

On two sources of ϕ -feature valuation and its consequences for syntactic computation: A case study of nominal-inflection at the syntax-semantics interface

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While it has been recognized in the syntactic and semantics literature that gender and number features within a DP may be valued either from the syntactic structure (typically from the lexicon), or from the context (Corbett 1991, Dahl 2000, Wechsler and Zlatić 2000, 2003, Sauerland 2004, Wiltschko and Steriopo 2007, Acquaviva 2008, Heim 2008, Wiltschko 2009, Spathas 2010, Sudo 2012, Matushansky 2013, Merchant 2014, among others), little is known about how exactly these two types of valuation are established, and what the consequences of the two sources of valuation for establishing ϕ -feature Agree chains are. While there is a growing consensus that more than one structural element can be the source of the valued features (for instance, $\sqrt{}$ and n in Kramer 2009), it is far from clear what it means for features to be valued from the ‘context.’ This paper elaborates on recent insights of phase theory (Chomsky 2001, 2008, 2013, Narita 2011) and explores the hypothesis that formal syntactic features can be valued either within the narrow syntax computation, or by minimal search from the CI interface at the point of Transfer. Crucially, only unvalued features located on a phase head may be valued in these two distinct ways. In turn, if such a phase head gets further embedded, the CI-valued features can become an Agree goal within a larger syntactic structure which may give rise to a ‘mixed agreement’ pattern.

In order to investigate this hypothesis, the paper presents a case study of Italian nominal inflection that directly bears on the questions at hand. The Standard Italian nominal system morphologically marks two distinct genders, three distinct nominal classes (idiosyncratic nominal endings), and two numbers, a combina-

tion which lends itself to a theoretical investigation of number-gender interactions. Crucially, Italian nominal inflection also distinguishes between grammatical, i.e., idiosyncratic, and natural, i.e., context-dependent, gender. This paper provides evidence that even though the source of valuation of these two genders is distinct, their grammatical locus is the same. More precisely, they enter the same gender Agree chain. The main theoretical contribution of the paper comes from configurations in which there are two possible sources of valuation of the same gender Agree chain within the derivation. This in turn allows us to investigate the timing of related syntactic operations and their interactions in a controlled way.

I use the intricate patterning of these examples to argue that we need to distinguish between syntactic valuation, i.e., a narrow-syntax process that utilizes Feature Inheritance (Richards 2007, Chomsky 2008, and subsequent work) and Agree, and context valuation, i.e., a process that gets triggered by labeling that is modeled as minimal search (Chomsky 2013) and reminiscent of variable binding. While in most cases the output of these two processes is identical, I present data from the domain of socio-linguistic variation where we can observe a reflex of the distinction in the overt morphology.

More precisely, the data provide evidence that unvalued ϕ -features within DP are always introduced by D, which is necessary if the features are to be minimally searchable by CI. In contrast, if ϕ -features appear on lower functional heads, it is only via Feature Inheritance. Their value, however, may be assigned either by an assignment function introduced by D, triggered by labeling at the Transfer to the interpretive component, or it may be encoded in the lexical entry of a nominal root (cf. Kramer 2009).¹

The option of having features valued from two different places, combined with Feature Inheritance, yields non-trivial timing interactions, including interactions that are best modeled in terms of ϕ -feature Agree intervention. The crucial observation is that only properly individuating D introduces a complete set of gender and number features. Consequently, gender assignment is dependent on the divisional function in the sense of Borer (2005), and not on the counter function, related to the number feature.

The second major contribution of the paper is that it provides suggestive evidence that there might be no gender and number dependency as such (cf. Greenberg 1963, Noyer 1992, Harley and Ritter 2002, among others). Instead, the paper argues that at least in Italian the seeming gender-number dependency is a side ef-

¹I assume throughout that feature matching is distinct from feature valuation (Chomsky 2000, Adger 2003, Pesetsky and Torrego 2007, among others).

fect of gender valuation being dependent on the (non-)deficiency of the divisional head. The empirical motivation for the proposal comes from the domain of mass nouns and nominals denoting predicative or non-atomic relations; namely, from the observation that D referring to a non-atomic entity gives rise to a defective gender and number chain in a way that is parallel to defective T in the CP domain.

Aside from providing a theoretical motivation for distinguishing between syntactic valuation and contextual valuation as a direct consequence of a multiple Spell-Out model and a theoretical explanation for the cross-linguistically common dependency between number and gender, the paper makes two additional theoretical contributions. The first contribution is that only a subset of nouns are based on category-neutral roots (cf. Marantz 1997), a conclusion supported by data from derivational morphology and compounding. Second, the proposal sheds further light on the cross-linguistically persuasive generalization that animate 3rd person nominals share feature properties with 1st and 2nd person (Ormazabal and Romero 1998, 2007, Adger and Harbour 2007, Ritter 2014, Wiltschko and Ritter 2014, Welch 2014, Lochbihler and Oxford 2015, among others) by utilizing the hypothesis that animate nouns require semantic licensing by CI and that this licensing is distinct from the licensing of inanimate 3rd person nominals.

1 The puzzle

In his foundational study of Spanish nominal inflection, Harris (1991) provides extensive evidence that gender and class markers² must be modeled as two separate entities. The same pattern that motivated Harris' conclusions arises in Standard Italian (Dressler and Thornton 1996, Thornton 2001, 2003b,a, Ferrari 2005, Ferrari-Bridgers 2007, 2008, among others).³ In general, native speakers of Italian share the intuition that vocalic endings on nominals correspond to grammatical gender.⁴ Namely, a noun which in singular ends in *-o* is grammatically masculine (M) where grammatically masculine means that it triggers a masculine agreement on agreeing elements such as determiners or predicative adjectives, while nouns

²I will use the term 'class marker' as a descriptive label for idiosyncratic nominal vowel endings. The theoretical status of these markers is one of the questions to be addressed in this study.

³The basic facts extend to Italo-Romance and Ibero-Romance dialects, though the dialectal groups show distinct behavior in agreement patterns and in some nominal domains, such as mass nouns. See [left out for anonymity].

⁴Unless indicated otherwise, the data are from my ongoing project with [left out for anonymity]. The data were either collected from native speakers, or are a result of systematic dictionary, grammar, and internet searches.

ending in *-a* are grammatically feminine (F), and nouns ending in *-e* can be either. Even though this correlation is frequent, a closer look at the data does not support this intuition beyond it being a statistical tendency.⁵ While it is indeed the case that some nouns ending in *-o* are grammatically always masculine, such as *il libro* ‘the.M book,’⁶ there is a handful of *-o* nouns that are grammatically always feminine such as *la mano* ‘the.F hand.’ Some *-o* nouns denoting people may be grammatically masculine or feminine depending on the natural gender of their referent, such as *il soprano*, *la soprano* ‘the.M soprano, the.F soprano,’ or *il chirurgo*, *la chirurgo* ‘the.M surgeon, the.F surgeon.’⁷

The same type of gender variation is attested with nouns ending in *-a* and *-e* as well, for instance, *l’artista bravo* ‘the-artist good.M’ vs *l’artista brava* ‘the-artist good.F,’ *il giornalista* ‘the.M journalist’ vs *la giornalista* ‘the.F journalist,’ and *il preside* ‘the.M head (of something)’ vs *la preside* ‘the.F head (of something),’ *il vigile* ‘the.M sentry’ vs *la vigile* ‘the.F sentry’.

Based on this data we can conclude that class marker and grammatical gender cannot correspond to the same grammatical representation because the same ending can correspond to either gender and either gender can be realized by any of the vocalic endings. It follows that if both gender and class marker are part of the morpho-syntactic module,⁸ they must be modeled as separate entities.

Interestingly, there is a class of nouns which challenges this conclusion, namely, nouns with endings that change depending on the natural gender of their referent.

⁵According to Ferrari-Bridgers (2007), 32% of Italian nouns in her database are feminine *-a* nouns and 32% are masculine *-o* nouns. Individual authors differ in how they treat ‘exceptions.’ While for Thornton Thornton (2001, 2003b,a) the exceptions are significant and require a separate treatment of class and gender, Ferrari (2005) and Ferrari-Bridgers (2007, 2008) believe that because the gender of 98% of Italian nouns can be predicted by hierarchically ordered rules (phonological, morphological, and semantic), gender does not need to be represented in the structure. Others, most notably Lampitelli (2010, 2014), assume that there is an isomorphic mapping between gender and vowel endings, that is, there are no exceptions. As we will see throughout this paper, not distinguishing between gender and class misses an important generalization.

⁶Throughout the paper I mark gender in glosses on elements that agree in gender with the noun in question. Abbreviations used in the paper: M: masculine, F: feminine, GEN: gender, NUM: number, SG: singular, PL: plural, CL: class, MN: mass noun.

⁷The agreement properties of nouns that may be grammatically feminine or masculine depending on the natural gender of their referent is complicated by various socio-linguistic factors, such as social prestige. I will discuss the variation in ending and agreement properties in detail in Section 2.7.

⁸I assume a Distributed Morphology style of grammar architecture (Halle and Marantz 1993); however, I will use the term ‘morpho-syntactic’ as a useful shortcut for syntactic features and representations which will play a role in the morphological realization module.

In these nouns, the so-called *mating nouns* of Harris (1991), the vocalic ending is strictly determined by the grammatical gender of the referent.⁹ More precisely, if a mating noun ends in *-o*, for instance, *il bambino*, *il ragazzo*, then it denotes a male or an underspecified individual. Thus, *bambino* denotes a baby boy or a baby, while *ragazzo* denotes a boy or a child in general. In contrast, *-a* versions of mating nouns strictly denote females. Thus, *la bambina* is the baby girl, and *la ragazza* is the girl.¹⁰

The attested pattern thus raises the following questions: (i) What is the relationship between grammatical and natural gender? (ii) What is the relationship between class marker and gender? (iii) Why, in some instances does natural gender ‘rewrite’ the nominal ending, while in others, it leaves it intact?

The rest of the paper is organized as follows. Section 2.1 will introduce a toy grammar of Italian nominal inflection. In order to minimize theoretical assumptions which might obscure some less obvious properties of the system, the account will first be somewhat naïve, becoming more refined as we consider more complex data, some of them being introduced as predictions of the system. The primary purpose of this section is to separate class as a strictly morpho-phonological reflex of the root lexical specification (analogically to the treatment of theme vowels in Oltra Massuet 1999, Embick and Halle 2005, Embick and Noyer 2007) from the gender and number that correspond to formal syntactic features. Crucially, the basic pieces introduced here will have major consequences for the overall architecture of the proposed model. Section 2.2 will introduce natural gender and argue that gender may come into the derivation either via the root or via D. That the value of the gender feature can come from two distinct places introduces non-trivial timing issues. 2.3 explores the two basic configurations and how they differ only in where these feature values come from. Section 2.4 investigates nouns strictly based on gender valued by D. Section 2.5 refines the distinction between the two sources of gender value by introducing PERSON into the system and by investigating the role of animacy. The two basic configurations differ in the amount of structural information that must be present in the lexicon. As we will see, only a subset of the nouns are formed by category-neutral roots. Section 2.6 looks closely at predictions stemming from this conclusion. Section 2.7 investigates socio-linguistic variation attested in the gender marking system and provides a crucial piece of evidence for the proposed distinction between variable binding

⁹The notion of mating nouns is related to Corbett’s notion of common gender. As the notion of common gender covers a wider range of phenomena, I will use the term mating noun only.

¹⁰See Percus 2011 for an extensive discussion of such examples.

and valuation by Agree. Section 2.8 comments on some predictions the system makes for V-N compounds.

A crucial assumption of the proposal is that unvalued ϕ -features are strictly introduced by D, and if they appear on lower functional heads, it is only by Feature Inheritance. Since, as we will see, features may be valued from two distinct places, D and the root, we expect to find evidence of Agree intervention. The ‘relational’ and mass nouns investigated in Section 3 show that this prediction is borne out. Section 4 concludes by addressing some cross-linguistic issues raised in the existing literature.

2 How many genders are there: A case study of feature valuation

2.1 Dissociating class marker and gender

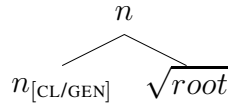
We have seen in the previous section that we need to dissociate the grammatical realization of gender and class marker (or at least the nominal vocalic endings) in order to account for the basic data patterns in Standard Italian. I argue that we will need to make one more distinction: we will need to distinguish between gender being an idiosyncratic part of the lexical specification and gender being introduced at the syntax-semantics interface. In order to see what type of grammatical restrictions the data patterns impose on us, I will first propose a toy grammar of the nominal inflection in Standard Italian. After I introduce the basic pieces, the next section will investigate how to add natural gender to the system.

