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Semantics and Morphosyntactic Variation

*Qualities and the Grammar
of Property Concepts*

ITAMAR FRANCEZ AND ANDREW
KOONTZ-GARBODEN

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General preface

The theoretical focus of this series is on the interfaces between subcomponents of the human grammatical system and the closely related area of the interfaces between the different subdisciplines of linguistics. The notion of ‘interface’ has become central in grammatical theory (for instance, in Chomsky’s Minimalist Program) and in linguistic practice: work on the interfaces between syntax and semantics, syntax and morphology, phonology and phonetics, etc. has led to a deeper understanding of particular linguistic phenomena and of the architecture of the linguistic component of the mind/brain.

The series covers interfaces between core components of grammar, including syntax/morphology, syntax/semantics, syntax/phonology, syntax/pragmatics, morphology/phonology, phonology/phonetics, phonetics/speech processing, semantics/pragmatics, and intonation/discourse structure, as well as issues in the way that the systems of grammar involving these interface areas are acquired and deployed in use (including language acquisition, language dysfunction, and language processing). It demonstrates, we hope, that proper understandings of particular linguistic phenomena, languages, language groups, or inter-language variations all require reference to interfaces.

The series is open to work by linguists of all theoretical persuasions and schools of thought. A main requirement is that authors should write so as to be understood by colleagues in related subfields of linguistics and by scholars in cognate disciplines.

A fundamental question, little discussed in the recent formal syntactic and semantic literature, is whether syntactic variation can be tied down to variation in the repertoire of conceptual categories. In this monograph, Francez and Koontz-Garboden argue for a transparent relationship between variation in form and variation in meaning, based on an analysis of property attribution sentences. The idea that underpins the analysis is a semantic distinction between lexemes that characterize individuals and those that denote qualities, a distinction that feeds into the syntax and semantics of predication and possessive structures across a wide range of languages. It follows that meaning plays a rather more direct role in explaining cross linguistic morphosyntactic variation than is often assumed in current theorizing.

David Adger
Hagit Borer

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Portions of Chapters 2 and 3 first appeared in Francez and Koontz-Garboden (2015). The discussion of the Malayalam facts and their consequences in Chapter 4 was first published as Francez and Koontz-Garboden (2016b). The Ulwa double possession study in Chapter 6 was first published as Francez and Koontz-Garboden (2016a). All of these previous works are either in the public domain or we own the copyright to them.

Finally, we thank Na'ama, Melissa, Alma, Yasmin, Heath, and Blaine for their tolerance, and dedicate this book to each other, without whom it would not have been possible.

Glossing conventions

ACC	accusative case
APPL	applicative
ASP	aspectual marker
AUX	auxiliary
CL	classifier
C _{lf}	cleft marker (in Wolof)
CONT	continuous aspect
COP	copula
DA	– <i>da</i> – verb class marker (see Koontz-Garboden 2009d for description and analysis of Ulwa verb class morphology)
DAT	dative case
DEF	definite article
DET	determiner
DS	different subject switch reference marking
EQ-COP	equative copula (in Malayalam)
EX	existential predicate
EX.COP	existential copula (in Malayalam)
FEM	feminine
FIN	finite
MASC	masculine
NEG	negative
NON-NOM	non-nominative case
NON-FUT	non-future
OBL	oblique case
P	preposition (in Yucatec Mayan)
PA	– <i>pa</i> – verb class marker
PAST	past tense
PL.EXCL	plural exclusive (of first person plural)
PL.INCL	plural inclusive (of first person plural)
PL	plural
POSS-CS	construct state (in Hebrew)

PRES	present tense
RAUPI	the Ulwa <i>raupi</i> (see Koontz-Garboden 2009d: 476 ff.), very roughly a marker of subjecthood
REL	relativizer
SENT-KA	the sentential <i>ka</i> marker in Ulwa (on which see Koontz-Garboden 2009c)
SING	singular
SS	same subject switch reference marking
TA	– <i>ta</i> – verb class marker
TOP	topic marker
WA	– <i>wa</i> – verb class marker
1,2,3	1st, 2nd, 3rd person
5–19	Basaá noun classes
< >	gloss inside angle brackets indicates glossed morpheme is an infix

Introduction: Lexical semantics and morphosyntactic patterns

This book explores some of the consequences of a specific hypothesis about a particular systematic morphosyntactic pattern, with the aim of contributing to a broader understanding of the nature of constraints on morphosyntactic variation. Our argument is that variation is constrained by lexical semantics, in ways that are familiar from some corners of the linguistic literature, but that are not yet generally appreciated, particularly by formal semanticists and syntacticians.

The pattern of focus (exemplified in more detail in the next section) is found in the morphosyntactic expression of what we call (following Dixon 1982 and Thompson 1989) *property concept sentences*. Property concept sentences are English predicative adjectival sentences like (1) and their translational equivalents across languages.

(1) Krishna is wise.

The point of variation we concern ourselves with arises as a consequence of the fact that non-verbal property concept sentences either can have the canonical form of non-verbal predication such as seen in (1), or can take the form of possessive sentences, as with the minimal pair counterpart of (1) in (2):

(2) Krishna has wisdom.

Although the form of property concept sentence in (2) is rather limited in English, as we show throughout the book, particularly in Chapters 2 and 3, there are languages in which it is the primary if not the exclusive form in which property concept sentences are attested.

At its most basic level, the analytical question we are concerned with in this book is why this variation exists—what is responsible for the different modes of expression of what seems like the same meaning (or set of meanings in the case of all property concept sentences) across languages? Our hypothesis, which we call the **Lexical Semantic Variation Hypothesis** (stated and elaborated in detail in Chapter 2), is that what determines whether a property concept sentence is possessive or not is the lexical semantics of the basic property concept lexeme on which that sentence is built. The

lexica of different languages can associate basic property concept lexemes (like *wise* but also like *wisdom*) with one of two closely related types of meaning, and the semantic consequences of these associations determine whether the sentence these lexemes appear in is possessive or not.

The chapters of this book demonstrate the explanatory power of our hypothesis, and, in doing so, are concerned with illustrating two more specific programmatic points. The first is that some principled morphosyntactic variation is rooted in, and hence explained by, semantic generalizations, and ones that moreover can be stated explicitly using the tools of formal semantics, as we do for the Lexical Semantic Variation Hypothesis and its key components in Chapters 3 and 6. While formal semantics has lagged far behind phonology, morphology, and syntax in taking a comparativist perspective (presumably because of the view, inherited from the philosophy of language, that meaning is, in some sense, universal), adopting such a perspective has been at the center of much recent work in the literature. The second programmatic point is that at least some of the semantic generalizations that explain differences in form are generalizations about **lexica**: language-specific sets of (morphologically simple or complex) expressions that form the input to syntactic operations. That the lexicon is an important source of variation in form is rather uncontroversial as relates to functional categories. It is more controversial as relates to open class inventories, and Chapters 4 and 5 deal specifically with this issue. In the remainder of the introduction, we set the backdrop for these two claims.

1.1 Morphosyntactic variation, semantics, and translational equivalence

The empirical scope of any comparative linguistic question is delimited by variation in form in the face of translational equivalence. What the relevant notion of translational equivalence is is a highly complex problem (see e.g. Keenan 1973; von Stechow and Matthews 2008 for discussion). Nevertheless, that different forms across languages can stand in an intuitively identifiable relation of translational equivalence is the backbone of work in crosslinguistic syntax and language variation in the generative tradition.¹ Consider, for example, the relative ordering between verbs and objects. In many languages, verbs tend to precede their objects (e.g. English), while in others objects precede verbs (e.g. Ulwa; Misumalpan, Nicaragua). This difference can be illustrated through creation of minimal pair sentences like (3) and (4):

- (3) This child broke my pencil.

¹ Similarly, the idea that different forms within one language compete to express, in some sense, the same meaning is essential to the notion of blocking which plays a fundamental role in theories of morphology: see e.g. Kiparsky (1982); Andrews (1990).

- (4) *aka bakaka ulni-ki panka bahtida.*
 this child writing-1SING stick broke
 ‘This child broke my pencil.’ (0405–1030)²

Any theory that recognizes the generalization that Ulwa and English differ in the relative ordering of verb and object, and that this is a general syntactic difference between the two languages, must be able to treat (3) and (4) as translational equivalents. De facto, the practice of assuming translational equivalence between expressions is uniformly followed in generative theorizing. The assumption, often left implicit, is that any interpretational differences between structurally different translational equivalents do not affect the structural explanandum.

In the context of this book, in which translational equivalence plays an utterly crucial role, it is important to contrast two ways of thinking of the relation between the relevant notion of translational equivalence and model-theoretic semantics. As Keenan (1978) points out, any notion of translational equivalence³ implies sameness of meaning, and sameness of meaning certainly entails sameness of truth conditions. Two sentences that differ in truth given a fixed set of circumstances can surely not have the same meaning and hence cannot be translational equivalents. In generative linguistic semantics, it is standard to assume that sameness of truth conditions should be captured as model-theoretic identity, that is, as the imposition of identical conditions on models. In other words, two expressions have the same truth conditions, or make the same contribution to truth conditions, if they impose the same restrictions on the models against which they are taken to be interpreted. Clearly, two sentences that impose identical restrictions on the model should count as having the same meaning and as being translational equivalents.⁴

However, this is not the only way to think about truth conditional equivalence. In particular, there is no a priori, pre-theoretical reason to identify truth conditional identity with identity of model-theoretic restrictions. Doing so involves, in fact, a step that is far from innocent. That step identifies the ‘fixed set of circumstances’ in which sentences are intuited by speakers to be true or false with the abstract models assumed by semanticists. In fact, truth in a model is merely a technique for capturing certain aspects of our intuitions about truth in the world, and there can be no doubt that reality greatly underdetermines the nature of the models we use to model it for the purposes of doing semantics.⁵ The circumstances under which speakers judge the truth of sentences are real world situations, and assent and dissent are behavioral categories.

² This data point comes from Koonz-Garboden’s unpublished fieldnotes on Ulwa. Reference to these fieldnotes is in the form year-page, with 0405 referring to the collection of fieldnotes from a fieldtrip spanning 2004–5.

³ Keenan is specifically concerned with demonstrating the inviability of a general notion of exact translation between languages.

⁴ By identical restrictions on the model we aim to include identity of presuppositions.

⁵ This point is famously made by Quine (1960) in his indeterminacy of reference and translation theses.

It is perfectly reasonable, therefore, to assume that speakers can judge sentences to be true or false under the same circumstances of evaluation, without those sentences imposing identical conditions on models in an adequate grammatical analysis of their meaning. In fact, it is quite clear that this situation is prevalent in natural language, since languages can differ quite widely in how they ‘say the same thing’. As an example, consider ways of asking a person for their age in English, Hebrew, French, and Spanish in (5).

- (5) a. How old are you?
 b. *bat* *kama* *at?*
 daughter.POSS-CS how.much you.FEM
 ‘How old are you?’ (Lit.: The daughter/possessor of how much are you?)
 c. *Quel* *age* *as* *tu?*
 what age have.2SING you
 ‘How old are you?’ (Lit.: What age do you have?)
 d. *Cuantos* *años* *tienes?*
 how.many years have.2SING
 ‘How old are you?’ (Lit.: How many years do you have?)

Each of these questions involves expressions making reference to model-theoretic objects which are, at least *prima facie*, rather different. While English asks about a measure or degree of being old, Hebrew asks about possession of an amount, French about the identity of a possessed age, and Spanish about the number of possessed years. Nevertheless, presumably no grammarian would want to deny that all the sentences in (5) ask the same thing, and that they are translational equivalents of one another. Examples of this kind are by far the norm rather than the exception in natural language. We see no reason not to conclude from them that translational equivalence can be viewed as a relation that holds between sentences that do not impose identical restrictions on the models we use in model-theoretic semantics. In particular, different languages might invoke rather different semantic primitives in building up complex sentential meanings that, for reasons that must be explained but cannot be explained by grammatical theory, lead to the same behavioral patterns of judgment. Alternatively, there might be well-motivated reasons to provide, instead, an analysis of sentences like those in (5) in which they all converge, though in different ways, on the same model-theoretic conditions.

In this book, we follow the general *modus operandi* alluded to in the previous paragraph, assuming translational equivalence between certain sentences, but remain agnostic throughout about whether the particular cases of translational equivalence dealt with are best captured in terms of identity of model-theoretic contribution or not. Our arguments do not require resolving this thorny issue. When relevant (e.g. in Chapter 3), we discuss the implications of making a choice. The pattern that is in

our focus, however, is precisely of the kind in (5), where different languages, and also different constructions within a single language, employ different basic components in expressing translational equivalents, that is, overall sentential meanings that are intuited to be ‘the same meaning’ in the relevant sense. This, together with the fact that the pattern is systematic (unlike that in (5)), is what makes it an interesting case study for examining the role of semantics in shaping morphosyntactic variation.

Whenever there are differences in form between translational equivalents, the question arises how these differences are intertwined with the composition of the translationally equivalent meanings. Specifically, what is at stake is whether the differences in form are best analyzed as due to syntactic, morphological, and phonological differences between the variants, or whether instead they are direct reflections of differences in the basic semantic components involved. This question is fairly uninteresting in the case of word order differences like those illustrated above between Ulwa and English, since the denotation is generally independent of basic word order, but becomes crucial when translational equivalents are composed of different basic components. As mentioned earlier, this book explores this question in detail in relation to what we call *property concept sentences*, translational equivalents of English copular sentences with a predicate adjective,⁶ which vary between possessive and non-possessive forms (the same variation is arguably found intralinguistically: see Chapter 2). An example of this pattern is (6), contrasting English and Spanish.

- (6) a. I am hungry.
 b. *Teng-o hambre.*
 have-1SING hunger
 ‘I am hungry.’

It is apparent on the surface that (6b) involves the Spanish equivalent of English ‘have’, used elsewhere in the language for the expression of possession. Example (6a), by contrast, has the morphosyntactic shape found elsewhere in ordinary non-verbal predication, not only with adjectives, but with predicative nominals and locatives as well:

- (7) a. Kim is a teacher.
 b. Kim is at work.

As discussed in detail in Chapter 2, the pattern in (6b) is relatively poorly attested in Germanic and Romance, but found, to varying degrees, across a wide range of unrelated languages. More generally, what may be a minor form of expression of some meaning in one language, may be the dominant, even the only pattern in another. For example, Ulwa, the endangered Misumalpan language spoken in Nicaragua that

⁶ The term ‘property concept’ is borrowed from Thompson (1989), who employs it for the notional categories associated with adjectives in Dixon’s (1982) seminal study.

features prominently in key areas of discussion in this book, overwhelmingly has a pattern better characterized as being like that in (6b) rather than (6a) for the expression of property concept sentences (Koontz-Garboden and Francez 2010, Francez and Koontz-Garboden 2015; 2016a; Koontz-Garboden 2016). This is illustrated by the data in (8), which show that the same morphology that appears on a possessed noun in a possessive noun phrase (8a) also features in property concept sentences (8b).

- (8) a. *Alberto pan-ka.*
 Alberto stick-3SING.POSS
 ‘Alberto’s stick’ (0405–829)
- b. *yang as-ki-na minisih-ka.*
 1SING shirt-<1SING.POSS> dirty-3SING.POSS
 ‘My shirt is dirty.’ (Green 2004: asna)⁷

While (8b) is a predicative sentence with the same structure as that of a sentence involving predication of a predicate nominal (9), its predicate, *minisih-ka* ‘dirty’, the translational equivalent of the English adjective *dirty*, is a noun, and features an affix otherwise used to express adnominal possession, as seen by comparing it to the form of a possessed noun as in (8a).

- (9) *Alberto ya al as.*
 Alberto the man one
 ‘Alberto is a man.’

The question about this pattern is whether the difference between possessive and non-possessive forms reflects differences in the semantics of the constituents that make up the relevant sentences, or whether there is underlying semantic uniformity, masked by superficial morphological and syntactic differences.

At the extremes, there are two opposing views about what such differences might mean (see Chierchia 1998b; Matthewson 2001; von Stechow and Matthewson 2008; Koontz-Garboden 2014; Francez and Koontz-Garboden 2015 for some relevant discussion). To give them names, we call one view **uniformity** and the other **transparency**. Uniformity holds that the observed morphosyntactic differences in such cases reflect variation in the inventory and phonological realization of functional heads, but *not* in semantics, at least of open class elements. As we detail below, such a view is assumed explicitly in much neo-constructionalist, Nanosyntax, and Distributed Morphology literature (see Ramchand 2008: 8,151; Son and Svenonius 2008: 393; Embick 2009; Menon and Pancheva 2014), in passing in Hale and Keyser (2002), and in some semantic work with no particular syntactic commitments (e.g. Piñón 2001).

The contrasting view we call transparency, which has it that the observed variation in form reflects variation in semantics. This view lies at the heart of Talmy’s (1972;

⁷ References to data from Green’s (2004) unpublished, unpaginated electronic dictionary are made to the entry in the dictionary where the example is found.

1985; 2000) analysis of the motion typology and functionalist literature building on him. More recently, it has been explicitly adopted in work in formal semantics dealing with questions of variation (e.g. Chierchia 1998b; see Matthewson 2001 for discussion), some of which we consider in §1.2. This book argues for, and explores several interesting consequences of, a transparentist account of the pattern described above. Our claim is not a reductionist one; the claim is not that *all* morphosyntactic variation is semantically consequential. It is rather that some systematic patterns of variation in form, and the one observed with property concept sentences in particular, do reflect differences in semantics and cannot be reduced to syntactic variation and superficial accidents of morphophonology. There is a systematic variation in the lexical semantics of basic property concept lexemes and those, together with individual languages' lexical inventories, lead to differences in how the overall meaning of property concept sentences is constructed compositionally, differences that are ultimately manifested on the surface.

In the sections that follow we consider, largely without judgment, the broader backdrop of this research question, with the aim of better problematizing and contextualizing the question and clarifying the contrast between uniformity and transparency. We divide the discussion by empirical issue, grouping together those areas that have fueled one or the other agenda. We start with the claims of transparency, and the empirical base that such claims have been made on, and then turn to uniformity, considering how those committed to a more uniform underlying semantics have grappled with the variation that has fueled the transparent agenda, and the additional facts they have brought to the fore. We follow this discussion with an outline of the remainder of the book, situating our study against this broader question in response to which these studies, as well as our own, have been pursued.

1.2 Transparency in the literature

1.2.1 *Talmy on the motion typology*

Talmy's typology of directed motion event expression (Talmy 1972, 1985) is, to the best of our knowledge, the first example, at least in the modern literature, of transparent analysis of crosslinguistic variation in morphosyntax. Talmy's starting point was to observe that there are various meaning components in a motion event, among them the object in motion (figure), the fact of motion (motion), possibly some manner in which the motion is carried out (manner), an optional path of motion (path), and the entity toward which the motion is directed (ground). These are all illustrated by the English example in (10), with the various lexical items labeled as to the Talmyan component of the motion event whose lexical entailments they introduce:

- (10) Kim ran into the house.
 FIGURE MOTION+MANNER PATH GROUND

As observed in (10), in a canonical sentence describing a motion event in English, motion and manner entailments are packaged together ('conflated' in Talmy's terminology) in the verb, with path outside of it, in what Talmy calls a 'satellite'. This state of affairs contrasts with what is seen in other languages. Spanish is a common point of comparison, as exemplified by (11), the translational counterpart of (10):⁸

- (11) *Kim entró a la casa corriendo.*
 Kim entered to the house running
 'Kim ran into the house.' (Lit.: Kim entered the house running.)

In a canonical Spanish sentence describing a motion event, by contrast with English, the matrix verb imposes entailments of motion and path on the figure; there is no entailment of manner. The generalization that emerges, then, is that verbs expressing directed motion can encode either motion and manner, or else motion and path, but cannot encode both manner and path (though see Beavers and Koontz-Garboden forthcoming for some critical discussion).

In the context of the agenda of this book, the question raised by data such as these is what they say about how the meanings of sentences describing directed motion events are composed in English versus Spanish. According to Talmy, these differences are ultimately a consequence of the lexical semantics of the open class verbal inventories of the two languages. Talmy observes that English has a large inventory of verbs that entail both manner and motion of the figure, verbs such as those in (12):

- (12) English verbs of manner of motion (Levin 1993: 264 ff.)
 bounce, drift, drop, float, glide, move, roll, slide, swing, coil, revolve, rotate, spin, turn, twirl, twist, whirl, wind, amble, backpack, bolt, bounce, bound, bowl, canter, cavort, charge, clamber, climb, clump, coast, crawl, creep, dart, dash, dodder, drift, file, flit, float, fly, frolic, gallop, gambol, glide, goosetstep, hasten, hike, hobble, hop, hurry, hurtle, inch, job, journey, jump, leap, limp, lollop, lope, lumber, lurch, march, meander, mince, mosey, nip, pad, parade, ...

Languages like Spanish, he observes, have far fewer manner of motion verbs. Instead, verbs entailing motion of a figure in these languages tend also to entail a path of the figure, as with the Spanish verbs in (13):

- (13) Motion + path verbs in Spanish (Talmy 1985: 69 ff.)
entrar 'enter'; *salir* 'to leave'; *pasar* 'to move by or through'; *subir* 'to go up (ascend)'; *bajar* 'to go down (descend)'; *irse* 'to move away'; *volver* 'to return'; *cruzar* 'to cross'; *ir* 'to go (along)'; *andar* 'to move about'; *juntarse* 'to join together'; *separarse* 'to move apart'; *meter* 'to put in'; *sacar* 'to remove'.

⁸ Spanish is more complicated than presented later in this section (see e.g. Aske 1989), though not in ways that impact the more general point being made here.

This is why Spanish shows a ‘verb-framed’ syntax, whereas English shows a ‘satellite-framed’ syntax. Since Spanish verbs do not encode manner, manner must be introduced compositionally by adverbial modifiers such as *corriendo* ‘running’. Since English verbs do not encode path, path information must be introduced by prepositional phrases such as *into*. Although this basic typology is widely known to be oversimplified,⁹ Talmy’s basic intuition, that the variation in morphosyntax reflects differences in the way in which his meaning components are lexically packaged together and compositionally put together is widely accepted in some form or another.¹⁰

1.2.2 Chierchia on crosslinguistic variation in DP syntax

Chierchia (1998a,b) sets out to explain why it is that in Mandarin Chinese, nouns translated in English as count nouns require classifiers in the same manner as their mass noun counterparts, as illustrated by the data in (14):

- (14) a. *yí lì mǐ*
 one CL rice
 ‘one (grain of) rice’
 b. *liǎng lì mǐ*
 two CL rice
 ‘two (grains of) rice’
 c. *yí zhāng zhuōzi*
 one CL table
 ‘one (piece of) table’
 d. *liǎng zhāng zhuōzi*
 two CL table
 ‘two (pieces of) tables’
- (Chierchia 1998a: 92)

Although Chierchia’s characterization of these facts as above is controversial, and has been argued to be oversimplified (see e.g. Cheng and Sybesma 2012 and references), his mode of analysis has been influential, and has heralded into formal semantics a new crosslinguistic agenda, and into generative linguistics more generally more

⁹ See Levin and Rappaport Hovav (forthcoming) for detailed overview discussion and references, and Beavers et al. (2010) for a proposal, consistent with transparency, to capture additional complexity not countenanced under the traditional Talmy typology. See Acedo-Matellán and Mateu (2013) for a recent syntactic analysis more consistent with uniformity.

¹⁰ An interesting example is presented in Son and Svenonius (2008), who seem to us to propose a transparentist analysis within a uniformitarian (specifically, Nanosyntactic) framework. Their intuition is that there is a universal inventory of meaning components that feature in the semantic composition of directed motion, each represented as a functional head in a syntactic structure, and languages differ in what ‘vocabulary items’ they have to realize these heads. The result is that languages vary precisely in the lexical semantics of their verbs, except that the relevant notion of *verb* is not a lexical one. They do not, however, discuss the complementarity of manner and path.

serious consideration of the extent to which variation in semantics might underpin crosslinguistic variation in morphosyntax. Because our goal in this section is simply to illustrate both the crosslinguistic problem and the transparent mode of analysis, we consider his characterization of the problem, accepting that it may be an idealization.

Bearing in mind the above caveat, Chierchia aims to understand what the explanation for the observed difference between English and Chinese is. Why does English allow direct composition of numerals with ordinary count nouns, while Chinese requires classifiers with both count and mass nouns? Clearly English and Chinese differ in some way that leads to this variance. Chierchia's argument, not unlike Talmy's, is that the source of variation lies ultimately in contrasts in the denotations of the basic lexical building blocks of the languages. Specifically, while English has a genuine lexical semantic contrast between mass nouns and count nouns, formalized in Chierchia's terms as a contrast between nouns that include both pluralities and atoms in their denotation versus those that include only atoms (in the case of singular count nouns), Chinese lacks such a contrast—all nouns in Chinese, according to Chierchia, have the kind of denotation that mass nouns in English have. As a consequence, they behave in a syntactically uniform fashion in the constructions that Chierchia examines. In particular, nouns that look like count nouns, based on their translation into English, can be used as bare singulars, like mass nouns generally, as shown in (15):

- (15) *wò kànjiàn xióng le.*
 I see bear ASP
 'I saw (some/the) bears.' (Chierchia 1998b: 354)

Additionally, all nouns require classifiers to combine with numerals—they have to be individuated in the same way as any mass noun from familiar languages. Also, such an analysis gives rise to the correct prediction that there is no plural marking in Chinese, since mass nouns generally do not pluralize. In short, Chierchia's argument is that the contrasting noun phrase syntax in English and Mandarin Chinese follows directly as a consequence of contrast in the kinds of denotation that nouns have in the two languages.

Such an analysis falls squarely in the transparent category—the differences in the form of expression of translational equivalents arise, according to Chierchia, from a difference in the lexical semantics of the nominal inventories of the two languages. Classifiers surface precisely when they are semantically required. Chierchia also considers, however, a uniform analysis, under which both the syntax and semantics of Chinese and English are, at some deeper level, identical. He remarks:

We can of course say, if that makes us happier, that the parameter is really the presence versus absence of plural morphology, plus the possibility of occurring bare as a bare argument, and what not. . . . We know that whether a certain cluster of grammatical differences is to be accounted for in syntactic or in semantic terms (or by some combination of the two) is a purely empirical issue. In the present case, direct appeal to semantic notions has the advantage

of identifying the principles governing a class of phenomena (plural marking, classifier systems, presence of the article) that it is not clear have a non ad hoc account on syntactic grounds alone. Chierchia (1998a: 97)

The transparentist claim, then, is that placing the locus of variation in the semantics, and treating the morphosyntactic differences as reflecting semantic differences, leads to a unified explanation of a range of contrasts that would otherwise be mysterious. This book makes a parallel argument in the domain of property concept constructions, showing how locating the variation observed in their form in lexical semantics allows a unified explanation of several generalizations that would otherwise remain both disparate and mysterious, and, in doing so, contributing to the semantic variationist agenda that Chierchia holds considerable responsibility for initiating within generative linguistics.

1.3 Uniformitarianism in literature on morphosyntactic variation

Having surveyed two prominent areas (among many others) where it has been claimed that variation in the form of translational equivalents reflects variation in the meaning of their basic components, in the sections that follow we survey areas in which it has been claimed that the opposite is the case, and that surface differences in morphosyntax amount largely to noise, so far as underlying syntax and semantics are concerned.

1.3.1 *Ramchand and Svenonius on crosslinguistic variation in DP syntax*

In a high-level consideration of the sources of crosslinguistic variation in morphosyntax, Ramchand and Svenonius (2008) make the strong claim that there is no parametric semantic variation. In cases where the same meaning is derived in what look like morphosyntactically different ways, looks are deceiving: in fact, the syntactic structure is entirely uniform, but this is masked by accidents of morphophonology, specifically the covertness (i.e. phonological vacuity) of some pieces of structure. Furthermore, there is no variation in the primitives that feed composition, except for differences in the degree of semantic specification in the functional vocabulary. To accentuate the relevant contrast, we consider here only their alternative view of the kinds of differences in DP syntax highlighted by Chierchia, which he believed motivated a transparent analysis.

Ramchand and Svenonius (2008: 5) reject Chierchia's view according to which the comparison of Chinese, Russian, English, and Italian justifies positing parametric variation in semantics. Their argument is one from elegance: a theory that does not posit a semantic module in which there can be parametric variation is, *a priori*, preferable to a theory with the same coverage that does posit such a module.¹¹

¹¹ Nothing we have to say in this book depends on a modular approach to grammar, about which we remain agnostic as a matter of strategy. What we argue for is simply that languages can differ in

Ramchand and Svenonius take the basic explanandum to be the behavior of noun phrases in argument position in the different languages. They argue, following Cheng and Sybesma (1999), that, absence of morphophonological evidence notwithstanding, Chinese (and Russian) does have a determiner, underspecified for definiteness, and just as in familiar languages, it maps predicate-denoting NPs to DPs with an argumental type meaning. What look like bare occurrences of noun phrases in Chinese and Russian, then, are really full DPs, in which the determiner is underspecified for familiarity (in other words, the languages do not distinguish lexically between definite and indefinite determiners).

Ramchand and Svenonius, then, capture the fact that all nouns can be used bare as arguments in a uniformitarian fashion, assuming a universal syntax and no variation in the denotations of open class lexical items (specifically, without concluding that all Mandarin nouns have mass denotations). The appearance that all nouns can be used bare in languages like Chinese is simply due to the accidental phonological fact that the determiner is null.¹²

1.3.2 Possessive structures

There is a great deal of diversity in the surface morphosyntax of sentences expressing possessive predication (data from Myler 2014: 5–6; see also Stassen 2009 for detailed overview). Some languages, such as English, have a transitive *have* verb, as shown in (16).

(16) I have a book.

It is quite common, however, that languages lack such a verb, or have other structures that are the more colloquial ones to use for the expression of predicative possession. One kind of alternative structure uses a copular verb, either with the possessee as the object of a comitative adposition, as in Icelandic (17a), or with the possessed marked with nominal possessive morphology, and used as a predicate nominal, as in Cochabamba Quechua (17b).

(17) a. *Ég er með bók.*

I am with book.ACC

'I have a book.' (Icelandic; copular *be* + possessee in 'with' PP; Myler 2014: 5)

the denotations they assign to lexical items: semantically, syntactically, and morphologically underived elements of the lexicon. Furthermore, we do not share Ramchand and Svenonius' view that the null hypothesis favors a theory without parametric semantic variation. Given that such variation need not be viewed as parametric, but simply as variation in the association of forms with meanings in the lexicon, the burden of proof is rather on a theory that claims to see syntactic structure where none is immediately apparent.

¹² How they account for Chierchia's other morphosyntactic contrasts is not discussed, as the point of their discussion is a more programmatic one. Presumably, a full-fledged analysis along the lines they suggest would follow Cheng and Sybesma's empirical and theoretical lead in those areas.

b. *noqa libru-yoq ka-ni.*

I book-POSS be-1S

‘I have a book.’

(Cochabamba Quechua; copular *be* + predicate nominal possessee;

Myler 2014: 5)

Also common are existential constructions of various types, such as the Hebrew in (18), where the possessor is an inflected preposition, and the possessed is the pivot of the existential construction:

(18) *yeS li sefer.*

EX to.me book

‘I have a book.’

(Hebrew; existential particle + dative possessor)

The problem such variation raises is framed aptly by Myler, who remarks of the above data that “although these sentences are translations of each other, they seem to differ radically in argument structure, at least on the surface” (Myler 2014: 6). What is the source of this variation? Should the different structures be reduced to a common syntax? Although Myler goes on to argue that such reductionism is ultimately not warranted, it is a very common view in the mainstream syntactic literature that it is. According to a view that goes back at least to Benveniste (1966), and stated within a generative framework most famously in Freeze (1992), locative, possessive, and existential sentences form a ‘locative paradigm’, sharing the underlying structure of predicative locative copular constructions. This view is based on certain superficial similarities of structure between the existential, predicative possessive and predicative locative sentences of some languages. The superficial similarity of existential and possessive sentences is exemplified by the Hindi, Tagalog, and Yucatec data in (19)–(21).

(19) Hindi (Freeze 1992: 576)

a. *kamree-mēē aadmī hai.*

room.OBL-in man COP.3SING.PRES

‘There is a man in the room.’

b. *larkee-kee paas kuttaa hai.*

boy.OBL-GEN proximity dog COP.3SING.PRES

‘The boy has a dog.’

(Lit.: ‘By the boy is a dog.’)

(20) Tagalog (ibid.)

a. *may gera sa ewropa.*

COP war in Europe

‘There is a war in Europe.’

b. *may relos ang naanai.*

COP watch ART mom

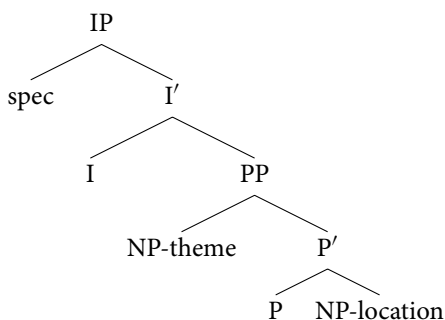
‘Mom has a watch.’

- (21) Yucatec (ibid.)
- a. *yaan huntul ciimin ti? yukataan.*
 COP one horse P Yucatan
 'There is a horse in Yucatan.'
- b. *yaan huntul ciimin ti? in-paapa.*
 COP one horse P my-father
 'My father has a/one horse.'

Freeze's argument is that possessives, in all languages, are locatives in which the location is animate. Both existentials and possessives are derived from predicative locative structure by movement of the locative predicate into subject position. The only difference between what we call a possessive construction and what we call an existential construction is that in a possessive, the locative predicate is animate.

The crosslinguistic diversity is then a consequence of the variety of ways in which the D-structure (in Freeze's GB era syntax) of possessives(/existentials/locatives) can be perturbed. Consider (22), the alleged underlying syntax of all members of the locative paradigm:

- (22) Freeze's (1992: 558) D-structure for the locative paradigm



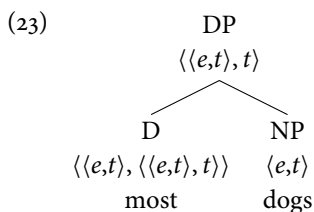
Freeze's claim is that in an existential construction, the locative P' in (22) moves to the specifier of IP. In a possessive, precisely the same thing happens, simply with a location that happens to be animate. Much of the variation in structures of possessives across languages, according to Freeze, is then simply a consequence of independently motivated differences (in e.g. case, word order, etc.) between the various languages, differences that he argues should not be pinned on either existentials or possessives per se.¹³ The syntax underlying the superficial variety of constructions is uniform.

¹³ The exception is in relation to languages with dedicated possessive verbs, like English *have*. Freeze's claim in relation to these is that only the location moves to the specifier of IP, leaving behind a stranded P, which is 'incorporated' into the copular position. This structure is realized in a special way (e.g. 'have' rather than 'be').

While Freeze does not provide a semantics for any of the proposed structures, it seems clear that he supposes that the semantics is also identical.¹⁴

1.3.3 Matthewson on DP syntax/semantics

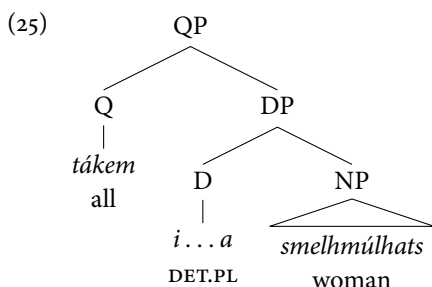
The standard analysis of quantified DPs (see e.g. Keenan 1997: §1) has it that a quantifying determiner composes with a type $\langle e, t \rangle$ noun to create a phrase of generalized quantifier ($\langle \langle e, t \rangle, t \rangle$) type. This is schematized by the tree in (23).



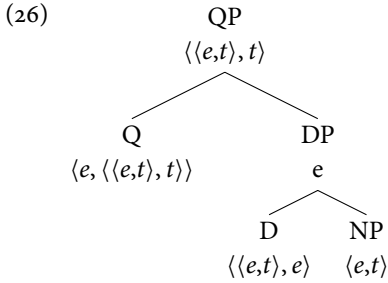
In St'átimcets, Matthewson argues, such a syntax/semantics looks a priori implausible, since quantifiers take full DPs as arguments, suggesting quite simply that the quantifier is not in the determiner position, and does not take an NP as its argument (Matthewson 2001: 146). This state of affairs is illustrated by the data in (24).

- (24) *tákem [i smelhmúlhats-a]*
all DET.PL woman.PL-DET
'all the women' (St'átímcets; Matthewson 2001: 146)

Matthewson suggests that St'átimcets, as schematized in (25), transparently reflects the structure of quantified DPs, and that the received wisdom on their syntax and compositional semantics is wrong (Matthewson 2001: 153). Rather than the orthodox view in which quantifiers compose with a type $\langle e, t \rangle$ NP, she argues that instead, quantifiers compose with an e type DP in order to create a generalized quantifier, as shown in (26).



¹⁴ In fact, semantically, existentials and possessives clearly do not pattern with predicative locatives. See Francez (2007, 2009a); Koontz-Garboden (2009b) for extensive discussion.



If this is the correct analysis for St'átimcets, then it raises the question, which Matthewson reflects on in detail, how English and St'átimcets differ semantically and syntactically. Matthewson proposes that the null hypothesis should be that they do not differ at all, and pursues the idea that English quantified DPs have the syntax and semantics proposed for St'átimcets (Matthewson 2001: 155).¹⁵ In fact, she argues, we see the relevant structure quite commonly in English surface syntax (assuming that the *of* in partitives is vacuous; Matthewson 2001: 162) in examples like those in (27).

- (27) a. all (of) the dogs
 b. both (of) the dogs
 c. half (of) the dogs

The claim does present challenges in other areas particularly as relates to the analysis of English *every* (Matthewson 2001: 177), but Matthewson's claim ultimately remains that the syntax and semantics of quantified DPs, at least across English and St'átimcets, can be reduced to one and the same. More generally, her argument is that the null hypothesis should be that where there are superficial differences in syntax that necessitate differences in underlying semantics, the syntax and semantics of all languages should be reduced to a common underlying one. This has a wide range of theoretical advantages, she argues, even if it does cause empirical problems.

1.3.4 Piñón on variation in direction of derivation in the causative alternation

Our last example of a uniformity analysis concerns treatment of the causative alternation, the phenomenon wherein a change of state verb can be used in either a transitive frame as in (28a), or an intransitive frame with its subject argument corresponding to the object argument of the transitive variant, as in (28b).

- (28) a. Kim broke the vase. (causative)
 b. The vase broke. (inchoative)

¹⁵ Giannakidou (2004) presents an alternative, but equally uniformitarian, analysis, in which the semantics of quantified DPs is uniformly a classical generalized quantifier semantics, but what varies is whether contextual domain restriction is encoded overtly or not (and if it is encoded, where).

Given the large swath of the English verbal lexicon to which the alternation applies (see Levin 1993 for examples and references), standard linguistic methodology leads to the conclusion that the two variants of the verb are neither unrelated, nor both listed in the lexicon. Rather, the assumption is that one is derived from the other, or both from some more abstract source. In English, there is no morphology to tell us what this derivational relationship is, and all possible directions have been assumed. That the inchoative is derived from the causative is argued in Levin and Rappaport Hovav (1995); Chierchia (2004); Reinhart and Siloni (2005). That the causative is derived from the inchoative is argued in Lakoff (1965); Dowty (1979); Hale and Keyser (2002). That they are both derived from a more abstract source is argued in Piñón (2001).

An obvious way of working toward resolving this controversy has been to investigate what happens crosslinguistically. As it happens, this just deepens the mystery. In some cases, derivation of the causative from the inchoative is observed, as with the Tongan (Polynesian) data in (29).

- (29) a. *lahi*
 ‘become big’
 b. *faka-lahi*
 ‘cause to become big’ (Koontz-Garboden 2005: 83)

In other cases derivation of the inchoative from the causative is observed, as with the Eastern Armenian data in (30).

- (30) a. *epel*
 ‘cause to become cooked’
 b. *ep-v-el*
 ‘become cooked’ (Megerdumian 2002: 98)

There are also what Haspelmath (1993: 91) calls ‘non-directed’ derivations, where both causative and inchoative are separately derived from a root, as with the Warlpiri data in (31).

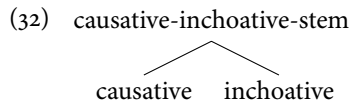
- (31) a. *wiri-jarri-*
 ‘become large’
 b. *wiri-ma-*
 ‘cause to become large’
 c. *wiri*
 ‘large’ (Hale and Keyser 1998: 93)

The question, then, is what the crosslinguistic diversity means, both for the analysis of any single language, and for the nature of variation in this part of grammar. The transparent style of analysis (laid out by e.g. Koontz-Garboden 2009a, 2014) takes as its point of departure the idea that the crosslinguistic differences reflect differences

in the direction of derivation. Lundquist et al. (2015) pursue this hypothesis in detail, investigating subtle semantic predictions that follow from it (and which are in fact borne out). The alternative, however, is to assume that the morphological diversity reflects nothing more than variation in morphophonology, and that the alternation is in fact morphosyntactically and semantically uniform at the relevant level of abstraction. This is precisely the analysis pursued by Piñón (2001), who sums up the issue and his proposed *modus operandi* nicely as follows:

In the face of this apparent morphological anarchy, it would be easy to despair and to conclude that languages just pick and choose and that no general analysis of the causative-inchoative alternation that respects the morphological facts is possible. Now, although it is undeniable that languages really do pick and choose, it does not necessarily follow that no general analysis of the causative-inchoative alternation that respects the morphology is possible. On the contrary, it seems to me that the analytic strategy to pursue in this case has to be that of looking for the least common denominator. More precisely, we should try to develop an analysis that in no instance outright contradicts the surface morphology but at the same time does not always naively take the surface morphology at face value. (Piñón 2001: 4)

The analysis Piñón opts for is to treat *all* causative alternations as non-directed, so that both causative and inchoative are derived from a more abstract form, which Piñón calls the causative-inchoative stem. His analysis (the details of which are not important here) is schematized in (32).



