyzing numeral classifier languages (see Gil 2013). First, not all languages with numeral classifiers use them with all numerals. For instance, the numeral classifiers in Pnar are used only for numerals above one, as can be seen by comparing the examples in (2) above and (6) below (Ring 2015 : 108).

(6) Pnar (Khasian; Austro-Asiatic; Ring 2015 : 108)
ɛm jap ka=wi ka=kṇt^{h}aj tṃmɛn
have die F=one F=female old
"there is one old woman (who) died"

In Abau (Upper Sepik; Sepik) numeral classifiers are used only for a small set of lower numerals from one to three (Lock 2011 : 56–57).[6] These kinds of limitations do not make a difference to the analysis here: all languages in which numeral classifiers are limited to low numerals or do not occur with low numerals are analyzed as having a numeral classifier system.

Second, in some languages the set of classifiers is very limited. Marathi (Indo-European), for instance, has one numeral classifier *jaṇ*, which is used with nouns denoting persons. A similar system occurs in some Hindi dialects and in Nepali (Indic; Indo-European; Emeneau 1956 : 11–12). Since these languages have only one numeral classifier, they were not analyzed as having a numeral classifier system. In this I follow, for instance, Nichols (1992) and the *Autotyp* database (Bickel et al. 2017) for not analyzing languages with one numeral classifier as having a numeral classifier system.

[6]Note that higher numerals do not exist in Abau at all.

Following Nichols (1992 : 129, 132) and Corbett (1991 : 4–5) my main criterion for distinguishing numeral classifiers and gender from one another was agreement. The defining criterion for gender is that gender classes are marked by agreement on other syntactic constituents – and importantly that gender marking is not limited to numeral constructions, whereas classifiers are not marked by agreement and numeral classifiers in particular may exist only in conjunction with numerals. However, there are some borderline instances that may be in transition or there may be multiple systems of noun classification in a language. Three such borderline examples are discussed briefly.

The noun classification system in Luganda (Bantoid; Niger-Congo) has more than 12 classes and some are based on shape, much like in typical numeral classifier systems. The classes are further marked on numerals, as in numeral classifier systems. However, "there is agreement, multiple marking in the sentence, marking elsewhere than on or with numerals, and sufficient lexical fixation to justify regarding these systems as noun classes" (Nichols 1992 : 136). This system therefore has many properties of gender but also some properties of typical numeral classifier systems. Following Nichols (1992) and Corbett (2013), I analyze such systems as gender.

Some languages use a single set of class markers for multiple purposes and these systems have been accordingly analyzed in different ways. For instance, according to Derbyshire & Payne (1990 : 261) Mundurukú (Tupian) has verb-incorporated classifiers, as in (7a). However, in their definition of verb-incorporated classifiers they specifically state that such classifiers "do not occur in noun phrases and do not express concord in the generally accepted sense" (Derbyshire & Payne 1990 : 245). These classifiers in Mundurukú occur, nevertheless, also on numerals (7b) and demonstratives (7c), wherefore Mundurukú has been classified as a multiple classifier system (Aikhenvald 2000 ; Passer 2016b). Derbyshire & Payne (1990) consider this system as verb-incorporated because of its historical origins, but because these classifiers in Mundurukú are used in environments outside the predicate as well, it is less desirable to analyze this system primarily as a verb-incorporated classifier system. Passer (2016b) analyzes these classifiers originally as nominal classifiers that have spread to an additional host, namely to predicates. Since it is not uncommon for numeral classifiers to attach to demonstratives as well, as in Mandarin Chinese (see example 5c), it seems justified to analyze Mundurukú as a numeral classifier language.[7]

[7] Gil (2013) analyzes Mundurukú as not having numeral classifiers based on data from Derbyshire & Payne (1990). Here I follow the more recent data and analyses of Passer (2016b).

(7) Mundurukú (Tupian; Derbyshire & Payne 1990 : 261)

a. *bekitkit ako-ba* *o'-su-ba-dobuxik*
child banana-CLF 3-REF-CLF-find
"The child found the banana."

b. *xepxep-'a wexik-'a*
two-CLF potato-CLF
"two potatoes"

c. *ija-ba* *ako-ba.*
this-CLF banana-CLF
"this banana."

Yagua (Pega-Yaguan) is similar to Mundurukú in that it has a single set of classifiers that can be used in multiple environments, namely, with predicates, demonstratives and numerals (Payne 2007). However, these classifiers also attach to nominal modifiers, such as adjectives and have sometimes been thought of as marking agreement (Aikhenvald 2000 : 217). In line with these analyses, Yagua has sometimes been analyzed as having both numeral classifiers and gender (Nichols 1992 : 136–137). However, according to Payne (2007) these constructions do not exhibit syntactic agreement, at best semantic agreement "between nouns that are in apposition" as in example (8a). Example (8b) illustrates a construction with a numeral and the same classifier *-nụ* as in (8a). For this reason, I analyzed Yagua as having numeral classifiers (following Gil 2013) but no gender (following Payne 2007).

(8) Yagua (Peba-Yaguan; Payne 2007 : 461)

a. *wánụ wásíyąa-nụ* *hąámu-kii-nụ*
man fat-CLF.ANIM.SG big-long-CLF.ANIM.SG
"big fat man' (or 'man, a fat animate one, a big long animate one')"

b. *Hásiy sa=wichą́-ąsiy* *ádną-nụ-hụy* *kiiwą́.*
there 3SG.ANIM=be-PROX1 two-CLF.ANIM.SG-two fish
"There were two fish."

The noun classification systems in the sample languages were analyzed following the above criteria. My main hypothesis, based on earlier literature, is that there is an inverse relationship between gender and numeral classifiers. Some preliminary indication for this relationship was provided by Sinnemäki (2014c : 188–189) on the basis of the data in the *World atlas of language structures* (hence,

WALS, Dryer & Haspelmath 2013), but here this hypothesis is approached with a much larger sample and with more rigorous methods (using generalized mixed effects modeling instead of ordinal correlation). The null hypothesis is that there is no relationship between gender and numeral classifiers. In the next section I describe the statistical methods used in this research.

3.2 On statistical methods

One of the central interests in language typology is the interactions among linguistic patterns across languages (Bickel 2007). However, the distribution of linguistic patterns, such as gender or numeral classifiers, can be affected by a number of factors that may be difficult to delineate from one another. It has been customary in language typology to treat such factors, especially inheritance and borrowing, as nuisance factors. Their confounding effects on the typological distributions have been tried to eliminate primarily through (stratified) sampling to draw conclusions on the actual relationship between the structural factors, usually with association or correlation tests. In recent years more advanced multifactorial methods have been applied to typological data as well which allow genealogical and areal factors to be built as factors into the models themselves so that their effects can be tested rather than simply controlled away. Genealogical and areal factors have been modeled as fixed effects using generalized linear modeling (e.g., Cysouw 2010 ; Sinnemäki 2010) or as random factors using mixed effects modeling (e.g., Bentz & Winter 2013).

Yet it has proven difficult to model particularly the effect of genealogical inheritance on typological distributions because of the large number of small families and language isolates. Isolates are not genealogically related to any known languages. In effect they are language families with just one member; yet such families may constitute roughly one third of the world's language families (Campbell 2016). This high proportion of isolates means that if language family is built into the research design, the number of parameters in the model increases so much that reliable estimates are no longer possible (cf. Sinnemäki 2010 : 877–880). Four approaches have been used in recent research to address this issue.

In one of the earlier approaches genealogical inheritance is controlled by restricting the way datapoints are counted. One such way is to group languages into genera – genealogical groups of languages that have approximately the same time-depth to the branches of Indo-European – and then count as datapoints not languages but different values in genera (Dryer 1992 , Dryer 2000). If three languages are sampled from the same genus, all without gender, then this genus contributes one datapoint to the calculations. If four languages are sampled from

another genus in which all but one have gender, then this genus contributes two datapoints (= one with gender and one without gender). While this method is rather crude, it enables the controlling of genealogical inheritance to some degree but it may also leave out important variation at some other level of taxonomic classification than the one chosen (see Bickel 2008).

Another, more recent approach evaluates whether a particular linguistic pattern is statistically preferred in languages within families (Bickel 2013). In case of a binomial variable (e.g., presence vs. absence of gender) a family is either biased towards presence of gender, towards absence of gender, or they are indifferent: in any event a family always contributes just one datapoint to the calculations. This method is related to the controlled genealogical sampling of Dryer (Dryer 1992 , Dryer 2000) but it tests biases within families statistically. However, biases can only be estimated when the families are large enough, usually requiring at least five sampled languages from a family. The preferences in large families can then be extrapolated to smaller families and isolates (see Bickel 2013 for details). While this method enables a dynamic approach to language universals, it requires very large samples – the typical samples have contained roughly 400 languages (e.g., Bickel 2013 ; Bickel et al. 2014).

Linguists have also adapted methods from biology to model correlated changes in genealogical lineages. In this approach lexical data is first used to build a family tree and to estimate branch lengths within the tree. Then typological feature-values are mapped on the trees and finally it is estimated whether a change in one typological feature is correlated with a change in another feature in a particular lineage (e.g., Dunn et al. 2011 ; Levinson et al. 2011). While this phylogenetic approach is promising, it has been criticized especially for lack of statistical power (e.g., Cysouw 2011).

Researchers have also applied (Generalized) Linear Mixed Models (or GLMM) to typological data (e.g., Cysouw 2010 ; Jaeger et al. 2011 ; Bentz & Winter 2013).[8] The idea in mixed effects modeling is that the value of the dependent variable is predicted based on the independent variables and using a particular grouping structure (that is, random structure) in the modeling to adjust the variables of interest. The distributions are therefore affected by both the independent variables (the fixed factors) and random factors. In typological research fixed effects are typically the structural factors, such as numeral classifiers, while language families and geographical areas can be modeled as random factors. Once the effect

[8] Winter (2013) provides a tutorial on mixed effects modeling that was helpful in learning more about mixed effects modeling also in typology. See Breslow & Clayton (1993) and Gelman & Hill (2007) for general introductions to GLMM.

of the random factors is accounted for, the impact of the fixed factors can be established. Mixed models offer efficient and flexible ways of modeling group level structure both within groups and across groups and they are also suitable for small samples which are typical in typological data (Jaeger et al. 2011 : 289–290). For these reasons I use here Generalized Mixed Effects Modeling to construct a model that statistically evaluates the relationship between gender and numeral classifiers across the languages of the world.[9]

The first step in using GLMMs is to plan the model design and to decide which variable is the response or the dependent variable and which variable is the predictor. The dependent is the variable whose distributions are modeled with the predictor variable(s) and the random structure. When choosing the dependent variable it is not theoretically completely clear whether gender or numeral classifiers should be chosen as the dependent. One argument for choosing gender as the dependent is the fact that classifiers are often thought as the most common source of gender in languages (see Corbett 1991 : 136; Seifart 2010 : 727–728; Luraghi 2011 : 450–452 and references). Greenberg (1978 : 78–79) suggests that gender develops from classifying demonstratives which in turn often develop from numeral classifiers (Harris & Campbell 1995 : 341–342 for further evidence for the development of gender from demonstratives). Although he does not present any actual reconstructions, Greenberg (1972 : 35–36) suggests that there seems to be a synchronic universal that if a numeral classifier system spreads within a language, it will spread to demonstratives (and often only to them), as seems to have happened in Mandarin Chinese (see example 5).

Luraghi (2011 : 451) presents the general stages in the development of gender as in (9). While some gender systems develop from classifiers others may some develop from case and number agreement (Luraghi 2011 : 452). In addition, it may be more likely that gender develops not from numeral classifiers but from an earlier noun classifier system, as has happened in some Australian languages (Plaster & Polinsky 2007).

(9) Generic nouns > classifiers > pronominal demonstratives > attributive demonstratives > determiners > agreement markers

There is thus clear theoretical reason to choose gender as the dependent variable. Diachronically the opposite grammaticalization path, that is, numeral clas-

[9] All statistical computing and graphs were done in the R programming environment (R Core Team 2017) using the packages `lme4` (Bates, Maechler, et al. 2015), `ggplot2` (Wickham 2009), `vcd` (Meyer et al. 2006 , Meyer, Zeileis & Hornik 2015 ; Zeileis et al. 2007), and `pbkrtest` (Halekoh & Højsgaard 2014). The maps were generated with a mapping tool developed by Hans-Jörg Bibiko for the *WALS*.

sifiers developing directly from gender has not been attested. However, there are examples such as Bengali which lost its gender and number marking but developed numeral classifiers partly recycling the same morphological material that was used for gender and number earlier (see Aikhenvald 2000 : 379 and references). This data suggests that it is possible but rare for a numeral classifier system to arise from an earlier gender system. For these reasons, I model gender as the dependent and numeral classifiers as the independent factor in my main model, but I also used a competing model in which I modeled numeral classifiers as the dependent and gender as the independent variable.

The equation showing the structure of mixed logistic regression is presented in (10) (cf. Gelman & Hill 2007 : 279; Bentz & Winter 2013 : 8).

(10) $P(y_i = 1) = logit^{-1}(\alpha_{j,k[i]} + \beta_{j,k[i]} x_i)$

The term α is the intercept for each ith datapoint (= language) and the β is the regression coefficient (the slope) for the predictor (x). In (mixed) logistic regression the intercept is the logarithm of the odds for the dependent variable given the default level of the predictor(s), which in R are chosen alphabetically (Arppe 2008 : 128). In my models gender is the dependent variable with two values "absence" and "presence" and its default level is "absence". The predictor in my model is numeral classifiers which has two values "absence" and "presence" and with a default value "absence". The intercept in my model, therefore, is the log odds of gender for languages that have no numeral classifiers. In (mixed) logistic regression the slope for a binary variable is the difference in the log odds of the dependent variable between the different levels of the predictor variable. Here this means that the slope is the difference in log odds for having gender in a language that has numeral classifiers compared to a language that has no numeral classifiers.

In (mixed) logistic regression the dependent variable is categorical and its expected response, the odds $1/(1 - p)$, is transformed via natural logarithm to yield logarithm of the odds. In my model design this means $log(1/(1 - p))$ for observing gender vs. not observing gender. Alternatively, to obtain predicted *probabilities* for observing gender vs. observing no gender in a language the predictor is transformed via inverse logit function, as in (10). In this equation, $P(y_{\text{i}} = 1)$ is the predicted probability that we observe gender (presence of gender = 1) for each item i and the subindices j and k represent the adjustments of the intercept and slope for each grouping factor (here area and family, see below).

This possibility to adjust the intercept and the slope through each grouping factor is probably the most powerful property of mixed effects modeling. I use

geographical area and language family as grouping factors and I let both the intercept and the slope vary between the levels of these grouping factors. A random intercept for family means that each family is allowed to have different intercepts to account for the family-related variability in the distribution of gender. A random slope for the family, on the other hand, means that numeral classifiers are allowed to have a different effect on gender in each family to account for the family-related variability in how numeral classifiers affect gender. The random effects for area work analogously. In addition, the models include a correlation term between the intercepts and slopes of a particular random effect. This correlation term accounts for the variation that may arise from families (or areas) with large adjustment for the intercept (= gender) having also a large coefficient for the slope (= numeral classifiers).

The grouping factors language family and area were coded as follows. For language families I used the highest level of classification in the genealogical taxonomy of the *WALS*. For geographical area I used the ten continents of the *Autotyp* (Bickel et al. 2017), illustrated in Figure 1 with the 2949 languages of the *Autotyp* database.[10]

figures/13/Fig1_Map10continents_s.pdf

Figure 1: The ten continents of the Autotyp on a world map (Bickel et al. 2017)

For mixed models p-values can be derived by using maximum likelihood ratio

[10]The ten continents are: Africa, West and Southwest Eurasia, North-Central Asia, South/Southeast Asia, New Guinea and Oceania, Australia, West North America, East North America, Central America, and South America. The database has information on 2950 languages, but there are no latitudes or longitudes provided for International Sign Language.

tests. This was done by comparing the likelihood ratio of a model with the variable of interest to that of a simpler model without the variable of interest (e.g., Baayen et al. 2008 ; Barr et al. 2013).

3.3 Sampling and data

The main data sources were two chapters in the *WALS*, Corbett (2013) on "Number of genders" and Gil (2013) on "Numeral classifiers". Corbett (2013) has data on 257 languages and Gil (2013) on 400 languages. The cross-section of their data, however, is "only" 133 languages (from 106 genera), which is a relatively small proportion of the two samples and not really adequate for modeling the effect of areal and genealogical factors statistically. Moreover, the languages of Eurasia are overrepresented in the cross-section of the samples: the coverage of genealogical diversity (the share of sampled genera from all genera in a macroarea) is 2–3 times greater in Eurasia than in the other five macroareas.

For these reasons, I analyzed more data based on the same principles as in the two main sources in an attempt to increase the sample sizes especially outside Eurasia. I also reanalyzed Corbett's (Corbett 2013) data, since he included pronominal gender in his data, whereas I focus solely on noun gender. By pronominal gender I mean pronouns that reflect gender, such as the English third person pronouns *he* and *she*, which as anaphoric pronouns are often analyzed as part of agreement (Corbett 2013). In the minimal case, pronominal gender can provide the only evidence for a gender system in a language, as was done by Corbett (2013). In this paper pronominal gender is excluded in order to make gender and numeral classifiers more comparable to one another, because numeral classifiers co-occur with nouns but not usually (or possibly at all) with pronouns. The main data sources for my own data collection were grammar descriptions, scholarly articles (e.g., Derbyshire & Payne 1990), Nichols' (Nichols 1992) database on gender and numeral classifiers, and general works on linguistic areas and language families (e.g., Mithun 2001 ; Janhunen 2003).

The sample contains 360 languages from 252 genera (see Appendix for more information), which is significantly larger compared to what the *WALS* can offer with regard to these variables. I have also attempted to ensure that especially areas that are often less well sampled, such as South America and New Guinea would be sampled to a reasonable degree; in the current paper languages are sampled from roughly 40% of all the genera in those areas. Table 2 provides more detailed information about the sample composition by macroarea. Note that the coverage of genealogical diversity of macroareas outside Eurasia is now much better than in the cross-section of the *WALS* chapters: genealogical coverage of

Eurasia is not more than 1.2–1.4 times greater than in the other areas.

Table 2: Number of sampled languages, number of genera, and the genealogical coverage (share of genera sampled) in each macroarea

	Afr.	Eur.	Papunes.	Austr.	N. Am.	S. Am.	Total[11]
Languages	52	69	99	23	58	59	360
Genera (sample/total)	34/81	49/87	61/139	18/44	49/102	43/108	252/544
Genealogical coverage	42%	56%	44%	41%	48%	40%	46%

4 Results

4.1 Preliminary results

The data come from 360 languages (see Appendix 2). Based on the raw numbers there were 122 languages (34%) that had only gender, 81 languages (23%) that had only numeral classifiers, 22 languages (6%) with both gender and numeral classifiers and 135 languages (38%) with neither.[12] All in all, 144 languages had gender (40%) and 103 languages (29%) had numeral classifiers. The geographical distribution of the sample languages on the world map is shown in Figure 2. The three smaller maps in Figure 2 zoom into three areas where gender and/or numeral classifiers are particularly frequent: 1. Central Africa, 2. Southeast Asia, New Guinea, and North Australia, and 3. South America (see also the discussion below on the areal distribution of gender and numeral classifiers). When counting distinct values in genera gender occurred in 38% of genera and numeral classifiers in 28% of genera. These shares suggest that gender is globally more common than numeral classifiers. In the *WALS*-data, the shares for genera that had gender or numeral classifiers were 40% and 29%, respectively (Corbett 2013 ; Gil 2013). The differences to my data (38% and 28%, respectively) are very small, and the 2%

[11] In Table 2 the total number of genera in the *WALS* are not sums of the macroarea-wise counts, because languages from one genus can be spoken in multiple macroareas and thus be counted multiple times. The total is the total of all genera without macroareal partition.

[12] Note that the frequency of languages that had both gender and numeral classifiers (6.9%; counting genera) is similar to the frequency of languages with dominant object-subject word order (6.0%; counting genera; Dryer & Haspelmath 2013) which is usually considered to be typologically very rare.

difference in terms of gender can be explained to some extent by the fact that I sampled only noun gender, whereas Corbett (2013) included pronominal gender in his research.

figures/13/Fig2_MapSample.png

Figure 2: Sample languages on a world map. The three smaller maps at the bottom zoom into central Africa on the left, Southeast Asia and New Guinea in the middle, and the Northern half of South America on the right.

Aikhenvald (2000 : 1) estimates that "[a]lmost all languages have some grammatical means for the linguistic categorization of nouns and nominals." While here my focus is not on all types of noun classification, it is worth noting that 63% of the sample languages (n = 225) had either gender or numeral classifiers or both and this may suggest an overall preference for languages to develop some type of noun classification (but since 38% of my sample languages had neither gender nor numeral classifiers, the estimation that almost all languages have some type of noun classification is too strong). If we count how many genera had languages with either type of noun classification, roughly 58% of genera (n = 152) had either gender or numeral classifiers or both, while 42% of genera (n = 111) had neither gender nor numeral classifiers. According to exact binomial test, this distribution is statistically significant (one-tailed p = 0.0067). This result

provides evidence that languages prefer to develop either gender or numeral classifiers or both rather than not to develop any type of noun classification. Since my counts do not include possessive classifiers and noun classifiers, it is plausible that if those other types of classifiers had been included, the preference would have been even stronger.

A heatmap of the distribution of gender and numeral classifiers is shown in Figure 3 (counts in genera). If we count distinct values in genera, and perform Fisher's Exact test to the data, then there is a statistically significant inverse dependence between gender and numeral classifiers ($p = 0.005$). According to this distribution, gender is 2.3 times less likely in genera that have languages with numeral classifiers than in those that lack numeral classifiers. However, counting genera is a crude way of controlling for genealogical inheritance (cf. §3.2) and this test also does not take into account possible areal diffusion. Those issues will be more properly dealt with in the next section using generalized mixed logistic regression.

figures/13/Fig3_heatmap.pdf

Figure 3: Heatmap of the distribution of gender and numeral classifiers (counts in genera).

The data also allows to estimate genus-internal diversity and stability of gender and numeral classifiers. There were altogether 56 genera with more than one sampled language and in 12 of these (21%) there was diversity in terms of gender (that is, some languages with gender and some without gender). This means that 79% of genera were uniform in either having gender or not having gender and this distribution is statistically significant (exact binomial test; two-tailed; p =

0.00002). As for numeral classifiers, there was diversity in 11 genera (20%). This means that 80% of genera were uniform in either having numeral classifiers or not having them and this distribution is statistically significant (exact binomial test; two-tailed; p = 0.000005). If we take these figures as a proxy for the stability of gender and numeral classifiers within genera, both features seem to be relatively stable (see Bickel 2013 : 433–434 for similar conclusions for pronominal gender; also Dahl 2004 : 196–202).

A few words can also be said concerning the areal distributions of gender and numeral classifiers. As for numeral classifiers, it has been noted by Johanna Nichols and colleagues that numeral classifiers cluster in languages spoken around the Pacific Ocean (e.g., Nichols 1992 : 132–133; Nichols & Peterson 1996 : 366–367; Nichols 2003 : 299). On the basis of the distributions in Figure 2, this claim seems largely true, although some languages in Africa, Europe and Central Asia also have numeral classifiers, while no language in Australia has them (Aikhenvald 2000 : 121–124).[13] Here I use GLMM to evaluate Nichols' claim whereby numeral classifiers are more likely to occur in languages spoken in the Circum-Pacific. Following Bickel & Nichols (2006) I define Circum-Pacific as encompassing the Americas, Oceania (including New Guinea and Australia), Southeast Asia, and the Northeastern Coast of Asia. Following Nichols (2003), I include mainland and island Southeast Asia in this area. I then compare the distribution of numeral classifiers in this large area against the rest of the world (that is, Africa and Eurasia except for Southeast Asia and Northeastern Coast of Asia). Figure 4 presents the sample languages inside and outside the Circum-Pacific area on a world map. An association plot of the distribution of numeral classifiers inside and outside the Circum-Pacific area is shown in the left panel of Figure 5.

I modeled numeral classifiers as the dependent, area as a binomial predictor (whether a language is spoken inside or outside the Circum-Pacific area), and the *WALS* families as a random intercept. According to the mixed logistic regression, languages spoken in the Circum-Pacific area were significantly more likely to

[13] The observation that there are no numeral classifiers in Australian languages may be related to their numeral systems in general. The existence of numeral classifiers presupposes that a language has a numeral system (Aikhenvald 2000 : 99). However, many Australian languages have numbers only for the low numerals (e.g., from one to three), but these do not necessarily form a separate part of speech (see Aikhenvald 2000 : 100 and references there). The reason why there are no numeral classifiers in Australia may thus be related to the fact that in many languages in this area numerals either do not exist at all as a separate part of speech or numbers are expressed through other larger parts of speech. However, other types of classifiers, such as noun classifiers, are common in Australian languages (Aikhenvald 2000 : 82; see also Plaster & Polinsky 2007).

have gender than languages spoken outside this area (logit estimates: 2.3 ± 1.2 (standard errors); χ^2 (1) = 5.1; p = 0.024). As an alternative approach I used stocks (the highest level of genealogical classification in the *Autotyp*) as a random intercept. According to this model design, languages spoken in the Circum-Pacific area were again significantly more likely to have numeral classifiers than languages spoken outside this area (logit estimates: 2.6 ± 1.3 (standard errors); χ^2 (1) = 6.0; p = 0.014). When interpreting the coefficients as odds ratios in this model, languages spoken in the Circum-Pacific region were thirteen times more likely to have numeral classifiers than languages spoken outside this region.

figures/13/Fig4_MapCircumPacific_s.pdf

Figure 4: Sample languages on a world map according to area (white = Circum-Pacific area, black = the rest)

The areal distribution of gender has not been in focus very often, but what has been said about it in the literature (simplifying a little) is that gender is not too frequent in the Americas and in the Austronesian languages, whereas it tends to cluster especially in Africa, Europe, Caucasus and the Indian Peninsula as well as in Australia (Corbett 1991 : 1–2; Nichols 1992 : 130–132; Corbett 2013).[14] This distribution sounds like the opposite to that of numeral classifiers. I therefore compared the distribution of gender in the Circum-Pacific area against the rest of the world as above in the case of numeral classifiers, first modeling *WALS*-family as random intercept. An association plot of this distribution is shown in

[14]Nichols (1992 : 130–132) proposes that most gender-languages occur in hotbeds, that is, areas in which gender occurs in most languages of the area, but they come from diverse families and occur in diverse forms. Because my focus is not on the formal aspects of gender marking, her proposal cannot be statistically tested in this paper.

the right panel of Figure 5.

figures/13/Fig5_assocplot.pdf

Figure 5: Association plots of the distribution of numeral classifiers (left panel) and gender (right panel) inside and outside the Circum-Pacific. Positive Pearson residuals (blue color) indicate that the cell values were greater than expected and negative Pearson residuals (red) indicate that the cell values were smaller than expected.

According to the mixed logistic regression, languages spoken in the Circum-Pacific area were less likely to have gender than languages spoken outside this area (logit estimates: −0.7 ± 0.5 (standard errors)), but this relationship was not statistically significant (χ^2 (1) = 1.8; p = 0.18). As an alternative approach I used stocks (the highest level of genealogical classification in the *Autotyp*) as a random intercept. According to this model design, languages spoken in the Circum-Pacific area were significantly more likely to have numeral classifiers than languages spoken outside this area (logit estimates: −1.1 ± 0.5 (standard errors); χ^2 (1) = 4.2; p = 0.041). When interpreting the coefficients as odds ratios in this model, languages spoken in the Circum-Pacific were about three times less likely to have gender than languages spoken outside this region.

The conclusion from these distributions is that there is an inverse relationship between gender and numeral classifiers in the languages of the world. On the other hand, there is a roughly complementary areal distribution of gender and numeral classifiers so that numeral classifiers are more likely to occur in the Circum-Pacific region than outside it, whereas gender has the opposite distribution. One consequence of these results could be that the inverse relationship between gender and numeral classifiers is simply an outcome of their biased areal distributions. However, as will be shown in the following section, gender has this inverse relationship to numeral classifiers independently of geographical areas.

4.2 Testing the main hypothesis

The hypothesis that an inverse relationship exists between gender and numeral classifiers was tested with generalized mixed effects models. I constructed a model using the *WALS* families as a grouping factor for genealogical affiliation and the ten continents from the *Autotyp* as the grouping factor for areas. This is my main model and it is also a maximal model that has all the theoretically motivated random intercepts and slopes included. In recent research, it has been suggested that maximal models are preferred in mixed models and especially that models without random slopes may produce spurious results (Schielzeth & Forstmeier 2009 ; Barr et al. 2013).

According to the mixed logistic regression, languages with numeral classifiers were significantly less likely to have gender than those with no numeral classifiers (logit estimates: −2.1 ± 1.1 (standard errors); χ^2 (1) = 7.7; p = 0.0056). The negative coefficient and the highly significant p-value suggest that the hypothesis is confirmed. A closer inspection of the random effects in Table 3 confirms that the random structure is feasible: the correlation terms between the random intercept and the random slopes for both family and continent are not too large (0.41 and −0.09, respectively).

Table 3: Random effects for the maximal model

Random effects:				
Groups	Name	Variance	Std.Dev.	Corr
family	(Intercept)	2.35	1.53	
	clfyes	1.48	1.22	0.41
continent	(Intercept)	0.63	0.80	
	clfyes	0.53	0.73	−0.09

I further tested the validity of the result with a parametric bootstrap method (Halekoh & Højsgaard 2014). This method returns the fraction of those simulated likelihood ratio test values that are larger or equal to the observed likelihood ratio test value. Using 2 000 simulations the parametric bootstrap derived p-value was 0.0398. Although this p-value is larger than the one derived from the χ^2-distribution (p = 0.0056), it still confirms that the inverse relationship between gender and numeral classifiers is significant and holds independent of geographical area and language families. When interpreting the coefficients as odds ratios, we can conclude that gender is about eight times less likely to occur in a

language when that language already has a numeral classifier compared to languages without numeral classifiers. To put it in another way, there is a statistical implicational universal in languages that if a language has numeral classifiers, then it is likely not to have gender but if a language does not have numeral classifiers then it is likely to have gender. The results were then tested by using an alternative genealogical classification and three alternative areal configurations. These tests and their results are presented in Appendix 1. In all these additional models the result was the same as here: an inverse and significant relationship occurred between gender and numeral classifiers.

I then fitted a competing model choosing numeral classifiers as the dependent and gender as the predictor. I modeled the random structure as in the model above. *WALS*-families were used to model genealogical affiliation and the ten *Autotyp* continents were used to model geographical areas. According to the mixed logistic regression, languages with gender were *more* likely to have numeral classifiers than languages with no gender (logit estimates: 1.0 ± 2.2 (standard errors), but this relationship was not statistically significant (χ^2 (1) = 0.21; p = 0.64). But the random structure of this competing model suggests that the model may be too complex to fit to the data. The correlation between the random intercepts and slopes for both family and continent are −1.0 and the variances for family are extremely large (93 for the random intercept and 21 for the random slope). These problems with the random structure may explain why the relationship between numeral classifiers and gender was positive and not negative as expected (cf. Appendix 1). To further double-check this I refitted the competing model but using the six macroareas of the *WALS* as the geographical area-factor (see Appendix 1 for the distribution of these macroareas on a map). According to this model, languages with gender were *less* likely to have numeral classifiers than languages with no gender (logit estimates: −1.8 ± 2.5 (standard errors), but this inverse relationship was not statistically significant (χ^2 (1) = 0.0; p = 1.0). I then refitted the competing model using the 24 areas of the *Autotyp* as the geographical area-factor (see Appendix 1 for the distribution of the 24 areas on a map). According to this model, languages with gender were again less likely to have numeral classifiers than languages with no gender (logit estimates: −4.0 ± 3.4 (standard errors) and this inverse relationship was statistically significant (χ^2 (1) = 4.8; p = 0.028).

All in all the results of the competing models were very variable and depended on the areal configuration used, whereas the results of the main model (and the additional models in Appendix 1) were consistent regardless of how genealogical affiliation and geographical areas were coded. I interpret these results to mean

that numeral classifiers are more likely to have an effect on gender rather than the other way round, which is exactly what has been suggested in the literature (§3.2).

The results of the mixed effects logistic models suggest that there is a statistically significant complexity trade-off between gender and numeral classifiers. This result was also independent of how geographical area and language family were coded. However, because the data contained many counterexamples against the trade-off the generalization is not an absolute universal. Many languages, for instance, had neither gender nor numeral classifiers, and therefore the generalization must be understood as a probabilistic universal.[15]

5 Discussion

The distribution of gender and numeral classifiers and the complexity trade-off between them raise questions that require explanations. Three issues in particular require attention. Why is there a trade-off between gender and numeral classifiers? Why are their areal distributions so biased? Why are languages more likely to have some noun classification system rather than no noun classification at all? Within the limits of this paper I confine myself to providing some preliminary thoughts on possible explanations.

The central question here is why there is a complexity trade-off between gender and numeral classifiers? Two relevant issues are discussed here. First, from a functional point of view gender and numeral classifiers tread the same functional domain, that is, they encode semantically-pragmatically closely related functions across languages (Miestamo 2007 : 293). These functions have to do primarily with individuation and reference-identification (or 'reference-tracking'), although other functions are also shared across gender and numeral classifier systems (Contini-Morava & Kilarski 2013 : 293–294). Because gender and numeral classifier systems share these similar functions, the inverse correlation between these variables can be explained functionally by economy and distinctness. The rationale for this explanation is the following. Economy and distinctness are functional motivations that relate to the amount of linguistic structure, economy for keeping it minimal, and distinctness for preserving distinctions in linguistic structure. Now, if a language has already developed a system of noun classifi-

[15]For instance, all or almost all languages in Quechuan, Oto-Manguean, Uto-Aztecan, and Trans-New Guinea language families had neither gender nor numeral classifiers, whereas some languages in the Arawakan, Tucanoan, and West Papuan families had both gender and numeral classifiers (e.g. Palikur in (1)).

cation (e.g., gender), it is inefficient and redundant for that language to develop another type of nominal classification (e.g., numeral classifiers) to serve a similar set of functions (e.g., Hawkins 2004 ; Sinnemäki 2014b). The small likelihood of developing multiple systems of noun classification is, therefore, a matter of the Zipfian principle of least effort or economy and its interaction with distinctness: linguistic structures are kept minimal without losing distinctness.

The second issue is diachronic in nature. If a language loses its noun classification system, it may redevelop another type via reanalysis. For instance, gender markers have been lost in many Iranian and Indic languages, but many of these languages have developed numeral classifiers. In Bengali this resulted in reinterpreting the old feminine forms in terms of numeral classifiers. In Africa, Ogonoid (also called Kegboid) languages, such as Kana (Ogonoid; Niger-Congo), lost their noun class system and instead developed numeral classifiers, which are very rare in Africa. Overall, noun classification may thus be a rather stable feature in language although the particular classification system may be lost. (See Aikhenvald 2000 : 379–381 and references.)

While multiple systems of noun classification are possible, they are rare (see §4.1). One reason for languages to develop more than one system of noun classification is language contact. For instance, Santali (Munda; Austro-Asiatic) has two gender systems as well as numeral classifiers. One gender system is native to Santali and it distinguishes animate from inanimate, while the other system is borrowed from Indo-Aryan and it distinguishes male from non-male (Ghosh 2008 : 39). In (11), the noun *Kali-idol* triggers object gender agreement on the verb, which is marked by the third person object clitic *-e* that is reserved for animate beings, but it also requires the use of the a numeral classifier *-taŋ*.

(11) Santali (Austro-Asiatic; Ghosh 2008 : 39)
uni mit'-taŋ kəli-boŋga benao-akad-e-a-e
3SG.M one-CLF Kali-idol make-PRF.A-3SG.OBJ-FIN-3SG.SBJ
"He has made a Kali idol."

Numeral classifier systems can also be borrowed, as seems to have happened in Malto (Dravidian). Malto presumably borrowed numeral classifiers from Magahi (Indic; Indo-European) and elaborated the system subsequently (Emeneau 1980 : 117–118). Besides the numeral classifier system Magahi also has a gender system (Steever 1998). These are illustrated in (12).

(12) Malto (Dravidian; Steever 1998 : 363, 372)

a. *tīni jen maler*
three CLF man.PL
"Three men."

b. *rājah awḍah.*
king.M.NOM say.PST.3SG.M
"The king said."

Language contact is also one reason for why multiple systems of noun classification get reduced. For instance, Retuara (Tucanoan) has lost its classifier system and retained only a gender system because of language contact with Yucuna (Arawakan; see Aikhenvald 2000 : 386 and references).

The kinds of "compensating" mechanisms discussed above, motivated by economy and distinctness and manifest in diachronic change, may be found in other areas of grammar as well (e.g., Sinnemäki 2014b). Ultimately economy and distinctness are grounded in language processing and are like the two sides of the same coin. As a processing principle economy is a matter of 'minimize all you can', which means that all unnecessary distinctions can be dispensed so that distinctness is not lost (Bornkessel-Schlesewsky & Schlesewsky 2009). In terms of language change, complexity trade-offs may be seen as adaptive processes where linguistic structure adapts to preferences in language processing (Sinnemäki 2014a ; Bickel et al. 2015). In noun classification this adaptation shows up in the fact that while the majority of the world's languages have a system of noun classification (§4.1), there is a tendency in languages not to develop more than one such system.

This leads us to another important question raised by the results, namely, why the presence of noun classification is preferred over its absence across languages (§4.1). One relevant issue in this regard is the discussion on language complexity that has taken place during the past 15 years. Many researchers have argued that gender is relatively devoid of meaning (not marking real-world categories), adds unnecessary complexity to language, and therefore tends to be lost in situations that involve heavy language contact by adult learners (e.g., McWhorter 2001 : 129; Kusters 2003 : 25; Trudgill 2011 : 155–166). It has also been claimed that classifier systems are at a corresponding level of complexity compared to gender systems (Riddle 2008 : 136–141, 147–148). Although numeral classifiers tend to mark real-world categories – and in this sense are more semantically based – they have been analyzed in the same way as gender, adding unnecessary complexity to

language (e.g., McWhorter 2007 : 22). Some quantitative evidence for the loss of gender complexity comes from pidgins, which tend to lose especially agreement categories, such as gender (Roberts & Bresnan 2008). Against this background it is surprising that there seems to be a preference for languages to develop this kind of grammatical marking, be it gender or numeral classifiers, if it really is unnecessary for human communication.

One possibility for this preference may be functional. The shared functions of gender and numeral classifiers deal primarily with individuation and reference-identification, but gender shares further functions with other types of classifiers as well, including the derivational expansion of the lexicon (Contini-Morava & Kilarski 2013 ; see also Riddle 2008 : 136–141). These functions may be central enough in communication that there is a general preference in languages to develop some type of noun classification to serve these functions. On the contrary, especially gender marking may sometimes lead to tracking failure and ambiguity and there are also grounds to believe that the referential functions of gender (and possibly also those of classifiers) are important only in languages which have many classes in their noun classification system (Trudgill 2011 : 158–159). In this sense it is unclear whether the above functions of noun classification are important enough to attract and sustain noun classification in languages.

Another possible explanation is based on the simple fact that noun classification groups nouns into classes. Even languages that do not have noun classification may have some other forms of grouping nouns into subcategories. One such example is declensional type (or inflectional class), which is a way of classifying nouns into groups depending on how they inflect for grammatical categories such as number and case (e.g., Kramer 2015 : 67–68). Dahl (2000 : 583–584) makes the strong point that sometimes inflectional classes actually look like gender distinctions and some of them could be analyzed as gender. Thus, noun classification and inflectional classes share the fact that they group nouns into subcategories. This leads me to the following preliminary conclusion for why there is a preference to develop noun classification in the languages of the world: languages prefer to classify nouns into subcategories and languages reach this goal in different ways by using gender, classifiers, inflectional classes, or some other means.

The third question that the results raised is why the areal distributions of gender and numeral classifiers were so biased. Since the origin and/or distribution of gender and classifiers have been discussed in multiple publications (e.g., Corbett 1991 , Corbett 2013 ; Nichols 1992 , Nichols 2003 ; Aikhenvald 2000 ; Luraghi 2011 ; Gil 2013 ; Passer 2016a), I will only provide some observations here.

There is increasing evidence suggesting that classifiers spread through language contact more easily than gender does and therefore serve as strong areal markers (Seifart 2010 : 730). In addition, what tends to diffuse is often the pattern of classifiers and not the actual markers (in terms of Matras 2009 : 234–237); it is rather the native words that are employed for the purpose of an incipient classifier system. Gender systems do not spread so easily because agreement systems are less easily borrowed, although parts of the systems may be borrowed (Aikhenvald 2000 : 386–388). Since the pattern of numeral classifiers may be relatively easy to spread, whereas the pattern of gender tends not to spread easily, it is probably no coincidence that gender is considered more stable (that is, more likely to be genealogically inherited) than numeral classifiers (e.g., Nichols 2003 : 299–303). This observation is confirmed by Dediu & Cysouw (2013) who compared eight stability metrics recently developed for estimating the stability of typological parameters. Based on their comparisons, gender (more specifically number of gender; data from the *WALS*) appears to be more stable than numeral classifiers according to the metrics (p. 13, Table 7).

On the other hand, the greater diffusability and instability of numeral classifiers may be related to the way noun classification systems develop. Numeral classifiers tend to develop ultimately from lexical sources, from generic nouns, such as 'man' and 'woman', whereas gender tends to develop either from an earlier classifier system or from a morphosyntactic source, namely, case or number agreement (Luraghi 2011). In other words, when a language begins to develop noun classification, it most commonly starts with a classifier system that may then, in some cases, further develop into a noun class or a gender system. The latter systems require longer time and more steps in their development and are, therefore, more 'mature' in terms of Dahl (2004). The fact that gender does not spread so easily is probably related to its greater dependence on the language-specific agreement system, whereas the idea of classifiers can spread much more easily from one language to another, possibly regardless of the language-specific system.

This last point leads us to consider the macroareal distributions of gender and numeral classifiers. As was observed in §4.1, numeral classifiers cluster in the Circum-Pacific, while gender clusters in the Old World.

However, if we focus on the frequency distribution of gender and numeral classifiers separately inside and outside the Circum-Pacific, a different picture emerges. The barplot in Figure 6 shows that the frequency distributions of these two types of noun classification are almost identical in the Circum-Pacific. In the Old World, on the contrary, gender is much more frequent than numeral

classifiers. In other words, what stands out in the frequency distributions is the smaller than expected frequency of numeral classifiers in the Old World and the higher than expected frequency of gender in the Old World. Thus, if we focus on the distributions of noun classification overall, there is evidence that it is the distributions in the Old World that are biased rather than those in the Circum-Pacific.

Here I can only speculate possible reasons for these distributions. One possible explanation for the greater frequency of gender in the Old World is the following. As was discussed above, gender can develop from classifiers or from case or number agreement. If we assume that there has been a roughly equal probability of developing gender from classifiers in both the Circum-Pacific and in the Old World, then the higher frequency of gender must be explained by gender having developed in the Old World more probably from case or number agreement compared to the Circum-Pacific. However, this explanation cannot really account for why the frequency of numeral classifiers is so much lower than expected in the Old World. If gender would develop more likely from case or number agreement than from classifiers in the Old World, this may explain the higher frequency of gender in that area, but not the lower than expected frequency of numeral classifiers.

figures/13/Fig6_barplots.pdf

Figure 6: Barplots of gender (on the left) and numeral classifiers (on the right) inside and outside the Circum-Pacific region (counts in genera)

Another possibility is to assume that the probability of developing gender from case or number agreement was roughly similar in the Circum-Pacific and in the Old World. The higher frequency of gender in the Old World could then only be explained by gender being developed more likely from classifiers in the Old

World compared to the Circum-Pacific. This explanation could account for the higher than expected frequency of gender in the Old World and also the lower than expected frequency of numeral classifiers in the Old World – provided that we assume that when a numeral classifiers system changes into gender that change is complete and the old system of numeral classifiers is practically lost.

This possibility crucially depends on the hypothesized grammaticalization path from classifiers to gender (see §3.2). Although many researchers have suggested this path as one possibility for gender to develop, Passer (2016a : 346) found no evidence for this process in his in-depth study. He suggests that the reason for the lack of evidence may be the following: when a classifier system turns into a gender system, this change requires large changes in the grammar of the language that go beyond noun classification, including the development of obligatory inflectional agreement. Such large changes in grammars would require that many languages change their morphological type in the process. Numeral classifiers tend to occur especially in analytic languages, but changing morphological type to synthetic is unlikely and rare in the languages of the world. The reasons for the biased areal distributions must, therefore, be sought from elsewhere. (Passer 2016a .)

Another reason for the biased areal distributions of gender and numeral classifiers may be related to structural stability (cf. §4.1 and Dahl 2004 : 196–202). Gender and numeral classifiers may simply be stable over very long periods of time, numeral classifiers being further reinforced by neighboring languages in the Circum-Pacific area and gender being reinforced by neighboring languages outside this area. This may be part of the story, since these variables are not the only ones that mark off Circum-Pacific area from the rest of the world. Bickel & Nichols (2006) show that this area is typologically marked off from the rest of the world by about 40% of the 86 linguistic variables they surveyed. In addition, Dediu & Cysouw (2013 : 13) observed that both gender and numeral classifiers are among the more stable features when compared to the other selected *WALS* features. This stability may be related to language type, as was implied above: although the morphological type of languages may sometimes change, it is unlikely that so extensive changes would be mere epiphenomena of changes in noun classification. Languages are more likely to stick to their morphological type and change some aspects of their linguistic patterns or lose those patterns but not change those patterns completely from one type to another (Passer 2016a : 346). It is more cautious but probably more to the points to say that the kind of noun classification attracted by analytic/isolating languages is (numeral) classifiers and those attracted by languages with inflection is gender (cf. Corbett 1991

: 137).

6 Conclusion

In this paper I have researched the interaction between gender and numeral classifiers in a representative sample of the world's languages. The data suggested that there is a strong inverse relationship between gender and numeral classifiers.

This interaction adds to our knowledge of statistical language universals and bespeaks for the existence of complexity trade-offs in well-circumscribed areas of grammar. Previous research has not revealed many instances of complexity trade-offs (e.g., Shosted 2006 ; Maddieson 2006 ; Miestamo 2009). Those that have been found, such as the one between case marking and rigid word order (Siewierska 1998 ; Sinnemäki 2008 , Sinnemäki 2011 , Sinnemäki 2014b), have overwhelmingly occurred between functionally related variables that, for instance, tread the same functional domain (such as argument marking). It is possible that new complexity trade-offs will be found among typological variables, but my contention is that they will be found among variables that are functionally related and may therefore also be diachronically connected to one another.

Although the current data suggests a new complexity trade-off this result does not provide evidence for the claim that all languages are equally complex. As I have demonstrated elsewhere (Sinnemäki 2014c) correlational evidence based on typological feature-data cannot either validate or falsify this claim.

I have said very little about the typological distribution of noun classifiers and possessive classifiers. Numeral classifiers are just one subtype of classifiers, so to form a more precise picture of how gender interacts with classifiers in general it would be necessary to survey at least these two types of classifiers in the future as well.

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Abbreviations

The following is the list of abbreviations used in the interlinear glosses in this paper:

3	third person	HUM	human	PL	plural
A	active	ICMP	incompletive	POSS	possessor marking
ANIM	animate	INDF	indefinite	PREP	preposition
BEN	benefactive	M	masculine	PRF	perfect
CLF	classifier	LOC	locative	PROX	proximal
CLT	clitic	NHUM	non-human	PST	past
DET	determiner	NOM	nominative	REF	referential
F	feminine	NUM	numeral	SBJ	subject
FIN	finite	NVIS	non-visible	SG	singular
GEN	genitive	OBJ	object	WK	week

Appendix 1: Supporting material about mixed effects modeling

The results of the mixed effect modeling indicated that gender correlated inversely with numeral classifiers irrespective of variation related to language families and geographical areas. Here I discuss the model specifications in greater detail and present also a few additional tests that replicate the results.

One important issue that often surfaces in relation to generalized mixed effects modeling is the convergence of models. A common problem in fitting the models is that they do not always converge. In generalized linear mixed effects modeling an iterative algorithm is used to produce the model parameters. This iteration stops when the difference between successive iterations is smaller than a predetermined tolerance. If so, the model is said to converge, otherwise it is said not to converge. In R the tolerance is set to 1e−8 by default, which means that in practice the model fit cannot be improved with further iterations. See (Hardin & Hilbe 2007 : 2, 9, 10, 31) and (Kimball et al. submitted : 3–4) for more details and references to more technical papers.

When the model does not converge, there are three options available: simplify the models, increase the number of iterations, or use a different optimizer. Based

on my experience with generalized linear mixed models using binomial response factors it is hardly ever the case that increasing the number of iterations leads to convergence. The most common alternative in linguistics has been to simplify the models and remove one or more of the random slopes (or the correlation parameters between the random intercept and random slope for some effect). However, there is ongoing debate among researchers whether it is justified to leave out any aspect of the random structure. The simulations of Barr et al. (2013) suggest that it is best to work with maximal models, whereas, for instance, Baayen (2008), Baayen et al. (2008 : 395), Bates, Kliegl, et al. (2015), and Gries (2015) argue that it is fully justified to ask whether all of the random structure is necessary. The statistical literature, on the other hand, suggests that estimating random effects with likelihood ratio test (anova) is not a valid approach for building mixed effects models (see Kimball et al. submitted : 8 and references there). For this latter reason I did not use model simplification for the purpose of improving convergence. (Kimball et al. submitted .)

However, there are situations that may be somewhat problematic if maximal random structure is used. Sometimes the correlation parameter between the random intercept and the random slope for a particular effect is close to or even equals ±1.0. This circumstance means that there is not enough data to fit both a random intercept and a random slope for a particular effect (Baayen et al. 2008 ; Bates, Kliegl, et al. 2015). In these situations I followed the recommendations of Barr et al. (2013) and chose to keep the maximal model. There are two reasons for this. First, simplifying the models by removing the correlation between random effects or by removing a random slope usually only increases the likelihood ratio of the fixed term (here numeral classifiers) and makes its p-value smaller. In all the models below, the fixed effect was significant even with the maximal model, so simplifying the models would not have changed the situation. Second, since languages change at different rates across families and areas (cf. Nichols 2003), it is crucial to include random slopes for both families and areas. Yet owing to the high number of families it may not be usually possible to include more than one random factor for genealogical affiliation especially in Generalized Linear Mixed Models. For instance, Atkinson (2011) modeled both genera and families as random factors but only as random intercepts not as random slopes (or as nested factors, which could have been done). Thus mixed models may not be able to account for the internal structure of language families for which other approaches are called for, such as the Family Bias Theory of Bickel (2013) or phylogenetic regression (e.g., Dunn et al. 2011).