The basic idea is this: if a class and/or gender value is idiosyncratic, then it needs to be associated with the root already in the lexicon, be it a valued feature of some sort or a lexical diacritic.¹¹ Consequently, such a root cannot be category neutral in the sense of Marantz (1997). Furthermore, if the valued feature appears on a higher functional head, it must have been valued by Agree.

Formally, such an idiosyncratic value might come about in two distinct ways. Either the root is stored in a lexicon as a nominal structure, i.e., a structure already

¹¹Embick (2000), Embick and Noyer (2007, and subsequent work) argue that even though the phonological form of a root is not syntactically represented, other properties, such as features, might be in principle accessible to syntax. See also Lowenstamm (2008) for an extensive argument isolating gender as being either on $\sqrt{}$ or very close to it.

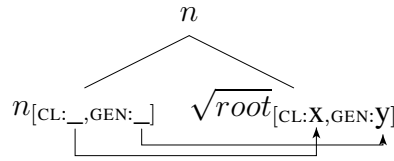
including category-defining n :



, or the root comes with a

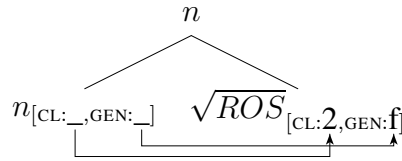
valued class feature/diacritic which will restrict which functional head will be able to combine with such a root, $\sqrt{root}_{[CL/GEN]}$.¹² As for the latter option, n would be merged in syntax (as category-defining n) and the class and/or gender feature value would be assigned via Agree:

(1)



For concreteness, if we assign *-a* nouns class value 2, a noun like *rosa* ‘rose,’ which is grammatically feminine would have the following representation:

(2)



I assume that the actual vocalic ending is inserted in morphology, with the morphological realization being determined by morphological mapping rules strictly based on the subset principle (Halle and Marantz 1993).¹³ The mapping rules need to reflect number, which we do not have in the system yet, but for now we can use something like (3).¹⁴ Note that the mapping rules reflect the intuition that the vocalic endings reflect the class, not the gender.¹⁵

¹²If c-selection can be reduced to Agree, such a diacritic needs to be modeled as some kind of feature, though it is not clear to me what type of feature it would be. Another option is that n would select a root based on a list of possible nominal roots. This would mean, however, that technically such a root would be category-neutral. In Section 2.6, we will see evidence that these roots indeed are not.

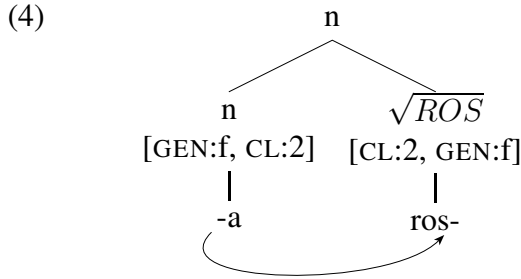
¹³Taraldsen (2009) argues based on dialectal data that the insertion rules should be superset based. As far as I can tell, the proposal predicts there should be a larger number of plural-ending combinations than empirically attested. Hence, the subset principle seems to be a better empirical fit for Italian.

¹⁴The rules miss an important generalization, namely, that only masculine *-o* nouns and feminine *-a* nouns end in plural in *-i*, while all other nouns have either no vocalic plural ending or end in *-e*. See Lampitelli (2010, 2014) for a detailed discussion of the attested patterns.

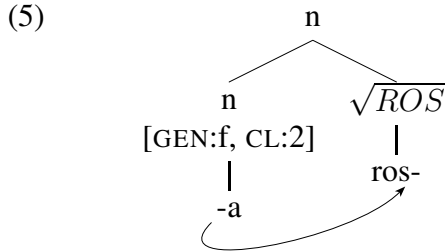
¹⁵The α feature specification is to solely indicate that the rule requires a gender specification,

- (3)
- a. [CL:1, GEN: α] \rightarrow -o
 - b. [CL:2, GEN: α] \rightarrow -a
 - c. [CL:3, GEN: α] \rightarrow -e
 - d. [CL:1, pl] \rightarrow -i
 - e. [CL:2, pl] \rightarrow -e
 - f. [CL:3, pl] \rightarrow -i

If we assume some form of morphological affixation (be it m-merger, affix hopping, or whatever bound morpheme procedure the reader prefers), we obtain the following structure for *rosa* ‘rose’:



If we assumed a structure with CL/GEN features on *n* being already valued in the lexicon, the structure for *rosa* would be as in (5).



As the reader can easily verify for herself, there is no difference between these two representations for the purposes of morphological insertion and feature interactions with a higher syntactic structure. In the remainder of the paper, I will use the simplified representation for the sake of clarity of presentation. In fact, if unvalued gender features are introduced to the derivation only by D, the simpler

but the actual value is irrelevant. I leave aside the exact feature representation needed for the α notation to be executable.

option is the only viable option. Unless, of course, category-defining *nP* forms a phase. Since I am not aware of any data that would directly bear on the question of the potential phasehood of *nP*, I will leave this question for future exploration. Note also that if the unvalued gender feature comes from D, it could not participate in c-selection (if indeed c-selection can be reduced to Agree, as argued for instance in Adger 2003).

Before we proceed, one clarification is necessary. Even though the class information needs to be structurally present (we'll see empirical evidence for this position in Section 2.6), it does not interact with syntactic features higher in the structure. Thus there is no reflex of class on any agreeing element either within the extended DP or outside. Furthermore, as pointed out by Lampitelli (2010), the vocalic ending of Italian diminutives is strictly based on grammatical gender, as in (6). This fact strongly suggests there is an adjacency requirement on the class realization.

(6) (Lampitelli 2010)

- a. rosa.F 'rose' / rose 'roses' → ros-in-a.F 'little rose'
- b. dente.M 'tooth' / denti 'teeth' → dent-in-o.M 'little tooth'
- c. film.M 'movie' / *filmi 'movies' → film-in-o.M 'little movie'

The data are thus in line with Oltra Massuet (1999), Embick and Halle (2005), Embick and Noyer (2007), Lampitelli (2010, 2014) and other work in Distributed Morphology that argues for class markers to be considered Theme vowels, which is to say, class markers are nominal diacritics, morphologically realized only at PF. Since this paper focuses on ϕ -features, I remain agnostic as to whether the relevant node is already present in syntax or whether it is inserted only at PF.¹⁶ The only necessary property is that the class diacritic must be 'visible' in narrow syntax, because as we will see in Section 2.6, nouns with a specified class feature are syntactically distinct from nouns that lack such a diacritic.

With this system in place, it is possible to predict that any combination of class and gender should be possible, as proves to be the case. Thus, we straightforwardly derive the possibility of having masculine *-o* nouns, masculine *-a* nouns, feminine *-o* nouns, feminine *-a* nouns, masculine *-e* nouns, and feminine *-e* nouns.

Though the current system copes well with the basic type of Italian noun, it raises some nontrivial questions. First, it is indeed the case that most *-o* nouns are masculine and that most *-a* nouns are feminine. In the proposed system, this

¹⁶For possible lists of vocabulary insertion rules see, for instance, Thornton (2001, 2009) and Ferrari-Bridgers (2007).

comes out as an accident. The issue can be technically amended if we assume that the morphological insertion rules for class markers follow a markedness hierarchy in the sense of Oltra Massuet (1999). There are three suggestive pieces of evidence supporting some form of a markedness hierarchy. As Thornton (2001) points out, following Vogel et al. (1983), masculine *-o* / *-e* endings tend to undergo phonological reduction, unlike their feminine counterparts, a fact which suggests that they are morpho-phonologically less marked. Furthermore, historically, noun classes in Proto-Indo-European were originally based on animacy; grammatical gender as a three-way distinction emerged only in their later development (Brugmann 1891, István 1959, Matasović 2004, among others). It is perhaps not so surprising that masculine and feminine nouns tended to cluster in major declension classes because the nouns would be less likely to get reanalyzed in the newly emerged grammatical gender system, and the data available to the synchronic learner thus come with a robust bias (see Lampitelli 2010 for a similar suggestion). The other concern is why purely gender based assignment rules, to be discussed in the next section, yield the same vocalic endings as the major declension classes. Though I do not have direct evidence for this, this correspondence might follow from the markedness hierarchy for vocabulary insertion of class markers as well. If indeed the rules jointly refer to class and gender, the gender-only rules are compatible with the markedness hierarchy. Finally, only nouns that end in a non-stressed vowel *-a*, *-o*, or *-e* are declinable in Standard Italian. Nouns that end in stressed vowels do not change their form from singular to plural: città ‘city.F,’ oblò ‘porthole.M,’ caffè ‘coffee.M,’ virtù ‘virtue.M,’ supplì ‘arancini.M’ (lit. on the phone) (Lampitelli 2010)

Yet, it is worth considering whether we might be able to get rid of the class marker altogether. The most obvious move to make would be to say that the vocalic ending is part of the root (or the stem) and there is only a gender feature associated with the root. We could then adjust our mapping rules so that no vocalic ending would be mapped onto *n* whenever the stem ends in a vowel.¹⁷ There are two reasons not to take this route. First, as we will see, the current system, unlike its class-less counterpart, is straightforwardly extendable to the existing variation discussed in Section 2.7. Furthermore, even though Italian has a default plural marker (*-i*), consonant-final loan words, i.e., loan words that cannot be associated with a class, cannot be overtly pluralized and remain undeclinable (**filmi*

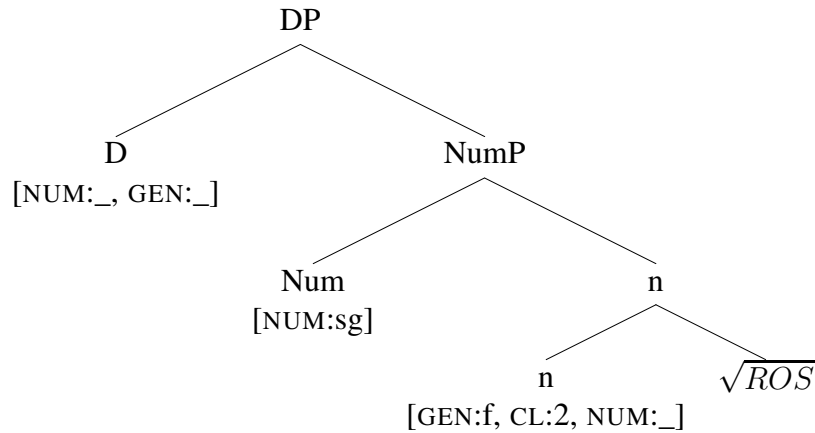
¹⁷Having the mapping rules sensitive to the phonological form of the stem is necessary because of mating nouns in which gender ‘rewrites’ the vocalic ending. If the rules were not sensitive to the phonological form, mating nouns would need to have consonant-final roots.

‘movies’). In the remainder of the paper, I will thus assume that there is a class marker in the structure as having the marker in the structure makes the discussion more transparent.

Before we start looking at interactions with natural gender, let us make sure we can build a complete DP out of the current structure. To obtain a complete DP, we need to merge at least Num and D projections (Ritter 1993, 1995, Borer 2005).¹⁸ Since D agrees in number and gender, it will need to have unvalued NUM and GEN features. For concreteness, we can assume that Num comes with a valued NUM feature from the lexicon, though we will need to revise this assumption in the next section, Section 2.2.¹⁹ Note also that I use simplified labels F/M and SG/PL in order to avoid for now the question of the exact feature geometry.

As for the technical details, let us assume downward probing Agree, with matching and valuation being distinct (Chomsky 2000, Adger 2003, Pesetsky and Torrego 2007).²⁰ The complete step-by-step derivation of *la rosa* ‘the.F rose’ is given in (7).