What look like anticausative directions of derivation on this view, then, look this way because the inchoative derivation is phonologically null. What look like causative directions of derivation, by contrast, look this way because the morphology deriving inchoative from the abstract stem is null. In languages like Warlpiri, however, the true direction of derivation comes out clearly.

On Piñón's analysis, then, the alternation is, in fact, crosslinguistically *uniform*, and only appears non-uniform because of morphological idiosyncrasy.

1.4 The path forward

In the preceding discussion we have surveyed several points of crosslinguistic variation in morphology and syntax. All the areas discussed are ones in which there is variation in the canonical form of expression of translational equivalents. The question in the discussions of these phenomena is what explains this variation. At a broad level, two different kinds of explanation were discussed. In the work we characterized as **transparent**, variation is fundamentally a consequence of variation in lexica: whether

a language primarily conflates manner with motion or path with motion in its verb inventory, and whether its nouns have atomic denotations or not. These lexical differences create a need for different morpholexical devices across languages in order to achieve equivalent meanings. If, for example, motion and manner are conflated in the meaning of a verb without path, then the introduction of path entailments by necessity comes from somewhere other than the verb. The contrasting **uniformity** view has it that underlying syntactic structure and semantics of translational equivalents are uniform across languages; what varies is the inventory and morphophonological realization of syntactic functional heads. So, for example, the appearance of variation in direction of derivation in the causative alternation is just that—appearance. In actual fact, on such a view, the variation is morphophonological, with underlying direction of derivation being uniform across languages, and perturbed on the surface by the idiosyncrasies of language-specific phonological realization of the derivational operation. Ramchand and Svenonius present a similar view in relation to Mandarin DP syntax, on which the source of variation between Mandarin, Russian, and Italian is to a large degree the phonology of D. The situation is similar in relation to possessives in Freeze (1992), where crosslinguistic variation in form is due to the realization of particular syntactic heads, and the language-specific availability of certain transformational operations, such as the incorporation of a locative preposition into a predicative head (Freeze 1992: 586).

These views are not generally subjected to empirical investigation in the literature. Rather, they are simply assumed. Talmy assumes transparency in relation to the Talmy typology. Ramchand and Svenonius assume uniformity in their analysis of the distribution of seemingly bare DPs in argument position. More rare is explicit engagement with the two views, as falsifiable starting points for an understanding of the nature of crosslinguistic variation in morphology and syntax. Matthewson and Chierchia both carry out work aimed at contributing to this research agenda, reaching different conclusions in their respective areas. One of the goals of this book is to contribute to this program, treating the question, following Chierchia and Matthewson, as one that is in principle falsifiable, and subjecting it to rigorous empirical investigation in one domain of study.

Regarding our empirical domain, that of property concept sentences, our argument is a transparentist one, locating the variation observed in their structure in the lexical semantics of their basic building blocks. The basic argument for this claim is laid out in Chapters 2–4, with Chapter 2 demarcating the empirical domain, and Chapter 3 laying out the formal foundations of our analysis. Chapter 4 is then dedicated to directly contrasting transparentist and uniformitarian alternatives. We consider in detail a conceivable hypothetical alternative to our transparent analysis as well as an attested uniform analysis developed by Menon and Pancheva (2014) on the basis of Malayalam. We show that the uniform analyses are not supported by the data, and that they in fact strongly support the transparent view.

Chapters 5 and 6 seek to demonstrate the strength of the transparentist analysis by examining in detail some interesting consequences it has in the unexpected domains of lexical categorization and the semantics of mass nouns. In relation to the former, we consider in Chapter 5 the age-old question whether syntactic categorization is tied to lexical semantics. Our point of departure is the Lexical Semantic Variation Hypothesis, established in Chapter 3, which has it that property concept lexemes come in two semantic guises. The question we ask is whether there is any link between these two kinds of meaning and syntactic category; we show that the answer is an unequivocal ‘yes’, and explain why it is, tying the inability of a particular kind of meaning to be carried by adjectives to the essence of adjectivehood—the ability to act as an adnominal modifier. Chapter 6 deals with the semantics of mass nouns, taking as its point of departure our claim that possessive predicating property concept lexemes have a kind of denotation generally attributed to mass nouns. We show that, as expected given this claim, they pattern with mass nouns in a variety of ways, underpinned by the mereological structuring of mass noun denotations given the widely accepted view of mass noun semantics due to Link (1983), which we adopt. At the same time, we also show that they differ from ordinary mass nouns across a range of languages and constructions in showing gradable behavior. We argue that this is evidence for a size-ordering on their denotations, which we independently propose in Chapter 3, and which is independently required in order to capture facts surrounding gradability and comparison with possessive property concept sentences.

In Chapter 7 we conclude, returning to the larger theme of the book, and reflecting again on what our observations suggest about the sources of crosslinguistic variation in morphology and syntax.

Variation in the form of property concept sentences: The explananda

2.1 Demarcating the empirical domain

The empirical domain of this book is easy to intuit but difficult to define. Dixon (1982) and Thompson (1989) were aiming to isolate a certain grammatically important class of expressions in posing the question ‘how does it [a language with either no adjective class at all or only a small non-productive minor class of adjectives] express concepts that are expressed through adjectives in languages, like English, which do have this major class?’ (Dixon 1982: 3; Thompson 1989: 167). The relevant concepts are dubbed ‘property concepts’ by Thompson. Dixon (1982) famously identified seven classes of property concept lexeme, given in (1),¹ and discovered a range of implicational relationships in grammatical behavior among the members of these classes.

- (1) Dixon’s seven classes of property concepts
- | | |
|-------------------------|--|
| dimension | big, small, long, tall, short, wide, deep, etc. |
| age | new, young, old, etc. |
| value | good, bad, lovely, atrocious, perfect, proper, etc. |
| color | black, white, red, etc. |
| physical | hard, soft, heavy, wet, rough, strong, hot, sour, etc. |
| speed | fast, quick, slow, etc. |
| human propensity | jealous, happy, kind, clever, generous, cruel, proud, etc. |

Our interest lies in the fact that the property concept lexemes in Dixon’s list are at the heart of constructions of gradability and comparison, which have been the focus of intense study in the semantic and syntactic literature on adjectives dating back to Kamp (1975); Cresswell (1977); Klein (1980). The term ‘property concept’, in the sense employed here, does not correspond to any familiar theoretical object in generative linguistic theory. It is meant as a cognitive term, not one to be defined in terms of a formal theory of grammar. Consequently, it is not really clear what it means for an

¹ Dixon (2004) revises this list upward to ten. Although nothing we say hinges on either categorization, we keep to the traditional one here.

expression to encode a property concept. Therefore, we define our empirical scope in a somewhat different way, in terms of translational equivalence of sentences that feature property concept lexemes, that is, adjectival words, as main predicates.

The empirical focus of the book is translational equivalents of copular sentences in which the main post-copular predicate is an adjective, such as (2a) in English, or similar sentences in other languages with a large and open class of adjectives, and, to a degree, related comparative sentences.² We refer to such sentences as *property concept sentences*. On this understanding, the English sentence in (2a) and the French one in (2b) are both property concept sentences.

- (2) a. Pierre is hungry.
b. Pierre a faim. (French)

We call the primitive lexeme responsible for introducing the ‘property concept’ in such sentences—*hungry* in (2a), *faim* in (2b)—the PROPERTY CONCEPT LEXEME.

This delineation of our empirical scope thus relies on the assumption that the notion of a ‘translational equivalent’ is a coherent one, and specifically that one can tell when a sentence in one language is a translational equivalent of another. That this is the case is a working assumption adopted de facto, tacitly or explicitly, almost universally within any linguistic theory, generative or not. Spelling out and defending a rigorous notion of translational equivalence, however, is far from trivial. As will become clear as the discussion unfolds, equating translational equivalence with identity of propositional content is not straightforward. Nevertheless, it seems clear that there is some sense in which (2a), (2b) are translational equivalents. For example, speakers of French and English will tend to assent and dissent to them under similar circumstances. We do not attempt to define or defend a notion of translational equivalence here, and simply assume that the kind of naive intuitions about translational equivalence we invoke, and on which the field at large relies, correspond to something real and stable that can, in principle, be elucidated. In order to facilitate the expression of our main claims and observations, we take the liberty of assuming, throughout this book, that there is a *content* that property concept sentences all share, a content that is presumably closely related to, but *not* to be equated with, the model-theoretically stated truth conditions we assign to different property concept sentences. In fact, one of the interesting questions the work reported in this book opens up in a particularly vivid way is whether there can be crosslinguistic variation in the manner in which model-theoretic elements are employed in the expression of what linguists intuitively take to be ‘the same semantic content’, that is, translational equivalents.

The observation at the base of this book, demonstrated in (2), is that property concept sentences can involve canonical predication of the property concept lexeme, as in (2a), or they can feature possessive material not otherwise involved in non-verbal

² This chapter is a lightly revised version of §§2 and 3 of Francez and Koontz-Garboden (2015).

predication, as in (2b), a predicative possessive sentence.³ We refer to the employment of possessive material in property concept sentences as a possessive strategy of property concept predication. Languages vary in the extent to which they employ possessive and predicative strategies. For example, English and other Germanic and Romance languages employ both strategies, but the possessive one is very limited in scope, and in cases in which both exist with a single notional category, as in (3), the possessive member is very marked and, in many cases, unidiomatic.

- (3) a. I'm hungry vs. I have hunger.
b. I'm strong vs. I have strength.
c. I'm tall vs. ??I have height/tallness.
d. I'm beautiful vs. I have beauty.

In other languages, this pattern is reversed, with the possessive structure the more widespread, and the non-possessive predicating one more limited. The Chadic language Hausa, for example, has a small class of adjectival lexemes, which predicate using the canonical copular construction used with predicate nominals, as shown by comparison of the adjectival (4a) with the predicate nominal in (4b).

- (4) a. *Audù dōgō nē.*
Audu tall COP
'Audu is tall.' (Jaggar 2001: 457)
b. *Audù dāṛaktā nē.*
Audu director COP
'Audu is/was the director.' (Jaggar 2001: 457)

Hausa also has a large set of nouns, referred to in the descriptive literature as 'abstract nouns of sensory quality' (Parsons 1955), which can be used in predicative possessive sentences to express property concept sentences, as shown in (5).

- (5) a. *munā dā ƙarfi.*
we.CONT with strength
'We are strong.' (Newman 2000: 224)
b. *yāriyā tanā dā zōbē.*
girl she.CONT with ring
'The girl has a ring.' (Newman 2000: 222)

We refer to property concept lexemes like these, which trigger possessive strategies of predication, as *possessive predicating*, and to those that do not as *non-possessive*

³ These are not the only ways in which languages can express the content of property concept sentences, but the contrast between predicative and possessive morphosyntax is recurrent across many unrelated languages and is the focus of this book.

predicating. These two kinds of property concept lexeme also contrast in the way they participate in comparative constructions. There are comparative constructions that are dedicated to, that is, can only be constructed with, possessive predicating lexemes, such as Hausa ANSQs. For example, the canonical Hausa comparative construction is one that makes use of an *exceed* verb and an ANSQ, as illustrated in (6).

- (6) *jirgī yā fi mōtā girmā.*
 plane it exceed car largeness
 'A plane is bigger than a car.' (Newman 2000: 93)

Adjectival lexemes, by contrast, cannot serve as the argument of this *exceed* verb (Newman 2000: 93; Russell Schuh, p.c.), as illustrated by (7), where the ANSQ *girmā* 'largeness' in (6) is replaced with its adjectival counterpart *bàbba* 'big'.

- (7) **jirgī yā fi mōtā bàbba.*
 plane it exceed car big
 'A plane is bigger than a car.' (intended; Newman 2000: 93)

That property concept sentences systematically feature possessive material has, as far as we know, not been recognized, let alone analyzed, in the semantic literature on such sentences.⁴ The objective of this chapter is to establish the crosslinguistic robustness of the distinction between non-possessive and possessive strategies of property concept predication, and to further establish that the contrast also exists in the domain of comparatives. The two sections that follow are devoted to this, as well as to demonstrating the diversity of forms in which possessive strategies of predication come, which includes both the wide variety found in the typology of predicative possession (namely, Stassen 2009) as well as forms found in the expression of adnominal possession. In later chapters, we make the case that what determines which strategy is used in the construction of a property concept sentence is fully determined by the lexical semantics of the property concept lexeme involved.

2.2 Possessive strategies of predication

Possessive strategies of predication are far from exotic, and distinguish nominally encoded property concepts from adjectival ones in very familiar Germanic and Romance languages such as German and Spanish. The data in (8) demonstrate the contrast for Spanish, where adjectives predicate with a copula like predicate nominals, (8a,b), whereas nominally encoded property concepts form property concept sentences with a possessive construction, (8c,d). The data in (9) demonstrate the same for German.

⁴ Isolated instances, however, have been documented in the functional-typological literature on lexical categories and predication, e.g. Wetzter (1996: 178). Very little attention is devoted to them even there, however.

- (8) a. *Kim es alto.*
 Kim is tall
 ‘Kim is tall.’
- b. *Kim es un profesor.*
 Kim is a professor
 ‘Kim is a professor.’
- c. *Kim tiene sueño.*
 Kim has tiredness
 ‘Kim is tired.’
- d. *Kim tiene un carro.*
 Kim has a car
 ‘Kim has a car.’
- (9) a. *Ich bin hungrig.*
 I am hungry
 ‘I am hungry.’
- b. *Ich bin Arzt.*
 I am doctor
 ‘I am a doctor.’
- c. *Ich habe Hunger.*
 I have hunger
 ‘I am hungry.’
- d. *Ich habe ein Auto.*
 I have a car
 ‘I have a car.’

In Germanic and Romance, only a few property concept lexemes behave in this way, and these seem to be restricted to those intuitively describing temporary experiences, that is, those encoding concepts belonging to Dixon’s *human propensity* class. In the languages described at §§2.2.1–4, the use of possessive strategies is more extensive, covering practically all property concept lexemes in languages like Ulwa,⁵ and spanning several possessive constructions in languages like Hausa.

2.2.1 Hausa

As mentioned, the descriptive literature on Hausa (Newman 2000; Jaggar 2001) recognizes a large class of property concept words lexicalized as nouns. Following Parsons (1955), these are traditionally called in the literature ‘abstract nouns of sensory

⁵ See Koontz-Garboden and Francez (2010: 213) for five possible exceptions.

quality', or ANSQs (Newman 2000: ch. 2; Jaggar 2001: 103), and number about sixty property concept words, some of which are listed in (10).

- (10) Some ANSQs in Hausa (Newman 2000: 13; Jaggar 2001: 103 ff.)
dādi 'pleasantness, niceness'; *nauyi* 'heaviness'; *tsāmī* 'sourness, acidity'; *wāri* 'stench'; *zāki* 'sweetness'; *zurfi* 'depth'; *dāci* 'bitterness'; *dāri* 'cold'; *danshi* 'dampness, moistness'; *fādi* 'breadth, width'; *gautsi* 'brittleness'; *kaifi* 'sharpness'; *karfi* 'strength'; *lāmī* 'tastelessness'; *laushī* 'softness'; *nauyi* 'heaviness' . . .

As shown in (4) and (5) above, property concept sentences with ANSQs do not pattern together with predicative sentences with predicate nominals. The latter are copular constructions, whereas the former are predicative possessive constructions. In Newman's words: "HAVE sentences with complements consisting of abstract nouns indicate predicative qualities" (Newman 2000: 224).

Hausa possessive strategies of predication are not restricted to the prepositional possessive construction illustrated in (5). Hausa has a range of constructions that are used for expressing possession (Abdoulaye 2006), many of which can also be used to form property concept sentences with ANSQs. For example, there are two existential constructions that serve this function. The first of these constructions is given the following informal characterization by Newman, which succinctly summarizes how it works:

An existential structure made up of *àkwai* plus a pronoun extended by *dà* plus an NP indicates possession . . . The thing possessed, indicated by the *dà* phrase, is usually a quality rather than a concrete object. (Newman 2000: 179)

The data in (11) exemplify this construction.

- (11) a. *àkwai shì dà wàyō.*
exists him with cleverness
'He is very clever.' (Newman 2000: 179)
- b. *àkwai sù dà kyāu!*
exists 3PL with beauty
'They're really beautiful!' (Jaggar 2001: 465)
- c. *mutānen nān, àkwai sù dà rōwā.*
men these, exists them with miserliness
'These men, they are misers.' (Newman 2000: 226)

That this construction is implicated in the grammar of possession more generally is illustrated by the data in (12).⁶

⁶ There are a number of features that are not yet well understood in relation to the syntax and semantics of this construction. For example, according to Abdoulaye (2006), it can only host pronouns, not full noun phrases, a fact illustrated as follows by (i):

- (12) *Rāshiidaa mù tafī gidāa, àkwai mù dà tuwo-n-mù à gidāa!*
 Rashida 1PL go home exist 1PL with food-of-1PL at home
 ‘Rashida, let us go home, we **have** our food at home!’ (Abdoulaye 2006: 1139)

The data in (13) show that this construction is restricted in its use to the class of ANSQs. While the adjective *doogoo* is judged unacceptable in the construction (13a), its ANSQ minimal pair *tsawoo* is licit (13b), a fact that further illustrates the split between the two classes of property concept lexeme in the language.

- (13) a. **Bàlki àkwai tà dà doogoo.*
 Balki exists her with tall
 ‘Balki is really tall.’ (intended; Mahamane Laoualy Abdoulaye, p.c.)
 b. *Balki àkwai tà dà tsawoo.*
 Balki exists her with tallness
 ‘Balki is really tall.’ (Mahamane Laoualy Abdoulaye, p.c.)

According to both Wetzer (1996: 178) (via personal communication with Russell Schuh) and Jaggar (2001: 465), property concept predication can also be expressed by an existential construction “where the quality-denoting NP is the existential subject” (Jaggar 2001: 465). In other words, in this construction the pivot is the property concept term itself, and the bearer of the property is contributed by the complement of the preposition, as exemplified in (14).

- (14) a. *(àkwai) hankàlì gārē shì.*
 exists cleverness at 3SING.MASC
 ‘This boy, he’s clever alright!’ (Jaggar 2001: 465)
 b. *àkwai fad’i ga kogin nan.*
 exists width at river this
 ‘This river is wide.’ (Wetzer 1996: 178, via Russell Schuh, p.c.)
 c. *àkwai hāzīkancī gārē shì.*
 exists cleverness at him
 ‘There is cleverness with him.’ (Newman 2000: 182)

(15) shows that this construction can be used to express possession as well.⁷

- (i) **àkwai Bālki dà wāyō.*
 exists Balki with cleverness
 ‘Balki is really clever.’ (Abdoulaye 2006: 1139)

Noun phrases seem to be licit, however, in the presence of an anaphoric pronoun, as shown by (13b). For our purposes, what is important is that a construction used for the expression of nominal possession is also used for the formation of property concept sentences, and that it distinguishes between two kinds of property concept lexemes (ANSQs and adjectives), as discussed in the remainder of this section.

⁷ *ga* and *gārē* in (14) and (15) are allomorphs of the same morpheme, the latter used when followed by a personal pronoun, the former used everywhere else (Newman 2000: 467).

- (15) *àkwai kudĩ gārē kà?*
 exists money at you
 ‘Do you have any money on you?’ (Jaggar 2001: 466)

2.2.2 *Huitoto*

A possessive strategy similarly based on predicative possession is found in Huitoto, a Huitotoan language of Colombia. According to Minor et al. (1982), Huitoto has a class of adjectives (Minor et al. 1982: 42) as well as a class of nominal ones. While the former predicate directly (16a), the latter require the suffix *-re* (16b), which is also the suffix that expresses possessive ‘have’ in the language, as shown in (16c).

- (16) a. *jofo áillue.*
 house big
 ‘The house is big.’ (Minor et al. 1982: 42)
- b. *rozilli naimé-re-de.*
 pineapple sweet-HAVE-3SING
 ‘The pineapple is sweet.’ (Minor et al. 1982: 49)
- c. *jofó-re-di-cai.*
 house-HAVE-NONFUT-1PL
 ‘We have a house.’ (Minor et al. 1982: 101 in Stassen 2009: 183)

As far as we have been able to tell, this possessive strategy is not used with predicate nominals and adjectives; (17) shows that predicate nominals that do not encode property concepts are predicated by simple juxtaposition of subject and predicate, and (18) shows the same for adjectives.

- (17) *cue moo cai illaima.*
 1SING father 1PL captain
 ‘My father is our captain.’
 (Minor et al. 1982: 62; glossed with aid of Minor and Minor 1987)
- (18) *jofo áillue.*
 house big
 ‘The house is big.’ (Minor et al. 1982: 42)

2.2.3 *Bisa*

A somewhat more exotic pattern is found in Bisa, a Mande language spoken in northern Ghana and southern Burkina Faso. In Bisa possession is expressed by existential constructions. The Bisa existential is exemplified in (19).

- (19) *wusu ta-w.*
 god exist-in
 'God exists.' (Naden 1982: 212)

A possessive sentence in Bisa is an existential in which the noun phrase argument of the existential predicate is a possessive noun phrase. Possessive noun phrases are formed by juxtaposition of the possessor and possessed nouns, as shown in (20). The possessive construction is exemplified in (21).

- (20) *mɔɔ lu bor naa-w.*
 I wife came this-at
 'My wife came here.' (Naden 1982: 212)

- (21) *mɔɔ lu ta-w.*
 I wife exist-in
 'I have a wife.' (Naden 1982: 212)

As shown in (22), property concept predication, at least with some property concept lexemes, is expressed as a possessive construction in which the possessed noun is a property concept lexeme.

- (22) a. *a gwili ta-w.*
 3SING weight exists-in.
 'It is heavy.' (Naden 1982: 212)
- b. *a gweli ta-w.*
 3SING beauty exists-in
 'She is pretty.' (Naden 1982: 213)

As (23) shows, predicate nominals in Bisa predicate with a copula, not with a possessive strategy.

- (23) *tiikya awo n.*
 teacher he COP
 'He is a teacher.' (Naden 1982: 213)

Naden's discussion clearly indicates that not all property concept lexemes in Bisa participate in this strategy, but he does not provide elaboration beyond this; the key point is simply that Bisa shows a contrast between possessive and non-possessive predicating property concept lexemes.

The data considered so far establish quite clearly that some property concept lexemes trigger possessive strategies of predication, and that several unrelated languages show a language-internal contrast between possessive and non-possessive predicating lexemes. Recall that the main theoretical claim underlying the research presented in

this book is that these two classes are characterized by different lexical denotations, as discussed in the next chapter. If this claim is correct, it is entirely possible that there are languages in which all property concept lexemes have one or the other denotation, and hence belong to one or the other class. The language discussed next, Ulwa (Misumalpan; Nicaragua), seems to be one in which nearly all, if not all, property concept lexemes are possessive predicating.

2.2.4 *Ulwa*

The possessive strategies shown so far are all instances of what Stassen (2009) calls ‘predicative possession’, that is, the structure used to express ‘have’ sentences. Ulwa shows an interestingly different possessive strategy of predication, built not on predicative possession but instead on nominal possession.⁸ The crucial properties of Ulwa are:

- (i) property concepts are encoded by morphologically bound precategory roots.
- (ii) The words that translate English adjectives are nouns, derived from such roots by affixing the morpheme *-ka*.
- (iii) The same morpheme marks the possessed noun in a possessive noun phrase.

The feature in (i) is a robust fact of Ulwa grammar, made clear from the discussions and data in Green (1999), Hale and Salamanca (2002), Koontz-Garboden (2007: ch. 6; 2009d), and Koontz-Garboden and Francez (2010).⁹ The features in (ii) and (iii) are discussed in Koontz-Garboden and Francez (2010), and illustrated here in turn.¹⁰

In Ulwa possessive noun phrases, possession is marked on the possessed noun. The possessive marker agrees with the possessor, according to the paradigm in (24), illustrated in (25).

⁸ See Kim and Koontz-Garboden (2013) for data showing that a similar kind of possessive strategy is found, albeit with fewer property concept lexemes, in the Mexican isolate Huave.

⁹ As discussed in detail by Koontz-Garboden and Francez (2010: 210–14), the use of property concept roots in their bare form is marginal, though attested (to varying degrees and with unstable judgments) in contexts in which the root appears to cliticize to some surrounding element that is at least bimoraic in phonological weight. The question is why the morpheme that is used to turn the bound roots into morphologically free words is specifically possessive.

¹⁰ Also discussed by Koontz-Garboden and Francez (2010: 213–14) is the fact that while nominal possessive affixation agrees in person and number with the possessor, the possessive morphology on property concept roots never agrees with its subject in person and number. As they note, “given that property concept words in *-ka* are nouns, and that nouns in predicative position do not show agreement with their argument, it is unsurprising that there is no agreement for person/number on the predicative property concept *-ka* word. Furthermore, that it is the third person form of *-ka*, rather than some other form, which is used with property concept roots is unsurprising, as third person commonly surfaces as the default form in non-agreeing contexts” (Koontz-Garboden and Francez 2010: 214).

- (24) Nominal possessive paradigm (Green 1999: 78)

1SING	-ki	1PL.EXCL	-ki-na
2SING	-ma	2PL	-ma-na
3SING	-ka	3PL	-ka-na
		1PL.INCL	-ni

- (25) a. *yang pan-ki*
 1SING stick-1SING
 'my stick'
 b. *man pan-ma*
 2SING stick-2SING
 'your stick'
 c. *alas pan-ka*
 3SING stick-3SING
 'his/her stick'
 etc.

The third person possessive suffix, *-ka*, illustrated in (25c), appears on property concept roots in predicative (and adnominal) position, as illustrated in (26).

- (26) *yang as-ki-na minisih-ka.*
 1SING shirt-<1SING.POSS> dirty-3SING.POSS
 'My shirt is dirty.' (Green 2004: asna)

Koontz-Garboden and Francez (2010) and Koontz-Garboden (2016) show, based on Misumalpan diachrony, that the morpheme *-ka* which appears in property concept constructions and the one that marks possessed nouns are one and the same, rather than accidental homophones.¹¹ In brief, the observation is that in the history of Misumalpan, when the third singular possessive suffix underwent a shift in its phonological shape, the property concept suffix also underwent precisely the same shift, showing that, at least at the time of the shift, the two suffixes were actually one and the same.

Ulwa also has a possessive strategy based on predicative possession, using the non-verbal predicate *watah* 'have', illustrated in (27), which is occasionally also used for property concept predication, as in (27).¹²

- (27) *muih luih ya pâpangh watah ka.*
 person all the father have SENT-KA
 'Everyone has a father.' (Green 2004: pâpangh)

¹¹ Koontz-Garboden (2016) additionally shows, based on a combination of the same diachronic argument and typological observations, that *-ka* does not realize a morpheme (in the sense of Aronoff 1994 and Maiden 2005).

¹² The 'sentential *ka*' illustrated in (27) is, best we can tell, unrelated to the nominal possessive *-ka* under discussion here. See Koontz-Garboden (2009c) for details.

- (28) *yâka û-ka* *yâka yûh-ka.* *an tarat watah ka.*
that house-3SING.POSS that long-3SING.POSS. and tall have SENT-KA
'That house is long. And it's tall.' (Oct09-109)

This strategy is less common than the nominal possessive strategy laid out above, though is still well-attested in naturally occurring speech.

In §3.2, we use Ulwa to exemplify the semantics we propose for possessive predicating property concept lexemes, on the basis of the more productive nominal possessive construction.¹³

2.2.5 Summary

To summarize, this section has shown that possessive strategies of predication are a very general phenomenon, observed in a variety of unrelated languages. Possessive strategies are in fact attested in many other languages, among them Hebrew, Basaá (Jenks et al. 2016), Wolof (Baglini 2015), and various members of the Austronesian family (Kaufman 2014). Even having restricted the discussion to a few representative languages, what this small survey already shows is that possessive strategies seem to come in as many forms as there are possessive constructions; the patterns observed in this section are schematized in (29).

(29) Possessive strategies of predication

TYPE	LANGUAGE	PARAPHRASE
Nominal possessive marking 'Have'	Ulwa	—
	Ulwa, Huitoto,	She has strength.
	Hausa	She is with strength.
Existential: BEARER pivot	Hausa	There is her with strength.
Existential: PROPERTY pivot	Hausa	There is strength at her.
Existential: possessive NP pivot	Bisa	There is her strength.

In the languages looked at, possessive strategies are never used with predicate nominals, are only used with precategorial or nominally encoded property concept lexemes, and never with adjectival ones. In Chapter 5, we argue that these observations reveal an interesting and novel generalization about the relation between lexical semantics and the nature of lexical categories.

¹³ See Francez and Koontz-Garboden (2016a) for additional details and analysis of the *watah* 'have' construction in Ulwa.

2.3 Comparatives dedicated to possessive predicating property concept lexemes

The class of possessive predicating property concept lexemes identified in the previous section on the basis of behavior in predicative constructions can also be identified, in at least two ways, on the basis of the morphosyntax of comparative constructions in some languages.

First, in Ulwa, comparatives are built on top of the possessive strategy, as illustrated in (30), where the comparative is formed with the degree modifier *kanas* ‘more’ in combination with the possessive *-ka* marked property concept word *yûh-ka* ‘tall’.

- (30) *Abanel ya kanas yûh-ka Clementina karak.*
 Abanel the more tall-3SING.POSS Clementina with
 ‘Abanel is taller than Clementina.’ (Jan11–14)

Since all Ulwa property concept lexemes are possessive predicating (modulo nn. 5, 9), no contrast between classes of property concept lexemes is found in the comparative. In Spanish and German, however, the comparative construction that builds on a possessive strategy distinguishes nominal from adjectival property concept lexemes. As illustrated in (31), the comparative with nominal property concepts is formed using possessive *have* with the degree modifiers translating as ‘more’ (*mas* in Spanish, *mehr* in German).

- (31) a. *Papi tiene más sueño que yo.*
 Dad has more tiredness than me
 ‘Dad is more tired than me.’
 (<http://album.enfemenino.com/album/see_539867_12/Hector.html>)
- b. *Er hatte mehr Hunger als ich.*
 he had more hunger than I
 ‘He was hungrier than me.’

This contrasts with the comparative construction these languages employ with adjectives, which, unsurprisingly, has no overt exponent of possession, makes use of a copula, and, in the case of German, features comparative morphology (32).

- (32) a. *Juan es más alto que Pedro.*
 Juan is more tall than Pedro
 ‘Juan is taller than Pedro.’
 (<<http://perso.wanadoo.es/usoderazonweb/html/conten/argum/arganalo/analoz.pdf>>, accessed July 2016)
- b. *Ich bin älter als du.*
 I am older than you
 ‘I am older than you.’

Adjectives cannot be used with the possessive strategy comparative, as shown by (33a) and (34a), and likewise the possessive predicating lexemes cannot be used with the comparative used with non-possessive predicating lexemes with the intended meaning, a fact shown by (33b) and (34b).

- (33) a. **Papi tiene más alto que yo.*
 Dad has more tall than me
 Intended: 'Dad is taller than me.'
- b. **Papi es más sueño que yo.*
 Dad is more tiredness than me
 Intended: 'Dad is more tired than me.'
- (34) a. **Ich habe mehr alt als du.*
 I have more old than you
 Intended: 'I am older than you.'
- b. **Ich bin mehr Hunger als du.*
 I am more hunger than you
 Intended: 'I am hungrier than you.'

In some languages which have lexemes of both classes, possessive predicating and non-possessive predicating, there is a comparative construction that targets possessive predicating lexemes but does not build on the possessive strategy. This was already illustrated for Hausa by the data in (6) and (7), repeated in (35a,b) respectively, which show that the comparative with *fi* 'exceed' can be used with possessive predicating property concept lexemes (i.e. the class of ANSQs) (35a), but not with the smaller class of non-possessive predicating adjectives (35b).

- (35) a. *jirgī yā fi mōtā girmā.*
 plane it exceed car largeness
 'A plane is bigger than a car.' (Newman 2000: 93)
- b. **jirgī yā fi mōtā bābba.*
 plane it exceed car big
 'A plane is bigger than a car.' (intended; Newman 2000: 93)

In sum, in languages for which we have data, the same lexemes that give rise to possessive strategies of predication also give rise to special behavior in comparative constructions. In Ulwa, Spanish, and German a possessive strategy is found not only in the predicative construction, but in the comparative as well. In the latter two languages, the possessive comparative construction targets nominal property concept lexemes to the exclusion of adjectival property concept lexemes. Similarly, in Hausa, there is a special comparative construction in which only lexemes of the possessive predicating class can be used.

2.4 Conclusion: An explanandum is born

This chapter laid out the domain of inquiry on which the remainder of the book is based: property concept sentences and the property concept lexemes from which they are formed. Both within and across languages, such sentences can be formed with and without possessive morphosyntax, with some property concept lexemes triggering possessive strategies and others not. While possessive morphosyntax features prominently in the property concept constructions of some languages, among them Ulwa and Hausa, in other languages, such as English (and in fact most languages that have been investigated in any detail in the semantic literature on property concept constructions), possessive strategies are rare and marked, and non-possessive strategies of non-verbal predication are far more common. In Koontz-Garboden and Francez (2010); Francez and Koontz-Garboden (2015) we argue that what determines whether a property concept sentence is possessive or not is the lexical semantics of property concept lexemes, and most of this book is dedicated to further supporting this position and discussing some of its predictions and higher level implications.

The lexical semantic variation hypothesis

3.1 Introduction

This chapter describes the simple hypothesis, proposed in Francez and Koontz-Garboden (2015) and adopted here, that what determines whether a property concept sentence is possessive or not is the lexical semantics of the property concept lexeme involved. Specifically, we hypothesize that underlying the distinction between possessive predicating and non-possessive predicating property concept lexemes is a *semantic* distinction between **individual-characterizing** and **quality-denoting** lexemes: possessive predicating lexemes are all and only quality-denoting ones. Intuitively, individual-characterizing lexemes describe individuals, whereas quality-denoting lexemes describe qualities such as wisdom and beauty. The hypothesis that some, but not all, property concept lexemes describe qualities drives all of the discussion in this book. We argue that it affords a simple motivation for the occurrence of possessive morphosyntax in property concept predication and the contrasting behavior of possessive and non-possessive predicating lexemes in comparative constructions as seen in this chapter and Chapter 4; that it reveals the generalization about the relation between meaning and syntactic category proposed in Chapter 5; and that it explains the range of distributional and interpretative contrasts between property concept nominals and other mass nominals discussed in Chapter 6.

We reify this idea as the hypothesis in (1), modified slightly from Francez and Koontz-Garboden (2015):

- (1) **The Lexical Semantic Variation Hypothesis:** Possessive predicating property concept lexemes are quality denoting and non-possessive predicating property concept lexemes are individual characterizing.

The intuition that links possessive predication to quality denotation is simple. Suppose that *wisdom* is a property concept word that denotes the quality wisdom (ignoring, for the moment, the obviously crucial issue of what a quality is, which is addressed in model-theoretic terms at §3.2.1). A sentence predicating this word directly of an individual, as in (2a), is clearly not a paraphrase of the property concept sentence (2b),

which features the corresponding adjective. The possessive sentence in (2c), while not, strictly speaking, truth conditionally equivalent to (2b), is certainly a paraphrase of it.¹

- (2) a. Krishna is wisdom.
- b. Krishna is wise.
- c. Krishna has wisdom.

Expressing this intuition in a theoretically fruitful way calls for a characterization of qualities. In Francez and Koontz-Garboden (2015), we model qualities (there referred to as “substances”) using the algebraic approach to mass noun denotation standard since Link (1983). The motivation for this move (instead of, say, modeling qualities as simple property-theoretic individuals as in Koontz-Garboden and Francez 2010 or Menon and Pancheva 2014) is discussed in more detail below. It also requires articulating a compositional, model-theoretic semantics for quality possession, which can capture the fact that property concept sentences based on possessive strategies have all the semantic characteristics of property concept constructions that are familiar from the literature on gradability and comparison with adjectives. As we show, the range of possessive strategies across languages is quite wide. The analysis is demonstrated using the particularly interesting and apparently rare strategy found in Ulwa, a Misumalpan language of Nicaragua.

As for non-possessive predicating property concept lexemes, we remain agnostic as to the details of their exact denotation, and commit only to their type being individual characterizing (i.e. the traditional type $\langle e, t \rangle$). What the exact denotation of adjectives is is a matter of significant theoretical debate in the literature on gradability and comparison (Kamp 1975; Cresswell 1977; Klein 1980; von Stechow 1984; Heim 1985; Bierwisch 1989; Kennedy 1999; Moltmann 2009; Husband 2010; van Rooij 2011; Rett 2014; Morzycki in press; among many others). In fact, on the most widely assumed analyses, lexical adjectives are not, strictly speaking, individual characterizing, but rather their ‘positive form’ is. In much of the literature, following especially the detailed analysis developed in Kennedy (1999), the positive form of an adjective is derived morphosyntactically, much in the way that we suggest for quality-denoting property concept words. By virtue of the Lexical Semantic Variation Hypothesis, we are committed to the claim that the meaning associated with the positive form of an adjective, whatever it is, is a meaning adjectives have lexically, and that it is not morphosyntactically derived.² As it happens, there is, in our opinion, no

¹ We view sentences like (2b) and (2c) as forming a kind of paradigm, and therefore subject to the interpretative effects of Horn’s (1989: 197) ‘division of pragmatic labor’. In particular, (2c) is a more marked way of saying (2b), and comes to generate implicatures. See Levinson (2000: §2.4) for extensive discussion of this kind of phenomenon.

² This could be brought about by a type-shift, for example, as Grano (2011) argues is the case in Mandarin.

convincing structural evidence, either from morphology or from syntax, for the structural complexity of the positive form, and as discussed in detail in Chapter 4, the cases in which there *is* evidence for structural complexity in the form of possessive morphosyntax demonstrably do not involve the kind of degree morphology posited for the positive form in the relevant literature.

3.2 Possessive strategies and quality possession

Our proposal is that property concept nouns that give rise to possessive property concept constructions denote qualities. Intuitively, qualities are abstract mass entities or abstract ‘stuff’, and quality-denoting expressions denote functions that characterize all and only the ‘portions’ of the relevant quality.

The job of a theory of possessive strategies is to provide a model-theoretic account of qualities and quality possession that can be used in assigning a compositional semantics to predicative and comparative property concept constructions. Such a semantics must capture the crosslinguistically invariable aspects of the semantics of property concept constructions, in particular the well-known context dependence of predicative property concept sentences (see Kennedy 2007 for an overview). This chapter presents such a theory, based on an algebraic, order-theoretic definition of qualities. We then illustrate how the possessive strategy is implemented compositionally in one language by developing compositional analyses of the Ulwa predicative and comparative constructions.

3.2.1 Qualities

We assume that the universe of quantification, U , is partitioned into two relevant subdomains. D_e is the domain of entities, and D_p is a domain of portions ($U = D_p \cup D_e$). Qualities are subsets of D_p subject to the following assumptions:

- A Qualities are mutually disjoint.
- B Qualities are ordered by a total preorder (transitive, reflexive, but not antisymmetric) \leq , thought of intuitively as a size ordering. Since \leq is not antisymmetric, two portions of a quality can be of the same size (i.e. occupy the same place in the \leq ordering) without being identical. \leq thus induces an equivalence relation on D_p , each class consisting of all and only those portions that are of the same size.
- C Qualities are a sort of mass entity in the sense of Link (1983), partially ordered by a mereological part relation \preceq . The size preorder \leq preserves \preceq , so that given a quality P , and two portions $p, q \in P$: $p \preceq q \rightarrow p \leq q$

Assumption A is meant to model the intuition that just as when something is water it cannot also be milk, so something that is wisdom cannot at the same time be beauty.

This assumption plays an important role in our discussion of lexical categories in Chapter 5. It is, we submit, a stipulation, but we see no argument against it.³

In B, there are really two assumptions. First, the assumption that qualities are ordered by the preorder \leq plays a crucial role in the account below of the context sensitivity of property concept sentences with quality-denoting nouns, and of comparatives with such nouns.⁴ Second, the assumption that \leq is a preorder, i.e. that it is not antisymmetric, is meant to capture the intuition that even if a rose and a tulip are equally beautiful, the rose's beauty and the tulip's beauty are not the same thing. This assumption is discussed and argued for further in §3.2.5.

Assumption C is motivated by the fact that when property concept lexemes are nominal, these are generally mass nouns, as discussed in Chapter 6. This is the case for example for English nominal property concept lexemes such as *strength*, *hunger*, etc., the property concept nouns in Romance and Germanic, and the ANSQs in Hausa discussed at §2.2.1. The semantics of abstract mass nouns has remained largely unexplored in the linguistic literature until recently (see Tovina 2001; Moltmann 2009; Nicolas 2010; Baglini 2015; Hinterwimmer, under review).⁵ As a consequence, there is no standard model-theoretic treatment of them. We adopt Link's (1983) mereological approach to mass nouns for qualities.⁶ The assumption that qualities are masses ordered by the mereological ordering \preceq is defended in Chapter 6, drawing on the fact that quality-denoting lexemes, when nominal, are mass nouns, and also based on the behavior of a curious construction in the grammar of Ulwa, which we believe can only be made sense of on the assumption that qualities are indeed mereologically ordered. In Chapter 6, we also discuss a range of interesting properties distinguishing quality-denoting nouns from other mass nouns, and argue that the differences are explained by the assumption that qualities are preordered by the size relation \leq . In

³ Locutions such as *her wisdom is her beauty* are not a counter-example to this. Clearly this sentence does not predicate being a portion of beauty of *her wisdom*, but rather asserts that it is her wisdom by virtue of which she has beauty.