Convergence can be improved also by using a different optimizer. The R pack-

figures/13/Fig7_Map6areas_s.pdf

Figure 7: Six macroareas of the *WALS* on the world map

figures/13/Fig8_Map24areas_s.pdf

Figure 8: The 24 areas of the *Autotyp* on a world map

age `lme4` (Bates, Maechler, et al. 2015) uses two optimizers, BOBYQA and Nelder-Mead, to estimate the random effects in generalized linear mixed effects modeling. My models did not always converge with the default settings, that is, when using both these optimizers. My solution was to use only one optimizer at a time. I used BOBYQA for most of the models (it is also faster in practice) and Nelder-Mead only when using BOBYQA did not work: these choices resulted in model convergence in all situations. A more general solution to the convergence error is offered by Bayesian mixed effects modeling (see e.g. Kimball et al. submitted), but I chose to use the frequentist approach here because of its greater familiarity in linguistics.

In the mixed effects modeling I let the intercepts and the slopes vary between the *WALS* families and between the continents as defined in the *Autotyp*. But there are other genealogical classifications that could have been used and the world can also be divided into geographical areas based on different criteria. The classifications I chose capture variation at one particular level of configuration, so it is informative to try out alternative configurations as well. For instance, the ten continents used in the *Autotyp* may conceal variation that occurs in finer-grained areas or in larger macro-areas. For this reason I retested the hypothesis by using an alternative genealogical classification as well as two alternative areal configurations. As an alternative genealogical classification I used stocks, the highest level of classification in the *Autotyp* database (Bickel et al. 2017). As alternative areal configurations I used the six macroareas in the *WALS*, the 24 areas in the *Autotyp*, and the Circum-Pacific vs. the Old World as discussed in §4.1. The six macroareas of the *WALS* are illustrated on a world map in Figure 7 (using the 2679 languages of that database), the 24 areas of the *Autotyp* are illustrated in Figure 8 (using 2949 languages of that database), and the Circum-Pacific vs. the Old World are illustrated in Figure 4 in §4.1 (using the languages of my sample).[16] These combinations of the genealogical and areal classifications produced seven additional models listed in Table 4.

The results of these additional models are summarized in Table 4. As the fourth column suggests, in all the additional models there was an inverse relationship between gender and numeral classifiers. As the rightmost column suggests, this relationship was significant in all the models. These results further replicate those reported in §4.2.

[16] See Hammarström & Donohue 2014 for a macroareal definition that is different from those used in the *WALS*. Most areal breakdowns in language typology are based on geography, but it would be possible to use also areal breakdowns based on other criteria, such as social structure (Burton et al. 1996). However, typological research has yet to discuss and employ such approaches.

Table 4: Seven additional models, the design of their random effect structure, and the results of the mixed effects modeling

Model	Areal configuration	Genealogical classification	logit estimates + std error	χ^2 (1)	p-value
W24	24 areas	*WALS*-families	**−2.1 ± 1.1**	9.3	0.002
W6	6 macroareas	*WALS*-families	**−1.9 ± 0.9**	4.1	0.042
W2	Circum-Pacific / Old World	*WALS*-families	**−2.0 ± 0.8**	6.3	0.012
A10	10 continents	*Autotyp*-stocks	**−3.4 ± 2.4**	8.3	0.004
A24	24 areas	*Autotyp*-stocks	**−3.1 ± 2.3**	9.2	0.002
A6	6 macroareas	*Autotyp*-stocks	**−3.1 ± 1.9**	4.7	0.030
A2	Circum-Pacific / Old World	*Autotyp*-stocks	**−5.1 ± 2.8**	8.0	0.005

Appendix 2: The sample and sources

The table below provides information about the 360 sample languages, including genealogical classification, macroareal classification, the data on numeral classifiers and gender, and sources. A more detailed database on noun gender is in preparation to *Journal of Cross-Linguistic Databases*.

Table 5

Macroarea	Family	Genus	Language	Cl	Gd	Sources (classifiers)	Sources (gender)
Africa	Afro-Asiatic	Berber	Berber (Middle Atlas)	–	+	Penchoen 1973 : 24–25	Penchoen 1973 : 12–13, 21–22, 25–27, 39–40, 54–55
Africa	Afro-Asiatic	Biu-Mandara	Margi	–	–	Gil 2013	Hoffman 1963 : 46, 72–75, 85–87
Africa	Afro-Asiatic	Central Cushitic	Kemant	–	+	Appleyard 1975 : 329, passim	Appleyard 1975 : 319–322, 332–333
Africa	Afro-Asiatic	Dizoid	Dizi	–	+	Gil 2013	Corbett 2013 ; Nichols 1992 : 295
Africa	Afro-Asiatic	E. Cushitic	Arbore	–	+	Gil 2013	Corbett 2013 ; Hayward 1984 : 131–132
Africa	Afro-Asiatic	E. Cushitic	Oromo (Harar)	–	+	Gil 2013	Corbett 2013 ; Owens 1985 : 65
Africa	Afro-Asiatic	E. Cushitic	Qafar	–	+	Bliese 1981 : 185–186	Bliese 1981 : 180–182, 186–188
Africa	Afro-Asiatic	S. Cushitic	Alagwa	–	+	Gil 2013	Corbett 2013 ; Mous 2008 : 147–149
Africa	Afro-Asiatic	S. Cushitic	Iraqw	–	+	Gil 2013	Corbett 2013 ; Mous 1992 : 41
Africa	Afro-Asiatic	Semitic	Amharic	–	+	Gil 2013	Corbett 2013 ; Leslau 1995 : 33–34
Africa	Afro-Asiatic	Semitic	Arabic (Egyptian)	–	+	Gil 2013	Corbett 2013 ; Hanna 1967 : 12–18
Africa	Afro-Asiatic	Semitic	Arabic (Moroccan)	–	+	Gil 2013	Harrell 1962 : 40, 45–46, 95–97
Africa	Afro-Asiatic	Semitic	Tigré	–	+	Elias 2005 : 110–112	Corbett 2013 ; Elias 2005 : 210–216
Africa	Afro-Asiatic	W. Chadic	Hausa	–	+	Gil 2013	Corbett 2013 ; Schuh 1976 : 47
Africa	Afro-Asiatic	W. Chadic	Miya	–	+	Gil 2013	Corbett 2013 ; Schuh 1989 : 171–173
Africa	Austronesian	Barito	Malagasy	–	–	Gil 2013	Corbett 2013
Africa	Central Sudanic	Moru-Ma'di	Lugbara	–	–	Gil 2013	Nichols 1992 : 295
Africa	Eastern Sudanic	Kuliak	So	+	–	Gil 2013	Carlin 1993 : 73
Africa	Eastern Sudanic	Nilotic	Datooga	–	–	Gil 2013	Kiessling 2007 : passim
Africa	Eastern Sudanic	Nilotic	Lango	–	–	Gil 2013	Corbett 2013
Africa	Eastern Sudanic	Nilotic	Maasai	–	+	Gil 2013	Payne 1998 : 160
Africa	Eastern Sudanic	Nubian	Nubian (Dongolese)	–	–	Gil 2013	Corbett 2013
Africa	Eastern Sudanic	Surmic	Murle	–	–	Arensen 1982 : 100	Corbett 2013
Africa	Fur	Fur	Fur	–	+	Gil 2013	Jakobi 1990 : 84, 99–115
Africa	Gumuz	Gumuz	Gumuz	–	–	Ahland 2012 : 131–135	Ahland 2012 : 95–96
Africa	Hadza	Hadza	Hadza	–	+	Edenmyr 2004 : passim	Sands 2013 : 108–110
Africa	Kadu	Kadugli	Krongo	–	+	Reh 1985 : 309–310	Reh 1985 : 126–127
Africa	Khoe-Kwadi	Khoe-Kwadi	Khoekhoe	–	+	Gil 2013	Corbett 2013 ; Hagman 1973 : 81–88
Africa	Koman	Koman	Uduk	–	+	Killian 2015 : 129–132	Killian 2015 : 67–68
Africa	Kordofanian	Rashad	Orig	–	+	Gil 2013	Nichols 1992 : 295
Africa	Kxa	Ju Kung	Ju|'hoan	–	–	Gil 2013	Corbett 2013 ; Dickens 1992 : 12–16
Africa	Mande	W. Mande	Mandinka (Gambian)	–	–	Nichols 1992 : 295	Nichols 1992 : 295
Africa	Niger-Congo	Bantoid	Ejagham	+	+	Watters 1981 : 309–313	Watters 1981 : 291–293, 318–321, 328–331, 434–440
Africa	Niger-Congo	Bantoid	Lingala	–	+	Meeuwis 1998 : 23–24	Corbett 2013 ; Kamwangamalu 1989 : 110–111
Africa	Niger-Congo	Bantoid	Luganda	–	+	Gil 2013	Nichols 1992 : 295
Africa	Niger-Congo	Bantoid	Luvale	–	+	Horton 1949 : 36–37, 166–167	Horton 1949 : 36–37, 166–167
Africa	Niger-Congo	Bantoid	Shona	–	+	Fortune 1985 : 108–109, 127	Corbett 2013 ; Fortune 1985 : 107–126
Africa	Niger-Congo	Bantoid	Swahili	–	+	Gil 2013	Corbett 2013 ; own knowledge
Africa	Niger-Congo	Bantoid	Zulu	–	+	Gil 2013	Corbett 2013 ; Canonici 1995 : 21
Africa	Niger-Congo	Cross River	Kana	+	–	Gil 2013	Aikhenvald 2000 : 110–111
Africa	Niger-Congo	Defoid	Yoruba	–	–	Gil 2013	Corbett 2013
Africa	Niger-Congo	Gbaya-Manza-Ngbaka	Gbeya Bossangoa	–	–	Gil 2013	Samarin 1966 : 98

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Table 5 – *Continued from previous page*

Macroarea	Family	Genus	Language	Cl	Gd	Sources (classifiers)	Sources (gender)
Africa	Niger-Congo	Gur	Dagaare	–	+	Gil 2013	Grimm 2012 : 45–48
Africa	Niger-Congo	Gur	Koromfe	–	+	Gil 2013	Corbett 2013 ; Rennison 1997 : 206–233
Africa	Niger-Congo	Gur	Supyire	–	+	Gil 2013	Corbett 2013 ; Carlson 1994 : 75
Africa	Niger-Congo	Igboid	Igbo	–	–	Gil 2013	Corbett 2013
Africa	Niger-Congo	N. Atlantic	Diola-Fogny	–	+	Sapir 1965 : 74	Sapir 1965 : 24–25, 61–62
Africa	Niger-Congo	N. Atlantic	Fula (Cameroonian)	+	+	Nichols 1992 : 295	Nichols 1992 : 295
Africa	Niger-Congo	Ubangi	Zande	–	–	Gore 1926 : 42–45	Corbett 2013 ; Gore 1926 : 20–23
Africa	Saharan	W. Saharan	Kanuri	–	–	Gil 2013	Corbett 2013
Africa	Sandawe	Sandawe	Sandawe	–	+	Gil 2013	Nichols 1992 : 295; Eaton 2010 : 14–17
Africa	Songhay	Songhay	Koyra Chiini	–	–	Gil 2013	Heath 1999 : 55
Australia	Bunuban	Bunuban	Gooniyandi	–	–	Gil 2013	Corbett 2013
Australia	Gaagudju	Gaagudju	Gaagudju	–	+	Gil 2013	Harvey 2002 : 144–157
Australia	Garrwan	Garrwan	Garrwa	–	–	Gil 2013	Mushin 2012 : 38, 190
Australia	Gunwinyguan	Nunggubuyu	Nunggubuyu	–	+	Gil 2013	Corbett 2013 ; Heath 1983 : 131–132
Australia	Iwaidjan	Iwaidjan	Maung	–	+	Gil 2013	Corbett 2013 ; Capell & Hinch 1970 : 73–77
Australia	Mangarrayi-Maran	Alawa	Alawa	–	+	Sharpe 1972 : passim	Sharpe 1972 : 66, 79–80
Australia	Mangarrayi-Maran	Mangarrayi	Mangarrayi	–	+	Gil 2013	Corbett 2013 ; Nichols 1992 : 297
Australia	Mangarrayi-Maran	Warndarang	Warndarang	–	+	Gil 2013	Nichols 1992 : 299; Heath 1980 : 22–23
Australia	Mirndi	Djingili	Djingili	–	+	Gil 2013	Pensalfini 1997 : 247–248, 253–259
Australia	Mirndi	Jaminjungan	Jaminjung	–	–	Gil 2013	Schultze-Berndt 2000 : passim
Australia	Mirndi	Wambayan	Wambaya	–	+	Nordlinger 1998 : 72–80	Nordlinger 1998 : 59–70
Australia	N. Daly	N. Daly	Malakmalak	–	+	Gil 2013	Birk 1976 : 30–31
Australia	Pama-Nyungan	N. Pama-Nyungan	Dyirbal	–	+	Gil 2013	Corbett 2013 ; Dixon 1972 : 44
Australia	Pama-Nyungan	N. Pama-Nyungan	Uradhi	–	–	Gil 2013	Corbett 2013
Australia	Pama-Nyungan	N. Pama-Nyungan	Yidiny	–	–	Gil 2013	Corbett 2013
Australia	Pama-Nyungan	S.-E. Pama-Nyungan	Ngiyambaa	–	–	Gil 2013	Corbett 2013
Australia	Pama-Nyungan	W. Pama-Nyungan	Martuthunira	–	–	Gil 2013	Corbett 2013
Australia	Pama-Nyungan	W. Pama-Nyungan	Yingkarta	–	–	Gil 2013	Dench 1998 : 20
Australia	Tiwian	Tiwian	Tiwi	–	+	Gil 2013	Corbett 2013 ; Osborne 1974 : 51–52
Australia	Worrorran	Worrorran	Gunin	–	+	Gil 2013	McGregor 2004 : 146–149
Australia	Worrorran	Worrorran	Ungarinjin	–	–	Gil 2013	Nichols 1992 : 299
Australia	Worrorran	Worrorran	Worora	–	+	Gil 2013	Clendon 2000 : 95
Australia	Yangmanic	Yangmanic	Wardaman	–	+	Merlan 1994 : 120	Corbett 2013 ; Merlan 1994 : 61–63, 241–242
Eurasia	Afro-Asiatic	Semitic	Hebrew (Modern)	–	+	Gil 2013	Corbett 2013 ; Glinert 1989 : 51–52, 91, 104, 117–120, 185–198
Eurasia	Ainu	Ainu	Ainu	+	–	Gil 2013	Corbett 2013
Eurasia	Altaic	Mongolic	Buriat	–	–	Gil 2013	Skribnik 2003 : 110–111, 117–120
Eurasia	Altaic	Mongolic	Khalkha	–	–	Gil 2013	Corbett 2013
Eurasia	Altaic	Tungusic	Evenki	–	–	Gil 2013	Corbett 2013
Eurasia	Altaic	Tungusic	Nanai	–	–	Gil 2013	Nichols 1992 : 297
Eurasia	Altaic	Turkic	Chuvash	–	–	Gil 2013	Corbett 2013
Eurasia	Altaic	Turkic	Tatar	+	–	Gil 2013	Poppe 1968 : 29–57
Eurasia	Altaic	Turkic	Turkish	+	–	Gil 2013	Corbett 2013
Eurasia	Altaic	Turkic	Tuvan	–	–	Gil 2013	Nichols 1992 : 297
Eurasia	Austro-Asiatic	Aslian	Semelai	+	–	Gil 2013	Corbett 2013
Eurasia	Austro-Asiatic	Khasian	Pnar	+	+	Ring 2015 : 124–125, 357–369	Ring 2015 : 101, 107–108

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Table 5 – *Continued from previous page*

Macroarea	Family	Genus	Language	Cl	Gd	Sources (classifiers)	Sources (gender)
Eurasia	Austro-Asiatic	Khmer	Khmer	+	–	Gil 2013	Corbett 2013
Eurasia	Austro-Asiatic	Munda	Korku	–	+	Gil 2013	Bhattacharya 1976 : passim
Eurasia	Austro-Asiatic	Munda	Santali	+	+	Gil 2013	Ghosh 2008 : 11–12, 32–33, 39–40, 44–45
Eurasia	Austro-Asiatic	Nicobarese	Nicobarese (Car)	+	+	Gil 2013	Corbett 2013 ; Braine 1970 : 103–108
Eurasia	Austro-Asiatic	Palaung-Khmuic	Khmu'	+	–	Gil 2013	Corbett 2013 ; Premsrirat 1987 : 30, 32–33
Eurasia	Austro-Asiatic	Viet-Muong	Vietnamese	+	–	Gil 2013	Corbett 2013
Eurasia	Austronesian	Malayo-Sumbawan	Acehnese	+	–	Durie 1985 : 137–139	Durie 1985 : 29
Eurasia	Austronesian	Malayo-Sumbawan	Cham (E.)	+	–	Gil 2013	Thurgood 2005 : passim
Eurasia	Basque	Basque	Basque	–	–	Gil 2013	Corbett 2013
Eurasia	Burushaski	Burushaski	Burushaski	–	+	Gil 2013	Corbett 2013 ; Munshi 2006 : 161–167
Eurasia	Chukotko-Kamchatkan	N. Chukotko-Kamchatkan	Chukchi	–	–	Gil 2013	Corbett 2013
Eurasia	Dravidian	N. Dravidian	Brahui	–	–	Gil 2013	Corbett 2013
Eurasia	Dravidian	S. Dravidian	Kannada	–	+	Gil 2013	Corbett 2013 ; Sridhar 1990 : 221–222
Eurasia	Dravidian	S. Dravidian	Tamil	–	+	Schiffman 1999 : 48–50	Corbett 2013 ; Schiffman 1999 : 57–58
Eurasia	Hmong-Mien	Hmong-Mien	Hmong Daw	+	–	Gil 2013	Nichols 1992 : 297
Eurasia	Indo-European	Albanian	Albanian	–	+	Gil 2013	Matasović 2012 : 17, 18, 29
Eurasia	Indo-European	Armenian	Armenian (E.)	–	–	Gil 2013	Corbett 2013
Eurasia	Indo-European	Baltic	Latvian	–	+	Gil 2013	Corbett 2013 ; Kalnaca 2014 : 66–73
Eurasia	Indo-European	Germanic	English	–	–	Gil 2013	Corbett 2013 ; own knowledge
Eurasia	Indo-European	Germanic	German	–	+	Gil 2013	Corbett 2013 ; own knowledge
Eurasia	Indo-European	Indic	Assamese	+	–	Gil 2013	Goswami & Tamuli 2003 : 415
Eurasia	Indo-European	Indic	Bengali	+	–	Gil 2013	Klaiman 2009 : 425
Eurasia	Indo-European	Indic	Hindi	–	+	Gil 2013	Corbett 2013 ; McGregor 1986 : 1–22
Eurasia	Indo-European	Indic	Marathi	–	+	Gil 2013	Corbett 2013 ; Pandharipande 2003 : 702–707
Eurasia	Indo-European	Indic	Sinhala	–	+	Gil 2013	Henadeerage 2002 : passim; Chandralai 2010 : 79–82, 228–229
Eurasia	Indo-European	Indic	Waigali	–	+	Gil 2013	Nichols 1992 : 297
Eurasia	Indo-European	Iranian	Persian	+	–	Gil 2013	Corbett 2013
Eurasia	Indo-European	Romance	French	–	+	Gil 2013	Corbett 2013 ; own knowledge
Eurasia	Indo-European	Slavic	Bulgarian	–	+	Gil 2013	Nicolova 2017 : 86–89
Eurasia	Indo-European	Slavic	Russian	–	+	Gil 2013	Corbett 2013 ; Wade 2011 : 54
Eurasia	Japanese	Japanese	Japanese	+	–	Gil 2013	Kaiser et al. 2001 : passim
Eurasia	Kartvelian	Kartvelian	Georgian	–	–	Gil 2013	Corbett 2013
Eurasia	Korean	Korean	Korean	+	–	Gil 2013	Nichols 1992 : 297
Eurasia	Nakh-Daghestanian	Avar-Andic-Tsezic	Avar	–	+	Gil 2013	Charachidzé 1981 : 29–30; van den Berg 2005 : 155–156
Eurasia	Nakh-Daghestanian	Avar-Andic-Tsezic	Bagvalal	–	+	Gil 2013	Corbett 2006 : 749–750
Eurasia	Nakh-Daghestanian	Avar-Andic-Tsezic	Hunzib	–	+	Gil 2013	Corbett 2013 ; van den Berg 2004 : 1367
Eurasia	Nakh-Daghestanian	Lak-Dargwa	Dargwa	–	+	Gil 2013	van den Berg 2005 : 156–158
Eurasia	Nakh-Daghestanian	Lezgic	Lezgian	–	–	Gil 2013	Corbett 2013
Eurasia	Nakh-Daghestanian	Nakh	Chechen	–	+	Gil 2013	Nichols 1994 : 37
Eurasia	Nakh-Daghestanian	Nakh	Ingush	–	+	Gil 2013	Corbett 2013 ; Nichols 2011 : 141–142
Eurasia	Nivkh	Nivkh	Nivkh	+	–	Gil 2013	Corbett 2013
Eurasia	NW Caucasian	NW Caucasian	Abkhaz	–	+	Gil 2013	Corbett 2013 ; Spruit 1986 : 108
Eurasia	Sino-Tibetan	Bodic	Gurung	–	–	Nichols 1992 : 297	Nichols 1992 : 297

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Macroarea	Family	Genus	Language	Cl	Gd	Sources (classifiers)	Sources (gender)
Eurasia	Sino-Tibetan	Bodo-Garo	Garo	+	–	Gil 2013	Burling 1961 : passim
Eurasia	Sino-Tibetan	Burmese-Lolo	Burmese	+	–	Gil 2013	Corbett 2013
Eurasia	Sino-Tibetan	Burmese-Lolo	Lahu	+	–	Gil 2013	Corbett 2013
Eurasia	Sino-Tibetan	Chinese	Cantonese	+	–	Gil 2013	Corbett 2013
Eurasia	Sino-Tibetan	Chinese	Mandarin	+	–	Gil 2013	Corbett 2013
Eurasia	Sino-Tibetan	Mahakiranti	Chepang	–	–	Gil 2013	Caughley 1982 : 42, 50, 51, 55
Eurasia	Tai-Kadai	Kadai	Lachi	+	–	Gil 2013	Kosaka 2000 : 68–77
Eurasia	Tai-Kadai	Kam-Tai	Thai	+	–	Gil 2013	Corbett 2013
Eurasia	Uralic	Finnic	Finnish	–	–	Gil 2013	Corbett 2013
Eurasia	Uralic	Mordvin	Mordvin (Erzya)	–	–	Gil 2013	Zaicz 1998 : 191–197
Eurasia	Uralic	Permic	Komi-Zyrian	–	–	Gil 2013	Nichols 1992 : 295
Eurasia	Uralic	Samoyedic	Nenets	–	–	Gil 2013	Corbett 2013
Eurasia	Uralic	Ugric	Hungarian	+	–	Gil 2013	Corbett 2013
Eurasia	Yukaghir	Yukaghir	Yukaghir (Kolyma)	–	–	Gil 2013	Corbett 2013
N. America	Algic	Algonquian	Cree (Plains)	–	+	Gil 2013	Corbett 2013 ; Wolfart 1973 : 20–24, 33–38
N. America	Algic	Yurok	Yurok	+	–	Nichols 1992 : 299	Corbett 2013
N. America	Atakapa	Atakapa	Atakapa	–	–	Gil 2013	Swanton 1929 : 125, 136–140
N. America	Chibchan	Talamanca	Teribe	+	–	Gil 2013	Quesada & Skopeteas 2010 : passim
N. America	Chimakuan	Chimakuan	Quileute	–	+	Gil 2013	Nichols 1992 : 299
N. America	Chitimacha	Chitimacha	Chitimacha	–	–	Gil 2013	Granberry 2004 : 52–53, 78–85
N. America	Chumash	Chumash	Chumash (Barbareño)	–	–	Gil 2013	Wash 2001 : passim
N. America	Chumash	Chumash	Chumash (Ineseño)	–	–	Gil 2013	Applegate 1972 : passim
N. America	Eskimo-Aleut	Eskimo	Yup'ik (C.)	–	–	Reed et al. 1977 : 201–207	Corbett 2013
N. America	Haida	Haida	Haida	+	–	Gil 2013	Corbett 2013
N. America	Hokan	Chimariko	Chimariko	–	–	Gil 2013	Corbett 2013
N. America	Hokan	Yuman	Diegueño (Mesa Grande)	–	–	Nichols 1992 : 299	Nichols 1992 : 299
N. America	Hokan	Yuman	Maricopa	–	–	Gil 2013	Corbett 2013
N. America	Iroquoian	N. Iroquoian	Seneca	–	+	Gil 2013	Corbett 2013 ; Chafe 1967 : 13–22
N. America	Karok	Karok	Karok	–	–	Gil 2013	Corbett 2013
N. America	Keresan	Keresan	Acoma	–	–	Gil 2013	Corbett 2013
N. America	Kiowa-Tanoan	Kiowa-Tanoan	Kiowa	–	+	Gil 2013	Sutton 2010 : 59–67
N. America	Kutenai	Kutenai	Kutenai	–	–	Gil 2013	Corbett 2013
N. America	Mayan	Mayan	Jakaltek	+	–	Gil 2013 ; Craig 1986 : 244	Day 1973 : passim
N. America	Mayan	Mayan	Tzeltal	+	–	Gil 2013	Kaufman 1963 : 171–172
N. America	Mayan	Mayan	Tzutujil	+	–	Nichols 1992 : 301	Nichols 1992 : 301
N. America	Mayan	Mayan	Yucatec	+	–	Gil 2013	Brody 2004 : 66, 69
N. America	Misumalpan	Misumalpan	Miskito	–	–	Gil 2013	Heath 1913 : 56
N. America	Muskogean	Muskogean	Choctaw	–	–	Gil 2013	Davies 1986 : passim
N. America	Na-Dene	Athapaskan	Navajo	–	–	Gil 2013	Nichols 1992 : 299
N. America	Na-Dene	Tlingit	Tlingit	+	–	Gil 2013	Boas 1917 : passim
N. America	Oregon Coast	Coosan	Coos (Hanis)	–	–	Gil 2013	Corbett 2013
N. America	Oto-Manguean	Chichimec	Chichimeca-Jonaz	–	–	Gil 2013	de Suárez 1984 : 23–30
N. America	Oto-Manguean	Mixtecan	Mixtec (Chalcatongo)	–	–	Gil 2013	Corbett 2013 ; Macaulay 1996 : 81–85
N. America	Oto-Manguean	Otomian	Otomí (Mezquital)	–	–	Hess 1968 : passim	Hess 1968 : passim
N. America	Oto-Manguean	Zapotecan	Zapotec (Coatlán)	–	–	Beam de Azcona 2004 : passim	Beam de Azcona 2004 : passim
N. America	Penutian	Chinookan	Chinook (Upper)	–	+	Gil 2013	Hymes 1955 : 72–75, 214
N. America	Penutian	Klamath-Modoc	Klamath	–	–	Gil 2013	Mithun 2001 : 448–451

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Macroarea	Family	Genus	Language	Cl	Gd	Sources (classifiers)	Sources (gender)
N. America	Penutian	Maiduan	Maidu (NE)	–	–	Gil 2013	Nichols 1992 : 299
N. America	Penutian	Miwok	Miwok (S. Sierra)	–	–	Gil 2013	Corbett 2013
N. America	Penutian	Sahaptian	Sahaptin (Umatilla)	+	–	Nichols 1992 : 299	Nichols 1992 : 299
N. America	Penutian	Tsimshianic	Gitksan	+	–	Nichols 1992 : 299	Hunt 1993 : passim
N. America	Penutian	Tsimshianic	Tsimshian (Coast)	+	–	Gil 2013	Corbett 2013
N. America	Penutian	Yokuts	Yawelmani	–	–	Gil 2013	Nichols 1992 : 299
N. America	Salinan	Salinan	Salinan	–	–	Gil 2013	Nichols 1992 : 299
N. America	Salishan	Central Salish	Halkomelem (Island)	+	+	Gerdts & Hinkson 2004 : 254–266	Gerdts 2013 : 417–418; Gerdts 2010 : 176–177
N. America	Salishan	Interior Salish	Thompson	+	–	Gil 2013	Corbett 2013
N. America	Siouan	Core Siouan	Lakhota	–	+	Gil 2013	Van Valin 1977 : 36–37
N. America	Siouan	Core Siouan	Mandan	–	–	Gil 2013	Kennard 1936 : passim
N. America	Takelma	Takelma	Takelma	–	–	Gil 2013	Nichols 1992 : 299
N. America	Tequistlatecan	Tequistlatecan	Chontal (Huamelultec Oaxaca)	–	–	Nichols 1992 : 301	Waterhouse 1967 : 356–358
N. America	Tol	Tol	Tol	–	–	Gil 2013	Corbett 2013
N. America	Totonacan	Totonacan	Tepehua (Tlachichilco)	+	–	Nichols 1992 : 301	Nichols 1992 : 301
N. America	Tunica	Tunica	Tunica	–	+	Gil 2013	Corbett 2013 ; Haas 1940 : 36–38, 62, 64–65, 102–110
N. America	Uto-Aztecan	Aztecan	Nahuatl (Tetelcingo)	–	–	Gil 2013	Corbett 2013
N. America	Uto-Aztecan	Aztecan	Pipil	–	–	Gil 2013	Corbett 2013
N. America	Uto-Aztecan	California Uto-Aztecan	Luiseño	–	–	Gil 2013	Elliott 1999 : 23–28
N. America	Uto-Aztecan	Numic	Paiute (S.)	–	–	Gil 2013	Nichols 1992 : 299
N. America	Uto-Aztecan	Tepiman	O'odham	–	–	Gil 2013	Nichols 1992 : 299
N. America	Uto-Aztecan	Tepiman	Tepehuan (SE)	–	+	Gil 2013	Willett 1991 : 83–84
N. America	Wappo-Yukian	Wappo	Wappo	–	–	Gil 2013	Nichols 1992 : 299
N. America	Yuchi	Yuchi	Yuchi	–	+	Gil 2013	Nichols 1992 : 301
N. America	Zuni	Zuni	Zuni	–	–	Gil 2013	Corbett 2013
Papunesia	Austronesian	Atayalic	Atayal	–	–	Gil 2013	Rau 1992 : passim
Papunesia	Austronesian	C. Malayo-Polynesian	Kambera	+	–	Gil 2013	Corbett 2013
Papunesia	Austronesian	C. Malayo-Polynesian	Ke'o	+	–	Gil 2013	Baird 2002 : passim
Papunesia	Austronesian	C. Malayo-Polynesian	Leti	–	–	Gil 2013	van Engelenhoven & Klinken 2005 : passim
Papunesia	Austronesian	C. Malayo-Polynesian	Sawu	+	–	Gil 2013	Corbett 2013
Papunesia	Austronesian	C. Malayo-Polynesian	Tetun	+	–	Gil 2013	Morris 1984 :xiv
Papunesia	Austronesian	Celebic	Tukang Besi	+	–	Gil 2013	Corbett 2013
Papunesia	Austronesian	Chamorro	Chamorro	+	–	Nichols 1992 : 137, 299; Topping 1973 : 164–166	Topping 1973 : passim; Nichols 1992 : 299
Papunesia	Austronesian	E. Formosan	Amis	–	+	Gil 2013	Wu 2006 : 79
Papunesia	Austronesian	Greater C. Philippine	Tagalog	–	+	Gil 2013	Corbett 2013 ; Schachter & Otanes 1972 : 197–198
Papunesia	Austronesian	Javanese	Javanese	+	–	Gil 2013	Oakes 2009 : passim
Papunesia	Austronesian	Malayo-Sumbawan	Balinese	+	–	Gil 2013	Artawa 2013 : passim
Papunesia	Austronesian	Malayo-Sumbawan	Indonesian	+	–	Gil 2013	Corbett 2013
Papunesia	Austronesian	Malayo-Sumbawan	Minangkabau	+	–	Gil 2013	Crouch 2009 : 60–63
Papunesia	Austronesian	N. Borneo	Begak-Ida'an	+	–	Gil 2013	Goudswaard 2005 : 88, 101–102
Papunesia	Austronesian	NW Sumatra-Barrier Islands	Batak (Karo)	+	–	Gil 2013	Corbett 2013
Papunesia	Austronesian	Oceanic	Drehu	–	–	Gil 2013	Nichols 1992 : 299

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Macroarea	Family	Genus	Language	Cl	Gd	Sources (classifiers)	Sources (gender)
Papunesia	Austronesian	Oceanic	Erromangan	–	–	Gil 2013	Corbett 2013
Papunesia	Austronesian	Oceanic	Fijian	–	–	Gil 2013	Corbett 2013
Papunesia	Austronesian	Oceanic	Futuna-Aniwa	–	–	Gil 2013	Dougherty 1983 : passim
Papunesia	Austronesian	Oceanic	Hawaiian	–	–	Gil 2013	Corbett 2013
Papunesia	Austronesian	Oceanic	Iaai	–	–	Gil 2013	Corbett 2013
Papunesia	Austronesian	Oceanic	Kilivila	+	–	Gil 2013	Corbett 2013
Papunesia	Austronesian	Oceanic	Mokilese	+	–	Gil 2013	Corbett 2013
Papunesia	Austronesian	Oceanic	Pileni	+	–	Gil 2013	Corbett 2013
Papunesia	Austronesian	Oceanic	Pohnpeian	+	–	Gil 2013	Rehg & Sohl 1981 : passim; Nichols 1992 : 299
Papunesia	Austronesian	Oceanic	Rapanui	–	–	Gil 2013	Corbett 2013
Papunesia	Austronesian	Oceanic	Tawala	–	–	Gil 2013	Nichols 1992 : 297
Papunesia	Austronesian	Oceanic	Teop	–	+	Mosel & Spriggs 2000 : 328–329	Svärd (2019 [this volume])
Papunesia	Austronesian	Oceanic	Tongan	+	–	Gil 2013	Otsuka 2000 : 49
Papunesia	Austronesian	Oceanic	Toqabaqita	+	–	Gil 2013	Lichtenberk 2008 : passim
Papunesia	Austronesian	Oceanic	Tuvaluan	+	–	Gil 2013	Corbett 2013
Papunesia	Austronesian	Oceanic	Ulithian	+	–	Lynch 2002 : passim	Lynch 2002 : passim
Papunesia	Austronesian	Paiwan	Paiwan	+	–	Tang 2004 : 380–382	Corbett 2013
Papunesia	Austronesian	Palauan	Palauan	–	–	Georgopoulos 1985 : passim	Georgopoulos 1985 : passim
Papunesia	Austronesian	S. Halmahera - W. New Guinea	Taba	+	–	Gil 2013	Corbett 2013
Papunesia	Austronesian	S. Sulawesi	Makassar	+	–	Gil 2013 ; Jukes 2006 : 205	Jukes 2006 : passim
Papunesia	Austronesian	Sama-Bajaw	Bajau (Sama)	+	–	Jun 2005 : 387	Jun 2005 : 387
Papunesia	Austronesian	Yapese	Yapese	+	–	Gil 2013	Jensen 1977 : passim
Papunesia	Baining-Taulil	Baining	Mali	–	+	Gil 2013	Stebbins & Tayul 2012 : 12–15
Papunesia	Baining-Taulil	Taulil	Taulil	–	+	Gil 2013	Terrill 2002 : 69–70
Papunesia	Border	Border	Imonda	–	–	Gil 2013	Corbett 2013
Papunesia	Dagan	Dagan	Daga	–	–	Murane 1974 : 75–81, 91	Corbett 2013
Papunesia	E. Bougainville	E. Bougainville	Motuna	+	+	Terrill 2002 : 74–75	Terrill 2002 : 74–75
Papunesia	E. Bougainville	E. Bougainville	Nasioi	+	–	Nichols 1992 : 299; Foley 1986 : 83–85	Nichols 1992 : 299; Terrill 2002 : 75–76; Hurd & Hurd & Hurd 1966 : passim
Papunesia	Kiwaian	Kiwaian	Kiwai	–	–	Gil 2013	Brown 2009 : 14
Papunesia	Kuot	Kuot	Kuot	–	+	Lindström 2002 : 132, 200	Lindström 2002 : 130, 176–177
Papunesia	Left May	Left May	Ama	–	+	Årsjö 1999 : 79	Svärd (2019 [this volume])
Papunesia	Lower Sepik-Ramu	Lower Sepik	Yimas	–	+	Gil 2013	Corbett 2013 ; Phillips 1993 : 175–178
Papunesia	Sentani	Sentani	Sentani	–	–	Gil 2013	Corbett 2013
Papunesia	Sepik	Middle Sepik	Ambulas	–	+	Gil 2013	Wilson 1980 : 53, 63, 67
Papunesia	Sepik	Middle Sepik	Iatmul	–	+	Jendraschek 2012 : 137–140	Jendraschek 2012 : 124–128
Papunesia	Sepik	Ram	Awtuw	–	+	Gil 2013	Feldman 1986 : 41, 45, 108–109
Papunesia	Sepik	Sepik Hill	Alamblak	–	+	Gil 2013	Corbett 2013 ; Bruce 1984 : 74–75, 81, 96–98, 149
Papunesia	Sepik	Tama Sepik	Yessan-Mayo	–	–	Gil 2013	Foreman 1974 : 27–28, 34–42, 56
Papunesia	Sepik	Upper Sepik	Abau	+	+	Lock 2011 : 56–59	Lock 2011 : 85–89
Papunesia	Sepik	Upper Sepik	Iwam	–	+	Laycock & Z'graggen 1975 : 742–743	Laycock & Z'graggen 1975 : 742–743
Papunesia	Skou	W. Skou	Dumo	–	+	Gil 2013	Ross 1980 : 83–86, 94
Papunesia	Skou	Warapu	Barupu	–	+	Corris 2005 : 115–116	Svärd (2019 [this volume])
Papunesia	Solomons E. Papuan	Lavukaleve	Lavukaleve	–	+	Terrill 2003 : passim	Corbett 2013 ; Terrill 2003 : 53–56, 243
Papunesia	Sulka	Sulka	Sulka	–	–	Gil 2013	Tharp 1996 : 79, 85, 90

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Macroarea	Family	Genus	Language	Cl	Gd	Sources (classifiers)	Sources (gender)
Papunesia	Timor-Alor-Pantar	Greater Alor	Adang	+	–	Haan 2001 : 292–304	Haan 2001 : passim
Papunesia	Timor-Alor-Pantar	Greater Alor	Klon	+	–	Baird 2008 : 62–64	Baird 2008 : 62–64
Papunesia	Timor-Alor-Pantar	Greater Alor	Teiwa	+	–	Klamer 2016 : 36	Klamer 2016 : 33
Papunesia	Timor-Alor-Pantar	Makasae-Fataluku-Oirata	Makasae	+	–	Huber 2008 : 13, 23–24	Huber 2008 : 13, 23–24
Papunesia	Tor-Orya	Tor	Berik	–	+	Westrum 1988 : 139, 155–156, passim	Westrum 1988 : 150, 153
Papunesia	Torricelli	Kombio-Arapesh	Arapesh (Mountain)	+	–	Nichols 1992 : 297	Nichols 1992 : 297
Papunesia	Torricelli	Kombio-Arapesh	Mufian	–	+	Alungum et al. 1978 : 104	Alungum et al. 1978 : 92–93
Papunesia	Torricelli	Urim	Urim	–	–	Hemmilä & Luoma 1987 : 82–84, 139–140	Hemmilä & Luoma 1987 : passim
Papunesia	Torricelli	Wapei-Palei	Olo	–	+	Staley 2007 : 17, 19	Staley 2007 : 9–10, 17–18
Papunesia	Torricelli	Wapei-Palei	Au	–	+	Scorza 1985 : 231–232, 238–239, 259	Svärd (2019 [this volume])
Papunesia	Trans-New Guinea	Angan	Tainae	–	+	Carlson 1991 : 7, 116–118	Carlson 1991 : 7, 23–34
Papunesia	Trans-New Guinea	Awju-Dumut	Kombai	–	–	Gil 2013	de Vries 1993 : 21, 34–42
Papunesia	Trans-New Guinea	Binanderean	Korafe	–	–	Gil 2013	Farr 1993 : passim
Papunesia	Trans-New Guinea	Binanderean	Suena	–	–	Gil 2013	Corbett 2013
Papunesia	Trans-New Guinea	Dani	Dani (Lower Grand Valley)	–	–	Bromley 1981 : passim	Bromley 1981 : passim
Papunesia	Trans-New Guinea	E. Highlands	Hua	–	–	Gil 2013	Haiman 1980 : 47, 219
Papunesia	Trans-New Guinea	Engan	Huli	–	–	Lomas 1988 : 196–197	Lomas 1988 : 184–185
Papunesia	Trans-New Guinea	Engan	Kewa	–	–	Gil 2013	Corbett 2013
Papunesia	Trans-New Guinea	Finisterre-Huon	Awara	–	–	Quigley 2016 : 16–19; Aikhenvald 2000 : 124	Quigley 2016 : passim
Papunesia	Trans-New Guinea	Finisterre-Huon	Kâte	–	–	Gil 2013	Nichols 1992 : 297
Papunesia	Trans-New Guinea	Koiarian	Koiari	–	–	Gil 2013	Dutton 1996 : 39–41
Papunesia	Trans-New Guinea	Madang	Amele	–	–	Gil 2013	Corbett 2013
Papunesia	Trans-New Guinea	Madang	Kobon	–	–	Gil 2013	Corbett 2013
Papunesia	Trans-New Guinea	Madang	Usan	–	–	Reesink 1987 : passim	Reesink 1987 : passim
Papunesia	Trans-New Guinea	Mek	Nalca	–	+	Svärd 2013 : 31–33	Svärd (2019 [this volume])
Papunesia	Trans-New Guinea	Mek	Una	–	–	Louwerse 1988 : 77–78	Corbett 2013
Papunesia	Trans-New Guinea	Ok	Mian	–	+	Fedden 2011 : 144–148	Fedden 2011 : 169–171
Papunesia	Trans-New Guinea	Ok	Telefol	–	+	Gil 2013	Nichols 1992 : 299
Papunesia	Trans-New Guinea	Wissel LakesKemandoga	Ekari	+	+	Doble 1987 : 75	Doble 1987 : 89, 94
Papunesia	W. Bougainville	W. Bougainville	Konua	–	+	Gil 2013	Müller 1954 : 14, 21–25
Papunesia	W. Bougainville	W. Bougainville	Rotokas	–	+	Robinson 2011 : 125–127	Svärd (2019 [this volume])
Papunesia	W. Papuan	Hatam	Hatam	+	–	Gil 2013	Corbett 2013
Papunesia	W. Papuan	Kebar	Mpur	+	+	Klamer 2014 : 109–110; Reesink 1996 : 10	Reesink 1996 : 2–3
Papunesia	W. Papuan	N. Halmaheran	Tidore	+	+	Gil 2013	Corbett 2013 ; van van Staden 2006 : passim
Papunesia	W. Papuan	N-C. Bird's Head	Abun	+	–	Gil 2013	Berry & Berry & Berry 2000 : passim
Papunesia	W. Papuan	N-C. Bird's Head	Maybrat	+	+	Gil 2013	Corbett 2013 ; Dol 1999 : 68, 98
Papunesia	W. Papuan	W. Bird's Head	Tehit	+	+	Gil 2013	Hesse 2000 : 25–26
Papunesia	Yale	Yale	Nagatman	–	+	Campbell & Campbell 1987 : 14	Campbell & Campbell & Campbell 1987 : 18–22, 44–49
S. America	Arauan	Arauan	Culina	–	+	Gil 2013	Derbyshire & Payne 1990 : 249–251
S. America	Arauan	Arauan	Dení	–	+	Gil 2013 ; Derbyshire & Payne 1990 : 249–252	Moran & Moran & Moran 1977 : 40–41
S. America	Arauan	Arauan	Jamamadi	–	+	Gil 2013 ; Derbyshire & Payne 1990 : 249–250	Campbell 1985 : 1
S. America	Arauan	Arauan	Jarawara	–	+	Aikhenvald 2000 : passim	Dixon 1995 : 264–265

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Macroarea	Family	Genus	Language	Cl	Gd	Sources (classifiers)	Sources (gender)
S. America	Arauan	Arauan	Paumarí	–	+	Gil 2013	Corbett 2013 ; Aikhenvald 2010 : 237
S. America	Araucanian	Araucanian	Mapudungun	–	–	Gil 2013	Corbett 2013
S. America	Arawakan	Alto-Orinoco	Baniwa	+	+	Aikhenvald 2007 : 479–487	Aikhenvald 2007 : 476–479
S. America	Arawakan	Bolivia-Parana	Terêna	–	–	Gil 2013	Derbyshire & Payne 1990 : 252
S. America	Arawakan	C. Arawakan	Parecis	+	–	Gil 2013	Brandao 2014 : 4
S. America	Arawakan	C. Arawakan	Waurá	+	–	Gil 2013	Payne 1991 : 377
S. America	Arawakan	Caribbean Arawakan	Arawak	–	+	Gil 2013	Pet 1987 : 23, 28–29
S. America	Arawakan	E. Arawakan	Palikur	+	+	Gil 2013 ; Aikhenvald 2000 : 192–198	Derbyshire & Payne 1990 : 262–263; Aikhenvald 2000 : 192–198
S. America	Arawakan	Inland Northern Arawakan	Baré	–	+	Gil 2013	Aikhenvald 2007 : 850–852
S. America	Arawakan	Inland Northern Arawakan	Warekena	+	+	Gil 2013	Aikhenvald & Dixon 1998 : 298–299
S. America	Arawakan	Pre-Andine Arawakan	Ashéninka Perené	–	+	Mihas 2010 : 184–185	Mihas 2010 : 121–122
S. America	Arawakan	Pre-Andine Arawakan	Nomatsiguenga	–	+	Derbyshire & Payne 1990 : 262	Derbyshire & Payne 1990 : 262
S. America	Arawakan	Purus	Apurinã	–	+	Gil 2013	Corbett 2013 ; da Silva Facundes 2000 : 145–148, 222–232, 348–349
S. America	Arawakan	Purus	Piro	–	+	Gil 2013	Derbyshire & Payne 1990 : 248
S. America	Aymaran	Aymaran	Jaqaru	–	–	Gil 2013	Corbett 2013
S. America	Barbacoan	Barbacoan	Awa Pit	–	–	Curnow 1997 : 86, 93–94	Corbett 2013
S. America	Cahuapanan	Cahuapanan	Chayahuita	+	–	Gil 2013	Hart 1988 : 258–272
S. America	Cariban	Cariban	Hixkaryana	–	–	Gil 2013	Corbett 2013 ; Derbyshire 1985 : 6–7
S. America	Cariban	Cariban	Macushi	–	+	Abbott 1991 : 89	Abbott 1991 : 105
S. America	Cariban	Cariban	Panare	–	–	Gil 2013	Derbyshire & Payne 1990 : 263–264
S. America	Cayuvava	Cayuvava	Cayuvava	–	–	Gil 2013	Corbett 2013
S. America	Chapacura-Wanham	Chapacura-Wanham	Wari'	–	+	Gil 2013	Corbett 2013 ; Everett & Kern 1997 : 2–3
S. America	Chibchan	Arhuacic	Ika	–	–	Gil 2013	Corbett 2013
S. America	Chibchan	Chibcha-Duit	Muisca	–	–	Gil 2013	Adelaar & Muysken 2004 : 81–108
S. America	Choco	Choco	Epena Pedee	–	–	Gil 2013	Corbett 2013
S. America	Harakmbet	Harakmbet	Amarakaeri	–	+	Gil 2013	Tripp 1995 : 213
S. America	Huitotoan	Boran	Bora	+	+	Gil 2013	Thiesen 1996 : 27, 33, 36–37, 46–47
S. America	Huitotoan	Huitoto	Ocaina	+	–	Gil 2013	Derbyshire & Payne 1990 : 257
S. America	Jivaroan	Jivaroan	Jivaro	–	–	Gil 2013	Saad 2014 : 32
S. America	Kwaza	Kwaza	Kwazá	+	–	Gil 2013	van der Voort 2004 : 24, 105
S. America	Macro-Ge	Ge-Kaingang	Canela-Krahô	–	–	Gil 2013	Corbett 2013
S. America	Máku	Máku	Máku	–	–	Gil 2013	Aikhenvald & Dixon 1999 : 362
S. America	Mosetenan	Mosetenan	Mosetén	–	+	Gil 2013	Corbett 2013 ; Sakel 2002 : 288–302
S. America	Movima	Movima	Movima	–	+	Haude 2006 : 10, 113–114	Haude 2006 : 148–149
S. America	Mura	Mura	Pirahã	–	–	Gil 2013	Corbett 2013 ; Everett 1986 : 281
S. America	Nadahup	Nadahup	Hup	–	–	Gil 2013	Epps 2008 : 191–195, 241–244
S. America	other	Creoles & Pidgins	Ndyuka	–	–	Gil 2013	Corbett 2013
S. America	Panoan	Panoan	Capanahua	–	–	Gil 2013	Loos 1969 : passim
S. America	Panoan	Panoan	Shipibo-Konibo	–	–	Gil 2013	Corbett 2013
S. America	Peba-Yaguan	Peba-Yaguan	Yagua	+	–	Gil 2013	Payne 2007 : 457, 460–462
S. America	Quechuan	Quechuan	Quechua (Huallaga)	–	–	Gil 2013	Weber 1989 : passim
S. America	Quechuan	Quechuan	Quechua (Imbabura)	–	–	Gil 2013	Corbett 2013
S. America	Sáliban	Piaroa	Piaroa	+	–	Gil 2013	Krute 1989 : passim
S. America	Trumai	Trumai	Trumai	–	+	Guirardello 1999 : 68–75	Guirardello 1999 : 48–55
S. America	Tucanoan	Tucanoan	Barasano	–	+	Jones & Jones 1991 : 49–50, 59–60	Jones & Jones 1991 : 31, 73–75
S. America	Tucanoan	Tucanoan	Orejón	+	+	Gil 2013	Velie 1975 : 24–27

Continued on next page

Table 5 – *Continued from previous page*

Macroarea	Family	Genus	Language	Cl	Gd	Sources (classifiers)	Sources (gender)
S. America	Tucanoan	Tucanoan	Siona	+	+	Gil 2013 ; Derbyshire & Payne 1990 : 256	Wheeler 1970 : 2, 91–95, 140–141; Derbyshire & Payne 1990 : 256
S. America	Tucanoan	Tucanoan	Tucano	+	+	Gil 2013	Derbyshire & Payne 1990 : 255–256; Ramirez 1997 : 207–208
S. America	Tucanoan	Tucanoan	Tuyuca	+	+	Gil 2013 ; Derbyshire & Payne 1990 : 354	Bowles 2008 : 19, 21–22
S. America	Tupian	Monde	Gavião	–	–	Gil 2013 ; Derbyshire & Payne 1990 : 246, 248	Moore 1984 : passim
S. America	Tupian	Munduruku	Mundurukú	+	–	Passer 2016b : passim; Gil 2013	Passer 2016b : passim; Derbyshire & Payne 1990 : 261
S. America	Tupian	Tupi-Guaraní	Guaraní	–	–	Gil 2013	Corbett 2013
S. America	Waorani	Waorani	Waorani	+	–	Gil 2013	Derbyshire & Payne 1990 : 259; Peeke 1973 : 125–128
S. America	Yanomam	Yanomam	Sanuma	+	–	Gil 2013 ; Derbyshire & Payne 1990 : 246–248	Borgman 1990 : 144–149, 197–198
S. America	Zaparoan	Zaparoan	Arabela	–	–	Gil 2013 ; Derbyshire & Payne 1990 : 256–257	Rich 1999 : 22–23, 35–36

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Chapter 14

The dynamics of gender complexity

Bernhard Wälchli

Francesca Di Garbo

In this chapter we view grammatical gender as a category type that emerges, evolves and disappears in languages as a result of diachronic processes and whose complexity grows and diminishes through time (§1–§2). Traditional approaches to grammatical gender focus on two properties that already presuppose a high degree of maturity of gender systems: noun classes and agreement. Here we conceive of gender rather as a category type with a semantic core of animacy and/or sex reflecting classes of referents, which have a propensity to turn into classes of noun lexemes. When growing and retracting, gender characteristically follows the animacy or individuation hierarchy. However, this hierarchical patterning breaks down when animacy leaks into the inanimate domain led astray by many different associative pathways, which is why lexical organization according to noun classes has to be invoked to maintain some sort of order (§3). Gender manifests itself in form of marking on noun-associated words, often within the local domain of noun phrases. Here we put gender marking into the wider context of nominal morphology (non-lexical markers within the noun phrase), which often originate in independent use in headless noun phrases and are extended to headed noun phrases only in a subsequent development (§4). As more mature manifestations of gender get organized in form of noun classes, they typically follow certain pathways of development that can be subsumed under the formula "From X to Y" (§5–§6). Agreement is fuzzy as its prototypical non-noun targets gradually develop by form of decategorialization from nouns, and controllers and targets are not always simple words, but can be complex (consist of syntactic formal groups) and controllers can be entirely contextual (§7). Gender should not be considered in isolation as it is – more often than not – parasitic on other grammatical category types, notably number, case, and person, with which it cumulates and which contribute to its high degree of complexity (§8). Number is particularly tightly intertwined with gender in pluralia tantum and other phenomena related to lexical plurality (§9). As gender is organized in form of systems, its diachronic evolution cannot be captured in terms of

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individual diachronic processes. When gender systems evolve, there is virtually always co-evolution of connected events. Hence the study of system evolution is indispensable for understanding the complexity of gender (§10). However, the evolution of gender also displays characteristic areal and genealogical patterns and is sensitive to external factors of language ecology (§11).