- (7) *la rosa* ‘the.F rose’: feminine -a noun
 a. feature distribution taken from the lexicon:

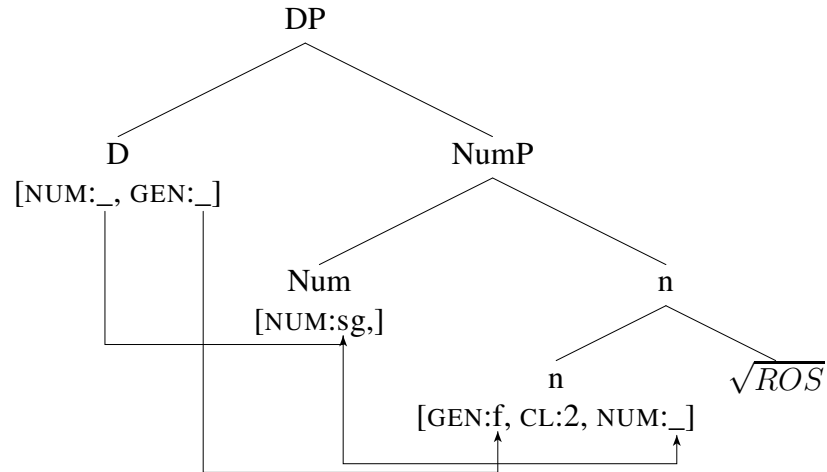


¹⁸Even though I follow Borer (2005) in her basic insights, I will not make use of her more fine-grained nominal structure.

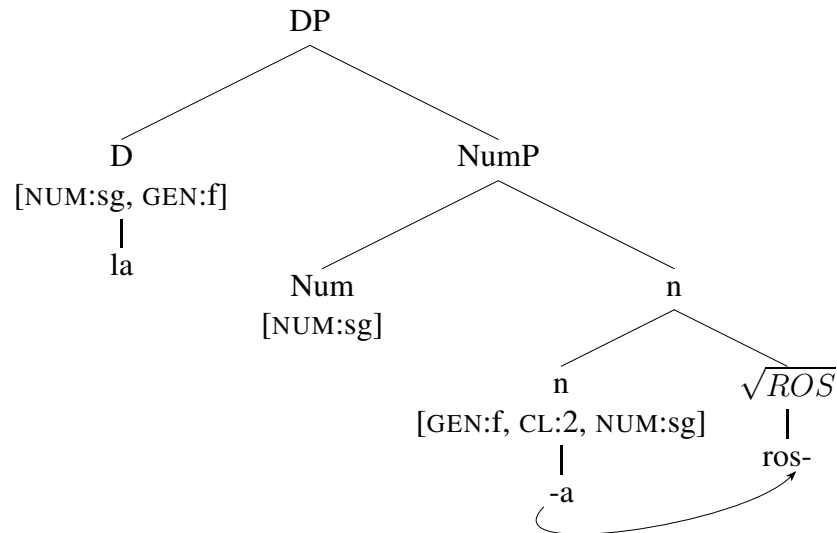
¹⁹We also need unvalued NUM feature on *n* in order to have a complete set of features required by the morphological mapping rules.

²⁰Note that with the system set up this way, ϕ -features need to probe separately because if we included a requirement on ϕ -completeness, nothing would ever get valued within a DP. (See Danon 2011 for a detail discussion of the issue of ϕ -completeness within DP.) However, once we introduce Feature Inheritance, we will be able to dispense with this stipulation. Note also that the proposed model crucially assumes that nominal concord relations, at least the relation between D and its complement, are based on Agree. But see Norris (1994) for an alternative view.

b. Matching:



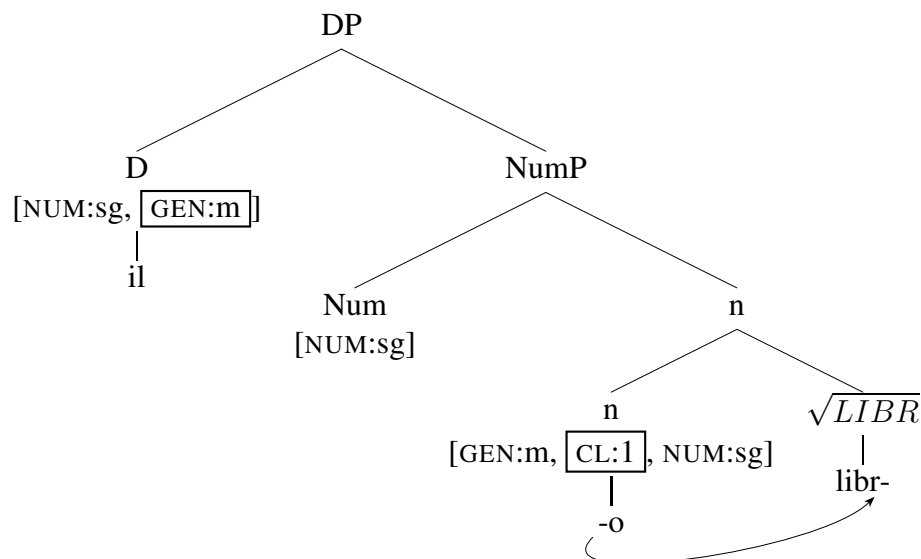
c. Feature valuation by Agree and morphological output:



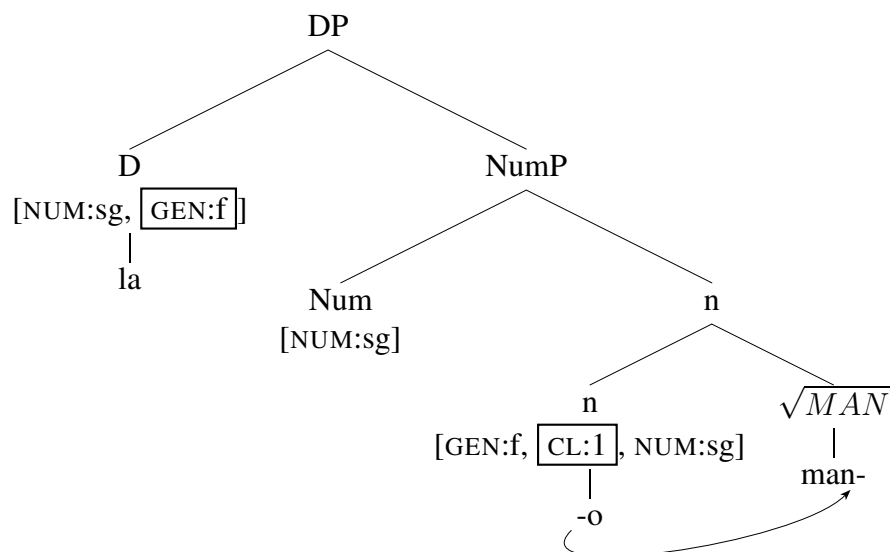
As the simplified derivations in (8)–(9) show, the same structure gives us a masculine *-o* noun such as *il libro* ‘the.M book,’ i.e., another case in which the vocalic ending seems to correspond to gender. In order to derive a feminine *-o* noun such as *la mano* ‘the.F hand,’ we only need to alter the value of gender on *n*. The boxes indicate which features are central to the morphological realization.²¹

²¹For clarity of presentation the boxes do not include the number features even though the

- (8) *il libro* ‘the.M book’: masculine -o noun



- (9) *la mano* ‘the.F hand’: feminine -o noun



To summarize the basic properties of our current toy grammar, we have seen that we need to separate gender and class. Even though they both need to be represented in the structure as they are crucial for morphological insertion, they number value is crucial for the morphological realization as well.

fundamentally differ in that only gender is a formal syntactic feature that interacts with the rest of the syntactic structure. Class does not interact with the structure beyond *nP*. The system thus crucially differs from other proposals for Standard Italian that assume that class is some PF feature, most notably Ferrari (2005), Ferrari-Bridgers (2007, 2008), Lampitelli (2010, 2014), but that do not make a strict dissociation between class and gender. Even though these systems do well with the subset of data they concentrate on, they do not extend to the more complex patterns to be discussed in next sections.

2.2 Natural gender and the issue of timing

The previous section cannot provide the full story, however, as there are nouns that come from the lexicon with an idiosyncratic class marker but have their grammatical gender determined by the natural gender of their referent. Thus there are *-o* nouns that can grammatically be either masculine or feminine, such as *il/la soprano* ‘the.M/F soprano’ and *il/la chirurgo* ‘the.M/F surgeon.’ The same gender duality is attested with *-a* nouns (for instance, *artista* ‘artist’ and *autista* ‘driver’) and *-e* nouns (e.g., *preside* ‘head (of something)’ and *vigile* ‘watch person’) as well. Furthermore, for some speakers, the grammatically masculine form of these nouns can refer to a female as well.

The basic intuition, I follow here, is that the grammatical value of gender may be determined either from the lexicon or from the context. The crucial observation is that the contextually determined gender (roughly, is the referent male or female?) may in some cases value a formal syntactic gender feature. That is, the gender of agreeing syntactic elements may be dependent on this contextually determined feature, as in *il.M chirurgo* for a male surgeon versus *la.F chirurgo* for a female surgeon. While in other cases, the noun phrase may remain grammatically masculine even if the noun phrase denotes a female. That is, for some speakers, *il.M chirurgo* can refer to a male or to a female surgeon, in parallel to a classic example from Corbett (1991): ‘The doctor said he/she could see me tomorrow.’

The data belong to a larger family of phenomena in which there is a difference between so-called grammatical and semantic/natural gender (Corbett 1991, Sauerland 2004, Wiltschko and Steriopolo 2007, Neeleman 2008, Matushansky 2013, among others), with some authors making an additional difference between lexical and referential gender (Dahl 2000, Wechsler and Zlatić 2000, 2003). A parallel distinction has been made in semantic literature on the ϕ -feature specification of pronouns and other anaphoric elements. The crucial observation here is that pronominal agreement and gender specification on pronouns is anaphoric,

but the source of the relevant antecedent is in principle twofold (Heim and Kratzer 1998): namely, the ϕ -feature valuation can be determined either from the structure (syntax), or from the context (Heim 2008, Spathas 2010, Sudo 2012, among others).²² In my analysis, I will follow the essence of the semantic approaches and tie these ideas to the existing syntactic analyses.

Let us start by making the following assumption: for the morphological form of a definite article to depend on a contextually determined gender, there must be a valued syntactic gender feature within the DP, and the syntactic feature value must match the contextually determined value.²³ Once we make this assumption, two questions arise: First, where is this formal feature located? Second, how does this formal feature get valued?

We have already seen that at least for some nouns gender is determined on the root²⁴ through the lexicon. However, if the gender value is contextually dependent, it cannot be determined on the root, unless we posit two distinct lexical entries – one for feminine, one for masculine. If the contextually determined gender is not on the root, it needs to be located somewhere within the extended nominal projection, either as a valued feature, or as a specified functional projection. This type of dissociation has been argued for in Sauerland (2004), Wiltschko and Steriopolo (2007), Kramer (2009), Wiltschko (2009), Matushansky (2013), Pesetsky (2013), among others. The authors differ in where exactly they posit the other gender location, with the two main candidates being *n*, most prominently in Kramer (2009), and *D*, as in Sauerland (2004).²⁵

I argue that at least in Standard Italian, the context sensitive gender value is assigned on *D*, thus siding with Sauerland (2004) and Wiltschko and Steriopolo (2007), but I differ from the previous proposals in that I argue that the formal gender feature, irrespective of whether it gets valued from the lexicon or via *D*, will end up being part of the same Agree chain. The logic of the argument will first be theory internal, but we will see in the next section that the theory makes correct predictions with respect to locality of agreement and with respect to potential defective Agree chains within a DP.

Once we posit *D* as the locus of the context-sensitive valuation, we can an-

²²Technically, the gender feature is construed as a variable, and its value is determined by an assignment function.

²³Without this feature the morphological component would not know whether to insert *il* or *la*.

²⁴By on the root I mean within the nominally specific structure stored in the lexicon, in the sense discussed in the previous section.