⁴ An interesting question arises in this context about whether the entire domain of portions, D_p , should be ordered by \leq , or just particular qualities. What is at stake is data involving comparison across qualities, which involves data similar to that known in the literature as comparative sub-deletion. On the one hand, examples like (i) seem to indicate that it must be possible to compare and grade portions of different qualities.

(i) Helen has more courage than beauty.

On the other hand, to the degree that examples like (ii) are odd, they indicate that there are incommensurability phenomena (Kennedy 1999; Morzycki 2011), indicating perhaps that not all qualities can be compared.

(ii) The room has more width than warmth.

We leave the issue open here whether or not it is desirable to allow cross-quality comparisons, especially since we do not fully understand the empirical landscape in languages that, unlike English, have a robust possessive strategy.

⁵ There is a somewhat richer tradition of work on abstract mass terms in the philosophical literature, however. See e.g. Sellars (1967).

⁶ Further justification for the mereological treatment we propose is discussed in §3.2.5.

this way, we argue that qualities are at once like ordinary mass noun denotations in being mereologically ordered, but unlike them in also being totally preordered by the \leq relation.

3.2.2 Quality possession

A key element of our proposal is that property concept sentences formed with property concept words that denote qualities express a semantics of quality possession (since predicating quality-denoting lexemes directly of individuals does not yield the intended meaning), a semantics we now illustrate. For convenience, we use boldfaced English nominalizations as constants over qualities. For example, **strength** is the constant naming the quality of strength, that is, the set of all portions of strength. We use P, Q etc. as variables over qualities (type $\langle p, t \rangle$), and p, q etc. as variables over portions (type p). If α is an expression denoting the quality **strength**, the denotation of α is written as the characteristic function of this quality, as in (3).

$$(3) \llbracket \alpha \rrbracket = \lambda p. \text{strength}(p)$$

Clearly, combining α with an expression denoting an individual a yields the proposition **strength**(a), which says that a is a portion of strength, not that a is strong (namely, *Kim is strength* versus *Kim is strong*). We propose that possessive property concept sentences relate individuals and portions of qualities by a binary relation, which we represent with the constant π . An individual is said to possess a quality if and only if there is a portion of that quality such that the individual and the portion stand in the π relation. Crosslinguistically, the relation π relating individuals to portions is expressed by possessive lexemes.⁷ Possessive lexemes (including verbs like *have*, and the Ulwa possessive morpheme *-ka* discussed at §3.2.3) are assigned as their denotation a relation between sets and individuals, such that the individual bears π

⁷ This might raise the question why it is possessive lexemes that express the π relation. In other words, why it is that languages use the same expressions to relate individuals to (portions of) qualities that they use to relate people to their kin, or people to their material possessions, or problems to their solutions, etc. We do not have a particularly enlightening answer to this question, and in fact doubt that it can or should be answered within a formal theory of grammar. The grammatical fact seems to be that it is overwhelmingly the case that possessive lexemes are used crosslinguistically to express certain privileged relations between things (i.e. relation that things bear to other things in an exclusive way), and so it is unsurprising that they should also be used to relate individuals to qualities. Of course, one can imagine a more conceptually motivated explanation. For example, it is a fact that languages generally use possession to express relations of integral parthood between things. One could argue that the relation between individuals and qualities is 'conceptualized' as a relation of integral parthood (or even, metaphysically, that it *is* such a relation), i.e. that humans conceive of qualities as integral parts of the individuals that have them. This is certainly how some philosophers think about them, in particular proponents of various versions of the so-called 'bundle theory' of particulars, going back at least to Hume and built in to Montague's treatment of names as generalized quantifiers (for discussion of the 'bundle theory' see, *inter alia*, Russell 1940; Cleve 1985; Hawthorne and Sider 2002). And indeed, integral parthood, especially in cases where the part is existentially dependent on the whole, is very prototypically expressed as possession in natural languages. This is easily seen for English in examples like (i):

to some element in the set. In the case of qualities, possessive lexemes will express a relation between an individual and a quality (a set of portions) which holds if and only if the individual bears π to some portion in the quality. This semantics is illustrated in full detail in the analysis of Ulwa property concept constructions at §3.2.3.

A crucial aspect of the interpretation of property concept sentences that any theory must account for is their well-known context dependence (see e.g. Kennedy 2007 for a summary). A sentence like (4) can vary in truth value, depending on what standard one is using to evaluate tallness.

(4) Felicia is tall.

The sentence can be true in some contexts, false in others, and in yet other contexts its truth value may be indeterminate. For example, suppose Felicia is five feet tall. Is (4) then true? In some contexts, she would count as tall, in others not, and in yet others she would be a borderline case and it would be intuitive to say that she is neither tall nor not tall. This context dependence is presumably universal and holds also for languages in which property concept sentences are possessive and, by hypothesis, express a semantics of quality possession. This is demonstrated for Ulwa by the data in (5), which show that the extent to which *yuhka* ‘tall’ can be truly attributed to Sherwell depends on the context in which he is considered.

- (5) *Sherwell ya bikiska balna karak laih yuhka katka muih*
 Sherwell the child PL with TOP tall-3SING.POSS but person
almuk balna karak laih yuhka sa.
 old.man PL with TOP tall-3SING.POSS NEG
 ‘Sherwell is tall compared to children, but compared to old men he is not tall.’
 (Jan11–2)

In the literature on adjectives, context sensitivity is dealt with in various ways: for example by invoking contextually salient degrees on a scale, or partial functions and supervaluations. So far, what we have said about the semantics of quality possession does not reflect context dependence in any way. The truth of a property concept sentence expressing quality possession, on the proposed account, depends on whether an individual bears the π relation to some portion of some quality or not, and this does not depend on context in any way. One way to bring in context dependence is to insist that the relation π is in fact gradable, and that an individual can bear π to a portion of a quality to a certain degree. But such a move seems both counterintuitive and

- (i) a. A square has four corners.
 b. The sock has a hole.
 c. John has a nose.

However, we do not wish to draw conclusions about either the nature of the world or the epistemology of speakers from natural language data, and remain agnostic about the plausibility of such an explanation.

empirically unmotivated. The oddity of data like (6), for example, indicates that the possessive relation, at least as holds between two simple individuals, is not gradable.⁸

(6) #John has a nose more than Mary (does).

It is precisely to deal with gradability and context dependence, however, and with the concomitant issue of comparison, that we introduced the ordering relation \leq on portions in the previous section. This order can be used to replicate the semantic effect of contextual standards in the domain of qualities. Since the semantics of quality possession is constructed as involving existential quantification over portions, context sensitivity can naturally be introduced as contextual quantifier domain restriction.

It is widely believed that quantification in natural language is very often, if not always, restricted, and that the restriction is often contextually determined (Westerstahl 1984; von Stechow 1994; Roberts 1995; Cooper 1996; Gawron 1996 *inter alia*, and see Szabó 2011 for arguments that there is unrestricted quantification in natural language). For example, in most utterance contexts, (7) would not be understood to make a statement about everything in the domain of quantification, but rather about everything in a contextually salient subset of this domain.

(7) Everything is in the car.

We propose to incorporate context sensitivity as a contextual domain restriction on the existential quantifier over portions in the semantics of quality possession. Informally, the idea is that only portions that are, in a sense, 'big enough' count as relevant in evaluating whether an individual has a quality or not (cf. what Kennedy 2007 calls the 'stand out' relation). That is, in asserting that there is a portion of a quality P that an individual has, quantification is restricted to those portions that are ranked high enough by the preorder \leq .

A similar kind of order-sensitive contextual domain restriction is found in the domain of modality. It is common since Kratzer's work (Kratzer 1977, 1991) to view modal auxiliaries such as *might* in (8) as quantifiers over possible worlds.

(8) Felicia might be dead.

Example (8) might be analyzed as asserting that a possibility, that is, a possible world, exists in which Felicia is dead. As Kratzer has emphasized, however, only reasonably non-remote possibilities count. For example, a hearer who has seen Felicia sitting in the next room a minute ago, is likely to consider an utterance of (8) false, even though a very remote possibility that, by some extremely unlikely accident, she has in fact

⁸ To the extent that (6) is acceptable, it is on a metalinguistic reading, paraphrasable as something like 'it is more appropriate to describe John as having a nose than Mary.' Such a reading is perhaps more salient with (i):

(i) Kim has a bulbous nose more than Sandy does.

died in the minute that has passed cannot be ruled out.⁹ This suggests that, when ordered domains are involved, it is natural to find contextual restriction to elements ‘high enough’ in the order, as we posit for quantification over possessed portions of qualities.

To illustrate how domain restriction can be utilized to model context dependence, we turn now to a compositional analysis of property concept sentences in Ulwa, in §3.2.3.¹⁰ In §3.2.4 the same mechanism of domain restriction used in modeling the context sensitivity of property concept sentences is used to model comparison and Ulwa comparative sentences, which also involve possessive strategies.

3.2.3 *Ulwa property concept sentences*

Ulwa property concept sentences have the form in Ch. 2, (26), repeated in (9).

- (9) *yang as-ki-na minisih-ka.*
 1SING shirt-<1SING.POSS> dirty-3SING.POSS
 ‘My shirt is dirty.’

As discussed in §2.2, Ulwa property concept words are constructed from a root and the possessive suffix *-ka*, which also marks the possessed noun in a possessive NP. We take property concept roots in Ulwa to denote qualities in the sense as elaborated in §3.2.1. Consistent with our usage so far, *P*, *Q* are used as variables (and metavariables) over such qualities, and English nominalizations in boldface as quality constants. For example, the quality denoted by the Ulwa root *minisih-* is written as **dirtyness**, a constant of type $\langle p, t \rangle$, as in (10).¹¹

- (10) $\llbracket \text{minisih} \rrbracket = \text{dirtyness} \subseteq D_p$

The denotation we propose for the suffix *-ka* is in (11), where *I* is a variable over contiguous left-bounded intervals of qualities, the type of which is ι . Intuitively, contiguous left-bounded intervals of a quality are simply subsets of that quality that contain all and only the portions that are either at or above a certain cut-off point in the preordering \leq . Intervals are explained further and given a formal definition in example (13). We use variables *I*, *J* for intervals and \mathcal{I} , \mathcal{J} for sets of intervals. The notation \exists^I is used to express restriction of the existential quantifier only to the portions in *I*.

- (11) $\llbracket -ka \rrbracket = \lambda P_{pt} \lambda x_e \lambda I_\iota \subset P. \exists^I z [\pi(x, z)]$

⁹ In Kratzer’s and much subsequent work, this kind of domain restriction is done by means of a contextually determined ‘ordering source’.

¹⁰ Ulwa was chosen simply because it is the language the possessive strategy of which we understand best. The next chapter extends the same analysis to Malayalam.

¹¹ As above, this is purely a notational convention, not a theoretical claim about nominalization in English.

According to this denotation, *-ka* takes a quality P and an individual x and returns a function from left-bounded intervals of P to truth values. This function is true of an interval I of the quality P if and only if there is a portion of P in I that x has.¹²

The denotation of an Ulwa word like *minisihka* ‘dirty’ is straightforwardly derived from the meaning of *-ka* and the meaning of the root by function application, as in (12).

$$(12) \llbracket \text{minisihka} \rrbracket = \lambda x \lambda I I \subset \text{dirtiness} . \exists^I z [\pi(x, z)]$$

Here we are adopting a directly compositional approach to context dependence (see e.g. Jacobson 1999, 2000 for discussion). The denotation for *minisihka* ‘dirty’ in (12) is context dependent, in the sense that after it combines with its argument it does not denote a proposition. Rather, in order to express a proposition, context must supply an interval of **dirtiness** to serve as the domain restriction for the existential quantifier over portions. The interval that context must supply is the equivalent within this proposal of what in degree-based approaches is called the ‘contextual standard’. The interval I includes all and only portions of **dirtiness** that rank above a certain threshold, that is, all and only the portions of **dirtiness** that, in the context, are considered big enough.

The requirement that the sets that form the restriction of quantification are contiguous, left-bounded intervals is necessary in order to ensure that this semantics is coherent, and in particular that it extends coherently to comparatives. The relevant intervals are defined in (13).

- (13) **Interval:** For any quality P , an interval $I \subset P$ is a set of portions such that $\exists q \in P [I = \{p : q \leq p\}]$

This constraint ensures the validity of certain intuitively valid inferences, such as the one in (14).

¹² Since our motivation for assuming a possessive strategy for Ulwa is the fact that *-ka* is used in nominal possession, the question arises how the denotation of *-ka* in (11) relates to that of *-ka* in nominal possession. Koontz-Garboden and Francez (2010) discuss this issue in detail, within an LF-style analysis of the syntax semantics interface (inspired by Barker 1995). For various reasons, we do not endorse this style of analysis here, and prefer an analysis of possessive NPs as generalized quantifiers (see e.g. Barker 2002; Peters and Westerståhl 2006; Francez 2009b for discussion). The details of such an analysis are too complex to present here, and are largely irrelevant to our concerns. In (i) below we therefore simply give the two denotations we propose for the two uses of *-ka*. The two differ combinatorically, as necessitated by their different syntactic distribution. The crucial point is that the lexical semantic core of *-ka*, the contribution it makes to truth conditions, is identical in both uses. The relevant part of the denotation is underlined in (i) ((ib) includes the conjunct $P(z)$ which does not occur in (11), but that is only because specifying it is redundant, as I is already restricted to be a subset of P).

- (i) a. $\llbracket -ka \rrbracket$ (in possessive NPs) = $\lambda P \lambda x \lambda Q . \{z : \pi(x, z) \ \& \ P(z)\} \subseteq Q$
 b. $\llbracket -ka \rrbracket$ (on property concept roots) = $\lambda P \lambda x \lambda I \subset P . \exists^I z [\pi(x, z) \ \& \ P(z)]$

- (14) a. Keats has great beauty.
 b. Yeats's beauty is greater than Keats's beauty.
 c. \therefore Yeats has great beauty.

If contextual domains are not continuous left-bounded intervals, (14) does not come out as a valid inference on our semantics. To see this, suppose there are only three portions of *beauty*, ordered as in (15).

- (15) $\{p_0 \leq p_1 \leq p_2\}$

Suppose that Keats has portion p_0 and Yeats has portion p_1 , and further that the contextually given set of portions I such that having a portion in I counts as having great beauty is $\{p_0, p_2\}$. Then Keats has a portion in I but Yeats does not, which means Keats has great beauty and Yeats does not, even though Yeats's beauty outranks Keats's.¹³ The restriction of values of I to subsets of a quality conforming to (13) prevents this problem. With this semantics for Ulwa property concept sentences in place, we now turn to comparatives.

3.2.4 Comparatives in Ulwa

As discussed earlier, Ulwa comparatives involve the use of possessive *-ka* in addition to the comparative lexeme *kanas* 'more'. An example is given in (16).

- (16) *Abanel ya kanas yùh-ka Clementina karak.*
 Abanel the more tall-3SING.POSS Clementina with
 'Abanel is taller than Clementina.' (Jan11–14)

The intuition behind our analysis of the Ulwa comparative is that (16) expresses the proposition that Abanel's maximal portion of height outranks Clementina's maximal portion of height by the ordering \leq . The role of *kanas* is to introduce a comparison between these two portions. Formally, this is done indirectly by way of comparing the domains restricting the quantification over portions possessed by the target and the standard. The analysis makes use of the fact that, due to the mereological structure of qualities, the set Π_a^P of P -portions that an individual a has is a join semi-lattice, and therefore has a supremum.¹⁴ Because the preorder \leq respects the mereological order \preceq (see assumption C in §3.2.1), the supremum is also the maximal portion that a has, that is, the one that outranks all others on \leq .

Since the portions quantified over in the semantics of quality possession are restricted to intervals, as defined in the previous section, Abanel's maximal portion of

¹³ For a full discussion of modifiers like *great* in *great beauty*, see Chapter 6.

¹⁴ There is a clear connection between the supremum of the set of an individual's portions of a property and Moltmann's (2009) notion of a trope. Consequently our treatment of gradability and comparison bears an obvious affinity to hers. See §3.2.5 for more on the affinities between our analysis and Moltmann's (2009).

tallness can outrank Clementina's if and only if the set of intervals containing portions of tallness possessed by Abanel is a proper superset of the set of intervals containing a portion of tallness possessed by Clementina.¹⁵ This is because there is at least one interval, the one containing all portions of tallness bigger or equal to Abanel's maximal portion, that does not contain any portions of tallness possessed by Clementina.

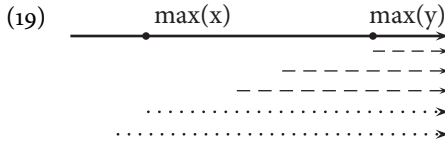
We exemplify the formal analysis by showing the compositional derivation of (16). The denotation we propose for *kanas* 'more' is given in (17) (where α is a variable over the type of property concept words in *-ka*).

$$(17) \quad \llbracket \text{kanas} \rrbracket = \lambda\alpha\lambda x\lambda y.\alpha(y) \subset \alpha(x)$$

kanas combines first with a property concept word, returning a relation between individuals. Combining *kanas* with *yûh-ka* 'tall' yields the relation in (18).

$$(18) \quad \begin{aligned} \llbracket \text{kanas } yûh\text{-ka} \rrbracket &= \lambda x\lambda y. \llbracket yûh\text{-ka} \rrbracket(x) \subset \llbracket yûh\text{-ka} \rrbracket(y) = \\ &\lambda x\lambda y. (\lambda u\lambda I \subset \text{tallness}. \exists z^I [\pi(u, z)])(x) \subset \\ &(\lambda u\lambda J \subset \text{tallness}. \exists z^J [\pi(u, z)])(y) = \\ &\lambda x\lambda y. \{I \subset \text{tallness} : \exists z^I [\pi(x, z)]\} \subset \{J \subset \text{tallness} : \exists z^J [\pi(y, z)]\} \end{aligned}$$

This relation holds between two individuals x, y if and only if the set of intervals of tallness in which y has a portion is a strict superset of the set of intervals in which x does. This is the case if and only if y is taller than x , as illustrated pictorially in (19). In this picture, the dotted lines are the domains in which x has a portion. The dashed lines are domains in which y has a portion but x does not. The solid line is the set of all portions of tallness ordered by \leq .



¹⁵ Here is a simple proof of this. Let a, b be individuals and P a quality. Let Π_a^P be the (non-empty) set of portions of P that a has, and similarly for Π_b^P . Let \mathcal{I}_a be the set of intervals that contain an element of Π_a^P , and similarly for \mathcal{I}_b . Let MAX_a be the supremum of Π_a^P , and similarly for MAX_b . We want to prove (i).

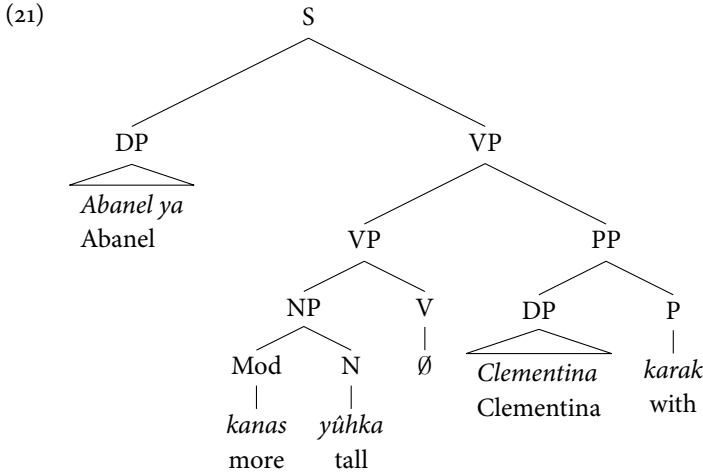
$$(i) \quad \mathcal{I}_a \subset \mathcal{I}_b \Leftrightarrow MAX_a < MAX_b$$

Suppose the right-hand side is false. Then $MAX_a \geq MAX_b$. Let $I \in \mathcal{I}_b$. By interval, $\exists p : I = \{q : p \leq q\}$. By definition of \mathcal{I}_b , $p \leq MAX_b$. Therefore, $p \leq MAX_a$. Therefore, $MAX_a \in I$, and therefore $I \in \mathcal{I}_a$. So we get that whenever $I \in \mathcal{I}_b$, $I \in \mathcal{I}_a$, contrary to the left-hand side $\mathcal{I}_a \subset \mathcal{I}_b$. This proves one direction. For the other direction, suppose that the left-hand side is false. Then $\mathcal{I}_b \subseteq \mathcal{I}_a$. Let $I \in \mathcal{I}_b$. Then, by definition of \mathcal{I}_b and interval, $\exists p \in \Pi_b^P, I = \{q : p \leq q\}$. Suppose $p = MAX_b$, then for any element $q \in I$, $q \geq MAX_b$. Since, by assumption, $\mathcal{I}_b \subseteq \mathcal{I}_a$, and $I \in \mathcal{I}_b$, then $I \in \mathcal{I}_a$. Hence, $\exists q \in \Pi_a^P : q \geq MAX_b$, contrary to the right-hand side $MAX_a < MAX_b$. QED.

For simplicity, we take the denotation of the standard prepositional phrase to be simply that of the nominal complement of the preposition *karak* ‘with’.¹⁶ Thus, the target and standard phrase both contribute individuals. Combining (19) with these individual denotations in order (standard first, then target, consistent with the syntax in (21)) yields the final meaning of (16) in (20).

$$(20) \llbracket (16) \rrbracket = 1 \text{ iff} \\ \{I \subset \text{tallness} : \exists z^I [\pi(\text{Clementina}, z)]\} \subset \\ \{J \subset \text{tallness} : \exists z^J [\pi(\text{Abanel}, z)]\}$$

For completeness, the syntactic structure we assume for (16) is given in (21).¹⁷



The example in (16) is a simple phrasal comparative in which the standard and target phrases are proper names. While Ulwa does not have clausal comparatives, it does have phrasal comparatives in which the standard phrase is an internally-headed relative clause (a structure robustly attested in the grammar of Ulwa and Misumalpan

¹⁶ Our treatment of the target prepositional phrase as entity denoting, essentially denying that there is any semantic contribution by the target marker (in this case *karak*), is consistent with a position generally held in the literature (see e.g. Kennedy 2007). However, it has also been argued in the literature that the target marker *than* does make a non-trivial semantic contribution (Alrenga et al. 2012). We do not have the data to determine whether similar arguments call for assigning *karak* a denotation, and leave this issue open.

¹⁷ This syntax seems to be well-motivated, but since the focus of this chapter is not the syntactic structure of comparatives, we do not dwell on it in detail here. We have included a null V in (21), since the copula is null in the third person but not in other persons (see e.g. the discussion and data in Koontz-Garboden 2009b). We treat the target phrase syntactically as a modifier. This choice is motivated by its free order with respect to the other constituents; it can appear sentence initially, after the subject DP, or finally, as it does in (16). The prosodically unmarked position for it is sentence final, as in (16) and in the structure in (21). That *kanas yúhka* ‘more tall’ is a constituent is suggested by the fact that it is never split up by target or standard material.

generally—see Alpher and Hale n.d.; Green 1992; Koontz-Garboden and Francez 2010). These are exemplified by the data in (22).

- (22) a. *û-ma ya kanas sik-ka ka wak dai karak.*
house-2SING the more big-3SING.POSS SENT-KA other PAST with
‘Your house is bigger than the other was.’ (Jan11–24)
- b. *sirihiring-ma ya kanas yam-ka ka*
speedboat-2SING.POSS the more good-3SING.POSS SENT-KA
pumting dai ya karak.
think-1SING.PERF PAST the with
‘Your speedboat is better than I thought.’ (Jan11–26)

These examples, like their translational English counterparts, cannot be analyzed in the same manner as (16), since they do not compare individuals but rather portions (or degrees). Intuitively, while (16) compares Clementina and Abanel for height, (22b) compares the maximal portion of goodness that your speedboat has to the maximal portion of goodness I thought it had (i.e. the maximal portion it has in all of my belief worlds). In the literature on comparatives (see Kennedy 2006 for an overview), English examples of this kind are often treated as involving abstract syntax, with the comparative morpheme *-er* taking scope over two clauses. The standard phrase is taken, following Bresnan (1973), to involve obligatory deletion of a predicate identical to the matrix predicate. Regardless of whether such a syntax is correct for the relevant Ulwa examples, it is clear that their interpretation is similar to the one assumed for similar English examples, and involves a meaning for *kanas* that scopes over two clausal meanings.¹⁸ Such a meaning for *kanas* is given in (23), where \mathcal{I} and \mathcal{J} are variables over sets of intervals.

- (23) $\llbracket \text{kanas} \rrbracket = \lambda \mathcal{I} \lambda \mathcal{J}. \mathcal{I} \subset \mathcal{J}$

The derivation of (22b) is then as follows. The target phrase *pumting dai ya karak* (literally, ‘with the I thought’) is interpreted as involving obligatory deletion of the matrix material *Sirihiring-ma ya yam-ka* ‘your speedboat is good’, to produce the meaning in (24).

- (24) $\llbracket [.PP [[[\text{Sirihiring-ma ya yam-ka}] \text{ pumting dai}] \text{ ya}] \text{ karak}] \rrbracket =$
 $\lambda I \subset \text{goodness.I thought: } \exists^I z [\pi(\text{your-speedboat}, z)]$

The matrix clause is interpreted by function application in the obvious way, yielding (25).

¹⁸ In the literature, phrasal comparatives like the ones analyzed earlier are sometimes reduced to this kind of case, so as to provide a uniform semantics for degree modifiers such as *more* and *kanas*. See e.g. Pancheva (2006); Bhatt and Takahashi (2007); Merchant (2009); Hofstetter (2012) for discussion. We leave it open here whether this is desirable for Ulwa.

- (25) $\llbracket \text{Sirihiring-ma ya yam-ka} \rrbracket =$
 $\lambda J \subset \text{goodness}.\exists^I z'[\pi(\text{your-speedboat}, z')]$

These two denotations form the arguments for *kanas*, yielding (26) as the meaning of (22b).

- (26) $\lambda I \subset \text{goodness}.\exists^I z'[\pi(\text{your-speedboat}, z')] \subset$
 $\lambda J \subset \text{goodness}.\text{I thought: } \exists^I z[\pi(\text{your-speedboat}, z)]$

According to (26), (22b) is true just in case the set of intervals that contain a portion of goodness that your speedboat possesses is a proper subset of the set of intervals containing a portion that I thought your speedboat possesses, which is the case exactly when the maximal portion of goodness your boat has in my belief worlds is smaller than the maximal portion it actually has.

The overarching point of this section has been that modeling quality possession in terms of existential quantification over preordered portions allows us to handle both predicative and comparative property concept constructions in Ulwa, capturing the fact that the former are context sensitive in a way that the latter are not. An important and, we believe, highly desirable feature of this analysis is that the meaning of the comparative form is built compositionally on the meaning of the positive form, exactly as one would expect, given that the former is syntactically built from the latter by addition of *kanas*. We elaborate on this point further in Chapter 4.

3.2.5 *Qualities and scales*

Our explanation for why possessive property concept sentences are possessive relies on the assumption that the property concept lexemes that appear in such sentences denote qualities.¹⁹ Qualities are not standardly evoked in the semantic literature on property concept constructions, which is concentrated on adjectives and employs instead an ontology of scales, conceived of as totally ordered sets of points, generally called degrees (see Kennedy 1999: 97, 188 for discussion). It is therefore pertinent to examine the exact relation between qualities and scales, determining in what ways, if any, they differ, and whether our analysis of the difference between possessive and non-possessive property concept sentences depends in any way on choosing between them. In the following, we discuss this issue, showing that qualities and scales do in fact have distinguishing properties, but that none of them are relevant for the analysis of possessive property concept sentences. The distinction between quality-denoting

¹⁹ It is perhaps worth stressing that qualities are just mathematical objects used to model the meaning of certain expressions. By positing qualities in our models, we are *not* thereby committing ourselves to any metaphysical or ontological claims in the philosophical sense. Such claims are about the nature of the world, or perhaps about a theory of that nature, but in any case not about grammatical models. Emmon Bach (1986) famously drew the distinction between *natural language metaphysics* and *metaphysics*. If anything, we are engaged in the former, and remain blissfully agnostic about the latter.

and individual-characterizing property concept lexemes could equally well be stated in terms of scales. Nevertheless, the order-theoretic differences between the two have potential empirical consequences that we feel motivate the use of qualities.

Both qualities and scales are ordered sets, and the relation between them is completely determined by the different orderings involved. We consider first how scales and qualities differ with respect to ordering. We then discuss the kinds of data that we believe motivate the adoption of a quality-based theory over a scale-based theory.²⁰

3.2.5.1 Order-theoretic differences between qualities and scales Two orderings were invoked in the analysis of qualities at §3.2.1. The first is the mereological order \leq , the second is the ‘size’ ordering \leq .²¹

The first difference between qualities and scales is in the ‘size’ ordering \leq . In our definition of qualities, \leq is a total preorder on portions. It is an essential property of scales that they are ordered by a total order, rather than a preorder. The difference between a total order and a preorder is that the former is antisymmetric and the latter not. The ordering relation on degrees on a scale is, by definition, antisymmetric. That is, if two degrees d_1, d_2 are such that they occupy the same place in the ordering ($d_1 \leq d_2$ and $d_2 \leq d_1$), they are the same degree. Giving up antisymmetry for qualities has exactly one consequence, namely that two distinct portions of a quality can occupy the same position in the ordering (intuitively, be of the same ‘size’). While this is a substantive difference between qualities and scales, it does not play any role in our analysis of and has, therefore, no consequence for our statement of the Lexical Semantic Variation Hypothesis. The motivation for assuming that portions are preordered rather than ordered has to do with more general considerations about the behavior of mass nouns, which are discussed at §3.2.5.3.

The second difference between qualities and scales is in mereological structure. In the tradition stemming from Parsons (1970) and Link (1983) and adopted here, the essential property of mass nouns such as *water* and *oil* is that the sets they denote are partially ordered by a transitive, reflexive, and antisymmetric ordering relation, \leq ,

²⁰ One key motivation for scales provided in the literature that we do not believe distinguishes them from qualities is scalar typology of the kind documented for adjectives by Kennedy and McNally (1999); Rotstein and Winter (2004); Kennedy and McNally (2005). Certain English adjectives, such as *pure*, are taken to have closed scales, i.e. scales that have an upper limit, a maximal degree. For example, pure cocaine cannot become any purer than it already is. So far as we can see, such generalizations, to the degree that these hold for possessive property concept constructions (a question that requires empirical investigation), can be captured in terms of qualities. The difference between open and closed scales can be modeled by distinguishing between bounded and unbounded qualities, where the former have a set of maximal elements (and possibly a supremum) whereas the latter do not. We leave a detailed exploration of this issue for future research.

²¹ In the literature on mass nouns, mass denotations have not traditionally been associated with any ordering beyond the mereological part-of relation, but this is not for any principled reason. In Chapter 6, we argue that the fact that mass noun denotations are not ordered by size (or, in other words, by quantity) is responsible for a host of grammatical facts distinguishing mass nouns from quality-denoting property concept lexemes.

conceived of as a mereological part-whole relation. The ordering on degrees on a scale, in contrast, is not intended to be mereological. Degrees do not intuitively stand in a part-whole relation to one another; they cannot overlap and have parts in common. This is reflected formally by the fact that degrees are totally ordered. For any two distinct degrees d_1 and d_2 , either d_1 precedes d_2 , or vice versa, whereas two portions of water need not be parts of one another. However, it is easy to define mereological objects based on scales that behave like qualities in the relevant respects. Any scale is uniquely correlated with a set of intervals over that scale (with points as a special case).²² Intervals on a scale can intuitively be partially ordered by a part-whole relation \leq , and can form parts of other intervals, overlap, etc.²³ Any properties of qualities related to their mereological structure could, therefore, be recreated in terms of sets of intervals on a scale. Like the assumption that \leq is a preorder, the assumption that qualities have mereological structure is not crucial for the statement of the Lexical Semantic Variation Hypothesis and for our semantics of quality possession. Rather, this assumption is motivated by more general facts about possessive predicating property concept lexemes, as well as by a specific set of data from Ulwa, discussed extensively in Chapter 6.

The conclusion of this discussion is that the formal properties that distinguish qualities from scales are not consequential for the main thesis defended in this book, namely that what underlies the contrast between possessive and non-possessive property concept sentences is a lexical semantic contrast between two classes of property concept lexemes. The distinction we propose between the two classes can equally well be stated using scales. A translation of our theory into one based on a scalar ontology could be constructed by recasting our *quality-denoting* property concept lexemes as *scale-denoting* property concept lexemes. Individual-characterizing property concept lexemes would then differ from scale-denoting ones in that they do not denote scales, but something else. This is congruent with the semantic literature on adjectives. While there is no consensus over what adjectives denote (§3.1), it is never assumed that they denote scales. Under such assumptions possession would play the same role it does in our quality-based analysis, namely that of contributing a relation between individuals and scales. For example, an individual could be related to a scale by having a degree or an interval on that scale.²⁴ In fact, on one common analysis of adjectives going back to Cresswell (1977), they denote relations between individuals and degrees on a scale that hold if and only if the individual has the degree. On such a relational analysis, adjectives can be taken to encode lexically the meaning that is constructed

²² For any two points a and b , on a scale such that $a \leq b$, an interval is the set of points x satisfying $a \leq x \leq b$.

²³ In fact, it has been argued, e.g. by Kennedy (2001) and Schwarzschild and Wilkinson (2002), that intervals should replace degrees in the analysis of comparatives.

²⁴ An analysis along these lines has recently been proposed in Bochnak (2013: 112 ff.) for the Bantu language Luganda.

compositionally by combining a scale-denoting property concept lexeme with possessive morphosyntax. This essentially recreates our analysis of the observed distinction between possessive and non-possessive property concept sentences, pinpointing it again on the lexical semantics of property concept lexemes. We take no stance on the desirability of such an analysis for English adjectives, and more generally on whether or not the denotation of individual-characterizing property concept lexemes should be identified, in at least some languages, with the denotation reached by composing quality-denoting lexemes with possessive morphology.²⁵ We point it out only to show that a reasonably concrete proposal for replacing qualities with scales leaves our core intuition about the pattern at hand unchanged. As already mentioned, the potential recasting of our analysis in terms of scales aside, there are other, independent empirical considerations that motivate, in our view, using qualities rather than scales. These are discussed briefly in the §§3.2.5.2 and 3.2.5.3.

3.2.5.2 Mereology The first and most obvious motivation for invoking an ontology of qualities, or, more precisely, for assigning possessive predicating property concept lexemes mereologically structured denotations, is that in many languages, such lexemes are mass nouns. For example, at least one of the possessive constructions in which the Hausa property concept nominals described earlier are used is restricted to mass and plural nouns (Abdoulaye 2006: 1139–40). Similarly, in Huave (see Chapter 2 n. 8) the possessive construction used in possessive property concept predication otherwise only allows mass nouns (Kim and Koontz-Garboden 2013: 14). In Basaá (briefly discussed in §2.2.5 and in Chapter 5), possessive predicating property concept words pattern with mass nouns in not inflecting for number (Jenks et al. 2016). Finally, in English and other familiar Romance and Germanic languages, as discussed in Chapter 6, the property concept nouns that participate in possessive property concept predication are always mass nouns. It is only natural to assign such nouns mass denotations, on a par with other mass nouns. As mentioned at §3.2.5.1, however, scales can also be associated systematically with mass-like structures, namely sets of intervals. As far as we can see, such sets would do equally well in capturing the affinity between possessive predicating property concept lexemes and other mass nouns.

A second argument for assigning possessive predicating property concept lexemes mereologically structured denotations is that this allows an explanation for certain facts about Ulwa. Specifically, Ulwa nouns in *-ka*, such as *minisihka*, can, in certain contexts, have quality denotations. The assumption that qualities are mereologically structured affords a straightforward explanation of this initially puzzling ambiguity. This is discussed extensively in Chapter 6.

²⁵ In the next chapter, we argue explicitly, however, against an analysis proposed by Menon and Pancheva (2014), according to which all adjectives are syntactically derived and have the structure of constituents consisting of possessive predicating lexemes combined with possessive material.

3.2.5.3 *Antisymmetry* The motivation for giving up antisymmetry in modeling possessive predicating property concept lexemes comes from considerations about the semantics of English abstract mass nouns such as *beauty* and *strength*. To the degree that English has possessive property concept constructions, they feature such mass nouns, and it is therefore desirable for a semantic theory of possessive predicating property concept lexemes that it be at least compatible with their semantic properties. One such property has to do with the relation between gradability/comparison and identity conditions. There is a strong intuition, modeled explicitly in the philosophical literature, especially Moltmann (2009), that attributes have unique manifestations in individuals. In that literature, such unique manifestations are called tropes, and their identity conditions are determined by their bearers (the manifesting individuals), independently of gradability and comparison. For example, the particular entity that is Kim's strength is not identical to the particular entity that is Sandy's strength, even if Kim is exactly as strong as Sandy. In Moltmann's theory, phrases like *Kim's strength* are names of tropes. The counterparts of tropes in our terminology are portions of qualities.²⁶ The intuition that two individuals who are equally strong nevertheless have distinct portions of strength is naturally captured if portions of qualities are preordered, since two portions of a quality can occupy the same place in an ordering without being identical. This intuition might have linguistic manifestation in sentences such as (27).

- (27) The Taj Mahal has as much beauty as the Stata Center, though their beauties are very different.

It is difficult to see how to assign truth conditions to (27) that do not require that the Taj Mahal and State Center have the same degree of beauty, while having different beauties. This would be impossible to do if the noun *beauty* were taken to denote the scale of beauty, and a noun phrase like *the Taj Mahal's beauty* the Taj Mahal's degree of beauty. In that case, (27) would come out saying that the two buildings have the same degree of beauty but their degrees of beauty are different. This is a contradiction and clearly not what (27) means. If, on the other hand, a noun like *beauty* is taken to denote a set of preordered portions, then (27) can be taken to say that the two buildings have different portions of beauty that nevertheless occupy the same position in the preorder.²⁷

²⁶ In fact, our possessive relation seems closely related to the relation *B* assumed by Moltmann (2009: 69) to hold between a trope and its bearer.

²⁷ If the following remark, Cresswell (1977), citing Wheeler, might seem to suggest relaxing antisymmetry for scales. "The $>$ is heuristic, in order to suggest the direction of the comparison. It is tempting to think of $>$ as at least a partial ordering (i.e., a transitive and antisymmetric relation); whether it should be strict or not or total or not seems unimportant, and perhaps we should even be liberal enough not to insist on transitivity and antisymmetry" Wheeler (1972: 319). Cresswell explicitly says, however, that his $>$ is a hypothesized empirical relation on individuals, not an ordering on degrees. In fact, we know of no suggestion to relax antisymmetry for scales. Cresswell's intuition that degrees are somehow related to a

A similar argument is inspired by conversation with Lucas Champollion (p.c.) and concerns intuitions about causal relations. Consider the syllogism in (28):

- (28) a. Kim and Sandy have the same weight.
 b. Kim's weight gave her a heart attack / broke the chair.
 c. Sandy's weight gave Kim a heart attack / broke the chair.

This syllogism is invalid; (28c) does not follow from (28a,b). That this is because *Kim's weight* and *Sandy's weight* refer to different entities, notwithstanding their identity of measure, is made clear by contrasting (28) with minimal pairs in which there clearly is identity of reference in the subject NPs in the two final sentences. Consider, for example, (29):

- (29) a. Kim and Sandy have the same brother.
 b. Kim's brother drinks beer.
 c. Sandy's brother drinks beer.

This argument is clearly valid, since *Kim's brother* and *Sandy's brother* refer to the same individual.

In sum, the Lexical Semantic Variation Hypothesis does not necessitate assigning qualities as the denotations of possessive predicating property concept lexemes. It is equally consistent, or so it seems to us, with assigning them scales as denotations. There are independent empirical reasons, however, that motivate the use of qualities. More precisely, these considerations motivate assigning possessive predicating property concept lexemes denotations that are both partially ordered by a mereological ordering and totally preordered by size.

3.3 Conclusion

The main theoretical question of this chapter is what determines whether a property concept sentence is possessive or not. We proposed the Lexical Semantic Variation Hypothesis, according to which this is determined by the lexical semantics of property concept lexemes. Specifically, we posit two classes of property concept lexemes, quality-denoting and individual-characterizing ones, and argue that possessive

preorder is made explicit in Bale (2011). In his theory of adjectives, the meaning of an adjective is built from a primary scale, which is a scale of equivalence classes of individuals. The primary scale is formed based on a connected preorder on individuals, e.g. the preorder 'has as much beauty as'; Bale points out that a scale based on this preorder can be constructed by linearly ordering the equivalence classes. He then derives the meaning of adjectives based on a mapping between such a linear order and a universal scale, which is also a strict order. Qualities are thus similar to Bale's primary scales, in being preordered, but differ in that they relate portions rather than individuals. In other words, where Bale has the relation 'x has as much beauty as y' as a primary relation that figures in the meaning of adjectives, we have the predicate 'p is a bigger portion of beauty than q' as a primary relation, and derive his primary relation 'x has as much beauty as y' compositionally.

property concept sentences are possessive because possession is semantically required for quality-denoting lexemes to express property concept sentences. This hypothesis was explored through the development of a model-theoretic analysis of qualities as a special kind of mass denotations, and an analysis of Ulwa property concept sentences in which their context dependence is captured in terms of order-sensitive contextual quantifier domain restriction.