Keywords: gender, complexity, animacy, historical linguistics, agreement, number, pluralia tantum, system emergence, areal linguistics, language ecology

1 Introduction

This chapter has no ambition to provide a comprehensive survey of the very rich literature that exists on grammatical gender, for which we refer to Corbett (Corbett 1991 ; Corbett 2006 ; Corbett 2014), Aikhenvald (Aikhenvald 2000 ; Aikhenvald 2016), Kilarski (2013), Heine (1982), and Seifart (2010), to mention just a few. Furthermore, no attempts are made here to strictly delimit gender from classifiers; rather, grammatical gender is our focus of interest. Moreover, this chapter does not relate grammatical gender to gender studies. Having stated what this chapter is NOT about, let us now proceed to explain its focus of interest.

This chapter represents a DYNAMIC APPROACH to the understanding of grammatical gender (henceforth simply called *gender*). This means that we view gender as something that emerges, evolves and disappears in languages as a result of diachronic processes. Greenberg (1978) has been an important source of inspiration for the kind of diachronic and dynamic approach we propose here. In addition to the diachronic perspective, we are also interested in assessing the complexity of gender. While in many languages gender is complex, which is why Corbett (1991 : 1) calls it "the most puzzling of the grammatical categories", different degrees of gender complexity are attested in different languages. There are also languages with simpler kinds of gender.

In this chapter we are interested in why gender can grow quite complex in some languages and remain rather simple or turn simple again in other languages. Thus, even as far as complexity is concerned, we adopt a dynamic approach. We view gender as a MATURE PHENOMENON. According to Dahl (2004 : 2), a mature phenomenon is a phenomenon that presupposes a non-trivial prehistory. Since we are also interested in how gender comes into being in the first place, we cannot define the object of study too narrowly, as otherwise there is a risk that we will miss much of the non-trivial prehistory. Our approach to linguistic complexity, in general as well as in the domain of gender, is outlined in §2. In the following, we provide a roadmap for the topics discussed in the chapter and how

they relate to the general purposes of this volume.

At least since Hockett's (Hockett 1958 : 231) succinct definition – "Genders are classes of nouns reflected in the behavior of associated words", adopted by Corbett (Corbett 1991) – it has been common to define gender in terms of NOUN CLASSES and AGREEMENT. We argue here that noun classes and agreement are both mature phenomena.

The prototypical function of nouns is to express referents (Croft 2005 : 438; Baker 2003). Hence, there are two different things that can be meant by noun classes: classes of noun lexemes and classes of referents. These are manifest in Dahl's (Dahl 2000a : 107) notions LEXICAL GENDER, classes of noun lexemes, and referential gender, for which we use the name REFERENT-BASED GENDER suggested by Nichols (2019 [this volume]), classes of referents. Most approaches to gender take for granted that lexical gender is the primary object of interest, as, for instance, reflected in Corbett & Fedden's (Corbett & Fedden 2016 : 9) Canonical Gender Principle: *in a canonical gender system, each noun has a single gender value*. It is not a priori clear why it should be useful for a language to partition noun lexemes into classes, but it is immediately understandable why speakers can be inclined to classify real world objects into classes. If we adopt a dynamic approach to gender, it is thus a reasonable assumption that referent-based gender is primary and that lexical gender is a later development that does not really have any clear purpose but is somehow hard to avoid, once words bearing gender markers are constantly associated with nouns and constantly collocate with nouns. The relationship of gender and reference is discussed in §3.

Many researchers agree that gender always has a SEMANTIC CORE: ANIMACY and/or SEX (Dahl 2000a : 101; Corbett 1991 : 68; Luraghi 2011). However, somewhat strangely, this semantic core is usually not considered part of the definition of gender. The male-female sex distinction is clearly connected to animacy, as it is not applicable strictly semantically to inanimates. Animacy is thus crucial for the organization of gender. Animacy is a hierarchy rather than a simple dichotomy. Hierarchies are principles of organization that can considerably limit the complexity of a phenomenon. Hence, an important question for us to consider is how the ANIMACY HIERARCHY relates to the complexity of gender. As far as reference and lexicon are concerned, it makes more sense to organize referents according to a semantic core, and notably according to the animacy hierarchy, than noun lexemes. In languages where nouns carry grammatical markers, the DECLENSION CLASSES that structure grammatical allomorphs need not adhere to any semantic principle. This can be taken as evidence that classes of referents are crucial for the understanding of gender. The hierarchical patterning of gender is

also discussed in §3.

Like other grammatical category types, gender is expressed by grammatical markers, viz. GENDER MARKERS. Unlike declension classes, these are not directly realized on nouns that condition the choice of class (Güldemann & Fiedler 2019 [this volume], use the term "deriflection"), but on NOUN-ASSOCIATED FORMS (adnominal modifiers, verbal argument indexes, or anaphoric pronouns, to mention just the most important ones). Many noun-associated forms are parts of the NP, so gender marking has to do with the wider question of what kind of non-lexical marking exists within noun phrases and how this marking emerges. There are languages that get along perfectly well without any NOMINAL MORPHOLOGY (non-lexical markers within the noun phrase). Nominal morphology is obviously a mature phenomenon. However, unlike its sub-phenomenon gender within noun phrases, nominal morphology need not necessarily distinguish classes. It can be the same marker all over, as in the English prop-word *one* for independent adjectives (adjectives without overt nominal head), as in *the big one*. Lehmann (1982), Moravcsik (1994), and others have emphasized the importance of independent noun-associated elements (such as free relative clauses, pronominal demonstratives and numerals) for the development of markers on attributive modifiers. From a developmental perspective on gender, it is important to put gender into the broader context of how nominal morphology emerges and spreads across various kinds of elements in the noun phrase. This is what we discuss in §4.

Conceiving of NOUN CLASSES in a dynamic perspective means to view them as phenomena undergoing change, which can be expressed by the formula "FROM X TO Y". As already mentioned above, noun classes typically change from referent-based to predominantly lexical, and sometimes back to referent-based gender again (as in English). Several types of changes in noun classes have in common that there is an increase of complexity, notably the development of several types of gender assignment, the development from semantic to opaque assignment (gender assignment characterized by numerous exceptions), and the generalization of noun classes to all nouns. The dynamics of gender assignment and its evolution are what we focus on in §5 and §6.

The word *complex* is ambiguous. Most of the time we are talking about complexity in this chapter we mean by it (i) non-trivial in structure, so that an exhaustive description cannot be short. But "complex" can also mean (ii) consisting of several elements and (iii) consisting of different, but related phenomena. In discussing agreement, meanings (ii) and (iii) will be as important as meaning (i) and it is important to discuss how they relate to each other. Since Corbett's (Corbett 2006) influential monograph, AGREEMENT has often been conceived of

as a morphosyntactic feature, which emphasizes the morphological realization on word-forms and the syntactic nature of the link between controller and target. Given that there is not only intra-sentential, but also inter-sentential agreement, we hold that agreement is less uniform than commonly believed. It can be both syntactic and semantic. However, controllers and targets are not just morphological units, but often consist of several words (complex controllers and complex targets), and hence syntactic rather than morphological units. Controllers can be latent and are then neither morphological nor syntactic, but entirely contextual elements. It is often claimed that agreement always expresses coreferentiality, but coreference is actually only one of several specific relationships that may hold between controller and target. While controllers are typically nouns and targets noun-associated words, there are also nominal gender targets, and it can be shown that agreement often emerges step-by-step when nouns DECATEGORIALIZE (lose their nominal properties). To put agreement into a dynamic perspective means to recognize that agreement is not a uniform phenomenon, but rather a family of similar phenomena with complex diachronic relationships among them. We therefore suggest a broad definition of agreement, since a narrow definition is not easily compatible with a dynamic approach. This is the topic of §7.

Every definition of gender faces the problem that there is not just one, but several other grammatical category types that gender interacts with. Many researchers have recognized the close relationship to CLASSIFIERS, and it has even become common to view gender and classifiers as one set of phenomena, for which various cover terms have been proposed, such as nominal classification (Seifart 2010) and nomifiers (Haspelmath 2018). At least since Dixon (1982 : 160), it has been common to argue that gender is characterized by a smallish number of classes (usually between two and ten, but sometimes up to twenty) and by obligatory grouping of all nouns into noun classes. A possible dynamic interpretation would be that gender is just a more advanced stage in the grammaticalization of nominal classification than classifiers (Passer 2016a). However, there is much reason to believe that many gender categories never went through a classifier stage (Nichols 1992 : 142). While it is undeniable that some phenomena are intermediate between genders and classifiers, a major problem of the unified account is that gender does not entertain close relationships only to classifiers, but also to a range of other grammatical category types; for instance, with indexation (Croft 2003 , Croft 2013 ; see §7.1) and with person name markers (markers indicating that an element is the name of a person). It has been repeatedly observed that a majority of languages with gender exhibit CUMULATION with NUMBER, and cumulation of gender and CASE and of gender and PERSON is also very common. This

trend is so far-reaching that we think it is reasonable to include "cumulation with number, case and/or person" into the definition of gender (notably since such cumulation is often lacking in classifiers). In fact, to the extent that it is known how gender systems evolve, cumulation with number or case often exists from the very beginning. One reason for this is that animacy is a typical conditioning factor for the choice of number and/or case (for instance, in differential object or other differential case marking). From a condition on number or case, animacy can further develop into a gender feature (a fully paradigmaticized grammatical category type expressed by systematic morphological marking) that still maintains cumulative exponence with the grammatical categories it originates from. This suggests that gender can be mature and hence complex from the very beginning and just appropriates the complexity of other mature grammatical categories it is connected with. Thus, when we say that gender is mature this does not necessarily entail that there is a non-trivial prehistory of gender, it can be a non-trivial prehistory of another grammatical category. Cumulation of gender with number, person, and case is discussed in §8.

Beyond the patterns of cumulative exponence that make gender closely interact with the encoding of number, case, and person, PLURALIA TANTUM nouns, that is, nouns that only exist in the plural, and other phenomena related to LEXICAL PLURALITY, whereby plural nouns form lexical classes, may also pose delimitation problems to the definition of gender as an independent grammatical category type. A common approach is to do away with this delimitation problem by saying that pluralia tantum cannot be a gender because their special behavior stems from them being lexically specified for number, which is a separate morphosyntactic category. This way of thinking derives from the assumption that gender and number are different morphosyntactic features. However, there is growing evidence that there are languages with two largely independent CONCURRENT GENDER SYSTEMS which cannot be subsumed under one gender feature (Fedden & Corbett 2017 ; Corbett et al. 2017 ; Svärd 2019 [this volume]; Liljegren 2019 [this volume]). If there is not just one gender feature, why should we then assume a priori that gender and number features must be always neatly distinct? There is evidence from a dynamic perspective that pluralia tantum can develop into gender classes diachronically, which is an argument for a close relationship between gender and lexical plurality (Dryer 2019, Olsson 2019, both in this volume). The relationship between gender and pluralia tantum is discussed in §9.

Gender is often called a "SYSTEM", but few approaches are explicit in what this label implies. A system is minimally an opposition between at least two markers, but mature gender systems are more complex than that. They are highly orga-

nized language-specific complexes with both paradigmatic and syntagmatic components that play an important role in the architecture of grammar. Although systems can exhibit considerable complexity, there is reason to believe that they are also mechanisms to keep complexity within manageable limits. For the dynamic approach it is important to view systems as phenomena that emerge and evolve. Hence, rise, expansion, reduction and loss of gender must be viewed as processes of system evolution. This is the topic of §10.

However, the structure of gender does not only have language-internal implications. Gender exhibits specific GENEALOGICAL AND AREAL PATTERNS. It has repeatedly been observed that gender is quite stable diachronically, but gender seems to be more stable in a language if the contact languages also have gender systems of the same kind. A further question is as to whether there are any external factors in the ECOLOGY OF LANGUAGES that condition whether languages have gender and what kind of gender systems. This and related questions are addressed in §11.

Having provided a roadmap for the main topics discussed in this chapter, we are now in a position to propose a tentative definition of gender that takes the dynamic approach into account.

> Gender is a grammatical category type with a semantic core of animacy and/or sex reflecting classes of referents, which have a propensity to turn into classes of noun lexemes. It is overtly marked on noun-associated forms. It typically exhibits cumulative exponence with number, case, and/or person. Gender is organized in the form of systems.

The building blocks of this dynamic definition of gender are discussed in the remainder of this chapter and based on the following outline. §2 considers the relationship between gender and complexity. §3 explores the relationship of gender with reference and animacy. §4 discusses gender in the broader context of nominal morphology. §5 and §6 deal with noun classification and gender assignment. §7 reconsiders the notion of gender agreement. §8 investigates the relationship between gender, number, case and person while §9 focuses on pluralia tantum. §10 explores the extent to which gender is subject to system evolution. §11 addresses gender in its genealogical and areal context and discusses the relevance of external factors in the ecology of languages. §12 summarizes the results and concludes the chapter.

Since *gender* is not the only term to keep track of, we have compiled an appendix with short definitions of terms at the end of this chapter. All definitions have the perspective of gender and/or complexity and their primary purpose is

to facilitate the understanding of this chapter rather than being universally applicable in linguistics.

2 Complexity and gender

In §2.1 we provide an overview of current approaches to the notion of linguistic complexity. §2.2 then discusses the relationship between complexity and gender as well as existing metrics of gender complexity.

2.1 Understanding and measuring complexity

Over the last couple of decades, the debate on linguistic complexity has focused primarily on three overarching topics:

(i) what counts as linguistic complexity,

(ii) what to measure when quantifying complexity,

(iii) and what relevance this has for understanding languages overall.

These topics, and their relevance to the understanding of grammatical gender, are tackled in the chapters by Audring, Nichols and Sinnemäki. Audring (2019 [this volume]) provides a theoretical account of gender system complexity by comparing the notion of linguistic complexity with canonicity and difficulty. Nichols (2019 [this volume]) tests and falsifies the hypothesis that languages with gender are more complex overall. Sinnemäki (2019 [this volume]) investigates whether there is a complexity trade-off between the distribution of gender systems and that of numeral classifiers across the languages of the world. A fourth contribution, Di Garbo & Miestamo (2019 [this volume]), approaches gender system complexity from a diachronic perspective by investigating disappearing and/or emerging patterns of gender agreement and their complexity features.

Starting with the first topic – what counts as linguistic complexity – all four contributions define complexity in ABSOLUTE terms, that is as an objective property of grammatical domains rather than as a subjective feature of language use (what is also known as *relative complexity*). This issue has been extensively debated in the literature. While some influential cross-linguistic studies in the field (Kusters 2003 ; 2008) deal with complexity as a measure of difficulty in language learning and use, the dominant approach in the functionally oriented literature has been that linguistic complexity is best viewed as a property of language systems rather than as a measure of ease of acquisition and use. This is essentially

because we do not yet have a full account of language processing difficulties in different domains of grammar and across different modes of language acquisition. Important contributions in establishing the roadmap for such an approach to the theoretical and empirical study of linguistic complexity are the two volumes edited by Miestamo et al. (2008) and Sampson et al. (2009).

The second issue that has been central in the debate on language complexity is what to measure when quantifying complexity. Nichols (2019 [this volume]) sees two main answers to this question: (i) INVENTORY (OR COMPOSITIONAL) COMPLEXITY, that is, the number of distinctions in a grammatical system (e.g., the number of tones, tenses, genders), and (ii) DESCRIPTIVE COMPLEXITY (or Kolmogorov complexity), defined as the information required to describe a system (the longer the description the more complex the system). While Nichols sees inventory and descriptive complexity as independent of one another and argues that descriptive complexity "is a better measure" that "captures well the non-transparency relevant to learnability and prone to be shaped by sociolinguistics", an integrated approach is proposed by Miestamo (2008), and followed by Audring (2019 [this volume]) and Di Garbo & Miestamo (2019 [this volume]). Under this approach, linguistic complexity is defined in terms of overall description length, which can be measured on the basis of two principles, the Principle of Fewer Distinctions and the Principle of One-Meaning–One-Form.

The PRINCIPLE OF FEWER DISTINCTIONS is a measure of inventory complexity and states that the fewer distinctions are made within a grammatical domain the less complex the domain (the fewer the tones, tense or gender distinctions, the less complex the tone, tense or gender system overall). The PRINCIPLE OF ONE-MEANING–ONE-FORM is a measure of transparency whereby the less complex grammatical phenomenon is one where there is a one-to-one correspondence between meaning and form.

Under the Principle of One-Meaning–One-Form, cumulative morphemes (simultaneously expressing more than one grammatical meaning) or multiple exponents (where one grammatical meaning is distributed over several morphemes) are more complex than morphemes that are only associated with one grammatical meaning. Working specifically on the measurability of gender system complexity, Di Garbo (2014 ; 2016) expands this approach by proposing a third complexity principle, the PRINCIPLE OF INDEPENDENCE, which targets interactions between grammatical domains and their effect on the overall complexity of individual domains. Under the Principle of Independence, a marker that cumulates the encoding of gender and number distinctions features higher gender complexity than a non-cumulative marker because the marking of gender distinctions is

dependent on the number value of nouns. In the gender complexity measure proposed by Audring (2019 [this volume]), the Principle of Fewer Distinctions and the Principle of One-Meaning–One-Form are referred to as Principle of Economy and Principle of Transparency while the same label as Di Garbo (2014 ; 2016) is kept for the Principle of Independence.

The third and final issue that has been frequently addressed in the literature on linguistic complexity is the relevance that complexity measures may have to understanding languages overall. Is it at all possible to design complexity metrics that allow us to estimate whether one language is generally more complex than another? And, provided that this is the case, how can such metrics be used? McWhorter (2001) proposes to measure overall grammatical complexity on the basis of a pool of features ranging from phonology to syntax. However, the features suggested by McWhorter (2001) aim to capture the peculiarities of one specific language profile, the creole profile, and to demonstrate that creole languages are overall less complex than non-creoles. The question thus remains whether the ambition to measure linguistic complexity overall is a feasible, and even meaningful, enterprise even beyond the creole/non-creole dichotomy. This question is approached in work by Miestamo (2008), Nichols (2009), and Sinnemäki (2014b), who argue that measures of global linguistic complexity are both theoretically and empirically unfeasible. Even assuming that the daunting task of formulating an exhaustive inventory of complexity features that are truly representative of overall grammatical complexity could be accomplished, it is still hard to establish empirically how each of these features contributes to overall complexity in comparison to others. For instance, it would be impossible to truly establish whether the presence of grammatical gender implies higher complexity than the presence of, say, grammaticalized tone distinctions or the other way round, both within and across languages. Miestamo (2008) refers to this as the problem of comparability and argues that one way to overcome this problem is to restrict the quantitative and qualitative typological study of linguistic complexity to individual grammatical domains, and eventually compare domain-specific data with each other in search for potential complexity trade-offs between individual grammatical domains and their functional explanations. All contributions to this volume approach the complexity of gender systems in the spirit of this suggestion, and even those chapters that explicitly focus on comparisons and relationships between the complexity of gender and other domains of grammar bring support to the idea that domain-specificity is a key to understanding the distribution of linguistic complexity within and across languages.

The chapter by Nichols (2019 [this volume]) shows that testing whether the

presence of grammatical gender makes languages more complex overall produces negative results. Sinnemäki (2019 [this volume]) demonstrates that comparing gender and classifier systems in terms of complexity distributions may be useful to unravel functional trade-offs in the domain of nominal classification whereby the presence of grammatical gender in a language disfavors the occurrence of numeral classifiers and vice versa.

2.2 Gender complexity metrics and the principles behind them

Gender complexity metrics have been proposed by Audring (2014 ; 2017) and Di Garbo (2014 ; 2016). In their approaches, gender is considered to be a grammatical domain of its own and its complexity is assessed on the basis of the three principles introduced in §2.1: (i) Economy or the Principle of Fewer Distinctions, (ii) Transparency or the Principle of One-Meaning–One-Form and (iii) (the Principle of) Independence. See Audring (2019 [this volume]) and Di Garbo & Miestamo (2019 [this volume]) for a more detailed treatment of the three principles.

Di Garbo's (Di Garbo 2014 ; 2016) metric is an index of six features, each ranging between zero and one, that is applied to a dataset of 84 African languages with gender. The features are Number of gender values (GV), Nature of Assignment Rules (AR), Number of indexing targets (IND) (all three Fewer Distinctions), Cumulative exponence of gender and number (CUM) (One-Meaning–One-Form and Independence), Manipulation of gender assignment triggered by number/countability (M1), and Manipulation of gender assignment triggered by size (M2) (both Independence). The first three features of the metric are based on the proposal by Audring (2014). Features CUM, M1, and M2 are meant to measure the impact that interactions of gender and number, and gender and evaluative morphology, have on the overall complexity of gender. The features by Di Garbo (2014 ; 2016) are designed such that a simpler gender system can always take the value zero (only two genders, only semantic assignment, only one indexing target, non-cumulative exponence and no manipulation of gender). However, all languages in Di Garbo's sample have higher total values than 0.0, and many have 1.0, which can be interpreted such that gender tends to be complex at least in African languages. The metric has been applied by Liljegren (2019 [this volume]) to the languages of the Greater Hindu Kush area. He identifies two languages with value 0.0, Khowar and Kalasha (together making up the Chitral subgroup), both of which have developed animacy-based gender distinctions quite recently. All other gender languages in Liljegren's sample have Medium or High gender complexity.

Based on the same three principles, Audring (2017) develops a metric consist-

ing of 23 features, which all can take the values *simple* and *complex*. The metric is illustrated only for one language, German (Indo-European, Germanic), whose gender system turns out to score less than expected (only 9 of 23 features complex). This is most likely due to the fact that many simple gender features have been overlooked in the literature, while the metrics proposed by Audring allows to capture them. This metric is further elaborared upon by Audring (2019 [this volume]) in the context of a broader discussion of the relationships between complexity, canonicity, and difficulty.

3 Referent-based gender and the limited hierarchical patterning of gender

3.1 Introduction

In this section we are going to argue that REFERENT-BASED GENDER (classes of referents) is more basic from a developmental perspective than LEXICAL GENDER (classes of noun lexemes). Referents are typically classified in terms of animacy, and animacy is organized in form of a hierarchy. Nichols (2019 [this volume]) suggests that hierarchical patterning is a decomplexifying mechanism. The question thus arises as to why hierarchical patterning in gender does not limit complexity. In this section we will argue that hierarchical patterning in gender is rooted in referent-based gender and that gender typically originates as referent-based gender in the top segment of the animacy or individuation hierarchy (§3.2). However, as referent-based gender travels down the animacy hierarchy, there are two things that happen that render it less transparent. First, some or several animal gender values (animate, or, masculine and/or feminine) are expanded to inanimate objects by means of various factors often of a metonymic or metaphoric character, such as agentivity, discourse salience, uniqueness, power, purview, and possession (discussed in §3.3 and §3.4). These cannot be neatly arranged on a single scale and hence hierarchical patterning fails to apply to them. Second, if gender has travelled down the animacy hierarchy, it gets increasingly more associated with nouns and is aligned with the conceptual structure of nouns, which means that it turns into lexical gender (§3.5). Noun lexemes, however, are not subject to hierarchical patterning in the same way as referents, and hence there is no hierarchical mechanism that can efficiently limit the complexity of lexical gender, even though the semantic core originating in referent-based gender is maintained. In order to prevent complete disorder, gender must thus take resort to lexical patterning, instead of hierarchical patterning, and lexical patterning

has a much higher degree of freedom than hierarchical patterning, which entails that complexity is less effectively limited in lexical gender. However, when lexical gender develops, referential-based gender does not disappear, but interacts with it, and lexical and referential-based gender are sometimes so similar that they are difficult to distinguish (§3.6). Both lexical and referent-based gender allows for reconceptualization of referents, which is why gender is not suitable for reference tracking (§3.7).

3.2 The animacy/individuation hierarchy

Dahl (2000a) follows Aksenov (1984) and Corbett (1991) in claiming that all gender systems have a semantic core and he uses the animacy hierarchy in (1)

(1) Animacy hierarchy
human > higher animals > lower animals > inanimate

to further specify that core. Above some cutoff point on the animacy hierarchy, gender is semantically assigned; below the cutoff point, gender is non-semantic (formal or arbitrary). If the animate pole is further subdivided, the major criterion is sex. From the point of view of complexity, this means that gender tends to be simple on the animate pole of the hierarchy and complex on the inanimate pole of the hierarchy, even though often the same gender values are used both above and below the cutoff point: "inanimate nouns are quite often assigned to genders whose semantically determined core consists of animates" (Dahl 2000a : 102–103) and "gender distinctions often cut through the animal kingdom" (Dahl 2000a : 100). A neat example is Walman (Nuclear Toricelli, West Palai; see Dryer 2019 [this volume]), where nouns denoting humans and some larger animals are either masculine or feminine, depending on the sex of the referent, whereas nouns denoting most animals, especially non-mammals, appear to have relatively arbitrary gender, but are assigned to the same two genders masculine and feminine.

Various forms of the animacy hierarchy can be found in the literature. Croft (2003 : 130) uses the so-called extended animacy hierarchy (2), which, according to him, combines three distinct, but related hierarchies: person, referentiality, and animacy (3). Here and elsewhere we replace "proper names" by *person names*, since names of animals, things, and places are usually disregarded in discussions of animacy.

(2) Extended animacy hierarchy (Croft 2003 : 130, following Dixon 1979 : 85 and Silverstein 1976):
first/second person pronouns > third person pronoun > person names > human common nouns > nonhuman animate common nouns > inanimate common nouns

(3) Component hierarchies of the extended animacy hierarchy

Person:	first, second > third (proximate > obviative)
Referentiality:	pronoun > person name > common noun
Animacy:	human > higher animals > lower animals > inanimate

As pointed out by Croft (2003 : 166), different hierarchies often interact. He illustrates this with examples from Eastern Panjabi[1] (Indo-European, Indo-Aryan) for differential object marking, which combines the factors animacy and referentiality. Eastern Panjabi objects are overtly coded with *(-)nũ* unless the object is both inanimate and non-definite (specific or non-specific). This suggests that the component hierarchy "Referentiality" actually falls into two sub-hierarchies: Part-of-speech (pronoun > person name > common noun) and Definiteness (unique > definite > specific/referential > non-specific/non-referential).

Siemund (2008) surveys pronominal gender in varieties of English and other languages. He comes to the conclusion that pronominal gender in English crucially depends on the degree of individuation of the entries referred to. He adduces Sasse's Individuation Hierarchy (1) to account for this, a further variant of the animacy hierarchy.

<table>
<tr><td>person names</td><td>humans</td><td>animals</td><td>inanimate tangible objects</td><td>abstracts</td><td>mass nouns</td></tr>
<tr><td colspan="2">humans</td><td colspan="4">non-humans</td></tr>
<tr><td colspan="3">animates</td><td colspan="3">inanimates</td></tr>
<tr><td colspan="4">count nouns</td><td colspan="2">mass nouns</td></tr>
</table>

Figure 1: Individuation hierarchy according to Sasse (1993 : 659)

The individuation hierarchy is more elaborate than Croft's Extended animacy hierarchy in that it contains two further sub-hierarchies: countability (count noun > mass noun) and concreteness (concrete/tangible > abstract).

[1]Here and elsewhere in this chapter, we use mostly the language names in Glottolog in Hammarström et al. (2018). Thus, here "Punjabi" is replaced by "Eastern Panjabi". If Glottolog names are not used, these are given in brackets.

Individuation is relevant in varieties of English in various ways. Diachronically, Siemund & Dolberg (2011 : 527) show that "gender change appears to have started with nouns ranking low in terms of individuation" in English in the transformation of a German-like complex gender system to a pronominal gender system. In West Somerset English there is a mass/count distinction (*the bread – it*, *the loaf – he*). For further examples from other languages, see Siemund (2008 : 175–217).

3.3 The animacy hierarchy does not structure the connections between inanimate referents and animacy

The extended animacy hierarchy does not provide any guidelines for the domain of inanimates and the individuation hierarchy offers only three very general groupings: tangible objects, abstracts and mass nouns. However, there are various semantic connections that can link inanimate referents with animates, notably the following: agentivity, salience, purview, uniqueness, power, and possession. Possession will be addressed in §3.4, the other ones in this section. In these semantic domains, there are often metaphorical or metonymic connections between inanimate referents and animacy. These cannot easily be arranged on a single scale of animacy and individuation. But they all provide pathways for expansion from animate genders to the inanimate domain.

(i) **Agentivity** Agents are usually conceived of as animate. Inanimate referents can leak into animate genders when they are construed as agents. In Zande (Atlantic-Congo, Ubangi), nouns referring to inanimate things usually control inanimate gender, but can take animate gender when animacy is imputed on them, as in (4):

(4) Zande (Atlantic-Congo, Ubangi; Gore 1926 : 32)
*Ime ki sa ti-**ru** (/ti-e) ni kure*
water and.then turn REFL-**ANIM** (/REFL-INAN) with blood.
'And the water turned itself into blood.'

In various languages with gender, nouns for natural phenomena are treated as animates. Dryer (2019 [this volume]) in his description of gender in Walman mentions that the quasi-animate natural phenomena *onyul* 'earthquake', *knum* 'whirlpool, riptide', *snar* 'moon', and *nganu* 'sun' are masculine (unlike all other inanimates, which are feminine). *Nganu* does not only mean 'sun', but also 'day', and is masculine in both meanings, hereby

demonstrating that the gender of this noun, even though motivated by animacy and probably originating from referent-based gender, has become lexical gender.

Agentivity can come in different forms. It can be more syntactic, as in (4) where an inanimate referent is construed as an actor, or it can be more derivational, when an inanimate referent is construed as an agentive noun. Mopán Maya has masculine and feminine person name markers extended to nouns, and one of their major functions is to form analytic agentive nouns: *ix p'o'* [GM.F wash] 'washerwoman' ("Ms wash"), *aj jook'* [GM.M fish] 'fisherman' ("Mr fish") (Contini-Morava & Danziger 2018 : 140). Gender markers can be used to suggest unexpected agentivity of inanimate objects as in (5).

(5) Mopán Maya (Mayan, Yucatecan; Contini-Morava & Danziger 2018 : 141)
Ox-tuul-oo' ***aj*** *kuch-b'äk'* *a*
three-NUM.CLF.ANIM-3UNDERGOER.PL **GM.M** carry-meat ART
xoolte' *leek-oo'* *a* *b'e'*
walking_stick 3.EMPH-3UNDERGOER.PL ART DEM.4
'Those aforementioned walking sticks became three (living) meat-carriermen.'

(ii) **Salience** Pawley (2004) shows that "animated pronouns" are a prominent feature in Tasmanian Vernacular English. That there is some degree of animation can also be seen from examples where other animate words besides pronouns, such as *fella*, are used, as in (6). "The entity must be referential (specific or definite). Other factors include its importance in the discourse (as a main topic, background element, etc.), its sequential position in the discourse, and its inherent salience" (Pawley 2004 : 114). For portable goods other than vehicles, *he* expresses an attitude of detachment and *she* (emotional) attachment. Plants, animals, and male genitals are *he*, everything else is *she*.

(6) Tasmanian Vernacular English (Pawley 2004 : 126): attitude of detachment
[Salesman is showing carpets to two customers] ***That fella*** *he's a poly,* ***he****'s two fifty.*

The classical study on animated pronouns in English is Mathiot & Roberts (1978), who observed similar patterns in spoken English in two parts of the USA, Los Angeles County and Buffalo NY. However, for portable goods there is a polarity effect: men use predominantly *she* and women *he* (Pawley 2004 : 134).

(iii) **Purview** The notion of purview has been introduced by Gerdts (2013) for Halkomelem (Salishan, Central Salish). Halkomelem has a sex-based semantic gender system marked on determiners and demonstratives, where female singular humans take feminine gender and all other nouns masculine gender. However, feminine optionally appears on hundreds of inanimate nouns when they are in the feminine PURVIEW (Gerdts 2013). This includes objects that belong to or relate to a female, are perceived as being feminine in size, shape, or function, or are spoken about by a female.

In Comaltepec Chinantec (Otomanguean, Chinantecan), gender "can be rhetorically upgraded to express a closer association than the normal gender assignment would indicate" (Anderson 1989 : 57). In (7), the word for 'paper', which is usually inanimate, is animate in order to mark a more intimate status as a product "of someone's personal labor and attention" (Anderson 1989 : 57).

(7) Comaltepec Chinantec (Otomanguean, Chinantecan; Anderson 1989 : 57)
mï^{LM}*-r* ***hmi***^{L}***giú:n***^{L}*-b* *hiu*^{LH} *ma*^{H}*hí*^{L}
request.3PL-3 **many.ANIM**-AFFIRMATION DIM paper
'S/he asks for many papers.'

(iv) **Uniqueness** In the Irish-Canadian author Emma Donoghue's (Donoghue 2010) novel *Room*, a mother and son are captured in a backyard shed that the boy never leaves until they manage to escape when the boy is five. In the boy's language things in Room with unique reference are *he* and *she*. In Room English, feminine and masculine gender are inseparably tied to uniqueness and referentiality. In Room, *Blanket* is feminine: *we put Blanket over [TV] and just listen through the gray of* ***her*** (p. 11). However, things outside Room are all different and not unique: ***it****'s not fleecy gray like Blanket,* ***it****'s rougher* (p. 166), *Officer Oh tries to put the blanket over my head, I push* ***it*** *off* (p. 177). It may be argued that this example is artificial, but it is still a doculect of English, and the example shows that a particular use of

referent-based gender may be contextual and need not necessarily apply to a whole language as a system.

In narrative discourse, inanimates are often personified as unique referents. One of the arguments adduced by Leeding (1989 : 232) that gender assignment in Anindilyakwa (Gunwinyguan) is semantically motivated is that masculine and feminine words often are connected in traditional Dreamtime stories as dramatis personae, e.g. *yi-ningwimwapwalhpwa akwa thi-wirrawilya* 'M-Bat and F-Rainbow'. This suggests that they at least in some of their typical uses are conceived of as unique, which may have favored the extension of masculine and feminine to inanimates.

(v) **Power** Straus & Brightman (1982) have argued that the seemingly arbitrary distribution of animate and inanimate gender for inanimate referents in Algonquian languages is motivated by power. Animate nouns are all in some sense "powerful" (Straus & Brightman 1982 : 135). In Cheyenne (Algic, Algonquian, Cheyenne), some body parts (finger/toe, thumb, fingernail, claw, eyebrow, knee, kidney, and brain) are animate, but not when indicated on a drawing or discussed as abstractions, and there is a good story for each of them why exactly these are powerful (Straus & Brightman 1982 : 128–130). Cheyenne *moʔeško* 'finger, toe', for instance, is animate because fingers are used symbolically as weapons and as channels of power in cursing, but there is also an inanimate noun *moʔeško* 'ring'. Power has cultural implications. However, whether ascribed to language or culture, the classification of nouns is complex and on some level due to convention. "For example, nouns labeling mechanical items introduced by Whites are largely inanimate in Ojibwa while they are often animate in Menomini" [Menominee] (Straus & Brightman 1982 : 133). This suggests that referent-based animate gender of inanimates, originally motivated by the factor power, has largely turned into lexical gender in Algonquian languages.

3.4 Inherited gender

A further semantic connection between animate and non-animate referents is possession, which is even more difficult to include in the animacy hierarchy. In INHERITED GENDER, surveyed by Evans (1994) for Australian languages, the gender of a noun or NP is determined by the gender of its possessor. Inherited gender is usually referent-based rather than lexical gender, and this is stated explicitly by Olsson (2017 : 186) for Coastal Marind (Anim, Marindic). In Coastal Marind,

a few nouns, including *igih* 'name' in (8), inherit the gender of the referent to which they are attached.

(8) Coastal Marind (Anim, Marindic; Olsson 2017 : 187)
igih ***ta/tu/ta/ti*** *ka-ha-b*
name **what:I/what:II/what.III/what.IV** PRS.NEUT-INT-ACT[3SG.A]
'What is his/her/its name?' more literally: 'What is the he-name, she-name, it-name?'

Note that the possessive pronoun in the English translation is misleading. The interrogative pronoun simply takes the gender that the speaker assumes to be the class of the referent (male name for gender I, female or nouns denoting animals for class II, thing of a noun in class III or IV for class III and IV; Olsson 2017 : 187–188). For inherited gender in New Guinea, see also Fedden (2011 : 177).

In Halkomelem, inherited gender is part of the extension of feminine to inanimates by purview. In example (9), the instrument *šəptən* 'knife' can be feminine if possessed by a female, but must be masculine when possessed by a male:

(9) Halkomelem (Salishan, Central Salish; Gerdts 2013)
*niʔ ʔəncə kʷθə/**łə** šəptən-s θeẏ q̓emiʔ?*
AUX where DET/**DET.F** knife-3.POSS DEM.F girl
'Where is that girl's knife?'

In North America, inherited gender is also attested in Tunica (isolate), where body parts inherit gender (Swanton 1921 : 23).

It is important to emphasize that inherited gender is not always referent-based gender. In Jarawara (Arawan, Madi) inalienable possession, the gender of the NP is determined by the gender of the possessor. The Arawan languages have complex lexical gender assignment. It is thus not astonishing that even inherited gender in Jarawara is more complex than in Halkomelem, where there is virtually no lexical gender anywhere in the language. In Jarawara, it is the lexical gender of the possessor that is inherited, not the gender of the referent. Pronouns are feminine irrespective of referent-based gender (Dixon 2000 : 489).[2] Hence, the NP in (10) is feminine and triggers feminine agreement on the predicate, whatever the sex of the referents. As we will see in §7.3, this is a kind of gender resolution. However, some inalienable nouns also have derivational gender suffixes, whose gender is determined in a different and rather complex way, but also by the lexical gender of the possessor. A first person inclusive possessor, as in (10), always

[2]Jarawara is not the only language where pronouns all trigger a specific gender. In Uduk (Koman; Killian 2019 [this volume]) pronouns are always in class 1.

triggers masculine derivational gender. This is an instance of a nominal target (see §7.6), where a derivational affix of a noun can be an agreement target.

(10) Jarawara (Arawan, Madi; Dixon 2000 : 490)
Ee *man-**o*** *koma-**ke***
1PL.INCL.INALIEN arm-DERIV.M be.sore-DECL.F
'Our (inclusive) arms are sore.'

In Australian languages it is common to mix inherited gender and intrinsic lexical gender. In Mawng (Iwaidjan Proper), some nouns for body parts, such as *ngijalk* 'body', always have inherited gender, whereas *ngaralk* 'tongue' (class IV), *murlu* 'nose' (class III) and *algij* 'liver' (class V) can have lexical gender (Capell & Hinch 1970 ; Evans 1994 : 5). In Tiwi (isolate), body part nouns take the gender of their possessor, except for genitals that take the gender of the opposite sex (Evans 1994 : 2). The opposite choice for genitals can be explained by purview. Genitals relate to the other sex. Opposite choice is also attested for the Amwi variety of War-Jaintia (Austroasiatic, Khasian; Weidert 1975): *ʔu kdɛ* 'DET.M vagina', *kə khlɛ* 'DET.F penis'. However, inverted inherited gender, i.e. gender opposite to that of the referent of the possessor, is generalized in Amwi War. Body parts, tools and household items take the gender opposite of the person they are associated with. Inverted inherited gender in Amwi War exhibits the same fluidity as non-inverted inherited gender in Halkomelem, and this suggests that we have to deal with referent-based gender rather than with lexical gender here: *ʔu khlia kə* [DET.M head 3.SG.F] 'her head' (personal pronouns preposed to nouns are gender markers of that noun, possessors are postposed to their heads in NPs), *kə klia-w* [DET.F head-3.SG.M] 'his head'. Only tools and clothes only associated with one sex are not fluid, in the same way as genitals: *kə cin* 'jeans (only for men)'.

Inherited gender and gender by purview is a kind of associated gender. The most famous case of associated gender in the literature is Dyirbal. Corbett (1991 : 16) uses the term concept association for the well-known Dyirbal examples where 'fishing line' and 'fish spear' are gender I (animate) because of their association with 'fish' (but see Plaster & Polinsky 2007 for an alternative explanation). In the light of the many examples of association by referent surveyed in this section it seems to us that the term "concept association" is problematic. Association in gender is mainly association with referents and not association with concepts. Of course, as in other cases where referent-based gender turns into lexical gender, association of referents can eventually turn into association of concepts.

Not only are the semantic connections discussed in §3.3 and this section often metonymical or metaphorical in character, some of them also provide pathways

for how cultural beliefs can make their way into language structure. This holds in particular for purview and power. If we conceive of gender as referent-based originally, it does not necessarily express cultural beliefs from its very origin. There are many languages with semantic gender assignment where there is no associated gender of the kind that is attested in Dyirbal and Algonquian languages. There is no reason to believe that communities speaking languages without associated gender are poorer in their cultural beliefs. It is thus possible to view the "culturalization" of gender as a trait of maturity. Languages with many cultural properties embedded in grammatical gender presuppose gender categories with non-trivial prehistories.

3.5 Lexical gender originates from referent-based gender

In §3.2 and §3.3 we have considered cases where referent-based animate gender leaks to inanimate referents. In this section we will now consider instances of referent-based gender marking that have further developed into lexical gender as gender has travelled down the animacy hierarchy from personal pronouns and person names to NPs headed by nouns.

Russian and other Slavic languages have developed a lexical animacy distinction in addition to the three-way masculine-feminine-neuter lexical gender system inherited from Indo-European. Slavic animacy subgenders originate from differential object marking. Due to sound change, nominative and accusative singular could not be distinguished anymore morphologically in the major masculine declension class, which is why forms of the genitive singular started being used in object function (Meillet 1897 ; Huntley 1980 : 206), and the genitive form was then also used in non-object function following prepositions. In Old Russian of the 13th and 14th centuries, genitive singular forms had generally replaced accusative forms for personal pronouns and person names (Dietze 1973 : 263). According to Dietze (1973 : 265), socioeconomically subordinate and dependent persons, such as children, servants, slaves, and messengers, go with the inanimate category; *mužь* 'man' is animate in the meaning 'husband' but inanimate as the subjects of a prince, and *vinogradъ* 'vineyard' is animate when used metaphorically for the world populated with people, as in (11). Hence, animacy gender on masculine singular common nouns was referent-based in Old Russian.

(11) Old Russian (Indo-European, Slavic; Dietze 1973 : 267)
gospodi *bože…* *posěti* *svo**ego***
lord.VOC.SG god.VOC.SG… visit(PFV).IMP.2SG own.**GEN.SG.M**

*vinograd**a***
vineyard(**M/ANIM**).GEN.SG
'O Lord God…visit your vineyard'

Animate forms with animals start appearing in the 16th century, and in the 17th century, animate forms for animals are generalized (Dietze 1973 : 270). (12) from Modern Russian illustrates that animate gender has become lexical. Even though the Modern Russian animacy distinction is clearly semantically motivated, it is entrenched in the lexicon and some modern dictionaries now indicate whether a noun is animate or inanimate. In (12) *konkurent* 'competitor' is animate (takes genitive singular in object function) and *Uzbekistan* is inanimate (takes nominative singular in object function), although they both have the same referent.

(12) Russian (Indo-European, Slavic): lexically entrenched animacy distinction
Kazaxstan-Ø *rassmatrivaet* *Uzbekistan-**Ø*** *kak*
K.(INAN/M)-NOM.SG view(IPFV).PRS.3SG U.(INAN/M)-**NOM.SG** how/as
*konkurent-**a**.*
competitor(ANIM/M)-**GEN.SG**
'Kazakhstan views Uzbekistan as a competitor.'

Gender marked on NP-markers may develop from person name markers. Person name markers have a tendency to be expanded. Varieties of Catalan have the person name markers masculine *en* (< *don* < Latin *dominus*) and feminine *na* (< *dona* < Latin *domina*). In Balearic Catalan, these markers can be expanded to names of animals (*en Pluto* for a male dog), and to folk names of clouds and celestial bodies: *en Catalí* 'Venus at dawn' (Caro Reina 2018 : 195–197). This is arguably not lexical gender, since common nouns are not involved, but referent-based gender having traveled down the animacy hierarchy. Person name markers are very common in Austronesian languages, where they are sometimes extended to some older kinship terms, such as 'father' and 'mother', which are often unique, or titles.[3] Like many other Austronesian languages, Tagalog (Central Philippine) makes a distinction between noun phrase markers for common

[3]It should be noted here that uniqueness does not have the same effect in gender as in definiteness, where it has also been claimed to play an important role Russell 1905 ; Lyons 1999). Definite articles are used in the first place with concepts that are not unique out of context but which happen to be unique in a particular situation. Person name markers, however, express uniqueness on items that are unique in any context and are extended first of all to expressions that are typically construed as unique.

nouns (topic *ang*, non-topic *nang*, oblique *sa*) and for person names (topic *si*, non-topic *ni*, oblique *kay*). Person name markers can also be used with older kinship terms (*ate* 'eldest sister', *kuya* 'eldest brother', *ina/nanay* 'mother', *ama/tatay* 'father' and some others), the difference is that this use is optional and they can be used with nouns designating occupations when expressing titles: *si Abogado Cruz* 'Lawyer Cruz' (Schachter & Otanes 1972 : 94). In several Oceanic languages, person name markers have been extended to some common nouns and turned into lexical gender. In Nakanai, the person name marker is used with about 70% of the names of species of fish, birds and insects and a majority of loanwords (Johnston 1980 : 166–167). For Teop, see Svärd (2019 [this volume]) and the references given there; for Owa and Kahua, see §6.4; and for Austronesian in general, see Handschuh (2018).

In the Mek languages in New Guinea it can be observed how lexical gender can develop from a referent-based gender uniqueness vs. non-uniqueness distinction, where uniqueness looks very much like an extended person name marking. The more conservative Mek languages Una and Eipo [=Eipomek] have a uniqueness distinction and Nalca, which is more progressive and closely related to Eipo, has developed a gender system with four lexical gender classes with rather simple gender assignment principles (Wälchli 2018).

Una has only an opposition between *bi-* unique and *a-* non-unique. *Bi-* is mainly used with person names and kinship terms older than ego – thus the cutoff point on the animacy hierarchy is between older and younger kin – but also with highly individuated non-kinship human nouns and sometimes even animals and things. Thus, in the Una New Testament, *bi-* occurs, for instance, with *ner* 'woman' where it means 'queen', with *Mi* 'child, son' only when it is the 'Son of God' (capitalization in orthography has a function similar to the uniqueness marker), and with *Uram* 'voice, word' only when it is 'God's voice'. (13) illustrates its use with a person name as opposed to *a-* with common nouns. Note that Una also can mark person names with preposed third person pronouns not distinguishing gender (*Er Jesus* 'he Jesus') and that the two strategies can be combined, as exemplified in (13).