²⁵A notable exception is Wiltschko (2009) and subsequent work which argues that languages differ in the exact location of the contextually determined feature.

swer the second question, namely, how does the feature value get assigned? In other words, how can a formal syntactic feature be assigned a value from another grammar module? I argue that a formal syntactic feature can be assigned a context sensitive value only at the syntax-semantics interface. More precisely, I argue that the gender feature on D may be valued from the CI component at the point of Spell-Out. The Spell-Out is the only point during the syntactic derivation when a formal syntactic feature may be valued by the CI component, and consequently only an unvalued feature located on the phase head (D) is within the local domain of valuation by the CI component, here modeled as minimal search in the sense of Chomsky (2008, 2013) and Narita (2011). Crucially, if such a phase gets selected by a higher syntactic structure, the feature valued by CI will now be visible for Agree within the narrow-syntax derivation and may in turn value other instances of formal syntactic features.²⁶

If the locus of the semantic feature valuation is a phase head, one might wonder whether such a feature could be assigned to *n* head instead, assuming *n*P might be a phase as well (Kramer 2009). I will answer this question in more detail in section 2.5 where I discuss the role of animacy and Person, but the intuition behind the proposal is that only a complete DP can interact with natural gender because the assignment of the gender feature is tied to establishing a referent. Since *n*P does not denote an individual, the semantic component cannot associate *n*P with a natural gender feature. Formally, there is no feature on *n* that would trigger minimal search by CI. In contrast, the referential properties of D provide such a trigger. The technical distinction thus corresponds to the distinction between Spell-Out and Transfer (Chomsky 2008, 2013). While *n*P might be a complete unit from the point of view of narrow syntactic derivation, hence it might trigger Spell-Out, only DP forms a semantically complete unit, i.e., a structure that can be transferred to the interfaces (Larson 2011, Arsenijević and Hinzen 2012).

For concreteness, I follow the essence of the semantic literature on anaphoric pronominal valuation (Heim 2008, Spathas 2010, Sudo 2012, among others), and I argue that unless ϕ -features within DP are specified from the lexicon, they must be introduced by D. I model D as a bundle of ϕ -features where the individual features are variables bound within the structure or via the context.²⁷ I argue

²⁶Suggestive evidence for the phase head being the source of valuation comes from the fact that historically, gender marking on attributive demonstratives and determiners preceded agreement markers (Corbett 1991).

²⁷Using variable representations avoids some non-trivial difficulties associated with constructing context-dependent valuation as Agree. As we will see in Section 2.7, there are non-trivial differences between variable binding and valuation by Agree, but crucially they concern labeling

that in syntactic terms, binding such features corresponds to unvalued ϕ -features being valued. The critical distinction is whether the valued feature will come from the lexicon, or whether it will be determined by D accessing the value either from the syntactic, or from the non-syntactic context.²⁸ If ϕ -features appear on lower functional heads, aside from those introduced in the lexicon, it is by Feature Inheritance (Richards 2007, Chomsky 2008, and subsequent work). If the features are valued from the context, we will effectively obtain natural gender. In contrast, if the value of gender is determined in the lexicon, we will obtain grammatical gender. Crucially, there is no formal distinction between grammatical and natural gender features. In other words, while the source of valuation is twofold (the syntactic structure in the case of grammatical gender, the context in the case of natural gender), their locus is the same, i.e., both grammatical and natural gender enter the same Agree chain.

Interestingly, as I will show in Section 2.7, even though the locus of grammatical and natural gender is the same *within* a DP, the difference in valuation plays a critical role in the labeling of the nominal structure (Chomsky 2013).

Let us now turn to the syntactic derivation. Since the value of ϕ -features may be determined from the structure (where the value on n is obtained from the lexicon) or from the context, we need to make sure that the individual operations happen in the right order. I argue we need the following order of syntactic operations:

- (10) *The timing of syntactic operations:*
- (i) Merge of D
 - (ii) inheritance of unvalued ϕ -features from D onto lower functional heads
 - (iii) matching
 - (iv) valuation by Agree using features already present in the structure
 - (v) valuation of D from the context for the features that have not been valued yet
 - (vi) valuation by Agree of remaining features, simultaneous throughout

of the nominal structure (Chomsky 2013), not the Agree chain within the nominal structure.

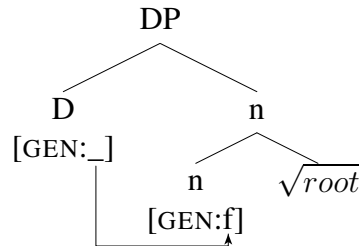
²⁸The proposed system might seem reminiscent of Collins and Postal (2012) and their idea that there might be a pronoun embedded within a syntactically larger DP. In the present proposal, however, there are no two distinct values of ϕ -features. The purpose of D being modeled as a bundle of ϕ -features is to have a formalization of how natural gender values might be made accessible to syntax proper. We will see more details on how exactly this is done in Sections 2.4 and 2.5.

the Agree chain

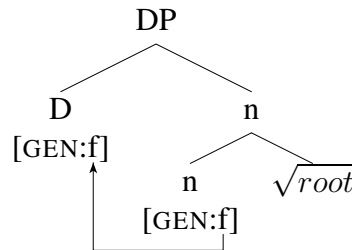
The two basic configurations of gender valuation within a DP are given in (11)–(12). I indicate the difference between grammatical and natural gender by adding an index to the feature valued by D.²⁹

(11) *Configuration I: Gender from the lexicon (n)*

a. Matching:

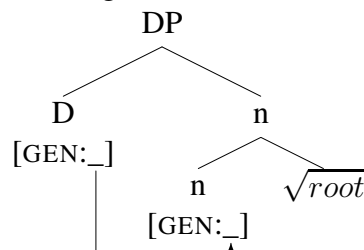


b. Valuation by Agree within the structure:



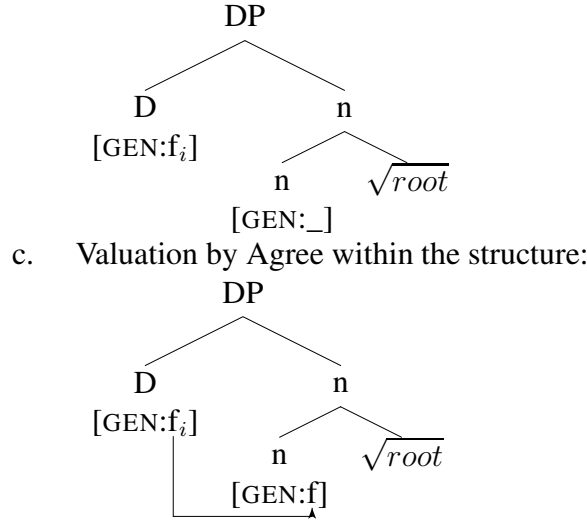
(12) *Configuration II: No gender from the lexicon (D)*

a. Matching:



b. No valuation within the structure, D valued from outside:

²⁹For now, I use the index only for explanatory purposes, however, as we will see in Section 2.5, the presence of the index indicates a [+PERSON] feature and is relevant for the semantic interpretation of the structure.



Note that even though we have discussed only gender, number should be modeled analogically to gender. While in most cases, the number on a nominal is determined from the context (either from the world of evaluation or from the syntactic structure), it may be determined from the lexicon as well, as in the case of pluralia tantum or grammatically plural mass nouns (Alexiadou 2011, Ouwayda 2014). I will not articulate the argument here, but from now on I will assume that number is indeed introduced by D as well. Which is to say, there is no point in the derivation when Agree takes place before the complete set of unvalued ϕ -features is introduced in the structure. Consequently, we can dispense with the worry expressed in the current literature (cf. Danon 2011), according to which ϕ -features in the DP domain are unlike ϕ -features in the CP domain in that each need to probe separately. Once we take the notion of Feature Inheritance seriously, ϕ -features in both of these domains can be modeled in an identical way.

The attentive reader might wonder whether the proposed system utilizes some notion of semantic agreement. Though it might superficially seem to be the case, so far the system is based strictly on the syntactic notion of Agree. As will become clearer once we discuss the implementation with concrete examples, the interpretive effect is restricted only to the LF interpretation of the referential index associated with the valuation from the context.

Finally, the proposal shares the basic insights of Wechsler and Zlatić (2000, 2003) who to my knowledge were the first to make a clear distinction between class (‘declension’), valuation within narrow syntax (‘concord’), valuation from the context (‘index’), and semantic interpretation (‘semantics’). Some of the dis-

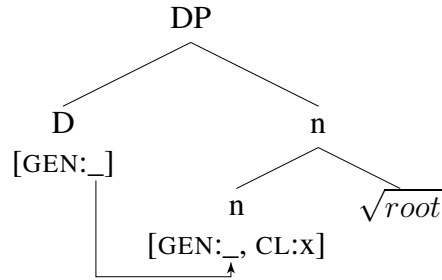
tinctions between their proposal and my proposal are solely attributable to differences in the architecture between HPSG and the Minimalist Program. Other distinctions, however, are more fundamental, such as differences in the lexicon representation, to be investigated in the rest of this section, and interactions between gender and number, to be investigated in Section 3.

2.3 Gender-class interactions

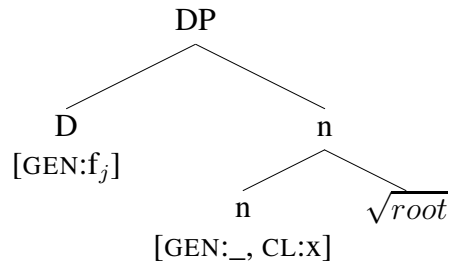
As we have seen, the current system utilizes two basic configurations for Italian nominal inflection: one with the value of gender being determined from the lexicon, and one with the value being introduced by D. The structure in (11) corresponds to the cases we have investigated so far (*il libro, la rosa, . . .*). The structure in (12) schematizes what happens when gender is not determined from the lexicon but is determined by D instead. The structures are simplified in that they do not take the role of the class feature into account. We will turn to the interaction of class and gender in this section.

There are two basic sub-configurations of (12) to consider. In the first one, even though there is no gender value from the lexicon, the root structure comes with a class feature. With the morphological mapping rules introduced in (3) and repeated below, we expect no change in the form of the noun itself, as the vocalic ending is determined by the class. In contrast, the determiner and other agreeing elements should reflect the gender value introduced by D. A schematic representation for such a configuration is given in (13). As before, the features crucial for morphological insertion are indicated by boxes.

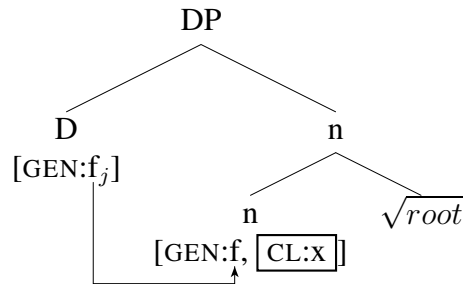
- (3) a. [CL:1, GEN: α] \rightarrow -o
 b. [CL:2, GEN: α] \rightarrow -a
 c. [CL:3, GEN: α] \rightarrow -e
 d. [CL:1, pl] \rightarrow -i
 e. [CL:2, pl] \rightarrow -e
 f. [CL:3, pl] \rightarrow -i
- (13) *Configuration IIa: No gender but class from the lexicon*
 a. Matching:



- b. No valuation of gender within the structure, D valued from outside:



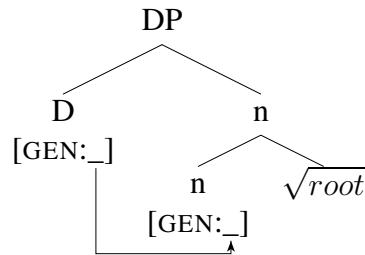
- c. Valuation by Agree within the structure:



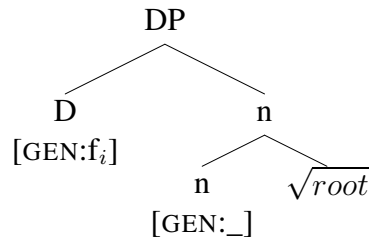
In contrast, the system predicts that if there are nouns formed by category-neutral roots (i.e., roots that have neither a gender feature nor a class marker determined in the lexicon), their morphological form, including the vocalic ending on the noun itself, should be determined solely by the gender value brought to the structure by D. Such a configuration is schematized in (14).