An alternative approach to the data would be to deny the Lexical Semantic Variation Hypothesis, and find a way of pinning the difference between possessive and non-possessive property concept sentences on syntactic factors. In the next chapter we consider two such alternative approaches, arguing in each case that their coverage of the data is inferior, and that an analysis that pins the difference on semantics is to be preferred.

The locus of variation in property concept sentences

The main question of this book is what determines whether a property concept sentence is possessive or not. The broader issue at stake, as discussed in Chapter 1, both theoretically and empirically, is the role of meaning (specifically, lexical meaning) in determining recurrent patterns of variation in the surface form of translational equivalents.

In Chapter 1, we considered two positions on this issue: **uniformity** and **transparency**. According to uniformity, surface variation in form masks underlying uniformity in syntax and semantic composition. According to transparency, such variation reflects underlying variation in the basic elements of meaning and, consequently, in the way in which meanings are combined in the two structural varieties.

In the previous chapter, we outlined our transparentist position on property concept sentences, in the form of the Lexical Semantic Variation Hypothesis and the semantics of quality possession. The question then arises whether the range of relevant data can be explained equally well or better on a uniformitarian view, and whether and how the two views differ in their empirical predictions. Clearly, a theory that assigns the same kind of denotation to all property concept lexemes and therefore to all property concept sentences immediately captures the intuition that possessive and non-possessive property concept sentences are translational equivalents. On that kind of theory, they would simply have the same (or at least very closely related) truth conditions. In this respect, all other things being equal, such a theory would certainly have an advantage over the transparentist one we propose, which ultimately says nothing (beyond what intuition says) about how the truth conditions of possessive property concept sentences relate to those of non-possessive ones.

Any uniformitarian account of property concept sentences will have the feature that all property concept lexemes are assigned the same type of meaning. Broadly speaking, there are two options for what that meaning might be (see Matthewson 2001 for extensive general discussion of this kind of issue). First, some existing semantic theory of adjectives in languages such as English could be extended to account for possessive property concept sentences. Alternatively, a theory of possessive property

concept sentences, such as the one we have developed in the preceding chapters, could be extended to adjectival property concept sentences in familiar languages. What we show in this chapter is that neither of these reductive possibilities is tenable; both result in significant loss of generalization. The conclusion that we draw is that the transparentist position is the desirable one on empirical grounds. Independent of a priori considerations of the relative merits of transparency and uniformity, the facts in this case, we argue, clearly point to variation in the lexical semantics of property concept lexemes as the source of the observed variation in the form of property concept sentences.

The two positions are explored through two case studies. In the first, we consider whether the facts from Ulwa, much discussed throughout this book, can be captured by an analysis that reduces their semantics to that of adjectival property concept sentences in familiar languages. We show that this cannot be done without loss of generalization, and that the Lexical Semantic Variation Hypothesis is motivated by these facts as a consequence. The second case study examines property concept sentences in the Dravidian language Malayalam. Recently, on the basis of detailed investigation, Menon and Pancheva (2014) have argued that Malayalam property concept sentences provide support for uniformity, and that the morphosyntactic variation they exhibit is best located in the inventory and morphophonological realization of functional heads. We argue against this proposal, showing, on the one hand, that it leads to loss of generalization language-internally, and on the other hand that, viewed as universally applicable (as Menon and Pancheva suggest), it leads to crosslinguistic predictions that do not seem to be borne out. Both Ulwa and Malayalam, then, support the transparentist view we defend in this book. More generally, the conclusion our observations point to is that, at least in some cases, morphosyntactic differences between translational equivalents must be explained in terms of differences in the lexical semantics of the basic lexemes involved.

4.1 Ulwa and the semantic irreducibility of quality-denoting lexemes

The basic Ulwa pattern, discussed in the two previous chapters (and in extensive detail in Koontz-Garboden 2007: 162–70) is repeated in (1). The words that translate English adjectives are nouns, derived from morphologically bound roots by affixing the morpheme *-ka*, which is also the morpheme that marks the possessed noun in a possessive NP. Nominal predication, exemplified in (2), does not employ the suffix *-ka* on the predicate nominal.

- (1) Possession / property concept *-ka* syncretism in Ulwa

a. *yang as-ki-na minisih-ka.*
 1SING shirt-<1SING.POSS> dirty-3SING.POSS

‘My shirt is dirty.’

(Green 2004: asna)

b. *Alberto pan-ka*

Alberto stick-3SING.POSS

‘Alberto’s stick’

(0405–829)

(2) *Alberto ya al as.*

Alberto the man one

‘Alberto is a man.’

(Mar08–1.10)

Diachronic and typological arguments discussed in Koontz-Garboden (2016) and Koontz-Garboden and Francez (2010) demonstrate that one and the same suffix is involved in (1a) and (1b), and the vast majority of property concept sentences in the language show the same pattern (Koontz-Garboden and Francez 2010). Ulwa is thus clearly a language in which property concept sentences are predominately possessive.

4.1.1 *The Ulwa explananda*

If the Lexical Semantic Variation Hypothesis and the concomitant analysis of Ulwa presented in the previous chapter are correct, then Ulwa property concept roots denote qualities, whereas non-possessive predicating lexemes, like English adjectives, have a different, individual-characterizing, denotation. This section examines the plausibility of eliminating lexical semantic variation, thereby restricting the degree of crosslinguistic variation in the semantics of property concept lexemes, by assimilating the semantics of Ulwa property concept roots to that of English adjectives.

The hypothesis that Ulwa property concept roots have the same meaning as adjectives is not immediately implausible, but several considerations argue clearly against it. We demonstrate in what follows that extending existing semantic theories of adjectives to the Ulwa data leads to an analysis that misses key generalizations.

Any theory of Ulwa property concept sentences must explain the role of *-ka* in them. More specifically, it must provide answers to these two questions:

(i) Why is there a suffix on property concept roots?

(ii) Why is the suffix that occurs on property concept roots possessive?

Question (ii) is particularly important to answer, in light of the central observation of this book, namely that many unrelated languages robustly have possessive translational equivalents of property concept sentences. While an answer might be given to question (i), depending on the approach, we show that question (ii) receives no answer on the assumption that Ulwa property concept lexemes have the meanings of English adjectives.

Broadly speaking, there are two main approaches to the semantics of adjectives in the literature, which we call the *vague predicate* approach and the *positive operator* approach. We examine each in turn, showing that assuming it for Ulwa roots leads to a theory that fails to answer one or both of the questions above about the nature of the suffix *-ka*.

4.1.2 *The vague predicate analysis*

The vague predicate analysis (e.g. Kamp 1975; Klein 1980; van Rooij 2011) models adjectival meanings as partial functions that, in any given context, delineate the domain into a positive extension, a negative extension, and an extension gap. Different contexts determine different delineations. Comparatives are handled using supervaluations or quantification over contexts. The technical details of this kind of analysis are not important here. What matters is that on this analysis, adjectives are individual characterizing.

If Ulwa roots are taken to denote vague predicates, then their suffixed forms with *-ka* must have the same denotation, since it is the vague predicate that, on the relevant theories, applies to an individual denoted (or quantified over) by the subject. If that is the case, the semantic role our analysis assigns to *-ka*, the contribution of possessive semantics, is obliterated. Absent a semantic role, some auxiliary explanation for the occurrence of *-ka* is required, if question (i) is to be answered. In Koontz-Garboden and Francez (2010), we point out that *-ka* also plays the morphosyntactic role of turning bound roots into free-standing syntactic words. However, as we also point out, a theory on which this is the *only* role for *-ka* fails to answer question (ii), or at best answers it by saying that the suffix occurring on Ulwa property concept roots is identical to the possessive suffix by pure accident. This amounts to giving up on an explanation for possessive strategies of predication, clearly an unattractive result given the robustness of such strategies across unrelated languages.

4.1.3 *Positive operator analyses*

The positive operator analysis was first proposed by Cresswell (1977), developed, elaborated, and integrated into modern generative grammar in the work of Kennedy (1999; 2007 *inter alia*), and assumed by many others following him. On this analysis, lexical adjectives have a denotation that requires composition with a degree operator in order to be used predicatively in property concept sentences. The relevant degree operator is called *pos*, and is introduced either by a degree morpheme (e.g. von Stechow 1984; Kennedy 1999) or by a type-shift (Grano 2011). In comparatives, the degree operator is contributed by comparative morphology or syntax. The important feature of this analysis for our purposes is that the two degree operators, the positive and the comparative one, are in complementary distribution. That is, in any given property concept sentence or comparative sentence, the lexical adjective composes with exactly one of these operators.

If Ulwa roots have the denotation posited for adjectives on this approach,¹ an answer to question (i) above could be given, namely that *-ka* is a degree morpheme, contributing the *pos* degree operator. However, this answer makes the prediction that

¹ There are at least two denotations of adjectives that have been proposed within positive operator theories. Kennedy (1999) assumes that adjectives denote measure functions. Cresswell (1977) assumes they denote relations between individuals and degrees on a scale. This difference is irrelevant to the discussion here.

–*ka* should be in complementary distribution with the comparative morpheme *kanas*. This prediction is clearly false, as shown by (3). Furthermore, this approach offers no answer to question (ii), and wouldn't do so even if the analysis of –*ka* as a degree morpheme did not make the aforementioned incorrect morphological prediction.

- (3) *Abanel ya kanas yûh-ka* *Clementina karak.*
 Abanel the more tall/long-3SING.POSS Clementina with
 'Abanel is taller than Clementina.' (Jan11–14)

The case study from Ulwa, then, shows that property concept roots cannot be profitably analyzed as having either kind of denotation that has been suggested in the literature for adjectives. Reducing the semantics of possessive predicating property concept lexemes to that of individual-characterizing ones therefore is not a viable route toward a uniformitarian view of the variation in form exhibited by property concept sentences.

Our theory that roots denote qualities, on the other hand, provides a perfectly natural answer to both the questions mentioned at §4.1.1. Ulwa property concept roots carry a suffix because the suffix contributes the semantics required for them to be used in (a translation equivalent of) a property concept sentence (question (i)), and the suffix they carry is possessive because they denote qualities, and the semantics they require to be used in a property concept sentence is that of quality possession (question (ii)).

4.2 Malayalam and the semantic irreducibility of individual-characterizing lexemes

If it is not possible to maintain that all property concept lexemes have the semantics of adjectives, the obvious alternative is to argue that they all have the semantics of possessive predicating lexemes (whatever that semantics is).² On such a view, *all* property concept sentences, including those with seemingly non-possessive predicating property concept lexemes, have a possessive semantics of the kind that we have proposed in the preceding chapters for possessive predicating property concept sentences.

Precisely such a theory is developed by Menon and Pancheva (2014). They present data from Malayalam which, they claim, support a uniformitarian view in which property concepts “universally lexicalize as roots, rather than as adjectives or nominals”, and property concept sentences are universally and uniformly possessive. The variation in form they exhibit is attributed to the language-specific inventory and morphophonological properties of categorizing functional heads with which property concept roots combine. One consequence of their analysis is that adjectives, in the

² The discussion in this section draws heavily on Francez and Koontz-Garboden (2016b).

languages that have them, are syntactically derived from roots by morphology with possessive semantics that is often phonologically null. In the sections that follow, we re-examine the data, arguing that it is not only consistent with, but in fact supports the transparentist view encoded in the Lexical Semantic Variation Hypothesis. We first lay out the facts of Malayalam, then detail Menon and Pancheva's analysis, then point out what we perceive to be its inadequacies, and why our transparentist alternative does not suffer from them.

4.2.1 *Malayalam: The descriptive facts*

There are two classes of property concept lexeme in Malayalam, which Menon and Pancheva (2014) call Class 1 and Class 2. At a purely descriptive level, the lexemes in Class 2 are possessive predicating, whereas those in Class 1 are not. Both classes are robustly attested in the language.

4.2.1.1 *Class 1* Class 1 roots are those that become free words when suffixed with *-a*, as shown by the data in (4).

- (4) Malayalam property concepts words in *-a* (Menon and Pancheva 2014: 290)
valiya 'big'; *čeriya* 'small'; *puthiya* 'new'; *nalla* 'good'; *pačča* 'green'; *niila* 'blue'

As discussed by Menon and Pancheva, the suffix *-a* is, diachronically, a relativizer. Whether it should be taken to be a relativizer synchronically or not is a matter of debate: Asher and Kumari (1997: 116–17, 350) reject this idea, while others, including Menon and Pancheva (2014: 290) argue that it is indeed synchronically productive. We cannot contribute to a resolution of this issue, but nothing we say here hinges on it being resolved. In the remainder of the discussion we follow Menon and Pancheva and call forms like *nalla* 'good' relativized.

These relativized forms, in order to be used as predicates, must be turned into light-headed relatives, using suffixes that Menon and Pancheva describe as bound pronouns (Menon and Pancheva 2014: 292). Examples are given in (5) (the glosses throughout are Menon and Pancheva's).

- (5) a. *nalla-val*
 good-FEM.SG
 'she who is good'
 b. *nalla-van*
 good-MASC.SG
 'he who is good' (Menon and Pancheva 2014: 292)

These light-headed relatives serve as the main predicates in property concept sentences built on Class 1 roots, as illustrated by the data in (6).

- (6) a. *avaḷ nalla-vaḷ aaṇə.*
 she good-FEM.SG EQ-COP
 'She is good.'

- b. *avan nalla-van aaṇə.*
 he good-MASC.SG EQ-COP
 'He is good.'

(Menon and Pancheva 2014: 292)

Such sentences feature what Menon and Pancheva call the 'equative copula' *aaṇə*, the copular element generally used for non-verbal predication in Malayalam, as shown by the data in (7).

- (7) a. *avan kolayali aaṇə.*
 he murderer EQ-COP
 'He is a murderer.'

- b. *avaḷ keḷḷkun-a-vaḷ aaṇə.*
 she hear-REL-FEM.SG EQ-COP
 'She is one who can hear.'

(Menon and Pancheva 2014: 293)

4.2.1.2 Class 2 Class 2 roots are mostly borrowings from Sanskrit and combine with the Sanskrit borrowed suffix *-am* to form nouns. Some property concept words in this class are given in (8).

- (8) *santosham* 'happiness'; *sankaṭam* 'sadness'; *madhuram* 'sweetness'; *prayasam* 'difficulty'; *santam* 'quietness'; *pokkam* 'tallness'

(Menon and Pancheva 2014: 290)

The suffix *-am* is "a productive nominal marker in Malayalam" (Menon and Pancheva 2014: 293), as evidenced by the fact that it forms nouns not only from property concept roots, but also from roots that form verbs, as in (9), and other ordinary nouns, as in (10).

- (9) a. *chaat-uka* 'to jump'; *oot-uka* 'to run'; *snek-ikk-uka* 'to love'
 b. *chaat-am* 'a jump'; *oot-am* 'a run'; *sneh-am* 'love'

(Menon and Pancheva 2014: 293)

- (10) *paz-am* 'banana'; *vell-am* 'water'; *kall-am* 'theft' (Mythili Menon, p.c.)

In contrast with Class 1 roots, Class 2 roots combining with *-am* form property concept sentences with possessive morphosyntax. Ordinary possessives in Malayalam are created with an existential construction, using a special copula (which Menon and Pancheva call the 'existential copula') and with a dative marked possessor, as shown in (11).

- (11) *ava[kkə mookutthi uŋtə.*
 she.DAT nose.pin EX.COP
 ‘She has a nose pin.’ (Menon and Pancheva 2014: 294)

Precisely the same construction is used to create property concept sentences with Class 2 property concept roots suffixed by *-am*, as shown by the data in (12).³

- (12) *ava[kkə pokkam uŋtə.*
 she.DAT tallness EX.COP
 ‘She is tall.’ (Menon and Pancheva 2014: 294)

4.2.1.3 Summary of the descriptive facts in Malayalam To summarize, descriptively speaking, there are two classes of property concept lexeme in Malayalam. Property concept lexemes in what Menon and Pancheva call Class 1 appear in property concept sentences suffixed with relativizing morphology and with morphosyntax otherwise used for canonical non-verbal predication in the language. Class 2 lexemes appear in property concept sentences suffixed with nominalizing morphology and with possessive morphosyntax.

Menon and Pancheva argue for an analysis in which the appearance that property concept sentences with Class 1 roots are not possessive is a surface illusion due to the morphophonological contingencies of Malayalam. In fact, they claim, both types of property concept sentences have possessive syntax and possessive semantics. The possessive syntax is simply covert with Class 1 roots.

4.2.2 Menon and Pancheva’s analysis of Malayalam

Menon and Pancheva’s (2014) analysis is couched in the framework of Distributed Morphology, with the goal of maintaining a universally uniform lexical semantics for property concept lexemes and, consequently, a universally uniform semantics for property concept sentences. The key assumption of the analysis is that property concept lexemes are universally precategorical roots, and universally denote *properties* (in the property-theoretic sense of Chierchia and Turner 1988, following Koontz-Garboden and Francez 2010). Property concept sentences built on these

³ Comparatives based on Class 2 roots are also built on a possessive morphosyntax, by contrast with those in Class 1, as shown by the data in (i) and (ii). Menon and Pancheva make the interesting observation that comparatives based on Class 1 property concept roots disallow *kuuŋuttal* ‘more’ whereas those based on Class 2 roots optionally allow it, as (i) shows.

- (i) a. *Anil-inə Komalan-e kaa[-um (kuuŋuttal) pokkam uŋtə.*
 Anil-DAT Komalan-ACC than more tallness EX.COP
 ‘Anil is taller than Komalan.’ (Menon and Pancheva 2014: 299)
- b. *Anil Komalan-e kaa[-um nalla vidhyarathi aaŋə.*
 Anil Komalan-ACC than good student EQ-COP
 ‘Anil is a better student than Komalan.’ (Menon and Pancheva 2014: 299)

Why this is the case is unclear to us; neither we nor Menon and Pancheva have an explanation for this contrasting behavior.

roots always express the proposition that an individual possesses an ‘instance’ of the property denoted by the root. In cases where there is non-possessive predication on the surface, as with Malayalam Class 1 roots, possession is introduced covertly by a phonologically null categorizing head. In the case of Malayalam Class 1 roots, the null categorizing head is a *v* head, assumed to have possessive semantics. When possessive morphosyntax is seen on the surface, this is because possessive semantics has not been introduced by the head categorizing the root. This is the case with Malayalam Class 2 roots, which are categorized by a *n* head, spelled out as *-am*, which does not introduce possessive semantics. With *-am* derived nouns, possessive semantics is instead introduced overtly by a possessive construction. In the rest of this section, we describe this analysis in detail, and in §4.2.3 consider its merits as a uniformitarian account of variation in the form of property concept sentences.

4.2.2.1 Class 1 roots Class 1 roots are turned into possessive predicates by a functional verbalizer *v* with possessive semantics, which also introduces a degree argument. Formally speaking, as shown in (13), this phonologically null *v* head takes a property-denoting root and creates a degree predicate from it—a function from degrees to a function from ordinary individuals to truth values which, when predicated of an individual *a* and a degree *d*₁, yields truth just in case there is some instance *y* of the root property that *a* has and the measure of *y* exceeds *d*₁.⁴

$$(13) \quad \llbracket \emptyset_{v\text{-poss}} \rrbracket = \lambda \Pi \lambda d \lambda x. \exists y [y \text{ is an instance of } \Pi \ \& \ x \text{ has } y \ \& \ \mu(y) \geq d]$$

As elsewhere in the degree-based literature on property concept sentences, a key question concerns the source of the degree argument in any particular sentence with a gradable predicate in it. In comparatives, the degree argument is saturated by comparative degree morphology. To account for the context dependence of the positive form in (14), Menon and Pancheva assume a POS-operator approach (see §4.1.3), where the POS degree head is phonologically null. The POS degree head’s denotation is in (15). This operator takes a degree predicate (the denotation of the verbalized property concept root), and creates a predicate of individuals, true of an individual *a* iff there is a degree *d* such that *a*’s instance of the root property outranks *d*_s, a contextually provided standard.

$$(14) \quad \begin{array}{lll} \textit{avan} & \textit{nalla-van} & \textit{aanə} \\ \text{he} & \text{good-MASC.SG} & \text{EQ-COP} \\ & \text{‘He is good.’} & \end{array}$$

(Menon and Pancheva 2014: 292)

$$(15) \quad \llbracket \text{POS} \rrbracket = \lambda g_{\langle d, \langle e, t \rangle \rangle} \lambda x \exists d [g(d)(x) \ \& \ d > d_s]$$

⁴ Menon and Pancheva are not explicit about what an instance of a property is, but it is clear that they do not understand by this an individual instantiating the property. Rather, by ‘an instance of a property’ they seem to us to understand the instantiation of a property in an individual, a notion similar to Moltmann’s *trope* (e.g. Moltmann 2009), and hence also to our *portions*.

Schematically, then, their treatment of a property concept word such as *nalla* ‘good’ in the context of a sentence like (14) is as in (16). The root is first verbalized by the phonologically null verbalizer, which introduces the possessive semantics required in order to relate a property to individuals. The null POS head saturates the degree argument and introduces a contextually determined standard of comparison, as described above. Finally, relativizing morphology is affixed, presumably for syntactic reasons that are not important here. This yields for *nallavan* ‘good-MASC.SG’ the denotation in (16b).

- (16) a. $[[[\sqrt{nall} + \emptyset_{v-poss}]_v + POS]_{v-a-van}]_{rel}$
 b. $\lambda x \exists d \exists y [y \text{ is an instance of goodness} \ \& \ x \text{ has } y \ \& \ \mu(y) \geq d \ \& \ d > d_s]$

4.2.2.2 *Class 2 roots* Class 2 roots are turned into nouns by a nominalizing functional head *n*, realized as the suffix *-am*. On Menon and Pancheva’s analysis, this categorizing *n* can have different meanings, one of which is a function that takes a property and returns a relation between degrees and ‘instances’ of the property, as in (17).

- (17) $[-am] = \lambda \Pi \lambda d \lambda x [x \text{ is an instance of } \Pi \ \& \ \mu(x) \geq d]$

This suffix, unlike the verbalizing morphology at §4.2.2.1, does not introduce possessive semantics. Rather, it maps a property to a relation between instances of the property and degrees. The degree argument introduced by *-am* needs to be saturated. As before, saturation is by comparative morphology in comparative constructions, and by the null degree head POS in the positive case (18).

- (18) *ava[kkə pokkam un̩tə].*
 she.DAT tallness EX.COP
 ‘She is tall.’ (Menon and Pancheva 2014: 294)

Schematically, this gives the structure in (19a) to a property concept word like *pokkam* ‘tall’. Its denotation in a positive context such as (18), with a saturated degree argument, given in (19b), is a set of instances of tallness that outrank some contextually given standard.

- (19) a. $[[[\sqrt{pokk} + am_n]_n + POS]$
 b. $\lambda x \exists d [x \text{ is an instance of tallness} \ \& \ \mu(x) \geq d \ \& \ d > d_s]$

Crucially, (19b) is not a predicate of ordinary individuals, and therefore cannot be directly predicated of an ordinary individual to express the translational equivalent of a property concept sentence. This is why, on Menon and Pancheva’s analysis, possessive morphosyntax surfaces with such lexemes in property concept sentences. The overt possessive morphosyntax seen in (18) introduces the semantics of the phonologically null verbalizer in property concept sentences with Class 1 roots.

Having laid out the analysis, we now consider its merits as an alternative analysis aimed at advancing a uniformitarian approach to property concept sentences.

4.2.3 Malayalam and the consequences of uniformity

Descriptively, as discussed in §4.2.1, Malayalam shows two strategies of property concept predication. Class 1 roots give rise to non-possessive predication, as illustrated in (20), while Class 2 roots give rise to possessive property concept sentences, as in (21).

- (20) *ava[nalla-va[aaŋə.*
 she good-FEM.SG EQ-COP
 ‘She is good.’

- (21) *ava[kkə pokkam un̩tə.*
 she.DAT tallness EX.COP
 ‘She is tall.’

On Menon and Pancheva’s uniformitarian analysis, this descriptive generalization is only true on the surface, an illusion created by the idiosyncratic morphophonology of Malayalam. At a deeper level, both (20) and (21) have a possessive syntax as well as possessive semantics. Possession is simply covert with the Class 1 roots, since the morpheme contributing possessive morphology happens to be phonologically null (i.e. *v*-poss). With Class 2 roots, the possession is observed on the surface, in the form of the possessive existential copula+dative construction. Furthermore, their assumption is that property concept sentences are always possessive, not only in Malayalam, but universally (Menon and Pancheva 2014: 301). As mentioned earlier, they claim that property concept lexemes are universally property-denoting roots, requiring possessive predication, and property concept sentences universally express relations between individuals and instances of properties. Crosslinguistic variation arises as a consequence of (i) morphophonological accidents, such as that observed internal to Malayalam, where a possessive *v* is phonologically null, and (ii) differences in the inventory of functional heads. Generally, on their view, the descriptive distinction we draw between possessive and non-possessive property concept sentences is simply a distinction between overtly possessive property concept sentences and covertly possessive ones.

Adjectives, in languages that have them, are assumed on this analysis to be “syntactically derived categories that too use a possessive strategy of predication, a covert one” (Menon and Pancheva 2014: 301). While they do not spell out an analysis of adjectives, it is clear enough what such an analysis would have to look like. The adjectivizing categorizer of roots in languages like English would presumably be a phonologically null head *a*, and would introduce possessive semantics.

The following sections show that this uniformitarian account has two kinds of undesirable consequence. The first is that it overgeneralizes in Malayalam. The second is that pinning variation on language-specific inventories of functional morphemes gives rise to crosslinguistic expectations that do not seem to be met. We discuss each of these classes of problem in turn.

4.2.3.1 *Problems specific to Malayalam* The uniformitarian analysis leads to at least two kinds of missed generalization about Malayalam which a transparentist analysis captures.

The first concerns the motivation for the functional morphology appealed to by the analysis. While it is debatable whether the nominal categorizing morphology *-am* should be treated syntactically, as it is in Menon and Pancheva's analysis, there is no doubt that *-am* is a nominalizer, that is, a suffix that makes a noun out of a bound root. In the case of the hypothesized *v* head that categorizes Class 1 roots, however, there is reason for serious doubt, since it is never realized phonologically, and Menon and Pancheva offer no empirical arguments for its existence.⁵ The arguments, rather, are purely theory-internal—the semantically uniform treatment of property concept lexemes, and the broader Distributed Morphology assumptions which entail that all word formation is syntactic, cannot be maintained without it.⁶ A more plausible analysis, we claim, would treat the Class 1 lexemes simply as lexically individual characterizing. Such an analysis makes moot the question why there is no evidence for a phonologically null, semantically possessive verbal functional head, since it does not posit such a head to begin with.⁷

The second problem is that the proposed syntactic view does not in fact make the two classes of roots natural classes. Specifically, nothing in the analysis laid out by Menon and Pancheva blocks any root from occurring with any head, whether *n* or *v*. To state the concern differently, the analysis, as stated, actually predicts that all roots should appear in both non-possessive and possessive property concept sentences. This is because both functional heads take property-denoting bound roots as arguments, and both Class 1 and Class 2 roots are roots of precisely that type on this analysis. In fact, however, the roots are restricted in distribution—Class 1 roots appear only in (overtly) non-possessive predicating property concept sentences, while Class 2 roots appear only in (overtly) possessive property concept sentences.

A proponent of Distributed Morphology might argue that this deficiency could be overcome by appealing to something like the notion of allosemy elaborated recently in Wood (2015). The assumption would then be that all roots combine with all heads, but that the combination of Class 2 roots with *n* is not assigned any denotation at LF, and similarly for the combination of Class 1 roots with *v*. This line of argument seems to us simply to recreate the problem elsewhere, as nothing explains why it is that, systematically, whenever the combination of a root with *v* is blocked at LF, the combination of that root with *n* is not, and vice versa.

⁵ See Menon and Pancheva (2016), however, for a possible argument from color terms.

⁶ A Distributed Morphology adherent might argue that there is independent motivation elsewhere for the view that word formation is always syntactic, and that positing a *v* head is justified on those grounds. See Baker (2003: ch. 5) for a sound rebuttal of this view.

⁷ Both analyses still need to account for the fact that Class 1 lexemes, whatever their categorial status, are restricted in distribution and only occur with the morpheme *-a*.

Furthermore, the fact remains that the combination of Class 1 roots with, for example, the nominalizer *-am* simply does not exist in Malayalam. It seems to us that the proponent of Distributed Morphology would have to elaborate a theory that allows discrimination between head–root selection and LF-blocking, with applicable diagnostics to tell the two apart. Finally, there is at least one other reason to believe that the two classes of roots in Malayalam are in fact natural classes, namely the fact that Class 1 roots are native Dravidian roots, whereas Class 2 ones are generally borrowings.

While we believe that these two Malayalam-internal considerations already cast significant doubt on the uniformity view, there are yet more formidable ones that emerge when the analysis is generalized crosslinguistically.

4.2.3.2 Crosslinguistic problems A basic assumption of Menon and Pancheva's uniform analysis is that property concept lexemes are universally precategorical, property-denoting roots. Variation in the form of property concept sentences across languages is a consequence of differences in (i) the inventory of categorizing functional heads: for example, whether the particular categorizing heads a language has have a possessive semantics or not, and (ii) whether syntactic material introducing possessive semantics is phonologically realized or not. These assumptions give rise to three problematic crosslinguistic predictions.

First, since categorizing morphology is responsible for introducing the possessive semantics in property concept sentences that are not morphosyntactically possessive on the surface, it follows that there should be a general link between categorizing morphology and possessive semantics. For example, Menon and Pancheva's hypothesis about adjectives in languages such as English is precisely that the adjectivizing functional head carries possessive semantics. We should therefore expect to see a crosslinguistically robust coincidence of categorizing morphology with possessive morphology, but this is not what we find. Arguably, coincidence of categorizing morphology and possessive semantics is what we see in Ulwa *-ka*. As we argued in Koontz-Garboden and Francez (2010) and Francez and Koontz-Garboden (2015), and mentioned earlier in this chapter, *-ka* seems to be at once a nominalizer and a possessive morpheme. So far as we are aware, however, the Ulwa pattern is very much the exception rather than the norm, Dalabon (Evans and Merlan 2001; Ponsonnet 2015) and Huave (Kim and Koontz-Garboden 2013) being the only other languages we are aware of in which adnominal possessive morphology is potentially used (potentially, because the syntactic category system in Dalabon is unclear [Evans and Merlan (2001); Ponsonnet (2015)] and because the relevant strategy is only marginally used in Huave).

For other categorizers, however, the situation is much worse, and no coincidence is ever observed with possessive morphology. For example, so far as we are aware, no language has adjectivizing morphology on property concept roots that is also

possessive, despite the fact that many languages that have adjectives have overt possessive morphemes. Nor are we aware of any language that displays an observable coincidence of verbalizing morphology and possessive morphology. This prediction of the uniformitarian view is clearly not borne out.

Second, if property concept lexemes universally denote properties, and if all categorization is syntactic, then we expect to see categorizing morphology systematically diverge between categorizers of property concept roots and categorizers of other roots in the same syntactic categories. This is on the reasonable assumption that not *all* roots denote properties, i.e. that the roots of many verbs and nouns (like *eat* or *dog*) are not property denoting and do not call for a semantics of possession in combination with arguments. For example, we would expect a crosslinguistically recurring distinction between property concept verbs and other verbs, as well as between property concept nouns and other nouns, in terms of the categorizing morphology used in word formation with them. At the very least, we expect this in languages in which categorizing morphology is overt. While seriously corroborating or disproving this prediction requires a systematic crosslinguistic investigation, which we have not carried out, we are highly skeptical as to its being borne out.

A third prediction concerns the syntactic categories of property concept words that overt possessive morphosyntax is found with. Absent additional development of the theory, Menon and Pancheva's view has it that categorizers are found in both possessive and non-possessive guises. So, for example, *n* in Malayalam, realized by *-am*, lacks possessive semantics, while in Ulwa, the *n* realized by *-ka* does introduce possessive semantics. While this may be unproblematic in the domain of nominalizers, we are skeptical, and certainly not aware of any evidence that there is a functional head *v* that combines with property concept roots but does not carry possessive semantics. In other words, Menon and Pancheva's theory predicts the existence of verbal property concept words that, in order to form property concept sentences, require combination with external possessive morphosyntax. We know of no such cases. Worse, as we discuss in Chapter 5, it is a clear generalization that there are no languages that have possessive property concept sentences featuring adjectives. What this means in the context of the uniformitarian account of variation is that adjectivizing heads *always* have possessive semantics. Perhaps there is some explanation, in the context of a uniformitarian account, for why this might be the case, but it is unclear to us what this explanation might be. What is clear, however, is that the theory as currently stated falsely predicts that overt possessive morphosyntax should, across languages, be found with property concept lexemes of all syntactic categories.

To summarize, what this discussion shows is that the semantics of non-possessive predicating property concept sentences cannot be reduced to that of compositionally constructed, possessive property concept sentences. Property concept lexemes cannot be assigned a universal quality (or property) denotation. A theory that assigns them such denotations leads to overgeneralization in the context of Malayalam and to a

series of crosslinguistic predictions that are not (or, in some cases, at least do not seem to be) borne out.

4.2.4 A transparent analysis of Malayalam

The Malayalam data, we believe, actually lend very clear support for the Lexical Semantic Variation Hypothesis. According to this hypothesis, as discussed extensively in Chapter 3, variation in the form of property concept sentences is directly tied to variation in the lexical semantics of property concept lexemes. In particular, the hypothesis has it, quite simply, that property concept sentences are morphosyntactically possessive when they are semantically possessive, which is when, and only when, they feature quality-denoting property concept lexemes. When they feature individual-characterizing lexemes, they are not semantically possessive, and therefore also not morphosyntactically possessive. This is why this hypothesis is transparentist.

We hypothesize that, in Malayalam as elsewhere, what you see is what you get. Class 1 lexemes are individual characterizing, and Class 2 lexemes are quality denoting, and this is why, as the Lexical Semantic Variation Hypothesis predicts, property concept sentences built on Class 2 roots are possessive whereas those built on Class 1 roots are not. Specifically, we follow Menon and Pancheva in assuming that Class 2 lexemes are morphologically bound roots, and that *-am* is a nominalizer. The fact that nouns formed with *-am* have all sorts of meanings, including meanings like *pazam* ‘banana’, as shown in (7), suggests that *-am* does not have a semantics that is specific to the gradable denotations of property concept roots, but is rather semantically inert. We propose that, unlike Ulwa *-ka*, which is restricted to property concept roots, *-am* really is just a nominalizer, and plays only the morphosyntactic role of forming nouns from bound roots (presumably in the lexicon). Being semantically inert, it has a trivial denotation, the identity function, and returns the meaning of the root it combines with. Unlike in Menon and Pancheva’s analysis, then, the transparent analysis does not require multiple denotations for *-am*—one that introduces degrees with property concept lexemes as in (17) and one for non-gradable nouns such as *pazam* ‘banana’.⁸ The transparent analysis, by contrast, derives the meanings of *-am* nouns simply from their roots. The fact that nouns derived from Class 2 roots with *-am* are possessive predicating now falls out immediately as a prediction. If Class 2 roots are quality denoting, as we hypothesize, and *-am* denotes the identity function, then nouns derived from Class 2 roots by *-am* suffixation are also quality denoting, and therefore form possessive property concept sentences.⁹

⁸ In fact, Menon and Pancheva might even need a third denotation for *-am* depending on what they say about the result noun cases like *chaat-am* ‘a jump’. We leave that issue to the side here.

⁹ Menon and Pancheva have *-am* introduce a degree semantics with their property-denoting roots. If roots denote qualities, no degree semantics is needed, since, as discussed in Chapter 3, gradability is guaranteed by the \leq preorder on qualities.

We propose that Class 1 lexemes suffixed with *-a* are fossilized forms with individual-characterizing denotations. Not knowing nearly enough about the language, we leave it open whether these forms have been reanalyzed as adjectives, or, as Menon and Pancheva suggest, as relative clauses on analogy with the general pattern of relativization in Malayalam, which involves suffixing *-a* to a participial form of the verb.¹⁰ Since Class 1 lexemes such as *nall-* are not active roots in the modern language, and do not participate, as far as we know, in any other word-formation processes, it is unsurprising that they cannot combine with categorizing morphemes like *-am*. If forms such as *nalla* are individual characterizing, it is of course also unsurprising that they are not possessive predicating.

This transparentist line of analysis is advantageous first and foremost because it makes the morphosyntactic variation in the form of property concept sentences systematic. According to this view, we find possession if and only if the property concept lexeme has a quality denotation. Furthermore, it brings the Malayalam data in line with a pattern observed in language after language. It has the further advantage that it does not give rise to false crosslinguistic expectations, such as the expectation of a link between possessive semantics and categorizing functional morphology. Finally, it does not invoke syntactic structure for which there doesn't seem to be structural evidence, and it does not overgenerate, since it does not posit that Class 1 lexemes are productive roots.

As a final note, an interesting complication of this discussion of Malayalam, which must be left for future research, is the situation in the closely related Tamil. E. Annamalai points out (p.c.) that Tamil, like Malayalam, has possessive and non-possessive property concept sentences. Unlike in Malayalam (at least, as described by Menon and Pancheva), however, in Tamil there is no direct correlation between choice of strategy (possessive vs. non-possessive) and root class. Specifically, while Tamil, like Malayalam, has property concept roots that take *-am* and give rise to possessive strategies, it also has roots like *nall-*, which in Malayalam are Class 1, that occur with *-am* creating non-possessive predicating lexemes. Similarly, roots that in Malayalam are Class 2, can occur in Tamil with *-am* in non-possessive property concept sentences. While these observations are preliminary, they are not surprising

¹⁰ Intriguingly, data cited by Andronov (1996: 64) from archaic Malayalam very strongly suggest that the source of the *-a* in forms such as *nalla* is not the relativizer *-a*, but instead an inflectional affix on *nall-*, which had both 'substantive' and 'adjectival' uses. Andronov shows that the full inflectional paradigm of *nall-* is preserved in classical Tamil, and states that Classical Malayalam preserved only the 3rd-person forms, and eventually lost all but the 3rd-person plural form, *nalla*. On the other hand, there are data from dialectal variation that seem to lend credence to the idea that forms like *nalla* have been reanalyzed as relative clauses. In particular, Gamliel (2013: 146) shows that in Jewish Malayalam, the variety spoken by Jews who emigrated from Kerala to Israel, the relative participle ending *-a* is replaced with *-e*, and that, again intriguingly, this replacement carries over to the Jewish Malayalam form for *nalla*, which is *nalle*. Of course, these two sets of data are not inconsistent, and suggest the conjecture that forms like *nalla* are fossilized inflected forms, which synchronically are morphologically simplex, but distributionally analogized to syntactically constructed relative clauses.

given our transparentist analysis, which relates the choice of strategy to the lexical semantics of the root, and treats *-am* as a general nominalizer, anticipating the possibility of there being no correlation between possessive strategies and the presence of *-am*. What the full range of data is for Tamil, how it compares with Malayalam, and what the consequences are for the kind of questions raised in this section remains to be seen.

4.3 Conclusion: Morphosyntactic variation reflects semantic variation

The general question this chapter is aimed at addressing is why it is the case that translationally equivalent expressions sometimes show variation in their morphosyntactic form, both language-internally and crosslinguistically. The point of departure for this book has been the observation that precisely this state of affairs holds with property concept sentences—in some cases they have a possessive morphosyntax, in other cases a non-possessive predication morphosyntax. The Lexical Semantic Variation Hypothesis expresses the view that what governs the choice of morphosyntactic strategy (possessive or non-possessive), language-internally and crosslinguistically, is differences in the lexical semantics of property concept lexemes. Those property concept lexemes that turn up in property concept sentences with a possessive morphosyntax do so because they denote qualities, in the sense defined and elaborated in the Chapter 3.

An influential research agenda in generative linguistics, an agenda of uniformity, seeks to place as much variation in form as possible in the *morphophonological* component of grammar, keeping syntax and semantics universal. Analyses of the variation that we have observed in property concept sentences that follow in this agenda are both conceivable and attested in the literature. Generally speaking, such analyses deal with variation by reducing the semantics of one of the variants to that of the other, and attempting to explain the surface differences in form as parochial accidents. What we showed in this chapter is that, in the case of the facts about property concept sentences, this strategy fails. Attempting to reduce the semantics of possessive property concept sentences to that of non-possessive predicative ones or vice versa invariably leads to missed generalizations and false predictions, both in the context of individual languages such as Malayalam and Ulwa, and in the broader crosslinguistic context.

We thus conclude from this chapter that the observed variation in the form of property concept sentences is indeed driven by variation in lexical semantics. On the one hand, this result is hardly a surprise. It would be very surprising if differences in lexical semantics did not bring about differences in morphosyntactic form, since form is generally the conveyor of meaning. On the other hand, though, this is a somewhat uneasy result because, in the end, it posits that sentences that are model-theoretically entirely unrelated are nevertheless translational equivalents. This is, no doubt, a

strange thing to argue. The facts of the relevant languages, however, seem to us to speak unequivocally for it.

At a higher level, we take these results to point in a direction that a growing body of literature seems to be pointing to, in relation, *inter alia*, to the mass/count distinction (Chierchia 1998b; Wilhelm 2008; Dalrymple and Mofu 2012), quantifiers (Bach et al. 1995; Matthewson 2001), and related parts of the literature on gradability and comparison (Beck et al. 2010; Bochnak 2013; Bogal-Allbritten 2013; Baglini 2015). There are crosslinguistically robust patterns in morphology and syntax that are not formed by principles of morphology or syntax per se, but rather simply by differences in the basic semantic building blocks employed within and across languages. We see this observation fitting into the broader, emerging research program in formal semantics that seeks to take a comparative perspective and identify semantic constraints on systematic variation. The next chapter takes another step in the same direction, and argues that the Lexical Semantic Variation Hypothesis leads to the discovery of novel observations about the relation between meaning and the parts of speech.