(13) Una (Nuclear Trans New Guinea, Mek; New Testament 41009020)
Ba, sun-ci a mi ***a-si*** *Er Yesus dam bo-ya-nmai*
but they-ERG this child **N.UNI-ACC** 3SG Jesus near carry-come-PST.3PL
ura, a mi wek-am-we isa ***a-ryi*** *Er Yesus*
after this child enter-previously-PST.3SG ghost **N.UNI-ERG** 3SG Jesus
bi-si *asing eib-mou ura, a mi* ***a-si*** *tomob-oka*
UNI-ACC eye see-PST.3PL after this child **N.UNI-ACC** erect-CVB
oublob-mou.
crush-PST.3SG
'And they brought this child to Jesus. And when the ghost who had entered the child saw Jesus, the spirit immediately convulsed the child…'

Ø	<—SINGULAR———— *bi-*		*a-* ————————————————————->			
Ø		<—PLURAL———a————————————————————->				
personal pronouns	person names prominent animates *masculine nominalizations* *masculine demonstrative*	kinship terms older than ego	kinship terms younger than ego	humans	animates	things

Figure 2: Una *bi-* unique and *a-* non-unique and the animacy hierarchy

The Una gender system can thus largely be characterized by the animacy hierarchy in Figure 2. There are two anomalies (in italics in Figure 2). There is a masculine singular nominalizing suffix *-nyi*, often used in indigenous names, and nominalizations suffixed by *-nyi* are always unique *bi-*.[4] The same marker *-nyi* can also be added to the demonstrative *a-*, which then together with *bi-* unique can serve as a masculine grammatical anaphor (but is different from the third person pronoun which does not distinguish gender). These anomalies are the germs for a further development of the Una unique marker *bi-* towards a lexical masculine gender *be-* in Nalca (see Wälchli 2018 for the details).

In a wide range of languages from different places in the world, noun markers, whether they distinguish gender or not, are so called PRONOMINAL ARTICLES (Himmelmann 2001 : 838), which means that noun markers have the same form as personal pronouns (mainly third person pronouns, but occasionally also second and first person) and have developed from personal pronouns (unlike Romance

[4]We will return to Mek nominalizations in §7.3 in the discussion of complex controllers.

where both articles and personal pronouns independently originate from demonstratives). For the development of pronominal articles from personal pronouns in Kxoe (Khoe-Kwadi, Khoe), see Heine & Reh (1984 : 231–234). Interestingly, many languages with pronominal articles with gender, such as the Khoekhoe language Nama (Khoe-Kwadi, Khoe), Khasi (Khasian, Austroasiatic), Mian and Oksapmin (Ok-Oksapmin, Nuclear Trans New Guinea), Abau (Sepik), Kayabi and Tenharim (Tupian, Tupi-Guarani), use pronominal articles with proper names (except in vocatives and non-referential use where a person is given a name), in contrast to articles from other origins, which are rarely used with proper names. This suggests that person names may play an important role when pronouns extend to articles, and a reasonable hypothesis is that pronominal gender can expand to nouns travelling down the animacy hierarchy, among other things via person names. Evidence that pronominal articles travel down the animacy hierarchy comes from languages where pronominal articles are less grammaticalized and restricted to human or animate referents. In Oksapmin (Loughnane 2009 : 178–184), pronominal articles occur with specific human referents, but usually not with things or animals, where the definite article (of demonstrative origin) is used (14).

(14) Oksapmin (Nuclear Trans New Guinea, Ok-Oksapmin; Loughnane 2009 : 180
robin ***ux****=nuŋ* *bəp ulxe* *ap* ***jox***
Robyn **3SG.F**=OBJ SO 3SG.F.REFL.POSS house **DEF/DEM**
o=m-de-pti
leave=PROX.OBJ-make-IPFV.PL.PRS
'After that, we left Robyn at the house.'

The Oksapmin definite article (a demonstrative) may co-occur with the pronominal article and the order is then noun-definite.article-pronominal.article: *nap jox ux* [younger.sister DEF/DEM 3SG.F] 'the younger sister' (Loughnane 2009 : 128). In Oksapmin, pronominal articles can be used with animals, when a specific animal is opposed to another one or for mythical animals with human-like characteristics. Pronominal articles can also occur with forces of nature. There does not seem to be any lexical gender in Oksapmin. Feminine is restricted to female human referents. Oksapmin thus provides support for the hypothesis that, if expressing gender, pronominal articles mark referent-based gender at first, and can later turn into markers of lexical gender, if their extension to inanimate nouns is more advanced.

3.6 The relationship between referent-based and lexical gender

The preceding sections might have evoked the idea that referent-based and lexical gender are strictly opposed to each other, but this is actually not the case. To the extent that lexical concepts denote sets of referents that are homogeneous with respect to the referent-based properties distinguished in gender there is no mismatch.

The best-known mismatches are so-called HYBRID NOUNS, such as German *Mädchen*, which is neuter as a lexical noun (due to its diminutive suffix *-chen*, which morphologically assigns neuter gender to the lexeme), but refers to female beings. In cases of conflict, lexical gender is more likely in local than in distant agreement, where semantic agreement (referent-based gender) prevails, which is Corbett's well-known Agreement Hierarchy (15).

(15) The Agreement Hierarchy (Corbett 1991 : 226)
attributive < predicate < relative pronoun < personal pronoun
ein nettes[N] *Mädchen* (N), *das* [N] *ich kenne. Sie* [F]…
'a nice girl whom I know. She…'

We assume here that lexical gender is the special case and referent-based gender is the rule. Lexical gender need only be invoked if gender in a language cannot be captured in terms of the animacy or individuation hierarchy. If a language distinguishes marking associated with person names as opposed to common nouns, such as Tagalog, discussed in §3.5, there is no need to invoke lexical gender.

Now, many languages with lexical gender still have choices of gender values that are reminiscent of referent-based gender. Thus, Swedish (Indo-European, Germanic) makes a distinction between the mass noun *öl* 'beer' (neuter gender) and *en öl* 'one.CM beer' (common gender) when it is countable as a glass or a bottle of beer. This distinction is well in-line with the individuation hierarchy, but it is also lexical, since most Swedish nouns denoting liquids do not follow the same pattern.

Plains Cree (Algic, Algonquian, Cree) *mistik* means 'tree' when animate and 'stick' when inanimate (Wolfart 1973 : 22; similarly in Cheyenne, see Straus & Brightman 1982 : 128). This is again in accordance with the animacy/individuation hierarchy. However, it can hardly be avoided to specify this distinction in a lexical description of Cree and Cheyenne.

If lexical gender develops from referent-based gender, as we assume here, it has to be expected that there are many such cases where the transition from referent-based to lexical gender is tangible. This does not mean that the direction of diachronic change will always be referent-based > lexical. (It is not unlikely

that the Swedish, Danish and Norwegian use of counting 'beer' in common – or masculine – gender is an innovation.) However, hybrid nouns re-instantiating the animacy/individuation hierarchy testify to the relevance of referent-based categorization in gender even in languages with predominantly lexical gender.

Audring (2009) shows that pronominal gender systems (where gender is restricted to pronouns) are generally semantically organized, Wälchli 2019 [this volume]), in a typological study based on parallel texts, argues that gender in anaphoric use can be addressed in terms of semantic core only, and Bosch (1988 : 227) claims that the descriptive content of gender is activated in contrastive use in implicit or explicit focus. While the development of referent-based to lexical gender can entail loss of transparency (see §6.3), transparency can also be reintroduced, especially in certain anaphoric uses, such as contrastive focus constructions and reference tracking after long stretches of discourse (in line with Corbett's Agreement Hierarchy). Seifart (2018 : 24) discusses the case of nouns denoting animals in the Miraña variety of Bora (Boran) that have undergone re-classification to a transparent class. Based on Bosch's (Bosch 1988) findings, Seifart (2018) argues that contrastive use and other contexts, where the descriptive content of gender is activated, is more frequent with animate than with inanimate nouns. As a consequence, animate nouns are more likely to undergo re-classification to a transparent class. The preference of animate referents for transparent gender is well in line with Dahl's (Dahl 2000a) findings about the interaction of gender and animacy discussed in §3.2 above.

While there are languages with referent-based gender only (such as Una), there are probably no languages that only have lexical gender and no referent-based gender. Languages and language varieties with referent-based gender only are not restricted to emergence of gender, but also occur where gender is in decline. Modern English is a good example of a language with referent-based gender having developed from an earlier stage with predominantly lexical gender. Notably in cases of intensive language contact, gender systems tend to be reorganized based on animacy, as shown, for instance, by Karatsareas (2014) for varieties of Koineic Greek in Asia Minor (see also Di Garbo & Miestamo 2019 [this volume]).

In many languages, definiteness and referentiality play important roles for whether or not gender is marked. Greenberg (1978) shows how important the definiteness hierarchy is for the evolution of gender systems along the cycle of the definite article (0 demonstrative > I definite article > II non-generic article > III general noun marker). In several languages, gender markers or noun classifiers are missing when nouns are used in predicative function, where they are non-referential (see Fedden 2011 : 110–111 for Mian and Grinevald Craig 1977 : 330 for

Jacaltec [=Popti']).

3.7 Gender and reference tracking

Above we have emphasized the importance of reference for gender, especially from a developmental perspective. One important thing that remains is to show that this does not entail that gender is suitable for reference tracking (see Kibrik 2011 : 355 against Heath 1975 and Foley & Van Valin 1984 , chap. 7). Much of the complex ways in which gender deals with reference originates from the fact that it is more important for gender how objects are categorized than what they refer to. Here we will show that this holds both for lexical and referent-based gender. Let us consider lexical gender first.

It is directly understandable why lexical gender is not particularly suitable for reference tracking, since classes of noun lexemes are easily affected by reconceptualization of referents in discourse (also called recategorization). The best known case is probably Cornish's (Cornish 1987 : 256) example from French (see also Croft 2013 : 121), where *le potage* 'soup(M) (refined term)' is later referred to by another interlocutor by the anaphor *elle* (F), implicitly associated with *la soupe* 'soup(M) (common term)'.

Similarly, in (16) from Meskwaki (Algic, Eastern Great Lakes Algonquian), where gender is marked on verbal pronominal indexes and free pronouns, a referent is first implicitly construed as 'game (venison)' and later as 'birds'. *Mi:čipe:h-i* [game-INAN.SG] is animate when indefinite, but animate *mi:čipe:h-a* [game-ANIM.SG] when definite "by convention" (Thomason 2003 : 380). Here, "by convention" simply means that we are dealing with lexical gender. As in the French example with the soup, the noun is not explicitly mentioned, but only latently present in association with the inanimate form of the indefinite pronoun *ke:ko:h-i* [something-INAN.SG]. The speaker then further specifies the referent as 'birds', a noun that is always animate in Meskwaki, whether indefinite or definite, and therefore the next verb 'he put them' agrees for animate object. This and other examples in Thomason (2003) show that gender does not necessarily remain constant in cases of coreference. However, person, in (16) obviative, is more constant in this respect.

(16) Meskwaki (Algic, Eastern Great Lakes Algonquian; Thomason 2003 : 380)
*ke:ko:h-**i***
something-**INAN.SG**
*ne:hto:-**čini**,*
whenever.3.ANIM.SG.PROX.killed.it-3.**INAN.SG.OBV**.ITER

*wi:škeno:he:h-**ahi*** *nekotah-meko*
little.bird-ANIM.PL.OBV somewhere-EMPH
*e:h-as-**a:či*** *i:na* *kwi:yese:h-a.*
3.ANIM.SG.PROX.put-**3.ANIM.PL.OBV** that.SG.PROX boy-ANIM.SG.PROX
'Whenever he killed anything, birds, that boy put them in a certain place.'

However, keeping markers constant with same reference does not only fail with lexical gender. This is because different position on the animacy hierarchy does not always entail different referent, as can be seen in (17) from Tagalog, where the proper name *Maria* and the common noun *ina* 'mother' have the same referent, but take different topic markers, since the former is a person name and the latter a common noun.

(17) Tagalog (Austronesian, Central Philippine; New Testament 40013055)
*Hindi ba **si*** *Maria **ang*** *kanya-ng* *ina...*
not Q **PN.TOP** Maria **CM.TOP** POSS.3SG-LNK mother
'Is not Maria his mother?'

In gender systems where person names play an important role, such as Uduk (Koman), Nalca and Owa (Austronesian, Oceanic; Mellow 2013), coreference does not play any major role in agreement. For Uduk, see Killian (2019 [this volume]). Note also the gender recategorization in (5) from Mopán Maya in the context of a change of agentivity in the referent.

Following Kibrik (2011 : 334–360), Nichols (2019 [this volume]) argues that the usefulness of gender in reference tracking is marginal. She argues that gender, unlike person, never refers. If a category is referential, like person, it is the category itself that refers, and not the word that carries that category. Gender can be referent-based (and very often is, as shown in this section), but not referential.

3.8 Conclusion

We can conclude that hierarchical patterning plays an important role for limiting the complexity of gender, but the potential for hierarchical patterning is strongly limited in gender. It is a powerful decomplexifying mechanism only for the top segment of the animacy hierarchy. In this section we have discussed several cases where it can be shown or at least be made plausible that gender originates as referent-based gender in the top segment of the animacy hierarchy. Referent-based gender then tends to leak into inanimate referents due to such factors as agentivity, salience, purview, uniqueness, and possession, which have

the potential of linking certain inanimate referents with animacy. These connections cannot easily be arranged on the animacy hierarchy and, as a consequence, hierarchical patterning breaks down. The only alternative, then, to restitute order is to organize gender in terms of lexical nouns, and the outcome of this development is lexical gender. Lexical gender cannot easily be organized in hierarchical terms, which means that gender turns into a category that is fully dependent on the part-of-speech nouns. This leads us to the next section, where nominal morphology is discussed.

4 Gender as a special case of the accumulation of nominal morphology

4.1 Introduction

Many gender markers occur within the noun phrase. According to the Canonical Approach, local agreement (i.e., agreement within the noun phrase) is most canonical (Corbett 2006 : 21; Audring 2019 [this volume]). In this section we will look at gender markers in the wider context of non-lexical markers within the noun phrase, for which we use the term NOMINAL MORPHOLOGY.

In the simplest possible noun phrase grammar, the head noun and its modifiers are unmarked. However, the elements of noun phrases tend to accrue markers in languages of most different kinds, and presence of nominal morphology is obviously more complex than its absence. Even if there is a set with only one marker, an inventory of one is still larger than an inventory of zero. Nominal morphology can consist of uniform markers not distinguishing gender, such as the suffix *-pela* in (18) from Tok Pisin (Pacific Creole English; from English *fellow*), or gender-number markers, as the plural proclitic *ki=* in Pnar (Austroasiatic, Khasian) in (19) (opposed to *u=* masculine singular, *ka=* feminine singular, and *i=* diminutive/neuter singular), or the feminine gender marker *n(a)* in Bari (Nilotic, Eastern Nilotic) in (20) (opposed to *l(ɔ)* masculine). Accumulation of nominal morphology, including gender marking, does not seem to correlate with high overall morphological complexity (see Nichols 2019 [this volume]). As the clitics in Pnar illustrate, nominal morphology need not consist of affixes. Two of the languages used here for illustration, Tok Pisin and Pnar, have low overall morphological complexity.

(18) Tok Pisin (Pacific Creole English; Verhaar 1995 : 417)
*Dis-**pela** kantri Nimrot i bos-im i gat tri-**pela** bik-**pela***
this-NOMIN country Nimrot 3 rule-TR 3 have three-NOMIN big-NOMIN

taun.
town
'This country (that) Nimrod ruled over had three big towns.'

(19) Pnar (Austroasiatic, Khasian; Ring 2015 : 339)
ki**=ni* ***ki**=so* ***ŋut ***ki**=kʰlawaṯ* ***(ki) wa*** *jap* ***jɔŋ*** *u=daloj*
PL=this PL=four CLF.HUM PL=warrior PL NMLZ die GEN M=Daloj
'those four warriors of the Daloi who died'

(20) Bari (Nilotic, Eastern Nilotic; Spagnolo 1933 : 396)
"Āso ***na**rakwan* ***n**-io'* ***na*** *jɔndya* *nan nɪ."*
well wife/female F-POSS.1SG REL.F bring.DETR 1SG here
'Well, my wife whom I brought here.'

(18)–(20) illustrate the attributive use of modifiers with their markers. However, nominal morphology can also occur independently without a noun head. For instance, English adjectives in NPs without nominal heads, which take a prop-word *one(s)* (*the big* ***one(s)***; Jespersen 1949 : 245–271), and so called free or headless relative clauses (she who will read this chapter). In all cases of NPs with modifiers without noun heads, we will speak here of INDEPENDENT use, a term suggested to us by Martin Haspelmath. Instead of attributive markers we will also speak of ADNOMINAL markers, since we need a term that also includes markers accompanying the head noun where there is no attribute in the NP. We will therefore speak of independent adjectives (*the big one*) and independent relative clauses (*he who came*) as opposed to adnominal adjectives (*the big house*) and adnominal relative clauses (*the man who came*).

Given the importance of agreement in traditional approaches to gender, the focus of investigation in the typology of gender has mainly been on adnominal markers. However, there is reason to believe that markers on independent elements (in NPs without head noun) are very important for the development of nominal morphology (including gender markers). For the dynamic approach adopted in this chapter it is therefore essential to consider nominal morphology on independent elements as much as markers on NP attributes. The approach adopted in this section is thus more comprehensive than the study of gender usually is in two ways: (i) markers on independent NP-elements (in NPs lacking head nouns) are included as much as markers on NP attributes, and (ii) sets of markers with one member, such as Tok Pisin *-pela* in (18), which do not partition

nouns into noun classes and where there is thus no gender agreement are also included.

In many languages, nominal morphology first develops in independent use and may then eventually expand to attributive use. English relative clauses illustrate this point neatly. When Middle English had lost gender in relative pronouns – Old English *se* M, *seo* F, *þæt* N were replaced by indeclinable *that* in the 13th century – a human/general gender distinction *who/that* was reintroduced in Standard English[5] from independent relative clauses, probably first with such non-canonical antecedents as personal pronouns as in (21) (Fischer et al. 2000 : 91–93).

(21) Middle English (Indo-European, Germanic; Wooing Lord 275.18; Fischer et al. 2000)
hwam mai ***he*** *luue treweliche* ***hwa*** *ne luues his broðer*
'whom can he love truly, who(ever) does not love his brother'

In this section we will discuss the following four hypotheses which are all closely connected:

(a) Nominal morphology – including gender markers – tends to develop in independent use and therefore there are usually not more markers in attributive than in independent use.

(b) Many languages have more than one set of markers (see also Dahl 2000b), such as Standard English three genders in pronouns and human/non-human in relative clauses.

(c) Relative clauses can play an important role in the development of gender.

(d) The nature of a set of markers has properties from the function where it originates. For instance, distinctions originating from interrogative pronouns are typically human vs. non-human or animate vs. non-animate.

Hypothesis (a) is inspired by Lehmann (1982) and Heine & Reh (1984 : 233; based on Kxoe) and is akin to a universal proposed by Edith Moravcsik: "No noun phrase constituent carries more gender, number, and/or case inflection in adnominal use than it does in pronominal use" (Moravcsik 1994 ; Universals Archive no. 1733; our term for "pronominal" is independent). (d) is inspired by Croft (1994), who argues that different kinds of classifiers and noun classes tend

[5]Herrmann (2005) shows that virtually all British English dialects are less constrained.

to express different functions. Numeral classifiers tend to express animacy and shape. Noun classifiers and gender tend to express animacy and sex. Possessive classifiers (at least in Oceanic) tend to express edibility.

4.2 A notation system for adnominal and independent marking

In this section we introduce a simple notation system for markers, which is illustrated in Table 1 for English. For each attributive, head, or independent content element in the NP (henceforth in this section simply called *element*), the set of markers used is represented by the number of markers opposed to each other (for the sake of simplicity we count singular values only). Where there are several different sets with the same number of values, these are distinguished with lower case letters of the alphabet. Thus, "3" in the English independent NP slot stands for *he/she/it*, "2a" in the relative clause slot (Rel) stands for *who/that*,[6] and "1b" stands for the prop-word *one(s)* in independent adjectives and independent interrogatives (*which one(s)?*). English has two other sets with two values in independent question words (*who/what* as opposed to the adnominal question word *which*, which can also occur independently with the prop-word *which one*), and in independent indefinites (*someone*, *-body* vs. *something*),[7] and there are at least four different sets with one value (definite article *the*, prop-word *one*, complementizer [Cmpl] *that*, and genitive *'s*). We distinguish two kind of possessors. "Gen" is used for noun possessors and "Poss" for pronominal possessors (adnominal *my*, independent *mine*).

Table 1: English nominal morphology

	NP	Dem	Num	Adj	Rel	Cmpl	Gen	Poss	Int	Indef
ADNOMINAL	1a	0	0	0	2a	1c	1d	0	0	0
INDEPENDENT	3	0/1b	0	1b	(3+)2a	1c	1d	1d	2b/0/1b	2c

1a: *the* (indefinite *a/an*), 3: *he/she/it*, 1b: *one(s)*, 2a: (*he/she*) *who/that*, *which*, 1c *that*, 1d *'s*, *mine*, 2b *who/what*, 2c *-one*,*-body*/*-thing*

Human/non-human distinctions restricted to relative clauses tend to be disregarded when gender is discussed. Estonian (Uralic, Finnic), which is not usually

[6] Non-restrictive *which* is not a value of its own and is not counted, and adverbial contexts such as *where* are disregarded here for the sake of simplicity.

[7] *-one* in indefinite pronouns is by the way the source for the prop-word in independent adjectives (see Rissanen 1997).

considered a gender language, has extended the animacy distinction from free relative clauses in Finnic to attributive relative clauses (*kes* 'who', *mis* 'what'), whereas Finnish retains an omni-purpose attributive relative pronoun *joka* and makes the animacy distinction only in free relative clauses (*kuka* 'who', *mikä* 'what'). The approach applied here can be used to get a better grip on nominal morphology falling into classes (sets where the number of markers is larger than one).

The notion of *gender system* might suggest that nominal morphology in a language tends to be uniform in a language with gender or that there are at least not two different sets of markers with a number of items higher than one. English alone shows that this is not the case. However, we do not want to argue that English has more than one gender system or that Estonian has gender.

Even though one might be inclined to believe that interrogative pronouns 'who?' vs. 'what?' are very obvious potential sources for animacy-based gender distinctions, interrogative pronouns do not seem to have developed into a full-fledged gender system anywhere as far as we know. This is perhaps because relative pronouns, which can develop from interrogatives and give rise to NP-internal agreement as in English, are largely restricted to European languages (see, e.g., Comrie & Kuteva 2013). There is thus good reason to exclude interrogative-based animacy distinctions in relative clauses from the definition of gender, as well as animacy-based distinctions in indefinite pronouns. However, it is still useful to have a more comprehensive approach to nominal morphology side-by-side with the gender system approach, since interrogative-based relative clauses are, among other things, instructive for how independent markers can interact with adnominal markers, and this may be relevant for gender as well.

In dealing with nominal morphology in general, we need not be concerned with the question to what extent gender builds uniform systems. Many languages, such as English, have more than one set of markers at the same time. It makes sense to have this more general perspective alongside with the more focused gender system perspective.

From the point of view of complexity in NP structure, gender agreement is part of a broader phenomenon of marker accumulation. This is why it is important to also consider sets with one marker, as Tok Pisin *-pela* in (18). Given the frequent origin of markers on adnominal elements from markers on independent elements, markers on independent elements cannot be disregarded. For Tok Pisin, there is actually some evidence that *-pela* has originated in independent use. In Australian Kriol, which is related to Tok Pisin, modifiers can be extended with *wan* ('one') and *pala*. In Fitzroy Australian Creole, *dijan* 'this one' and *thar-*

ran 'that one' are obligatory in independent use, whereas *dis* 'this' and *det* 'that' frequently occur in attributive use (Hudson 1985 : 79). In Tok Pisin, the demonstrative *dispela* is not attested without *-pela* in Verhaar (1995). Thus, both sets of single markers in Tok Pisin and sets of two markers in English and Estonian relative clauses suggest that there is a typical developmental pathway from markers in independent elements to markers in adnominal elements, and this suggests that it might be useful to pay more attention to independent elements in studies of gender as well.

In mature gender systems we expect the same kind of markers pervasively entrenched in all adnominal and independent forms – this is what is usually called a gender system with maximum utilization of available distinctive features. The main expected difference is the kind of elements affected. In German, for instance, noun possessors and numerals above two are not affected. There is the expected animacy distinction in interrogative pronouns, which has also expanded to independent relative clauses, (2a) but which has not affected adnominal marking (see Table 2).

Table 2: German nominal morphology

	NP	Dem	Num 2+	Adj	Rel	Cmpl	Gen	Poss	Int	Indef
ADN	3/0	3	0	3	3	1a	1b	3	3	3
IND	3	3	0	3	3/2a	1a	1b/3	3	2a	2b

4.3 Nominal morphology in emergent gender systems

In order to see clear differences between adnominal and independent marking it may be more promising to look at emergent gender systems, and we will therefore now consider some languages from different families, some of which have figured prominently in the literature on the origin of gender.

Coatzospan Mixtec (Oto-Manguean; Small 1990 : 415) has seven classes for third person pronouns, which occur as stressed free forms and clitics (Table 3), but it is not clear whether the set of genders is a strictly closed class, since some generic nouns also have clitic forms, but, based on the seven rows in Table 3, we label the gender set "7" in Table 4.

Example (22) consists of two NPs in apposition with two proclitics. There are heavy constraints in Coatzospan Mixtec on the number of modifiers per NP head. Apposition of NPs is the only option for combining a stressed demonstrative with

Table 3: Coatzospan Mixtec third person pronouns

	Free form	Proclitic form*	Enclitic form*
Adult	*ñaha*	*ña*	*ña*
Masculine respect	*shtaha*	*shta*	*shta*
Younger masc. man speak.	*naha*	*na*	*na*
Younger masc. woman speak.	*chéhnū*	*chénū*	*chí*
Younger feminine	*táhnū*	*tánū, tá*	*tún*
Animal/spherical object	*kɨtɨ*	*kɨtɨ*	*tɨ*
Other inanimate		*é*	*i, Ø*

*Enclitic forms are used as subjects and objects of verbs and proclitic pronouns occur, among other things, in relative clauses.

Table 4: Coatzospan Mixtec nominal morphology

	NP	Dem	Num	Adj	Rel	Cmpl	Poss	Int
ADN	0	0	0	0	1a/7		0	2
IND	7	0	0	7	7	1a	1b	2
PRED				0				

1a: *é* complementizer; 1b: *iñá* 'thing'; 2: *sh(o)ó* 'who, which (anim.)', *ne(é)* 'what, which (inan.)'

a relative clause, but the order of NPs in appositional sequences can be freely reversed.

(22) Coatzospan Mixtec (Otomanguean, Mixtec; Small 1990 : 366)
tánū *tsīkan* ***tánū*** *kíshi* *iku*
F that F COMPL:come yesterday
'that girl who came yesterday'

Attributive relative clauses need not display gender. The marker *é*, which also occurs in complement clauses (probably from *iñá* 'thing'; de Hollenbach 1995), is always possible and is obligatory, if there is no proclitic pronoun. de Hollenbach (1995), who surveys relative and complement clause formation in Mixtec and Trique languages, argues that the general relativizer and complementizer marker originates in the headless relative function and can be shown to derive from a noun meaning 'thing' in many Mixtec languages. The development is not

equally advanced in all Mixtec languages. In Ayutla Mixtec, for instance, the complementizer *ña* (< *ñaha* 'thing') is not obligatory in relative clauses.

Given the nominal origin of the markers, the question may arise as to whether relative clauses headed by proclitic pronouns as in (22) could be considered intermediate between headless and strict relative clauses. Such a proposal has been made by Epps (2012) for Hup [=Hupdë] (Nadahup), and Wälchli (2019 [this volume]) argues that many languages have GRAMMATICAL ANAPHORS, which are intermediate between personal pronouns and full noun phrases. In Hup, relative clause heads range from lexical nouns over bound nouns (cannot occur alone in an NP) and classifying nouns to the general dependent suffix *-Vp*, which is why Epps (2012) comes to the conclusion that headedness is best considered to be a gradient phenomenon. There are many bound and classifying nouns in Hup, which is symbolized by "nnn" in Table 5. Classifiers only very rarely attach to several elements in a row. Thus, example (23) is best considered a sequence of three noun phrases in apposition.

(23) Hup (Nadahup; Epps 2008 : 278)
*núp=**(g'æt)** pɨhɨ́t=**g'æt*** *tɨh=pŏg=**(g'æt)***
this=LEAF banana=LEAF 3SG=big=LEAF
'this big banana leaf'

Table 5: Hup nominal morphology

	NP	Dem	Num	Adj	Rel	Cmpl	Poss	Int
ADN	0	0	0	0	0		1d	1e
INTERMED	1a	nnn	nnn	(nnn)	nnn		1d	nnn
INDEPENDENT	1a	0	1a	1a	1b/1c	1c	1d	2

1a: *tɨh* (23); 1b: *-Vp*, 1c: *-n'ɨ̌h*, 1d: *-nɨ̌h*, 2: 'who' vs. 'what'

According to Epps (2008 : 279), Hup can be considered an incipient classifier system. More advanced classifier systems, such as Kilivila (Austronesian, Oceanic), look very much like an expansion of the intermediate area between adnominal and independent use to all functions. In languages with large sets of classifiers, such as Kilivila, it is difficult to apply the notion of independent use. Senft (1986 : 81) lists 176 classifiers of which he could find 92 in actual speech. Only few of them occur frequently and only few of them have translation equivalents with independent forms in languages without classifiers. Numerals for

maths, for instance, take either the masculine/people or thing classifier (Senft 1986 : 84). However, because demonstratives, numerals and one set of adjectives (24) always take classifiers we have decided to use "nnn" for large set for both adnominal and independent use in Table 6.[8] Many classifiers are REPEATERS (the noun and the classifier have the same form) or shortened forms of nouns (Senft 1993 : 104).

(24) Kilivila (Austronesian, Oceanic; Senft 1985 : 379)
*M-**to**-na tau **to**-paisewa e-tatai **ke**-veaka kuliga **ke**-vau*
DEM-**M**-DEM man **M**-work 3SG-cut **WOODEN**-big rudder **WOODEN**-new
'This industrious man cuts a big new rudder.'

Table 6: Kilivila nominal morphology

	NP	Dem	Num	Adj	Rel	Cmpl	Poss	Int	Indef
ADN	0	nnn	nnn	0/nnn	nnn		4	1/nnn	nnn
IND	1/2	nnn	nnn	0/nnn	nnn	0	4	2/nnn	nnn

Bora and Miraña – which can be considered two different varieties of the same language – differ from Hup mainly in that class markers are much more frequently used adnominally and in that there is a set of six general class markers (three in the singular: masculine, feminine, and inanimate). Demonstratives, numerals, adjectives and relative clauses in the NP can take either the general class marker, masculine in (25), or the specific class marker, FLAT&ROUND in (25). Seifart (2005 : 88–100) lists 66 specific class markers and 53 repeaters for Miraña. Many nouns, such as 'turtle' in (25), have class markers inherently as part of the lexeme ("nnn" underlined in Table 7, underlined stands non-inflectional use of the marker). Given the lack of concord, as in (24), noun phrases with several elements can be considered sequences of appositions (see also Passer 2016a).

(25) Miraña Bora (Boran; Seifart 2005 : 169)
*aj:-**di**/ɛ:-**hɨ** múhɯ-**hɨ**/múhɯ-:**bɛ** kúː:mɯ-**hɨ***
DIST-**M/FLAT&ROUND** be.big-**FLAT&ROUND/M** turtle-**FLAT&ROUND**
'that big turtle'

[8]Nauru (Austronesian, Oceanic; Kayser 1993), which has figured prominently in Dixon 1982 : 167), is another Austronesian language with a system similar to Kilivila with many classes, even though not closely related to Kilivila within Oceanic.

Table 7: Bora nominal morphology

	NP	Dem	Num	Adj	Rel	Cmpl	Poss	Int
ADN	0/nnn	3/nnn	3/nnn	3/nnn	3/nnn		0	2a
INTERMED	nnn	nnn	nnn	nnn	nnn		nnn	nnn
INDEPENDENT	3/1a	3	3	3	3	1b	1b	2b/3

Like in Mixtec languages, the marker used in complement clauses (22) is the general class marker for inanimate ("1b" in Table 7) *-nɛ̀/ɲɛ̀* 'thing'. It is also used in independent possessors. Note that the whole question in (26) is embedded and *-nɛɛ* 'INAN/thing' marks it as a complement clause.

(26) Bora (Boran; Thiesen & Weber 2012 : 364)
*ts^{h}a^{HʔH} ò kpá:hák^{h}ù-t^{h}ú [mú-ʔà tsa^{S}:]-**nɛ̀ɛ́***
not I know-NEG who-PL come-**INAN**
'I do not know who (or what animals) come', lit. "that who(PL) come"

In possession, class marking is limited to the intermediate domain. Possessive pronouns with the inanimate class marker can suffix a specific class marker (Thiesen & Weber 2012 : 179).[9]

We have seen above for Mixtec, Hup, and Bora how appositions of noun phrases can contribute to the introduction of markers in adnominal position. Basically there are three possibilities how attributes and the noun can be connected in the NP: (a) the attribute modifies the noun, which is then its head noun, (b) the noun and attribute are appositions, and (c) there is a HEADEDNESS REVERSAL (a semantic modifier of a phrase is its formal head). Headedness reversal is not equally common for all types of attributes, but is well-known from numerals. In Russian, for instance, numerals higher than four are historically nominalized and the noun counted is in the genitive plural: *p'at' čas-ov* [five hour-GEN.PL] 'five hours' (literally 'five of hours'). For our purposes it is especially relevant to consider headedness reversals in relative clauses, viz. the so-called head-internal relative clauses or "circum-nominal" relative clauses (Lehmann 1984 : 109–121). A gender language with head-internal relative clauses is Mian. Mian has four gender classes (masculine, feminine, neuter 1 and neuter 2; Table 8). These are

[9] Aside from third person pronouns with general class markers, there is also an even more general third person pronoun ("1a") which is used for coreference, glossed as "self" in Thiesen & Weber (2012 : 360). This is a further parallel between Bora and Coatzospan Mixtec.

distinguished in third person pronouns, which also occur as articles at the end of noun phrases if the noun is used referentially. Adnominal demonstratives replace the article. Attributive adjectives and numerals are usually not followed by gender clitics, but gender clitics may occur with them. Since head-internal relative clauses are noun phrases, they have final enclitic articles, as illustrated in (27). There are also unmarked prenominal relative clauses.

(27) Mian (Nuclear Trans New Guinea, Ok-Oksapmin; Fedden 2011 : 506)
nī *senso=**e*** *Ɉemeni daak=o* *walo-Ø-ob=**e***
we.EXCL chainsaw=SG.**N1** PN down=N2 buy.PFV-REAL-1PL.SBJ=**N1**.SG
ayam=o=be
good=PRED=DECL
'The chainsaw we've bought down in Germany is good.'

Mian head-internal relative clauses are sentential nominalizations with the gender-distinguishing article as nominalizer. The same construction can also be used as temporal adverbial clause, but has then always a "neuter 2"-class article (maybe because time nouns are neuter 2).[10]

Table 8: Mian nominal morphology

	NP	Dem	Num	Adj	Rel	Cmpl	Poss	Int
ADN	4	4	0/4	0/4	4/0		0	2
IND	4	4	4	4	4	1a	1b+4	2
PRED	0			0			1b	

The Ngan'gityemerri variety of Nangikurrunggurr (Southern Daly; Reid 1990) is another language prominently figuring in the literature on the origin of gender. It is like Hup rather than Bora in that class markers on modifiers are optional, and not all nouns belong to a class. Demonstratives and possessive pronouns can stand alone in free use ("0"), but adjectives cannot head noun phrases on their own. Personal pronouns make a masculine/feminine distinction ("2a"), but are mainly used as possessive pronouns (example (28)), since subject and object are indexed on verbs, where gender is not marked ("1"; see Table 9). As in Coatzospan Mixtec, gender markers can occur as free words, as proclitics and as postnominal markers, here suffixes, but only a small number of classes have reduced forms.

[10] Mian has further a system of six classificatory prefixes on verbs of object manipulation, which is not considered here (see Fedden 2010 : 459; Fedden 2011 : 185).

Eight classes have proclitics: M *wa=*, F *wurr=*, group of people *awa=*, animal/meat *a=*, vegetable *mi=*, dogs *wu=*, tree/things *yerr=*, and *yeli=* bamboo spears. Class suffixation is restricted to the interrogative *tyen-* 'what kind of' ("nb"), and the negative particle *minbe-* ("nc"), with which the suffix forms a kind of negative indefinite pronoun. *Tyen-* 'what kind of' has a class *-da* 'country/place', which does not occur in proclitics. Free interrogative pronouns make a human/non-human distinction ("2b"): *kene* 'who', *tyagani* 'what'.

Table 9: Ngan'gityemerri Nangikurrunggurr nominal morphology

	NP	Dem	Num	Adj	Rel	Poss	Int	Neg.indef
ADN	0/n̲/nn	0/n/nn	0/n/nn	0/n/nn	n	0/n/nn	0?/n/nn?	nc
INTERMED	n/nn	n/nn	n/nn	n/nn	n	n/nn	n/nb	nc
INDEPENDENT	1/2a	0	?	n	n	0	2b	nc
PRED				n/0				

The same set of markers that are used as proclitics occur as prefixes for deriving nouns ("n̲"), except bamboo spears, which has the freeform classifier *yawurr* instead. In four classes (animal/meat *a/e-*, vegetable *mi-*, canines *wu-*, tree/things *yerr/yed-*), the clitics have turned into prefixes in some lexicalized forms, and a prefix is also *da/de-* for bodyparts, which is no agreement class. Class marker proclitics can also be prefixed to sentences, so-called GENDERED CLAUSES, such as *a=yenim-walal-pi* [ANIM=3SG.AUX-shake-head] (lit. animal-it shakes its head) 'clickbeetle', *a=dudu-meny-tyamu* [ANIM=swollen-3SG:do-cheek] 'blanket lizard' (lit. animal-it has swollen cheeks) (Reid 1997 : 210). Unlike some other Australian languages, such as Bininj Kun-Wok (Gunwinyguan), where gendered clauses are highly limited in productivity, gendered clauses are fully productive in Ngan'gityemerri, as in (28). Note that the relative clause in (28) actually consists of four clauses with different subjects. The antecedent is possessee of the first, local oblique of the second, subject of the third, and local oblique of the fourth clause. Despite its syntactic complexity, its function is derivational. It serves to express a concept, viz. escalators.

(28) Ngan'gityemerri Nangikurrunggurr (Southern Daly; Reid 1990 : 380; Reid 1997 : 205)
yentyi-ngirrki-tye ***yerr****=[watypela* *nem,*
3SG.take-1DU.EXCL.do-PST **INAN/TREE**=whitefella 3SG.M

wannim-derri-tyerr, yentyin-yirrimbin, wannim-fel wun-ambirri]
3PL.go.PRS-back-halt 3SG.take-3SG.go 3PL.go-jump there-ahead
'He took the two of us onto that thing of whitefella's, that they stand still on, and it takes them and they jump off ahead there at the top (i.e., escalators)'

All examples of non-lexicalized relative clauses given by Reid have either masculine or inanimate class proclitics. There is a special relative locational marker *ngan-*, but relative clauses do not seem to be used as complement clauses. Ngan'gityemerri has similar sets of markers for different elements, but they have not really grown together into one uniform gender system.

Let us now return to Bari and Pnar, which have been exemplified at the beginning of this section. Bari is an Eastern Nilotic language, and the East Nilotic languages have innovated gender agreement with Bari being the language that has the least developed system (Heine & Vossen 1983 : 257). Masculine (*lɔ*) and feminine (*na*) gender is distinguished on demonstratives, one type of adjectives, relative clauses, possessive pronouns and noun possessors (except inalienable kin), and the interrogative adjective. Interrogative pronouns, however, have a human/non-human distinction (*ŋa* 'who', *nyɔ* 'what') ("2b"; see Table 10).

Table 10: Bari nominal morphology

	NP	Dem	Num	Adj	Rel	Cmpl	Poss	Int
ADN	0/2	2	0	0/2	2		2/0	2
IND	1	2	0	0?/2	2	0	2	2b
PRED				0/2				

In Acoli, which is a Western Nilotic language, we can trace the origin of the gender system in a marker set consisting of a single marker. Acoli *là-*, PL *lɔ̀-* is a derivational prefix 'person, individual, one who…' without distinction of sex, and has the function of introducing gendered clauses which are a kind of headless relative clauses: *là-íʈ-ɛ́ ò-tɔ̀* [NMLZ-ear-POSS.3SG 3SG.PST-die/become.useless] 'a deaf person' (Crazzolara 1955 : 37). This construction seems to have evolved from N N compounds with *là-* as an erstwhile light noun 'person' (which is not a noun anymore in Acoli), as in *là-bòŋò lëë̀m* [NMLZ-NEG property] 'one without goods'. The prefix *là-* also forms nouns for members of a nation or tribe in Acoli: *Là-pàtíkô* 'man of Patiko' (Crazzolara 1955 : 42). Shilluk, another Western Nilotic language, has a similar feminine element *nya*: *nya Lul* 'a woman/girl of Lul' (Kohnen 1933

: 17). In Acoli, *ny(a)à* means 'daughter' and is much more restricted in its use in compounds. According to Heine & Vossen (1983 : 263), the "Eastern Nilotic gender markers **lɔ* M, **na* F are likely to go back to lexical items which formed head nouns in genitive constructions". However, it is important to emphasize that it is attributive possessive construction with non-anchored possessors (possessed expressions without referential possessor, see Koptjevskaja-Tamm 2005), such as for the expression of membership to a tribe, that we are talking about. Acoli has a different construction for predicative possession with anchored possessors. The non-anchored possessor construction became productive and expanded to possession in general in Bari (but not to inalienable kin), and from gendered clauses, in a similar way as in Ngan'gityemerri, it expanded to relative clauses. The development probably started with a set with one member **lɔ* M. Feminine **na* joined in later and originally only had the non-anchored possessor function. If, as we assume, Acoli represents the original situation and Bari a secondary development, then this development demonstrates how important it is to include nominal morphology with one member in marker sets if gender is considered from a developmental perspective.

Pnar (Ring 2015) has gender marking third person pronouns and corresponding proclitic noun markers (pronominal articles; *u=* masculine singular, *ka=* feminine singular, and *i=* diminutive/neuter singular, *ki=* plural, "3" because there are three singular classes).[11] There are also three numeral classifiers ("3b") used with numerals above 'one': human *ŋut*, non-human *tɬli*, and weeks *ta* (see also Sinnemäki 2019 [this volume]). Possessors are partly unmarked and partly marked with preposed *jɔŋ* ("1b"), which is obligatory if the possessor occurs without head noun. Relative clauses are nominalized with the preposed marker *wa* ("1a"), which also occurs – together with the gender proclitic – in independent adjectives. Pnar is one of very few languages that lacks an animacy distinction in interrogative pronouns, but the interrogative pronoun *ji* 'who/what' and the interrogative adjective *wɔn* or *nu* is combined with the class proclitic. If the gender of the individual or item asked about is known, the apporpriate class proclitic is used, otherwise any class proclitic is possible, but *i=ji* is most common then (Ring 2015 : 235). However, there is an animacy distinction in an unexpected place, viz. one of two types of adjectives. Type 1 does not take the nominalizer in attributive position ("0"; *ki=sistar tm̩mɛn* [PL=nun old] 'the old nuns'; Ring 2015 : 173), but Type 2 requires the nominalizer only when the head noun is human ("2"; see Table 11, example (29)):

[11] The personal pronoun in the accusative has different forms.

(29) Pnar (Austroasiatic, Khasian; Ring 2015 : 177): Type 2 adjective

a. *u=ksaw* ***(wa)*** *hɛʔ*
M=dog **NMLZ** be.big
'the big dog'

b. *u=bru* ***wa*** *hɛʔ*
M=person **NMLZ** be.big
'the big man'

Table 11: Pnar nominal morphology

	NP	Dem	Num(2+)	Adj	Rel	Cmpl	Poss	Int
ADN	3	3	3b/3+3b	0/2	(3+)1a	3+1a	0/1b/3+1b	3
IND	3	3	3+3b	3+1a	3+1a	0	3+1b	3
PRED				0/3				

Relative clauses always take the preposed nominalizer *wa* ("1a"). Independent relative clauses require a preposed gender marker. Relative clauses with or without gender proclitic also function as noun complements (19). Interestingly, the gender proclitics serve also for forming various kinds of verbal nouns (*ka=* resultative/F, *i=* inchoative action/DIM, *u=* purposive nominals/M, Ring 2015 : 71), as can also be seen in (30): *ka=sɔrkar* 'government' and *u=pn̩ɛmkam* 'for using'.

(30) ***ka****=sɔrkar da pn̩=miʔ kɔ ki=aɲ [ʍa m̩ hɔj*
F=govern REAL CAUS-bring.out 3SG.F.NOM PL=rule NMLZ NEG be.fitting
u*=pn̩-ɛmkam plastik]*
NF=CAUS-need plastic
'the government brought rules that it's not good to use plastic'

4.4 Nominal morphology in a gender system in decline

Finally, after having considered examples from emerging class systems, let us now look at an instance of a language variety where gender is in decline and which is a counterexample to Moravcsik's suggested universal that there are never more gender distinctions in attributive than in independent function. We are not making any predictions here about what typically happens in cases of

gender loss. However, the example discussed here shows that distinctions in independent use can be lost first, which can result in a system where gender is distinguished only in attributive, but not in independent use.

Whereas Standard Latvian (Indo-European, Baltic) and most Latvian dialects have a fairly canonical gender system with two values masculine and feminine, Northwestern Latvian dialects [=Tamian], are in various stages of gender loss, which is partly due to Finnic (Livonian and Estonian) substrate (see Wälchli 2017 and Di Garbo & Miestamo 2019 [this volume]). Like Pnar, the Baltic languages Lithuanian and Latvian are exotic in that they lack an animacy distinction in interrogative pronouns (Nau 1999 ; Lindström 1995). In the dialect of Dundaga, feminine agreement is retained only in attributive function. In all other uses, both independent and predicative, only the masculine form is used. This is illustrated in example (31) with attributive and independent uses of the adjective.

(31) Dundaga Latvian (Indo-European, Baltic; Dravniece 2008 : 87; Wälchli 2017)
vel' bi *[**visâ:ʒ*** *â:d* *gurc̄]* –
still be.PST all.sorts.NOM.PL.F skin.GEN.SG belt(F).NOM.PL
plattak *un* ***šoûrak,*** ***mẹĩ':,*** ***brũn'***
thicker.NOM.PL.M and thinner.NOM.PL.M black.NOM.PL.M brown.NOM.PL.M
un ***ʒẹĺtẹn'.***
and yellow.NOM.PL.M
'Moreover, there were all kinds of belts: thicker ones and thinner ones, black ones, brown ones and yellow ones.'

Masculine marking is also generalized in actor nominals, which most typically occur in predicative function: *oûd'ẹs* [weave.AGN.NOM.SG.M] 'weaver (of a woman or man)'. See Table 12.

4.5 Conclusion

Let us now return to the four hypotheses stated at the beginning of this section. Most elements in the few languages surveyed here are in accordance with hypothesis (a) that there are not more adnominal markers than independent ones. However, it is important to point out that the hypothesis does not take into account the intermediate area between independent and adnominal use which is important in classifier languages. Large sets typically develop in the intermediate zone between independent and attributive use as we have seen in the discussion of Hup. This holds true probably also for Bora (synchronically most clearly

Table 12: Latvian and Dundaga Latvian nominal morphology

Standard Latvian	NP	Dem	Num	Adj	Rel	Cmpl	Poss	Int
ADN	0	2	2	2	1/2	1	2/1	2
IND	2	2	2	2	1/2	1	2/1	1
PRED	2			2				
Dundaga Latvian	**NP**	**Dem**	**Num**	**Adj**	**Rel**	**Cmpl**	**Poss**	**Int**
ADN	0	1	2	2	1	1	2/1	2
IND	1	1	1	1	1	1	1	1
PRED	1/2			1				

in possessives), Kilivila, Mixtec, and Ngan'gityemerri, where the development is more advanced. This means that nominal morphology typically originates in independent or in intermediate function and may eventually expand to attributive use, but not the other way round. It may then occur that a new set in independent use has fewer distinctions than one already entrenched in attributive use, which is the case in German relative clauses, where a human/non-human set originating in interrogative pronouns competes with the three-way masculine/feminine/neuter distinction in relative pronouns. A special case is the Pnar human/non-human distinction emerging in attributive adjectives from the opposition of the presence of the nominalizer wa with humans (same construction as with independent adjectives) versus its absence with non-humans. Finally, Dundaga Latvian shows that in contexts of gender loss the independent function can be innovative in introducing the absence of gender whereas gender is retained in the attributive function.

In this section we have shifted away the perspective from gender systems to sets of markers which need not form systems and entirely different sets may occur in different elements and functions (Hypothesis b). This makes it easier for us to see the many cases where there is arguably more than one set of markers in the same language, which holds for English, Coatzospan Mixtec, Bora, Mian, Ngan'gityemerri, and Pnar. In several cases an animacy distinction originating in interrogative pronouns is involved (English, Coatzospan Mixtec, Bora, Mian, and Ngan'gityemerri). This shows that the question as to what makes a gender system is not a trivial one. Even if marker sets originating from interrogative pronouns are excluded, which is probably reasonable to do, since interrogatives do not seem to be attested as origins for full-fledged gender systems, many lan-

guages have more than one marker set (see also Dahl 2000b, who comes to similar conclusions).

We have also argued that relative clauses are important for the emergence of gender (Hypothesis c). Several languages with emergent gender systems have been found to have relative clauses originating from gendered phrases with markers having developed from light nouns. This holds notably for Ngan'gityemerri and Bari. In Mian, a type of relative clauses consists of gender-marked NPs for another reason, namely due to headedness reversal in head-internal relative clauses. This means that relative clauses play an important role in the emergence of gender systems for a number of different reasons.