- (14) *Configuration IIb: No gender or class from the lexicon (D)*

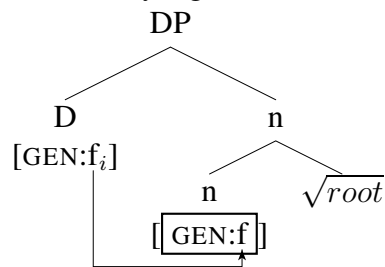
- a. Matching:



- b. No valuation within the structure, D valued from outside:



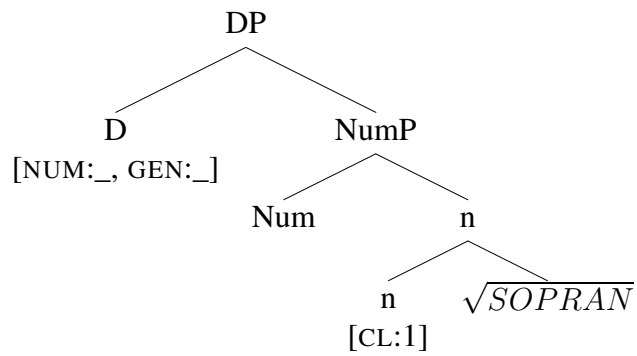
- c. Valuation by Agree within the structure:



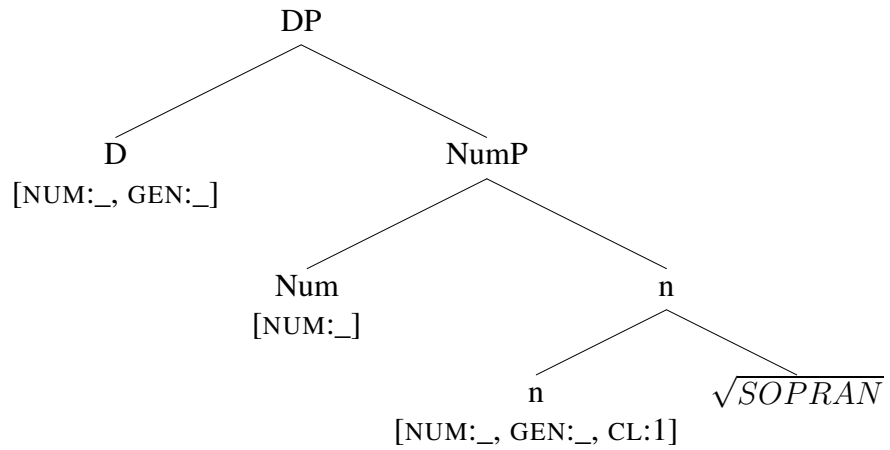
Both of these configurations are empirically attested. The configuration in (13) corresponds to nouns like *soprano*, i.e., nouns for which grammatical gender is dependent on the natural gender of the referent but the form of the noun itself remains unaltered. A detailed derivation of *il soprano* is given in (15). The parts crucial for morphological realization are again indicated by boxes.

(15) *il soprano* ‘the.M soprano’

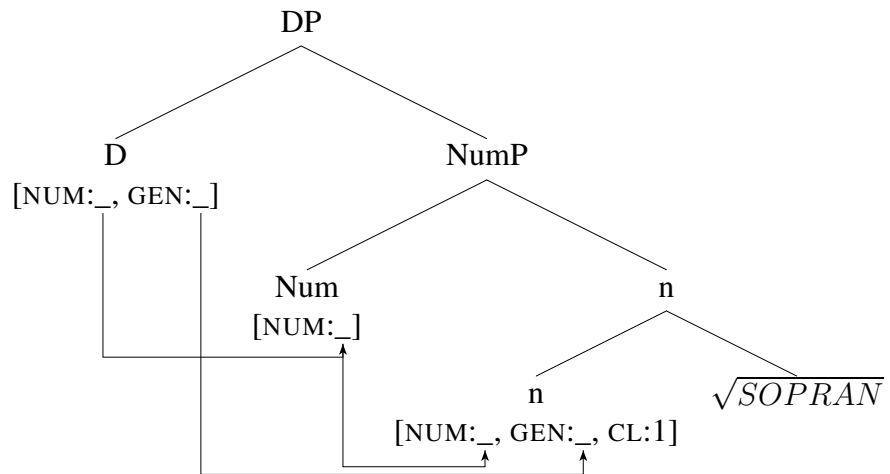
- a. feature distribution taken from the lexicon:



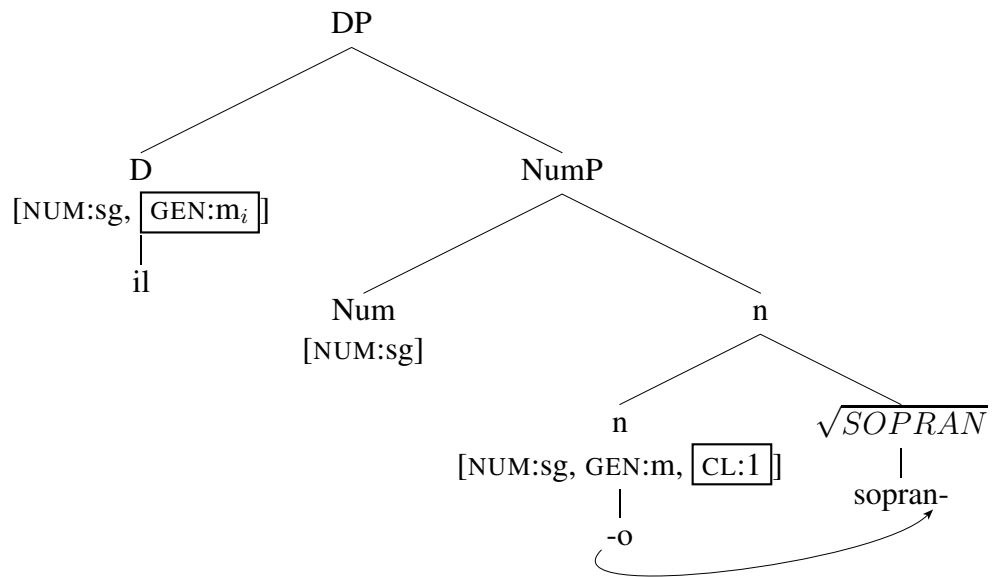
- b. feature distribution after feature inheritance takes place:



- c. Matching:

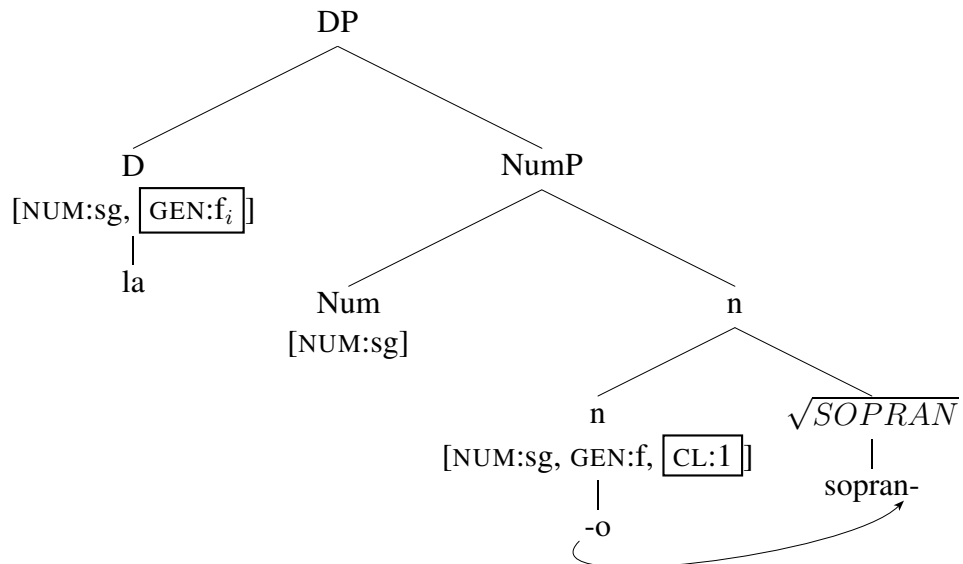


- d. Feature valuation and morphological output:



A simplified derivation of the feminine version of *soprano*, i.e., *la soprano* ‘the.F soprano’ is given in (16). The only difference in the derivation is that this time the gender feature on D gets valued as feminine.

(16) *la soprano* ‘the.F soprano’



In all of these configurations, agreement with the rest of the syntactic structure is strictly determined by the value of the gender feature introduced by D.

2.4 When gender trumps class: mating nouns

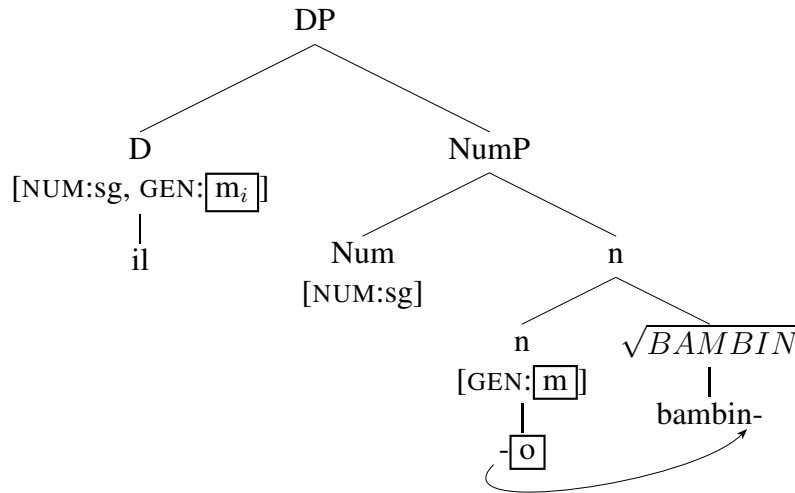
Let us now turn to nouns corresponding to (14). These are nouns with no gender or class feature determined from the lexicon. Since D introduces only ϕ -features to the structure, there should be no class marker in the structure. Instead we expect the vocalic ending to be strictly determined by gender, i.e., the vocalic ending is the exponent of a gender feature. This is exactly what we find with so-called mating nouns, i.e., nouns whose vocalic endings are dependent on the natural gender of their referent, such as *il bambino* ‘the.M baby/baby boy’ vs *la bambina* ‘the baby girl,’ *il ragazzo* ‘the.M kid/boy’ vs *la ragazza* ‘the.F girl’.

In order to account for the morphological realization, we need to expand our set of mapping rules for n to include rules sensitive to gender. The most straightforward way to account for the data is to posit a set of rules such as those given in (17).

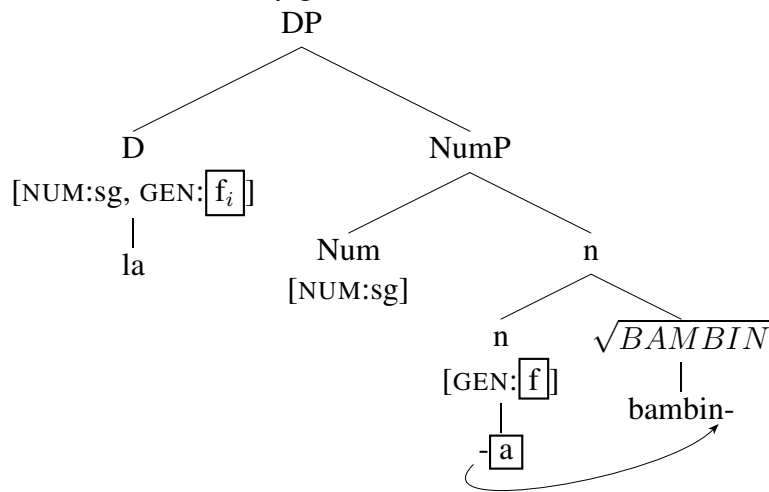
- (17) *Mapping rules for n*
- a. [CL:1, GEN: α] \leftrightarrow -o
 - b. [CL:2, GEN: α] \leftrightarrow -a
 - c. [CL:3, GEN: α] \leftrightarrow -e
 - d. [GEN:m] \leftrightarrow -o
 - e. [GEN:f] \leftrightarrow -a

With such mapping rules and the current system in place, we straightforwardly derive the alternation attested in mating nouns, as the reader can verify for herself in the simplified structures in (18) and (19).