Meaning and category: Semantic constraints on parts of speech

The hypothesis underlying the discussion throughout this book is that property concept lexemes come in two semantic varieties: those that characterize individuals (like *wise*) and those that denote qualities (like *wisdom*). The purpose of this chapter is to examine whether this hypothesis can be harnessed to shed new light on a very old problem, namely the relation between meaning and the nature of lexical categories, or parts of speech.

Two observations can be made about the data introduced so far:

- (i) Individual-characterizing property concept lexemes are always adjectives.
- (ii) Quality-denoting property concept lexemes are *never* adjectives, always nouns or precategorical roots, as in Ulwa.

The chapter starts by scrutinizing these observations in view of more data, focusing, as elsewhere in this book, on nouns and adjectives. Once the data set is expanded, an interesting empirical generalization emerges about the relation between lexical categories and meanings. It turns out that the observation in (i) above is false—individual-characterizing lexemes can be nouns as well as adjectives. But the observation in (ii) is apparently true. There do not seem to be any quality-denoting adjectives in the world's languages. In other words, while a language can have a noun *nwise* that means 'wise', no language has an adjective *jwise* that means 'wisdom'. Thus, the generalization that emerges is that certain meanings cannot be associated with words in the adjective class. If this generalization can be derived as a consequence of basic assumptions about the nature of the adjective category, then that would demonstrate the existence of discoverable and predictive grammatical constraints, which are model-theoretically statable, on the relation between lexical semantics and lexical category. This is a possibility which has not been appreciated in the vast literature on lexical categories. We argue that this generalization can indeed be derived from explicit assumptions about the nature of adjectives. Specifically, we show that the generalization follows as a theorem from a particular formulation of the idea, common in the literature, that the essence of adjectives is to act as adnominal modifiers.

On the definition we put forth of what adnominal modification is, adjectives with quality denotations simply cannot be adnominal modifiers. Developing this argument involves taking a controversial position on some general issues in the semantic literature on adjectives, and so the discussion in this chapter is more broadly consequential for the theory of adjectives. More generally, this chapter demonstrates by example the fruitfulness of the perspective on studying the relation between form and meaning advocated in this book, namely that the focus should be on finding systematic patterns of variation (and explanations thereof), rather than positive universal features present in all languages.

5.1 The lexical semantics of lexical categories

Linguists of all theoretical persuasions agree that lexical categoryhood is among the most important and vexed issues in linguistics (Givón 1984; Schachter 1985; Croft 1991; Hengeveld 1992; Bhat 1994; Wetzer 1996; Croft 2001; Beck 2002; Baker 2003). In the most comprehensive and ambitious discussion of the topic within the generative framework, Baker (2003) makes the observation with particular candor:

The division of words into distinct categories . . . is one of the oldest linguistic discoveries, with a continuous tradition going back at least to the *Téchnē grammatikē* of Dionysius Thrax (c.100 BC) (Robins 1989: 39) . . . often when students enter their first linguistics class, one of the few things they know about grammar is that some words are nouns, others are verbs, and others are adjectives. Linguistics classes teach them many fascinating things that go far beyond these basic category distinctions. But when those classes are all over, students often know little more about what it means to be a noun, verb, or adjective than they did at first, or indeed than Dionysius did. (Baker 2003: 1–2)

One of the central questions about categoryhood has been whether there is a universal semantic criterion motivating category membership internal to a single language, and more broadly across languages. Many modern linguists, particularly those approaching the problem from a functionalist and cognitive perspective, follow traditional grammar in viewing the search for notional universals underlying category membership as a productive research program. For example, Givón (1984: 51 ff.) argues that verbs (prototypically) name (transient) actions, nouns name (time-stable) things, and adjectives have a kind of meaning related to time-stability that lies somewhere in between these two poles. Langacker (1987) argues for a notional theory of the major lexical categories in cognitive linguistic terms. Croft, for his part, argues that prototypically, nounhood entails reference to an object, adjectivehood modification by a property, and verbhood predication of an action (Croft 2001: 89).

While such analyses are not without their defenders and merits, they are often criticized (e.g. Newmeyer 1998; Baker 2003) for lack of formal articulation of key notions. Framing the discussion in terms of prototypes shields these views from obvious counter-examples (stative verbs like *resemble* do not refer to actions, etc.),

but makes formulating interesting predictions about the morphosyntactic behavior of words of different categories very difficult.

Model-theoretic semantics, which employs relatively precisely defined mathematical tools, might have been expected to shed some light on these questions. If there are notional categories that play a role in the *grammar* of the lexical categories, then they might be translatable into model-theoretic terms. There is very little in this literature on the semantics of lexical categories, however, other than brief pessimism for the general project in von Fintel and Matthewson (2008: 152–3) and brief optimism in Bach et al. (1995), Kaufman (2009: 32), Koch and Matthewson (2009: 129), and Koontz-Garboden (2012). Overall, the generative literature perceives the search for a universal semantic characterization of parts of speech to have failed, as is made clear by von Fintel and Matthewson:

Our question... is whether semantics can predict which predicates will end up in which lexical category (N, V or A) cross-linguistically. The answer to the question appears to be 'no'... semantic characterizations of the categories N, V and A are able to predict only general cross-linguistic tendencies, and we therefore do not see that there are clear semantic universals to be found in this area. (von Fintel and Matthewson 2008: 152–3)

Our aim in this chapter is to shift attention away from the search for a set of universal semantic categories underlying the major lexical categories, and, in line with the generativist view that what is universal in language is not particular categories but constraints on variation, to search instead for **systematic constraints on denotation** that can be argued to follow from category membership. The Lexical Semantic Variation Hypothesis that frames the discussion in this book, repeated in (1), provides a very natural context in which to carry out such a search.

- (1) **The Lexical Semantic Variation Hypothesis:** Possessive-predicating property concept lexemes are quality denoting and non-possessive-predicating property concept lexemes are individual characterizing.

Presented with two types of possible denotation that property concept lexemes can have, the question naturally arises whether there are restrictions imposed by category membership on which of the two types a given lexeme can have. If there are, that would immediately raise the question of what it is about the lexical categories that can explain the restriction. Thus a new window into the nature of the major parts of speech might open.

Our investigation suggests that, at least in the domain of nominal and adjectival property concept lexemes, the answer is positive. Lexical category membership does restrict the kind of denotation that a lexical item can have. Specifically, while nouns can have either kind of denotation, adjectives are restricted to individual-characterizing meanings. We go on to propose a derivation of this restriction from what is widely agreed to be the defining property of adjectives, the capacity to act as adnominal modifiers.

We begin by considering the case of property concept nouns, pointing to facts that suggest they can have either kind of denotation. Turning then to adjectives, and taking it for granted from previous chapters that adjectives can have individual-characterizing denotations, we then go on to consider what a quality-denoting adjective might look like, and whether there is any evidence for the existence of adjectives with such meanings. Concluding that there is not, we then propose to derive the existence of this gap from a specific definition of the semantics of adnominal modification as *subsecutive strengthening*. In defending this claim, we explore a range of potentially problematic data from the literature. In each case we argue that the facts have been misunderstood, concluding that all adjectives must be able to act as subsecutive modifiers, and that, consequently, there is a genuine model-theoretic restriction on the possible meanings an adjective can have that follows from the definitional characterization of adjectivehood.

5.2 Nominal denotations

The preceding chapters gave many examples of quality-denoting property concept nouns (e.g. *wisdom*, *height*). But does being a property concept noun entail having a quality denotation? Looking at English, the answer is not entirely clear. One might argue that nouns such as *idiot*, *giant*, *midget*, *sage*, *antique*, *genius*, or *beauty* are nominal equivalents of adjectives such as *stupid*, *big*, *small*, *wise*, etc. However, the equivalence is not perfect. For example, the noun *idiot* does not characterize all the stupid things, only the stupid people. A dog or an idea can be stupid, but it cannot be an idiot.

Other languages, however, exhibit a robust and unambiguous class of individual-characterizing property concept nouns. Such a language is Basaá, a Bantu language spoken in Cameroon whose inventory of property concept lexemes and associated morphosyntax and semantics are investigated in detail by Jenks et al. (2016). Basaá has three classes of property concept lexeme. The first is a small closed class of adjectives. The second is a class of possessive predicating property concept nouns called *property nominals* like those observed elsewhere in this book. The final class consists of property concept words that Hyman et al. (2012) call *nominal adjectives*, but we call *adjectival nouns*, and which is demonstrably nominal and individual characterizing.

The adjectives are distinguished from the last two classes in their behavior in adnominal contexts—only adjectives can be adnominal modifiers without additional morphosyntactic material (in the form of a *connector* element, as discussed in detail by Hyman et al. 2012):

- (2) a. *hí-nuní hi-kéńí híí hí ńʰtóp hémbí.*
 19-bird 19-big 19-that 19.SBJ sing 19.song
 ‘That big bird is singing.’ (adjective; Jenks et al. 2016: 11)

- b. *lí-múgê* ⁴*lí* *hí-nuní líí* *lí* *ń⁴tóp* *hémbí*.
 5-quiet 5.CON 19-bird 5-that 5.SBJ sing 19.song
 ‘That quiet bird is singing.’ (AN; Jenks et al. 2016: 11)
- c. *hí-nuní hí* *ngúy* *hí* *ń⁴tóp* *hémbí*.
 19-bird 19.CON 9.strength 19.SBJ sing 19.song
 ‘The strong bird is singing.’ (PN; Jenks et al. 2016: 30)

The more interesting contrast is between the property nominals (PNs) and the adjectival nouns (ANs). Both classes are demonstrably nominal in their syntactic category. This is shown particularly in that they can head NPs, and in that they exhibit the morphological and syntactic behavior with respect to the system of Bantu noun classes expected of any nouns. That the adjectival nouns can head an NP is seen in (2b), where its inherent Class 5 noun class is responsible for triggering Class 5 subject agreement and agreement on the determiner. Example (2b) additionally is an example in which the adjectival noun is in the head position in an NP, preceding modificational material introduced by the connector.¹ Inherent noun class is seen for both kinds of property concept nominal in (2) as well, in that they have a noun class independent of the class of the noun whose meaning they restrict semantically. This contrasts with adjectives, as in (2a), where the noun class is controlled by the noun that it modifies, so that if *kényí* were to modify a noun in a different noun class, its class would reflect the class of that noun.

Although the adjectival nouns and the property nouns are clearly nominal in their syntactical category, they contrast in their lexical semantics, in a way relevant for the consideration of the link between lexical category and the two kinds of meaning posited under the Lexical Semantic Variation Hypothesis—while property nouns are quality denoting, adjectival nouns are individual characterizing. That this is the case is suggested by the fact already mentioned, that property nominals trigger possession in predication, as seen in (3a), while the adjectival nouns predicate non-possessively, as shown in (3b):

- (3) a. *a gweé ma-sódá*.
 1.AGR have 6-luck
 ‘(S)he is lucky.’ (PN; Jenks et al. 2016: 4)
- b. *hí-nuní híí hí yé lí-múgê*
 19-bird 19.that 19.SUB be 5-quiet
 ‘That bird is quiet.’ (AN; Jenks, Koontz-Garboden, and Makasso fieldnotes)

¹ Although the syntax of this modificational construction is quite out of the ordinary, we assume that semantically, the meaning of the full NP is composed from the meanings of its parts by a rule of predicate modification, as in e.g. English adjectival modification of a noun. See Morzycki (in press); McNally (to appear) for extensive discussion.

Additional phenomena that Jenks et al. (2016) point to also lead to the same conclusion. In particular, while property nominals behave like mass nouns in a number of ways, adjectival nouns exhibit count noun behavior, suggesting that they cannot be quality denoting, given the understanding of qualities laid out in previous chapters. Additional arguments from the behavior of quantifiers and pronominal anaphora, alongside behavior in predication, suggest that the adjectival nouns have individual-characterizing denotations. We take these combined observations as convincing evidence that Basaá has a genuine, robust class of individual-characterizing property concept lexemes that are *nominal* in their syntactic category. This being the case, we believe there is no necessary link between nominality and either quality or individual-characterizing denotation (even if the former seems to be more common with property concept nouns). The situation is different, however, with adjectival property concept lexemes, as we show in the remainder of this chapter. These can *only* have individual-characterizing denotations, and *never* quality denotations, for reasons that are inextricably tied to the nature of adjectivehood itself.

5.3 Adjectival denotations

That there are individual-characterizing adjectives is clear, given the discussion and observations in the preceding chapters, as well as observations from the literature more generally.² The question whether adjectives can be quality denoting has, to the best of our knowledge, never been asked before. This is unsurprising given that the possibility of there being such adjectives only emerges as a consequence of the Lexical Semantic Variation Hypothesis and the data motivating its postulation.

In order to investigate whether quality-denoting adjectives exist, we must consider the kinds of meaning generated by adjectives in the syntactic contexts in which adjectives occur, and examine whether any of these are plausibly quality denoting. We discuss three such syntactic context/meaning pairings here. First, as predicates, they should map to *true* all and only the portions of the qualities they characterize. Second, as adnominal modifiers, they should intersect the nouns they modify with the quality (i.e. the set of portions) they characterize. Finally, they should form the basis

² To be precise, there are certainly theories that do not view adjectives as lexically individual characterizing. The most obvious example is the prevalent theory of adjectives as denoting measure functions, going back to Kennedy (1997). On that theory, adjectives become individual characterizing by composing with degree morphology. The fact that there is no unequivocal evidence for such morphology in any language is a weakness of this theory. Baker (2003) argues that adjectives denote simple properties in the sense of property theory (Chierchia and Turner 1988). For him, it is the role of (overt or covert) copulas to turn adjectives into individual-characterizing predicates. In a sense, the question we ask here can be rephrased in Baker's terms or in Kennedy's. Adopting those theories would simply mean that instead of individual-characterizing lexemes we now have measure function-denoting or property-denoting ones to contrast with quality-denoting ones. The question remains as to whether adjectives can also have quality denotations, as property concept nouns do.

for the formation of change of state verbs that express change into a quality. None of these expected semantic properties is actually exhibited by any adjectives we are aware of in any language. We exemplify them here using mostly English and Hebrew as examples.³

5.3.1 Predication

As was already observed, when quality-denoting nouns like *wisdom* are predicated directly of individual-denoting arguments, the result is the semantically anomalous and necessarily false proposition that the individual is a portion of the relevant quality. This is exemplified by (4).

- (4) Krishna is wisdom.

If English, or some other language, had quality-denoting adjectives, then using such adjectives in predicative position would yield precisely the same semantically anomalous, necessarily false proposition. This is obviously not the case with regular English adjectives, as (5) shows.

- (5) Krishna is wise.

The minimal pairs in (6)–(8) illustrate the same facts for Hebrew, Marathi, and Finnish. In all cases, the b-examples feature an adjective and do not have the semantically anomalous, necessarily false reading.

- (6) Hebrew

- a. *Krishna tvuna*.
Krishna wisdom
'Krishna is wisdom.'

- b. *Krishna navon*.
Krishna wise
'Krishna is wise.'

- (7) Marathi (Ashwini Deo, p.c.)

- a. *Krishna hushaarii aahe*.
Krishna cleverness is
'Krishna is cleverness.'

³ One might object to the relatively restricted crosslinguistic investigation provided here, and suggest that given how limited it is, the non-existence claim is on somewhat shaky ground. Although we agree that more data from more languages is always better, we also think that English and Hebrew are ideal languages to be looking at, (1) because one of them is not Indo-European and (2) because both are languages with large open classes of adjectives. In relation to (2) in particular, if quality-denoting adjectives exist at all, it is precisely in languages like English and Hebrew we should expect to find them.

- b. *Krishna hushaar aahe.*
 Krishna clever is
 ‘Krishna is clever.’

(8) Finnish (Hanna Siurua, p.c.)

- a. *Ahmed on viisau.*
 Ahmed is wisdom
 ‘Ahmed is wisdom.’
- b. *Ahmed on viisas.*
 Ahmed is wise
 ‘Ahmed is wise.’

While it is difficult, if not impossible, to demonstrate non-existence of a phenomenon in an empirical science, the data we are so far familiar with support the generalization that predicative adjectives would never give rise to the odd reading expected if they are quality denoting.⁴

5.3.2 *Adnominal modification*

Essentially the same argument comes from adnominal modification. In the simple cases, the denotation of a noun phrase consisting of a head noun and a modifying adjective is the intersection of the set characterized by the noun with that characterized by the adjective. For example, the denotation of *brown dog* is the intersection of the set of dogs with the set of brown things. The meaning of a noun phrase consisting

⁴ It is important in relation to this observation not to confuse this particular reading with reference to abstract objects with what McNally and de Swart (2015) call ‘abstract object’ (ia) and ‘relational inflected adjective’ (ib) constructions in Dutch (see also Kester 1996), and related constructions in other languages (see Glass 2014 for English and Giannakidou and Stavrou 1999 for similar uses in Greek).

- (i) a. *Ze moeten wennen aan al het nieuwe, al het vreemde dat dit land hen biedt.*
 they must get-used to all the new all the strange that this land them offers
 ‘They must get used to everything new, everything strange that this land offers them.’
 (McNally and de Swart 2015: 316)
- b. *Het vreemde van de situatie vind ik dat politieke partijen het maar laten*
 the strange of the situation find I that political parties it just let
gebeuren.
 happen.
 ‘The strange thing about the situation, I find, is that political parties just let it happen.’ (ibid.)

On McNally and de Swart’s analysis, the schematics of which we find convincing, these adjectives (in their inflected form, shown at (i)) denote relations between individuals and some abstract property argument, much as in the traditional literature on adjectives following Cresswell (1977), where adjectives denote relations between individuals and degrees, or in the trope-based literature, where they denote relations between properties and their bearers (Moltmann 2009). What is special about constructions like (ia), according to McNally and de Swart, is that an ordinary adjectival meaning is simply predicated of some phonologically null abstract mass-denoting pronoun (as with the abstract object construction); in (ib), reference is made directly to the property argument (or its equivalent on one’s theory of choice) of the adjective. Such facts, then, pose no threat to our claims that adjectives are never quality denoting.

of a head noun modified by a quality-denoting adjective would thus be expected to be the intersection of the set characterized by the noun with the quality (i.e. set of portions) characterized by the adjective.⁵ For example, if the adjective *wise* meant ‘wisdom’, an NP like (9) would mean something like (9a), which, of course, is not an available meaning for this noun phrase, the only meaning of which is the one in (9b).

- (9) a wise woman
 a. \neq a woman who is a portion of wisdom
 b. = a woman who is wise

We are aware of no adjective, in any language, that gives rise to such a meaning in adnominal modification. Again, it should be stressed that the non-existence of such adjectives cannot be proven, and we have not scanned the world’s known languages for an exhaustive list of all adjectives. Nevertheless, we take the fact that even languages with as large an inventory of adjectives as the familiar Indo-European ones fail to provide examples of quality-denoting adjectives as strongly indicative of their universal non-existence.

5.3.3 Behavior of deadjectival verbs

The third and perhaps least obvious expectation about the behavior of (hypothetical) quality-denoting adjectives comes from the formation of deadjectival change of state verbs, a crosslinguistically ubiquitous word-formation process (see e.g. Koontz-Garboden 2005). In the simplest case, change of state verbs describe a process in which an individual moves from not being in the extension of the adjective from which the verb is derived to being in it. For example, (10) is true if and only if the can became flat, that is, underwent a process from not being flat to being flat.⁶

- (10) The can flattened from the impact.

Given this, a change of state verb formed from a quality-denoting adjective should also describe a process in which an individual moves from not being in the extension of the adjective to being in it. In other words, such a verb should express a change in which an individual becomes a portion of a quality. For example, if the adjective *wide* had a reading on which it meant ‘width’, then the verb *widen* should mean (*cause to*) *become width*. But *widen* never has this meaning, and, as far as we are aware, neither do any other deadjectival change of state verbs in English or their equivalents in other languages. Here we exemplify only the verb formed from the adjective *wide* in English

⁵ This intersection is, by definition, empty, since portions of qualities and individuals are entities of different sorts (see §3.2), a fact that plays a crucial role in our explanation at §5.4 of the non-existence of quality-denoting adjectives.

⁶ In fact, this description of the meaning of change of state verbs is a significant simplification, but harmless for our purposes here. See Deo et al. (2013) for a more nuanced understanding of the nature of state change.

and its equivalent in Hebrew. Consider a context in which God morphs the Nile river so that its length becomes width. Such a scenario can easily be described, in both English and Hebrew, with quality-denoting nouns, as in (11a) and (12a). It cannot, however, be described with a deadjectival verb, as shown in (11b) and (12b).

- (11) a. God turned the Nile's length into width. \neq
 b. #God widened the Nile's length.
- (12) a. *elohim hafax et ha-orex Sel ha-nilus le-roxav.* \neq
 God turned ACC the-length of the-Nile to-width
 'God turned the Nile's length into width.'
 b. *#elohim hirxiv et orko Sel ha-nilus.*
 God widened ACC length of the-Nile
 'God widened the Nile's length.'

Again, the fact that even languages rich in adjectives and with a productive deadjectival change of state verb-formation mechanism do not seem to have change of state verbs derived from them that express change into a portion of a quality suggests that qualities are not possible denotations for adjectives in the first place.

5.3.4 *Interim conclusion*

The emerging empirical observation is that even languages that have an open and very large class of adjectives do not seem to have any quality-denoting adjectives. Stated in the model-theoretic terms developed in the preceding chapters, lexical adjectives, unlike nouns, never denote in D_p , but rather always in the broader domain D_u . The remainder of this chapter proposes an explanation for this gap which links it to the grammatically definitional characteristics of the adjective category.

5.4 Explaining the absence of quality-denoting adjectives

We propose to derive the absence of quality-denoting (type $\langle p, t \rangle$) adjectives from the assumption that the sine qua non of adjectivehood is the ability to act as attributive modifiers of nouns, a widely held assumption in the literature on lexical categories (Hengeveld 1992; Bhat 1994; Beck 2002; Schachter and Shopen 2007). Specifically, we argue that the essential grammatical role of adjectives is to modify nouns, and that, semantically, the effect of adnominal modification is *strengthening the meaning of the modifiand*. This is achieved by subsection of the denotation of the modified noun. The reason why languages do not lexicalize adjectives with $\langle p, t \rangle$ denotations is that such adjectives would systematically fail to strengthen the meaning of their modifiands.

The argument proceeds as follows. We begin by reviewing the literature on the categorial essence of adjectivehood, drawing the conclusion that adnominal modification is part of its categorial essence. We then discuss in more detail the assumption that the

semantics of adnominal modification always results in subsection of the denotation of the modified noun, going on to show that this minimal set of assumptions derives the absence of quality-denoting adjectives as a theorem. The assumption that adnominal modification is always subsective is controversial, and it is widely assumed in the literature that many adjectives are not subsective. We discuss this view, and argue that all the cases of allegedly non-subsective adjectives are actually subsective in the relevant sense, when properly understood.

5.4.1 *The syntactic essence of adjectives*

While there is much disagreement in the literature about the semantics of adjectives and what their syntactic properties follow from, it is widely agreed that a key syntactic property of adjectivehood is the ability to act as attributive nominal modifiers. In fact, attributive modification is often argued to be the grammatical behavior distinguishing adjectives from other word classes. For example, Payne declares that “[a]n adjective is a word that can be used in a noun phrase to specify some property of the head noun of the phrase” (Payne 1997: 63). Schachter and Shopen present a similar view, writing that “. . . adjectives have usually been defined . . . as words which modify nouns” (Schachter and Shopen 2007: 13). This position is also taken by Hengeveld (1992), and, following him, Beck (2002), who views an adjective as “a lexical item that without further measures being taken can be used as the modifier of a noun” (Beck 2000: 11). Similarly, Pullum and Huddleston (2002: 526) state (albeit with some additional complications): “At the general level, adjectives may be defined as a syntactically distinct class of words whose most characteristic function is to modify nouns.” In Montague (1970), where semantic type and syntactic category are homomorphic, adjectives are of a type that takes a word of the type of nouns as an input and returns a word of that same type, making adnominal modification inherent to their categorial essence.⁷ Although Wunderlich (1996) and Baker (2003: ch. 4) seek to derive the distributional properties of adjectives from more abstract theoretical assumptions (for Baker, lack of a specifier) they both agree that adnominal modification is one of their key distributional properties.

This small sampling attests to the prevalence, in a broad spectrum of the literature, of the perception that adnominal distribution is a key property of the adjective word class. While we share with, for example, Wunderlich (1996), Baker (2003), and Szabó (2014) the view that this distributional property should, ideally, receive a deeper theoretical explanation, we do not attempt one here. We simply assume that however it comes to be, it is a key property that adjectives have, and one that, as we argue in the remainder of this chapter, has consequences for the kinds of meaning that adjectives can have. First, however, we turn to an obvious counter-example to any theory that

⁷ The situation is similar for Siegel’s (1976) (CN/CN) adjectives.

pins adjectivehood on adnominal distribution—namely the existence of adjectives that cannot act as adnominal modifiers.

5.4.2 *Allegedly non-attributive adjectives*

If we are correct that a definitional property of adjectivehood is the ability to act as an adnominal modifier, then there should not exist adjectives that are unable to be used in this way. In fact, there are a number of words that cannot be used in this position which have been claimed to be adjectives. We show in what follows that there are clear grammatical explanations for the behaviors of these words.

Siegel (1976) documents a number of adjectives that seem to be barred from occurring in attributive position (see also Bolinger 1967 and Baker 2003: 206 ff.). The list includes at least those in (13).

- (13) Words claimed to be adjectives but which cannot be adnominal modifiers (Siegel 1976: 179): *rife*, *akimbo*, *asleep*, *alive*, *asunder*, *agape*, *agog*, *loath*, *afloat*, *prone*, *averse*, *remiss*

That these words do not naturally occur in adnominal position can be seen by the data in (14).

- (14) a. ?The rife divisions in the community were causing discord.
b. ?His akimbo arms
c. ?An asleep baby
d. ?An awake baby
e. ?An alive plant
f. ?Two asunder people
g. ?An agape man
h. ?An agog woman
i. ?The loath to disagree with his mother child
j. ?The afloat boats
k. ?The prone to self-harm parrot
l. ?The averse to secrecy politician
m. ?The remiss in his work man

Accepting these judgments, we argue that in each case, the relevant word cannot be used as an adnominal modifier because of some identifiable confounding factor.

A large subset of the words in (14) are the so-called *a*-adjectives (Jespersen 1913; Bolinger 1967; Jacobsson 1996; Markus 1998; Schlüter 2008). These form a heterogeneous class, and some of them occur quite readily in attributive position, especially when coordinated or otherwise modified (see Schlüter 2008 for an extensive and empirically rich discussion). For all of them, however, the total or partial inability to occur attributively has ready explanations, coming from diachrony. One subclass of

a-adjectives, including *afloat*, *alive*, and *asleep*, are historically prepositional phrases comprised of an Old English preposition *a* meaning ‘in/on’, followed by a noun. Prepositional phrases in English can generally not occur prenominally, and these prepositional phrases retained their syntactic distribution even as their phrasal structure became obscure with the loss of the relevant prepositions and their reduction to an unstressed schwa (Jespersen 1913; Jacobsson 1996; Schlüter 2008).

A second class of words that challenge our assumption that the ability to act as an attributive modifier is a necessary condition for adjectivehood, and do not fall into the *a*- class, includes *loath*, *prone*, *averse*, and *remiss*. For these, there is a confounding factor precluding their use as adnominal modifiers, noted already by Jespersen (1913): namely that they all take complements, as evidenced by the data in (15).

- (15) a. Kim is loath *(to disagree with his mother).
 b. This parrot is prone *(to self-harm).
 c. The senator is averse *(to secrecy).
 d. Kim is remiss *(in his work).

These seem to be genuine transitive adjectives on a par with, for example, *near*, as argued by Maling (1983). Their use as attributive modifiers is precluded by having a complement, since English syntax requires postposition of modifiers with complements (see Pullum and Huddleston 2002: 551). *Near* can occur prenominally only when its complement is absent, as shown by the data in (16) (drawn in part from Maling 1983: 270).

- (16) a. the near island
 b. *the near to the shore island
 c. the island near to the shore.

Similarly, adjectives which otherwise can be used as adnominal modifiers like *red* in (17a), and which can take a complement as in (17b), cannot be used adnominally with the complement, as shown by (17c).

- (17) a. Kim has a red face.
 b. Kim’s face is red from embarrassment.
 c. *A red from embarrassment face is a bad thing to enter a classroom with.
 d. A face red from embarrassment is a bad thing to enter a classroom with.

The inability of the adjectives in (15) to occur in attributive position thus follows from a very general syntactic constraint in English against adnominal modifiers with complements.

The only remaining word from Siegel’s putative list of adjectives which cannot be used adnominally is *rife*. This adjective is rare, especially in comparison with related adjectives such as *widespread* or *common*. However, when it was in more common usage, it did occur attributively, as in the attested example (18).

- (18) But the institution founded thereon has outlasted it so long that one of the rifest errors cherished by every class of the English people is to confound the Estates and not to apprehend that two of them are contained in the House of Lords.

(https://archive.org/stream/francejooobodl/francejooobodl_djvu.txt),
accessed July 2016)

Siegel (1976: 179) also includes *touched (mad)*, *redolent*, and *aboveboard* in her list of predicative only adjectives. The relevant sense of *touched* is in fact shorthand for the expression *touched in the head*, no longer in use. The inability of this adjective to occur attributively follows from the same generalization covering the data in (15)–(17), that adnominal modifiers cannot generally have complements.

As for *redolent* and *aboveboard*, the OED lists the attested use of this adjective as an adnominal modifier, as in (19) and (20).

- (19) 1999 *Time Out* N.Y. 25 Feb. 58/1 Arika Someya . . . works with a highly redolent material: motor oil. (*Oxford English Dictionary*)

- (20) a. The Aboveboard Method Of Asking A Girl Out
(<http://www.bforbel.com/2014/07/the-aboveboard-method-of-asking-a-girl-out.html>)

- b. The Aboveboard Home Inspection Inc. Company
(<https://www.1031exchangemadesimple.com/professionals/listing/NV/2392/>)

- c. Meet Constance Allen: no-nonsense, by the books . . . innocent. The above-board accountant is on a mission to make sure the New Dawn casino's finances are legit, and maybe even get a promotion . . .

(<http://www.goodreads.com/book/show/21942819-a-high-stakes-seduction>). All websites accessed July 2016.

Finally, Baker claims that *present* and *handy* cannot occur adnominally, but both are in fact attested in adnominal uses.⁸

- (21) A present father is like a wall that our kids can lean against.
(<https://books.google.com/books?isbn=1441242309>), accessed July 2016)

- (22) If you are looking to replace your old and dull kitchen sink with a new one but not able to find a handy plumber for the job . . .

(<http://www.look4articles.com/Art/9569/93/Replace-Your-Old-Kitchen-Sink-With-A-New-One.html>), accessed July 2016)

⁸ The example in (21) accords with Bolinger's 1967 claim that attributive adjectives tend to express properties that hold of their bearers in general, rather than at a given time and place. In the adnominal use in (21), the adjective is used not to express presence at a particular time and space, but a more general property of a father, namely being generally present in the lives of his children.

Thus, the broad conclusion is that it is a practically exceptionless generalization that adjectives function as adnominal modifiers. What exceptions there are all have grammatical explanations in the form of constraints that override the expectation that the word in question be usable attributively, and do not pose a problem for taking attributive modification to be definitional of adjectives, as we do here.

5.4.3 *The semantics of modification*

As mentioned above, we take it that what makes adjectives a lexical category distinct from other major lexical categories is a syntactico-semantic notion of adnominal modification. Ability to occur in attributive position is the syntactic aspect of this notion. In this section, we consider the semantics of adnominal modification and propose a constraint on adjectives that they must be able to effect *subsecutive strengthening* of the noun they modify. The absence of quality-denoting adjectives is then shown to follow as a consequence of this semantic constraint.

We start out with the assumption that, generally, the semantic outcome of modification is the strengthening of the meaning of the modifiand. Consider, for example, the case of sentential modifiers such as *yesterday* (23) and *by the river* (24).

- (23) a. Adam ate the apple yesterday. \Rightarrow
 b. Adam ate the apple.
- (24) a. Eve talked to a snake by the river. \Rightarrow
 b. Eve talked to a snake.

In both cases, the modified sentence ((23a) and (24a)) is true in a subset of the worlds in which the unmodified sentence ((23b) and (24b)) is. Consequently, the modified examples asymmetrically entail their unmodified variants.

A similar situation holds of manner adverbs vis-à-vis their modifiands, as illustrated in (25).

- (25) a. Adam runs quickly. \Rightarrow
 b. Adam runs.

Manner adverbs like *quickly* modify verb phrases rather than sentences. Assuming a simple-minded theory of verb phrase meaning in which a verb phrase denotes a set of individuals or events, then what a manner adverb does is to restrict that set. For example, the set of individuals that run quickly, or events of running quickly, denoted by the modified verb phrase in (25a), is a subset of the set of individuals who run, or running events, denoted by the unmodified verb phrase in (25b). Again, the first sentence asymmetrically entails the second.

In the same way, attributive adjectives also function to strengthen the meaning of the noun they modify. For example, the set of brown dogs, denoted by the noun phrase in (26a), is a subset of the set of dogs denoted by the noun phrase *dog* in

(26b).⁹ Consequently, the sentence in (26a) is stronger (asymmetrically entails) the one in (26b).

- (26) a. Kim has a brown dog.
b. Kim has a dog.

In the case of the attributive adjective in (26), strengthening is specifically a result of set intersection. For example, the adjectival modifier *brown* strengthens the meaning of its modifiand *dog* by intersecting the set of dogs with the set of brown things. The resulting set is a subset, and potentially a proper subset, of the denotation of the noun, and membership in the former entails membership in the latter. This is shown in (27).

- (27) a. $\llbracket \text{brown dog} \rrbracket = \{x : \text{brown}(x)\} \cap \{x : \text{dog}(x)\}$
b. $\text{brown dog}(x) \Rightarrow \text{dog}(x)$

We propose that *subsective strengthening* is the semantic aspect of the notion of modification characterizing the adjective class.¹⁰ Specifically, adjectives are words that can occur as adnominal modifiers and have the potential to non-trivially strengthen the meaning of the noun they modify. By non-trivial strengthening we mean mapping the nominal denotation to a **non-empty proper subset** of it. Of course, we do *not* require that any adjective–noun combination should yield, in any given model, a non-empty proper subset of the denotation of the noun. Obviously, in a model (or world) with no brown dogs, or no dogs, or no brown things, the denotation of *brown dog* is the empty set, and in a model (or world) in which all dogs are brown, that denotation is just the set of dogs. Rather, what we require of an adjective is that it have the potential to map a nominal denotation to a non-empty subset thereof, that is, that it does not by necessity, in all models (or worlds), map any nominal denotation to itself or to the empty set. The proposed constraint is stated in (28).¹¹

⁹ Assuming a DP syntax (Abney 1987), a predicate denotation for NPs, and a denotation for determiners like *a* that takes a predicate as an argument and returns a generalized quantifier type meaning (see e.g. Keenan 1997 for overview).

¹⁰ See Landman (2001) for the same claim regarding the semantics of adjectival modification.

¹¹ Note that potential non-triviality seems to hold of adjectives, but not of modifiers generally; modifiers in the following classes do not yield under modification a proper subset of the denotation of the modifiand:

- (i) speech act modifiers
 - a. Kim is going to see Manchester United tomorrow.
 - b. Indeed, Kim is going to see Manchester United tomorrow.
- (ii) intensifiers
 - a. Kim is going to the match tomorrow.
 - b. Kim is totally going to the match tomorrow.
- (iii) expletives
 - a. The MP from Tatton voted the wrong way.
 - b. The MP from Tatton fucking voted the wrong way.

(28) **Non-trivial subjective strengthening constraint:**

[[AP N]] is a potentially non-empty proper subset of [[N]]

Two properties of this constraint are worth taking note of in advance of the discussion below. First, it is stated in such a way so as to govern not only ordinary adnominal modification as seen in *brown dog* above, but also adnominal modification in which the modifier itself is modified, as in *very brown dog*, since *very brown* is taken to form an adjectival phrase headed by the adjective, and which itself is the modifier. However one wants to analyze the semantic contribution of *very*, it is clear that the set of very brown dogs is a subset of the dogs.

Second, the constraint requires the outcome of adnominal modification to be a proper subset of the denotation of the modified noun. The weaker requirement that it be a subset of the denotation of the noun is not sufficient, as it would allow a modifier to map a nominal denotation to itself, which does not count as non-trivial strengthening by our definition above. This proviso plays a key role in our derivation of the absence of quality-denoting adjectives at §5.4.4.

For this constraint to be generally viable, it must be true that all adjectival modification is subjective. Such a claim has previously been made (Landman 2001), but has not received a detailed defense. Furthermore, its consequences for the lexical semantics of syntactic categories have not been considered, as is done here. Its underconsideration is perhaps at least in part a consequence of the fact that it is controversial and widely taken to be false. We believe it is ultimately correct, and argue so in the remainder of this chapter. First, however, we explain how the non-existence of quality-denoting adjectives can be derived from the non-trivial subjective strengthening constraint in (28).

5.4.4 *The gap derived*

Recall that the empirical observation we have made in this chapter, and that we seek to explain, is that while property concept nouns are free to have individual-characterizing and quality denotations, adjectives cannot have the latter. Our proposal is that this fact follows directly as a consequence of the assumption that adjectives are subject to the constraint in (28), that they must be able to subjectively strengthen the meaning of the noun they modify. The basic observation is that, given the assumptions we make about qualities, a quality-denoting lexeme would not satisfy the constraint. Consequentially, no language lexicalizes adjectives with quality denotations.

The argument is as follows. Suppose there were a $\langle p, t \rangle$ adjective *wisde*, which characterizes the set of portions of wisdom. Standard assumptions about adnominal modification (in e.g. Heim and Kratzer 1998) have it that a set-denoting adjective composes with a noun in modification through a rule of predicate modification (or a type-shift that mimics it), which intersects the set denoted by the adjective with that

denoted by the noun.¹² Modification with *wisde* (or an adjectival phrase headed by it) will then map any $\langle e, t \rangle$ noun that characterizes a set of individuals to the empty set by definition, since the domain D_p of portions of qualities and the domain D_e of individuals are disjoint. A quality-denoting adjective like *wisde* would thus never be able to non-trivially strengthen the meaning of any individual-characterizing noun. It is questionable, therefore, whether it would be at all useful. And we suppose that if a particular word is not useful that it would not be lexicalized in the first place.¹³ Since most nouns in all languages are individual characterizing, and since no $\langle p, t \rangle$ adjective could modify any such noun, this fact alone is, from a functional perspective, already strong motivation for languages not to contain adjectives such as *wisde*.

Strictly speaking, however, this is not enough to rule out quality-denoting adjectives, since not all nouns are individual characterizing. In particular, property concept nouns are quality denoting, and so have $\langle p, t \rangle$ denotations that can intersect with an adjective like the hypothetical *wisde*. For a language to have adjectives that can only modify a particular subclass of nouns is perfectly ordinary. For example, an adjective like *low*, as opposed to *short*, can generally only apply to inanimate things. Given this state of affairs, one might imagine that a $\langle p, t \rangle$ adjective might simply be one restricted to modifying $\langle p, t \rangle$ nouns. Quality-denoting nouns, however, could also not be non-trivially strengthened by such adjectives, for example *wisde*, because qualities are mutually disjoint. This assumption has already been justified in Chapter 3 and entails that no quality-denoting word has in its denotation entities that are in the denotation of another quality-denoting word. For example, there are no portions of *wisdom* that are also portions of *strength* or any other quality.¹⁴

If all qualities are disjoint, then modifying a quality-denoting noun such as *beauty* with the adjective *wisde* would again yield the empty set in any model, since ‘wisdom’ and ‘beauty’ are disjoint qualities. So, a quality-denoting adjective would not be able to achieve non-trivial strengthening even with quality-denoting nouns. There is one special case, and that is the noun *wisdom*, which would be coextensive with the hypothetical adjective *wisde*. But as mentioned earlier, non-trivial strengthening requires that the adjective map the modified noun denotation to a *proper* subset thereof, not simply a subset, whereas intersecting a set with itself yields the same set, not a proper subset. So, even in the case of *wisdom*, the hypothetical *wisde* cannot

¹² To avoid confusion, it is worth pointing out that we are not suggesting that all adjectives compose with nouns in modification in this fashion or that all adjectives are set-denoting. Rather, we are saying *if* an adjective is set-denoting, this is how it composes with a noun in modification, on standard assumptions. Given that a $\langle p, t \rangle$ adjective would, by definition, be set-denoting, it would be expected to compose with a noun in modification in this way.

¹³ This notion of ‘usefulness’ as an explanatory force in the shape of grammars shares affinities with the notion as discussed by Haspelmath (2002), and merits further exploration, which we do not undertake here.

¹⁴ One might wonder about the noun *quality* itself. It is quite clearly a count noun (at least in the relevant uses), however, so cannot denote a quality, and hence cannot have portions (let alone all of them) in its denotation. More likely it denotes a set of (countable) qualities.

satisfy the constraint in (28). Thus, we have arrived at the conclusion in (29), which we dub the Modificational Impotence Theorem.