Can we say in which element and function a gender system originates from its synchronic characteristics (Hypothesis d)? There are at least some trends pointing in that direction. In sets with many markers, some of which express shape, numerals are usually involved. But maybe more importantly, sets with many markers originate in the intermediate zone between independent and attributive function. In systems where edibility plays a role, possessors are involved. This does not only hold for possessive classifiers in Kilivila, but also for Ngan'gityemerri, where class markers originate from generic nouns. Adjectives and relative clauses have a predilection for marker sets with just one single member. Interrogative pronouns are a frequent source for marker sets with two markers distinguishing animacy. If there is a sex distinction, either anaphoric NP expressions or person name markers or non-anchored possession for the expression of origin (Eastern Nilotic) are usually involved. Independent and intermediate NP sets sometimes make a respect/non-respect distinctions as in some Mixtec languages. This suggests that gender does not originate as full-fledged system, but is shaped by discourse functions in particular local domains.

As soon as independent functions of noun phrase constituents are considered it is difficult not to have the impression that gender and classifiers lurk behind every corner. To say it in the words of Sinnemäki (2019 [this volume]), whose statement is based on a much more respectable sample, languages are more likely to have some noun classification system rather than no noun classification system. Or, in order to say it with Gabelentz (1891), in language, there is always a trade-off between the strive for economy (*Bequemlichkeitstrieb*) and the strive for explicitness (*Deutlichkeitstrieb*). Nominal morphology often develops for marking explicitness as a compensation for excessive economy (omission of nominal heads in independent use).

5 Gender assignment

In this section, we discuss systems of gender assignment and consider possible diachronic developments in this domain. §5.1 is concerned with the split between semantic and formal assignment principles, and addresses some shortcomings of this binary typology. §5.2 treats flexibility in gender assignment, and how this phenomenon relates to complexity and the maturity of gender systems.

5.1 Types of gender assignment systems

Corbett (2013) argues that the systems of gender assignment attested in the languages of the world can be subsumed under two main types:

- Semantic assignment, whereby gender assignment is predicted by the meaning of nouns. Semantic assignment systems are further divided into two subcategories: strict semantic assignment systems, where semantic patterns are predictive of the gender assignment of virtually all nouns, and predominantly semantic assignment systems where for a minority of nouns no clear semantic pattern of gender assignment can be identified. Kannada (Dravidian) is cited as an example of a language with strict semantic assignment: nouns denoting males are masculine, nouns denoting females are feminine while all remaining nouns are neuter. Bininj Kun-Wok is classified as a language with predominantly semantic gender assignment: gender assignment is largely predictable for most nouns, but certain nouns with similar meanings may be arbitrarily split across two or more genders. For instance, lower animates can be either masculine or feminine, and no clear pattern motivates this distribution. Even though discussed, the two subtypes are not treated independently in the classification and coding system proposed by Corbett (2013).

- Semantic and formal assignment, whereby for some nouns gender assignment is predicted by their meaning, while for other nouns it is based on formal (phonological and/or morphological) criteria. Semantic and phonological gender assignment is attested in the East Cushitic language Afar. In Afar, nouns denoting males are masculine and nouns denoting females are feminine. For nouns that do not denote sexually distinguishable entities, gender assignment is based on stress patterns: nouns whose unmarked case forms (used, among other things, for direct object; Parker & Hayward 1985 : 225) end in a stressed vowel are feminine, all other nouns are mascu-

line. An example of a language with semantic and morphological assignment is Russian. In Russian, sex is a predictor of gender assignment for nouns denoting males and females. For the rest of the nominal lexicon, gender assignment is predicted by inflectional class. Inflectional classes are in turn defined based on the different patterns of case and number marking that nouns can take.

Corbett's classification of systems of gender assignment is widely accepted in the literature. Yet at least three of the contributions to this volume call it into question and argue that a bipartite typology does not fully capture the diversity of the gender assignment systems attested among the world's languages. These are Svärd's chapter on grammatical gender in New Guinea, Killian's work on the gender system of Uduk, and the chapter by Dahl on the language ecology of grammatical gender systems. The rationale behind this reappraisal is the same across all three contributions. Both in languages with semantic assignment and in languages with semantic and formal assignment there are often rather copious portions of the nominal lexicon for which gender assignment cannot be inferred from the meaning of the noun nor from its formal (phonological and/or morphological) appearance.[12]

While, as mentioned above, Corbett (2013) recognizes that languages with semantic assignment may have residual areas of the nominal lexicon that are not in the scope of the semantic rules which are elsewhere productive, this observation is not operationalized further in his typology. This in turns means that the incidence of arbitrary or opaque mechanisms of gender assignment in the *WALS* sample cannot be estimated based on the existing coding. Svärd (2019 [this volume]) proposes a revised version of Corbett's typology, where opacity of assignment is one of the criteria at stake, and tests it on a sample of twenty Papuan languages. The analysis shows that introducing a systematic distinction between *Transparent semantic assignment systems*, *Semantic and formal systems*, and *Semantic and opaque systems* provides a more accurate representation of the systems attested in the languages of his sample. While sixteen out of twenty languages count as displaying semantic assignment systems when using Corbett's classification, these figures drop by half (eight out of twenty) when purely semantic systems are distinguished from systems displaying both semantically predictable and opaque gender assignment.[13] Similarly, the gender assignment system

[12]For a recent discussion of semantic transparency and opacity in the diachrony of nominal classification systems, see also Seifart (2018). Opacity is also discussed by Passer (2016a).

[13]Svärd does not exclude the possibility that a language may display a combination of transpar-

of Uduk is described by Killian (2019 [this volume]) as partly semantic, partly formal, and largely opaque since for many nouns in the language it is not possible to retrieve any clear-cut connection with semantic and formal assignment criteria. Finally, Dahl (2019 [this volume]) suggests that the notion of opacity should be taken into account when studying the diachrony and evolution of gender systems, under the assumption that non-transparent patterns of gender assignment are an indication of highly mature, grammaticalized gender. While the issue of opaque or arbitrary gender assignment is often mentioned in descriptions of individual languages and has occasionally been brought to attention in the general linguistics debate (see for instance Dahl 2000a), this topic has not yet been addressed in large-scale comparative studies of gender systems. In §6.3 we discuss how opaque gender assignment may emerge from, and relate to, semantic gender assignment.

Another influential generalization in Corbett's typology of gender assignment systems is that while purely semantic systems are possible and relatively common across languages, purely formal systems of gender assignment are not attested. No matter how important morphological and phonological (or, in principle, opaque or arbitrary) patterns of gender assignment are in a language, there will always be at least a handful of nouns for which gender assignment can be predicted on semantic grounds. This semantic core has be shown to usually target the upper nominal end of the animacy hierarchy, that is nouns denoting humans and (higher) animates, with the cutoff points between these categories varying across languages (Dahl 2000a ; see also §3). Killian (2019 [this volume]) argues that in the Koman language Uduk the cutoff point for semantic gender assignment can be higher than 'human'.[14] In Uduk, personal pronouns have inherent gender and are always in class 1; proper names denoting humans (but not place names), on the other hand, are always in class 2. Both personal pronouns and proper names precede human nouns on the animacy hierarchy (1st person > 2nd person > 3rd person > proper names > kinship terms > other humans > animate nouns > inanimate nouns). Below this clearly identifiable cutoff point, semantic predictability in the Uduk gender system is extremely limited.

Di Garbo (Di Garbo 2014 ; Di Garbo 2016) distinguishes between semantic and formal assignment rules and proposes that gender systems with only one type of rule (only semantic) are less complex than systems with both semantic and

ent semantic, opaque, and formal assignment, or just opaque assignment. However none of these types is attested in his sample.

[14] A similar system is arguably found in Teop (Austronesian; Oceanic). See Dahl (2000b : note 3, 591–592) for details.

formal assignment. The relationship between types of assignment rules and the implications for the complexity of gender systems are, however, not discussed in Di Garbo's work. We return to these issues in §6.3 and §6.4 where the relationships between semantic and opaque, and semantic and formal gender assignment are discussed chiefly from a diachronic point of view.

5.2 Flexible gender and the nature of gender assignment

Grammatical gender is traditionally defined as an inherent property of nouns, whereby each noun is lexically associated with only one gender value. Corbett & Fedden (2016 : 9) formalize this assumption into the Canonical Gender Principle: in a canonical gender system, each noun has a single gender value. Yet, a moderate to strong degree of flexibility in the patterns of gender assignment that can be productively associated with nominal roots is not uncommon across the languages of the world. In Italian (Indo-European, Romance), many nominal stems denoting humans and higher animates have a masculine or feminine variant depending on the sex of the denoted entity, cf. *parrucchiere* 'male hairdresser' and *parrucchiera* 'female hairdresser', where the suffixes *-iere* and *-iera* are productive derivational affixes for the overt marking of gender distinctions.[15] Masculine/feminine doublets for one and the same nominal stem also exist outside the domain of animate nouns. For instance, nouns of trees and the respective fruits often belong to opposite genders as in *pero* 'pear (tree)' and *pera* 'pear (fruit)'. In a language like Italian, gender assignment is thus exploited as a noun formation strategy whose interpretation rests either on natural gender distinctions or on other kinds of semantic associations that establish taxonomic relationships or contrasts between entities within a given lexico-semantic field (such as, for instance, names of trees and fruits). For an overview of the relationship between gender assignment and word formation rules, see Contini-Morava & Kilarski (2013). The role of gender assignment in establishing contrasts between semantically interrelated entities is also discussed in §6.3. Gender doublets (as well as triplets and quadruplets) for the same nominal roots are also discussed by Olsson (Olsson 2019 : §2.1 [this volume]) for Coastal Marind.

While in all the cases mentioned above the gender contrasts are used to encode different classes of referents within a given lexico-semantic field (male vs. female entities or types of trees vs. types of fruit), there are languages in which flexibility in gender assignment is used not only for this purpose but also to ex-

[15] In §7.6 we discuss nouns becoming nominal gender targets when decategorialized, as, for instance, in predicative use.

press variation in a range of semantic properties associated with one and the same (type of) referent. Consider the examples (32)–(35).

(32) Gitonga (Atlantic-Congo, East Bantu; Carter 2002 : 21)

a. ***mu***-*sankwa*
CL**1**-boy
'boy'

b. ***tu***-*sankwa*
CL**12**-boy
'small boy'

(33) Wamey (Atlantic-Congo, North-Central Atlantic; Santos 1996 : 160)

a. ***ì***-*ñí*
CL**5**-elephant
'elephant'

b. ***bə***-*ỹí*
CL**18**-elephant
'big elephant'

(34) Tachelhit (Afro-Asiatic, Berber; Penchoen 1973 : 12)

a. ***aq***-*nmuš*
[M]SG-pot
'pot'

b. ***t***-*aq*-*nmuš*-***t***
F-SG-pot-F
'small pot'

(35) Tachelhit (Afro-Asiatic, Berber; Penchoen 1973 : 12)

a. ***t***-*aɣ*-*nžay*-***t***
F-SG-spoon-F
'spoon'

b. ***aɣ***-*nža*
[M]SG-spoon
'big spoon, ladle'

All four examples illustrate instances of switches in gender assignment that are used to encode variation in the size of the noun referent, from default to smaller than default (diminutive), in (32) and (34) and from default to bigger than default (augmentative), (33) and (35). Some crucial differences exist between the gender systems of Gitonga and Wamey as opposed to that of Tachelhit, as well as between their use of flexible gender assignment. Gitonga and Wamey have non-sex-based gender systems with more than five gender distinctions and dedicated diminutive and augmentative genders. Tachelhit has a sex-based gender system with two gender distinctions and no dedicated diminutive and augmentative genders. In this language, switches between the masculine and feminine gender are used to encode size-related types of contrasts. Based on a sample of 84 African languages with gender, Di Garbo (2014) finds that the relationship between type of gender system (in terms of number of distinctions and sex-based vs. non-sex-based assignment) and type of attested size-related gender shifts is rather robust in African languages. Languages with non-sex-based gender and rich inventories of gender distinctions are likely to have dedicated diminutive and augmentative genders, while languages with sex-based systems and a smaller number of gender distinctions encode the diminutive-augmentative contrast based on the sex-based contrast. In addition to size-related patterns of flexible gender assignment, Di Garbo (2014) finds that gender switches can be also used to modify the countability of nouns; for instance, to form collectives from nouns with regular singular and plural forms or to derive singulative nouns from nouns with collective meanings. Consider the examples:

(36) Eegimaa (Atlantic-Congo, North-Central Atlantic; Sagna 2011 : 243)

a. ***e***-*vval*
CL**3**-stone
'stone'

b. ***si***-*vval*
CL**4**-stone
'stones'

c. ***ba***-*vval*
CL**5**-stone
'pile of stones'

(37) Nafusi (Afro-Asiatic, Berber; Beguinot 1942 : 32)

a. *ettefâḥ*
apples**(M)**
'apples' (collective)

b. ***t**-attefâḥ-**t***
F-apples-**F**
'one apple'

In Eegimaa [=Banjal], the regular gender marker for the plural of the noun for 'stone' is *si-* (as exemplified in (36)). However, the noun can be marked by the gender marker *ba-* when the speaker wants to refer to a collection of stones. In Nafusi (37), the masculine, collective noun for 'apples' switches to the feminine gender when speakers want to refer to just one apple. The relationship between gender and the lexicalization of number values is further discussed in §9.

Besides Africa, New Guinea stands out as another documented hotbed of patterns of flexible gender assignment (see also Singer 2018 for an account of flexibility of gender assignment in the Northern Australian language Mawng). These types of systems and their uses have been surveyed by Aikhenvald (2012) and Svärd (2019 [this volume]), while Dryer (2019 [this volume]) digs into the specifics of the morphosyntax and semantics of the diminutive in Walman, a feature value that in some respects resembles a gender but in other respects does not. Some of the properties of the New Guinean systems, such as the contextual nature of the gender shift and the preferential association between masculine gender and big size and feminine gender and small size, closely match the patterns attested in African languages and suggest that at least some generalizations about flexible patterns of gender assignment can be made independently of linguistic areas and families. Other properties, such as the existence of dedicated diminutive genders or diminutives reminiscent of gender in languages with sex-based gender, as in the Papuan languages Motuna [Siwai] (South Bugainville) and Walman, seem to be much rarer in African languages, where dedicated diminutive genders are most commonly found in languages with non-sex based gender.

Two questions that can be asked on the nature of flexible gender assignment and that are particularly relevant to the topics discussed in this section are: (i) how does the presence of flexible assignment contribute to the overall complexity of a gender system? and (ii) how can flexible gender assignment be accounted for from a diachronic point of view, that is, from the perspective of the emergence and evolution of gender systems?

The first question has been addressed in work by Di Garbo (2014 ; 2016), who considers the presence of flexible gender assignment (which she calls gender

assignment manipulation) as a factor that increases the overall complexity of gender systems. This choice is motivated by the fact that in the majority of the languages of her sample, the possibility of manipulating gender assignment as a function of reference construal adds on the lexically specified, inherent, gender of a noun. The noun for 'boy' in Gitonga (32) is inherently a gender 1/2 noun and can be assigned to gender 12 when a diminutive construal is intended. The co-presence of inherent and contextual patterns of gender assignment increases the description length of gender assignment rules and thus the overall complexity of a gender system (see our discussion of gender complexity metrics in §2.1). One could argue that not in all languages with grammatical gender does every noun have inherently specified gender values. Aikhenvald (2012 : 42), for instance, reports that in the Papuan language Manambu, (Ndu) only nouns with animate referents have lexical (masculine and feminine) gender, whereas gender assignment with inanimate nouns is entirely referent-based, with the masculine being associated with the encoding of large size and/or long shape and the feminine with small size and/or round shape. Yet, even in a language like Manambu the existence of context-dependent mechanisms of gender assignment combines with the fact that, at least for some nouns (animate nouns), grammatical gender is an inherent, lexically specified feature. Thus, similarly to Gitonga, the co-occurrence of inherent and contextual gender assignment adds to the overall complexity of assignment rules.

Radically contextual gender assignment has been recently documented for Hamar [=Hamer-Banna] (South Omotic) by Petrollino (2016). In Hamar, neither gender nor number marking is obligatory and their occurrence depends on the speakers' choice. Patterns of gender and number agreement are only activated if nouns are overtly marked as masculine, feminine or plural. Nouns in the general form (that is, devoid of overt gender and number marking) do not trigger agreement. In addition, apart from a few kinship terms that have fixed, lexical gender, "any noun in Hamar can be inflected for masculine and feminine grammatical gender, and plural number" (Petrollino 2016 : 77). In general, while higher animates display stronger associations between gender marking and the encoding of natural gender distinctions, for lower animates gender marking can also be used to encode variation in size (feminine = augmentative, masculine = diminutive) and countability (feminine = collective), which becomes systematic with inanimate nouns. Hamar is a rather intriguing instance of a gender system with almost entirely contextual patterns of assignment and non-obligatory gender marking, two properties that would seem to challenge some widely accepted claims about the typology of gender, notably that gender is a lexical property of nouns with

obligatory morphosyntactic realization through patterns of agreement. Yet, with respect to the nature of assignment rules, the fact that for a few nouns gender assignment is still fixed suggests that patterns of flexible gender assignment, no matter how radical, would always imply at least some instances of lexically specified gender, and that in sex-based gender systems, lexically specified gender is likely to pattern with humans and higher animates.

Coming to our second question, how to account for flexibility from a diachronic point of view, one could be tempted to assume that highly flexible gender assignment is bound to be more frequent in non-mature gender systems where a lower degree of grammaticalization prompts stronger referential ties in gender marking, and the gender of a noun is largely determined by the speaker's construal of its referent. While this is a hypothesis that awaits systematic empirical testing, some observations can be made based on already available data.

For instance, we know for a fact that context-based, flexible gender assignment is well attested in highly grammaticalized gender systems such as those of the Bantu and North-Central Atlantic languages, which often have dedicated diminutive and augmentative genders. Since the Atlantic-Congo gender systems are mature systems, reconstructed in the proto-language and characterized by considerably opaque patterns of assignment, the existence of flexible assignment in these languages would seem to contradict the idea that its presence presupposes young and highly referential gender systems. Interestingly, though, studies of the Bantu gender systems have shown that the dedicated diminutive and augmentative genders (along with the locative genders) are less stable than other gender distinctions and more likely to be replaced by analytic types of evaluative constructions (Creissels 1999 ; Güldemann 1999 ; Di Garbo 2014 ; Verkerk 2014). This could suggest that dedicated diminutive and augmentative genders are less prototypical types of gender distinctions, and therefore likely to disappear or be replaced by other constructions when the system of gender marking undergoes erosion.

Moving on to sex-based gender systems and the use of the masculine/feminine contrast to encode variation in size, countability and/or appreciation/amelioration, one open question is whether the emergence of these patterns of encoding precedes or follows the grammaticalization of a sex-based type of opposition, or whether all these meanings emerge at once, provided that a contrast between two classificatory markers emerge. This issue has been addressed by Mettouchi (2000) for the gender systems of the Berber languages. Mettouchi suggests that the diminutive and singulative meanings of what synchronically is the feminine gender marker *t* developed before the sex-based meaning. According to this pro-

posal, the original function of the marker was purely contrastive. The marker *t* was used to single out an entity with respect to a reference point with which a hierarchical, part-whole type of relationship would be established. The feminine meaning emerged at a later stage and with animate nouns where the pattern of contrast got reinterpreted in terms of natural gender contrast. It remains to be seen whether a diachronic development of this type can be posited for other language families with similar gender systems and uses of flexible assignment.

6 The evolution of noun classes

6.1 Introduction

In accordance with the dynamic approach taken in this chapter, we think that it is crucial to emphasize the diachronic dimension of properties of noun classes. Diachronic developments can be addressed by means of cross-linguistic comparative concepts as much as synchronic systems. Here we will formulate diachronic cross-linguistic concepts using the formula *From X to Y*. This is all prepared by §3 where we already applied this approach to the developmental path that links referent-based gender to lexical gender, which can be described as:

(i) From classes of referents to classes of (noun) lexemes (§3)

In this section we will discuss a number of developments in the domain noun classes. These can be described as follows:

(ii) From one-to-one assignment to many-to-one assignment (§6.2)

(iii) From semantic to opaque assignment (§6.3)

(iv) From semantic to formal assignment (from "covert" to "overt" gender) (§6.4)

(v) From default genders to gender values with semantic content (§6.5)

(vi) From classes of single items to classes of larger sets (§6.6)

6.2 From one-to-one assignment to many-to-one assignment

Mature gender systems usually have a limited number of classes. But not all gender systems with two genders are complex. Complex gender systems with a limited number of classes can actually have two different kinds of origins that seem entirely opposite at first glance. They can develop from many classes and they

can develop from two classes. Here we argue that what these two seemingly opposite developments have in common is that there is a shift from ONE-TO-ONE ASSIGNMENT, where every assignment rule applies to another gender value, to MANY-TO-ONE ASSIGNMENT, where the same gender value is the outcome of several assignment rules. This is complexification according to the Principle of One-Meaning–One-Form (§2), as it entails a loss of transparency.

In this section we will consider Dyirbal (Pama-Nyungan) and Khasi, which both have many-to-one assignment. For Dyirbal it has been argued that its four genders have originated from many more classes. Khasi has three genders and they have developed from an entirely transparent pronominal two-gender system with referent-based semantic gender. Despite the entirely opposite range of number of original classes, both developments instantiate the same diachronic comparative concept *from one-to-one assignment to many-to-one assignment.*

Plaster & Polinsky (2007) propose that the four-gender system of Dyirbal (Dixon 1972) has developed from a noun classifier system such as the one described for the rather distantly related language Yidiñ with about twenty classifiers (Dixon 1977), "through the collapse of a larger number of classifiers into a smaller number of genders" (Plaster & Polinsky 2007 : 14).[16] Yidiñ and some other Australian languages have classifiers that functionally correspond to the classifiers posited by Plaster & Polinsky (2007) for an earlier, not-attested stage of Dyirbal (see Table 13).

According to Plaster & Polinsky (2007), some of the complexities in Dyirbal can be explained by the earlier classifier system that must have been similar to that in Yidiñ. In Yidiñ, a dog "could never be called *miɲa*" (Dixon 1977 : 490). Accordingly, in Dyirbal, 'dog' is not in class I, but in class II. For a more limited case of coalescence of homophonous partial repeaters in Boran, see Seifart (2018 : 22).

Many-to-one assignment can also develop when masculine and feminine anaphoric pronouns are expanding and become noun phrase markers for all inanimate nouns, as has happened in Khasi. Rabel-Heymann (1977) proposes 20 semantic sub-classes for feminine, and 14 for masculine nouns. However, the many-to-one assignment does not stop there, since many sub-classes have exceptions. These can even affect compounds. Usually, Khasi compounds have the gender of their head. But although *ka sim* [F bird] and most birds are feminine, some compounds with sim 'bird' are masculine, e.g.: *'u sim so' pho* 'woodpecker', put differently, have their own COMPOUND GENDER, where gender of the compound is different

[16] According to Dixon (1977 : 496) it is most likely that both Dyirbal noun classes and Yidiñ classifiers have developed from a smallish set of half-a-dozen or so classifiers.

Table 13: Merger of classes to Dyirbal noun classes according to Plaster & Polinsky (2007)

Dyirbal genders and their semantic core	Corresponding classifiers in Yidiñ
I *-l*: male humans, non-human animates	*bama waguɖa* 'male', *miɲa* '(edible) non-human animate'
II *-n* : female humans, birds, stinging things, inanimate nouns related to fresh water or fire	*bama buɲa* 'female', *ɖaruy* 'bird', *buɽi* 'fire, sparks, charcoal, a light, etc.',
	bana 'drinkable liquid', *ɖama* 'stinging animals and plants'
III *-m*: edible (non-meat) inanimates	*mayi* 'edible plant'
IV -Ø: everything else	*wira* 'inanimate nouns', no classifier

from the gender of the head. There are also a number of homophones different only in gender, such as *ka ja* 'rice', *'u ja* 'vegetable' and *ka dpey* 'hearth', *'u dpey* 'ashes' (Rabel-Heymann 1977 : 271), which demonstrate that gender assignment cannot be phonological here. An example of a sub-class with exceptions is natural forces and landscape features, where 37 feminine items contrast with six masculine exceptions: *'u khnñʊ'* 'earthquake', *'u prthat* 'thunder', *'u bnaay* 'moon', *'u khlʊor* 'star', *'u l'o'* 'cloud' and *'u slap* 'rain' (Rabel-Heymann 1977 : 265).

6.3 From semantic to opaque assignment

According to Svärd (2019 [this volume]), opaque gender is characterized by rules that are "not general or have numerous exceptions" and he finds that 8 of 20 languages of New Guinea in his sample have semantic and opaque gender assignment (as opposed to 8 with transparent semantic and 4 with semantic and formal assignment). Killian (2019 [this volume]) describes Uduk as a gender system with largely arbitrary assignment, and Dahl (2019 [this volume]) holds that "opaque" or "arbitrary" gender assignment is "a possibility that has been downplayed in recent decades". Opaque gender assignment is not entirely without rules, but, however the rules are formulated (and there may be conflicting solutions), there are many rules and they make reference to many semantic groups and parts of semantic groups or even to individual nouns. Opaque gender assignment systems do not necessarily lack formal criteria entirely, but non-formal rules (semantic

or item-wise) prevail.

Before considering the phenomenon any further, an admonition to caution is in order. There is a risk of adopting extreme positions, on the one hand, by postulating general principles of conceptual underpinning or formal assignment on the basis of a discussion of few examples or, on the other hand, by denying the reality of any assignment rules by emphasizing particular exceptions to trends. Plaster & Polinsky (2007) criticize attempts to explain gender assignment in Dyirbal as semantic by invoking such principles as association in myth or belief, domain of experience, and important property, because they cannot be falsified. "[T]he rules do not apply in any systematic way and, as they are, seem to act more as after-the-fact generalizations than operational principles" (Plaster & Polinsky 2007 : 6). They further argue that young children acquiring the language do not have access to the necessary information for motivating gender assignment in such manners. However, their own approach of explaining the gender of some Dyirbal nouns by phonological assignment is not free of after-the-fact generalizations either. Their five proposed phonological rules only account for one or two examples each, in some cases with as many or more counterexamples, and leave many nouns unexplained.

Here complexity may be useful as a methodological tool. It can be argued, for instance, that if a proposal is not shorter than another one in terms of description length, it cannot be considered adequate. For some languages, such as Dyirbal, it may be difficult to account for gender assignment in a straightforward manner and often it cannot be excluded that certain generalizations are real (researchers will disagree about them). However, different solutions will share the conclusion that gender assignment in a language such as Dyirbal is complex in terms of description length.

There are many unrelated languages in all major parts of the world with opaque gender assignment and some of them have developed grammatical gender quite recently, such as Khasi. Hence the question arises as to whether there is anything systematic about these exceptions. We suggest here that these expections can be summarized as the Principle of Contrast (38), which is an observation rather than an explanation.

(38) Principle of Contrast in opaque gender systems
While nouns in a semantic field often have a preferred gender, some salient nouns in the field tend to contrast with them and take an opposite gender.

Table 14 lists eleven unrelated languages with opaque masculine-feminine gen-

der and how they treat the gender of 'sun' and 'moon'. Difference of gender is in majority, but the null-hypothesis that same gender is equally common cannot be rejected statistically.[17]

Table 14: Gender of 'sun' and 'moon' in opaque masculine-feminine gender systems

Different gender	Same gender
'sun' m vs. 'moon' F: Abau, Skou	both M: Paumarí, Rotokas (North Bougainville)
'sun' F vs. 'moon' M: Bari, Dyirbal, Ket, Khasi, Mian	both F: Manambu, Tunica

One difficulty with contrast is that it is unpredictable where exactly there is an opposition in the semantic field (and how semantic fields are delimited). In Paumarí (Arawan), a language which "shows a high degree of semantic opacity" (Aikhenvald 2010 : 44), masculine 'sun' and 'moon' are arguably opposed to feminine 'sky' (Aikhenvald 2010 : 44).

Donohue's (Donohue 2004 : 334–342) description of Skou (Sko) emphasizes the relevance of gender oppositions and he launches the term "dynamic oppositions". Oppositions, such as female vs. male, small vs. large, squat-and-round vs. long-and-thin, natural vs. technological, etc., while global, can undergo local reversals, and "there are different, and contradictory, rationales behind the assignment of feminine and non-feminine gender" (Donohue 2004 : 341). Donohue provides possible explanations for many individual cases of gender choices. For instance, according to Donohue, *tang* 'canoe' (feminine), is an extension of land (feminine) and human society (feminine) into the changing, destructive, environment of the sea (masculine). However, what matters for our discussion here is that there are many local gender oppositions which all taken together form a complex pattern, whatever the explanation may be in individual cases.

Dynamic oppositions can especially be observed when two animate genders, typically masculine and feminine, expand below the cutoff point on the animacy hierarchy where gender cannot be controlled by hierarchical patterning anymore (see §3). Female and male purview (§3.3 iii) will not always be congruent with

[17] It is important not to include languages with formal assignment since the difference in gender need not be accounted for by semantics and it can be expected that languages with opaque animate vs. inanimate gender behave differently, which is why the test sample is necessarily very small.

semantic fields in their entirety and the metonymic and metaphorical associations at work (which are cross-field rather than intra-field) can be of many different kinds. As a consequence, the expanding masculine and feminine classes have a predilection for sharing semantic fields when taking over them. One reason is that size and shape oppositions, which are frequently observable in opaque masculine-feminine gender systems (see §5; Svärd (2019 [this volume]), and Aikhenvald 2016 , chap. 3), easily lend themselves to intra-field oppositions.

Another reason is that cross-domain (metaphorical) associations often have the form of contrasted pairs. According to Capell & Hinch (1970 : 49), sun and moon in Australia are always female and male respectively in mythology, even where the local language has no noun classes. However, such oppositions need not always be sensitive to the kind of grammatical gender oppositions at work, which accounts for its unpredictability. In Tunica, where both 'sun' and 'moon' are feminine, there is still a local opposition, but one of age which is irrelevant for gender: the moon is personified as granny and the sun as young woman (Haas 1940 : 57).

As discussed by Seifart (2018 : 21), increase in opacity can be also due to historical "accidents" when the prototypical referents of a noun change. In Miraña, 'axe' takes the classifier *-hɨ* for 'flat and round', since axes were earlier made of stone and round. Similar developments are also attested with pluralia tantum nouns, whose semantically motivated association with plurality may be lost when a noun no longer refers to a multiplicity of entities, but to just one entity, possibly consisting of smaller parts, as in Konso (Afro-Asiatic, East Cushitic) *filaa* 'comb' (more on lexical plurality and its relation with gender in §9). As mentioned in §3, opacity can also decrease, for instance, when nouns denoting animals shift to a transparent class in contemporary Miraña Bora (Seifart 2018 : 24).

Generally, it may be assumed that animate reference, distant targets and anaphoric use is an attractor for transparent gender, whereas inanimate reference, local targets and non-anaphoric use is an attractor for opaque gender. This is consistent with Audring's (Audring 2009) finding that all pronominal gender systems (where gender is restricted to pronouns) are semantically organized. Not unexpectedly, gender in Uduk (Killian 2019 [this volume]), which is highly non-transparent, is local (adjacent) and non-anaphoric. Among the non-transparent gender languages in Svärd's sample from New Guinea, Ama, with only verbal agreement, is probably the most unexpected case. However, gender agreement in Ama goes with absolutive arguments, which entails frequent use with inanimate referents. Interestingly, in a language with two concurrent gender systems, such as Paumarí (Aikhenvald 2010), both systems can be opaque, which adds to

their complexity.

We conclude that unpredictable exceptions are the essence of opaque gender assignment. They come into being, among other things, because cross-domain extensions have the form of local, in Donohue's (Donohue 2004) terms, "dynamic", oppositions and by historical accidents (Seifart 2018). Hence in many-to-one assignment in opaque gender, many does not only mean many semantic fields behaving differently, but also local oppositions within semantic fields without any overarching principle. Hence opaque gender assignment is complex, and its complexity may develop rapidly. However, this complexity is not due to the absence of any principles at work, so one could say that its complexity and unpredictability is, to some extent, systematic.

6.4 From semantic to formal gender assignment and from "covert" to "overt" marking of gender

In many languages with gender, the gender of nouns correlates to a large extent with some morphological or phonological characteristics of nouns. The terms "overt marking" or "formal gender assignment" (Corbett 1991 , chap. 3 as well as §5 in this chapter) applied to these phenomena suggest that the morphological or phonological marking is the cause and the assigned gender is the effect. From a diachronic perspective, however, the relationship usually goes the other way round.

There are at least three well-known ways in which overt gender marking can develop:

(i) As shown by Greenberg (1978) with a focus on African languages, free demonstratives or definite articles indicating gender can fuse with their head noun. For the fused markers, Greenberg further proposes a development from definite article via non-generic article to class affix.

(ii) When gender markers evolve from repeaters, as in Boran (Grinevald & Seifart 2004 : 278–279) or Ngan'gityemerri (Reid 1997), fused repeaters become gender markers on noun-associated words and can become derivational affixes on nouns. The grammatical and derivational markers will then exhibit a large amount of parallelism given their common source.

(iii) In languages with many declension classes, most of them will not originally be associated with a gender. In ancient Indo-European languages, only the non-neuter vs. neuter distinction is entrenched in declension classes. The more recent masculine-feminine distinction only correlates with few

declension classes (Delbrück 1883 : 116–117). However, in many modern Indo-European languages, such as Slavic and Baltic, declension classes highly correlating with gender have almost completely replaced all other declension classes.

When declension classes disappear, morphological assignment can turn into phonological assignment, which can entail considerable restructuring, as has happened, for instance, in the development from Latin to French (Polinsky & Van Everbroeck 2003) or in Wolof (Atlantic-Congo, North-Central Atlantic; Becher 2001 : 46). In Rendille (Afro-Asiatic, East Cushitic), pitch accent on the final mora in the majority of feminine nouns as opposed to masculines with pitch accent on the penultimate mora is due to a lost feminine suffix *-et* (Oomen 1981 : 46; Corbett 1991 : 102). Malkiel (1957–1958) introduces the term HYPERCHARACTERIZATION for the addition of a marker that overtly indicates a category, and a large amount of his examples are about gender in Romance, such as Modern Spanish *cuchara* 'spoon(F)' with the addition of *-a* formed from covert Old Spanish *cuchar* 'spoon(F)'. Newman (1979 : 202) argues for Hausa (Afro-Asiatic, West Chadic) that phonological characterization of feminine nouns has developed by massive application of hypercharacterization. Hypercharacterization is often not transparent in morphology synchronically. Hypercharacterization is thus a pathway from morphological to phonological gender assignment.

Phonological assignment can also originate directly from SANDHI without detour via morphological assignment, as in Nalca (Wälchli 2018). Owa (Austronesian, Oceanic; Mellow 2013 : 26) is another example. While the neighboring language Kahua has four classes distinguished by articles (*o* male person names and kinship terms, *ka* female person names and kinship terms, *i* places, and *na* default), as can be deduced from the Kahua Bible translation, Owa has in addition an *e*-class for four kinship terms beginning with *e-*: *ema(-na)* 'father(-POSS.3SG)', *ena(-na)* 'mother(-POSS.3SG)', *ewa(-na)* 'older sibling(-POSS.3SG)' and *esi(-na)* 'younger sibling(-POSS.3SG)'. Borrowed names and words beginning with *e-* are not *e*-class, which shows that phonological assignment is not productive. While the *e*-class is also semantically coherent (kinship terms), kinship terms not beginning with *e-* are masculine, feminine or default. Perhaps *e-* is a relic of an older general person name *a*-class. The closely related language Arosi, also spoken on the Island of Makira, has an article *a* for male and female person names and kinship terms: *a ina-mu* [PERS.NAME mother-POSS.2SG] 'your mother' (Capell 1982 : 14, 40). Nalca and Owa have in common that gender markers have developed from an extension of person name markers and that the classes of nouns with phonological assignment have very few members.

Güldemann & Fiedler (2019 [this volume]) argue that "overt gender" marking on nouns has to be kept strictly distinct from gender, and they term it "deriflection (classes)" as opposed to gender. Some other researchers make the same distinction, but not always using the same terminology. For instance, Evans (2003 : 181–221) for Bininj Kun-Wok strictly distinguishes between derivational markers on nouns (he calls this "noun classes"; this is deriflection classes according to Güldemann & Fiedler) and inflectional agreement markers on modifiers (he calls this "gender", as do Güldemann & Fiedler). Di Garbo & Verkerk (2018) distinguish between nominal (declension classes) and non-nominal (noun-associated forms) gender marking.

Other grammatical categories, such as number, do not have a restriction that the category has to exhibit syntactic DISPLACEMENT (has to be realized on another word). This is, of course, a consequence of how gender is defined and that other grammatical categories are defined in different ways. For instance, nominal number can be realized both on the head noun of a noun phrase, or, syntactically, on another word in the noun phrase or clause. Here we will argue that the special definition for gender makes sense, even though it differs from how most other grammatical categories are defined, because it is only displacement that turns gender into a grammatical category. If not displaced, a gender marker is derivational. Gender on nouns changes the meaning of the noun in such a way that it looks more like derivation than inflection. That is, the change in meaning is too large for it to stay within the limits of a lexeme. In this context, Bybee's (Bybee 1985) notion of RELEVANCE is useful. According to Bybee (1985 : 13), a "meaning element is *relevant* to another meaning element *if the semantic content of the first directly affects or modifies the semantic content of the second*" (emphasis in original source). Animacy and sex, which are the semantic core of gender, are directly relevant to nouns. As a consequence, markers expressing meanings related to gender realized on nouns will typically yield derivation rather than inflection, since, as Bybee (1985 : 17) puts it, "relevant categories produce derived words that are more distinct in meaning from their bases than the ones produced by less relevant categories, the combinations of relevant notions tend to be lexicalized". For all other parts of speech other than nouns, however, gender is not relevant. In Bybee's (Bybee 1985) scale of relevance categories realized on verbs, gender is the most inflectional and least lexical expression type, which means that gender markers tend to be more distant from the verb stem than markers of other categories.

In this context it is interesting to investigate what happens when function words bearing gender marking, such as articles or demonstratives, fuse with the

noun controlling gender. If grammatical gender has to be displaced, it will cease to be grammatical as soon as fusion takes place. This issue is not yet very well investigated typologically, but there are some indications that the prediction holds true at least as a trend. In Bulgarian (Indo-European, Slavic), the definite article is a second position clitic, but behaves differently depending on whether or not it is fused with the controller (Enger & Corbett 2012 : 315). If the clitic is realized on another word preceding the noun, such as an adjective, the article expresses the gender of the noun (39a/c). If the clitic is realized on the noun itself, however, its form can be influenced by the declension class of the noun as in (39b/d). According to Dost & Gribanova (2006 : 134) the clitic is phonologically clearly an affix when realized on the noun. Inflectional affixes on nouns can lead to complexities in declension classes (see Güldemann & Fiedler 2019 [this volume], their term is deriflection), but do not constitute additional genders. However, Bulgarian is specific in that the declension class affixes on nouns and the displaced gender markers on attributes have the same function within noun phrases.

(39) Bulgarian (Indo-European, Slavic; Enger & Corbett 2012 : 315)

a. *dobri-jat* *bašt-a*
good-DEF.SG.M father(M)-SG
'the good father'

b. *bašt-a-**ta***
father(M)-SG-DEF.SG.{F}
'the father'

c. *dobri-jat* *čič-o*
good-DEF.SG.M uncle(M)-SG
'the good uncle'

d. *čič-o-**to***
uncle(M)-SG-DEF.SG.{N}
'the uncle'

For similar phenomena in Norwegian dialects see Enger & Corbett (2012), where the situation, however, is complicated by the fact that feminine gender is in decline.

Fusion of an article with its head noun is a syntagmatic process. There is a paradigmatic parallel to this if inflectional markers on gender targets are extended to inflectional marking on nouns, which has happened in Latvian. Indo-European has different inflectional suffixes on nouns and pronouns. In Baltic,

the pronominal suffixes are extended to adjectives and in Latvian even to nouns in some case-number forms, especially in the dative singular. This entails that the dative singular nominal suffix in Latvian correlates 100% with gender (Nau 2011). Not only do masculine nouns of the ā-declension (usually feminine) have masculine agreement, they also take the masculine ending of the dative singular *-am* rather than the feminine ending *-ai*: *puik-am* [boy(M)-DAT.SG] 'to the boy' vs. *mās-ai* [sister(F)-DAT.SG] 'to the sister'. As in Norwegian, there can be further complications when gender in such a system is in decline (Wälchli 2017).

Since derivational phenomena connected to gender are beyond the scope of Hockett's classical definition of gender, they are often completely disregarded. An exception is Contini-Morava & Kilarski (2013), who argue, among other things, that "[n]oun class markers and classifiers can be used to expand the referential power of the lexicon either by creating new lexical items or by presenting referents from different perspectives" (Contini-Morava & Kilarski 2013 : 263). It is unclear to us whether this means that languages without noun classes and classifiers have less referential power in their lexicon. However, we would like to emphasize here that it also might be argued that gender, especially in languages without formal assignment, can mean that the lexicon can have fewer elements. As mentioned in §6.3 above, Khasi sometimes has a remarkable lexical underdifferentiation just because gender disambiguates as in *ka brɪw* [F human.being] 'woman' vs. *'u brɪw* [M human.being] 'man' (Rabel-Heymann 1977 : 270). However, as pointed out by Dahl (2019 [this volume]) it is not always quite easy to distinguish between formal and non-formal gender assignment. From a discourse perspective there is nothing particularly covert about gender in Khasi, since articles distinguishing gender are very frequent. Their status as independent word is not entirely clear either, and at least in the closely related language Pnar, the articles are clearly clitics (Ring 2015).

Sometimes decisions whether a language has formal or non-formal gender assignment are quite arbitrary. Algonquian languages are usually considered to have semantic gender assignment (Corbett 1991 : 24), which is, however, quite opaque despite its motivation by power, see §3.3 (v)). However, the plural marker on the noun clearly distinguishes between animate and inanimate, which is a morphological distinction. In Meskwaki, even the singular is clearly distinguished in noun inflection (see Table 15).

Gender in Algonquian can thus be said to be both semantically and morphologically assigned, as there are separate morphological paradigms for animate and inanimate nouns, but it is usually assumed that semantic assignment in Algonquian is so pervasive that morphology is secondary.

Table 15: Meskwaki noun inflection (Thomason 2003 : 10)

	Animate	Inanimate
singular proximate	*-a*	*-i*
singular obviative	***-ani***	*-i*
plural proximate	*-aki*	***-ani***
plural obviative	*-ahi*	***-ani***

6.5 The development of non-noun controllers and neutral genders

It is often argued that noun class systems differ from classifiers in that all nouns must have a gender. As we will see in §8.3, this property of gender systems is closely connected with degree of formalization, which goes hand-in-hand with cumulation of gender with number and/or case. From a developmental perspective this means that obligatorification of gender is not necessarily a gradual internal development within the category of gender, but is connected to the fact that the development of gender tends to be parasitic on other category types, notably number and case, which are already highly grammaticalized when gender starts emerging. As a consequence, there are hardly any attested developments from non-obligatory to obligatory gender. However, this does not mean that all gender systems where all nouns have a gender value are equally mature. Some languages have large default classes, which may be an indication of a non-mature gender system. Such a language is Nalca, where most nouns have default noun gender (see Wälchli 2018).

If all nouns are gender controllers, this usually implies that there are at least some gender targets where there is a forced choice of gender values. This even holds if there are no noun controllers, which means that the gender system must account provide solutions for non-nominal controllers. This is the major topic of this section.

Many languages have some kind of NEUTRAL agreement form used for agreement with "non-prototypical" controllers, such as infinitive phrases, clauses, interjections and other quoted phrases, where the term "non-prototypical" does not say anything else than that the controller is not a noun. A potential solution is to say that non-noun genders are default genders. However, this is problematic, as argued by Corbett (1991 : 214) in languages such as Spanish or Lithuanian, where there is a unique neutral agreement form dedicated to agreement with non-prototypical controllers (*ello* 'it, that', *lo curioso de esta situación* 'the

curious thing about that situation; Corbett 1991 : 214–215). Both in Spanish and Lithuanian, the unique neutral agreement form is a relic of the neuter gender, that remains after all nouns triggering neuter in Latin and Baltic switched to another gender. So it is arguably at least diachronically a default.

"Default" is usually thought of as last resort, or, as Corbett & Fraser (1999 : 71) put it, "the default is the last thing you get to do". However, neutral agreement can be expansive, which is not easily compatible with default as last resort. This is the case in the so-called "pancake" sentences in Scandinavian languages (see Faarlund 1977 and Enger 2004 for Norwegian). In Swedish and Norwegian, predicative adjectives usually agree with the subject in number and, in the singular, in gender. In (40) there is no such agreement. But (40) cannot be an instance of last resort default, since there is a subject to agree with. If default is conceived of as last resort, then it is strange that such a default can be extended.

(40) Swedish (Indo-European, Germanic)
Pannkakor *är* ***gott.***
panncake(CM).PL be:PRS good.**N.SG**
'Pancakes are good.'

Sentences such as (40) have the connotation of an event, in this case 'to eat pancakes is good'. In fact, Faarlund (1977) argues that we have to deal with reduced subject clauses, an analysis which is dismissed by Enger (2004), who also shows that any last-resort default analysis runs into serious troubles. Corbett (2006 : 150) speaks of extension in use of the default, but last resort defaults cannot be extended, if there is some other choice. Enger (2004) shows that Norwegian and Swedish pancake-sentences are largely semantically conditioned (low individuation) and are subject to Corbett's Agreement Hierarchy. Following Widmark (1966), he also points out that the syntax of the subject NP plays a certain role. In (41) the common gender form (M/F) of the predicative adjective is possible if the subject has an adjective attribute, but is ungrammatical if the subject is a bare noun.

(41) Norwegian (Indo-European, Germanic; Enger 2004 : 24)
Russisk *vodka* *er* *sunn* */ sunt.*
Russian.M.SG vodka(M).SG be.PRS healthy.**M/F.SG** / healthy.**N.SG**
'Russian vodka is healthy.'

If neutral gender and in particular its extensions in Scandinavian languages are semantic, this means that non-noun controllers can be as meaningful in clas-

sification as noun classes and should not necessarily be considered to be assigned by default.

In a diachronic perspective, this means that if noun classes have become obligatory for nouns in the sense that every noun must trigger a gender under certain circumstances, there will usually also be obligatory gender agreement with some non-noun controllers. A neutral gender may originate as a default, but the existence of unique neutral genders as in Spanish and of expansive neutral gender, as in Scandinavian, shows that neutral genders can become phenomena of their own. Put differently, default genders can acquire semantic content.

6.6 From classes of single items to classes of larger sets

Many classifiers and genders have originally a very restricted range of application which can be gradually extended. According to Erbaugh (1986 : 428), Chinese classifiers start out as specific for single items both in diachrony and in child acquisition, and several of the commonly used Mandarin classifiers, such as *běn* for 'books' and *dǔo* for 'flowers' (also 'clouds'), still tend to be restricted to single or few concepts in spoken Mandarin of adults. The Chinese general classifiers Mandarin *ge* and in earlier periods *méi* have developed from words for 'bamboo' and 'trunk of bamboo tree' and can be shown to have gradually extended their range of application (Erbaugh 1986 : 429).

The Ngan'gityemerri 'thing'-class *yerr-* has developed from *yawurr/yewirr* 'tree', "a natural extension of the allocation to this class of such traditional artefacts as woomeras, spears, shields, coolamons etc, which are all made from the timber of trees" (Reid 1990 : 309). Similar developments are found in other Australian languages. According to Allan (1977 : 300), a classifier for trees and objects is perhaps the most common inanimate classifier.

The Ateker [=Teso-Turkana] group of East Nilotic has developed a third gender (in addition the East Nilotic two gender masculine-feminine opposition as in Bari, see §3) from an anaphoric noun **(né)ní* 'that place (just referred to)' (Dimmendaal 1983 : 219; Heine & Reh 1984 : 228). In Turkana, an Ateker language, "[t]he new gender has lost virtually all traces of its locative origin" (Heine & Reh 1984 : 229 and has mostly a diminutive function. In another East Nilotic language, Masai, only one noun *wwéjì* 'place' belongs to the third gender that indicates place (Tucker & Mpaayei 1955 : 15; Payne 1998 : 160).

Not only individual nouns, but also, for instance, person names, nominalizations and diminutives (or particular types of them) can serve as starting points for the development of larger sets of classes. Similar to extensions from the use with particular nouns are extensions from other very specific functions. In Iro-

quoian languages, a feminine(-indefinite) gender in Five Nations Iroquois has developed from a generic and indefinite human index on verbs (still represented in Cherokee, Southern Iroquoian) (Mithun 2014 : 141). This development is an extension of referent-based gender rather than of lexical gender. In Mohawk (Iroquoian, Northern Iroquoian), the feminine-indefinite gender is mostly used for older women and for expressing respect, but individual speakers use it for specific sets of referents. "Often mothers are initially shocked to realize that they use different gender prefixes for different daughters" (Mithun 2014 : 138).

Many languages have some sort of respect or honorific distinction especially for women. Respect can originally be associated with specific nouns, as in the case of Lak (Nakh-Daghestanian). In Lak female nouns originally were gender II with the exception of *duš* 'girl, daughter' gender III. *Duš* 'girl, daughter' served as a so-called *Trojan horse* (Corbett 1991 : 100) to transfer all female nouns to gender III except older family members, because this gender is associated with politeness. In two different Polish dialect areas transitional to Czech and Slovak (Indo-European, Slavic), specific morphological formations for diminutives and patronyms for unmarried women, which happen to be neuter and masculine, respectively, are the origins for neuter and masculine gender use for unmarried women (Corbett 1991 : 101). As in Mohawk, it may play a role that the communities are small and everybody knows each other for keeping track of the sets of referents.

In some varieties of Swiss German, nicknames for women are either neuter or feminine depending on their morphological pattern. Accordingly, the anaphoric pronouns referring to specific women whom you know well are either neuter or feminine, and the neuter pronoun *ääs* 'it' can be used contrastively. Bosch (1988 : 218) argues for Standard German that the neuter pronoun *es* 'it' never can be accented, since the marked (emphatic) pronoun reflects a classification of referents. If Bosch's descriptive-content hypothesis is true, this means that the set of referents is part of the descriptive content of Bernese German neuter and feminine genders. In (42), there are two different women or girls with the name *Susanne* with different diminutive-based nicknames, one of which is feminine (*Suslə*) and one of which is neuter (*Susi*). The referents can be tracked by using the corresponding emphatic forms of personal pronouns in contrastive focus.