- (18) *il bambino* ‘the.M baby/baby boy’



(19) *la bambina* ‘the.F baby girl’

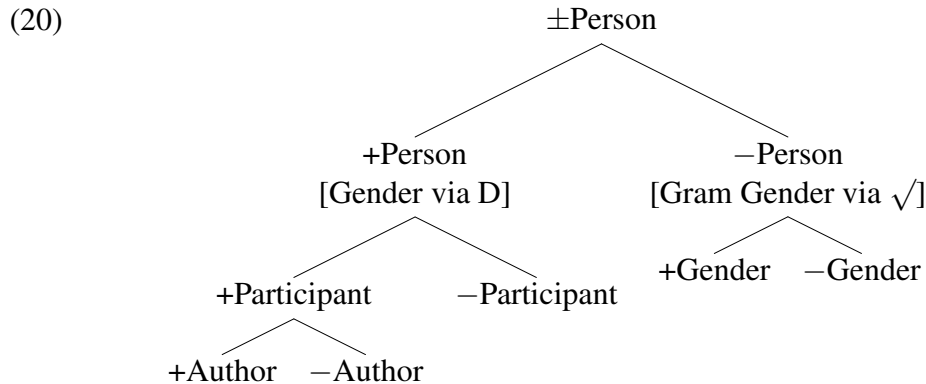


2.5 When Person becomes animate

We currently have two sources of gender valuation: the gender value can be either determined idiosyncratically from the lexicon, or it may be supplied by D. Interestingly, D seems to provide the gender value only if D refers to an animate referent. In other words, whenever D is the source of valuation, it is animate. In order to understand the connections we first need to look more closely at the

relation between Person and animacy. Once we establish this formal connection, I will propose a particular formal interpretation of gender and Person which will make it possible to derive gender valuation as being dependent on Person.

There is a line of research that argues that only 1st and 2nd person corresponds to [+PERSON] feature, while 3rd person does not have a feature representation (Kayne 2000, Bobaljik 2008, among others). However, this position has been disputed by other authors who argue that 3rd person needs to be represented by a feature. As Nevins (2007) observed, certain morphological insertion processes would not be possible if there was no feature representation of 3rd person in the syntactic structure. Consequently, the empirically adequate representation of 3rd person needs to refer to some form of [\pm PARTICIPANT] feature. This position is supported by a growing body of research investigating empirical phenomena in which animate 3rd person DPs pattern together with 1st and 2nd person to the exclusion of inanimate 3rd person (Ormazabal and Romero 1998, 2007, Adger and Harbour 2007, Trommer 2008, Lochbihler 2012, Ritter 2014, Ritter and Wiltschko 2014, Welch 2014, Lochbihler and Oxford 2015, among others).³⁰ Following this work, I argue that the seeming effect of animacy for gender valuation in Standard Italian in formal terms corresponds to animate 3rd person DPs being [+PERSON]. Consequently, we can assume the following feature hierarchy:³¹



How does this hierarchy help with the question of valuation of context-dependent gender? The guiding intuition is that the identity of the object may be used to assign a natural, i.e., context-dependent, gender only if D can be associated with

³⁰A recent theory internal argument for 3rd person to have a feature based on inherent properties of binary features can be found at Watanabe (2013).

³¹The basic shape of the proposed hierarchy follows the tradition of Harley and Ritter (2002). Note, however, that for Harley and Ritter (2002) only inanimate nouns have gender.

an animate object. In more technical terms, whenever D is the source of the gender value, D is valued for PERSON. Yet, not every animate noun gets its gender assigned from the context. In fact most of them get their grammatical gender from the lexicon.

To resolve this tension, I argue that the context-dependent gender valuation is a side-effect of licensing the [+PERSON] by CI at the point of Spell-Out. More precisely, the [+PERSON] feature must be valued by minimal search from CI as part of identifying the [+PERSON] feature with a referential index (*i*) which in turn can license the [\pm Participant] value. This formally corresponds to saying that [+PERSON] feature on D is licensed by a referential index (*i*) via minimal search by CI. As for the context-dependent gender valuation, I will treat it as a free rider on the referential feature licensing, but to justify this move we need to dive a bit into semantics.³²

Sauerland (2004) and Matushansky (2013) independently proposed that valuation of context-dependent gender features is driven by the semantic component. Interestingly, semantic treatments of gender do not interpret gender directly, but instead they treat it as a presupposition associated with an assignment index (in simple terms, as a pointer to the actual referent). A plausible semantic denotation of masculine and feminine gender is given in (21).

- (21) (modeled after Heim and Kratzer 1998, Sudo 2012)
- a. $\llbracket [\text{GEN:f}_i] \rrbracket^{w,g} = \llbracket \text{she}_i \rrbracket^{w,g} = \llbracket \text{herself}_i \rrbracket^{w,g} = g(i)$ if $g(i)$ is female in w , undefined otherwise
 - b. $\llbracket [\text{GEN:m}_i] \rrbracket^{w,g} = \llbracket \text{he}_i \rrbracket^{w,g} = \llbracket \text{himself}_i \rrbracket^{w,g} = g(i)$ if $g(i)$ is a person in w , undefined otherwise

The semantic formula asserts that a feminine feature associated with index *i* will denote a female person only if the referent associated with the index is indeed a female. For its masculine counterpart the formula asserts, that such an index will denote a person only if the individual the index points to is indeed a person.

Since the interpretation function in (21) ultimately interprets a referential index associated with the gender (*i*), not the actual gender feature, it will return a semantic denotation corresponding to natural gender only if D is valued as [+PERSON] and if this feature is licensed by CI. In other words, the gender fea-

³²An interesting corroboration of the hypothesis that [+PERSON] requires licensing by CI comes from Bhatt and Šimík (2009). They argue that bound pronouns, unlike their free counterparts, have a larger syntactic structure. They tie the structural difference to a [+PERSON] feature and suggest that this feature needs to be bound.

ture is going to be semantically interpreted only if the interpretation is a side effect of interpreting the referential index associated with the [+PERSON] feature. If the gender feature is assigned from the lexicon, it will not be semantically interpreted because it lacks the index.³³ Note also that while the denotation specifies feminine grammatical gender as denoting a female, the masculine gender is in principle compatible with both natural genders. This is exactly what we find in Standard Italian.³⁴ Thus, feminine *la soprano* ‘the.F soprano’ must denote a female, whereas *il soprano* ‘the.M soprano’ may denote a person of either gender.³⁵

Note that since we allow both types of gender features to enter the same Agree chain, the system ensures that they do not get interpreted more than once. Only gender features that correspond to the biological gender of the referent must be semantically interpreted. More precisely, not grammatical gender introduced in the lexicon but only gender associated with the [+PERSON] feature and a referential index will get interpreted.³⁶

The strict ordering of feature valuation from the lexicon and from D/CI ensures that the formal gender feature would have only one value, i.e., the context-dependent value is generated only if the gender feature on D was not previously valued by the root (from the lexicon), thus capturing Matushansky’s intuition that semantic gender features are last resort. Yet, one may wonder what exactly happens if the grammatical gender and the gender implied by the referential index are not identical. Section 2.7 will consider such cases. The other question that arises is why the gender features need to be inserted at all. I would like to suggest that the context-dependent valuation of gender features in the structure follows from the Maximize Presupposition principle of Heim (1991). The principle asserts that if there is a presupposition associated with a structure and if this presupposition can be grammatically realized, it must be realized. Since the semantic gender features are presuppositional, insertion of grammatical gender features as last resort satisfies this principle.

Note also that the proposed implementation sheds light on the traditional distinction between so-called animate and inanimate gender. Technically, animate gender is a gender feature which requires the co-occurrence of a [+PERSON] fea-

³³Though it might obtain a natural gender interpretation indirectly from the lexical semantics of the root.

³⁴The proposed asymmetry only holds for the semantic interpretation. There is nothing in the proposed system which would make F syntactically marked.

³⁵The preference for masculine gender being interpreted as a male in certain contexts presumably results from a Gricean reasoning.

³⁶See also Bobaljik and Zocca (2011) for a related set of facts.

ture. Inanimate gender lacks this co-occurrence requirement. In the next section, we will investigate how exactly the co-occurrence restriction interacts with the rest of the structure.

Finally, let us consider the properties of the gender feature if D is valued for [−PERSON]. In this case, the gender of the nominal is either determined by a gender value on the root, or it is the morphological default, i.e., [−GENDER], which in Italian corresponds to masculine.³⁷ I will keep using the labels masculine and feminine in the rest of the paper, but the markedness of feminine and the dependency of the gender on D and Person will be relevant for the predictions made by the system.

2.6 Predictions: category neutral roots

Before we continue refining the current system, it is useful to consider some robust predictions the system makes to ensure that the proposed implementation is in principle on track. First of all, the current proposal makes a clear prediction that some roots should come from the lexicon as being specified for nominal features, while others seem to be category neutral. Since only mating nouns are based on category-neutral roots (as they do not carry any idiosyncratic marking from the lexicon), only mating nouns should have corresponding verbs derived from the same root have no special verbal derivational morphology, i.e., derived only by the default inflectional suffix *-are*. This prediction is borne out. As far as I have been able to establish, there are no verbs based on the roots of nouns that carry a class marker, as approximated in (22).³⁸ In contrast, mating nouns tend to have

³⁷Thornton (2001) gives examples such as those in (i) as an argument for masculine to be the default gender in Italian. As we see, if there is no ϕ -bundle in the structure that could serve as the goal for ϕ -Agree, the agreeing elements default to masculine.

- (i) a. Andare a scuola è bello/ noioso/ faticoso
to-go to school is beautiful.M/ boring.M/ hard.M
'Going to school is beautiful/boring/hard.'
b. È vero che Gianni è partito.
is true.M that John is left
'It is true that John left.'

(Thornton 2001, 483, (2))

³⁸Some of these pairs might be excluded on semantic grounds. What matters though is that I am not aware of *any* verb based on the same root as class-marked nouns (putting aside denominal verbs derived by specialized verbal morphology).

verbal counterparts, as seen in (23), based on examples from Fabrizio (2013).³⁹

- (22) *Noun-verb pairs based on category-specific roots are nonexistent*
- a. il libro ‘the book’ ↔ *librare ‘to book’
 - b. la rosa ‘the rose’ ↔ *rosare ‘to rose’
- (23) *Noun-verb pairs based on category-neutral roots*
- a. la sposa ‘the bride,’ lo sposo ‘the groom’ ↔ sposare ‘to marry’
 - b. il figlio ‘the son,’ la figlia ‘the daughter’ ↔ figliare ‘to give birth’
 - c. l’astrologo, l’astrologa ‘astrologer’ ↔ astrologare ‘to practice astrology’
 - d. il monaco ‘the monk,’ la monaca ‘the nun’ ↔ monacare ‘to put someone into a convent, to make him/her become a monk/nun’
 - e. il commissario, la commissaria ‘commissioner’ ↔ commissariare ‘to put under a commissioner’

Another prediction concerns loan words. If a loan word ends in a consonant, it cannot be associated with any class marker.⁴⁰ By the same logic, such a loan word cannot be associated with a gender from the lexicon either. Consequently, consonant-final loan words should be based on category neutral roots. Furthermore, if they denote objects, they cannot have their gender assigned by D. In turn, they should be realized with a default grammatical gender, namely, masculine. In other words, the system predicts that consonant-final loan words should be masculine and that they should be able to have verbal counterparts derived without specialized verbal derivational morphology. Both of these predictions are borne out, as witnessed by the examples in (24).⁴¹

³⁹Not all mating nouns have a verbal counterpart, but I assume this is because of additional restrictions, such as the semantic interpretation of the root. The crucial point here is that there are some that do.

⁴⁰Note that this follows only if class marker is indeed a separate entity, not if the vocalic ending is part of the root/stem.

⁴¹Another prediction concerns incorporated objects. According to Espinal and McNally (2011) certain verbs in Spanish and Catalan incorporate their objects, which is to say, the objects lack the D functional layer. Italian seems to have the same structural possibility. The prediction is clear. If the incorporated objects are NPs, we should never find nouns with a vocalic ending determined by D in them. Thus we expect to find *cercando avvocato.M* ‘I look for a lawyer’ or *avere bambino.M* ‘I want a baby’ but not *cercando avvocat.F* ‘I look for a female lawyer’ or *avere bambina.F* ‘I want a baby girl.’ Even though a google search confirms the prediction (the search returned thousands of instances of the -o versions but not a single one -a version), my preliminary fieldwork was not conclusive as my speakers strongly preferred forms like *avvocatessa* to *avvocata*, and in general

(24) *Loan noun-verb pairs based on the same root*

- a. il chat ‘the.M chat’ ↔ chattare ‘to chat’
- b. il film ‘the.M film’ ↔ filmare ‘to film’
- c. il blog ‘the.M blog’ ↔ bloggare ‘to blog’

2.7 Valuation from the context vs valuation from the lexicon: a case study from socio-linguistic variation

As I mentioned in footnote 7, there is a persistent gender and agreement variation in the domain of names of professions. There is sociological prestige traditionally associated with the noun being in some grammatical sense masculine even if the profession is currently performed by women, such as *l’avvocato* ‘the.M lawyer,’ *il chirurgo* ‘the.M surgeon,’ and *il ministro* ‘the.M minister.’ While the sources of the variation, the variation’s extent and an accurate empirical description go beyond the scope of this paper, the proposed system sheds light on the attested variation, and, in turn, it allows us to investigate intricate interactions between natural and grammatical gender. As we will see, the data provide empirical support for distinguishing variable binding (here modeled as a result of labeling by minimal search in the sense of Chomsky 2013) and valuation by Agree.⁴²

Feminine versions of masculine nouns in Standard Italian may be formed either with the feminine derivational suffix *-essa*, or with the inflectional morphology we investigate here.⁴³ That is, the original grammatical gender value from the lexicon is reanalyzed by some speakers so the noun denotation can accommodate the current female uses.⁴⁴ Consequently, there are in principle three possible forms of an originally masculine noun formed by the *-o* class marker if such a noun denotes a female, i.e., if it is valued for [+PERSON] and if the gender value can be derived from the referential index associated with [+PERSON] licensing. The first option is the most conservative one, i.e., a noun that is stored in the lexicon with its class and gender feature already valued (25a). The second option is

found incorporated objects to be restricted to only a few lexical items.