(29) **The Modificational Impotence Theorem**

A quality-denoting lexeme cannot achieve non-trivial subsective strengthening of the denotation of any noun.

Because adnominal modification is a defining property of adjectives, and because the semantics of adnominal modification is non-trivial subsective strengthening, a quality-denoting lexeme would not be usable as an adjective. This, we claim, is the reason why languages do not seem to lexicalize qualities as adjectives.

With this we have reached the main point of this chapter. To recapitulate, we started with the empirical observation that property concept lexemes have different (grammatically relevant) semantic possibilities depending on their lexical category. While property concept nouns can denote either qualities or sets of individuals, adjectives cannot denote qualities. This in itself is an interesting finding about the relation between parts of speech and meaning. It was then shown that given a more precise characterization of fairly simple and natural assumptions about what the defining properties of the adjective class are, together with independently attractive assumptions about qualities, this observation can be derived as a theorem. We take it that the fact that it derives an empirical observation as a theorem argues in favor of our proposed characterization of the nature of adjective.

We now turn to defend one of the key assumptions on which our theory rests: the idea that all adjectival modification is subsective.

5.4.5 *All adjectival modification is subsective*

The claim that adjectives always subsectively strengthen seems, on the surface, straightforwardly falsified by a wide range of putatively non-subsective adjectives that have been discussed in the literature since at least Siegel (1976). In what follows we argue that such claims have been overstated, and that all the cases can, in fact, be reduced to subsective modification.¹⁵

There are three main classes of allegedly non-subsective adjectives.¹⁶ The first is the much-discussed class of ordinary context-sensitive adjectives. Intersective treatments of such adjectives have been proposed in the literature and we adopt such a treatment. The second class is what we call Larson adjectives, the adjectives that Larson (1998)

¹⁵ A similar position is taken by Landman (2001), Partee (2010), and Szabó (2014: 22), who takes the even stronger position that all adjectival modification is intersective.

¹⁶ Those that are straightforwardly subsective include all intersective adjectives as well as those that are contextually vague (see e.g. Partee 2010 for an overview) and those that have been proposed to modify events in some way or another in the meaning of the nominal modifiand (e.g. Larson 1998; McNally, to appear, for reflection). We remain agnostic on the proper analysis of all of these, as it is beyond dispute that they are subsective, and therefore compliant with our claims whatever their proper analysis.

famously analyzed as targeting an event argument in the denotation of the modified noun, as in *beautiful dancer*. Following Larson, we claim that these adjectives are perfectly intersective, but denote sets of events rather than ordinary individuals. The third class is composed of aspectual adjectives like *former*, as in *former dancer*. These we argue, following Szabó (2014), not actually to be adjectives at all. The final class contains so-called privative adjectives, like *fake* in *fake gun*. Following Partee (2010), we deny the claim that such adjectives are privative, and argue that they are better understood as intersective. We discuss each class in turn in the following sections.

5.4.5.1 Privative adjectives The first class of potentially problematic cases consists of what are generally called *privative adjectives*. These are adjectives which in modification are claimed to give rise to an entailment that any individual satisfying the NP-description is actually *not* in the denotation of the head noun, as illustrated in (30).

(30) $\text{fake-gun}(x) \Rightarrow \neg \text{gun}(x)$

We call this conventional wisdom—that an individual in the denotation of an NP with a so-called privative adnominal modifier is not in the denotation of the head noun—the *privative intuition*. The main motivation for the conventional view that this is correct comes from intuitions about the truth of sentences like (31), which are genuinely thought to be true by definition.¹⁷

(31) A fake gun is not a gun.

Our strategy, following Partee (2010), is to deny this received wisdom, and deny that privative adjectives are privative. There are several arguments for this view.

First, there are well-known examples, such as those in (32), that are difficult to reconcile with the privative intuition.

- (32) a. Is this gun real or fake? (Partee 2010)
b. Please sort these guns into fake ones and real ones.

(32a) is a question that presupposes that the thing asked about is a gun, and that it is possible that it is fake. This is only possible if some guns are fake while others are real,

¹⁷ A reviewer finds (i) somewhat less acceptable, by which we take it they mean that (i) sounds false; our judgments are that it is no more false than (31). This intuition is supported by (ii).

(i) A fake gun is a gun.

(ii) A fake gun is a gun that is fake.

We acknowledge, however, that the picture is quite murky. Other allegedly privative adjectives yield sentences that do sound necessarily false, such as (iii).

(iii) A pretend gun is a gun.

We suspect that, ultimately, these sentences should be explained in terms of truth in fiction. Clearly, a pretend gun *is* a gun in the pretense worlds.

and hence if fake guns are guns. The request in (32b) similarly presupposes that some guns are fake, and so that fake guns are guns.

These data clearly suggest that adjectives such as *fake* are not privative. The point is perhaps even easier to see with other nouns. The examples in (33), where *gun* is replaced with *coin*, are very clear and unambiguous. As shown in (33a), having tried to pay with a fake coin entails having tried to pay with a coin. Similarly in (33b), that coins can be sorted into the fake and the real entails that there can be fake coins that are coins.¹⁸

- (33) a. I tried to pay with a fake coin \Rightarrow I tried to pay with a coin.
b. Please sort these coins into fake ones and real ones.

Nevertheless, there is no denying that *fake* and similar adjectives do often give rise to privative intuitions. What accounts for this, if not a privative lexical semantics for such adjectives? We propose that sentences like (31) are felt to be true for pragmatic reasons. The locution *is not an N* has an idiomatic use to mean ‘is a defective N’, beside the literal meaning denoting lack of membership in the extension of N. Evidence for this comes from data like those in (34).

- (34) a. A man without a mustache is not a man.
b. Any man who doesn’t like to cook is not a man, but a little boy. (attested)

Example (34a) clearly is not intended to (incoherently) deny that men lacking a mustache are men. Rather, it conveys that mustacheless men are not ‘real’ men—not good exemplars of the category according to some (dubiously gendered) standard. The same holds for the naturally occurring (34b). We take it that even defenders of privative adjectives would be reluctant to argue on the basis of these data that *without a mustache* and *who doesn’t like to cook* are privative modifiers. It follows that examples like (31) simply do not warrant the conclusion that some adjectives are privative.

Following Partee (2010), we propose instead that adjectives like *fake* and others that have been previously classed as privative are in fact intersective in a way similar to other context-dependent adjectives (discussed e.g. in n. 16 and Chapter 3). Concretely, we propose that *fake* has a denotation along the lines of (35), a set of individuals lacking some contextually determined property F_c .

- (35) $\llbracket \text{fake} \rrbracket = \lambda x. \neg F_c(x)$
(where F_c is a contextually determined property)

The choice of F_c is partly determined by the modified noun, as is generally the case for contextual parameters relevant for the evaluation of adjectives. For example, a

¹⁸ A reviewer does not share our intuition about the entailment patterns in (33). We maintain that they hold, and would add that it is even more clear in (i):

(i) I put a fake coin into the meter. \Rightarrow I put a coin into the meter.

fake coin is just a coin that lacks some contextually relevant property, such as being minted by a legitimate authority, or being made of a certain material, etc. Crucially, however, F_c need not be the property denoted by the modified noun. Once the relevant contextual parameters are set, so-called privative adjectives are simply intersective. The denotation of *fake coin*, on this kind of analysis, would be the context-dependent property (36).

$$(36) \llbracket \text{fake coin} \rrbracket = \lambda x. \neg F_c(x) \ \& \ \text{coin}'(x)$$

This line of analysis offers a natural way to capture the truth conditions for sentences like (37), discussed immediately above, which a genuinely privative treatment cannot handle. The sentence is true if and only if Kim sorted the coins into the ones that lack the relevant property and those that do not lack it.

(37) Kim sorted the coins into the fake ones and the real ones.

Although we do not develop a full and detailed analysis along these lines here, the discussion so far seems to us to clearly establish this direction as a promising, and in fact advantageous, intersective alternative to the privative analysis. The advantages are better coverage of data and better parsimony with other types of context-sensitive adjectives.

5.4.5.2 Modal adjectives Perhaps the most well-known set of adjectives that on the surface violate subsectivity are modal adjectives like those illustrated in (38).

- (38) a. alleged communist
 b. possible murderer

It is certainly true that an *alleged communist* is not necessarily a communist, and hence that the denotation of the NP in (38a) is not a proper subset of the denotation of the head noun, at least on the surface. And the situation is similar for (38b) and any NP in which the head noun is modified by a modal adjective like one of those in (38).

The idea that these are not subsective, however, is an artefact of the oversimplified approach we have taken thus far to NP meaning (and sentence meaning more generally)—when world-times are taken into account, these can indeed be viewed as subsective. A range of phenomena in the literature suggests that predicates (among which are nouns) have world/time indexes (see von Stechow and Heim 2011 for a particularly lucid overview). Moving from the oversimplified extensional view of nominal meaning which we have assumed to this point, let us assume instead that nouns denote relations between individuals and world/time indexes. For the purposes of this section, we leave to the side the temporal member of this index (though return to it in §5.4.5.3). This gives to a common noun like *communist* a denotation like that in (39)—a set of individual/world pairs.

(39) $\llbracket \text{communist} \rrbracket = \lambda x \lambda w. \text{communist}(x)(w)$

This view of common noun meaning is pretty much standard in the literature. On it, we can say that every noun has an *extensional domain*, which is a set of individuals, and an (intensional) range, a set of worlds. For *communist*, for example, the extensional domain, as shown in (40), is the set of individuals who are communists in some world.

(40) Extensional domain: $\lambda x. \exists w [\text{communist}(x)(w)]$
(Individuals who are communists in some world)

The extensional domain is thus the set of all communists, independent of the world in which they may be a communist—if an individual is a communist in *some* world, then he or she is in the extensional domain of *communist*. With this as background, our observation is that what modal adjectives do is map the extensional domain of the noun to a subset thereof, by restricting the set of worlds in the range of the noun. Consider, for example, *alleged communist*, as in (41), where we consider *alleged* to restrict the extensional domain by restricting the set of worlds under consideration to those consistent with the allegation that *alleged* gives rise to an inference that were made:

(41) a. $\llbracket \text{alleged} \rrbracket = \lambda P_{\langle e, \langle s, t \rangle \rangle}, \lambda x \lambda w [\forall w' \text{ consistent with allegations in } w : P(x)(w')]$
b. $\llbracket \text{alleged communist} \rrbracket = \lambda x \lambda w [\forall w' \text{ consistent with allegations in } w : \text{communist}(x)(w')]$

Compare now the extensional domains of *communist* and *alleged communist* in (42):

(42) a. Extensional domain of *communist*: $\lambda x. \exists w [\text{communist}(x)(w)]$
(Individuals who are communists in some world)
b. Extensional domain of *alleged communist*: $\lambda x. \exists w [\forall w' \text{ consistent with allegations in } w : \text{communist}(x)(w')]$
(Individuals who are communists in the worlds consistent with allegations in some world)

While the extensional domain of *communist* includes all communists found in any world, that of *alleged communist* includes only those found in worlds that are consistent with the allegations made in some world. Plainly, the latter is a subset of the former. This is true generally of modal adjectives—those that manipulate the world argument of the noun they modify. This observation suggests a restatement of the non-trivial subsective strengthening constraint over extensional domains, as in (43).¹⁹

¹⁹ This move is somewhat similar in spirit to the proposal Landman makes in the context of modals, also stating her subsectivity generalization with a relativization to world/time pairs. She calls her revised constraint ‘Subsectivity Prime’ (Landman 2001: 8).

(43) **Non-trivial subjective strengthening constraint:**

The extensional domain of $\llbracket \text{AP N} \rrbracket$ is a potentially non-empty proper subset of the extensional domain of $\llbracket \text{N} \rrbracket$

The constraint as stated in (43) holds for all the cases discussed previously, in which the adjective does not manipulate the world argument of the modified noun, but also holds for cases like those discussed in this section where it does. Furthermore, quality-denoting adjectives would still fail to be subjectively strengthening under the understanding in (43) for the reasons already discussed in §5.4.4.

5.4.5.3 Temporal modifiers of nouns Another class of words that have been classed as non-subjective adjectives are temporal modifiers of nouns, like those in (44).

- (44) a. former president
b. future president

Clearly, the former and future presidents are not a subset of the current presidents. In that sense, *former* and *future* straightforwardly do not subjectively strengthen their modifiand in the sense articulated in (28). If we take temporal indexes into account, as we did for worlds in the preceding section, then they do satisfy the constraint as stated in (43) (where extensional domain is relativized to world/time pairs)—such modifiers manipulate the temporal index of the noun, so that the resulting NP has an extensional domain which is a subset of the extensional domain of the noun. For example, the set of individuals who have been president at some past or future time is a subset of the set of individuals who are presidents across any time at all. Clearly, then, such modifiers do satisfy the constraint in (43), if relativized to temporal indexes, and like modal adjectives thus pose no challenge to our derivation of the quality-denoting adjectival gap.

While it is clear, then, that these modifiers do satisfy the Non-trivial subjective strengthening constraint as stated in (43), it is actually not clear to us that they are adjectives in the first place. We are, in fact, sympathetic to Szabó's claim that they belong to closed classes of functional lexemes, and not to any of the major lexical categories and that, in the words of Szabó, "these expressions differ so significantly from ordinary adjectives that they must belong to closed lexical categories" (Szabó 2014: 22). If this is the case, then their semantics is simply irrelevant for our claims about the behavior of adjectives.

Szabó's conjecture is supported empirically by the observation that there are several ways in which the relevant modifiers do not behave like adjectives. The first obvious difference is that that these modifiers cannot occur predicatively (45), whereas adjectives, including allegedly subjective (46) and privative ones (47), can:

- (45) a. *Nixon is former.
b. *Hillary Clinton is future.

- (46) a. Kim is short.
b. Sandy is smart.

- (47) That coin is fake.

This is a weak argument, however, given that there are other modifiers which we do accept are adjectives—the modal adjectives, for example—which also cannot generally be used as predicates. There are many other ways in which the relevant modifiers do not have canonical adjectival distribution, however, and it is the combination of all of these which suggests to us that these modifiers are not adjectives. First, unlike adjectives, they fail to have change of state verb derivatives, as shown in (48).²⁰

- (48) a. *The impeachment formered Nixon.
b. *The election futured Obama.

Second, unlike other adjectives in English, they cannot be used as resultative secondary predicates, as shown by the contrast between (49) and (50).

- (49) a. Kim painted the house red.
b. Nixon drank himself silly.
(50) a. *Congress impeached Nixon former.
b. *The US elected Obama future.

Finally, unlike adjectives, they cannot be modified with adjective modifying adverbs:

- (51) a. Joseph is a surprisingly good violinist.
b. Joseph is an exceedingly tall basketball player.
(52) a. #Joseph is a surprisingly former violinist.
b. #Joseph is an exceedingly future president.

Moving beyond English, additional compelling distributional evidence against viewing such modifiers as adjectives comes from Polish, where similar modifiers are barred from a prominent adjectival context, for reasons that can only be to do with their syntax (and not their meaning). Polish has a phenomenon known as adjective splitting, whereby, in particular information-structural contexts, a noun and an adjective can be separated from one another, as illustrated by the data in (53).

- (53) a. *Do rozległej wszliśmy doliny.*
to large-GEN entered.1PL valley-GEN
'We entered a large VALLEY.'

²⁰ Although this is not a diagnostic in the standard canon of adjectival diagnostics, we believe this is simply because it has been overlooked. Baker (2003) does consider it among his.

- b. *Do doliny wszliśmy rozległej.*
 to valley-GEN entered.1PL large-GEN
 'We entered a LARGE valley.' (Nowak 2000 in Partee 2010: 5)

While ordinary gradable adjectives, including intersective, context-sensitive gradable adjectives, and allegedly privative adjectives, can appear in this construction, temporal modifiers, such as those discussed in this section, cannot (Partee 2010: 5), as illustrated by the data in (54).

- (54) a. **Z byłym rozmawiała prezydentem.*
 with former-INST talked.3FS president-INST
 'She talked with the former PRESIDENT'
 b. **Z prezydentem rozmawiała byłym.*
 with president-INST talked.3FS former-INST
 'She talked with the former PRESIDENT' (Nowak 2000 in Partee 2010: 5)

Additional examples of nominal modifiers that Partee notes are not licit in this construction include those in (55).²¹

- (55) Translations of Polish adjectives that cannot split (Partee 2010: 5): alleged, potential, predicted, disputed

Another argument comes from the fact that temporal modifiers can be realized as bound morphemes on a word. No other English lexical adjective can do this, whereas this is the prototypical realization for functional material like tense or aspect. For example, the alleged adjective *former* can be realized as the prefix *ex-*, and *future* can be realized as *to-be*.

- (56) a. *ex-president.*
 b. *spouse to-be / to-be spouse*

That these are affixal elements can be seen by the fact that they cannot be conjoined:

- (57) a. *My former and future wife.*
 b. **My ex- and to-be wife.*

Furthermore, there are languages, like Paraguayan Guaraní, where the expression of aspectual information carried by modifiers like *former* and *future* is systematically expressed by nominal affixes (see Nordlinger and Sadler 2004; Tonhauser 2006, 2007 for discussion).

²¹ As can be seen in (55), modal modifiers also appear in this list, raising the question whether these too might not be adjectives. While we believe that they are in English, it may well be that they are not in Polish, as this argument would suggest. We leave more thorough exploration of this question for the future, simply noting that our argument holds whether they are adjectives or not. Either they are, and they satisfy subsectivity as stated in (43), or they are not, and therefore are irrelevant for consideration of the question whether adjectives are subsectively strengthening in the first place.

We conclude from this discussion that temporal modifiers like *future* and *former* do not pose a threat to the generalization that all adjectives are subsectively modifying. Either they are like modal adjectives, and satisfy our revised Non-trivial subsective strengthening constraint in (43), or, consistent with Szabo's claim, they are not even adjectives at all, and therefore simply irrelevant to consideration of the question whether adjectives are subsectively strengthening.

5.5 Concluding remarks

This chapter examined whether the Lexical Semantic Variation Hypothesis, the hypothesis that property concept lexemes come in two semantic varieties, suggests anything about the traditional question of the relation between meaning and the parts of speech. It was shown that, while nouns can have both varieties of meaning, adjectives are restricted to just one, and specifically cannot be quality denoting. This raised the question whether an explanation for this restriction on the association between category and denotation can be linked to, and so be made to indirectly elucidate, the nature of the adjective category. We developed a formulation of the familiar idea that the essential grammatical role of adjectives is to be adnominal modifiers, according to which adnominal modification syntactically means having attributive distribution, and semantically means non-trivially subsectively strengthening the denotation of the modifyand in the sense articulated in (43). We defended this claim about adnominal modification against familiar syntactic and semantic counter-examples, and showed that the restriction on the association of adjectives with quality denotation falls out from it as a theorem—quality-denoting lexemes are modificationally impotent as stated in (29), and so cannot be adjectives.

Two broader conclusions can be drawn from this result. The first is that model-theoretic techniques can be productively deployed to make genuinely falsifiable claims about the relation between meaning and lexical categories, an area where little advancement has been made by alternative approaches. We hope that the results of this chapter will inspire future work in this direction aimed at further elucidating the semantic underpinnings of lexical categories. The second is that, in line with the general outlook of this book, it is in the study of systematic patterns of variation, rather than in the search for positive universal elements present in all languages, that grammatical generalizations about the relation between meaning and form are to be found. Neither the observation of the restriction on the association of categories with meanings made in this chapter, nor the definition of adjectives as nominal modifiers proposed in it, from which a number of general syntactic and semantic conclusions followed, could be reached without scrutinizing the systematic *differences* in the form of property concept sentences within and across languages.

Quality nouns and other mass nouns

The definition of qualities in Chapter 3 makes two assumptions about their structure. The first is that qualities are partially ordered by a mereological part-of relation. Each quality is a Linkian non-atomic join semi-lattice. The second is that qualities are ordered by the size preorder \leq , which is the main ingredient of the proposed semantics of gradability and comparison for possessive property concept sentences. Being ordered by the total preorder \leq is what distinguishes qualities from the denotations traditionally assumed for substance mass nouns like *water* or *sand*, which are only ordered by the mereological partial order.

This chapter is dedicated to motivating these two assumptions, partly by testing their predictions and partly by demonstrating their explanatory force. The assumption that qualities are mereologically ordered makes the prediction that quality-denoting property concept nouns should pattern morphosyntactically with other nouns that are assumed to be so ordered, namely other mass nouns. We show that this prediction is borne out by a range of morphosyntactic environments that target mass nouns in familiar languages. Furthermore, we argue that making this assumption affords a simple explanation for a corner of the grammar of property concept constructions in Ulwa which would remain mysterious if it were not made.

The assumption that qualities are preordered by size (\leq), and that the denotations of other mass nouns are not, predicts the existence of environments in which the two types of noun diverge. If there are such environments, it should be possible to link them in a natural way to the presence of a size ordering. We demonstrate that this prediction is borne out in an interesting way, based partly on novel observations and partly on observations made in the literature, for example by Tovená (2001) for Romance and more recently by Baglini (2015) for Wolof. Tovená and Baglini point out distributional contexts that sharply distinguish property concept nouns from other mass nouns, and propose to account for them in terms of a distinction between *intensive* and *extensive* quantity. We argue that those environments that distinguish the two kinds of mass noun are those that select for or are otherwise sensitive to the presence of a size-preordering.

6.1 Qualities are mereologically structured

This section provides motivation for the assumption that qualities are partially ordered by a mereological relation. First, we demonstrate that the prediction made by this assumption, that quality-denoting nouns should pattern with mass nouns in the familiar environments that track mereological structure, is borne out. Second, we show that this assumption provides an elegant account of the semantics of Ulwa possessive constructions in which the possessed noun is formed from a quality-denoting property concept root and the possessive suffix *-ka* described in Chapter 3.

6.1.1 *Patterning with mass nouns*

If qualities are mereologically ordered, then all other things being equal, we expect that constructions that are sensitive to this kind of denotation will exhibit this sensitivity also with quality-denoting nouns. Standard mass/count diagnostics (on which see e.g. Pelletier and Schubert 2003; Doetjes 2012 for recent overview discussion) in English and other familiar languages seem to bear this prediction out, in that nouns that are plausibly quality denoting are unambiguously mass. In this section we briefly lay out these facts.¹ The discussion makes the presumption, which we take to be fairly intuitive, that English ‘abstract’ mass nouns and nominalizations, words such as *courage*, *beauty*, and *patience* which occur in possessive near-equivalents of property concept sentences, are quality denoting. We do not argue for this presumption here.

One environment usually taken to distinguish count and mass nouns is pluralization—count nouns pluralize, while mass nouns do not, except in reference to either kinds or conventionalized units of the material in question, that is, on a so-called ‘universal packager’ interpretation (see Jackendoff 1991: 24 n. 11 for this term and its intellectual history).

- (1) dogs, cats, rainbows, whiskers, kittens
- (2) *rices, *beers, *waters

Technically, this diagnostic is sensitive not to mereological structuring, but rather to atomicity (or lack thereof)—only nouns with an atomic denotation pluralize, while nouns with a non-atomic one do not. However, because only mereologically-

¹ A typical starting point for discussions of the mass/count distinction is the question of divisivity/cumulativity. Intuitions about divisivity and cumulativeness of what is taken to be the reference of a noun are commonly taken to be diagnostic of its having a mereologically-ordered denotation. An example of this kind of argumentation is the intuition that when some water is removed from a cup of water, what remains is still water, whereas when some of part of a table is removed, the result is not necessarily a table. Another example is the intuition that adding the water in one cup to the water in another yields water, whereas adding a table to another table yields two tables, not a bigger table. In our view, these intuitions are intuitions about water and tables, not about language. While they might be translatable into linguistic diagnostics, we are not certain if they are, and determining this is not necessary for making our point. We therefore refrain from using such argumentation here.

structured domains are non-atomic² (see the axioms in Link 1983), a diagnostic that reveals a denotation to be non-atomic also diagnoses it as mereologically structured. Quality-denoting nouns like those in (3) behave in exactly the same way.

- (3) ?courage, beauties, hungers

Much like the nouns in (2), these are well-formed only on a kind-type reading. For example, in a world in which there are different *kinds* of beauty, one can talk about them with the plural of beauty. In reference to some mass of the quality beauty, however, the plural noun is ill-formed in the same way that ordinary mass nouns are.³

Given the above, it is no surprise that count nouns are acceptable when determined by a numeral, while mass nouns are not, save on a universal packager or kind-type reading.

- (4) one dog/cat/rainbow/whisker/kitten

- (5) one rice/beer/wind

This diagnostic, again, probes atomicity, but ultimately picks out nouns with a mereologically structured denotation for the same reasons pluralization does, as discussed above. Our intuition is that the same is true for quality-denoting nouns, to the extent they are acceptable at all. For example, *one anger* might be one particular kind of anger (quiet, aggressive, etc.), and similarly for *one courage*.

Also, quantifying determiners such as *each* and *every* appear with count nouns (6), but not mass nouns (outside universal packager contexts) (7).

- (6) each/every dog/cat/rainbow/whisker/kitten

- (7) ?each/every rice/beer/wind/sand

² Strictly speaking, though, a domain that is not mereologically ordered at all is also non-atomic, or, perhaps better said, not atomic, though we are unaware of any analysis of mass nouns that claims them to be non-mereological.

³ The exceptions to this generalization are the dimensional property concept nouns, which do pluralize:

(i) a. What are the weights/heights of the children?

b. At ASICS we know how important footwear widths are for athletes.

(<http://www.asicsamerica.com/collections/widths/cat/collection-widths-all>),
accessed July 2016).

Such nouns have other count noun uses, and can be used with *each* and *every*, which are otherwise unacceptable with mass nouns, as discussed below, and the ability to be counted in the right kind of context:

(ii) We need one pile for each/every weight/height/width. (In a context where things are put into piles based on their weight/height/width.)

(iii) The children in this class are five (different) heights/weights.

We conjecture that these are separate uses to the normal mass uses of such noun (the existence of which is amply evidenced by their ability to occur in mass contexts, e.g. with *much*, *little*, modifiers like *great* and *a lot of*). Perhaps these nouns used in this way denote sets of measures (qua equivalence classes). It is also plausible that these uses exist only for dimensions because only dimensional measures have names.

Again, quality-denoting nouns in English generally pattern with ordinary mass nouns—it is hard even to conceive of contexts in which DPs like those in (8) could be used (though see n. 3).

- (8) a. ?each/every courage
- b. ?each/every anger
- c. ?each/every wisdom

Certain determiners that divide nouns into count or mass also group quality-denoting nouns with uncontroversial mass nouns. For example, *little* and *much* are acceptable only with mass nouns (save in a universal-grinder context):

- (9) a. *little dog/cat/rainbow/whisker/kitten
- b. *much dog/cat/rainbow/whisker/kitten
- (10) a. little rice/beer/wind/sand/furniture
- b. much rice/beer/wind/sand/furniture

The same is true for quality-denoting nominals:

- (11) a. little courage/anger/wisdom/height/width
- b. much courage/anger/wisdom/height/width

As a final point, determination of mass nouns, outside universal packager contexts like those discussed above, normally requires use of the partitive construction (12), while count nouns normally appear in it only with universal-grinder interpretations (13).

- (12) a. a bucket of water
- b. a pail of sand
- c. a lot of furniture
- (13) a. ?a bucket of dog
- b. ?a lot of rainbow
- c. ?a pile of whisker

Again, quality-denoting nouns behave like ordinary mass nouns in appearing in the partitive construction.

- (14) a. a lot of anger
- b. a great deal of wisdom
- c. a boatload of courage
- d. a lot of weight

In short, the evidence from English is clear that in a range of mass/count diagnostic constructions, quality-denoting nouns pattern with ordinary mass nouns. And the same has already been seen for possessive-predicating nominals in the Bantu language Basaá in §5.2.3. We believe that the same is true quite generally of quality-denoting

nominals, and that this is, in fact, quite uncontroversial. We take these facts as evidence that quality-denoting nouns, like ordinary mass nouns, have a mereologically structured denotation. Additional strong evidence for this claim that the denotations of property concept lexemes are so structured comes from an obscure corner of the grammar of Ulwa, which we discuss next.

6.1.2 *Ulwa double -ka*

The Misumalpan language Ulwa, discussed in detail in previous chapters, has a pattern of double possession with property concept roots, which we have to this point not discussed, which provides a novel argument that property concept roots in the language have a mereologically-ordered denotation. Given the relationship of the Ulwa facts to possessive property concept predication in other languages, we also take this as an argument for the mereological structuring of quality denotations more generally.⁴

The starting point for the discussion is the fact, discussed extensively in Chapters 2–4, that in Ulwa, predication of property concept lexemes, as in (15a), draws on morphosyntactic material otherwise syncretic with NP-internal possessive marking, as can be seen through comparison with (15b).

- (15) a. *yang as-ki-na minisih-ka.*
 1SING shirt- <1SING.POSS> dirtiness-3SING.POSS
 ‘My shirt is dirty.’ (Green 2004: asna)
- b. *Alberto pan-ka*
 Alberto stick-3SING.POSS
 ‘Alberto’s stick’ (0405-829)

Our analysis of this, discussed extensively in previous chapters, is that Ulwa property concept lexemes are bound quality-denoting roots, to which possessive material suffixes to create a predicate of individuals. A sentence with such a word predicated of an individual *a* is true if *a* has some portion of quality ranked high enough in the total preorder of portions of quality denoted by the property concept root from which the predicate is derived.

There are two puzzling constructions of Ulwa that we have not yet discussed to which this analysis does not extend naturally, and the correct truth conditions of which it fails to capture. The first, illustrated by the data in (16), has property concept nouns in *-ka* occurring in the complement of the possessive verb *watah*. As (17) shows, the same position can host a bare root. The occurrence of a bare root in this environment is unsurprising on our theory, since *watah* is a possessive verb and so makes the same semantic contribution as *-ka*. The occurrence of a derived property concept noun,

⁴ This case study was first published as Francez and Koontz-Garboden (2016a), which this section draws heavily upon.

however, is more surprising, since the presence of the possessive verb *watah* looks as though it renders *-ka* semantically redundant (or vice versa).

- (16) *Jessica bas-ka ya tubak-ka watah ka.*
 Jessica hair-3SING.POSS the thick-3SING.POSS have SENT-KA
 ‘Jessica’s hair is thick.’ (simplified from Octo9-134)
- (17) *yâka û-ka yâka yûh-ka. an tarat watah ka.*
 that house-3SING.POSS that long-3SING.POSS and tall have SENT-KA
 ‘That house is long. And it’s tall.’ (Octo9-109)

As we discuss in Koontz-Garboden and Francez (2010: 235), versions with and without *-ka* seem to be in free variation in this position, with no clear difference in meaning. The question is how this could be the case.

A related second mysterious construction is one in which property concept nouns in *-ka* occur as heads of possessive noun phrases, as shown in (18).

- (18) *bilam sikamh-ka-ka raupi y-â-tak*
 fish stench-3SING.POSS-3SING.POSS RAUPI 1SING.NON-NOM-cause-3SING.DS
kang lâ-wa-yang Bob ya bilam watah ka.
 APPL CROSS-WA-1SING.PRES Bob DEF fish have SENT-KA
 ‘The stench of the fish makes me aware that Bob has fish.’ (Maro6-56)

The two constructions in (16) and (18) seem surprising at first in light of the analysis developed in previous chapters, since they each involve two instances of a possessive element. In (16), the possessive morpheme *-ka* co-occurs with the possessive verb *watah* ‘have’, and in (18), it co-occurs with another instance of *-ka*. If possessive semantics is required to turn root-denotations into predicates, what is the role of the second possessive marker? In what follows, we discuss these constructions in more detail. We refer to the construction in (16) as the *-ka watah* construction, and to the one in (18) as the *double-ka* construction. The answer we propose to the question why such constructions have double possession, builds directly on the analysis of Ulwa property concept sentences developed in previous chapters, and makes direct appeal to mereological structure in the denotation of Ulwa property concept roots.⁵ The analysis takes as its point of departure the fact that in ordinary Ulwa possessive noun phrases, the possessive relation contributed by *-ka* can be a mereological part-whole relation. We show that taking *-ka* to express the mereological relation-ordering qualities when it combines with property concept roots leads to a correct analysis of both problematic constructions. Under this analysis, the view of the Ulwa pattern as semantically motivated is not only maintained, but strengthened, since the possessive

⁵ See Koontz-Garboden and Francez (2010) for an inferior analysis of these facts in the framework laid out in that paper, and Francez and Koontz-Garboden (2016a) for a detailed critique of that analysis.

affix *-ka* emerges as having a range of interpretations that, we show, is natural given what is known about possession in Ulwa and crosslinguistically. These facts thereby constitute a strong argument not only for the general analysis of the Ulwa facts argued for in this book, but more specifically for mereological structuring in quality-denoting lexemes.

6.1.2.1 *-ka watah constructions* The *-ka watah* construction is exemplified in (16) and by the additional data in (19).

- (19) a. *Jessica bas-ka ya tubak-ka, salai-ka,*
 Jessica hair-3SING.POSS the thick-3SING.POSS smooth-3SING.POSS
yûh-ka palka watah ka.
 long-3SING.POSS very have SENT-KA
 ‘Jessica’s hair is thick, smooth, and very long.’ (Oct09-134)
- b. *yang tal-yang yang û-ki karak Ulwa û-ka ya*
 1SING see-1SING 1SING house-1SING with Ulwa house-3SING.POSS the
kanas mau-ka watah ka.
 more clean-3SING.POSS have SENT-KA
 ‘Between my house and the Ulwa house (= the house of the Ulwa Language Project), my house is cleaner.’ (Oct09-134)
- c. *âka dî-ka basta laih dî-ram katka*
 this thing-3SING medicine TOP drink-2SING.IRR but
batak-ka watah ka.
 bitter-3SING.POSS have SENT-KA
 ‘This medicine, you’ll drink it, but it’s bitter.’ (0405-809)

If we naively apply the analysis developed in the previous chapters to these data (ignoring the interval argument, for simplification), *-ka* and *watah* have the denotations in (20), *-ka* denoting a relation between properties and individuals that possess them and *watah* denoting a relation between individuals standing in the possessive relation to one another.

$$(20) \llbracket -ka \rrbracket = \llbracket watah \rrbracket = \lambda P \lambda x. \exists q [P(q) \ \& \ \pi(x, q)]$$

Such an analysis, blindly applied to the facts discussed in (19), assigns to the sentence in (21) (a simplified version of (19a)), the truth conditions in (22), where **thickness** is a constant of type *p*.

- (21) *Jessica bas-ka ya tubak-ka watah ka.*
 Jessica hair-3SING.POSS the thick-3SING.POSS have SENT-KA
 ‘Jessica’s hair is thick.’ (simplified from Oct09-134)

- (22) ([Jessica bas-ka ya]) [tubak-ka watah] =
 $\exists q, z[\text{thickness}(z) \ \& \ \pi(q, z) \ \& \ \pi(\text{J's hair}, q)]$

These truth conditions ensure that Jessica's hair has something thick, but not that it has thickness, that is, not that it *is* thick (recall that the analysis equates having thickness with being thick). Koontz-Garboden and Francez (2010: 237) conjecture that such examples might be viewed as analogous to English examples like (23a), which is roughly equivalent to (23b).

- (23) a. Jessica's hair has something strange about it.
 b. Jessica's hair is strange.

However, this is not a particularly illuminating analogy, as the relevant English examples are very limited, as shown by the oddity of (24a,b).⁶

- (24) a. #Jessica has something tall about her.
 b. #Jessica's hair has something black about it.

Furthermore, the desired equivalence with (23b) cannot be achieved without a prepositional phrase, as shown in (26).

- (25) #Jessica's hair has something strange.

A better analysis of these constructions would not make them exotic in this way, but rather generate a meaning for them consistent with the ordinary predication meaning that they seem to have.

6.1.2.2 Double –ka constructions As shown in (15b), the possessed noun in an Ulwa possessive noun phrase, is affixed with –ka. Since words resulting from affixing –ka to an Ulwa property concept root are, categorially, nouns (see Koontz-Garboden 2007: ch. 6), they too can head a possessive noun phrase, in which case they are again suffixed with –ka. This results in 'double' –ka suffixation, as illustrated in (26).

- (26) a. *bilam sikamh-ka-ka* *raupi*
 fish stinky-3SING.POSS-3SING.POSS RAUPI
y-â-tak *kang lâ-wa-yang* *Bob ya*
 1SING.NON-NOM-cause-3SING.DS APPL CROSS-WA-1SING.PRES Bob DEF
bilam watah ka.
 fish have SENT-KA
 'The stinkiness of the fish makes me aware that Bob has fish.' (Maro6-56)

⁶ Our immediate intuition is that this English construction is licensed only when the adjective involved is multidimensional (see Sassoon 2013 for recent discussion and references). For example, in (23) Jessica's hair is strange in some respect, and not strange in others. Example (24a) is odd because Jessica cannot be tall in any respect other than her height. As evidenced even by the small sample of double possessive constructions in Ulwa already discussed here, they are not restricted to those that look multidimensional. For example, *tubakka* 'thick' and *salaika* 'smooth' in (19a) do not seem plausibly multidimensional.

- b. *pâpangh-ni* *dasi-ka-ka* *kau* *baka-ki* *ya*
 father-1INCL.PL strong-3SING.POSS-3SING.POSS with child-1SING DEF
andih *ala-t-i* *bata-ka* *yak-t-ikda*.
 already raise-TA-SS youth-3SING.POSS extract-TA-1SING.PAST
 ‘With the strength of god, I have already raised my child into a youth.’

(0405-474)

That this second occurrence of *-ka* marks possession on the head of a possessive NP is clear from its morphological characteristics. On the head of a possessive noun phrase, *-ka* agrees with the possessor in person and number, as shown in (27). Precisely the same is true when the possessed noun is made of a root suffixed with *-ka*, as in double *-ka* constructions, as shown by the full paradigm in (28) for the root *sang-* ‘green, alive’ given in Green (1999: 81).⁷

- (27) Nominal possessive paradigm for *burimak* ‘guava’ (Green 1999: 177)
- | | | |
|--------------------|----------------------|-------------------|
| 1singular | <i>huri-ki-mak</i> | ‘my guava’ |
| 2singular | <i>huri-ma-mak</i> | ‘your guava’ |
| 3singular | <i>huri-ka-mak</i> | ‘his/her guava’ |
| 1plural, inclusive | <i>huri-ni-mak</i> | ‘our (inc) guava’ |
| 1plural, exclusive | <i>huri-kina-mak</i> | ‘our (exc) guava’ |
| 2plural | <i>huri-mana-mak</i> | ‘your (pl) guava’ |
| 3plural | <i>huri-kana-mak</i> | ‘their guava’ |
- (28) Nominal possessive paradigm for *sangka* ‘life/greenness’ (Green 1999: 81)
- | | | |
|--------------------|---------------------|----------------------------|
| 1singular | <i>sang-ki-ka</i> | ‘my life/greenness’ |
| 2singular | <i>sang-ma-ka</i> | ‘your life/greenness’ |
| 3singular | <i>sang-ka-ka</i> | ‘his/her life/greenness’ |
| 1plural, inclusive | <i>sang-ni-ka</i> | ‘our (inc) life/greenness’ |
| 1plural, exclusive | <i>sang-kina-ka</i> | ‘our (exc) life/greenness’ |
| 2plural | <i>sang-mana-ka</i> | ‘your (pl) life/greenness’ |
| 3plural | <i>sang-kana-ka</i> | ‘their life/greenness’ |

Examples (27) and (28) exemplify a well-known prosodic condition on the position of *-ka* in possessive noun phrases (see e.g. McCarthy and Prince 1998), namely that *-ka* can be infixed to the leftmost iamb of the host rather than suffixed.⁸ For example, *sang-ki-ka* is the first singular possessive form of the word *sang-ka*.

What meaning does our analysis assign to such double-possessed PC words? The starting point is obviously the denotation for *-ka* in each of the instances discussed above—as suffix to a property concept root, and as marker of possession on a possessed

⁷ We have simplified the table in (27) from (Green 1999: 81) omitting details irrelevant for the discussion here about phonological variation in the paradigm.

⁸ This is seen clearly for nouns, like those above, that have more than two syllables.

noun in a possessive NP. These share a common lexical core, namely the possessive relation, but differ type-theoretically, as discussed in Chapter 3 (see there n. 21). For the purposes of this discussion, we assume the denotation for root suffixing *-ka* in (29), again leaving to the side the interval variable, which is irrelevant for this discussion. The denotation we assume for possessive NP *-ka* is in (30)—it takes a nominal meaning, and creates a relation between individuals *x* and *y*, where *y* is a member of the set denoted by the noun composed with.⁹

$$(29) \llbracket \text{-ka}_{\text{property concept}} \rrbracket = \lambda P_{\langle p, t \rangle}, \lambda x. \exists z [\pi(x, z) \ \& \ P(z)]$$

$$(30) \llbracket \text{-ka}_{\text{poss NP}} \rrbracket = \lambda P \lambda x \lambda y [P(y) \ \& \ \pi(x, y)]$$

With this as background, the meaning our analysis assigns to double *-ka* marked property concept roots is exemplified in (31), with the example *bilam sikamhkaka* ‘fish’s stench’.