(42) Bernese Swiss German (Indo-European, Germanic; constructed example)
D Suslə ʊ ds Susi sötə beedi choo.
DEF.SG.F susle(F) and DEF.SG.N susi(N) should.COND.3PL both.PL come.INF

Sɪɪ ɪsch scho daa, abər ƐƐS no nɪd.
SHE be.PRS.3SG already here, but **IT** not yet.
'Susle(DIM.F) and Susi(DIM.N) are both supposed to come. SHE is here already, but "IT" is not yet here.'

The Mohawk, Polish and Swiss German examples show that extensions to general sets is not only relevant for lexical, but also for referent-based gender.

Since every noun class has its own history, it will usually be the case that different classes in the same languages are at entirely different levels of generalization. Mandarin, for instance, has a special classifier for 'books', *běn*, as opposed to the general classifier *ge*. The Ngan'gityemerri *kurum/kurim* 'canegrass spear' class is opposed to the much more general 'thing' class *yerr-*. It is hence astonishing that there are languages with a roughly equal distribution of nouns across genders. This is the more likely the lower the number of genders is, since the general tendency for Zipfian distributions is hard to do away with in larger sets of items. According to Zipf's Law (Zipf 1935), the frequency of a form is inversely proportional to its frequency rank. This entails that different forms will greatly differ in frequency.

Noun classes with very limited scope are not restricted to early stages of development. It is common that a gender disappears by steadily losing its members until nearly no members are left. Standard Swedish has largely lost the opposition between masculine and feminine in nouns, but retains the distinction for anaphoric gender in personal pronouns, and, to a certain extent, masculine in weak adjectives (see Dahl 2000b , as well as Di Garbo & Miestamo 2019 [this volume]). Traces of the earlier ability of nouns to trigger feminine are the anaphoric use of the personal pronoun hon 'she' with the antecedent *människa* 'human being', and with *klocka* 'clock' (Teleman et al. 1999 : 61). However, as will be discussed in §7.7, such a development has typically a component of idiomatization, which is characteristic for relics.

7 The complexity of agreement

7.1 Toward a definition of agreement

In this section we will define agreement as an asymmetric specific relation involving displaced information between a syntactically potentially complex controller and a syntactically potentially complex target. The rest of §7.1 has the aim of motivating this definition. §7.2 deals with specific relationships in agreement, §7.3 with complex controllers and §7.4 with complex targets. In §7.5 we argue that

features are a mature form of displaced information. Viewed in the dynamic perspective adopted in this chapter, agreement can gradually develop when nouns decategorialize to gender targets (§7.6). But targets can also have properties of controllers and agreement can be idiomatic, which contributes to the fuzzy character of agreement (§7.7).

Throughout §7 we will use the term *complex* in three rather different, but still connected, senses. As elsewhere in the chapter, we conceive of complexity as absolute descriptive complexity (see §2). Thus, *complex* means 'non-trivial in structure, so that an exhaustive description cannot be short'. The sheer length of this section will suggest that gender agreement is complex. However, this has much to do with *complex* in the sense of 'consisting of different, but related phenomena'. The phenomena commonly subsumed under agreement in the typological literature are of many different, but yet related kinds. We will argue here that this can be accounted for by the dynamic approach. Different kinds of agreement or agrement-like phenomena have different kinds of origin and represent different stages of maturity of agreement. Throughout the section, we will emphasize the importance of identifying some kind of unequivocal specific relationship between the elements involved in agreement. As we will show, this requirement can only be maintained if the units linked by agreement can be viewed as elements that can consist of several words (complex targets and complex controllers). *Complex* therefore also has the sense 'consisting of several elements'. Agreement is also complex in the sense of number of items involved, which however, limits its complexity in the sense of transparency. We claim that agreement relations can always be seen as one-to-one relations. This comes at the cost of rejecting the idea that agreement is simply a direct relationship between two words. In gender, the word(s) or context(s) triggering the choice of a grammatical value of a marker do not originate in the word on which the category is marked, which is what we call displacement of information, the very essence of agreement. If information is displaced, this happens in the form of a chain (from one chain link to another) and this chain can have more than two links. As we will show, it is not uncommon that there can be many links in the information transfer chain.

Agreement is one of the most traditional notions in linguistics. However, modern linguists very much disagree about its nature and whether it is a useful concept. While Corbett (2006) understands agreement in terms of the highly abstract notion of morphosyntactic feature triggered by a controller and expressed on a target (a conception compatible with many formal approaches), Croft (2013) questions the usefulness of the concept of agreement and Haspelmath (2018)

holds that agreement is poorly defined. Haspelmath suggests to replace the notion of (potential) agreement target in the definition of gender by "noun-associated form", which he defines as "an adnominal modifier (article, demonstrative, adjective, or numeral), or a verbal argument index (subject or object index), or an anaphoric pronoun". One of Haspelmath's arguments is that noun-associated forms are often used in situations when the corresponding noun is not overtly present. This argument has been well-known at least since Barlow's (Barlow 1999 : 190) discourse-oriented approach to agreement. Barlow conceives of agreement as a process of feature unification, a view shared by Corbett (2006) and approaches within Lexical-Functional Grammar (e.g., Kuhn & Sadler 2007). This implies that gender marked forms need not actually be controlled and can occur on their own, such as the isolated utterance in Spanish *Bella!* [beautiful.F.SG] '(You are/she is) beautiful!' While the unification approach accounts for syntactically non-controlled targets, it has the disadvantage that it models agreement as a symmetric relation.

In our view the concept of feature shared by a controller and a target captures the idea that agreement is a form of displaced information. The form where gender is realized is not where gender originates. The information necessary to determine the gender value comes from another part of the utterance, be it from a word or sequence of words elsewhere in the sentence or discourse or be it from the context.

We think that our definition of agreement has the potential of building a bridge between the extreme positions of either viewing agreement in highly abstract terms or doing away with the notion of agreement altogether. In our view, morphosyntactic features are highly mature forms of displaced information. This understanding of morphosyntactic features allows us to put agreement into a dynamic perspective, where abstract features can be seen as emergent.

Gender marking is the forced choice from a set of redundant marking options on an element that is typically not a noun (the target). The choice is externally determined by an overt, typically nominal, element (the controller) or by the context. In the latter case we will speak of a latent controller, as in Tasmowski-de Ryck & Verluyten's (Tasmowski-De Ryck & Verluyten 1982 : 328) famous French example (43), where there is no syntactic antecedent for the anaphoric pronoun.

(43) French (Indo-European, Romance; Tasmowski-De Ryck & Verluyten 1982 : 328)
(John is trying to stuff a large table (*la table*, feminine) in the trunk of his car; Mary says:)
Tu n'arriveras jamais à ***la*** **[F]**/**le* [M] *faire entrer dans la voiture.*

'You will never manage to get it into the car.'

In (43), the latent controller is lexical. The displaced feature originates in a specific lexical item in a specific word form (singular) which must be activated in the speaker's mind when she utters the target. The controller is not overtly present in syntax, but there is still displaced information from a latent lexical item to a target and there is an asymmetric relation between the latent controller and the target.

A consequence of externally forced choice (the use of *la* or *le* in (43) is not random) is that the target bears some typically nominal information, which can be some referent-based property, such as animacy, sex, size or shape, or some lexical feature of a noun, as in (43). In gender agreement, this is always displaced information. Displaced information is hence a defining criterion of gender agreement. However, there may be intermediate cases where it is unclear whether the choice of a marker is externally determined (by syntax or discourse), especially if the target is a noun or a noun phrase. As we will see, this is highly important from a diachronic perspective since gender agreement at least in some cases can be shown to evolve from the decategorialization of nouns (see §7.6). Agreement, as we conceive of it, is partly fuzzy. On the one hand, there are clear cases of agreement; on the other hand, there are phenomena which only have some properties of agreement, and the latter are important for understanding how agreement evolves diachronically.

Much of the disagreement about the notion of agreement comes from attempts to define agreement uniformly syntactically (e.g. Hengeveld 2012 and Passer 2016a)[18] or uniformly in terms of discourse (e.g., Barlow 1999). This has to do with the fuzzy nature of coreferentiality. Many agreement phenomena can be subsumed under Moravcsik's (Moravcsik 1978 : 363) Coreferentiality Principle, according to which all agreement targets include reference to the controller nominal. The Coreferentiality Principle is too narrow, as shown by Corbett (2006), since targets sometimes agree with non-coreferential controllers, for instance, if the gender of the possessee is marked on the possessor (see §7.6). However, coreferentiality is neither strictly opposed to lack of reference nor to completely independent reference, and, as a consequence, lack of reference is not strictly op-

[18] Hengeveld (2012), van Rijn (2016) and Passer (2016a) only distinguish between independent reference and agreement as the result of a syntactic feature copying-mechanism not involving reference. In their view, attributive adjectives exhibiting gender are an instance of agreement exactly because they do not refer. This entails a narrow definition of agreement, especially manifest in Passer (2016a : 86), who argues that concordial class systems must have a range of language specific modifiers, i.e. agreement within the NP.

posed to completely independent reference. Attributive adjectives in an NP are arguably coreferential with the head noun of the NP, but since it is the NP as a whole that refers, it is unclear whether reference need be invoked at all in this context. Croft (2013) argues that there is no principled difference between independent reference and dependent reference, which leads him to an independent reference analysis of "agreement" as indexation.

The information displaced through agreement marking can consist of features, such as gender and number, with very limited sets of possible values. Features are a mature form of displaced information, but displaced information is not restricted to features, it can be just a condition (a context where a certain choice of marker is made, whereby that context is information relevant for the choice). Corbett (Corbett 2006 , chap. 6) keeps features and conditions apart. We think that the two are just two different forms of displaced information in agreement and features are often mature conditions (which also explains why features often cumulate, see §9).

Agreement is syntactic to the extent that it involves words or groups of words as targets and controllers, but the relation between controller and target can be semantic and it can be inter-sentential. Our definition differs from Corbett's (Corbett 2006 : 4) in seeing the domain as part of the syntactic target. For instance, a target is not an adjective qua part of speech, but an adjective in a specific syntactic environment, such as attributive or predicative.

The visualization in Figure 3 captures some core ideas of our definition of agreement. Controller and target can consist of several words (small boxes within larger box). They are linked by a specific relation, which can be syntactic or semantic, and the information expressed by agreement and realized on the target is displaced information, in the sense that it does not originate in the target. It can consist of features or a feature or a condition on a feature.

Unlike Corbett, we think that the notion of relation is an indispensable defining term of agreement. Our definition is consistent in this respect with Lehmann, who requests "a grammatical or semantic syntagmatic relation" between controller and target (Lehmann 1982 : 203). However, we think it need not be syntagmatic, since the controller can be contextual. Coreferentiality is an example of a specific relationship that can hold between a controller and a target. Our claim is that there is always some specific relationship between target and controller in agreement. The relationship must be specific, because it must be unequivocal. This does not exclude occasional instances of ambiguity, but agreement is basically a one-to-one relationship or association, not a one-to-many or many-to-many relationship between controller and target. This entails that targets are

figures/14/fig3.pdf

Figure 3: A model of agreement

sometimes complex in the sense that they consist of FORMAL GROUPS, a term that we take from Croft's (Croft 2001 : 190) critique of the notion of constituent. A formal group can be a phrase or constituent, but it can also be another kind of syntactic grouping (which need not be a continuous string of words). Agreement is a means of indicating syntactic grouping (groups of controller and target or target groups or controller groups) parallel to, but not necessarily congruent with, constituency.

Sometimes a word displaying an agreement marker does not entertain any specific or exclusive relation with the controller if considered in isolation, but only when considered in terms of a formal group it is part of. This is evidence for syntactically complex targets. Consider (44) from Italian with object agreement in the participle of *dovere* 'must' in the verbal formal group *ho dovuti chiudere* 'had to close' preceded by the object clitic which triggers the agreement. The object is semantically an object of the verb *chiudere* 'to close', but the whole sequence consisting of three verbs is a unit when it comes to argument structure. In terms of Rizzi (1982), the modal auxiliary and the lexical verb form a verbal

complex. As further elaborated in §7.4, the verbal complex in (44) is an instance of a complex target or target group. The clitic, which is coreferential with pralines and biscuits in (44), is an object of the whole verbal complex, not just of 'must', and as an object of the whole verbal expression it triggers object agreement, which happens to be realized on the modal verb, because the participle is the only form in the verbal complex where object agreement can be realized. Furthermore, *[q]ueste praline e questi biscotti* 'these pralines and biscuits' is an instance of a complex controller with gender resolution (in Italian feminine and masculine is masculine); see §7.3 for complex controllers.

(44) Italian (Indo-European; Romance; constructed, with inspiration of text examples)
Queste praline e questi biscotti li ho
this.F.PL praline(F).PL and this.M.PL biscuits(M).PL 3M.PL.ACC have.PRS.1SG
*dovut**i** letteralmente chiudere sotto chiave.*
must.PTCP.PST.**M.PL** literal.ADV close.INF under key(M).SG
'Those pralines and biscuits I had to keep literally under lock and key.'

The agreement patterns in (44) can be described as an INFORMATION TRANSFER CHAIN (see Wälchli 2018) consisting of at least ten steps: The masculine plural marker *-i* (i) on the target word *dovuti* (ii) is part of the target group *dovuti chiudere* (iii), which receives masculine plural agreement from the pronoun *li* (iv), serving as controller under the condition that it precedes the verb (cf. *ho dovuto chiuder-li*, when the object clitic follows the verbal complex) (v), and is itself a target controlled by the controller group *queste praline e questi biscotti* (vi), whose gender results from gender resolution between the word-forms *praline* and *biscotti* (vii), whose word-form values feminine plural and masculine plural (viii) result from number inflection of the feminine lexeme *pralina* and the masculine noun *biscotto* (xi), which receive their lexical gender by formal gender assignment (x).

Above we have said that the specific relationship can be of different kinds. This is the topic of the next subsection.

7.2 Specific relationships in agreement

It is not the purpose of this section to give an exhaustive treatment of all possible specific relationships that can hold in agreement. What we want to point out here is that coreference is not the only kind of specific relationship that can hold in agreement and that specific relationship can be semantic (then agreement can be

inter-sentential) or formal (then agreement is usually intra-sentential). The latter part of this section will be devoted to adjacency, which is an under-researched phenomenon often encountered in agreement. We will argue that adjacency may qualify as a specific relationship in agreement.

The clearest case of agreement blatantly violating Moravcsik's (Moravcsik 1978 : 363) Coreferentiality Principle is gender in Archi (Nakh-Daghestanian, Lezgic). Archi has excessive agreement in the clause with the absolutive argument as controller. In (45) not only the verb 'make' agrees with the absolutive argument of the clause, but also the pronominal arguments in the ergative and dative cases and the adverb 'quickly' do so too.

(45) Archi (Nakh-Daghestanian, Lezgic; Bond et al. 2016 : 3)
*Nena<**b**>u* *do:ˁzu-**b*** *χˁon*
1PL.INCL.ERG<III.SG> be.big.ATTR-III.SG COW(III)[SG.ABS]
***b**-ela<**b**>u* *dit:a<**b**>u* *χir* *a<**b**>u*
III.SG-1PL.INCL-DAT<III.SG> quickly<III.SG> behind <III.SG>make.PFV
'We quickly drove the big cow to us (home).'

In our view, agreement here marks the whole clause as a formal group; put differently, the agreement target is the whole clause (see §7.4 for complex targets). Agreement with the same noun class is realized wherever it can be morphologically marked in the clause. This is actually less excessive in Archi than (45) suggests, because agreement can be spelled out only occasionally in the Archi clause. Agreement appears only in about one third of the verbs, in the ergative only in the inclusive plural, in the dative only in first person pronouns, and only in 13 of 392 adverbs (Bond et al. 2016 : 70). In clauses with two verbs with different absolutives, so-called biabsolutive constructions, there are two formal groups for agreement (Chumakina & Bond 2016 : 90–111).

The agreement relation in Archi is a specific relationship in the sense that it is a unique relationship between the head of the absolutive NP (controller) and its clause (target). Since this is a syntactic dependency relationship, Archi agreement is intra-sentential as opposed to coreference which is semantic and can be inter-sentential. However, coreference is not the only possible kind of specific semantic relationship in agreement.

CO-CONCEPTUALITY – where controller and target express identity of concept, but not identity of reference – is another important specific relationship in gender agreement. Unlike co-referentiality, there is usually no agreement in number, since number is a property of the referent, not of the lexical noun expressing the concept (except for pluralia tantum, see Wälchli 2017 for Latvian). If we

consider examples from the literature on anaphoric pronouns without explicit antecedents, such as *Either no letter was sent, or **it** got lost* and *Watch out for that snake. **They** are poisonous* (Bosch 1988 : 211), there is no relationship of co-reference between noun and pronoun. The anaphoric pronoun simply stands for something that is of the same kind as the noun (the same concept); it is a letter and they are snakes, irrespective of their reference and whether they are referential at all. Here also sort the so-called "donkey sentences", first introduced by the medieval philosopher Walter Burleigh around 1328, such as Latin *Omnis homo habens **asinum*** [donkey.ACC.SG.M] *videt illum* [DEM.ACC.SG.M] 'Every man having a donkey sees it' (Seuren 2009 : 269). In languages with lexical gender, such as Latin, there is usually agreement in gender in such cases of co-conceptuality.

Co-conceptuality is particularly important for independent adjectives and numerals and other independent elements as they have been discussed in §4. Like anaphoric pronouns, independent adjectives typically express some sort of anaphoric relationship, which, however, does not imply identity of reference, but identity of concept. This is illustrated in (46) from German.

(46) German (Indo-European, Germanic): independent adjective expressing co-conceptuality
Das mit dem Hemd [shirt(N)] *leuchtet mir so langsam auch ein… ja, **ein weißes*** [INDF.NOM.SG.N white.NOM.SG.N] *wäre in der Tat besser gewesen.*
[After a non-successful job application:] 'The thing with the shirt starts becoming clear to me, too…yes, a white one would indeed have been better.'
http://www.bewerbung-forum.de [2018-11-06]

It might be objected that (46) is a case of ellipsis of the head noun. However, the form of attributive adjectives or numerals with head nouns and of independent adjectives or numerals without head nouns is not always the same in all languages, which is an argument that independent adjectives and numerals are not attributive adjectives and numerals with ellipsis. In German, the independent numeral 'one' follows a different declension pattern (originally pronominal endings): (speaking of shirts) *ein-**es** ist hellgrau* [one-NOM.SG.N.PRON be.PRS.3SG light.gray] 'one is light gray' as opposed to *ein Hemd ist hellgrau* [one.NOM.SG.N shirt be.PRS.3SG light.gray] 'one shirt is light gray'. Wälchli (2017) discusses the case of Dundaga Latvian, where there is gender agreement only in NPs with head nouns, but not in independent adjectives (which only have number agreement; see example (31) in §4.4). As far as the Animacy Hierarchy is concerned, independent adjectives behave like pronouns. In (47) from German there is semantic

(referent-based) agreement with independent adjectives rather than lexical agreement. With attributive adjectives, semantic agreement is ungrammatical (*das*[N] *ältere Mädchen*(N), **die*[F] *ältere Mädchen*(N) 'the older girl').

(47) German (Indo-European, Germanic): co-conceptuality linked to coreference by means of part-whole relationship
Zwei Mädchen [girl(N).PL] *im Alter von sieben und acht Jahren sind am Samstag in Schwarzenberg am Böhmerwald (Bezirk Rohrbach) von der Holzleiter eines Hochstandes gestürzt.* ***Die*** [DEF.NOM.SG.F] ***ältere*** *der beiden war ausgerutscht und hatte* ***die*** [DEF.ACC.SG.F] ***jüngere*** *mitgerissen.*
'Two girls aged seven and eight years fell from the wooden ladder of a tree stand in Schwarzenberg am Böhmerwald (district of Rohrbach) on Saturday. **The older one** of the two had slipped and had dragged **the younger one** with her.'
http://www.salzburg.com/nachrichten/oesterreich/chronik/sn/artikel/zwei-maedchen-in-ooe-von-hochstand-gestuerzt-und-verletzt-209318/
[accessed 2017-06-05]

In the rest of this section we will now focus on adjacency as a further potential specific relationship in agreement.

ADJACENCY in agreement means that controller and target or target and controller immediately follow each other. Target and/or controller can consist of several words. Adjacency between controller and target is frequent in most languages with gender, which is natural, since agreement is often local. According to Corbett (2006), local agreement is more canonical than distal agreement. But most treatments of gender do not pay any particular attention to adjacency. We think that adjacency is an important issue in agreement that deserves particular attention because there are several languages where gender agreement is predominantly or exclusively adjacent.

Since adjacency is unequivocal, it has the potential of qualifying as a specific relationship between controller and target. Thus, it is a candidate for a type of specific relationship between controller and target on a par with coreference and other specific relationships.

It is well-known that linearity plays an important role in phonology, notably in sandhi phenomena, sound changes that take place at word- or morpheme-boundaries. As already mentioned in §6.4, some instances of gender agreement originate in sandhi. This adds a developmental perspective to the study of adjacency in gender agreement. In cases where sandhi is involved in the origin of gender agreement, adjacency may reflect preservation of an earlier phonological

motivation.

The importance of sandhi phenomena in agreement is well-known from Celtic languages. In all Celtic languages, feminine nouns have "mutated" onsets following an article: Irish *bean* 'woman(F)', *an bhean* 'the woman'; Welsh *pont* 'bridge(F)', *y bont* 'the bridge' (Fife & King 1986 : 480). Here it looks as if the controller noun is at the same time the target. However, morpho-syntactically it is rather the article which is the target with the gender marker being realized phonologically on the following word. In the case of postposed adjectives, it is just the other way round. In Breton *ur verc'h vras* 'a big girl' (*merc'h* 'girl', *bras* 'big'), *vras* 'big' looks as if it displays agreement with its initial mutation, but the mutation is in fact diachronically caused by the feminine noun preceding it (Fife & King 1986 : 480). (For the possessive pronoun in Welsh see Wälchli 2019 [this volume].)

Let us now turn to the discussion of languages in which target and controller in gender agreement almost always are adjacent. In Uduk, a language with two noun classes termed class 1 and class 2, gender targets immediately precede gender controllers (see Killian 2019 [this volume]). At the same time, coreference does not seem to play any major role. If there are two or more words in a noun phrase, the head noun and the modifier have genders of their own.[19] Gender in Uduk does not usually have the function of signaling that two words belong to the same constituent or are coreferential. The gender marker is simply triggered by the gender of the following word. In (48) the preposition *kí* is followed by a class 1 noun (*yìl* 'year'). With a following class 2 noun it would be *ká*. The modifier 'small', however, is class 2, as are all modifiers derived from stative verbs with the suffix *-gàʔ*. This is why the associative marker, which links words in the NP, takes a class 2 marker. Since the gender markers are clitics in some case forms (see Killian 2019 [this volume]), the words on which the gender marker may appear make sometimes rather unexpected targets, such as the adverbial subordinator *gòm* in (48).

(48) Uduk (Koman; Killian 2015 : 382)
*gòm=**à** 'cí yǐsǎ̀ 'bór-ó'd á'dī kí màsh kī-Ø*
for=CL2 'child(CL2) NEG good:IPFV-3SG 3SG NARR marry with-CL1
yìl=à gwǎ'd-gàʔ
year(CL1)=ASS.CL2 small-NMLZ(CL2)
'Because it's not good for the child to marry early.'

It is not entirely obvious what the target is in this case. In one possible analysis, *gòm* is the gender target, because this word bears the gender marker. In another

[19]For one single exception involving prenominal modifiers, see Killian (2015 : 128)).

possible analysis, which we prefer, the gender target is the clitic *=à* which happens to require a host for phonological rather than morphosyntactic reasons.

While almost all gender agreement in Uduk is adjacent, the Taa languages West !Xõo [=West Xoon] and East !Xõo [=East Taa] (Tuu [=Southern Khoisan], Taa) have several different kinds of agreement, only one of which exhibits adjacency. Agreement preceding the controller is necessarily adjacent, agreement within the NP with the NP head noun as controller is not. Adjacency agreement is illustrated in (49) with a compound. Its first part, which is not the head of the compound, triggers agreement on the preceding word. In Taa languages, the gender of the whole compound often differs from the gender of the parts of the compound. In (49), *ǁkx'oe nǁaen* [rain house.PL] 'clouds' has gender CL2A[SG]/CL2A[PL], but *ǁkx'oe* 'rain' (only singular) has gender 3 and *nǁahe* SG (*nǁaen* PL) 'house' has gender CL3[SG]/CL1[PL]. Adjacent gender in Taa languages is always controlled by the immediately following noun, which is the first part of the compound, *ǁkx'oe* 'rain(CL3)' in (49), rather than the whole compound 'cloud(CL2A)'. In (50), there is an associative plural formed from a person name. The associative plural has gender 4. However, the adjacency agreement is triggered by the gender of the person name, which is gender 1.

(49) West !Xõo (Tuu, Taa; Güldemann 2004): adjacency and compound gender
*n si n/a=**e** ǁkx'oe nǁaen ka ǁari*
1SG IPFV see=**CL3** [rain(**CL3**) house.PL(CL1)](CL2A) REL.CL2A many
ka
REL.CL2A
'I see many clouds.'

(50) West !Xõo (Tuu, Taa; Güldemann 2006): adjacency and associative plural
*nna n/a=**i** Tom-tu ku /ai k=i*
1SG:PRF see=**CL1** [Tom(**CL1**)-ASS.PL](CL4) REL.CL4 stay OBLIQUE=CL1
dertien ku
TOPONYM(CL1) REL.CL4
'I have seen Tom and them who were at post 13.'

Some clitic hosts, such as the question particle */V* in (51) (*V* means that the vowel must come from agreement), never occur without a following gender clitic. There is thus no gender marking, if there is no clitic host. If (51) were not a question, there would not be any gender marker.

(51) East !Xõo (Tuu, Taa; Traill 1994 : 18)
/=***ú*** *tûu* *à* *sîl*
Q=CL4 people(CL4) TENSE come
'Did the people come?'

A third language where adjacency plays an important role is Nalca. Gender is triggered by the immediately preceding constituent. In (52) the noun *heik* 'hamlet' is followed by two case markers, dative plus comitative, which together express the notion of source. Case markers and gender markers are mutually dependent on each other and hence almost always co-occur in the case-number word following the noun. In (52), *heik* 'hamlet' is default noun *e*-gender, which is why the first case-number word in (52) is default noun *e*-gender. However, since the controller cannot control anything but the gender of the immediately following target, the second case-gender word is default phrase *a*-gender (which is never triggered by a lexical noun). There is no adjacency condition on the demonstrative suffix, which is repeated in both case-number words.

(52) Nalca (Nuclear Trans New Guinea, Mek; New Testament 40021001; Wälchli 2018)
Heik *e-**nye**-k* *a-**nye**-b* *dara*
hamlet DN-**DEM**-DAT DP-**DEM**-COM/ABL TOP
'from this hamlet'

As argued by Wälchli (2018), gender in Nalca partly derives from sandhi phenomena, which motivates adjacency diachronically.

In both Nalca and Uduk, person names are important gender controllers (see Killian 2019 [this volume] for Uduk). In the Oceanic languages spoken on the island of Makira, gender classes have developed from an extension of person name markers, and, as discussed in §6.4, one of five classes in Owa originates from sandhi phenomena. Person names rarely have attributes. Thus it is natural that person name markers and person names are typically adjacent.

Adjacency-based gender developing from person name markers is not particularly complex when it first develops. There is only one agreement target, person name markers, and gender need not be specified in the noun lexicon, since it is organized by the animacy hierarchy (see §3). Person name markers can then travel down the animacy hierarchy, first expanding to older kinship terms and to other words typically expressing unique reference, in Makira languages also to the pronoun 'who'. Both Mek languages and Makira languages illustrate complexification in number of classes (in Mek from two in Una and Eipo to four to

six, in Nalca, depending on whether only classes with lexical controllers or all classes are counted, and in Makira from two in Arosi to four in Kahua and five in Owa). Uduk gender is considerably more complex in terms of gender assignment (see Killian 2019 [this volume]) and it is not known how the system has developed. Gender in Taa languages is the most complex among the languages discussed here and nothing is known about the origin of the system.

7.3 Complex controllers

Complex controllers, where the controller consists of more than one word, are well-known from gender resolution in coordination, but also inalienable possession, names consisting of several words, and nominalizations. They provide evidence for gender being assigned to a group of words rather than to a single word. In this section we will consider evidence from inalienable possession in Paumarí, from German restaurant names and Taa nominalizations. The section also discusses Nalca, where complex controllers are pervasive.

The assumption of complex controllers is uncontroversial for gender resolution in coordination, as illustrated in (44) in §7.1. However, gender resolution is not restricted to coordination. Consider (53) from Paumarí, a language with two different gender systems: masculine/feminine and *ka-* vs. non-*ka*-noun classes. In Paumarí, there is gender resolution in inalienable possession in the *ka-* vs. non-*ka* gender system. "If either the possessor, or the possessed noun (or both) belong to the *ka-* class, a modifier takes the *ka-* class marking, no matter which one of the two it modifies" (Aikhenvald 2010 : 240). Put differently, *ka-*/non-*ka* gender in Paumarí inalienable possession is computed with formal criteria in the same way as in gender resolution in coordination. In (53) the possessor is *ka* and the possessed noun is non-*ka*. The adjective displays *ka*-agreement whether it modifies the possessor or the possessed noun.[20] The possessor *bodi* 'mouth(N.*KA*;F)' also takes *ka-* because it agrees with *ojoro* 'turtle(*KA*;F)'.

(53) Paumarí (Arawan, Aikhenvald 2010 : 240): gender resolution in inalienable possession

ojoro	*ka-bodi-ni*	***ka**-karaho*
turtle(*KA*;F)	*KA*-mouth(N.*KA*;F)-3SG.F.DERIV	**KA**-big

'big mouth of a turtle' or 'mouth of a big turtle'

Further evidence for complex controllers comes from cases where gender is

[20] For similar phenomena in the related language Jarawara, where the *ka*/non-*ka*-gender was lost, see Dixon (2000) and §3.4.

assigned on the level of group of words rather than on the level of words, which can hold for names consisting of several words. Plank (2015) discusses German restaurant names, which often can be neuter irrespective of the gender of the head noun.[21] The German lexeme *Orkan* 'hurricane' is masculine. However, in (54), *Orkan* is used as name for a restaurant and is neuter. (55) illustrates the same phenomenon with a name consisting of more than one word. *Oma* 'grandma' is feminine, but it is the whole expression *Oma Plüsch* 'grandma Plush' that is the restaurant name and as a restaurant name consisting of two words it is neuter.

(54) German (Indo-European, Germanic; Angerer 2009 : 132)
Hinter der wohl schmalsten Eingangstüre
behind DEF.GEN.SG.F probably narrow.SUPERL.GEN.SG.F entrance.door(F)
Regensburgs verbirgt sich ***das*** *Orkan.*
Regensburg.GEN hide.PRS.3SG RFL **DEF.NOM.SG.N** hurricane(M)
'The Orkan is hidden behind the probably narrowest door in Regensburg.'

(55) German (Indo-European, Germanic; tripadvisor.de [2018])
Das *Oma Plüsch liegt direkt an der*
DEF.NOM.SG.N grandma(F) Plüsch lie.PRS.3SG directly at DEF.DAT.SG.F
Donau.
Danube(F)
'Oma Plüsch is located directly at the border of the River Danube.'

Adjectives as parts of names commit restaurant names to the gender of their lexical head: *der Bayerische Bahnhof* [the.M.SG Bavarian.M/F/N.SG railway_station(M)], and this even if the adjective cannot inflect: *die Schweizer Grenze* [the.F.SG Swiss.ADJ border(F)]. This only holds if the adjective is part of the name. With non-restrictive adjectives neuter is possible: *das spießige Vier Jahreszeiten* [the.N.SG petty-bourgeois.M/F/N.SG four seasons.PL] (Plank 2015). To state this in more general terms, if the lexical head is already combined with a potential target before the name is completed, the noun phrase has already committed itself to a gender, thus gender assigned to the name as a whole is no longer available. The same rule holds, for instance, for names of roses, which can be default-feminine unless

[21] According to Plank (2015), recategorization with default-neuter for German restaurants pragmatically indicates the distance of the name to gastronomy. Traditional names for restaurants, such as *Die Sonne* [the.F sun(F)] and *der Ratskeller* [the.M council.cellar(M)] are not neuter. Neuter gender for German restaurants is not obligatory.

they contain an adjective (*die Helmut Schmidt, die Gruß an Helgoland* [the.F.SG greeting(M.SG) to Helgoland], but *der Gelbe Engel* [the.M.SG yellow angel(M)]).[22]

While complex controllers in German are limited to names, Nalca has them all over. In Nalca there is a general alternation between one of four lexical genders – masculine *be-*, feminine *ge-*, phonologically assigned CV-gender *ne-* (the controller has the structure CV or V), and default noun *e*-gender – default phrasal gender *a-*, which is never controlled by a lexical noun. The switch is syntactically determined. Having certain modifiers ("allies") helps the noun impose its lexical gender, having certain other modifiers ("obstacles") conditions the phrasal default. Most nouns cannot impose their lexical gender unless they have an attribute ally that helps them impose their gender, as in (56) about boys' initiation rites, where *me* 'boy, child' with lexical CV-gender *ne-* triggers *ne-* only if there is an adjective in the NP, but has default phrase *a-* if it is bare in the NP.

(56) Nalca (Nuclear Trans New Guinea, Mek; Binzell n.d. Wälchli 2018 : 71)
me ***a-ra*** *gɛlɛlinga sɔob-vka*
child(CV) **DP-TOP** unnoticed enclose.in.netbag-CVB
bɔ-ba-lam-ek. *Nauba me* ***ne-ra*** *al-biyok*
carry-go-HAB/IPFV-PST.3PL big child(CV) **CV-TOP** 3SG-alone
ba-lam-ok. *Mek me* ***ne-ra*** *sɔob-oka*
go-IPFV-PST.3SG small child(CV) **CV-TOP** enclose.in.netbag-CVB
bɔ-ba-lam-ek.
carry-go-HAB/IPFV-PST.3PL
'They carried the boy away secretly in a netbag. A big boy went by himself. A small boy they carried in a netbag.'

There is a parallel in Mopán Maya, where gender also has developed from an extension of person name markers. Gender in Mopán Maya is marked only on one target, the "gender marker" proposed to the noun or adjective+noun, which distinguishes masculine *aj* and feminine *ix* (Contini-Morava & Danziger 2018). Only a minority of nouns have gender, most nouns take the article *a* instead (which, unlike gender markers, is not compatible with possessive pronouns). Nouns that are not gendered when used in isolation may sometimes optionally have a gender marker if there is an attributive adjective. Contini-Morava & Danziger (2018 : 138) give an example from a story where *a ch'o'oj=o* [ART

[22]Sometimes the gender of names is paradigmatically inherited – names of roses (F), apples (M), pears (F), beers (N), and wines (M) have the gender of their general noun as constituent gender default. However, in case of restaurants (N), ships (F), motorcycles (F), and cars (M), the default-gender is not inherited from a general noun.

rat=ECHO] 'rat' is first introduced without gender and then occurs with adjectives and gender markers as *aj noxi' ch'o'oj=o* [GM.M big rat=ECHO] and *aj tz'i' ch'o'oj=o* [GM.M small rat=ECHO] with a gender switch very similar to that in the Nalca example (56). The difference is that Nalca *a-* default phrase gender is formally integrated in the gender system and the alternation is more systematic in Nalca.

In some languages, sentential nominalizations can be gender controllers. Nalca sentential nominalizations, if not followed by a noun, can take one of three phrasal suffixes and each of the three resulting constructions without a nominal head takes another gender. Two of the three suffixes are homonymous and are distinguished only by the gender they control (Wälchli 2018): male nominalizations with suffix *-nya* (57) take masculine gender *be-* and thing-nominalizations with suffix *-nya* (58) take neuter gender *ne-* (which happens to have the same form as CV-gender in (56)).

(57) Nalca (Nuclear Trans New Guinea, Mek; New Testament, 44010021; Wälchli 2018 : 80)
*... [ugun-da na e-le-nu-lum]-**nya*** ***be**-ra, na-ra*
2PL-TOP 1SG[23] search-IPFV-OBJ.1SG-PRS.2PL-**NMLZ.M** **M-TOP** 1SG-TOP
al-an ...
3SG-DEM
'...I am he whom you are looking for!', lit. 'I am he, the one [you are looking for me]'

(58) Nalca (Nuclear Trans New Guinea, Mek; New Testament, 43006026; Wälchli 2018 : 80)
*... [ugun-da na-k e-le-nu-lum]-**nya*** ***ne**-ne-ra ...*
2PL-TOP 1SG-DAT search-IPFV-OBJ.1SG-PRS.2PL-**NMLZ.N** **N**-DEM-TOP
'...you seek me not [because you saw signs]...', lit. 'this fact that [you are looking for me]'

Nalca nominalizations are morphologically marked, but there is also a semantic component, which is strengthened by the homonymy of two different morphological markers. There is no competition with lexical gender as there are no lexical heads in the construction. The sentential nominalization with its morphological marker must immediately precede the gender target (adjacency agreement, see §7.2).

[23] In Nalca nominalizations, O is often zero marked, but 'thing' nominalizations tend to have a dative-marked O as in (58).

A similar construction is found in East !Xõo, where, however, nominalizations can only take one gender. The nominalization suffix *-sà* can attach to the verb stem (*!qāhe-sà* [hunt-NMLZ(CL2)] 'hunting') or to a verb phrase, the subject of the nominalization being expressed by a possessor in a POSSESSOR /*V*+GENDER.MARKER POSSESSED construction. The preposition /*V* takes the gender of the immediately adjacent following controller. The only available controller is the nominalized verb phrase, which is a constituent without any lexical head from which the gender of the nominalization derives.

(59) East !Xõo (Tuu, Taa; Traill 1994 : 30; Güldemann 2004 : 7)
ùh ń bà ǁṵ̄-n /à /ùã /àũ ǁnàa
CL4 TENSE ASPECT refuse-1SG POSS.CL2 hold/give.CL2 tobacco(CL2)
*/nēe-**sà***
to.3-**NMLZ(CL2)**
'They disapprove of my giving him tobacco.'

To summarize, there is a diverse set of formal syntactic groups that can all function as complex controllers. These include NP-coordination (gender resolution), possessed and possessor in inalienable possession, names consisting of several words, nominalizations, and – in Nalca – any kind of noun phrase. Since compounds are also groups of words, we can also add compounds taking compound gender, as in Khasi (see §6.3), as a further type of formal groups serving as complex controllers.

7.4 Complex targets

Target groups or complex targets must be invoked whenever the agreement relation applies between the controller and a formal group of words. This is the case, for instance, if the target is a complex predicate consisting of several verbs (lexical verb and auxiliary) which share the same argument structure. This is most clearly visible if there is agreement with the object and the agreement is realized on an auxiliary as in (44) from Italian discussed in §7.1.

Haspelmath (1999) discusses the Italian data together with two languages where agreement goes with the absolutive to which we turn now: Godoberi (Nakh-Daghestanian, Andic) and Hindi and Urdu (Indo-European, Indo-Aryan). In (60) from Hindi/Urdu, the feminine noun 'bread' is the object of 'eat', but all three verbs in the verb complex display agreement. This means that the three verbs make together one complex target. (61) from Godoberi shows so-called "long distance agreement", which Haspelmath (1999) analyzes as an instance

of clause-union. In our terms, the four verbs in (61) constitute together a formal group sharing the object argument and are a single complex target, with the neuter plural of the absolutive realized on three of them ('want' never takes agreement).

(60) Hindi/Urdu (Indo-European, Indo-Aryan; Wunderlich 1994 : 23; Haspelmath 1999 : 147)
*Raam ne roṭii khaa-**nii** caah-**ii** thii.*
Ram ERG bread**(F)**[SG] eat-INF.F.SG want.PST-F.SG be.PST.F.SG
'Ram had wanted to eat bread.'

(61) Godoberi (Nakh-Daghestanian, Andic; Haspelmath 1999 : 143)
*ilu-łi quči-be **r**-al-u **r**-uL-i*
mother-DAT book(N)-PL[ABS] **PL.N**-read-CVB.PST **PL.N**-finish-INF
*q'°araʕ-anta **ru**-k'-a.*
want-CVB.PRS **PL.N**-be-AOR
'Mother wanted to finish reading the books.'

Nakh-Daghestanian languages are known for their extensive clausal agreement, which takes different forms in different languages. In Godoberi all verbs of a unified clause are together an agreement target (see also the similar case of Archi in §7.2).

Complex gender targets involving complex predicates also occur in Coastal Marind. In (62) the patient *ebta* 'sago thatch' is an argument of the transitive verb *takun* 'make roof', but agreement is shown on the auxiliary *balen* 'finish (intr./tr.)'.[24]

(62) Coastal Marind (Anim, Marindic; Bruno Olsson, p.c.)
*ebta takun mbya nak-ap-ba<**h**>in*
sago.thatch(IV) make.roof NEG 1.A-CONTESSIVE-finish<IV.U>
'I didn't finish making the sago thatch roofing.'

In discussing agreement in case, Lehmann (1982 : 222) points out that viewing the head noun as controller of agreement is problematic notably when an NP lacks a head noun. This also holds for gender in independent headless NPs, such as Italian *Tu sei la più bella* 'you are the most beautiful one (F)' (see §4). Here

[24]For similar phenomena involving person in another language in South New Guinea, Nen (Morehead-Wasur), see Evans (2015).

it is obviously not the article controlling feminine gender on the adjective or vice versa, but the whole headless noun phrase in the predicate is a target group assigned feminine singular by a latent contextual controller.

If attributes in headless NPs form target groups, the question arises as to whether a series of target words within the same NP could generally be considered to constitute a target group. In many languages gender agreement with multiple targets in an NP is a way to signal that these elements all belong together in one formal group (which can be contiguous or non-contiguous). This would then mean that in NP agreement the head noun is the controller and the whole NP is the target. A potential problem is then that the head noun controlling the NP is also part of the NP. Lehmann (1982 : 223) suggests that this could be solved with the following condition "If B is the head of an NP A, B is not said to agree." This may seem entirely ad hoc at first glance. However, if we take into account that agreement is displaced information, it is a priori excluded that the controller can be part of the target. Target groups are formal groups, but not all formal groups are syntactic constituents. The easiest solution is to say that in NP agreement, the target group is the NP minus the head noun. What we have said for NPs here also applies to clauses in such Daghestanian languages as Archi and Godoberi where the whole clause can be the agreement target (see §7.2).

A further case of complex targets are gendered clauses in Ngan'gityemerri serving as relative clauses, discussed in §4.3.

Table 16: Formal groups serving as complex controllers and complex targets in gender agreement

	Formal groups manifest in gender agreement
Complex controllers	NP coordination
	Inalienable possession
	Names consisting of several words
	Nominalizations
	Compounds
	Complex noun phrases
Complex targets	Complex predicates
	Clauses
	Noun phrases
	Gendered clauses (relative clauses)

Table 16 summarizes the kinds of formal groups involved in complex con-

trollers and complex targets mentioned in §7.3 and §7.4.

7.5 Features as mature conditions

Morphosyntactic features are a highly mature form of information transfer. In non-mature gender systems it is often difficult to identify a [NUMBER] feature. For instance, Ngan'gityemerri has a noun class *awa-* glossed 'mob' for a group of people (Reid 1990 : 296), but number does not otherwise interact with gender. If we consider what makes gender a good feature, it is pretty much the same characteristics that are traditionally invoked for delimiting genders from classifiers: there is a closed set of values with up to twenty members (Dixon 1982 : 215), the same system of values applies to different targets, all nouns are controllers, and gender markers are bound elements on target words. All these properties are indications of maturity (see also §6). In our view, features are emergent and develop through grammaticalization, thus there is no reason to assume a universal set of morphosyntactic features. The existence of languages with two parallel concurrent gender systems, such as Paumarí (Aikhenvald 2010) and Burmeso (isolate; Donohue 2001), is an argument against a universal set of features (see also Dahl 2000b , Corbett et al. 2017 : 252 and Svärd 2019 , Liljegren 2019 , and Sinnemäki 2019 , in this volume for other languages with two parallel gender systems).

Further evidence that features are not all there is to displaced information in agreement comes from what Corbett 2006 calls conditions. Conditions are "factors which are not themselves realized directly in agreement" (Corbett 2006 : 176). As a rule of thumb, features, but not conditions, are usually glossed. Many examples of conditions pertain to the realm of animacy and related notions such as individuation. In Miya (Afro-Asiatic, West Chadic), attributive demonstratives take plural agreement only if the controller is animate. Since the masculine-feminine gender opposition is neutralized in the plural in Miya, this entails the peculiar pattern that in the plural masculine and feminine are realized only with inanimate controllers: *nákən víyayúw-awàw* [this.M.SG fireplace(M)-PL] 'these fireplaces' (Schuh 1998 : 193; Corbett 2006 : 178). Recall from §7.4 that groups of verbs in some Nakh-Daghestanian languages can form target groups, a phenomenon often referred to as "long distance agreement". In Tsez (Nakh-Daghestanian, Tsezic) "long distance agreement" is conditioned by topicality. A target group of several verbs agrees with the absolutive of the subordinate verb only if the S or O of the subordinate clause is a topic (Polinsky & Comrie 1999 ; Corbett 2006 : 197).

Conditions are conditions on agreement. As a consequence, if a condition turns into a feature, the result is usually a combination of two features in cu-

mulative exponence. If features develop from conditions it is no coincidence that features often cumulate with each other. Since animacy is a very frequent type of condition, it is no coincidence that animate gender or other gender values reflecting animacy frequently cumulate with other agreement features, such as number (this is the topic of §8).

Corbett (Corbett 2006 , chap. 6) distinguishes absolute conditions, factors that always determine a certain choice of agreement value (the two examples given so far in the previous paragraph), and relative conditions, factors that favor a certain optional choice of agreement value. We change the terms to *obligatory* and *optional*, which we think are more easily understandable. In Russian, controllers consisting of two conjuncts are more likely to trigger plural agreement when animate than when inanimate, which is an instance of an optional (relative) condition on agreement (Corbett 2006 : 179).

When conditions develop into features, it is reasonable to assume that they are first optional. This suggests the following grammaticalization path (63):

(63) Grammaticalization path from condition to feature
optional condition on agreement > obligatory condition on agreement > gender (= cumulative feature)

Consider the example of (in)animate subgenders in Russian and other Slavic languages (Corbett 1991 : 42, Corbett 2006 : 118; see also §3.5). In Russian, only the major declension class for feminine nouns has dedicated accusative forms, and only in the singular. Masculine singular nouns and all plural nouns take the genitive form if animate and the nominative form if inanimate. In Serbian-Croatian-Bosnian, only the masculine singular is affected, so there are only two subgenders in the masculine. Slavic (in)animate subgenders originate as a condition on case, but in Russian animacy has gone quite a long way to become lexical gender, as the subgender of most nouns is fixed irrespective of their referent-based animacy (see §3.5). For instance, *konkurent* 'competitor' is always animate; however, *duši* 'souls(F)' (in feminines, the animacy distinction is visible only in the plural), The Pentagon and The White House are never animate. Russian has undergone the development in (63). Huntley (1980) surveys evidence from several Slavic languages demonstrating how the category was extended from object function to use with other functions of the accusative with prepositions, and from definite human to human and animate. In Polish the genitive singular form is further extended to individualized inanimates (Björn Wiemer, p.c.).

In Slavic there was already gender (masculine, feminine and neuter) before the development in (63). The path in (63) is possible also when there is no gender

originally. However, there must be some form of agreement already. An interesting example in this respect is Lakota (Siouan) with plural actor and undergoer agreement on the verb with animate nouns, which Sinnemäki (2019 [this volume]), following Van Valin (1977 : 36–37), classifies as an instance of gender. Another possible interpretation is that the "enclitic *=pi* indicates plurality of all human subjects" (Mithun 1999 : 508) and that there is no verbal agreement at all in Lakota verbs. The question as to whether animacy in Lakota can be interpreted as a feature is very much dependent on how number, which it conditions, is interpreted. A condition cannot turn into agreement if the category which it conditions is not agreement.

Pnar attributive adjectives discussed in §4.3 illustrate that an animacy distinction can emerge in a language with gender without connection to that gender system. Recall from §4.3 (example (29)) that one type of attributive adjectives in Pnar optionally takes the preposed nominalizer *wa*. However, with human head nouns, the nominalizer *wa* is obligatory with this adjective type. This is an optional condition as far as non-human nouns are concerned, and an obligatory condition as far as human nouns are concerned.

We may conclude that features can evolve from conditions on agreement and that if there is a feature in agreement already, another one, especially if animacy-based, can more easily join it in cumulative expression (realized by the same marker).

7.6 Nominal gender targets and the decategorialization of nouns

Agreement usually has nominal controllers and non-nominal targets. Nominal is used here in the sense of a cover term for nouns, noun phrases and formal groups of nouns. However, nouns outside their prototypical discourse function of referring (Croft 2001 : 87) in modification or predication use tend to lose some of their nominal properties. Hopper & Thompson (1984 : 711) call this decategorialization. Decategorialization of nouns is highly relevant for gender, since the possibility to serve as a target for gender may be a property of nouns undergoing decategorialization.

An important kind of nominal target is adnominal possessors. The double nature of possessors is most obvious in independent possessors which can either agree with the possessed or with the possessor (the latter is person indexing) and in some languages, such as German (see, e.g., Wälchli 2019 [this volume] and Biak, do both.[25] Adjectivized possessors are more inclined to agree with the

[25]Biak (Austronesian, Cenderawasih Bay) distinguishes animates and inanimates only in the

head noun than nominal possessors. However, adjectivization does not always preclude possessors from being controllers for modifiers themselves, as in (64) from Upper Sorbian. It is unexpected that the Sorbian adjective can trigger agreement in (64), but given that this is the case, it is not unexpected that gender here is referent-based (since there is no lexical noun that could trigger the agreement).

(64) Upper Sorbian (Indo-European, Slavic; Schuster-Šewc (1976 : 27); Corbett 2006 : 62)
*w [naš-**eho** nan]-ow-ej chěž-i*
in our-GEN.SG.M father-POSS.ADJ-LOC.SG.F house(F)-LOC.SG
'in our father's house'

NOMINAL GENDER TARGETS (nouns or noun phrases that are gender targets) are a heterogeneous group of phenomena where a noun or noun phrase looks as if it was an agreement target of another noun or NP. (65) from German is an example of a nominal gender target. Most German nouns for professions have to mark gender derivationally (derivational gender). The predicate noun carries a redundant marking whose choice is determined externally, in (65) by the referent of the subject.