⁴²Some of the variation described in this section has been noted in Thornton (2009). I am not aware of any theoretical linguistics contribution that considers the full range of the facts.

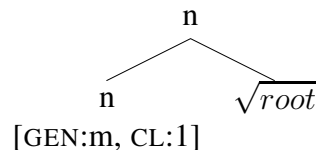
⁴³For instance, there are three distinct feminine counterparts of the noun *avvocato* ‘lawyer.’ Even though there is a designated feminine form derived by a feminine derivational morpheme *-essa*, *avvocatessa*, some speakers strongly prefer *avvocata* or *avvocato*.

⁴⁴To investigate how exactly such a reanalysis happens goes beyond the scope of the paper. The focus here is solely to provide a synchronic model that can accommodate the existing variation, while excluding non-attested options.

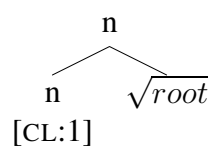
semi-conservative in that such a noun retains the class value in the lexicon but the gender is strictly determined by D, (25b). The third option, let us call it liberal, is that neither class nor gender is stored in the lexicon (25c).

(25) *Possible representations taken from the lexicon*

a. Conservative:



b. Semi-conservative:



c. Liberal: \sqrt{root}

Let us start with the liberal option. This option corresponds to a mating noun, i.e., a noun that has its form and gender fully determined by the gender of its referent (and has no gender or class specification assigned from the lexicon). Speakers whose lexicon contains this option thus produce *il ministro*, *la ministra* ‘the.M minister, the.F minister,’ *il soprano*, *la soprano* ‘the.M soprano, the.F soprano,’ *l’avvocato*, *l’avvocata* ‘the.M lawyer, the.F lawyer’.⁴⁵ Consequently, since D is valued only for natural gender, any agreeing elements in the structure will agree with this gender. Thus we get *il soprano bravo* ‘the.M soprano good.M’ and *la soprano brava* ‘the.F soprano good.F.’

We have seen the semi-conservative option as well. This is how we derived the contrast between *il soprano* and *la soprano*, i.e., nouns that do not store gender in the lexicon but still retain their class marker. Again, as with mating nouns, such nouns have the gender value on D determined by their referent, and agreeing syntactic elements agree with this gender. Thus we get *il soprano bravo* ‘the.M soprano good.M’ and *la soprano brava* ‘the.F soprano good.F’.

Finally, let us consider the conservative option. This is a noun which comes from the lexicon with a valued gender feature and a class marker. On the surface,

⁴⁵Since these nouns are based on category-neutral roots, one expects that they might have a verbal counterpart. This is partially confirmed as there is *avvocatare* ‘to practice law,’ but I have not found any other verb of this sort. Note though that this might be simply because this is a rather small group of nouns, and not all of them are compatible with a verbal interpretation. In addition, the relevant form might have already been lexicalized with a distinct meaning, such as *ministrare* which means ‘to give food to someone.’

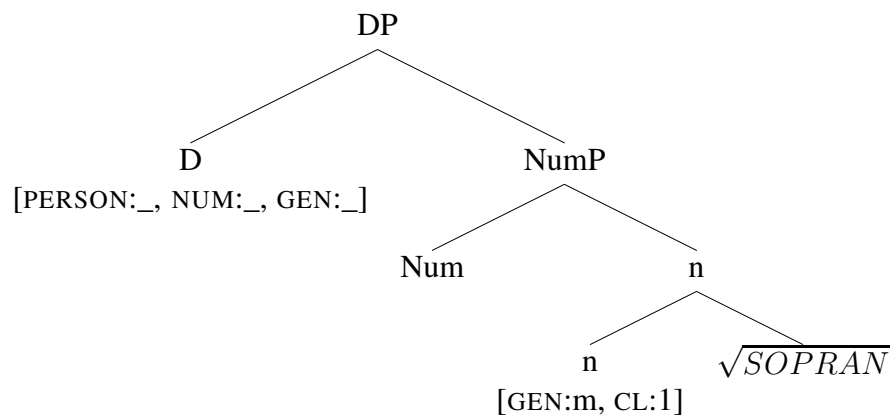
such a noun looks exactly like *il libro* or *la rosa*, i.e., a noun whose behavior is strictly determined by the values taken from the lexicon. However, if such a noun denotes a person, it will also have the [+PERSON] feature on D. Since the person feature is a potential source of an additional value of gender, we need to look at the structure more closely, and indeed, as we will see, this structure is critical for our investigation.

Recall that in Section 2.2 we proposed the following order of syntactic operations:

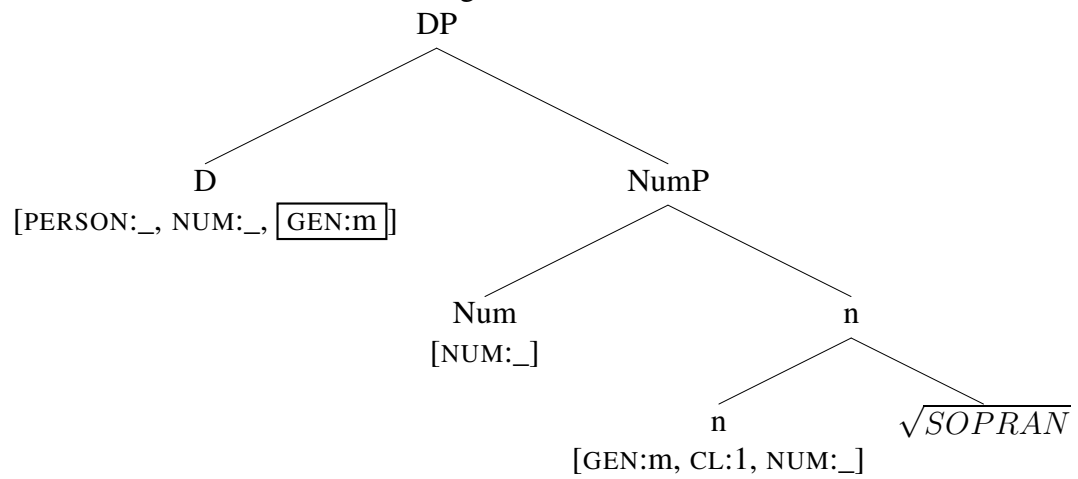
- (10) *The timing of syntactic operations:*
- (i) Merge of D
 - (ii) inheritance of unvalued ϕ -features from D onto lower functional heads
 - (iii) matching
 - (iv) valuation by Agree using features already present in the structure
 - (v) valuation of D from the context for the features that have not been valued yet
 - (vi) valuation by Agree of remaining features, simultaneous throughout the Agree chain

This order predicts that the gender value on D will be determined by the feature value on the root before D may be valued from outside. Consequently, the gender relevant for morphological insertion will be the gender from the root, irrespective of the gender valued by D. The individual derivational steps are schematized in (26). Note that there is a potential tension in the structure: the gender feature chain within the DP is strictly valued as masculine. Yet, if we were to consider the gender feature derivable from the [+PERSON] feature, it could be feminine. I mark the potential for the PERSON-related gender valuation by the subscript *f* on the PERSON feature.

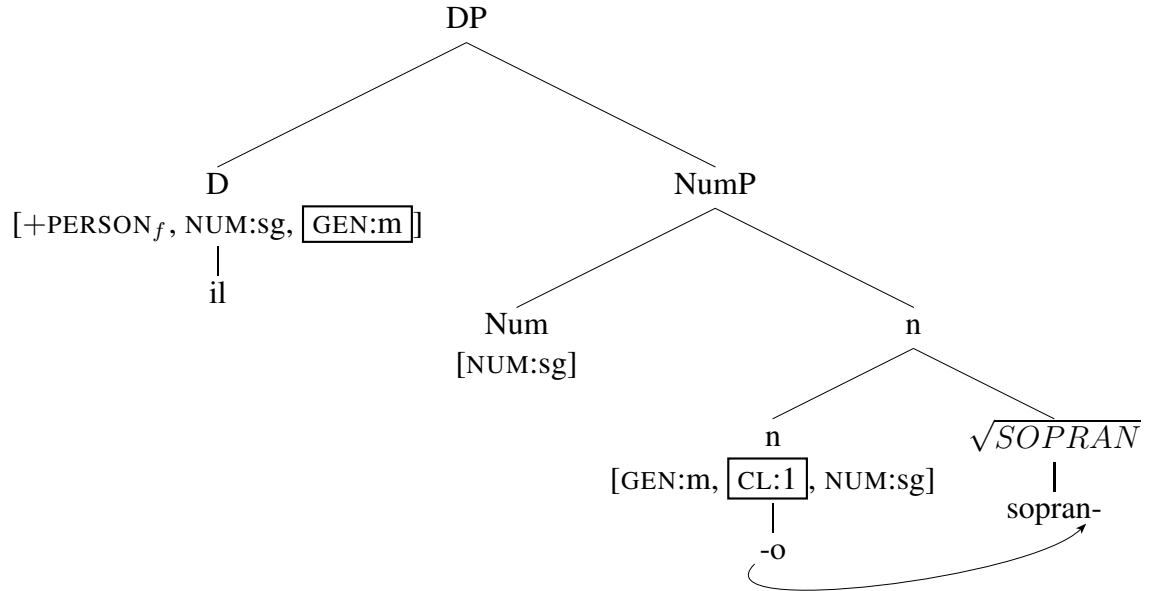
- (26) a. feature distribution from the lexicon:



b. Feature inheritance and Agree:



c. D valued from outside and the morphological output:



One way to understand this configuration is that even though such a noun is masculine with respect to its internal structure, its feature composition is ambiguous for the purposes of outer Agree probing. I argue that the gender value introduced by D is structurally more prominent because it is induced by the [+PERSON] feature. I argue that technically this is a result of the labeling of the completed DP structure by minimal search in the sense of Chomsky (2013), a process during which the PERSON feature and its associated gender feature will be visible to the search procedure, while its counterpart, taken from the lexicon, will remain muted for the purposes of the minimal search (Chomsky 2013). More precisely, I assume, in agreement with much of the recent work on ϕ -feature Agree, that ϕ -feature Agree is a free rider on the presence of a valued PERSON feature. Thus, the minimal search procedure identifies the PERSON feature and labels the DP structure by this feature. If such a DP becomes a probe the PERSON feature will value the PERSON feature on the probe and this valued PERSON feature will in turn trigger ϕ -feature Agree. Consequently, outer elements, such as predicative adjectives, can in principle agree with the gender value introduced by PERSON.⁴⁶

⁴⁶Note that the valuation by labeling as minimal search by CI derives a similar effect as the proposal made in Norris (1994). Norris argues that concord in nominal structures needs to refer to values at extended maximal projections. If extended maximal projections correspond to phases, we obtain the same restriction on locality domains. A careful comparison of the similarities and

This seems to be correct. While prescriptive grammars require *avvocato* to be grammatically masculine even if the noun refers to a female, feminine agreement is common, as witnessed by following examples from the internet: *brava avvocato* [...] *una donna meravigliosa*... (Facebook; accessed on April 16, 2014); *brava avvocato, grazie di causa*... (Twitter, February 2013). The same fact is acknowledged by other sources, such as the Enciclopedia Italiana di scienze, lettere ed arti, which gives the following examples of possible gender mismatch *il soprano è andato* vs *il soprano è andata* or *la soprano è andata*, i.e., both the determiner and the participle can be masculine (*il* ... *andato*), or they both can be feminine (*la* ... *andata*), or the determiner may be masculine but the participle feminine (*il* ... *andata*). Similarly, grammatically feminine nouns such as *la sentinella* ‘the.F guard’ may trigger masculine agreement if they denote a male person. A Google search for examples, such as *sentinella coraggiosa* ‘guard.F brave.F’ and *sentinel coraggioso* ‘guard.F brave.M,’ further confirms this prediction.⁴⁷

A related fact that supports the context-valuation by CI being accessible for external syntactic operations comes from Ferrari-Bridgers (2007). She observed that if grammatically feminine nouns like *guida* ‘guide’ or *guardia* ‘guard’ appear in a nominal conjunction, they trigger context-dependent agreement. The switch is demonstrated in (27). While for Ferrari-Bridgers (2007) the data mean that these type of nouns are underspecified for gender, I argue that the pattern provides additional evidence for the dissociation between gender being valued from the lexicon and gender being valued by CI. Since conjunction forms a plurality (Munn 1993, Bošković 2009, Bhatt and Walkow 2013), which is a process that requires access to the semantic component, the compounded gender value of the two conjuncts is based on the value provided by CI, instead of being determined by the lexicon.