- (31) a. $\llbracket \text{sikamh-ka} \rrbracket = \lambda x \exists z [\pi(x, z) \ \& \ \text{stench}(z)]$
 b. $\llbracket \text{sikamh-ka-ka} \rrbracket = \lambda P \lambda x \lambda y [P(y) \ \& \ \pi(x, y)] (\lambda x \exists z [\pi(x, z) \ \& \ \text{stench}(z)] = \lambda x \lambda y \exists z [\pi(y, z) \ \& \ \text{stench}(z) \ \& \ \pi(x, y)])$
 c. $\llbracket \text{bilam sikamh-ka-ka} \rrbracket = \lambda x \lambda y \exists z [\pi(y, z) \ \& \ \text{stench}(z) \ \& \ \pi(x, y)] (\text{fish}) = \lambda y \exists z [\pi(y, z) \ \& \ \text{stench}(z) \ \& \ \pi(\text{fish}, y)] =$
 ‘the set of things that have stench that the fish has’

Again, this does not correspond to the interpretation that such noun phrases seem to have. Intuitively, the noun phrase *bilamh sikamhka* should receive an interpretation matching its gloss, that is, it should refer to the fish’s stench (or the set of the fish’s stench portions, or the set of sets containing the fish’s stench portions). Instead, on this analysis, it denotes the set of smelly things the fish has. For example, (26a) on this analysis says that something stinky that the fish has alerts me to the fact that Bob has fish, rather than saying that the fish’s stench alerts me of this.

In §6.1.2.3 we show that the problem lies in not fully appreciating the consequences of the mereological ordering of quality denotations and in having an oversimplified understanding of possession. Once we have a more nuanced understanding of possession, it can be shown that these facts are actually predicted by the analysis, particularly when we understand more fully the consequences of the mereological ordering of quality denotations.

⁹ This denotation too is a simplification on the denotation given for possessive NP *-ka* in Chapter 3, n. 21. While we believe that the one given there is ultimately the correct one, the point we want to make here is more easily made by assuming, as in e.g. Barker (1995) and Koontz-Garboden and Francez (2010), that possessive NPs denote sets of possessed individuals, rather than generalized quantifiers as we laid out in Chapter 3, n. 21. What this issue hinges on is the treatment of quantified and type $\langle e, t \rangle$ possessors (see Francez 2009b), an issue irrelevant for the purposes of the discussion here, so we adopt the rhetorically simpler Barker-style treatment, even though we believe ultimately this is not the best analysis of possessive NPs.

6.1.2.3 *The alternative analysis* We have argued in the preceding chapters that possessive predicating property concept lexemes, Ulwa property concept roots among them, denote qualities. These are conceptualized as masses, and are modelled on a par with the denotations of mass nouns in the algebraic approach of Link (1983), as discussed in detail in Chapter 3. The key intuition of our analysis is that the possessive material in Ulwa property concept predication is required in order to turn quality-denoting property concept lexemes into predicates of individuals.

The point of departure for a better analysis of *-ka watah* and *double-ka* constructions is the observation, made repeatedly in the literature (see *inter alia* Barker 1995; Jensen and Vikner 1996; Heine 1997; Partee 1997; Vikner and Jensen 2002; Tham 2006 and references therein) that, crosslinguistically, nominal possessive morphology is highly underspecified semantically. In particular, among the relations introduced by English nominal possessive morphology are *alienable possession* (including ownership) (32), and a range of relations of *inalienable possession* or *integral part/whole* relations (33).

(32) the girl's car

(33) integral part/whole relation

- a. the girl's nose
- b. the book's first chapter
- c. the car's wheel
- d. the sand's grains

Why it is that possessive morphology functions to introduce these semantic relations, that is, what makes alienable and inalienable possession or integral parthood a natural class, is a very interesting question which we do not attempt to address here. What is important for our purposes is that, unsurprisingly, the same situation obtains also in Ulwa. Examples (34a) and (34b) show that *-ka* is used to introduce ownership relations and part/whole relations, respectively. Additional part/whole examples are given in (35).

(34) a. *pâpangh-ki kuring-ka*
 father-1SING canoe-3SING.POSS
 'my father's canoe'

(Green 2004: alhnaka)

b. *uhkan mak-ka*
 hone.palm seed-3SING.POSS
 'the seed of the hone palm'

(Green 2004: babaknaka)

(35) integral part/whole relation

a. *û pâp-ka*
 house door-3SING.POSS
 'the door of the house'

(0405-1073)

- b. *yalau ting-ka*
 mango.tree branch-3SING.POSS
 ‘branch of the (mango) tree’ (Green 2004: ahauka yaknaka)
- c. *kuma mak-ka balna isau*
 salt piece-3SING.POSS PL many
 ‘many pieces of salt’ (corpus)

Of particular interest is example (35c), which clearly demonstrates that among the relations expressible by *-ka* is that between masses and their mereological parts.

Once it is recognized that the relation \preceq , the mereological relation ordering qualities (see Chapter 3 for details), is one of the possible specifications of the underspecified possessive relation π , the correct interpretations are derived by the existing analysis. Portions of a quality bear \preceq to other portions of the same quality, and they bear another possessive relation, for which we use the symbol R , to individuals that bear them. R and \preceq differ from one another at a minimum in the latter being a transitive relation. With this as background, we have the formal tools in place to give a more satisfactory analysis to the two constructions of interest.

6.1.2.4 Reanalyzing -ka watah constructions We assume the same denotations for *-ka* and *watah*, namely the one given in (20) above. Assuming the possessive relation π can be resolved into different more specific relations as discussed at §5.1.2.3, combining *-ka* with a property concept root can lead to two different interpretations, tied to the realization of π as R or \preceq . If π is resolved to R , the possessive relation that holds between individuals and (portions of) qualities they have, the derived property concept noun denotes the set of individuals that have some portion of the quality named by the root. This is the meaning of such nouns in predicative position, as familiar from previous chapters, and as given in (36). The derivation is shown in (37).

- (36) *yang as-ki-na minisih-ka.*
 1SING shirt-<1SING.POSS> dirtiness-3SING.POSS
 ‘My shirt is dirty.’ (Green 2004: asna)

- (37) a. $\llbracket \text{minisih} \rrbracket = \lambda p.\text{dirtiness}(p)$
 b. $\llbracket \text{minisihka} \rrbracket = \lambda x.\exists q[R(x, q) \ \& \ \text{dirtiness}(q)]$
 c. $\llbracket (36) \rrbracket = \exists q[R(\text{my shirt}, q) \ \& \ \text{dirtiness}(q)]$

When π is resolved to \preceq , the resulting noun denotes the set of things that have a portion of the quality denoted by the root as a mereological part. This is what we suggest happens in *-ka watah* constructions. As an example consider again (19), repeated in (38).

- (38) *Jessica bas-ka ya tubak-ka watah ka.*
 Jessica hair-3SING.POSS the thick-3SING.POSS have SENT-KA
 ‘Jessica’s hair is thick.’ (simplified from Octog-134)

Resolving the relation introduced by *-ka* to \leq gives the noun *tubak-ka* the meaning in (39).

$$(39) \llbracket \text{tubak-ka} \rrbracket = \lambda q. \exists p [p \leq q \ \& \ \text{thickness}(p)]$$

In this case, the semantic effect of *-ka* affixation is to map the quality contributed by the root to the set of things that have some portion of the quality in question as a \leq -part. However, this set is simply the quality itself, since, by the definition of \leq as a relation that orders qualities, all and only portions of a quality have portions of that quality as \leq -parts. This is stated in (40), using *S* as a metavariable for qualities and *s*, *s'* as metavariables for portions.

$$(40) \text{ For any quality } S: \{s : \exists s' [s' \in S \ \& \ s' \leq s]\} = \{s : s \in S\} = S$$

Resolving π to \leq thus leads to an interpretation for the derived noun which is identical to that of the root, namely the quality named by the root. The full derivation of (38) is given in (41).

$$(41) \begin{aligned} \text{a. } \llbracket \text{watah} \rrbracket &= \lambda P \lambda x. \exists p [R(x, p) \ \& \ P(p)] \\ \text{b. } \llbracket \text{tubak-ka} \rrbracket &= \lambda p. \exists q [q \leq p \ \& \ \text{thickness}(q)] \\ \text{c. } \llbracket \text{tubak-ka watah} \rrbracket &= \llbracket \text{watah} \rrbracket (\llbracket \text{tubak-ka} \rrbracket) = \\ &\quad \lambda x. \exists p [R(x, p) \ \& \ \exists q [q \leq p \ \& \ \text{thickness}(q)]] \\ \text{d. } \llbracket (38) \rrbracket &= \exists p [R(\text{Jessica's hair}, p) \ \& \ \exists q [q \leq p \ \& \ \text{thickness}(q)]] \end{aligned}$$

Example (41d) says that Jessica's hair bears the *R* relation to something that bears the \leq relation to a portion of thickness. Because anything that bears \leq to a portion of thickness is itself a portion of thickness, what Jessica's hair bears *R* to is a portion of thickness. On this interpretation, then, (38) simply says that Jessica's hair has a portion of thickness, that is, that it is thick. More generally, constructions in which the complement of *watah* is a root receive exactly the same interpretation as *-ka watah* constructions, in which that complement is a noun derived from a root by *-ka* suffixation.¹⁰ This not only yields the desired truth conditions, but nicely derives the observation that there is genuinely free variation between roots (e.g. *tubak*) and *-ka*-suffixed property concept nouns (e.g. *tubak-ka*) in the complement of *watah* 'have', a fact illustrated above by the data in (16) and (17). Furthermore, while the forms are in free variation in contexts in which they can both occur syntactically, they are not generally in free variation. For example, the double *-ka* construction discussed below

¹⁰ Given the semantic equivalence between suffixed roots and unsuffixed roots on this interpretation, there is no semantic obstacle to stacking multiple instances of *-ka* recursively *ad infinitum*. This raises the question whether such stacking is attested, and if not, why not. In fact, such stacking does not occur in Ulwa, for completely mundane distributional reasons. Ulwa *-ka* affixation is generated in exactly two syntactic contexts: (1) on a property concept root, and (2) on the possessed noun in a possessive noun phrase. Once *-ka* suffixation has occurred once on a root, the result is a noun, and the grammar of Ulwa does not suffix nouns with *-ka* except when they head possessive NPs.

features possessive noun phrases in which the possessed noun denotes a quality. Since roots are not nouns and cannot head possessive noun phrases in Ulwa, they are barred in this construction.¹¹

6.1.2.5 *Reanalyzing double -ka constructions* All nouns heading a possessive NP are marked with possessive NP *-ka* (42a). The same is true of the nouns derived from roots by suffixing *-ka* (42b), giving rise to double *-ka* constructions. These constructions pose a similar problem to *-ka watah* constructions, and their semantics similarly becomes straightforward when π is interpreted as \leq when combining with a root.

- (42) a. *Alberto pan-ka*
 Alberto stick-3SING.POSS
 ‘Alberto’s stick’ (0405-829)
- b. *bilam sikamh-ka-ka*
 fish stench-3SING.POSS-3SING.POSS
 ‘the fish’s stench’ (Maro6-56)

We propose that in the head noun of (42b), *sikamh-ka*, *-ka* contributes the relation \leq . In this case, as was shown in (39), the meaning of the derived noun is equivalent to that of the bare root—both denote the quality named by the root. Thus, the noun *sikamh-ka* simply denotes the set of portions of stench. In combination with the possessor noun *bilam* ‘fish’, the entire possessive NP denotes the set of portions of stench that the fish bears the relation *R* to, or in other words, the fish’s stench. Example (43) shows the derivation of (42b).

- (43) a. $\llbracket \text{sikamh-} \rrbracket = \lambda p.\text{stench}(p)$
 b. $\llbracket \text{sikamh-ka} \rrbracket = \lambda q.\exists p[p \leq q \ \& \ \text{stench}(p)]$
 c. $\llbracket \text{sikamh-ka-ka} \rrbracket = \llbracket \text{-ka} \rrbracket(\llbracket \text{sikamh-ka} \rrbracket) =$
 $\lambda P\lambda x\lambda y.R(x, y) \ \& \ P(y)(\lambda q.\exists p[p \leq q \ \& \ \text{stench}(p)]) =$
 $\lambda x\lambda y.R(x, y) \ \& \ \exists p[p \leq y \ \& \ \text{stench}(p)]$
 d. $\llbracket \text{bilam sikamh-ka-ka} \rrbracket = (\llbracket \text{bilam} \rrbracket)(\llbracket \text{sikamh-ka-ka} \rrbracket) =$
 $\lambda x\lambda y.R(x, y) \ \& \ \exists p[p \leq y \ \& \ \text{stench}(p)] \text{ (the-fish)} =$
 $\lambda y.R(\text{the-fish}, y) \ \& \ \exists p[p \leq y \ \& \ \text{stench}(p)]$
 = the set of portions of stench that the fish bears *R* to

The key step in this derivation is (43b), in which the possessive relation contributed by *-ka* is resolved to \leq . This is what guarantees that the denotation of *sikamhka* is

¹¹ There is, however, a wrinkle in this proposal. Barring some general constraint on the resolution of π , our analysis also generates the strange meaning discussed above (and assumed by Koontz-Garboden and Francez 2010), according to which (38) says that Jessica’s hair has something thick. We ultimately believe that generating this reading is not undesirable. What is key, however, is that the intuitive meaning also be generated, as it is by this analysis. See Francez and Koontz-Garboden (2016a) for further discussion of this issue.

identical to the root *sikamh-*, allowing the denotation of the full possessive noun phrase to be, as in (43d), the set of stench portions that the fish has. Thus, our reanalysis of the data now assigns to the sentence (26a) above its most salient reading, namely that the fish's stench (rather than something stinky that the fish has) alerts the speaker that Bob has fish.¹²

6.1.2.6 Concluding remarks: Ulwa double possession as evidence for mereological ordering of qualities In the preceding, we discussed two constructions in Ulwa in which property concept roots are implicated, and whose interpretations, on first blush, seemed rather mysterious, given the analysis we have developed of Ulwa at various points throughout this book. We showed, however, that once one takes seriously both the semantics of the possessive relation, and especially the fact that qualities, the denotations of Ulwa property concept roots, are mereologically ordered, the interpretations that these constructions have fall out as a direct consequence. We take the existence of these constructions and their associated interpretations, as a consequence, as strong evidence in favor of the approach to qualities we have developed in this book—that is, as having a denotation much like mass nouns, and crucially with mereological ordering.

At the same time, on the analysis we have developed, qualities are not *exactly* like the denotations of mass nouns. In particular, we have argued that they are size-ordered, and that this size-ordering is directly responsible for their gradable behavior. We do not believe that the denotations of ordinary mass nouns, by contrast, are ordered in this way. In §6.2 we discuss empirical arguments for this position.

6.2 Qualities are totally (pre)ordered

This section motivates our assumption that quality nouns differ from other mass nouns in that the qualities they denote, unlike the masses denoted by other mass nouns, are totally ordered by size. The motivation comes from a set of environments, some observed in previous literature and some novel, in which mass nouns and quality nouns do not pattern together. We argue that these environments plausibly involve sensitivity to the presence or absence of a total order, and outline an analysis for each case.

¹² As in the case of *-ka watah* constructions, our analysis does also generate the meaning discussed above that the naive analysis generates. This happens when π is resolved to R rather than \leq in the combination of *-ka* with the root. As before, we allow the system to generate this meaning, noting that it is an open question whether this meaning actually exists, how it might be diagnosed in field conditions, and what blocks it if it does not exist. The advantage of the proposed analysis, by contrast with the naive analysis of Koontz-Garboden and Francez (2010), is that it generates the reading that we know to be attested and salient.

(44) a. *nessuno studente* ‘no student’
 b. *nessun coraggio* ‘no courage’
 c. **nessun libri* ‘no books’
 d. #*nessun vino* ‘no wine’ (Tovena 2001: 567)

In fact, the empirical picture regarding property concept nouns with *nessun* (and its variants *nessuno* and *nessuna*) seems to us to be fairly unclear. The intuitions of native consultants and the results of searches on Google coincide in indicating that common possessively predicating property concept nouns in Italian, like *fame* ‘hunger’, *sete* ‘thirst’, or *caldo* ‘heat’, are less acceptable with *nessun* than others, like *paura* ‘fear’ and *coraggio* ‘courage’. For example, most of our consultants reported the strong judgments in (45).

- (45) a. **Non ho nessuna sete.*
 NEG have.1SING no thirst
 Intended: I'm not thirsty.
- b. **Non ho nessuna fame.*
 NEG have.1SING no hunger
 Intended: I'm not hungry.
- c. *Non ho nessuna paura (dei cani).*
 NEG have.1SING no fear
 I have no fear (of dogs).

¹³ Of course, these selectional properties of *nessuno* are almost certainly related to its diachrony, and the fact that it is historically related to the numeral/count existential quantifier *uno* (and its variants).

One consultant, however, accepted all three. Google searches clearly show that *paura* ‘fear’ is far more common in collocation with *nessuna* than *fame* or *sete*. While all three are in fact attested, property concept sentences such as those in (45) with *nessuna* are practically unattested for *fame* and *sete*.¹⁴ It therefore seems to us that more detailed empirical work is required in order to establish what precisely is the class of expressions carved out by Tovenà’s generalizations, and that property concept nouns do not behave uniformly in the complement of *nessun*. If this is correct, then any analysis that would derive the pattern from a general semantic feature of property concept nouns would overgenerate.

Nevertheless, for current purposes it is interesting to ask whether our assumption that quality-denoting property concept nouns differ from mass nouns like *acqua* ‘water’ in being totally ordered by size could account for Tovenà’s generalization if it did turn out to apply uniformly to property concept nouns. We propose that it could. Specifically, we propose that *nessun* is a quantifier that requires a domain of discrete entities, that is, entities that do not overlap. This means that *nessun* can combine with expressions that denote exclusively in a domain of atom, immediately explaining (in a completely standard way and following Tovenà) the restriction against plurals and mass nouns. The acceptability of property concept nouns is explained precisely by the assumption that qualities are totally ordered. The total preorder \leq induces an equivalence relation on qualities, intuitively thought of as *is the same size as*, partitioning each quality into sets of portions of the same size. Each such equivalence class is discrete. The mereological partial order on masses does not induce an equivalence relation on parts of masses, because it is antisymmetric. Two distinct parts of water w, w_1 , for example, can, by definition, not be parts of one another,¹⁵ in contrast to two portions of a quality, which can be ‘bigger than or equal to’ each other (i.e. be the same size). Mass nouns, therefore, present no discrete entities for *nessun* to count.

This kind of explanation allows a simple statement of the semantics of sentences like (45c). This sentence asserts that the speaker stands in the *have* relation to no equivalence class of portions of the quality *fear*. It is reasonable to assume, and we do in fact assume this in Chapter 3, that any individual who has any portions of fear has exactly one maximal portion of fear. This maximal portion of fear is in exactly one equivalence class of portions of fear. We posit that an individual a has an equivalence class C_Q of portions of a quality Q if and only if there is a portion $p \in C_Q$ such that $\pi(a, p)$. The sentence in (45c), then, asserts that the speaker has no equivalence class

¹⁴ For example, Google.it produces 4,830 results for the exact phrase *non ho nessuna paura*, whereas for the exact phrase *non ho nessuna sete* only 85, many of which are recurring (e.g. the fixed phrase *sete di vendetta* ‘thirst for vengeance’).

¹⁵ The identity relation is, of course, an equivalence relation, but it is defined for any set, ordered or not, and cannot be said to be induced by the mereological part-whole relation. Moreover, as is well known, the parts of a mass are generally not discrete but overlapping (Landman 2010), so even the identity equivalence relation on parts will not yield classes quantifiable over by *nessun*.

of **fear**, and thus entails that the speaker has no portions of **fear**. From the fact that any individual has one maximal portion of any quantity, it follows that any individual either has one equivalence class of, say, fear, or else she has none. We conjecture that the uniqueness of possessed equivalence classes explains why quality nouns that can occur with *nessun* cannot occur with any other count quantifiers, such as numerals and other cardinals, as well as the fact, observed by Tovenà (but largely mysterious on her analysis), that although mass nouns like *coraggio* ‘courage’ can be used with singulative quantifiers like *nessun*, they cannot be used with *all* singulative quantifiers. For example, *coraggio* is unacceptable as the restriction for *qualche* ‘some’.

- (46) **qualche coraggio* ‘some courage’ (Tovenà 2001: 574)

This follows directly from the fact, discussed, for example, by Crisma (2012), that *qualche*, even though it combines exclusively with morphologically singular nouns, can be used only with plural reference, as shown in (47). If singulative quantification with quality-denoting nouns is over equivalence classes, and every portion of a quality is in exactly one class, then the domain of quantification for singulative quantifiers with quality nouns never contains a plurality of classes.

- (47) a. **Qualche pinguini stanno facendo chiasso in giardino.*
 some penguin-MASC.PL stay doing racket in garden.
 ‘Some penguins are making a racket in the garden.’
 b. *Qualche pinguino sta facendo chiasso in giardino.*
 some penguin-MASC.SG stays doing racket in garden
 ‘Some penguins are making a racket in the garden.’ (Crisma 2012: 473)

Creation of equivalence classes is not the only way to create discrete meaning from a mass noun. Ordinary mass nouns are somewhat famously known, as discussed in §6.1.1, to allow kind readings in count contexts, as for example in (48).

- (48) Any good restaurant has at least two wines and two beers on offer at any given time.

Kinds are certainly discrete in the sense that they do not have parts that might overlap. If ordinary mass nouns can be coerced to atomic kind readings, then we might expect that they could occur with *nessun* on a kind reading. This does seem to be the case, as evidenced by the naturally occurring (49).

- (49) *Nessuna birra buona può reggere il confronto con un buon vino.*
 no beer good can hold the comparison with a good wine
 ‘No good beer can hold a candle to a good wine.’
 (<<https://twitter.com/thebanale/status/611813169095405568>>, accessed July 2016)

The upshot of this brief discussion of Italian *nessun* is, first, that much more work is required to establish whether this quantifier indeed distinguishes between different

classes of mass noun and what these classes are exactly. Presumably, the same holds of the parallel case in French, though we have not examined the French data in any detail. Second, and more importantly for current purposes, assuming the empirical picture is roughly as proposed by Tovená, and that *nessun* distinguishes quality-denoting nouns from other mass nouns, our assumption that qualities are totally ordered by size whereas mass nouns are not provides an intuitive explanation of this.

6.2.2 Exclamatives

Another context discussed by Tovená (2001: 573) in which the same two classes of mass nouns emerge is *wh*-exclamatives. Exclamatives, generally speaking, are sentences used “to express an affective response to what is taken to be a fact” and “convey the speaker’s surprise that some present situation is remarkable” (König and Siemund 2007: 316). As is well known at least since early studies such as Elliot (1974) and Grimshaw (1979), exclamatives are a formally distinguished sentence class, differing from so-called ‘sentence exclamations’ (50) in that rather than taking the form of a declarative sentence, they take some other form, such as that of a question, an inversion structure, or just a noun phrase, as shown by the data in (51) (all from Rett 2011: 412).

- (50) (Wow,) John bakes delicious desserts! (sentence exclamation)
- (51) a. (My,) What delicious desserts John bakes! (*wh*-exclamative)
 b. (Boy,) Does John bake delicious desserts! (inversion exclamative)
 c. (My,) The delicious desserts John bakes! (nominal exclamative)

Our focus here is on *wh*-exclamatives. Aside from the formal difference, they differ from sentence exclamations also in their discursive effects. In particular, they have what Castroviejo Miró (2008) calls an *expressive content* and a *descriptive content*, neither of which seems to be asserted, but the exact theoretical status of which is still being negotiated in the literature (for Zanuttini and Portner 2003: 40 and Rett 2011: 414, the descriptive content is presupposed, but Castroviejo Miró (2008) and more recently Chernilovskaya and Nouwen (2012) argue that the discursive effects of exclamatives, regarding both the descriptive and the expressive content, are more complex). For example, (51a) has the descriptive content that the cakes John bakes are delicious to a high degree, and the expressive content that the degree to which these cakes are delicious has some emotive effect on the speaker (such as surprise).

A key property of *wh*-exclamatives is that their descriptive and expressive contents always involve a gradable notion. This gradable notion can be explicitly mentioned, as in (52a), or it can be left for contextual inference, as in (52b) (Milner 1978; Gérard 1980; Castroviejo Miró 2006; Rett 2011; Chernilovskaya and Nouwen 2012).

- (52) a. What a beautiful movie!
 b. What a movie!

An observation noted for Italian by Van de Velde (1996) (as reported in Tovenia 2001) and which holds also for English, is that *wh*-exclamatives with plural count nouns and ordinary mass nouns cannot generally be associated amount readings. By this we mean that the gradable property involved in their descriptive and expressive content cannot naturally be resolved to cardinality or quantity. For example, (53a) and (53b), featuring plurals, can be used to exclaim that Sandy has very beautiful dogs or that the neighbors have very well-behaved children; they cannot be used to exclaim that Sandy has (surprisingly/impressively . . .) many dogs, or that the next door neighbors have (surprisingly/impressively . . .) many children.

- (53) a. (My,) What dogs Sandy has! \neq Sandy has so many dogs!
b. What children the next door neighbors have! \neq The next door neighbors have so many children!

Exactly the same is the case for ordinary mass nouns, as demonstrated in (54). While (54a) can be used to exclaim that the Aegean has very pleasant (clean, etc.) water, and (54b) can be used to exclaim that the Plastic Albatros bar has excellent whiskey, these sentences cannot be used to exclaim that there is a lot of water in the Aegean or that the Plastic Albatros has a lot of whiskey.¹⁶

- (54) a. What water the Aegean has! \neq How much water the Aegean has!
b. What whiskey they have at the Plastic Albatros! \neq How much whiskey they have at the Plastic Albatros!

This behavior of mass nouns (and plurals) in *wh*-exclamatives contrasts sharply with that of quality-denoting property concept lexemes. With such lexemes, the amount reading is by far the most unmarked one, as shown by the sentences in (55). A speaker uttering (55a), (55b), or (55c) is committed to Kim having much courage, much beauty, or much wisdom respectively, and her utterance is paraphrasable as a sentence exclamation that is explicitly about amount.

- (55) a. (My,) what courage Kim has! \equiv Kim has so much courage!
b. (My,) what beauty Kim has! \equiv Kim has so much beauty!
c. (My,) what wisdom Kim has! \equiv Kim has so much wisdom!

¹⁶ Nominal exclamatives do allow amount readings with mass nouns, as shown by the examples in (i), involving what Grimshaw (1979) calls 'concealed exclamations' (see also Castroviejo and Schwager 2008).

(i) a. I couldn't believe the height of that building!

b. I couldn't believe the water I witnessed being poured on those desert golf courses.

(<http://activerain.trulia.com/blogsview/3747857/xeriscape-landscape-easy-to-maintain-little-water-needed>), accessed July 2016)

The contrast between quality-denoting property concept lexemes and mass nouns comes out particularly clearly with contrastive minimal pairs. The sentences in (56) are truth-conditionally equivalent, whereas the sentences in (57) are not.

(56) I didn't know what courage she had. \equiv I didn't know she had so much courage/
was so brave.

(57) I didn't know what soup they sell. \neq I didn't know they sell so much soup.

The same observation can be made contrasting *what*-exclamatives with *how much*-exclamatives, where an amount is compositionally introduced. With property concept nominals, the two exclamative types are equivalent, and both are further equivalent to a corresponding adjectival *how*-exclamative if there is one. This is shown in (58). With ordinary mass nouns, however, this equivalence breaks down for most native speakers, as shown in (59).

(58) a. What strength Kim has! \equiv
b. How much strength Kim has! \equiv
c. How strong Kim is!

(59) a. What blood you have! \neq
b. How much blood you have!

These data clearly suggest that there is a contrast in need of explanation.¹⁷

The contrast between mass nouns and quality nouns in English and Italian can be replicated in other Romance languages, such as Catalan, and in unrelated languages like Hebrew. For example, in Hebrew, a *which*-exclamative with a property concept nominal like *ko'ax* 'strength' is truth-conditionally equivalent to a *how much*-exclamative, as shown in (60). By contrast, a similar pair of sentences with the mass noun *mayim* 'water' is not truth-conditionally equivalent. With *eyze* 'which/what' in (61a), the exclamative gives rise to a property reading, while with *kama* 'how much' as in (61b), the exclamative gives rise to an amount reading.

(60) a. *eyze ko'ax yeš lax!* \equiv
which strength EX to.you.F
What strength you have! / How strong you are!

¹⁷ A minority of people, albeit a significant one (including Koontz-Garboden) does find some *wh*-exclamatives with ordinary mass nouns marginally acceptable on an amount reading given a contrastive context. For example, (i) (from John Collins, p.c.) is found marked but not unacceptable for some speakers in a context in which the speaker wishes to remark on the quantity of snow in Norway.

(i) What snow they have in Norway!

Similarly, explicit priming of cardinality before the exclamative improves the availability of an amount reading for some speakers:

(ii) They don't have much water in the Middle East, but what oil they have!

- b. *kama ko'ax yeš lax!*
 how.much strength EX to.you.F
 How much strength you have! / How strong you are!

- (61) a. *eyze mayim yeš lax!* \neq
 which water EX to.you.F
 What water you have!

- b. *kama mayim yeš lax!*
 how.much water EX to.you.F
 How much water you have!

Precisely the same pattern is observed in Catalan. A *wh*-exclamative gives rise to an amount reading with a property concept nominal (62a), but is odd with an ordinary mass noun (62b) (Elena Castroviejo Miró, p.c.).

- (62) a. *Quin coratge que té!*
 what courage that has
 How courageous s/he is!
- b. *#Quin aigua/diners que té!*
 what water/money that has
 Intended: How much water/money s/he has!

The emerging generalization is that *wh*-exclamatives are an environment that differentiates quality nouns and other mass nouns. While the former are most natural on an amount reading, the latter, when acceptable, only have a contextually determined property extent reading.

While we do not attempt here anything like a worked-out analysis of exclamatives, we do propose that this contrast receives a natural explanation as a consequence of the assumption that qualities are preordered by size whereas mass nouns are not. As mentioned above, the descriptive and expressive contents of *wh*-exclamatives are always built on a gradation. Quality-denoting property concept lexemes lexically provide a scale, namely the scale created by the preorder \leq . Mass nouns, on the other hand, provide no such scale lexically, and cannot therefore form the source for the descriptive or expressive content of an exclamative. Consider, for example, an exclamative such as (55a) above, repeated in (63).

- (63) What courage Kim has!

Intuitively, this sentence exclaims something about Kim's courage, which, given the semantics elaborated in Chapter 3, is a portion of courage of a certain 'size', that is, with a certain position in the \leq -ordering. The descriptive content is, roughly, that this portion is ranked high on \leq , and the expressive content that its ranking on \leq has an emotive effect on (impresses, surprises, etc.) the speaker. Since position on \leq is

something that all portions of qualities have inherently, the exclamative ‘has access’ to this gradable property.

Non-quality-denoting mass nouns, as discussed in §6.2.1, are partially ordered by a mereological part-whole relation. This partial order does not lend itself to gradability—there is no sense in which certain things are ranked higher than others on the part-whole relation, first and foremost because the ordering is partial, and it is not the case that any two given parts of, say, whiskey, are ordered relative to one another. Furthermore, and consequently, there is no sense in which a part of whiskey’s ‘position’ in the part-whole structure is something that a speaker has any way of perceiving and being impressed by, since nothing about the part of whiskey discloses anything about such a position. In contrast, speakers are, presumably, able to perceive, or at least we speak as if we are able to perceive, a person’s degree of courage (in our terminology, the equivalence class into which a person’s maximal courage-portion falls) from her behavior. Of course, the denotations of mass nouns certainly are measurable, and we convey quantitative information about masses all the time, for example, in sentences like (64).

(64) Kim has a lot of water/salt.

Quantities of masses, however, are not given by their part-whole structure inherent in the denotation of mass nouns, but rather imposed externally by such measures as volume, weight, etc. Such measures are not inherent to the lexical entry of a mass noun, and this, we submit, is why *wh*-exclamatives cannot pick up on amounts of mass substances without explicit contextual cues, and perhaps also a semantic coercion process which maps part of masses to a totally ordered scale of amounts by means of a measure function (as assumed in much of the literature: see, for example, Wellwood 2015 for an extensive discussion).

6.2.3 *Behavior under modification*

Tovena (2001: 572) observes that there are gradable modifiers that target the same class of Italian mass nouns as can occur with *nessun*, that is, her class of abstract mass nouns. We show in what follows that this is the case also in English, and that such modifiers, like *wh*-exclamatives, distinguish between quality nouns and ordinary mass nouns in a way explained by the presence or absence of the size ordering. Our starting point is work by Morzycki 2009; 2012, who observes that much as there are gradable and non-gradable adjectives (see e.g. Bolinger 1972: 21), there are also gradable and non-gradable count nouns, and that the difference is diagnosed by the ability to be modified by gradable modifiers. We show that his observations extend to mass nouns as well, in precisely the way that is expected given what was said in this section thus far: while quality nouns are gradable, mass nouns are not. This fact provides key evidence for our assumption that the two classes differ order-theoretically. Modifiers like those

documented by Morzycki are sensitive to the presence of a total order, and quality nouns have denotations that are totally ordered by size, whereas mass nouns do not.

Morzycki documents three classes of adnominal gradable modifiers. We leave to the side what he calls (Morzycki 2012: 191) the prototypicality modifiers *real* and *true*, which we believe, along with him, to be doing something other than accessing scale structure in the lexical semantics of a noun. The two classes of modifiers which are relevant here are his *big* class and *utter* class. Morzycki argues that the ability of a noun to appear in one class or another is a consequence of its dimensionality, namely whether the noun is gradable along a single dimension or along multiple ones. While we are skeptical of this line of explanation for the contrast, for reasons explained in n. 18, we agree with Morzycki that both classes diagnose gradability in the lexical semantics of nouns. Crucially, both classes distinguish quality nouns from ordinary mass nouns in the way predicted by Morzycki's claim that these modifiers diagnose gradability, and by our assumption that having denotations ordered by \leq is what makes quality nouns gradable.

The first class of modifiers includes *big*, *huge*, and *major*. The observation is that, on a property extent reading, distinguished from the irrelevant dimensional reading available for *big* and *huge*, some nouns can be modified by these modifiers (65) and others cannot (66).

- (65) a. a big/huge/major disaster
 b. a big/huge/major idiot
 c. a big/huge/major smoker
 d. a big/huge/major basketball fan
- (66) a. #a big/huge/major American
 b. #a big/huge/major sportscar

As Morzycki's work and these examples make clear, many nouns that can be modified by this class of modifiers are count nouns. We remain agnostic as to how gradability with count nouns should be formally implemented. Morzycki's point is that the noun phrase *big sportscar* in (66b) cannot be used to describe a sportscar that is in some way more of a sportscar than what normally counts as a sportscar. This contrasts *sportscar* with nouns like *disaster* or *idiot*. The phrase *big idiot* can, and normally would be, used to describe an individual who is more of an idiot than other idiots, and the phrase *major disaster* would normally be used to describe a disaster which is more disastrous than others.

Alongside this class of modifiers there exists another, consisting of the modifiers *utter*, *complete*, *absolute*, *outright*, which Morzycki (2012: 194) shows are more restricted in the class of nouns that they modify. This is exemplified in (67) and (68).

- (67) a. an utter/complete/absolute/outright disaster
 b. an utter/complete/absolute/outright idiot

- (68) a. #an utter/complete/absolute/outright smoker
 b. #an utter/complete/absolute/outright basketball fan
 c. #an utter/complete/absolute/outright American
 d. #an utter/complete/absolute/outright sportscar

Like the modifiers in the *big* class, those in the *utter* class can modify nouns like *disaster* and *idiot*, but fail to modify nouns like *American* and *sportscar*. Unlike the modifiers in the *big* class, however, *utter* modifiers cannot modify nouns such as *smoker* or *basketball fan*. Morzycki (2012: 193–4) argues that this contrast, too, has to do with multidimensionality: *smoker* and *basketball fan* are multidimensional, whereas nouns like *idiot* and *disaster* are not. In relation to *idiot*, Morzycki claims that “there is really only one property that makes one an idiot: idiocy. This is not to say that idiocy is perfectly indivisible. One can be an idiot about different things, or in view of different things, or to different degrees. But the crucial ingredient, idiocy, remains the same” (Morzycki 2012: 194). Similarly, in relation to *disaster*, “there are different reasons why something might be a disaster, but the sole criterion for determining whether something is a disaster is unambiguously disastrousness” (Morzycki 2012: 194). As with the *big* class modifiers, we are skeptical about the multidimensionality line of explanation of why *utter* modifiers differentiate between count nouns, not least because we are not fully convinced of the unidimensionality of nouns like *idiot*. What is clear, however, is that both *big* class and *utter* class modifiers diagnose gradability in nouns.

With this as background, we observe that the modifiers Morzycki documents also separate quality nouns from mass nouns, in the expected way. Many of those nouns that we claim are quality nouns and that therefore have \leq -ordered denotations are acceptable with both classes of modifiers:¹⁸

¹⁸ Not all are acceptable with both classes of modifier. The dimension nominals, *width* and *length* most notably, appear with the *big* class (i), but not with the *utter* class (ii):

- (i) a. ... key to understanding the Castle course is to see that it is a direct homage to the Old Course. It has **huge width**, but much of it is obscured from the tee ...
 (<<http://www.golfclubatlas.com/forum/index.php?topic=45121.0>>)
 b. I can't use regular girly shoes without having the problem of **big width** in the center. I feel really ashamed. Can anybody help me?
 (<<http://www.foot-health-forum.com/forum/showthread.php?t=87318>>)
 c. The gunner emptied the Lewis gun into the Zeppelin's **huge length** but on she flew! Seemingly invincible!
 (<<https://martinneville.wordpress.com/tag/anti-aircraft/>>)
 d. Kelly Osbourne Just Added Some **Major Length** to Her Hair
 (<<http://www.brit.co/kelly-osbourne-extensions/>>). All websites accessed July 2016.
- (ii) a. #utter/complete/absolute/outright width
 b. #utter/complete/absolute/outright length

If any nouns are unidimensional, then *width* and *length* are surely in that set. This, alongside our skepticism regarding his dimensionality claims with *idiocy*, for example, suggests to us that Morzycki's claim

- (69) a. It was all about **huge courage** and professionalism. It was all about recognising that without strong defences you have nothing as a country.
(<http://home.bt.com/news/uk-news/pm-pays-tribute-to-raf-courage-11363992191728>)
- b. Muffin has **big beauty** in a small package. This darling Jack Russell Terrier is about two years old ...
(http://www.z107fm.com/pages/tuesdays_pet)
- c. Public land grazing is a Government subsidized program where many large ranchers and corporations have acquired **major wealth**.
(<http://wildhorsesinwindsofchange.com/2011/06/a-ranchers-response-to-cattle-grazing-on-the-range>)
- d. It was a **huge pleasure** to be part of this great sporting occasion.
(<http://sluggerotoole.com/2010/09/20/owen-paterson-it-was-a-huge-pleasure-to-be-part-of-this-great-sporting-occasion>)
(All websites accessed July 2016)
- (70) a. In what should arm him for a war of life against life, he is a creature of utter cunning, **utter courage**, **utter strength**. He is a troglodyte ...
(A. H. Lewis, *The Boss and How He Came to Rule New York*, New York: A. L. Burt, 1903)
- b. This current world with all the shit going on still has **complete beauty** and brilliance.
(<http://www.truthcontrol.com/articles/world-really-prison-planet-and-soul-trap>)
- c. In other words, if one has **absolute wealth** to the point where more money grants little more in terms of power, then it stands to reason that in ...
(<http://sanctumzone.co.uk/forum/archived-news/93121-it-get-s-said-the-us-govt-shutdown-is-the-work-of-koch-brothers.html>); website now defunct)
- d. A perfect blend of local history, ecology and **outright pleasure**.
(http://www.tripadvisor.co.uk/ShowUserReviews-g147404-d2233053-r184375715-Virgin_Islands_Ecotours-St_Thomas_U_S_Virgin_Islands.html)
(Apart from c., all websites accessed July 2016)

that the *utter* class occur only with gradable nouns that are gradable along a single dimension is simply incorrect. Quite what the explanation is, we are unsure; what is important to us is simply the fact that these modifiers *do* seem to require gradability, which we model with our size-ordering. There are clearly further divisions within the class of gradable nouns, presumably as observed in the domain of adjectives (namely, Rotstein and Winter 2004; Kennedy and McNally 2005), which require further work to understand.

Ordinary mass nouns, by contrast, are quite straightforwardly unacceptable:¹⁹

- (71) a. #big/huge/major water
 b. #big/huge/major gold
 c. #big/huge/major soil
 d. #big/huge/major furniture
- (72) a. #utter/complete/absolute/outright water
 b. #utter/complete/absolute/outright gold
 c. #utter/complete/absolute/outright soil
 d. #utter/complete/absolute/outright furniture

Our proposal is that these modifiers are sensitive to the total ordering in the denotation of the noun they modify. Just like a big idiot is a predicate that holds of an idiot who outranks other idiots in idiocy, so *big beauty* is a predicate that holds of a portion of beauty that outranks other portions of beauty on the \leq ordering. Again, it is not crucial here to attempt denotations for all of the relevant modifiers, not least because it is a matter in need of further research how exactly they differ from one another (see n. 18 and discussion earlier in this section). What is clear, however, is that they all require gradability of their modifiand, and that the \leq -relation-ordering qualities makes quality nouns gradable. Essentially, *big* as a nominal modifier has a semantic effect roughly similar to that of an adjectival intensifier such as *very*. Something that has big or absolute beauty is something that is very beautiful. We propose (73) as a first pass at a denotation for the gradable modifier use of *big*, where P^{\leq} is a predicate with a totally ordered extension, and $!$ is a predicate modifier mapping the extension of any gradable property to a contextually determined subset thereof, consisting only of those elements that are ranked higher than a contextually supplied lower bound on the ordering associated with the modified property.