(65) German (Indo-European, Germanic): predicate professional noun marked for gender
Angela Merkel ist die beste
Angela Merkel be.PRS.3SG DEF.NOM.SG.F best.NOM.SG.WEAK
*Kanzler**in**, die wir je hatten.*
chancellor.DERIV.FEM REL.ACC.SG.F we.NOM ever have.PST.3PL
'Angela Merkel is the best chancellor we ever had'
www.plattentests.de/mobile/forum.php?action=showThread&id=89713 [2018-10-10]

Despite its female derivational suffix *-in*, *Kanzlerin* in (65) denotes the whole set of male and female Chancellors of Germany (otherwise the set could not be restricted by 'best'), among which there only was a single female one so far. The same holds when Margaret Thatcher in 2013 was called *Großbritanniens umstrittenste Premierminister**in*** 'Great Britain's most controversial prime minister' (www.spiegel.de › Politik › Ausland › Tories Apr 11, 2013).

plural. Body parts that occur in pairs are often animate, as in *tanduk v<y>e=s-ya* [horn <3SG>POSS=3PL.ANIM-SPEC] 'its horns (of one animal)' (Heuvel 2006 : 106). Excrements, such as 'spit', are plural and inanimate: *an inf se=na* [NMLZ spit 3PL.ANIM.POSS=3PL.INAN.SPEC] 'their spit (of those people)' (Heuvel 2006 : 273).

While adjectives do not agree in predicative position in German, superlative predicates mark gender agreement in the singular on the article. The superlative predicate necessitates a forced choice of gender, which is determined externally. In (66) there are two competing NPs with different lexical gender, differing also in their level of taxonomy. In German there is usually agreement by co-conceptualization with the hyperonym in the construction type instantiated in (66), in Latvian with the hyponym (67), and Italian is mixed, as illustrated in (68–69).

(66) German (Indo-European, Germanic): agreement by co-conceptualization with hyperonym
Von allen Tieren ist der Löwe
from all.DAT.PL animal**(N)**.DAT.PL be.PRS.3SG DEF.NOM.SG.M lion(M)
das *majestätischste.*
DEF.NOM.SG.N majestic.SUPERL
'Among all animals the lion is the most majestic one.'

(67) Latvian (Indo-European, Baltic): agreement by co-conceptualization with hyponym
No visiem zvēriem lapsa ir
from all.DAT.PL.M animal(M).DAT.PL fox**(F)**.NOM.SG be.PRS.3
*visgudrāk**ā**.*
all.smart.COMP.**NOM.SG.F.DEF**
'Among all animals, the fox is the smartest one.'

(68) Italian (Indo-European, Romance): agreement by co-conceptualization with hyponym
Tra tutti i fiori la rosa è
among all.PL.M DEF.PL.M flower(M).PL DEF.SG.F rose**(F)**.SG be.PRS.3SG
la *più* ***bella****.*
DEF.SG.F more beautiful.**SG.F**
'Among all flowers the rose is the most beautiful one.'

(69) Italian (Indo-European, Romance): agreement by co-conceptualization with hyperonym

Tra tutti i paesi la Svizzera
among all.PL.M DEF.PL.M country**(M)**.PL DEF.SG.F Switzerland(F).SG
è ***il*** *più neutrale.*
be.PRS.3SG **DEF.SG.M** more neutral.SG
'Among all countries, Switzerland is the most neutral one.'

Nominal targets are highly relevant for gender from a diachronic point of view since it is well-known that gender markers can grammaticalize from nouns (Heine & Reh 1984 : 225). Since grammaticalization from nouns to gender markers is gradual, there must be intermediate cases between noun targets and agreement proper with non-noun targets.

Yagua (Peba-Yagua) and other Amazonian languages demonstrate how agreement with noun targets can gradually give rise to agreement by decategorialization of nouns. Yagua has a large set of classificatory formatives, many of which can be shown to originate from nouns (Payne 1986 : 120), such as *jąą́* 'water' which is also the classifier for liquid. In attributive constructions as in (70), the classifier can be repeated, which looks like agreement.

(70) Yagua (Peba-Yagua; Payne 1986 : 126)
*jityąą-**jąą́*** *vánuqui-**jąą́***
breast-**CLF:LIQUID** hot-**CLF:LIQUID**
'hot milk'

Based on evidence from another Amazonian language, Miraña, which is not genealogically related to Yagua, Grinevald & Seifart (2004 : 278–279) argue that noun classes may grammaticalize from such constructions as (70) in Yagua where classifiers are used as repeaters.

It is particularly interesting in Yagua that different kinds of elements display different degrees of decategorialization. Attributes expressing qualities in Yagua are nouns and not adjectives and can also carry a non-classifying nominalizer, as in *mucata-y-sara* [boil-INTR-NMLZ] 'boiled'. The major function of the classifier in modifiers is to nominalize the modifier and marking is actually rare, since many adjective-like concepts are inherently nominal and need not be nominalized (Payne 1986 : 127). However, with demonstratives and numerals, decategorialization is more advanced. Demonstrative and numeral roots cannot stand without suffixation of a classifier, but classifiers do not cause a change in word class (Payne 1986 : 127). Agreement is not obligatory, since the general inanimate classifier *-ra* can be used on a demonstrative with any head noun.

When nominal targets develop into agreement proper, the agreement marker may originate from a noun, as in Yagua, but it can also originate from a nominal derivation marker. Dressler & Doleschal (1990) show that Italian agent nouns in appositive use, such as *una risposta rivelatrice* [one.SG.F answer(F).SG reveal.AGN.F.SG] 'a revealing answer', *uno sguardo rivelatore* [one.SG.M glance(M).SG reveal.AGN.M.SG] 'a revealing look' agree in gender, which testifies to their adjectivization (see also Luraghi 2015 : 75–76 for examples from other Indo-European languages).

A development from nominal targets to agreement proper also occurs in cases of gendered clauses turning into relative clauses, as in Ngan'gityemerri (Reid 1997) discussed in §4.3.

Decategorialization of nouns also occurs in the development of person name markers as in Iraya (Austronesian, North Mangyan; data from the New Testament) *laki Howan* 'John' (from *lalaki* 'man') and *bayi Mariya* 'Mary' (from *babayi* 'woman'), *laki Satanas* 'the devil'. For the development of nouns and NPs to anaphoric gender markers see Wälchli (2019 [this volume]). As shown by Mithun (1986), object noun incorporation may develop into a marker of verb classification. In the Northern Iroquoian languages, the incorporated elements are nominal as in (71):

(71) Cayuga (Iroquoian, Northern Iroquoian; Mithun 1986 : noun incorporation in classificatory use
*So:wá:s akh-**náhskw**-aę'.*
dog I-**domestic.animal**-have
'I have a (pet) dog.'

In the Southern Iroquoian language Cherokee, only relics of noun incorporation are left in the form of distinctions of a closed set of choices for a few verbs ('to give a living thing/liquid/a long, rigid object/a flexible object/else') (Mithun 1986 : 392). According to Mithun (1986), verb classifiers may express noun classification. Passer (2016b), however, emphasizes the differences between (supposed) verb classifiers and nominal classification based on a diverse sample of thirteen languages. Even though it is a matter of debate how far verb classifiers can reach in becoming a classifiers, they certainly belong to the complex of phenomena where decategorialization of nouns is involved in the development of some sort of asymmetric coreference relationship, even though it is not the core function of verb classifiers to classify nouns.

7.7 Target-controlled gender and idiomatization of gender agreement

The basic idea of the notion of agreement is that the feature value is selected by the controller. However, in some cases, the target contributes to the choice or selects the value entirely, which, similarly as nominal targets treated in §7.6, contributes to make agreement fuzzy.

Mohawk (Iroquoian) has four genders: masculine, feminine-indefinite, feminine-zoic, and neuter. Neuter differs from feminine-zoic only by not allowing for dual and plural number. Gender is expressed cumulatively with number and person in verbal prefixes. According to Mithun (2014 : 155), relatively few verb stems can be used with either animate or inanimate arguments. "[V]erbs for growing, catching, burying, and having a proper name require grammatically animate patients, that is, they routinely occur with Zoic Patient prefixes" (Mithun 2014 : 155). The verb for getting ripe, however, requires neuter gender. The gender for corn, for instance, is zoic when it is described as growing or short and neuter when it is ripe or dry (72):

(72) Mohawk (Iroquoian, Northern Iroquoian; Mithun 2014 : 154)
o-nenhst-e' *ken'=ok*
N-corn-NOUN.SUFFIX small=just
*ni-**konti**-hneni-es-on's*
PARTITIVE-**3ZOIC.PL.AGT.length**-be.long-DISTR
'The corn (i.e., corn stalks) are (ZOIC) very short.'

In Mawng, there are five genders, masculine, feminine, land, vegetation, and edible, which, among other things, are distinguished for S and O arguments in verbal prefixes (A arguments distinguish only masculine vs. non-masculine) (Singer 2012 : 984). However, many verbs tend to have different meanings with different gender prefixes. At the same time there are few overt nouns (Singer 2018 : 117). Each gender has several semantic domains associated with it. For instance, liquids are land gender, plant food is edible gender, most animals are masculine, and crabs are feminine. Hence, the Mawng verb *wa* 'consume' usually means 'drink' with land gender, 'eat plant food' with edible gender, 'eat animal food' with masculine gender, and 'eat crab' with feminine gender. In other instances, gender marking on verbs is even more idiomatic. For instance, the Mawng verb *-apti* 'have, hold' tends to have land gender when used in the meaning 'understand'. Explicit objects are often missing and most nouns for knowledge are land gender, but *mayali* 'knowledge' in (73) is vegetation gender. With this noun, *-apti* 'understand' can either take controller-induced vegetation gender or target-

induced land gender:

(73) Mawng (Iwajdian Proper; Singer 2012 : 972)
*K-**ang**-apti-Ø* *ma-lijap*
PRS-3N_M>**3LAND**-understand-N_PST VEGETATION-little
mayali
knowledge(**VEGETATION**)
'She understands a little bit of knowledge.'

When asked to express 'drink blood' with the noun *maningul* 'blood (vegetation gender)', a native speaker prefers target-induced land gender (Singer 2012 : 970), since liquids are usually land-gender.

Controller-induced gender is nothing else but lexical gender (see §3). Target-induced gender is the verbal equivalent of referent-based gender. Target-induced gender and referent-based gender are both opposed to lexical gender. If the term verbal gender were not already taken (*genus verbi* = voice), we might use this label here for the classification of events rather than referents. Singer (2012 : 978) draws the parallel to classificatory noun incorporation in Mawng's neighbor Bininj Kun-Wok (Gunwinyguan) (see §7.6 for noun incorporation in Iroquoian).

Mawng also has many cases of so-called lexicalized agreement (agreement with an argument that does not exist; Singer 2011). For instance, the verb *-marranyi* 'wave (at OBL)' always has third person land gender in the prefix where direct object is marked, but never has an identifiable direct object. According to Singer 2011 : 640 lexicalized agreement is also found in a number of other Northern Australian languages spoken near to Mawng, such as Tiwi (isolate) and Gaagudju (isolate). It also occurs in Southern Tiwa (Kiowa-Tanoan; Frantz 1995 : 84, "empty arguments") and in Ket (Yeniseian). However, Ket pseudo-actant markers (Vajda 2003 : 79) in, among other things, involuntary causatives and stative resultatives, differ from Mawng in that they always can be interpreted as (default) neuter gender. Despite the complexity of the Ket verb morphology, this is actually not that much different from dummy subjects in Germanic languages such as English ***it*** *rains.*

If we extend the notion of lexicalized agreement to free pronouns, idioms with pronouns such as English *to make it* 'to succeed' or *to rough it* 'to live without usual conveniences' (famous through Mark Twain's travel book *Roughing It*) can also be considered idiomatized agreement. An example with a masculine idiomatized pronoun from a Germanic language variety is Bernese Swiss German *er git ihm!* [he give.PRS.3SG him] 'he makes an effort, hurries up' (Greyerz & Bietenhard 1997 : 125) with a semantic shift 'hit a male person in a fight' > 'make an

effort'. An example of a gender relic in an idiom in Germanic is the specification of time in more conservative varieties of Standard Swedish with the feminine personal pronoun hon 'she':

(74) Swedish (Indo-European, Germanic; Teleman et al. 1999 : 276): feminine gender relic with time idiom
*Hur mycket är klockan/**hon**? – **Hon** är väl bortåt tre.*
how much be.PRS clock.DEF.SG.CM/**she** **she** be.PRS well towards three
'How much is the time/"she"? –"She" is around three, I guess.'

Idiomatization involving gender agreement may take many different shapes. In the Torricelli language Walman (Dryer 2019 [this volume]), masculine is mainly restricted to human males, some larger animals and a few quasi-animate natural phenomena. In a few idioms, however, nouns that are usually feminine or pluralia tantum are masculine, notably *olokol* 'mountain(PLT)' and *anako* 'sky(F)' in idioms for 'to thunder' and *won* 'chest(F)' in idioms expressing emotions.

If gender is only retained in idioms, it disappears as a grammatical category. In this, gender is not different from any other grammatical category. In Iwaidja (Iwaidjan Proper), which is related to Mawng, gender is lost entirely and in Garig-Ilgar (Iwaidjan Proper), it is reduced to a two-value system (masculine vs. non-masculine) (Evans 2000 : 115). Relics of object gender agreement can only be found in idioms (Evans 2000 calls them "pseudo-argument affixes"). Neuter gender (=Mawng land gender) and vegetable gender in Garig-Ilgar and Iwaidja still appear with a few verb roots, such as 'consume' and 'know' in idiomatic expressions in contexts where it is productive in Mawng (Evans 2000 : 116; Singer 2011 : 643). This can be compared to the many idioms in Swedish that retain case endings, as *till handa* 'at hand' and many other examples with an old genitive plural ending *-a*.

7.8 Summary

Agreement is prototypically a relationship between nouns and noun-associated forms. The prototypical discourse function of nouns is to express referents and nouns have a tendency to decategorialize if they are used in other functions, such as predication and modification. Decategorializing nouns and noun phrases gradually lose their ability to refer by themselves and some of their marking can then be reanalyzed as displaced information of referring expressions elsewhere in discourse. This displacement of information need not be syntactic, but can

also be paradigmatic. There is not always an overt controller, which makes it impossible to view agreement as a purely syntactic process.

In this section we have seen that agreement is much more complex than just a syntactic relationship between two words. The relationship can be semantic and agreement can be inter-sentential. Both controllers and targets may be complex and consist of several words. To the extent that agreement is syntactic, its function is to indicate formal groups, and these formal groups can be of three different kinds: controller groups, target groups and the grouping of controller and target. Even though agreement has the potential of indicating discontinuous groups with considerable distance between the elements, agreement is often local and it is not uncommon for controller and target to be adjacent. In several cases from widely different languages, gender agreement requires adjacency, which is an underresearched phenomenon. Much of the fuzziness of agreement derives from the fuzziness of coreference, the most important specific relationship that can hold between controller and target. However, as we have seen in §7.2, coreference is by far not the only kind of relationship between controller and target.

8 Cumulation of gender with number, case and person

Gender marking systems are more often than not conflated with the encoding of other morphosyntactic features such as number, case, and person. In §8.1, we consider cumulation with number, in §8.2 cumulation with case and/or person. §8.3 puts cumulation into the wider context of the formalization of gender.

8.1 Gender and number

Patterns of interaction between gender and number seem to be particularly prominent in the functioning of gender systems, and, in fact, number is claimed to be "the category most often realized together with gender" (Corbett 1991 : 189). Creissels et al. (2008) formulate an Africa-specific generalization on the nature of this relation. They claim that African languages devoid of gender tend to have less grammaticalized strategies for the marking of nominal plurality, whereas in languages with gender, number distinctions tend to be obligatory and expressed both through nominal and non-nominal marking, often in cumulation with gender. Di Garbo (2014) and Di Garbo & Agbetsoamedo (2018) bring empirical support to this claim by investigating patterns of exponence of gender and number

values in two partially overlapping samples.[26] Di Garbo (2014) is based on a sample of 100 African languages (84 with gender, 36 without). The sample used by Di Garbo & Verkerk (2018) is based on the gendered subset of the dataset in Di Garbo (2014), and thus consists of 84 languages, all of which have gender. In line with Creissels et al. (2008), the study by Di Garbo (2014 : 134) reveals that, in the languages of Africa, pervasive patterns of encoding on noun-associated forms almost always involve both gender and number, and that, in the absence of gender, number marking tends to remain optional and to operate at the phrasal level (one marker per noun phrase). The study also concludes that cumulative exponence of gender and number is by and large the most pervasive pattern of encoding in both nominal and non-nominal (noun-associated forms) domains of gender marking. Out of a sample of 84 languages, only the North-Central Atlantic language Wamey is found to display non-cumulative encodings of gender and number, both on nouns and on all relevant noun-associated forms. In this language, however, non-cumulative exponence of gender and number is the result of a recent innovation whereby the plural prefix of gender 1/2 (to which human nouns are typically assigned) became the default plural marker, generalized to all nouns and gender- and number-inflecting forms, independently of the animacy of the noun referent (Di Garbo & Agbetsoamedo 2018 : 187). A similar development is attested in the Kinshasa variety of Lingala (Atlantic-Congo, Central-Western Bantu), but only in the nominal domain. In Kinshasa Lingala, nouns can receive double plural marking: by means of a cumulative gender/number marker and the plural prefix *ba-*, which, as in the case of Wamey, originally was the plural prefix for nouns of gender 1/2, most typically human, but which is now used as a generalized plural marker, with human and non-human nouns alike (Di Garbo & Agbetsoamedo 2018 : 188). In addition to investigating the distribution of cumulative exponence of gender and number, Di Garbo & Agbetsoamedo (2018) also survey the occurrence of gender syncretism in the context of non-singular number values. The results show that syncretism of gender in the context of number is also very widespread in the languages of the sample (attested in 67 out of 84 languages), and that its occurrence always presupposes cumulative exponence of gender and number values.

These findings offer an interesting parallel to earlier results by Carstairs (1987), who finds a similar relationship between syncretism and cumulative exponence in the domain of case and number marking: case distinctions are more likely to be syncretized in the context of plural number than any number value in the

[26] See also Güldemann & Fiedler (2019 [this volume]) for a thorough discussion of co-exponence of gender and number in Niger-Congo gender systems.

context of any case distinction. In addition, these patterns of syncretism always presuppose cumulative exponence between the two features. Carstairs (1987) interprets these findings as pointing to the existence of functional asymmetries between case and number. Di Garbo & Agbetsoamedo (2018 : 205–206) suggest that the same reading could be applied to the results on gender and number. When non-cumulative exponence of gender and number emerges from the reanalysis of earlier cumulative systems of encodings (as in the case of Wamey and Kinshasa Lingala), this is likely to be linked to the development of new (and initially semantically motivated) strategies for the marking of nominal plurality. Similarly, the distribution of patterns of syncretism involving gender and number is strongly asymmetrical, with gender – and not number – being the morphosyntactic feature that is most likely to be syncretized.

There are various ways in which an asymmetric relationship between gender and number makes sense from a functional point of view. On the one hand, number has a more obviously semantic core function than gender. On the other hand, if gender preferably tends to develop in markers that already express another grammatical category, then the functional asymmetry between gender and number must be also interpreted in a developmental perspective. This is well in line with Nichols' (Nichols 1992 : 142) hypothesis that "agreement triggers noun classification (rather than vice versa)". Here are some examples where it has been argued that gender markers have developed in close connection to number markers.

In various Berber and Semitic languages, the feminine *t* also has singulative and diminutive functions. Mettouchi (2000 : 221) argues that the diminutive and singulative (partitive) function of the *t-* marker in Berber is diachronically prior to the feminine function (see also §5.2). Similarly, it has been suggested that the Arabic gender system was not sex-based originally. Moscati (1964 : 86) speaks of "a more complex system of classes within which the category of number has to be included as well".

The Khasian languages have innovated feminine pronouns for second and third person singular (Daladier 2011 : 184), which at least partly seem to derive from the second and third plural forms not distinguishing gender with different vocalism for singular and plural forms (Khasi 2PL *phi*, 2SG.F *pha*, [VS. 2SG.M *me*], 3PL *ki*, 3SG.F *ka*, [VS. 3SG.M *'u*]).

Interesting is also the case of Yagua mentioned by Wälchli (2019 [this volume]), where a woman who has given birth to a child or children is referred to with dual number. Payne (1985 : 42) does not consider Yagua to have gender, but Yagua is obviously an example of a language where sex can condition the use of number.

8.2 Gender and case and person

Given the pervasiveness of number as the the category type most obviously connected with gender, any other category type will look meager in comparison. Moreover case cannot be expected to be equally prominent because case is more restricted cross-linguistically than number. However, we think that case is also very relevant for the cumulative character of gender and this mainly for two reasons.

First, gender in anaphoric function in free and bound pronouns tends to exhibit some form of suppletion or neutralization according to grammatical relation (that is, grammatical case, if case is not restricted to dependent marking, but also includes indexical head marking on verbs), as shown by Wälchli (2019 [this volume]) specifically for feminine gender (but there is no reason to believe that feminine is exceptional in this respect). In this function, case occurs together with gender most typically in personal pronouns and pronominal affixes. Hence, here we deal with cumulation of gender with person and case rather than with case only. In addition, one person, the third, is clearly more dominant than others, and, within third person, the third person singular is more dominant than the plural, which in turn brings us back to the dominance of number as the feature with which gender interacts the most.

Second, there are several instances where gender displays systematic syncretism patterns with case, which can sometimes be shown to go back to the very origin of gender. In other instances, the origins of the patterns remain unexplained.

A well-known source of animacy in gender is differential case marking. In §3 and §7.5 we have discussed the example of Slavic, where animacy in gender has developed from differential object marking. Luraghi (2011 : 456) argues that the neuter vs. non-neuter distinction in Indo-European has developed from differential subject case marking. In both Slavic and Proto-Indo-European, the origin of gender from case entails a cumulation of gender and case marking, with case in actor and undergoer roles neutralized in the less animate gender. In both Slavic and Proto-Indo-European, there is already case agreement within the NP when gender develops. In Indo-European, forms from two different demonstrative stems, animate (**so*) and inanimate (**to*), were integrated into an already existing case agreement system (Luraghi 2011 : 456).

Two instances where the origin of pervasive syncretism patterns between case and gender are not known are Algonquian and Uduk. Algonquian languages have systematic syncretism between singular obviative and inanimate plural (where proximate and obviative are not distinguished; see Table 15 in §6.4). In Uduk, there is a syncretism of class 1 ergative case and class 2 accusative and associative

cases (see §5.2 and Killian 2019 [this volume]).

In some languages of New Guinea, notably in Nalca (Mek) and in Abau (Sepik), gender and case are expressed in the same word adjacent to the head noun. Svärd (2019 [this volume]) speaks of "case marker hosts". In Mek, it can be shown that gender was originally restricted to few postpositions distinguishing case functions and was secondarily extended to other postpositions in Nalca by analogy (Wälchli 2018).

What links gender together with case in several of the instances discussed so far is animacy (see also §3 and §3.2). While connections between gender and case due to animacy effects can be expected to be related predominantly to grammatical case, there are also interesting connections between gender and local cases. In some languages, locatives are well-connected with gender systems, in others they are completely outside of it. In many Bantu languages, locatives are integrated in gender systems (see, e.g., Bresnan & Kanerva 1989 for Nyanja [=Chichewa]). In Meskwaki, however, the locative case lacks gender or number distinctions (Thomason 2003 : 12). In several of the Oceanic languages on the Island of Makira, a place gender is developing from the local preposition *i* (see §6.4). These languages thus can help us understand how locative and gender can be intertwined. In Owa, *i* can still be interpreted as preposition when used in isolation, but in the "sentence medial" form, used among other things before objects and following prepositional verbs, nouns of the location class (mainly place names) must take *ki* (<*k*+*i*), which is *k*- plus class marker: *tanga-a k-i Jerusalem* [to-3SG MEDIAL-LOC J.] 'to Jerusalem' as opposed to *tanga-a k-o Herod* [to-3SG MEDIAL-M H.] 'to Herod'. Therefore, Mellow (2013 : 26) lists zero for "sentence initial" and *ki* for "sentence medial" article forms of the location-noun class.

8.3 Cumulation and the degree of formalization of gender

In this section we will argue that there is a correlation between cumulation of gender with other grammatical categories and the degree of formalization of gender, as represented by obligatoriness of gender agreement and noun classification, as well as by number of agreement targets. The degree of formalization in gender and classifier languages has been investigated by Passer (2016a). Passer compiles two indexes consisting of seven features each, measuring the "Dimension of Form" and the "Dimension of Transparency" of gender and classifier systems. These indexes are used to investigate the degree of grammaticalization of systems of nominal classification (classifiers and gender; for gender, which he defines very narrowly, he uses the term "concord"). Passer argues that conventionalization (reducing transparency) and formalization can be conceived of as

independent pathways of systems of nominal classification. With its 37 systems from 36 languages, Passer's sample is not particularly large, but it has the advantage that it has world-wide scope, is stratified and also comprises both gender and classifier systems. Passer takes for granted that the Form features and the Transparency features form two dimensions, but the extent to which the features cluster can actually be tested on the basis of Passer's database. Figure 4 shows a hierarchical clustering of a comparison of the ranking of the 14 features and the two indexes with squared Spearman's Rho (which is equally sensitive to positive and negative correlations; varclus() in the R Hmisc library described in Harrell 2001).

figures/14/fig4.pdf

Legend: x total formalization value, x1 inventory size, x2 host number (targets within NP), x3 locus operandi (targets outside of the NP), x4 obligatoriness, x5 boundedness, x6 multiple marking on various types of targets in the NP, x7 exhaustivity of classification, y total transparency value, y1 degree of semantic assignment, y2 number of different assignment rule types, y3 number of assignment rules, Y4 INDEPENDENCE FROM OTHER GRAMMATICAL CATEGORIES, y5 discreteness of markers, y6 redundancy, y7 flexibility

Figure 4: Clustering of Passer's (Passer 2016a) Form (x) and Transparency (y) features

Figure 4 suggests that there are actually more than two dimensions and that the total indexes do not reflect all of their components equally well. The three first transparency features (y1–3), and apparently also the whole y-index, measure similar things, viz. how transparent assignment is, ranging from semantic to opaque. Degree of formalization (x) seems indeed to be an important issue, but, as it turns out, y4 (in)dependence of other grammatical categories – even though arguably indicating transparency – actually correlates with multiple marking on various types of targets in the NP (x6), obligatoriness (x4), and boundedness

(x5), which seems to indicate that it is a characteristic property of a grammaticalized category of gender to exhibit interdependence with other grammatical categories.

We do not want to suggest here that gender does not exist if it does not cumulate with number, case, or person. However, where there is gender and no cumulation, gender tends to have a low degree of formalization. Notably, gender has a tendency not to be obligatory and not to be marked on multiple agreement targets, if it does not cumulate with other categories. Let us consider a few cases in point.

Within Sino-Tibetan, Limbu (van Driem 1987 : 21) and other Kiranti languages (Ebert 2003b : 508) have very a limited masculine-feminine gender opposition on attributive adjectives (one target type). The suffixes, masculine *-pa/ba* and feminine *-ma*, although they can be shown to be of nominal origin (*ma* and *pa* also mean 'mother' and 'father', for instance, in Camling; Ebert 2003a : 535), are common derivational suffixes in adjectives throughout Tibeto-Burman languages. In Classical Tibetan (Sino-Tibetan, Bodish), adjectives have nominal suffixes (*-pa/-ma/-po/-mo* or *-ka*): *chen-po* 'large', *legs-pa* 'good', *gsha-ma* 'worthy'; "a few adjectives may express the natural gender of their referent by alternating the masculine *pa/po* and feminine *ma/mo* suffixes, but most adjective forms are fixed" (DeLancey 2003 : 373). Not all adjectives, where the markers occur, do agree and agreement is not obligatory even in those adjectives where it occurs.

The Hindu Kush Indo-Aryan languages Khowar, Kalasha, and Dameli (Liljegren 2019 [this volume]) distinguish animacy in the root of the copula. Number and person are marked through suffixes attached to the animate/inanimate roots, and thus do not cumulate with the morpheme where animacy is marked.

Mopán Maya masculine and feminine gender (originating from person name markers) have only a single marking target. Only a minority of nouns are gendered and the gender marker can sometimes be omitted (Contini-Morava & Danziger 2018 : 133).

In Ngan'gityemerri (discussed in §4.3, included in Passer's sample), gender does not cumulate and not all nouns are classified in noun classes.

In languages where gender has been borrowed, gender is often not in cumulation with another grammatical category and not obligatory. For instance, Chamorro has borrowed the Spanish masculine and feminine gender markers as *-o/u* and *-a* along with Spanish words which results in a semi-productive sex-based type of gender system without cumulative exponence (Stolz 2012 ; Di Garbo & Miestamo 2019 [this volume]).

However, before hasting to conclusions, it is important to note that degree of

formalization has played an important role in delimiting gender from classifiers. Notably, obligatoriness is a traditional feature used for distinguishing between classifiers and gender (e.g., Dixon 1982 : 160: "a grouping of all the nouns of a language […] so that there is some overt indication of the class of a noun within any sentence in which it occurs"). According to these criteria, most of the languages discussed in this section would count as lacking gender. By applying these criteria, there is thus a danger of excluding by definition languages where gender has limited degree of formalization (see also Wälchli 2019 [this volume]). Yet, we have chosen to make the connection between gender and cumulation explicit in our definition of gender, which contains the statement that gender typically exhibits cumulative exponence with number, case, and/or person (see §1). However, this does not mean that categories lacking cumulation with other categories should be excluded from the study of grammatical gender.

8.4 Summary

To sum up, cumulation of gender with number, case and/or person is pervasive across the languages of the world. In addition, in a few cases we are able to establish through diachronic comparison that cumulative exponence with other morphosyntactic features can be reconstructed, and thus exists from the very origin of the history of a language- and/or family-specific gender system. This can most likely be explained with the fact that gender tends to develop from pre-existing grammatical systems. For instance, gender may arise as a condition on the distribution of a specific number value (as in animacy-constrained plural marking) or case distinction (as in differential argument marking). More research is needed to explore the diachronic relationship between gender and number, case, and/or person, but it is fair to say that interdependence of gender with these other grammatical category types is the rule rather than the exception. This typological finding is in need of diachronic explanation in each individual instance.

Cumulative exponence is a violation of the Principle of One-Meaning–One-Form (one and the same affix is associated with two or more grammatical meanings) and the Principle of Independence (the encoding of gender distinctions is dependent on number, case, and/or person values) and thus qualifies as a phenomenon that fosters complexity (see §2). The fact that gender typically has cumulation with other nominal morphosyntactic features naturally means that gender is usually complex.

9 Lexical plurality and grammatical gender

9.1 Introduction

In many languages, certain nouns tend to be inherently specified for number, that is, to display lexicalized number values. This fact has been claimed to blur the boundaries between the gender and number domain. The gender systems of the Papuan languages Coastal Marind and Walman, described by Olsson (2019 [this volume]) and Dryer (2019 [this volume]) are a case in point, which we discuss in this section in the light of the larger typological context.

The label pluralia tantum is typically used in the literature to refer to nouns that only exist in the plural-marked form, as in English *scissors*, *trousers*, *leftovers*, and *supplies*.[27] Broadly speaking, pluralia tantum nouns fall within the wider domain of LEXICAL PLURALITY. The term encompasses a variety of semantic and formal phenomena, both morphological and syntactic, which stem from the fact that plurality is a lexicalized property of a given noun, or, simply put, part of what there is to know about it (Acquaviva 2008 : 2). In this section we use the labels LEXICAL PLURALS and LEXICAL PLURAL NOUNS as general terms to refer both to pluralia tantum nouns, that is, nouns with fixed plural number, as well as to nouns that are inherently plural, but that are not necessarily marked as plural.

Previous studies both on the spoken and signed modality (Koptjevskaja-Tamm & Wälchli 2001 ; van der Meer 2015 ; Börstell et al. 2017) show that some broader semantic domains may be identified as recurrent attractors of lexical plurality across languages while languages differ considerably with respect to the specific concepts that tend to be associated with lexical plurality. In Table 17 we list some major semantic domains – they need not necessarily exclude each other – that have been shown to be most typically associated with lexical plurality. We illustrate each semantic domain with one exemplar concept with an English label. Notice that the concept chosen to exemplify a particular semantic domain need not to be a lexical plural of English, which is indicated by small caps.

Concepts typically expressed by lexical plurals differ in whether they are countable or non-countable, a distinction that not necessarily neatly aligns with the domains in Table 17. Countable units may refer to what we may think of as singular entities. The English nouns *leftovers* and *supplies* have a mass noun reading and it is not possible to talk about one item of them. Liquids and masses are usually non-countable, but also abstract concepts often sort here. Conversely, we can talk about *a pair of scissors/trousers*, which, in this respect, behave as count nouns.

[27] For a recent, typologically informed, classification of types of pluralia tantum nouns, see Corbett (2018).

Table 17: Semantic domains associated with nominal lexical plurality across languages

Semantic domain	Exemplar concept
Abstract*	ANGER
Collectives	CATTLE
Dual entities/Internally complex concept	GLASSES
Disease	MEASLES
Festivities and time intervals	SEASON
Liquids and masses	SALIVA
Locations	WOODS
Situations/activities involving more than one participant	FIGHT

*Abstract nouns can be either count or non-count and it is reasonable to suspect that it is the latter type that is especially likely to be attracted by the lexical plurality domain. We are grateful to Östen Dahl for this suggestion.

Languages differ as to whether they use special constructions to count multiple instances of a particular entity denoted by countable lexical plural nouns (as in English *one pair of scissors/trousers*), a topic which is not further addressed here.

As mentioned above, in spoken languages, nouns that are lexically plural typically only occur in the plural form. A parallel situation is found in the signed modality where lexical plurality is associated with double-handed signs, what Börstell et al. (2017) refer to as ARTICULATORY PLURALITY. Similarly to the spoken modality, where pluralia tantum nouns are typically marked by regular, productive number morphology, double-handed articulation is used in sign languages to mark non-lexical, compositional plurality with various types of signs (Carl Börstell, p.c.).

9.2 Lexical plurality and grammatical gender: a crosslinguistic overview

If a language has number agreement, lexical plural nouns typically trigger plural agreement, and the formal marking patterns are typically indistinguishable from those triggered by morphological plurals. While this would seem to be a rather unproblematic fact, it turns out that in languages with grammatical gender and large classes of lexical plural nouns, lexical plurality may come to interact so

closely with the morphosyntactic encoding of gender that the two domains (gender and number) may appear to be merged into one. This is the situation that we encounter in two of the Papuan languages investigated in this volume, Coastal Marind (Olsson 2019, this volume) and Walman (Dryer 2019, in this volume). Let us briefly summarize the Coastal Marind and Walman situations (for more extensive analyses, we refer to the individual chapters).

There are four genders in Coastal Marind: masculine, feminine, and two inanimate genders, which Olsson refers to as gender I, II, III, and IV. While gender I and II vary according to number (singular and plural), the two inanimate genders are number-invariant. In addition, the plural marker used for the two animate genders (I and II) and the marker of gender IV are the same, and this syncretism is systematic across all agreement targets, even through the patterns of suppletion that regulate argument indexing on verbs. While male humans are gender I and female humans gender II, there are no strong tendencies that help predict which inanimate nouns should be assigned to gender III and which other ones to gender IV. Nevertheless, some regularities can be detected. For instance, some of the semantic domains that are typically associated with lexical plurality tend to cluster in gender IV (e.g., internally complex objects, diseases, heterogeneous objects). This, together with the fact that the plural marker of the animate genders is systematically syncretic with the marker of gender IV, suggests that there might be an even tighter relationship between gender IV and nominal plurality. According to Olsson, this relationship can be understood in diachronic terms. He speculates that at least some of the gender IV nouns are the diachronic descendants of a large class of pluralia tantum nouns which, as such, used to trigger semantically motivated plural agreement, the same plural agreement pattern triggered by animate masculine and feminine nouns. Such an originally coherent class of pluralia tantum nouns later expanded "resulting in a large, semantically heterogeneous residue gender, with a small core that still reflects the 'plural semantics' of the original pluralia tantum grouping" (Olsson 2019 [this volume]).

Walman has two clear-cut gender values, masculine and feminine. In addition, together with the diminutive, Dryer (2019 [this volume])) describes lexical plural nouns as a gender-like phenomenon. Lexical plurals in Walman are not marked as plural, but can be described as syntactically pluralia tantum nouns because, independently of whether their denotational meaning is singular or plural, they always trigger plural agreement. Semantically, the range of meanings expressed by lexical plural nouns in Walman strongly overlaps with the semantic groupings identified in typological literature on the topic: objects consisting of multiple parts, dual entities (especially body parts coming in pairs), mass nouns. While

there can be mismatches (not all mass nouns are, for instance, pluralia tantum), the semantic makeup of this class of nouns is highly consistent. According to Dryer, what could justify describing the Walman pluralia tantum nouns as an independent gender value, alongside masculine and feminine, is the sheer number of lexemes in this class: 81 instances of lexical plurals are attested in Dryer's corpus, as opposed to 40 instances of masculine nouns.

Interactions between lexical plurality and grammatical gender similar to those attested in Coastal Marind and Walman are also found in other New Guinean languages. An interesting parallel to Coastal Marind is, for instance, the Ok language Mian. In Mian, along with the masculine and feminine genders there are two inanimate genders: neuter 1, which is sensitive to number distinctions, and neuter 2, which is number-invariant and whose marker is the same as the plural of neuter 1 (for a detailed description of the gender system of Mian, see Fedden (2011). Olsson (2019 [this volume]) notes that in Mian the overlap between neuter 2 nouns and the semantic domains typically associated with lexical plurality is even stronger than in Coastal Marind.[28] In his survey of gender systems in the languages of New Guinea, Svärd (2019 [this volume]) mentions the case of another New Guinean language, Ama (Left May), where lexical plurals systematically align with one gender value in a way that is at least partially reminiscent of the Coastal Marind system. There are three genders in Ama – masculine, feminine, compound – and nouns that are semantically connected with lexical plurality (in particular, nouns denoting objects having many parts and mass nouns) are always assigned to the compound gender (Årsjö 1999 : 68). In sum, the language-specific and cross-linguistic data presented in separate contributions to this volume show that a number of genealogically unrelated New-Guinean languages have classes of nouns, which fall in between representing a proper gender value and an unusually large class of nouns with fixed plural number/lexicalized plurality. The spread of this pattern within New Guinea and its role as a possible characteristic feature of the gender systems of this area would deserve to be further investigated.

There are a few typological parallels to the New Guinean languages discussed in this volume, where, other things being equal, lexical plurality has an inpact on patterns of encoding in the domain of gender and number agreement. One such parallel is Cushitic languages, or at least a subset of them. Cushitic languages are a branch of the Afro-Asiatic family, spreading from Eritrea all the

[28] Depending on the genealogical classification adopted, Anim and Ok, the language families to which Coastal Marind and Mian respectively belong, may be also seen as distantly related members of the Trans New Guinea phylum (see §11.1).

way down to Tanzania and consisting of approximately 40 languages, further divided into four subgroups: Agaw, Beja, East Cushitic, and South Cushitic. Nominal number marking in Cushitic is typically not obligatory. Speakers can leave nouns unmarked for number or use a variety of derivational suffixes and/or morphophonological strategies to mark a noun as singular or plural. In the literature on Cushitic languages, number-unmarked nouns are referred to as nouns with general number or as transnumeral nouns, whereas the derivational singular and plural morphemes are labeled as singulative and plurative. Cushitic languages typically have sex-based gender systems with a masculine-feminine distinction. Yet, some languages of the family are described as having three genders, with the third gender class beyond masculine and feminine being traditionally referred to as "the plural". There are two main scenarios under which some Cushitic languages have been analyzed as displaying a tripartite gender system with a distinction between masculine, feminine and plural gender.

Under the first scenario, languages have agreement patterns that are used to signal that the controller is plural, but that are not used with all plural controllers. This is, for instance the case of the East Cushitic language Baiso. The gender and number agreement system of Baiso has been described in detail by Corbett & Hayward (1987) and Corbett (2000). In the following, we provide a brief overview of its most relevant properties.

Baiso has two gender distinctions in the singular, masculine and feminine. Verbs agree in gender and number with the subject. With the majority of plural-marked nouns, the agreement pattern triggered by the verb is the same as the one triggered by masculine singular nouns, irrespective of whether the noun is masculine or feminine. This is illustrated in examples (75) and (76), which show gender and number agreement with masculine singular and plural nouns, and feminine singular and plural nouns, respectively.

(75) Baiso (Afro-Asiatic, East Cushitic; Corbett 2000 : 181): gender and number agreement with masculine nouns

a. *lúban* *hudure*
lion(M).GENERAL slept.M
'The lion slept.

b. *luban-**jool** hudure*
lion-PL slept.M
'The lions slept.'

(76) Baiso (Afro-Asiatic, East Cushitic; Corbett 2000 : 182): gender and number agreement with feminine nouns

a. *kimbír* *hudurte*
bird(F).GENERAL slept.F
'The bird slept.'

b. *kimbir-**jool** hudure*
bird-PL slept.M
'The birds slept.'

In addition to the two verb forms exemplified in (75) and (76), Baiso has a third verb form, which is only used when the subject (i.e., the controller noun) is the third person plural pronoun, a noun marked by the paucal suffix or one of the underived nouns given in Table 18. Because it is used with third person plural pronouns, this third verb form is traditionally glossed as PL, "plural". The use of the plural verb form with two paucal-marked nouns (one masculine and one feminine) is illustrated in (77).

(77) Baiso (Afro-Asiatic, East Cushitic; Corbett 2000 : 181–182): plural agreement

a. *luban-**jaa** hudureene*
lion-PAUC slept.PL
'A few lions slept.'

b. *kimbir-**jaa** hudureene*
bird-PAUC slept.PL
'A few birds slept.'

The eleven nouns in Table 18 always select the plural verb form. The noun for 'kidneys', *kalaljaa*, can be described as a "paucal tantum" noun as it is only attested in the paucal-marked form (Corbett & Hayward 1987 : 9). The suffix *-oo*, in which many of the nouns listed in the table end, is a productive plural suffix in several Omo-Tana languages, a subgroup within East Cushitic to which Baiso also belongs. However, *-oo* is not a productive plural suffix in Baiso (Corbett & Hayward 1987 : 19). Within Cushitic studies, the agreement pattern illustrated in (77) has been analyzed as the morphosyntactic realization of a third gender, the plural gender (Mous 2008 : 146). The analysis is motivated by the fact that the nouns listed in Table 18 select plural agreement even though they are morphologically underived for number. For these nouns, plurality is a lexically specified

Table 18: Underived nouns selecting plural agreement in Baiso, adapted from Corbett & Hayward (1987 : 9)

Semantic groupings	Nouns
Body parts	*ilkoo* 'tooth, teeth'; *kalaljaa* 'kidneys'; *luḳḳaa* 'foot, feet, leg(s)'; *ilọ o* 'eye(s)'; *ogorroo* 'hair'; *moo* 'hips, lumber region'
Collectives	*saé* 'cattle'
Mass nouns	*eenoo* 'milk'; *soo* 'meat'; *udú* 'faeces'
Objects coming in pairs	*keferoo* 'sandals'

feature as masculine and feminine are for other nouns. Corbett & Hayward (1987) and Corbett (2012) describe the peculiar agreement preferences of the nouns listed in Table 18 as lexical exceptions and reject the analysis of plural as a gender value. Semantically these nouns tend to denote collectives ('cattle'), entities that are prone to occur as pairs ('kidneys'), or masses ('meat'). They always select plural agreement because they are semantically and lexically plural. Di Garbo (2014 : 121–127) develops this line of reasoning one step further and describes Baiso as a language with a split system of number agreement. While the majority of nouns that undergo regular morphological plural marking do not trigger dedicated plural agreement but an agreement pattern that is syncretic with the one triggered by masculine singular nouns, as in examples (75) and (76), dedicated plural agreement is used only with a closed set of controllers: plural pronouns, paucal-marked nouns, the lexical plurals and a handful of plural-marked nouns that tend to denote small groups. Di Garbo (2014) speculates that the split number agreement system attested in Baiso is semantically motivated and that the controllers of dedicated plural agreement rank higher on a scale of semantic plurality than derived plural nouns.

There is yet another profile of languages within Cushitic that has been analyzed as displaying a tripartite gender system with plural as a gender value along with masculine and feminine. These are languages that have dedicated patterns of plural agreement that are used with all plural controllers: third person plural pronouns, derived plurals (that is, nouns that are morphologically marked as plural), and nouns that are unmarked for number but nevertheless control plural agreement. In these languages, gender distinctions are always neutralized in the plural. In addition, in these languages nouns that are number-unmarked but that always trigger plural agreement constitute a rather large lexical class. This

large class of inherently plural nouns encompasses both typically lexical plural concepts and concepts that are not associated with lexical plurality, somewhat similarly to nouns of gender IV in Coastal Marind. An example of such a language is Konso, an East Cushitic language spoken in Ethiopia. Konso displays subject agreement on the verb, which has three different inflectional forms depending on whether the subject argument is masculine (78a), feminine (78b) or plural (78c and d). The masculine and feminine forms are used if the subject is singular, the plural form is used if the subject is a plural-marked noun (78c) or a noun that is lexically specified as plural (78d). Definite markers, which are suffixed to nouns, only distinguish between singular and plural. The plural form of the definite marker is used both with overtly plural-marked nouns and with nouns that are lexically specified as plural.

(78) Konso (Afro-Asiatic, East Cushitic; adapted from Tsegaye 2017 : 36–37): gender and number agreement

a. *ǵmayta-**si?*** *i=kuti?-**ay***
old.man-DEF.SG 3=sit.down-PFV.3M
'The old man sat down.'

b. *aleeta-**si?*** *i=pi?-**t**-i*
hut-DEF.SG 3=fall-3F-PFV
'The hut fell.'

c. *laha-d́d-**sini?*** *i=muk-i-**n***
ram-PL-DEF.PL 3=sell-pass-IPFV.FUT-3PL
'The rams will be sold.'

d. *filaa-**sini?*** *i=pat-i-**n***
comb-DEF.PL 3=be.broken-PFV-PL
'The comb disappeared.'

Orkaydo (2013) and Tsegaye (2017) analyze the plural agreement pattern, as realized on verbs and definite markers, as the morphosyntactic manifestation of a gender value. According to this analysis, plural-marked nouns are also considered to be plural in gender. The main arguments that Orkaydo (2013) and Tsegaye (2017) bring in support of the plural as a gender-value analysis in Konso are: (i) the large number of nouns that are underived for number and only trigger plural agreement[29] and (ii) the fact that not all of these nouns are semantically analyz-

[29]Orkaydo (2013 : 318–330) lists 471 Konso nouns. Out of these, 92 are classified as being inherently plural (or, following his analysis, plural in gender), 134 as feminine, and 245 as masculine.

able as instances of lexical plurals.[30]

The possibility of positing an independent gender value for lexical plural/pluralia tantum nouns has also been defended for Russian by Zaliznjak (1977). Russian has a tripartite gender system with a masculine-feminine-neuter distinction that is further subject to a number of animacy-based conditions. Gender distinctions are neutralized in the plural. Pluralia tantum nouns always trigger plural agreement, irrespectively of whether they refer to singular or plural entities. This is illustrated in (79).

(79) Russian (Indo-European, Slavic; Corbett 2012 : 237)
*odn-**i*** *san-**i***
one-PL.NOM sledge-PL.NOM
'one sledge'

In virtue of the properties illustrated in (79), according to Zaliznjak, pluralia tantum nouns in Russian are better analyzed as representing one independent agreement class, and thus one independent gender value.

Corbett (2012 : 237–238) notices that *plural-as-a-gender-value* analyses have only been proposed for languages where gender distinctions are systematically neutralized in the plural. This is the case for Russian and indeed this is also the case for Coastal Marind, Walman, Baiso and Konso. In languages where gender distinctions are maintained in the plural, lexical plurals are usually distributed across different gender values, but still share the properties of carrying only plural morphology and/or of only triggering plural agreement. This is for instance the case of Italian where the plurale tantum noun *pantaloni* 'trousers' is masculine and selects only masculine plural agreement while the plurale tantum *forbici* is feminine and selects only feminine plural agreement as in *i pantaloni* 'the.F.PL trousers' and *le forbici* 'the.M.PL scissors'. Analyzing Italian pluralia tantum nouns as belonging to separate gender values would then mean positing at least two different lexical plural genders in the language, one formally overlapping with the masculine plural and one with the feminine plural. Corbett (2012 : 237–238) uses this argument to reject the cross-linguistic validity of *plural-as-a-gender-value* analyses. Conversely, he stresses that in languages where gender distinctions are neutralized in the plural, lexical plural nouns are de facto outside

[30]By inspecting the meanings of the 92 nouns classified by Orkaydo (2013 : 318–330) as inherently plural we found that more than half of them (about 50) have denotational meanings that align with the most typical semantic domains of lexical plurality (e.g., mass nouns, body parts coming in pairs, names of activities requiring multiple participants).

the system of gender distinctions because this system is only active in the context of singular number, which they are devoid of. The exceptional agreement preferences of these nouns are thus to be analyzed as a consequence of them being irregular from the point of view of number and not of gender.

While we agree that having or not having gender distinctions in the plural is a relevant typological parameter to take into account when assessing the type of encodings that lexical plurality may trigger in the domain of gender and number agreement, we believe that language-specific analyses where lexically plural nouns are described as making up a gender value of their own *should not* be a priori considered to be fallacious. The descriptive adequacy of language-specific categories should always be distinguished from what is generalizable across languages with the support of typologically adequate comparative concepts (Haspelmath 2010). Arguing, and demonstrating, that lexical plural nouns in some gendered languages exhibit gender-like properties does not equal to say that the lexical plural nouns of all languages with gender should be analyzed as instances of an independent gender value. In languages like Coastal Marind, Konso or Baiso, the lexicalization of the plural number value and the presence of large classes of nouns with fixed plural number, which only trigger plural agreement, clearly blurs the distinction between the gender and number domain.