- (73) $\llbracket \text{big} \rrbracket = \lambda P^{\leq} \lambda x. (! (P))(x)$

Whether a denotation along these lines is ultimately defensible, the facts reported in this section constitute strong evidence in favor of our proposal that quality nouns differ from other mass nouns in having denotations that are totally ordered by size.

6.2.4 A certain modifier

Van de Velde (1996), Tovená (2001), and Hinterwimmer (under review) observe that the modifier *certain* (and its French equivalent) has special properties when used with

¹⁹ Colloquially the string *big oil* can mean ‘a lot of oil’, as in *Texas has big oil*. This is not, however, the reading under consideration; rather, the relevant reading of *big* (and the other modifiers like it) is one in which some entity in the world has the property of being N more than some other entity. On this reading, it is clear that *big* cannot modify *oil*, as no portion of oil is in any sense more oil than any other. Cf. *idiot*, where speakers of English have a clear intuition that some individual can be more of an idiot (indeed, a bigger idiot) than some other individual.

certain abstract mass nouns. Hinterwimmer's observation is that with ordinary mass nouns, as in (74), *a certain* triggers a kind-type reading.

- (74) a. Mary always drinks a certain wine for dinner.
b. Mary went to every Asian market in town just to get a certain rice.
(Hinterwimmer, under review: (5)–(6))

The situation is different, Hinterwimmer observes, with abstract mass nouns, his examples of which are property concept nominals, presumably quality denoting.

- (75) a. I find a certain beauty in this picture.
b. She moved with a certain grace. (Hinterwimmer, under review: (5)–(6))

Although a kind-type reading is available with these, it is somewhat marked. The unmarked reading is one wherein "*a certain* makes the resulting statement weaker: In [(75b)]... the speaker is intuitively understood to make a slightly less positive claim about the relevant picture than in the variant with a bare noun, and likewise for [(75b)]..." (Hinterwimmer, under review: 7–8). That something other than a kind-type reading is available is made clear by the fact that a continuation denying a kind-type reading does not give rise to infelicity, as shown in (76). A similar continuation with a non-quality mass noun leads to contradiction (77).

- (76) I'd like the house to have a certain beauty, but I don't care what kind of beauty it is (simple, sophisticated, rustic, modern, etc.).

- (77) #Mary always drinks a certain wine for dinner. She doesn't care what kind it is.

Additionally, a continuation specifying a quantity is odd with a mass noun, but fine with a property concept noun (78).

- (78) a. #Mary has a certain wine, definitely more than Bill has.
b. Mary has a certain beauty, definitely more than Bill has.

What these data show is that *a certain* modification with property concept nominals gives rise to an amount reading that is not available with ordinary mass nouns. This points to exactly the same conclusion as was reached above for Morzycki's modifiers, namely that property concept nouns are gradable in a way that mass nouns are not, and again this is explained immediately on our assumption that qualities are lexically ordered by \leq whereas mass nouns are not. Mapping mass nouns to amounts requires a measuring function, which must be supplied compositionally, or introduced, presumably by means of coercion, by an explicit context.

6.2.5 Such

Another modifier that gives rise to amount readings with property concept nouns but not with other mass nouns is French *tel/pareil* 'such', as pointed out by Tovená

(2001: 571), and observed first by Van de Velde (1996). The same contrast is found in English for *such*, and, as expected, it distinguishes property concept nominals from ordinary mass nouns in the same way as the hitherto discussed modifiers do, pointing once more towards our hypothesized order-theoretic difference between qualities and masses. The contrast in English is demonstrated by contrasting (79) with (80).

- (79) a. It is rare to find such courage in a young person.
 b. It is exciting to find such beauty in a debut.
- (80) a. It is rare to find such water in this part of the world.
 b. It is common to find such gold in a ring.

Examples (79a,b) are statements about large amounts (of courage, beauty). Both sentences can be paraphrased with *so much* replacing *such*. This is not the case for (80), which can be about kinds, but not about amounts. Neither sentence in (80) can be paraphrased with *so much* replacing *such*. The contrast is brought out clearly with the minimal pairs in (81). While (81a) is perfectly coherent, (81b) is a contradiction.

- (81) a. Such courage is much more than I expected to see tonight.
 b. #Such wine is much more than I expected to drink tonight.

As with the previous cases, this contrast in the availability of amount readings is immediately explained by the assumption that property concept nouns denote qualities and that qualities, unlike masses, are totally ordered by \leq .

6.2.6 Wolof degree modifiers and comparatives

The contrast between property concept nominals and ordinary mass nouns emerges quite saliently in the Niger–Congo language Wolof, in a number of contexts recently noted and documented in Baglini (2015). These contexts include the behavior of gradable modifiers, comparatives, and degree questions. We discuss these areas in turn, drawing on Baglini's rich empirical observations.

Wolof has two classes of property concept lexemes. The first is a class of non-possessive predicating predicates that behave like intransitive verbs. This can be seen by comparing (82) with (83), an ordinary intransitive verbal sentence. The key observation is that both take verbal inflectional morphology, and lack any copula or possessive morphosyntactic structure (see also discussion in McLaughlin 2004).

- (82) *Awa rafet/njool/bees/baax na-Ø.*
 Awa pretty/tall/new/good FIN-3SING
 'Awa is pretty/tall/new/good.' (Baglini 2015: 16)
- (83) *Aïda jooy na-Ø.*
 Aïda cry FIN-3SING
 'Aïda cries.' (Baglini 2015: 133)

This pattern of predication contrasts with that exhibited by the second class of Wolof property concept lexemes, which are nominals. As shown by (84) and (85), Wolof property concept nominals are possessive predicating.

- (84) *Awa am na-∅ xel (lool).*
 Awa have FIN-3SING wit very
 ‘Awa is (very) witty.’ (Baglini 2015: 17)
- (85) a. *Aïda am na-∅ ceeb.*
 Aïda have FIN-3SING rice
 ‘Aïda has rice.’ (Baglini 2015: 133)
- b. *am-na-a loxo.*
 have-FIN-1SING hand
 ‘I have hands.’ (Tamba et al. 2012: 935)

The analysis we have developed in previous chapters extends straightforwardly to the Wolof data. We assume that possessive-predicating property concept lexemes in Wolof are quality denoting, and that in virtue of such a denotation trigger possession in predicative constructions. We also assume that like quality-denoting property concept lexemes in other languages, their denotation is ordered by \leq , and that this accounts for their gradable behavior. In the sections that follow we show, drawing on Baglini’s data and empirical argumentation, that Wolof property concept nominals contrast with ordinary mass nouns in precisely this property—while the former exhibit behaviors consistent with having a ‘size’ ordering, the latter do not.

6.2.6.1 Gradable modifiers The Wolof degree modifier *lool* can modify property concept verbs (86a) as well as verb phrases headed by the possessive verb *am* ‘have’ with a quality-denoting complement noun (86b). However, it is unavailable with verb phrases headed by the same verb when the nominal complement is a mass noun (87).

- (86) Wolof *lool*
- a. *Awa rafet-na-∅ (lool)*
 Awa pretty-FIN-3SING (very)
 ‘Awa is (very) pretty.’
- b. *Awa am na-∅ xel (lool)*
 Awa have FIN-3SING wit (very)
 ‘Awa is (very) witty.’ (Baglini 2015: 17)
- (87) *Awa am na-∅ ceed (*lool)*
 Awa have FIN-3SING rice (*very)
 ‘Awa has rice.’ (Baglini 2015: 17)

Our analysis of these facts takes as its point of departure the analysis of quality possession in Ulwa in Chapter 3. A central problem in that discussion was dealing with the contextually sensitive nature of quality possession in sentences such as (88).

- (88) *yang as-ki-na minisih-ka.*
 1SING shirt-<1SING.POSS> dirty-3SING.POSS
 ‘My shirt is dirty.’

As discussed at length in Chapter 3, in a sentence such as (88) the amount of dirtiness the shirt needs to have to make the sentence true will vary from context to context. In order to capture this, we gave the Ulwa possessive suffix *-ka* a denotation that resulted in such sentences denoting context-sensitive propositions—functions from intervals of portions to truth-values, as shown for the denotation of (88) in (89).

- (89) $\llbracket (88) \rrbracket = \lambda I_t \subset \mathbf{dirtiness}.\exists z^I[\pi(\text{my shirt}, z)]$

The idea is that the context-sensitivity of property concept sentences is captured in terms of intervals of qualities, where such intervals have a lower bound (see Chapter 3 for the details). Different values for the interval variable I in (89) determine different cut-off points in the \leq ordering, corresponding to minimum standards for dirtiness. Such size-ordered intervals of qualities also figured into our analysis of Ulwa comparatives. On that analysis, an individual x has more of some quality than an individual y if and only if there are more lower-bounded intervals in which x has a portion than there are ones in which y does. As shown in Chapter 3, this is the case if and only if x ’s maximal portion of the quality outranks y ’s on \leq .

With this as background, we now return to Wolof *lool* ‘very’. The intuition underlying our analysis of *lool* ‘very’ is that it manipulates the interval of the quality it modifies. Informally, a verb phrase composed of the possessive verb *am* and a property concept nominal denotes a relation between individuals and an interval of a quality. For example, *am xel* ‘have wit’, describes a relation between individuals and intervals of wit, a relation which holds if and only if the individual has a portion of wit that is in the interval, and hence has a portion of wit that is ranked higher on \leq than the standard set by that interval, that is, the interval’s lower bound. The effect of *lool* on such a VP denotation is to restrict the intervals involved to those with a lower bound that, in the context, is considered very high, higher than the lower bound for having wit in the context (cf. Wheeler 1972: 325 on English *very*).

We capture this intuition formally by making reference to the interval argument of a predicate. The VP *am xel* ‘have wit’ in our analysis has the denotation (90).

- (90) $\llbracket \text{am xel} \rrbracket = \lambda x \lambda I \subset \mathbf{wit}.\exists z^I[\pi(x, z)]$

The denotation we suggest for *lool* based on this proposal is in (91), where α is a variable over relations between individuals and intervals of qualities, and $!$ is the modifier we used in our semantics for *big* in §6.2.3, mapping any interval of a quality (including the quality itself) to a subset thereof, the lower bound of which is contextually considered to be very high.

- (91) $\llbracket \text{lool} \rrbracket = \lambda \alpha \lambda x \lambda J_t.\alpha(x, !(J))$

The derivation in (92) shows the meaning derived for (86b) under this analysis.

- (92) a. $\llbracket \text{am} \rrbracket = \lambda P \lambda x \lambda I_i \subset P. \exists^I z [\pi(x, z)]$
 b. $\llbracket \text{xel} \rrbracket = \lambda p. \text{wit}(p)$
 c. $\llbracket \text{am xel} \rrbracket = \lambda x \lambda I \subset \text{wit}. \exists^I z [\pi(x, z)]$
 d. $\llbracket \text{am xel lool} \rrbracket = \lambda \alpha \lambda y \lambda J_i. \alpha(y, ! (J)) (\lambda x \lambda I \subset \text{wit}. \exists^I z [\pi(x, z)])$
 $= \lambda y \lambda J_i \subset \text{wit}. \exists^{!(J)} z [\pi(x, z)]$
 e. $\llbracket \text{Awa am xel lool} \rrbracket = J_i \subset \text{wit}. \exists^{!(J)} z [\pi(\text{Awa}, z)]$

This proposal makes the sentence in (86b) true if and only if Awa has a portion of wit in a subinterval of the wit quality which includes all and only portions that, in the context, are ranked very high on \leq .

This analysis enables a straightforward explanation for why *lool* modification is restricted to just those VPs it is restricted to. *lool* modification is restricted to gradable predicates, a requirement which is intuitive, given its translation as ‘very’ and what is generally known about modifiers with that kind of meaning. In the current set-up, being gradable in Wolof means having totally ordered denotations. Specifically, *lool* operates on pairs of individuals and \leq -interval of a quality, and introduces the modifier $!$, which raises the lower bound of the input interval. Quality-denoting nouns provide such intervals. Herein lies the explanation for the unacceptability of *lool* as a modifier of *am*-VPs with an ordinary mass noun complement, as in (87). Ordinary mass nouns are partially ordered by a mereological order, but not totally ordered by size or any other total order, and do not make intervals available, correctly predicting the unacceptability illustrated by (87).

Wolof *lool* can also modify verbal property concept lexemes, as illustrated by the data in (86a), and we therefore propose that such lexemes have, as a matter of their lexical meaning, the same denotations as are achieved compositionally with property concept nominals. That is, they denote relations between individuals and intervals.²⁰ A property concept verb such as *rafet* ‘to be pretty’ has a denotation like that in (93).²¹

- (93) $\llbracket \text{rafet} \rrbracket = \lambda x \lambda I_i \subset \text{beauty}. \exists^I z [\pi(x, z)]$

²⁰ Here we follow a similar move made by Baglini (2015), who builds the denotation of property concept nouns and stative verbs on a common ontology of states. A possible argument in favor of an ontology of states is the observation, due to Alexis Wellwood (p.c.), that possessed PC nominals can be targeted by eventuality modifying adverbs, as in (i):

(i) Mary’s happiness with her husband in the morning after he feeds the cats pleases me.

How to model this kind of modification with qualities rather than eventuality arguments is not self-evident. Most importantly, it depends on a precise analysis of the effects of *-ness* nominalization in English, and on understanding the extent to which constructions such as (i) are attested in languages like Ulwa. We leave these interesting issues for the future.

²¹ It is worth being clear that we are emphatically not saying that Wolof verbal property concept lexemes are syntactically complex in the way proposed by Menon and Pancheva (2014) for the Malayalam property concept lexemes discussed in Chapter 4. Rather, we are saying that lexically, Wolof verbal property concept lexemes have the kind of denotation that is derived compositionally with property concept nouns.

Further evidence for our analysis of the modifier *lool* comes from the additional observations made by Baglini in relation to comparatives, which also group Wolof *am*-VPs with property concept nominals together with property concept stative verbs. Before moving on, we reiterate the main point, which is that the behavior of *lool* points to the same conclusion as we have drawn on the basis of a range of other facts in other languages discussed in this chapter, namely that what is responsible for the differential distribution and interpretative possibilities available to property concept nouns and other mass nouns is the order-theoretic properties of their denotations. Qualities are ordered by \leq , masses are not.

6.2.6.2 Comparatives Wolof has two kinds of comparative, both ‘exceed’ comparatives in the typology of Stassen (1985). One is formed with the verb *ëpp*, while the other is formed with a verb *gën*. Comparatives with *gën* are like the gradable modifier *lool* discussed in §6.2.6.1 in that they group *am* VPs with a nominal property concept complement with verbal property concept lexemes, to the exclusion of *am* VPs with ordinary mass noun complements. This is not to say that ordinary mass nouns cannot be used in comparatives; they can, but only with *ëpp*, which can be used with any mass or plural count noun (Baglini 2015: 140). The observation, then, is that *gën*, much like *lool*, seems to be sensitive to lexical gradability, encoded by hypothesis in the denotations of nominal and verbal property concept lexemes in Wolof through the total size preordering on qualities. The facts of both these comparatives are discussed in detail by Baglini (2015: ch. 4). We summarize only the facts related to *gën* here, since it is *gën* comparatives that provide evidence for our claim that property concept nominals come with a size ordering while ordinary mass nouns do not.

According to Baglini (2015: 140), comparatives with *gën* in Wolof are built based on the schema in (94), where stativity of the VP is a necessary (but not sufficient—see below) criterion.

- (94) *gën* comparatives in Wolof (Baglini 2015: 140)
 TARGET *gën* VP STANDARD

This schema is exemplified by the data in (95), where the stative VP is headed by a verbal property concept lexeme.

- (95) *Fanta mu-a gën-a-rafet Aïda.*
Fanta 3SING-C_{lf} exceed-a-pretty *Aïda*
 ‘Fanta is prettier than Aïda.’ (Baglini 2015: 142)

VPs headed by transitive stative verbs are also found in this construction:

- (96) *Ali mu-a gën-a-bëgg jën Aïda.*
Ali 3SING-C_{lf} exceed-a-like fish *Aïda*
 ‘Ali likes fish more than Aïda.’ (Baglini 2015: 142)

(97) shows that VPs headed by eventive verbs are unacceptable in the *gën* comparative.

- (97) **Ali mu-a gën-a-lekk jën Aïda.*
 Ali 3SING-C_{lf} exceed-a-eat fish Aïda
 Intended: ‘Ali eats fish more than Aïda.’ (Baglini 2015: 143)

As would be expected given this generalization, VPs headed by *am* ‘have’ with a property concept nominal complement are acceptable in *gën* comparatives.

- (98) *Aïda mu-a gën-a am doole Binta.*
 Aïda 3SING-C_{lf} comparative have strength Binta
 ‘Aïda has more strength than Binta.’ (Baglini 2015: 158)

As Baglini shows, however, non-eventivity of the VP alone seems not to be sufficient for use with *gën*. For example, we see no reason to believe that having rice is any more eventive than having strength in (98). Nevertheless, the VP *am ceeb* ‘have rice’ cannot be used in a *gën* comparative.²²

- (99) **Aïda mu-a gën-a am ceeb Binta.*
 Aïda 3SING-C_{lf} comparative have rice Binta
 Intended: ‘Aïda has more rice than Binta.’ (Baglini 2015: 158)

In fact, according to Baglini, ordinary mass nouns, when used as the complement of *am* ‘have’, generally create VPs that are unacceptable in *gën* comparatives.

The starting point for our analysis of these facts is recognition that *gën* comparatives are at least in some cases clearly *clausal* (Baglini 2014), as evidenced by (100).

- (100) *randal dākk-a gën-a-yomb toxal jikko.*
 move village-C_{lf} exceed-a-easy change character
 ‘It is easier to move villages than to change character.’ (Baglini 2014: 4)

We follow Baglini in generalizing the clausal analysis across all *gën* comparatives, and assign them the semantics we assigned to Ulwa clausal comparatives in Chapter 3. On that analysis the comparative operator *kanas* ‘more’ takes two clauses as arguments, each of which is assumed to denote a set of intervals. That clauses denote sets of intervals is a direct result of our semantic analysis of possessive strategies of predication, which, as noted in §6.2.6.1, works the same for Ulwa and Wolof.

A comparative on this analysis, then, compares the sets of intervals denoted by two clauses, and is true if and only if the intervals characterized by the first clause are a superset of the intervals characterized by the second (see the analysis of Ulwa

²² The key to Baglini’s analysis of Wolof is that the VP *am ceeb*, while not eventive, is nevertheless *not* stative. This is because for her, stativity is not determined by aspectual temporal properties, as it is in most of the literature. Rather, a stative predicate is one whose denotation is a set of states, where states are ontological primitives. As far as we can tell, the main difference between Baglini’s sets of states and our qualities is that qualities are mereologically structured, whereas sets of states are not.

comparatives in Chapter 3 for details). *gën* has the denotation in (101), where \mathcal{I}, \mathcal{J} range over sets of intervals of qualities.

$$(101) \quad \llbracket gën \rrbracket = \lambda \mathcal{I} \lambda \mathcal{J}. \mathcal{I} \subset \mathcal{J}$$

As with Ulwa comparative *kanas*, a comparative sentence with *gën* will be true just in case the set of intervals in which the standard has a portion is a subset of the set of domains in which the target has a portion. This is exemplified by the derivation of (102) in (103). Example (102) is shown to be true if and only if the set of intervals in which Binta has a portion of strength is a proper subset of the set of intervals in which Aïda has a portion of strength.

$$(102) \quad \begin{array}{l} Aïda \text{ } mu\text{-}a \quad \quad gën\text{-}a \quad \quad am \text{ } doole \quad Binta. \\ Aïda \text{ } j3SING\text{-}C_{If} \text{ comparative have strength Binta} \\ \text{'Aïda has more strength than Binta.'} \end{array} \quad (\text{Baglini 2015: 158})$$

$$(103) \quad \begin{array}{l} \text{a. } \llbracket gën \rrbracket (\lambda I \subset \text{strength}. \exists^I z [\pi(Aïda, z)]) \\ \quad (\lambda J \subset \text{strength}. \exists^J z [\pi(Binta, z)]) \\ \text{b. } \lambda I \subset \text{strength}. \exists^I z [\pi(Binta, z)] \subset \\ \quad \lambda J \subset \text{strength}. \exists^J z [\pi(Aïda, z)] \end{array}$$

The crux of the analysis is the same as it was for all other cases distinguishing quality nouns from mass nouns discussed in this chapter, namely that *gën* requires intervals. While intervals can be supplied by qualities, which are totally ordered by \leq , they cannot be supplied by mass nouns. This analysis correctly predicts, then, that *gën* is unacceptable with mass nouns.

In discussing the facts surrounding *lool*, we were led to the conclusion that Wolof property concept verbs have the same type of denotation as do verb phrases composed of the verb *am* ‘have’ and a property concept nominal, namely relations between individuals and domains of portions. This claim is also supported by the Wolof comparative facts. As shown in (104), *gën* comparatives can be formed with Wolof property concept verbs. This follows straightforwardly from our analysis if these denote relations between individuals and domains of qualities, as already suggested above. This is exemplified for (104) in (105), assuming the denotation for *rafet* ‘to be pretty’ independently proposed in the discussion on *lool* in (93) and the denotation for *gën* proposed in this section.

$$(104) \quad \begin{array}{l} Fanta \text{ } mu\text{-}a \quad \quad gën\text{-}a\text{-}rafet \quad Aïda. \\ Fanta \text{ } 3SING\text{-}C_{If} \text{ exceed-a-pretty Aïda} \\ \text{'Fanta is prettier than Aïda.'} \end{array} \quad (\text{Baglini 2015: 142})$$

$$(105) \quad \begin{array}{l} \text{a. } \llbracket gën \rrbracket (\lambda I \subset \text{beauty}. \exists^I z [\pi(Aïda, z)]) \\ \quad (\lambda J \subset \text{beauty}. \exists^J z [\pi(Fanta, z)]) \\ \text{b. } \lambda I \subset \text{beauty}. \exists^I z [\pi(Aïda, z)] \subset \lambda J \subset \text{beauty}. \exists^J z [\pi(Fanta, z)] \end{array}$$

As seen in (96), repeated in (106), it is not only property concept verbs that can be used in *gën* comparatives, but any stative VP, including ones involving stative transitives.

- (106) *Ali mu-a gën-a-bëgg jën Aïda.*
 Ali 3SING-C_{lf} exceed-a-like fish Aïda
 ‘Ali likes fish more than Aïda.’ (Baglini 2015: 142)

Within the theory developed so far, the obvious route for dealing with this fact is to generalize the semantics of quality possession to *all stative predicates* in Wolof, associating them with denotations that relate individuals to qualities. This is a proposal with a wide (and somewhat forbidding) range of interesting consequences which we cannot explore in the context of this book, but the grammatical cohesiveness of transitive statives, property concept verbs, and *am* ‘have’ verb phrases with property concept complements makes it *prima facie* attractive in our view. In order to concretize what taking this route involves, we sketch here a preliminary semantics for stative transitives such as *bëgg* ‘like’. The proposal is built on the intuition that portions of qualities can stand in different relations to individuals, and that qualities can be directed at something. For example, just as individuals can ‘have’ portions of a quality, they can also be the ‘target’ of a portion of a quality. Presumably, an individual is the target of a portion of liking if the liking is directed at them, or, in other words, if they are the reason for the fact that another individual has that portion of liking.

Formally, a transitive stative verb such as *bëgg* ‘like’ is assigned as its denotation a function mapping properties (and, presumably, also individuals, propositions, and possibly other types of semantic objects) to relations between individuals and qualities. For example, *bëgg* maps the predicate *jën* ‘fish’ to the property of being an individual who has a portion of liking that is directed towards fish. The quality of liking is totally ordered by \leq , like any other quality. Such a denotation is given in (107), where τ is a two-place relation, intended as the ‘target’ relation.

- (107) $\llbracket \text{bëgg} \rrbracket = \lambda P_{\langle e, t \rangle} \lambda x \lambda I \subset \text{liking} . \exists^I z [\pi(z, x) \ \& \ \tau(z, P)]$

Among the attractive features of this kind of denotation is that it retains the logic of transitive verbs, that is, captures inference patterns characteristic of such verbs which, presumably, would be valid in Wolof. For example, it would be very surprising if Wolof speakers did not have the intuition that the Wolof equivalent of *Ali likes fish* entails that *Ali likes something*, that the Wolof equivalent of *Ali likes fish and meat* entails *Ali likes fish*, etc.

Assuming this and the denotation for *gën* ‘exceed’ given in (101), we derive (108) as the meaning of a sentence like (106).

- (108) $\llbracket (106) \rrbracket = \lambda I \subset \text{liking} . \exists^I z [\pi(z, \text{Aïda.}) \ \& \ \tau(z, \text{fish})] \subset$
 $\lambda J \subset \text{liking} . \exists^I z [\pi(z, \text{Ali.}) \ \& \ \tau(z, \text{fish})]$

More evidence pointing in favor of this route of analysis of stative transitives such as *bëgg* ‘like’ comes from Baglini’s observation that, like all stative verbs, transitive statives can also be modified by *lool*, as shown in (109).

- (109) *Fanta bëgg-na-Ø ceeb lool.*
 Fanta like-FIN-3SING rice very
 ‘Fanta likes rice a lot.’ (Baglini 2015: 155)

The final question to answer in relation to *gën* comparatives is why eventive verbs are unacceptable in them, as shown in (97), repeated in (110).

- (110) **Ali mu-a gën-a-lekk jën Aïda.*
 Ali 3SING-C_{IF} exceed-a-eat fish Aïda
 Intended: ‘Ali eats fish more than Aïda.’ (Baglini 2015: 143)

Without going into a detailed analysis that would tie us to some particular theory of eventivity and its representation at syntax/semantics interface, issues that go far beyond the scope of this book, we conjecture that the answer lies in the nature of eventhood. Standard theories of events treat eventive predicates, like ordinary mass nouns, as being mereologically ordered (Krifka 1992), raising the possibility of ruling out eventive predicates in *gën*-comparatives on the same grounds as we ruled out verb phrases composed of *am* ‘have’ and a mass noun, that is, on the grounds of not being totally ordered. Intuitively, however, eating fish more than someone else means eating fish more often, which entails a count of fish-eating events. Such a count, as discussed extensively in the literature, requires a measure function (e.g. Krifka 1989, 1990, and most recently, Wellwood 2015), and no such measure function is supplied by the eventive verb itself. Assuming, as we have been, that lexemes like Wolof *gën*, unlike English *more*, do not bring in their own measure functions, but rather rely for their interpretation on a total ordering inherent in their semantic input, it is again not surprising that they cannot modify eventive verbs.

6.3 Concluding remarks

The point of departure for this chapter is the assumption, made in our semantics of quality possession, that qualities, the denotations of possessive-predicating property concept lexemes, share with masses (the denotations of mass nouns) the property of being mereologically ordered, and differ from masses in being totally ordered by a preorder \leq , thought of as a ‘size’ relation. The motivation for assigning to qualities the \leq ordering was that doing so was an intuitive way to formulate a semantics for possessive property concept sentences, and the motivation for assigning to them mereological structure came from some rough intuitions about what might be required in developing an account of certain patterns of inference with English nominalization. This chapter musters a range of empirical arguments for both these propositions.

It shows that standard mass/count diagnostics group property concept nominals with ordinary mass nouns, and that certain puzzling facts about Ulwa possessive noun phrases featuring property concept roots can be made sense of on the assumption that qualities are mereologically structured. At the same time, there are a wide range of contexts which we have pointed to, in Germanic and Romance languages, in Hebrew and in Wolof, in which property concept nominals do not pattern with other mass nouns. These contexts, we argued, are profitably and intuitively linked to the assumption that qualities, but not masses, are inherently ordered by the total order \leq . The arguments in this chapter, then, serve as independent evidence for the model-theoretic assumptions of the transparentist theory of possessive property concept sentences assumed throughout the book.

Conclusion

This book addresses the general issue of the role of meaning in the explanation of morphosyntactic linguistic patterns. It does so via a detailed examination of a particular pattern, directly observable and very robustly attested both within single languages and across languages. The pattern is very easy to describe in intuitive terms: in some cases, sentences that express the content of an English copular sentence with a predicative adjective (such as *Krishna is wise*), have the form of possessive sentences, or otherwise feature possessive morphology, in a way that is not generally found with non-verbal predication. This is illustrated by the contrasting the English and Spanish sentences in (1).

- (1) a. Kim is tired.
b. *Kim tiene sueño.*
Kim has tired(ness)
'Kim is tired.'
c. *Kim es un doctor*
Kim is a doctor
Kim is a doctor.

There is an undeniable sense in which, at some level of analysis, (1a) and (1b) convey the same content, and are hence translational equivalents. We therefore defined our empirical domain to be sentences that are direct translational equivalents of English copular sentences with predicative adjectives, and named them *property concept sentences*. The main question organizing the book is why some property concept sentences should feature possessive material. In other words, what exactly determines whether the form of a property concept sentence is possessive or not? In particular, what we are interested in is the relation between meaning and form: is the fact that property concept sentences are sometimes possessive related in a systematic way to what these sentences mean?

We contrasted two strong views against one another—uniformity and transparency—which correspond, respectively, to the *no* and *yes* answers to this last question. According to transparency, the structural differences between

translational equivalents stem from differences in the meanings of the components involved. Applied to the pattern at hand, this means that the presence of possessive morphosyntax in (1b) indicates the presence of possessive semantics, and its absence in (1a) indicates a semantics not involving possessive relations. Uniformity rejects this idea, and seeks instead to make the semantics of translational equivalents identical, locating the differences in their form in language-particular facts about the inventory and phonological realization of functional heads.

Throughout the book we have argued for a transparent view of structural variation in property concept constructions. While we do not reject the idea that uniformitarian considerations underlie many examples of crosslinguistic variation in morphology and syntax, we do reject the view that they underlie *all* variation in morphology and syntax, and have made the case that property concept constructions are one area in which it is not variation in the inventory and phonological realization of functional heads that is responsible for observed differences in the form of translational equivalents, but rather the lexical semantics of open-class lexical items. In the course of making this argument and exploring some of its predictions and consequences, several issues are left underexplored and ripe for future investigation. In the remainder of this Conclusion we consider some of these issues.

7.1 Translational equivalence

As discussed in the Introduction, the whole program of crosslinguistic comparative study is premised on the rarely articulated notion that different languages have structures that are, in an intuitive sense, direct translations. We called this notion ‘translational equivalence’, and, like those before us, have avoided any real discussion of how exactly this notion should be explicated, or how, beyond intuition, it can be determined whether two structures are translational equivalents of one another.

Tied to this issue is the question we raised, also in the Introduction, but did not answer, of how translational equivalence is to be related to model-theoretic notions. It seems to us to be standardly assumed in much of the syntax/semantics literature, particularly that of a uniformitarian persuasion, that translational equivalence entails model-theoretic identity of meaning. That is, two sentences are translational equivalents if they express the same truth conditions derived in the same compositional way from the same model-theoretic parts. This is, *prima facie*, an attractive position which immediately explains in what way translational equivalents are equivalent. Our treatment of the semantics of non-possessive- and possessive-predicating property concept sentences remained agnostic on this issue, in that we left open what precisely the right semantics is for non-possessive property concept sentences (including predicative

adjectival sentences). Our semantics for possessive property concept sentences has it that qualities stand in the possessive relation to ordinary individuals, the subjects of possessive property concept sentences.¹ We pointed out in Chapters 3 and 4 that there is a readily available analysis of adjectives as having the same denotation lexically as is achieved compositionally from the combination of possessive material with quality-denoting lexemes, although, to our knowledge, such an analysis has not been developed in the literature. Such an analysis would then immediately explain the translational equivalence of possessive and non-possessive property concept sentences in terms of identity of model-theoretic composition. The alternative is that non-possessive predicating property concept lexemes, such as adjectives, have the denotations proposed for them in the literature on the semantics of adjectives, whether as degree relations or as contextually sensitive sets in a supervaluationist theory. Given the theory we articulate for possessive-predicating property concept lexemes, this alternative entails that translational equivalence cannot be reduced to model-theoretic identity of composition. In other words, this view entails that different languages, for example, can express what is intuitively the same meaning using different model-theoretic building blocks.

We remain unclear and uncommitted on which of the two views of translational equivalence is correct for property concept sentences, and whether one of them is generally correct. This seems to us an interesting and foundational question for future research to address, not only in this specific domain, but in the context of a crosslinguistic comparative program in semantics more generally. In fact, the contrast between transparency and uniformity is, to a large degree, a contrast between analyses that stem from assuming that translational equivalence is always model-theoretical identity of composition, and analyses that stem from assuming that different languages might (though might also not) employ different model-theoretic building blocks to compose what are phenomenologically equivalent sentential meanings. Uniformity, then, has the advantage that it can say something intelligible about translational equivalence. Transparency, on the other hand, has the advantage of providing a more empirically and theoretically adequate analysis of the phenomenon at hand.

¹ In Chapter 3, we articulate an alternative to this view, in which possessive-predicating property concept lexemes denote scales, i.e. ordered sets of degrees, with possessive morphosyntax relating ordinary individuals to scales instead of qualities. As discussed there, the difference between scales and qualities is only that the ordering of the latter is not antisymmetric. While the facts surrounding property concept sentences can be explained perfectly well in terms of scales, we point out various independent motivations to a quality-based ontology.

7.2 Predictions of the uniformitarian analysis of Malayalam

Chapters 1–3 laid out the facts of non-possessive and possessive property concept sentences and articulated our analysis in terms of the transparentist Lexical Semantic Variation Hypothesis:

- (2) **The Lexical Semantic Variation Hypothesis:** Possessive-predicating property concept lexemes are quality denoting and non-possessive-predicating property concept lexemes are individual characterizing.

Chapter 4 then confronted the uniformity view with the transparency view directly, by considering two classes of uniformitarian analyses as alternatives to the Lexical Semantic Variation Hypothesis. The first class of alternative would reduce the semantics of possessive property concept sentences to that of non-possessive adjectival ones, based on the rich (if controversial) understanding of adjectives developed over decades in the formal semantic literature on gradability and comparison. This line of analysis, we argued, does not get off the ground in explaining why possessive morphosyntax is observed in just the cases it is, but not in others.

Another alternative, pursued in recent work by Menon and Pancheva (2014), reduces the syntax and semantics of non-possessive-predicating property concept sentences to that of possessive ones, assuming the latter have a semantics along the lines of that presented in Chapters 1–3 of this book. Variation in the morphology and syntax of property concept sentences observed on the surface is a consequence, on this alternative, of differences in the inventory and phonological realization of functional heads crosslinguistically, but crucially *not* of variation in the lexical semantics of property concept lexemes across the inventories of different languages, as the Lexical Semantic Variation Hypothesis would have it.

Chapter 4 argued at length that this alternative analysis gives rise to a range of predictions, some internal to Malayalam and some more general, which we believe are almost certain to be false. Our expectations notwithstanding, however, we have not undertaken a systematic investigation of these predictions that would prove them false. This remains work for the future. It is now a well-demarcated and understood area where transparent and uniformitarian analyses clearly diverge in predictions.

7.3 The lexical semantics of lexical categories

The Lexical Semantic Variation Hypothesis has it that there are two kinds of meaning that property concept lexemes can have—individual-characterizing and quality-denoting ones. Given the existence of these two kinds of meaning, and the widespread observation in the literature that property concept lexemes vary in their lexical category (see Chapter 5 for references and discussion), an obvious question to ask is whether there are any generalizations about the correlation between the

meaning of property concept lexemes and their lexical category. In Chapter 5 we sought to examine precisely this issue and made the observation that there is indeed such a generalization. While nouns can be both individual characterizing and quality denoting, adjectives are never quality denoting. We offered an explanation for this gap that derives it from the essence of the adjective category itself—the ability to be an adnominal modifier of nouns. Specifically, we proposed that lexical adjectives must have a meaning that, in attributive modification, leads to subjective strengthening, and demonstrated what we dubbed the Modification Impotence Theorem, namely that a quality-denoting adjective could not have such a meaning. Quality-denoting adjectives would, then, make a trivial semantic contribution no matter what they modified, and this is why languages do not lexicalize adjectives with such denotations. This perspective on the relation between lexical semantics and lexical category opens, we believe, a new path forward in the study of lexical categories. As discussed in Chapter 5, whether there is any semantic commonality to words sharing the same lexical category is a much-debated question. The traditional way of pursuing this question is to seek positive universals. We propose instead to turn this question around and show that category membership constrains the possible denotations of words of particular lexical categories.

This proposal, and the general research program it stems from, raises a number of additional questions that we have not been able to pursue here, but which we consider promising areas for future research. The obvious starting point is extending the question to other lexical categories. We have considered here the Lexical Semantic Variation Hypothesis in the context of adjectival and nominal property concept lexemes. But property concept lexemes are quite commonly verbal in their category as well, raising the question whether verbal property concept lexemes are subject to any restrictions. We have done no systematic research on this question, yet we suspect that verbal lexemes are restricted in a way similar to adjectival ones. Whether this is true, and if so why, remains to be investigated.

More generally, we hope the future will see more study of the relation between category and meaning from the kind of perspective we took it in Chapter 5, an approach we view as rooted in, and which is certainly inspired by, Mark Baker's (2003) study of lexical categories. The starting point is to identify classes of denotation and cross-classify these with lexical category. Where there are gaps, one asks whether there is anything about the nature of the category itself that might give rise to that gap.

7.4 Issues surrounding the nature of qualities

The Lexical Semantic Variation Hypothesis has it that possessive-predicating property concept lexemes denote qualities. As part of the development of this hypothesis, we have constructed throughout the book, particularly in Chapters 2, 3, and 6, a theory of qualities at a level of detail beyond any previously developed in the literature, certainly

for property concept lexemes, and we believe also for abstract mass terms (of which nominal property concept lexemes are a subset in many languages) more generally.

Among the assumptions we have made in developing our theory of qualities is disjointness—portions of a quality are in one and only one quality, so that, for example, a portion of strength is not at the same time also a portion of courage. This assumption played a key role in the derivation of the Modification Impotence Theorem in Chapter 5, and although we believe it is a reasonable assumption, we have not developed any empirical arguments for it. Given the role it plays in the derivation of the headline result in Chapter 5, an important outstanding question is whether the disjointness of qualities can be empirically grounded.

Another outstanding question related to our theory of qualities concerns whether portions of different qualities are ordered with respect to one another. As we discussed at length in Chapters 2, 3, and 6, our theory of gradability and comparison with possessive property concept sentences has it that qualities are ordered by a total preorder. What remains unclear is whether portions of different qualities are ordered with respect to one another or not. At issue, as discussed in Chapter 3 (n. 4) is the analysis of cross-quality comparison, and so-called incommensurability effects. Consider, for example, (3) and (4):

(3) The room has more width than it has length.

Unless the portions of at least some qualities are ordered with respect to one another, it is difficult to see how to analyze cross-quality comparatives like (3). On the other hand, if all qualities are ordered with respect to one another, it is difficult to see how to account for incommensurability effects, as illustrated for adjectives in (4).

(4) ? The room is wider than warm.

The general claim in the literature on adjectives is that sentences like (4) are odd because they involve comparison along scales that are incommensurable. Whether there are comparable facts with possessive property concept sentences, and how exactly such facts should be treated if there are, is an outstanding question.² The issues go far beyond the theory here, and are tied to quite subtle distinctions of the kind discussed in the domain of English adjectives by Morzycki (2011). The starting point is to establish what the facts are in a language, such as Ulwa, in which possessive property concept sentences are robust, and to see whether the kinds of contrast observed by Morzycki and others for non-possessive property concept sentences are attested also for possessive ones. Assuming they are, it then needs to be established whether incommensurability is a semantic or a pragmatic phenomenon, which is a

² It is our initial intuition that incommensurability effects do not arise with possessive property concept sentences. For example, we do not judge (i) odd in the way that (4) is odd.

(i) The room has more width than warmth.

theoretical question. Whatever the outcome, it is worth noting that the theory we have developed is unaffected. What is at issue is only whether to impose an ordering on the entire domain of portions, or not, based on a better understanding of the facts than is currently available.

Another lacuna in our theory of qualities is the treatment of antonyms. Although we have not investigated this issue, we assume that entailment relations like those illustrated in (5) are replicated with possessive property concept sentences.

- (5) Kim is taller than Sandy. \Rightarrow Sandy is shorter than Kim.

Further work should be carried out to determine whether such relations do indeed hold with possessive property concept sentences, and if indeed they do, how precisely they should be captured in a theory of qualities like that we have laid out here.³ Similarly, in languages with measure phrases (see e.g. Schwarzschild 2005) it is common that only one member of the antonym pair can be used with measure phrases:

- (6) a. Kim is two meters tall.
b. *Kim is two meters short.

Again, whether such contrasts are attested with quality-denoting property concept lexemes (and the extent to which there are measure phrases with such lexemes in the first place), and if so why, is a matter that future work on quality-denoting property concept lexemes and the nature of qualities more generally should focus on.

A final outstanding issue related to the nature of qualities concerns the appeal to them we made, following Baglini (2015), in our analysis of Wolof stative predicates in Chapter 6, including those featuring both intransitive and transitive stative verbs. As discussed in detail by Baglini (2015), Wolof groups possessive-predicating property concept lexemes with stative predicates more generally, to the exclusion of eventive ones. Like Baglini, we take this to mean that stative verbs (transitive and intransitive) and possessive-predicating property concept lexemes have denotations that are built from the same ontology in Wolof. Baglini's analysis appeals to an ontology of states, rather than to an ontology with portions (and qualities). Whichever ontology one chooses, the question that emerges is what exactly follows, especially regarding crosslinguistic variation, from claiming that in some languages, stativity is linked to possessive-predicating property concept lexemes, but not to non-possessive ones.

³ See Baglini (2015) for discussion of antonyms with possessive-predicating property concept lexemes in Wolof.

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