9.3 Extreme lexicalization of number values in Kiowa-Tanoan

In addition to the cases mentioned in §9.2, the gender system of yet other languages may be described as being entirely based on the lexicalization of number values.[31]

The most extreme cases of lexicalization of number values are arguably found in the languages of the Kiowa-Tanoan family of North America, illustrated here with Kiowa data from Sutton (2014 : 310) and Watkins & McKenzie (1984 : 78). Kiowa distinguishes singular, dual and plural numbers through a combination of suffixation on nouns and indexing prefixes on verbs. Nouns occur in two forms: the unmarked basic form and the inverse form, derived by suffixation. For every noun in the language it must be specified whether the noun occurs in the basic or the inverse form when reference is made to one, two or three or more entities (the labels basic and inverse are specific to the Kiowa-Tanoan descriptive tradition and should not be confused with similar labels in other grammatical traditions). For example, *tógúl* 'young man' is used in the basic form for reference to one or

[31]This subsection was written by Bruno Olsson. We are very thankful to Bruno for his general contribution to our discussion of gender and lexical plurality.

two young men, whereas the inverse form *tógú·dɔ́* must be used for reference to three or more young men. This contrasts with the noun *ʔɔnsó·* 'feet', which occurs in its basic form when reference is made to two or more feet, but in the inverse form *ʔɔnsôy* when reference is made to a single foot. For other nouns the basic form refers to two instances of the referent, as with *ʔálɔ·* '(pair of) apples', whose inverse form *ʔálɔ·bɔ* is used to refer to one apple or three or more apples. A fourth type of nouns lacks the inverse form and occurs in the basic form regardless of the cardinality of the referents.

Each noun in the language exhibits the basic-inverse alternation according to one of these four patterns. In the Kiowa-Tanoan literature the four patterns are referred to as noun classes and numbered I-IV (following Wonderly et al. 1954). Nouns in the four superclasses are further divided into subclasses according to their combinatorics with verb prefixes indexing person/number of core arguments. The intransitive third person paradigm consists of four prefixes: singular Ø-, dual *ę̀-*, plural *gyà-* and inverse *è-*. The inverse verb prefix occurs whenever the inverse form of the noun is used, and the singular and dual disambiguate the number reference of nouns in their basic form. It is the behavior of the plural prefix that reveals the need for subclasses. For example, some class II nouns ('bucket', 'saw', 'arrow') trigger the plural prefix when reference is made to three or more entities, while other class II nouns ('bed sheet', 'peg, stake', 'peyote, cactus') trigger the singular prefix when reference is made to three or more entities; these two patterns form subclasses IIa and IIb. When the full range of indexing patterns is taken into account, the total number of subclasses is between 7 (e.g. Watkins & McKenzie 1984) and 9 (Harbour 2008 ; the difference in granularity depends on whether some marginal patterns are counted as their own subclasses or not).

It is clear from Wonderly et al.'s (Wonderly, Kirk & Gibson 1954) use of the term *noun classes* that researchers realized early on that the Kiowa-Tanoan system of number marking amounts to a form of noun classification. Nichols' (Nichols 1992 : 141) conclusion that "noun classification appears to have arisen out of number agreement in the Kiowa-Tanoan family" explicitly couches this in diachronic terms (an interpretation repeated by Aikhenvald 2000 : 377 and Luraghi 2011 : 451).

The parallel with languages such as Coastal Marind, Walman, Konso and Baiso is most evident in the class of Kiowa nouns that trigger invariant plural prefixation on the verb regardless of the cardinality of the referent (class IVc in Watkins & McKenzie 1984). According to Harbour (2008 : 46) this class consists of objects composed of several parts ('trousers', 'book', 'necklace', 'tepee', 'headdress'; the

multi-part semantics are also noted by Merrifield 1959 : 270, "a single item is looked upon as having several constituent parts"), granular mass nouns ('flour', 'salt', 'sand') and abstracts ('problem', 'dance', 'word, language'), which echoes the pluralia tantum-like semantics of the nouns discussed for Coastal Marind, Walman, Konso and Baiso. The important difference is that Kiowa takes the lexicalization much further, and requires that every noun in the language be specified for its "inherent number". For some of the Kiowa noun classes this can be expressed straightforwardly as an inherent number value, so that Kiowa *kʰɔ́·dé* 'trousers' (class IVc) is inherently plural, and *ʔálɔ·* '(pair of) apples' (class III) is inherently dual. For other classes the pattern is more complicated, as with *tól* 'peg, stake' (class IIb) which triggers singular verb prefix when the cardinality of the referent is 1, the dual prefix with cardinality 2, but the singular also when cardinality is 3 and higher.

We think that the Kiowa-Tanoan systems of "inherent number" must be considered gender according to the Hockettian conception of gender as "classes of nouns reflected in the behavior of associated words". This also seems to be the contention of Harbour, who – working in the Chomskyan tradition – equates the Kiowa noun classes with Indo-European gender, with the main difference residing in their semantic basis: the former is based on number and the latter on sex. For our purposes, the important point is that Kiowa-Tanoan languages represent the extreme end of a spectrum in which the organization of nominal number in a language can be more or less gender-like. Further towards the other end of the spectrum we find languages such as Coastal Marind, Walman, Konso and Baiso, in which lexicalized number (in this case, plurality) appears to have blurred the line between gender and number to a much lesser degree.

9.4 Summary

We believe that a particularly promising direction of research on the interaction between gender and lexical plurality lies in diachrony and, in particular, in examining how the encoding of lexical plurality affects the evolution of gender and number agreement systems. Olsson (2019 [this volume]) suggests that a plausible explanation for the peculiar configuration of gender IV in Coastal Marind is that this agreement class evolved from a smaller nucleus of pluralia tantum nouns (which selected plural agreement because semantically plural) and only gradually came to include non-plural types of nouns. A similar hypothesis could be tested on Konso and other Cushitic languages exhibiting large classes of lexical plural nouns. Another promising area of investigation in this domain would be taking a closer look at languages like Baiso, where only certain types of agree-

ment controllers, among which the lexical plurals, trigger the use of dedicated plural agreement, whereas the majority of morphologically plural nouns trigger agreement patterns that are syncretic with either masculine or feminine singular agreement. These languages, where, synchronically, there seems to be a semantic split in the agreement patterns associated with nominal plurality, offer an interesting test case for hypotheses about the evolution and grammaticalization of number agreement, a topic that goes beyond the scope of the present volume.

10 System evolution

10.1 Introduction

System is probably the most commonly unexplained term in the literature on grammatical gender and thus arguably rather void of meaning. However, in this section, we will argue that the notion of system is highly important from a developmental point of view. Furthermore, the relationship between complexity and system needs to be sorted out. The Latin adjective *complex* 'weaved together' and the Ancient Greek noun *sústēma* '(what is) standing together' are very close in their original meanings. It is thus not surprising that complexity is often understood in linguistics as system complexity, which somehow wrongly takes for granted that complexity is necessarily connected to systems, especially if complexity is understood in terms of description length.

A very simple way of defining system in linguistics is to say that it is an opposition of at least two markers, and in this sense gender is always organized in terms of systems. However, this simple definition does not capture many of the systematic properties of mature gender. Gender connects different parts of language structure (one might say that it is always a multiple-interface phenomenon): syntax, semantics, and morphology are always involved. Lexicon is fundamentally involved to the extent that gender is lexical. Even phonology is sometimes involved, notably if there is phonological gender assignment. Mature gender systems imply a high degree of internal organization and, from a developmental perspective, it is interesting to consider how such complex systems can emerge.

In §10.2 we introduce the notion of co-evolution (a set of more than one diachronic change, which are at least partly dependent on each other), which is crucial for processes of system emergence. In §10.3 we discuss various approaches dealing with contextualization of variability where variation that is not accounted for is remotivated. In §10.4 we will argue that co-evolution in both rise and re-

duction of gender can take the form of cascades of anomalies.

10.2 Co-evolution

Diachronic processes, such as sound change, analogy, reanalysis, grammaticalization, and semantic shift, are often viewed as individual changes. One sound, morpheme, construction or meaning turns into another sound, morpheme, construction or meaning. However, changes can also co-occur in a sequence of connected events. The probably best-known example are push and drag chains of several sound changes that co-determine each other, such as the great vowel shift in English. Since gender consists of systems of at least two markers, individual diachronic processes are usually not sufficient for the modelling of the emergence and evolution of gender. Of course, it cannot be excluded that several changes that may result in a gender system co-occur accidentally, but more often than not there will be some sort of co-evolution of several changes in the evolution of gender.

Even a maximally simple gender system, such as the Japanese (Japonic) grammatical anaphors, *kanojo* 'she' (from the attributive form of the obsolete distal demonstrative in its attributive form kano plus the Sino-Japanese form *jo* for 'woman') and *kare* 'he' (from the independent form of the obsolete distal demonstrative; see Ishiyama 2008 and Wälchli 2019 [this volume]), is difficult to imagine without some sort of co-evolution. It is true that the loss of the distal demonstrative series *kano/kare* is a shared development that is important for rendering both forms opaque, but the forms are still heterogeneous. One is a complex NP, the other one is just a simplex demonstrative form. The development of *kare* to masculine 'he' presupposes a semantic shift of narrowing to masculine, and this process is hard to imagine without co-evolution of a parallel feminine form that makes that narrowing possible.

It is thus not astonishing that the general literature on grammaticalization, which focuses on individual cases of grammaticalization, says very little about the origin of gender. Heine & Kuteva (2002) only list a few cases such as MAN ('man', 'male', 'person') > THIRD PERSON PRONOUN in ||Ani (Khoe-Kwadi, Khoe), Lendu (Central Sudanic, Lenduic), and Zande.

10.3 Contextualization of variability

In a system, there are markers and a division of labor among them. It is a reasonable assumption that the markers (often of rather heterogeneous origin) are there first and that the division of labor is put into place in a second step. Here

we will discuss two approaches that can help us understand how this can happen: Lass' (Lass 1990) concept of exaptation and the experimental research on iterated artificial language learning by Kirby and Smith and collaborators (Kirby et al. 2008 ; Smith & Wonnacott 2010).

Lass (1990) borrows the term EXAPTATION from biology where it means the "opportunistic co-optation of a feature whose origin is unrelated or only marginally related to its later use" (Lass 1990 : 80), such as when the dinosaur ancestors of birds happen to have feathers which later turn out to be useful for flying. Linguistic exaptation is the development by which junk that is kept (instead of being relegated) is later used for some other purpose. Lass (1990) discusses the following two examples. (i) Indo-European distinguished perfect and aorist in the past, a distinction which was lost in Germanic, where the perfect and aorist stem forms were redeployed as singular and plural past stems in strong verbs. (ii) The Dutch alternation between suffix *-e* and Zero in attributive adjectives expressing gender and number agreement was redeployed in Afrikaans as an expression of various classes of adjectives (among other things, simple versus complex/compound adjectives).

Smith & Wonnacott (2010) use iterated learning modelled in an experiment as a tool for investigating the cultural evolution of language. One group of participants is presented with some stimuli they have to learn and the next group of participants has to learn the language reproduced by the first group and so on in several "generations". The equivalent of Lass' "junk" is free variation in the input. In Smith & Wonnacott's (Smith & Wonnacott 2010) experiment, learners were presented with nouns denoting animals with the two artificial plural words *fip* and *tay* distributed entirely randomly in the input for the first "generation". This junk, or pattern of free variation between two plural marking strategies, was redeployed in iterative learning. Smith & Wonnacott's (Smith & Wonnacott 2010) call this PROBABILITY-MATCHING BEHAVIOR: the learners reproduce markers more or less with the same proportion of frequency that the markers have in the input. However, as a consequence of transmission over several generations, the distribution of markers is made predictable by linking it to particular conditions, in this case the use of markers is made predictable by lexical conditioning. "A typical fifth-participant language exhibits […] predictable variability […] for instance, *fip* used to mark plurality on *cow* and *pig*, *tay* used to mark plurality on *rabbit* and *giraffe*" (Smith & Wonnacott 2010 : 447). The learners thus developed some sort of lexical gender. While the token frequency of markers changes very little, there is a change from zero predictability to full or almost full predictability. As a consequence, conditional entropy drops, and if entropy is considered a measure

of complexity, complexity drops. (Even though system complexity increases as we go from one grammatical distinction, number, to two, number and gender).

Lass' and Smith & Wonnacott's examples have in common that there is a co-evolution of many changes. Parallel changes take place in all Germanic strong verbs, all Afrikaans attributive adjectives and all nouns denoting animals in the experiment. Unmotivated alternations are conditioned, which makes the alternation predictable (lower complexity as meaning and form are better aligned) at the cost of a lower independence (higher complexity according to the Principle of Independence), while the number of markers remains constant.

In §7.5 and §8 we have seen that gender may emerge as a condition on an already existing grammatical category. This may seem strange if viewed as a complexification in terms of the Principle of Indepencence without any obvious benefit since grammatical gender does not seem to provide any communicative benefit. However, rise of gender is better understandable if we assume that the stage before there was gender contained some markers whose use was largely unpredictable. In more general terms, we can assume that the stages that precede the development of gender contain anomalies where some formal distinctions are poorly motivated. This can, for instance, be due to sound change, to decategorialization of nouns, or to anaphoric NPs having become opaque (as in Japanese).

10.4 Reduction and rise of gender as cascades of anomalies

Gender system evolution often involves a sequence of changes where the first change introduces increasing complexity in the form of unpredictable variability and subsequent changes restore order. Such an initial change introducing idiosyncratic patterning can be regular sound change. A well-studied example is the loss of gender agreement in the predicative adjective (but not in the attributive adjective) in German (Fleischer 2007a , Fleischer 2007b and the literature surveyed there). Old High German and Old Saxon had two competing inflectional paradigms of adjectives, one with endings originating from the pronominal paradigm and one with nominal endings. The nominal endings happened to be reduced to zero by regular sound change in all three genders in the nominative singular and in the nominative neuter plural. The idiosyncratic distribution created by phonological erosion is reflected quite accurately in Old Saxon in predicative use (SG 0%, M.PL 99%, F.PL 95%, N.PL 29%; Fleischer 2007a : Table 9). In Early Old High German, two opposite tendencies can be observed in predicative use. On the one hand, inflection tends to be lost in the forms where it is preserved. On the other hand, inflection is also partly reintroduced by analogy

to the forms where it was not lost by sound law. Inflected forms spread most easily to the neuter plural and to a lesser extent also to the feminine singular, which happened to have the same pronominal ending as the neuter plural (N.SG 0%, M.SG 1%, F.SG 8%, N.PL 64%, F.PL 79%, M.PL 80%; Fleischer 2007a : Table 11). While the uninflected forms were generalized in predicative use in Middle High German and Modern German, the inflected forms were generalized in Highest Alemannic dialects with support of language contacts with Romance languages (Fleischer 2007b). In attributive use, the inflected pronominal forms with gender and number agreement were generalized in all varieties of German.

In the development simulated by Polinsky & Van Everbroeck (2003) for the transition from Latin to Old French, "the major push for the restructuring of the gender system came from phonological changes (loss of vowel length, loss of word-final segments)" (Polinsky & Van Everbroeck 2003 : 385). Neuter merged with masculine in the singular and with feminine in the plural (as preserved in Romanian). In early Old French text, Romanian-like neuter nouns had been reduced to about 4.6% as compared to 21.1% neuter in Classical Latin.

There are also cascades of changes where an anomaly is remedied by restructuring which entails another anomaly which again calls for restructuring which in its turn is an anomaly and so on. Such a cascade of changes is responsible for a strange pattern in some Tamian Latvian dialects in northern Kurzeme where demonstratives do not agree in gender anymore (only in number and case) and always take the masculine form (80).

(80) Kandava Latvian (Indo-European, Baltic; Graudiņa 1958 ; Rudzīte 1964 : 65; Wälchli 2018 : 144)
un tas cũkgans a visàm ***tiẽm***
and that.NOM.SG.M swineherd(M).NOM.SG with all.DAT.PL.F that.DAT.PL.M
cũkam tur i palic:s.
swine(F).DAT.PL there be.PRS.3 stay.PST.PTCP.ACT.NOM.SG.M
'and this swineherd had remained there with all those pigs'

The starting point is a regular sound change (triggered by language contact with the Finnic contact language Livonian) where short vowels in final syllables of words longer than one syllable are lost. This causes gender neutralization (of masculine and feminine) in the accusative plural in nouns. Demonstratives are monosyllables and monosyllables are not affected by the sound change entailing neutralization. However, the neutralization is extended to them by analogy. The masculine accusative plural form in demonstratives is generalized also with fem-

inine controllers. Since there is a syncretism of feminine plural accusative and nominative, the use of masculine forms instead of feminine is extended also to the nominative plural, which causes the gender opposition in the demonstrative plural forms to be maintained only in the dative (attested in the dialect of Zlēkas). This is a new anomaly, the dative is less frequent than the nominative; thus masculine is further expanded to all plural forms in the demonstrative (attested in Puze and Pope). Demonstratives are the only target in these varieties that inflects for gender only in the singular and not in the plural. This is still an anomaly. In the dialect of Dundaga, the generalized use of masculine forms in demonstrative is further extended to all case-number forms of the demonstrative (see Wälchli 2017).

Wälchli (2018) considers the rise of gender in Nalca from the point of view of system emergence. The development in Nalca implies a large number of minor changes of different kinds (grammaticalization, analogy, and reanalysis) that all must have taken place within a short period of time. There are instances of grammaticalization (female person name marker *ge* from *gel* 'woman'), instances of reanalysis (*nimi ara* [men TOP] > *nim e-ra* [men DN-TOP]), and instances of analogical extension such as when gender is extended to the comitative postposition (*be-b/ge-b/ne-b/e-b/a-b* instead of just *ab* as in other Mek languages). Most of these developments are highly language-specific and are triggered by local anomalies that give to rise to new anomalies which again trigger further changes. As a whole, the development in Nalca is a highly specific development, which gives rise to a gender system with highly specific properties. However, since gender systems often exhibit highly specific properties, it can be assumed that complex system emergence of the kind that it can be reconstructed for Nalca may have taken place in other gender systems as well.

11 Areal and genealogical patterns and external factors

In this section, we will discuss patterns in gender that go beyond language-internal implications. §11.1 deals with genealogical and areal patterns. §11.2 addresses external factors in the ecology of languages.

11.1 Areal and genealogical patterns

If we take the nine language families in the world with more than a hundred languages (according to Hammarström et al. 2018), gender can arguably be reconstructed to the proto-language in three of them (Atlantic-Congo, Afro-Asiatic

and Indo-European), which testifies to the diachronic stability of gender. However, in all three families there are also a considerable number of languages that have lost gender. And, at least if we adopt a broad definition of gender, the remaining six large language families (Austronesian, Sino-Tibetan, Nuclear Trans New Guinea, Pama-Nyungan, Otomanguean, Austroasiatic) all have some languages with gender, and in all six families, gender must have emerged more than once. What contributes to the impression that gender is genealogically stable is its entrenchment in specific morphological marking patterns, which makes gender an interesting feature to look at for traditional historical linguistics. As Nichols (2003 : 303) puts it, "[f]or genders, with their clear formal exponents, it is very obviously not the abstract typological feature but particular form-function pairings that are transmitted from ancestor to daughter language".

However, old morphological material does not necessarily guarantee wide distribution across a large language family. A case in point is gender in Classical Tibetan and Kiranti languages discussed in §8.3, where masculine *-pa/po* and feminine *-ma/mo* are common derivational suffixes in adjectives throughout Tibeto-Burman languages, so it cannot be excluded that gender in Sino-Tibetan might be old.

There is probably a bias toward discussing stable gender in historical linguistics more often than instable gender. This is understandable since only morphologically entrenched stable gender is useful for establishing genealogical groupings of languages. There are so far no general surveys of the development of gender across Austronesian, Sino-Tibetan, Nuclear Trans New Guinea, Otomanguean or Austroasiatic (for Australian languages, however, see Dixon 2002 : 449–514), and no general surveys for the loss of gender across Atlantic-Congo, Afro-Asiatic or Indo-European.

Classifiers are more prone to areal diffusion than grammatical gender (see Seifart 2010 : 730–731 and the references given there). However, this does not mean that language contact is irrelevant for gender. Nichols (2003 : 300) argues that gender is a cluster phenomenon in the sense that it is most easily preserved where languages with gender are neighbors of (usually) related languages with gender. Put differently, gender is "of high stability only when reinforced by gender systems in neighboring languages" (Nichols 2003 : 303) and languages that lose gender are typically neighbors of each other. This does not only hold for gender in general, but also for particular gender agreement targets, as the preservation of gender in predicative adjectives in Highest Alemannic German dialects due to contacts with Romance languages discussed in §10.4 (Fleischer 2007b).

The findings of Liljegren (2019 [this volume]) on the distribution of gender in

Hindu Kush Indo-Aryan are well in line with Nichols' (Nichols 2003) suggestion. Liljegren identifies areal patterns both in the loss of gender, but also in the emergence of a new gender opposition based on animacy. Liljegren also highlights the diachronic dimension. The two Chitral group languages, Khowar and Kalasha, which have lost the Indo-Aryan masculine-feminine opposition and developed a new gender system based on animacy are likely to reflect a first wave of Indo-Aryan settlers in the Hindu Kush area. Languages with concurrent sex- and animacy-based systems are spoken in the vicinity of Chitral languages.

Areal patterns in the development of gender within clusters of languages of the same family can also be identified in other areas. Within the Austroasiatic Khasian branch, War-Jaintia is clearly more distantly related to Khasi than Lyngngam based on evidence from lexical data (Nagaraja et al. 2013 : 6). However, the similarities of gender systems rather follow areal patterns where the westernmost language Lyngngam (Nagaraja 1996) has the most rudimentary system among the Khasian languages (see also Di Garbo & Miestamo 2019 [this volume]). In Northern Australia, the Ngan'gityemerri Nangikurrunggurr (Southern Daly) nominal classification system is more similar to that of Marithiel (Western Daly) than to that of Murriny Patha, even though Murriny Patha (Southern Daly) is a closer genealogical relative. Marrithiyel and Ngan'gityemerri "share the larger, central classes, have a number of formally cognate classifiers, and display the same range of agreement patterns" (Green 1997 : 233). In central New Guinea, Anim and Ok have very similar gender systems (see Olsson 2019 [this volume]). They are so similar in form and function that they are likely cognates (Usher & Suter 2015 : 118). However, lexical comparison does not suggest any close genealogical relationship of Anim and Ok (E. Suter, p.c.). According to Seifart (2007), the systems of nominal classsification in Huitotoan and Boran are so strikingly similar, that entirely independent development is unlikely, but no common protosystem can be reconstructed.

11.2 External factors

As argued by Dahl (2019 [this volume]) it is not easily possible to establish any correlations between grammatical gender and ecological parameters, such as population size or degree of contact and there is no positive correlation with morphological complexity (Nichols 2019 [this volume]). This contrasts with evidence from other typological features where extralinguistic ecological factors are clearly reflected in typological distributions (Lupyan & Dale 2010 ; Sinnemäki 2014a). Sinnemäki & Di Garbo (2018) do not find any significant relationship between the number of gender distinctions (including whether or not a language

has gender) and sociolinguistic variables, whereas degree of inflectional synthesis in the verb is clearly sensitive to population dynamics. It is, of course, possible that number of genders does not accurately represent the complexity of gender and that other properties of gender systems must be used (for which large scale data sets are not availabe) to establish a relationship with factors of population dynamics. However, Blasi et al. (2017) do not find any evidence for adaptive patterns in gender marking even when looking at adjectival modifiers and personal pronouns in creole languages. The results from the large-scale quantitative studies conducted so far thus suggest that, if there are correlations between gender typology and sociolinguistic factors, they are rather subtle, so that they are unlikely to be covered in large typological databases.

A problem with large typological databases is that they often do not take into account dialects. The number of genders in Bininj Kun-Wok ranges from four in the central Kunwinjku dialect to zero in Kune, with Gun-djeihmi having three genders. According to Evans (1997), considerable differences in grammatical gender across dialects of Bininj Kun-Wok reflect social relationships with speakers of neighboring languages. In the *WALS* database, the number of genders listed for Bininj Kun-Wok is simply "four". As Evans (1997 : 105) puts it, deep regularities cannot always be seen in the shallow perspective of one dialect. Karatsareas (2014) shows that not all varieties of Koineic Greek are equally conservative, especially not the different varieties of Greek in Asia Minor. In Greek in Asia Minor the number of genders ranges from three (like in Modern Greek in Greece) in Pontic Greek (but with major restructuring of the system) to zero in Cappadocian Greek. Karatsareas (2009) argues that the loss of gender in Pontic Greek results from an interplay of heavy language contact with Turkish and language-internal analogical levellings. Interestingly, dialects of Ancient Greek in Asia Minor not surviving to the present were already undergoing restructuring of their gender systems due to substrate from Anatolian languages, which had only two genders (common and neuter) (Brixhe 1994 : 176). As in Greek, in Latvian gender restructuring of very different kinds occur in peripheral dialects with intensive language contact, in this case with Finnic (Livonian and Estonian) (see Wälchli 2017). Like Greek varieties in Asia Minor, the Tamian Latvian dialects are highly endangered.

There is thus evidence from a fair number of particular cases that a large proportion of non-native speakers and/or intensive language contacts with languages lacking grammatical gender can entail massive restructuring in gender systems which can, but need not, entail a reduction of the number of genders (see also Trudgill 2011 : 24). In a study of 36 languages distributed among 15 sets

of closely related languages, Di Garbo (forthcoming) finds that in Eurasia radical reduction, loss and emergence of gender agreement tend to cluster around language family edges, which is consistent with the findings of Nichols (2003). "Loss of gender agreement tends to prevail under circumstances in which the demographically dominant and/or more prestigious language lacks grammatical gender. On the other hand, borrowing of gender agreement patterns may be favored when the demographically dominant and/or more prestigious language has grammatical gender" (Di Garbo forthcoming , see also Di Garbo & Miestamo 2019 [this volume]). Prestige of languages with gender also plays a role in cases of language planning as reflected in the gender system of the Makanza variety of Lingala that was designed by missionaries (Meeuwis 2013 ; see also Di Garbo forthcoming and Di Garbo & Miestamo 2019 [this volume]). Di Garbo (forthcoming) launches the hypothesis that gender marking may actually have important ties to the way in which speakers and speech communities construe their linguistic identity in opposition to that of their neighbors. A case in point is the mixed language Michif which preserves both the gender system of French and the gender system of Cree (Bakker 1997 ; Di Garbo forthcoming).

12 Conclusions

In this chapter we have addressed grammatical gender and its complexity (as defined in §2) from a dynamic perspective. We found that dynamic comparative concepts of the form *From X to Y*, as summarized in Table 19, are highly useful to describe the typology of gender. Often it is the case that less mature gender is a source for more mature complex gender, which contributes to the view that complexity in gender is something that can grow over time.

Our starting point was a dynamic definition of gender in §1, repeated here for convenience.

> Definition of gender adopted in this chapter:
> Gender is a grammatical category type with a semantic core of animacy and/or sex reflecting classes of referents, which have a propensity to turn into classes of noun lexemes. It is overtly marked on noun-associated forms. It typically exhibits cumulative exponence with number, case, and/or person. Gender is organized in the form of systems.

This definition goes beyond the traditional Hockettian definition, which is based on two critieria: noun classes and agreement. Our definition is dynamic

Table 19: Less mature gender as source for more mature gender

Simpler earlier stage can develop into a…	…more mature stage	
Referent-based gender >	Lexical gender	§3
Marker in independent use >	Gender in adnominal use	§4
One-to-one assignment >	Many-to-one assignment	§6.2
Semantic gender assignment >	Opaque gender assignment	§6.3
Semantic assignment ("covert" gender) >	Formal assignment ("overt" gender)	§6.4
Morphological assignment or sandhi >	Phonological assignment	§6.4
Classes of single items >	Classes of larger sets	§6.6
Condition on another feature >	Gender feature	§7.5
Apposition and nominal gender targets >	Non-nominal gender targets	§7.5
Non-idiomatic gender >	Idiomatic use of gender	§7.7

in the sense that it expresses the fact that gender is an evolving category type, where gender has a semantic core of animacy and/or sex and exhibits hierarchical patterning according to the animacy hierarchy above some cutoff point in the animate segment of the hierarchy (§3). The semantic core and the hierarchical patterning reflect referent-based gender. Gender becomes lexical only as a secondary development. Put differently, the organization of gender in terms of noun classes is a mature phenomenon. Incipient gender need not have noun classes and in the process of gender loss, lexical gender can be lost before referent-based gender is lost. In several language groups, gender can be shown to originate from top segments of the animacy/individuation hierarchy and then move further down the hierarchy as it further develops. Gender thrives in symbiosis with nouns, but does not usually originate as noun classes. When associated with nouns, gender tends to lexicalize. Gender assignment can be semantic, formal, and/or opaque (§5 and §6). Gender has mechanisms to restore semantic assignment for animate referents if gender assignment for animate referents has become opaque (§6.3). In some languages, gender assignment can be flexible. Through flexible gender assignment speakers modify the construal of noun referents, targeting properties such as size and/or countability (§5).

Gender is a special case of nominal marking on noun-associated words where the number of values is larger than one. But there are also many cases of nominal marking with value one without opposition of gender values. Omission of head nouns in NPs and subsequent explicit nominal marking of non-headed NPs seems to be an important driving force for the accumulation of nominal morph-

ology as the marking of independent modifiers can be transferred to modifiers in headed NPs (§4).

Agreement is complex in the sense that it can involve syntactically complex controllers and syntactically complex targets and in the sense that the relationship between controller and target can be of various kinds: syntactic and strictly intra-sentential, semantic and inter-sentential, or purely contextual in the case of latent controllers. There is always a specific relationship between controller and target in agreement, but this specific relationship need not necessarily be coreference. Features are a highly mature form of agreement and features may develop from conditions. Gender requires displacement (realization on another element than the one triggering it) in order to be considered a grammatical category. Overt marking of gender on nouns is distinct from gender as a grammatical category, and relates to derivation rather than agreement (§7).

Gender systems almost always imply cumulation with number, case and/or person. This is so pervasive that we have decided to include this peculiarity in the definition of gender. Number and case also play an important role for the emergence of gender systems. In general, it seems to be the very essence of gender that it interacts with other grammatical domains, such as number, person, case, and evaluation. To the extent that interaction with other grammatical categories is counted as complexity according to the Principle of Independence, gender is almost always complex. Gender is thus arguably complex by definition. Cumulation with number, case and/or person has not been taken into account sufficiently in the literature pointing out the similarities between gender and classifiers. Classifiers are similar to gender in that they are classes of referents or classes of noun lexemes. However, classifiers do not tend to interact with number and case in the way gender does (§8).

As gender, number can be entrenched in the lexicon in form of classes of pluralia tantum, and pluralia tantum can further develop into gender values. It is, of course, possible to exclude pluralia tantum from gender by definition, but it is not clear whether this is useful since it is the very essence of gender to be connected to other grammatical categories, and among them number is the most important one (§9).

Gender is organized in terms of systems that connect different parts of language structure (lexicon, syntax, morphology, semantics, phonology) in order to efficiently and orderly assign values to markers. Although the origin of many gender systems is unknown, different kinds of diachronic approaches are indispensable for understanding how gender emerge and evolve as systems (§10).

Gender is stable diachronically in the sense that it is highly entrenched in

specific morphosyntactic marking. Gender displays areal patterns especially in groups of closely related languages. Especially in non-mature stages, gender seems to spread across closely related languages or languages with similar typological profiles. Gender is often lost or restructured in languages with intensive contacts with languages lacking gender or displaying different gender systems. There is no obvious general relationship between the typology of gender and language ecology, but larger proportions of non-native speakers and higher population size seems to go together with restructuring in gender marking (§11).

Gender, noun classes and agreement are among the most discussed topics in the linguistic literature, but there are still many open questions which could only be touched upon in this chapter or are not addressed at all. As the literature is growing, there is also a need of integrative surveys, even if only partial ones, as this chapter. We hope that this chapter, like the volume as a whole, will stimulate further descriptions of gender in particular languages and dialects, new large-scale typological studies, and more comprehensive surveys of the research than this chapter provides.

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Abbreviations

[ ]	non-overt element
( )	inherent category
{ }	gender which the morphological form is more commonly associated with
I,II,III,IV	Genders I, II, III and IV in Coastal Marind
III	Gender III in Archi
1	first person
2	second person
3	third person
A	actor
ACT	active
ABL	ablative
ABS	absolutive
ACC	accusative
ACT	actualis (Coastal Marind)
ADJ	adjective
Adj	adjective
ADV	adverb
AFFIRMATION	affirmation
AGN	agentive noun
AGT	grammatical agent
ANIM	animate gender
AOR	aorist
ART	article
ASPECT	aspect
ASS	associative case (Uduk)
ATTR	attributive (Archi)
AUX	auxiliary
CAUS	causative
CL	class
CL1 etc.	class 1 etc.
CLF	classifier
CM	common gender; common noun marker (not person name marker: Tagalog)
Cmpl	complement clause
COM	comitative
COMP	comparative
COMPL	completive aspect
COND	conditional
CONTESSIVE	contessive
CV	CV gender (Nalca)

CVB	converb
DECL	declarative
DEF	definite
DEM	demonstrative
Dem	demonstrative
DERIV	derivation
DET	determiner
DETR	detransitivizing “emphatic” form of verb (Bari)
ECHO	prosodic echo vowel
EMPH	emphatic clitic or particle
EXCL	exclusive
DIM	diminutive
DIST	distal
DISTR	distributive
DN	default noun gender (Nalca)
DP	default phrase gender (Nalca)
DU	dual
ERG	ergative
F	feminine
FLAT	flat
FUT	future
GEN	genitive; possession (Pnar)
Gen	noun possessor
GENERAL	general
GM	gender marker (Mopán Maya)
HAB	habitual
HUM	human
IMP	imperative
INAN	inanimate gender
INCL	inclusive
INDF	indefinite
INF	infinitive
INT	interrogative
INT	interrogative (Coastal Marind)
IPFV	imperfective aspect
ITER	iterative mood (Meskwaki)
KA	*ka*-class (Paumarí)
LAND	land gender
LEAF	leaf

LIQUID	liquid
LNK	linker
LOC	locative
M	masculine
MAKE	light verb ‘make’ (Oksapmin)
MEDIAL	medial
N	neuter gender
N_	non-
N1	neuter 1 (Mian)
N2	neuter 2 (Mian)
NARR	narrative
NEG	negation
Neg.indef	negative indefinite pronoun
NEUT	neutral orientation (Coastal Marind)
NF	non-finite (Pnar §4.3)
N_M	non-masculine
NMLZ	nominalizer
NOM	nominative
NOMIN	nominal marker
NOUN.SUFFIX	noun suffix
NP	noun phrase
Num	numeral
N.UNI	non-uniqueness
OBJ	object
OBV	obviative
PARTITIVE	partitive
PAUC	paucal
PFV	perfective aspect
PL	plural
PLT	plurale tantum
PN	proper name marker
Poss	possessive pronoun
POSS	possessive (affix)
PRED	predicator (Mian)
PRF	perfect
PROX	proximal; proximate (Meskwaki)
PRON	pronominal inflection
PRS	present

PST	past
PTCP	participle
Q	question particle
REAL	realis
REFL	reflexive
REFL.POSS	reflexive possessive
REL	relative
Rel	relative clause
ROUND	round
SG	singular
SPEC	specific
SUPERL	superlative
TENSE	tense
TOP	topic
TREE	tree-classifier
TR	transitive
U	undergoer
UNDERGOER	undergoer
UNI	uniqueness
VEGETATION	vegetation
VOC	vocative
WEAK	weak declension
WOODEN	wooden
ZOIC	zoic

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Appendix: List of topics with short definitions and where these are treated in the chapter

Absolute complexity: complexity as an objective property of grammatical domains (§2.1).

Absolute condition: also obligatory condition: condition that always determines a certain choice of agreement value (§7.5).

Adjacency: controller and target or target and controller follow each other immediately. A possible specific relationship in agreement (§7.2).

Adnominal use (of nominal morphology): marker on an adnominal modifier or dependent in an NP with a noun head or NP marker in a NP with a noun head (§4.1).

Adnominal modifier: modifier in an NP with a head noun, such as attributive adjective, relative clause with a head noun, attributive demonstrative and attributive numeral (§4.1).

Agentivity: semantic connection between animacy and inanimate objects, responsible for the fact that agentive nouns are more likely to take an animate gender (§3.3 (i)).

Agreement: an asymmetric specific relation between a controller and a target involving displaced information. Agreement is syntactic to the extent that it involves words or groups of words as targets and controllers, but the relation between controller and target can be semantic (as in inter-sentential

agreement). Controllers can be latent (contextual, semantic) (§7.1).

Agreement Hierarchy: more distal controllers are more likely to trigger semantic agreement along a hierarchy attributive < predicate < relative pronoun < personal pronoun (Corbett 1991 : 226) (§3.6).

Anaphor, pl. **anaphora:** linguistic element that is lacking clear independent reference and picks up reference through connection with another element.

Animacy distinctions: the linguistic encoding of the ontological difference between living and non-living beings.

Animacy hierarchy: certain patterns of language structure (e.g., plural marking, differential object marking) are more likely to emerge/be synchronically restricted to humans and or highly animate entities only. Based on these effects, types of entities can be arranged on a hierarchy of degree of animacy: speaker > addressee > 3rd person > kinship terms > other humans > "higher" animals > "lower" animals > discrete inanimates > nondiscrete inanimates (Smith-Stark 1974 ; Corbett 2000 ; Haspelmath 2013).

Apposition: two nominal constituents in the same case role and not in a predicative relationship and not in a relationship of subordination (none of the two is the head of the other one) (§4.3).

Areal pattern: distribution of linguistic properties across languages in a geographical area that cannot be explained by obvious genealogical relation of languages (§11.1).

Articulatory plurality: lexical plurality expressed with double-hand signs in sign languages (§9.1).

Associated gender: noun receiving its gender through a link with another noun (§3.4).

Augmentative: grammatical construction that, in its basic meaning, expresses that a given entity is bigger than its standard size (§5.2).

Canonical Approach: theoretical and methodological approach to the typological study of morphosyntactic features developed by Greville Corbett. The approach is based on the idea that, for every morphosyntactic phenomenon, there exists a space of crosslinguistic variation and that attested language-specific systems are situated in this space in ways that more or less correspond to a certain identified base of comparison (Audring & Fedden 2018 : 2) (§1).

Case: marker of grammatical relation or oblique semantic role, often cumulating with gender (§8.2).

Classifiers: cover term for numeral classifiers, noun classifiers, and possessive classifiers, and some further minor types of classifiers (§1).

Co-conceptuality: a specific relationship in agreement where controller and target express identity of concept (but not identity of reference) (§7.2).

Co-evolution: a set of more than one diachronic change that are at least partly dependent on each other (§10.2).

Complex controller: the agreement controller consists of several words (§7.3).

Complex: (i) non-trivial in structure, so that an exhaustive description cannot be short. But also (ii) consisting of several elements and (iii) heterogeneous, consisting of various, but related phenomena (§1).

Complex target: the agreement target consists of several words. These constitute a formal group (§7.4).

Compound gender: the gender of a compound is different from the gender of its head (§6.2).

Concurrent gender systems: two or more than two gender systems that are largely independent of each other within the same language (§1).

Condition: factor provoking the choice of an agreement value, can be absolute or relative (§7.5).

Contrastive focus: emphasis of a choice of argument as opposed to another or other possible choices, induces transparency in gender-marked anaphoric pronouns by activating the descriptive content of gender (§3.6).

Controller: formal or contextual element triggering the choice of a marker of a grammatical category (such as gender or number) (§7.1).

Coreferentiality: a specific relationship in agreement where controller and target have identity of reference (§7.2).

Covert marking of gender: extent to which nouns lack formal gender assignment (§6.4).

Cumulation: expression of two or more grammatical categories in the same morpheme (§8).

Decategorialization of nouns: nouns losing some of their prototypical properties, notably when used in non-referential contexts (e.g., predicatively) (§7.6).

Declension class: morphological paradigm (according to number, case, and/or any other nominal grammatical category) characterizing a subset of nouns (§1, §6.4).

Default: rest category for gender assignment, usually thought of as last resort (§6.5).

Derivational gender: gender in nominal targets expressed on nouns by derivational morphology (§3.4, §7.6).

Description length: from an information theory perspective, one of the ways of measuring system complexity. The longer its description, the more complex the system (§2.1).

Descriptive complexity: (or Kolmogorov complexity), the information required to describe a system (the longer the description the more complex the system) (§2.1).

Differential case marking: a grammatical relation is indicated by different case forms or appositions often depending on animacy and/or definiteness (§8.2).

Differential object marking: the grammatical relation object is indicated by different case forms or appositions often depending on animacy and/or definiteness (§3.5).

Diminutive: grammatical construction that, in its basic meaning, expresses that a given entity is smaller than its standard size. Additional meanings associated with diminutive constructions are: affection, partitive, female (see Jurafsky 1996 for a full list) (§5.2).

Displacement (of information): the word or context triggering the choice of a grammatical value of a marker does not originate in the word on which the category is marked (§6.4).

Dynamic approach: viewing a set of related phenomena as something that can emerge, evolve and disappear in accordance with certain diachronic pathways of development and assuming that these developments are crucial for understanding of the phenomena (§1).

Ecology of languages: the interaction between any given language and its natural and/or social environment (Haugen 1972) (§11.2).

Feature: a fully paradigmaticized grammatical category type expressed by systematic morphological marking. Typical examples of features are: gender, number, case, person, and tense (Corbett 2012) (§7.5).

Formal assignment: morphological and/or phonological gender assignment and opposed to semantic gender assignment (§5.1, §6.4).

Formal group: several words together constituting a syntactic unit (can but need not be a constituent; Croft 2001 : 190) (§7.1).

Gender: gender is a grammatical category type with a semantic core of animacy and/or sex reflecting classes of referents, which have a propensity to turn into classes of noun lexemes. It is overtly marked on noun-associated forms. It typically exhibits cumulative expression with number, case, and/or person. Gender is organized in form of systems (§1).

Gender assignment: rationale determining the gender of a noun (can be semantic or formal) (§5).

Gender recategorization: the phenomenon whereby gender assignment is not fixed but subject to vary based on reference construal. Synonymous with: *flexible/manipulable gender assignment.* But also used for reconceptualization of same referent in discourse (§3.7).

Gender resolution: the gender of a complex controller is determined by means of interaction between the genders of at least two of its parts (§7.3).

Gendered clause: subordinate clause (often an independent relative clause) bearing a gender marker (§4.3).

Gender value: one gender from the set of genders in a gender system (§1).

Grammatical anaphor: anaphor intermediate between pronoun (third person pronoun) and noun (noun in anaphoric function as in *that man*) (§4.3).

Headedness reversal: a semantic modifier or dependent of a phrase is its formal head (§4.3).

Hierarchical patterning: organization of the structure of a grammatical category according to a hierarchy (§3).

Hybrid noun: noun that can trigger two or more different gender values (but often only one of them is lexical gender) (§3.6).

Hypercharacterization: diachronic process whereby a marker is added that overtly indicates a category that the element already had before (§6.4).

Idiomatization of gender: a particular use of gender is restricted to idioms or an idiom (§7.7).

Independent modifier: modifier in an NP without a head noun, such as free relative clause, pronominal demonstratives and pronominal numerals (§4.1).

Independent nominal morphology: grammatical marking in an NP without a head noun (§4.1).

Indexation: an index is a bound or free grammatical marker – prototypically a marker of person – that denotes the argument itself. One argument can be marked several times by different indexes, which are then in a relationship of coreference (§7.1).

Individuation hierarchy: version of the animacy hierarchy subdividing inanimates into tangible objects, abstracts and mass nouns (Sasse 1993) (§3.2).

Information transfer chain: displacement of information in agreement in several steps, e.g., from gender assignment to noun lexeme to word-form to complex controller to complex target to word within target to gender marker realized on that word (§7.1).

Inherited gender: the possessor determines the gender of a noun or NP (§3.4).

Inter-sentential agreement: controller and target in agreement are or can be in different sentences (§7.1).

Intra-sentential agreement: controller and target in agreement are within the same sentence (§7.1).

Inventory complexity: the number of distinctions in a grammatical system (§2.1).

Latent controller: a contextual controller that is not realized in syntax (§7.1).

Lexical gender: classes of noun lexemes distinguished on noun-associated forms (§3.1).

Local agreement: agreement within the noun phrase (§4.1).

Mature phenomenon: a phenomenon with a non-trivial prehistory (Dahl 2004 : 2) (§1).

Many-to-one gender assignment: the same gender value is the outcome of several assignment rules (§6.2).

Morphological gender assignment: the gender value of a controller is determined by some of its inherent morphological properties (e.g., its declension class) (§5.1, §6.4).

Neutral gender: agreement form used for agreement with non-noun controllers, such as infinitive phrases, clauses, interjections and quoted phrases (§6.5).

Nomifier: cover term for gender and classifiers (§1).

Nominal gender targets: nouns or noun phrases that are gender targets (typically decategorialized nouns) (§7.6).

Nominal morphology: cover term for non-lexical markers within the noun phrase (§4.1).

Non-noun controllers: a controller in agreement that is not a noun, see neutral gender (§6.5).

Noun-associated form: an adnominal modifier (article, demonstrative, adjective, or numeral), or a verbal argument index, or an anaphoric pronoun (§1).

Noun class: same as gender, but emphasizing classes of noun lexemes (§1).

Noun incorporation: compound of a noun (usually in object function) and its verbal head. Has classifying potential to the extent the incorporated nouns are hyperonymic (§7.6).

Nominal target: agreement is imposed on a noun or noun phrase (§7.6).

Number: grammatical category marking number of referents (singular, plural, dual, non-singular etc.), frequently cumulating with gender (§8.1).

One-to-one gender assignment: every gender assignment rule applies to another gender value (§6.2).

Opaque gender assignment: non-formal gender assignment that is not general but characterized by numerous exceptions (§5.1, §6.3).

Overt marking of gender: extent to which nouns exhibit formal gender assignment (§5.1, §6.4).

Person: grammatical category indicating whether or not a referent is a speech act participant and which one (speaker or addressee), marked in free or bound personal pronouns (also called indexes). It may be sensitive to honorific distinctions. Person frequently cumulates with gender (§8.2).

Person name marker: marker indicating that an element is a name of a person, can be a general person name marker or distinguish male and female names; also called proprial article, but not all person name markers are articles and

"proprial" and "proper name" does not specify that the markers tend to be dedicated to person names rather than place names (§3.5).

Phonological gender assignment: the gender value of a controller is determined by some of its inherent phonological properties (§5.1, §6.4).

Plurale tantum, pl. **Pluralia tantum:** literally noun that only exists in the plural, but more broadly noun exhibiting lexical plurality (plural is a lexicalized property of a noun) (§9).

Principle of Contrast: captures the observation that in systems with opaque gender assignment nouns in a semantic field preferably have a dominant gender, but some salient nouns in the field tend to contrast with them and take an opposite gender (§6.3).

Principle of Fewer Distinctions (also Principle of Economy): measure of inventory complexity stating that the fewer distinctions made the less complex the domain (§2.1).

Principle of One-Meaning–One-Form (also Principle of Transparency): measure of transparency whereby the less complex grammatical phenomenon is one where there is a one-to-one correspondence between meaning and form (§2.1).

Principle of Independence: measure of complexity whereby the less complex grammatical domain/pattern of encoding is the one that is NOT dependent on another grammatical domain/pattern of encoding (§2.1).

Power: semantic connection between animacy and inanimate objects concerning objects endowed with some inherent potential of agency (§3.3 (iv)).

Pronominal articles: use of personal pronouns (third person and occasionally others) with noun phrases often with some restriction to referential, specific or animate (§3.5).

Pronominal gender systems: gender systems with pronouns as the only agreement target (§3.2).

Purview: semantic connection between animacy and inanimate objects concerning objects that belong to or relate to a human or animate referent, are perceived as human or animate in size, shape, or function, or are spoken about by humans (Gerdts 2013) (§3.3 (iii)).

Reconceptualization of referents (also called recategorization): switch of gender in a sequence of coreferential expressions due to association with different gender controllers with different gender (§3.7).

Referent-based gender: Dahl's (Dahl 2000a) "referential gender". Classes of referents distinguished on noun-associated forms (§3.1).

Relative condition, also optional condition: factor that favors a certain optional choice of agreement value (§7.5).

Relevance: The meaning of an element is relevant to another to the extent its semantic content interferes with the meaning of the other element (Bybee 1985) (§6.4).

Repeater: classifier with the same form as the noun classified (§4.3).

Sandhi: phonological processes across the border of words (§6.4).

Salience: semantic connection between animacy and inanimate objects based on the fact that discourse prominence of referents can be viewed as an aspect of animacy (§3.3 (ii)).

Semantic agreement: agreement with a referent-based controller (i.e., referent-based gender), often not local, can be inter-sentential. Follows the Agreement Hierarchy (§3.6).

Semantic gender assignment: the gender value of a controller is determined by some of its semantic properties, can be lexical gender or referent-based gender (§5.1).

Specific relationship in agreement: Property rendering the relation between controller and target unequivocal, e.g. coreference, co-conceptualization, certain kind of syntactic dependency, adjacency (§7.2).

System: minimally an opposition of at least two markers; however, often much more organized. If the notion is restricted to the more complex cases: highly organized language-specific complexes with both paradigmatic and syntagmatic components that play an important role in the architecture of grammar (however that architecture is modeled). Systems must constantly and actively be dealt with in production and comprehension, which presupposes a high degree of adaptability to previously non-encountered discourse contexts (§1).

System evolution: cover terms for all kinds of changes in the structure of systems and in particular including changes that entail the emergence of a system (§10).

Target: element or group of elements on which an agreement marker is realized (§7.1).

Target-controlled gender: the target restricts the choice of the gender value or contributes to the choice of gender value in another way (at the same time as there is displacement) (§7.7).

Unification: assumption that features of elements in an agreement relation are combined, which results in a symmetric interpretation of agreement. With unification, certain kinds of feature mismatches are tolerated and can be accounted for. Our approach does not provide feature mismatches, but accounts for the relevant phenomena with information transfer chains with several chain links (§7.1).

Uniqueness: a set of referents with a single member. Since animates are often unique (especially when referred to by person names), uniqueness is a semantic connection between animacy and inanimate objects (§3.3 (iv)).

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