- (27) a. La brava guida si e’persa nel bosco
 the good guide.F her/him lost.F in the woods
 ‘The guide lost his/her way in the forest.’

differences between these two proposals, however, goes beyond the scope of this paper.

⁴⁷I have not discussed here nouns of the third class, such as *dottore* ‘doctor’ and *studente* ‘student.’ These are strictly masculine, and their feminine counterparts are always realized by the feminine suffix *-essa*. These nouns are not susceptible to the variation described in this section. This might be significant because the third class is the only class that does not have a morphological overlap with gender marking, while the other classes might undergo a shift along the suggested markedness hierarchy for the insertion of the class marker. However, there are very few nouns of this type in Standard Italian, and it is possible this lack of susceptibility is the accidental result of the derived feminine form being socio-linguistically unmarked.

- b. La guardia e sua sorella sono andate al cinema sta
the guard.F and self sister have gone.F.PL to-the movies this
sera
evening
'The guard and her sister went to the movies tonight.'
 - c. La guardia e sua sorella son andati al cinema sta
the guard.F and self sister have gone.M.PL to-the movies this
stera
evening
'The guard and his sister went to the movies tonight.'
- [adapted from Ferrari-Bridgers (2007, 151, (4))]

The dissociation of agreement with ϕ -features determined by minimal search and valuation by Agree through features introduced by Feature Inheritance has far reaching theoretical consequences. I argue that the dissociation corresponds to the suggested, though never fully worked out, distinction between variable binding and valuation by Agree. While valuation by Agree is restricted to narrow syntax, variable binding is a process triggered at the interfaces. I believe the intuitive distinction is clear: valuation by Agree is an automatic procedure induced by Feature Inheritance and feature matching. No recourse to the interfaces is necessary. In contrast, labeling by minimal search is a process that might happen in narrow syntax but which must happen at the interfaces in order for the structure to be interpretable (see, for instance, Narita 2011 for an argument that minimal search might be restricted only to the CI interface). In other words, it is only when Transfer takes place, i.e., the structure is sent to the interpretive component, that valuation by context-dependent values becomes possible.

There is an additional difference between these two types of processes: while valuation by Agree is ultimately a bottom-up process related to structure building, variable binding is a top-down process. Interestingly, while in most cases these two types of valuation return the same output,⁴⁸ in a restricted set of cases, as in the socio-linguistically triggered cases discussed here, the two types of valuation may be dissociated.⁴⁹

⁴⁸This might be a result of some economy considerations.

⁴⁹I suspect that it is not an accident that the recent suggestion of Agree being always upward, as, for example, in Zeijlstra (2012), is semantically motivated. A closer look at the cases might indeed reveal that Upward Agree is based on variable binding as advocated in this paper.

2.8 A note on V-N compounds

I will finish this section by investigating a slightly different prediction which concerns compounds; more precisely, V-N nominal compounds. If the gender of the nominal part of the compound is determined from the lexicon, then the compound should never inherit the gender of the noun, as the nominalizing D-*n* structure attached to the V-N compound cannot establish an Agree chain with the gender value on the nominal root. This is because the ϕ -features on D cannot be inherited by the intervening V structure. Furthermore, if such a compound denotes an object, it should not be able to get the gender value from D either, as D would not be valued for [+PERSON]. Consequently, we expect such compounds to always surface with default morphological gender, which is masculine (see fn. 37). This prediction is borne out, as the following examples from Gracanin-Yuksek (2006) demonstrate.

- (28) *V-N compounds derived from mano ‘hand’* – F.SG
- a. l’asciugamano (M.SG.) - gli asciugamani (M. PL.)
‘the towel’ - lit. the ‘(to) dry-hand’
 - b. il baciamano (M.SG.) - i baciamani (M. PL.)
‘hand kiss’ - lit. the ‘(to) kiss-hand’

In contrast, if such a compound denotes a person, we expect its gender to be determined by the gender of its referent while its vocalic ending is determined by its lexically determined class. This prediction is borne out as well, as the following example from Gracanin-Yuksek (2006) shows.

- (29) un /una ficca-naso
a.M /a.F thrust-nose
‘busybody’

3 Defective chains: the number-gender dependency revisited

I have argued in the previous sections that unvalued ϕ -features are introduced by D. Consequently, they may appear on lower functional heads only by Feature Inheritance (Richards 2007, Chomsky 2008, 2013). If this is correct, we would expect to find instances of defective ϕ -feature Agree chains within a DP in a way that is parallel to defective Agree chains in the CP domain.

For concreteness, I follow Borer (2005) and argue that *n* enters a regular gender and number Agree chain only if it is associated with a divisional function.⁵⁰ It follows that the ϕ -complete set is inherited only if D is referential and individuating. In contrast, if D refers to non-atomic entities, then we expect the ϕ -feature chain to be defective, giving rise to irregular gender/number interactions. Crucially, since the dependence is on the divisional function and not on the counter function, i.e., the head which encodes number, the irregular patterns should be independent of whether or not the relevant noun can be counted. As we will see in this section, this prediction is borne out, as witnessed by ‘relational’ and mass nouns.

The system thus provides an alternative explanation for a widely attested dependency between number and gender (Greenberg 1963, Noyer 1992, Harley and Ritter 2002, among others). At least in Standard Italian, the seeming dependency is a side-effect of establishing the relevant Agree chain, which is dependent on the divisional function. If we look closely at the data, the seeming dependency between number and gender disappears.

3.1 Relational nouns

There is a class of nouns, so-called *-a* nouns, that are always masculine in the singular but may be masculine or feminine in the plural, depending on how their plurality is interpreted. I call these nouns *relational nouns* as they typically denote body parts, relations to a space, parts of something, and other relational properties, i.e., nouns such as *braccio* ‘arm,’ *labbro* ‘lip/edge,’ *muro* ‘wall,’ *fundamento* ‘foundation,’ *uovo* ‘egg,’ *osso* ‘bone.’

As pointed out in Acquaviva (2008) and the work cited there, these nouns do not form a natural semantic class. I argue, however, there is an overlooked common semantic denominator to their morphosyntactic behavior. Namely, if these nouns denote plurality of relations (body parts, relations to a space, etc.), instead of atomic entities (Sternefeld 1998, Beck and Sauerland 2000), for instance, when we count lips as one relational object instead of a pair of individualized muscles, their plural is always feminine, as can be seen in (30).

- (30) *Relational pattern:*
 a. il braccio → le braccia ‘arms’

⁵⁰Borer uses a more fine-grained structure of functional projections. I abstract from her fine distinctions as they do not seem to play a role in the patterns investigated in this paper.

- b. il labbro → le labbra ‘lips’
- c. il muro → le mura ‘walls of a city/fort’
- d. l’osso → le ossa ‘human bones’
- e. il membro → le membra ‘human body parts’
- f. lo staio → le staia (measure term used for grains)

In contrast, if these nouns denote plurality of atomic entities instead of plurality of relations, they acquire regular masculine gender and vocalic ending, as can be seen in (31). The semantic distinction is most clearly seen on nouns like *il dito* ‘the finger.M.SG.’ which counts as *dita*, i.e., feminine, if it counts plurality of fingers attached to a hand. In contrast, if such fingers were detached and counted separately from their body attachment, i.e., individual atoms, for instance, in an anatomy class setting, the plural becomes *diti*, i.e., masculine plural. In other words, what the feminine plurals have semantically in common is that they lack an atomic individuation property. Whenever they create individuating plurality, their grammatical plural is regular.

(31) *Atomic pattern:*

- a. il braccio → i bracci ‘arms of a lamp/cross’
- b. il labbro → i labbri ‘borders, edges’
- c. il muro → i muri ‘a number of walls’
- d. l’osso → gli ossi ‘bones to be eaten etc.’
- e. il membro → i membri ‘family members’
- f. lo staio → gli stai ‘bushels’

Historically, all these nouns come from Latin neuter (Löfstedt 1928, Spitzer 1941, Lausberg 1963, Väanänen 1963, Rohlf’s 1968, Tekavčić 1972, Maiden 1995), and one might thus consider positing a new nominal class for them, i.e., a class which would switch the gender value for separate lexemes associated with a given lexical entry (Merlo 1952, Hall 1956, Rohlf’s 1968, Bonfante 1961, Tekavčić 1972, Regula and Jernej 1975, Brunet 1978, Santangelo 1981, Lepschy and Lepschy 1988, Schwarze 1995, Marcantonio and Pretto 1988, Bach and Jensen 1990, Ojeda 1995, Maiden 1995, Dressler and Thornton 1996, Maiden and Robustelli 2000, Riente 2003). However, in doing so we would lose the generalization that if these nouns constitute regularly counted atomic elements, their gender pattern is regular. An alternative proposal has been made by Acquavivia (2008) who argues that these nouns are so called lexical plurals, that is, nouns whose plural must be stored in the lexicon and associated with a special semantic interpretation. His main ar-

gument is that these nouns do not form a natural semantic class; however, as stated previously, I believe such a characterization misses an important generalization: there is a common semantic denominator in the irregular plural pattern, and the *-a* plural does not denote individuating plurality. Instead, *-a* nouns pluralize relations in the sense of Sternefeld (1998), Beck and Sauerland (2000).⁵¹

In order to account for the correlation between the lack of individuation and the irregular gender pattern, I propose that relational nouns arise via defective intervention. Concretely, if the plurality constitutes plurality of relations instead of the plurality of atomic elements, *n* is not associated with the divisional function. Consequently, D cannot cyclically probe the gender feature on the root. The resulting F.PL agreement is the morphological default that arises in cases of failed agreement for gender.⁵²

In contrast, if we count atomic entities, the divisional function on *n* enables establishing a complete Agree chain which may in turn be valued by the gender on the root. Consequently, we obtain regular masculine plural agreement.

The proposal makes two predictions. First, if the irregular pattern arises because of the lack of a division function within the DP, we would expect to find a regular plural agreement if there is an outside source of individuating plurality. One place to look at is a nominal conjunction. As argued in Munn (1993), Bošković (2009), Bhatt and Walkow (2013), conjunction creates individuating plurality. Thus we expect that if we take a singular relational noun and conjoin it with another noun, the resulting plurality will treat the relational noun as masculine, without any change in its semantics. As the following examples from Acquaviva (2008) show, this prediction is borne out. In Standard Italian if a singular masculine noun conjoins with a singular masculine noun, the resulting agreement is masculine plural. As (32a) confirms, relational nouns are no exception. Similarly, if a singular masculine noun conjoins with a singular feminine noun, the resulting agreement is masculine plural. Again, as we can see in (32b), relational nouns behave as regular masculine nouns. Crucially, even when we conjoin two

⁵¹Even though I make a crucial distinction between individuating and ****-pluralization, my approach is fully compatible with an approach according to which there is only one type of pluralization. The only difference lies in what type of objects are being pluralized.

⁵²Note that the default in this case is not masculine plural, which is the case if there is no gender feature value available as with the V-N compounds in Section 2.8. See also fn. 37. Since this agreement arises from a defective intervention interaction, it becomes marked. I do not have a good explanation for this switch, but note that such behavior is common. For instance, the agreement attested with weather predicates is often neuter in languages with a three-way gender distinction, while their morphological default is masculine.

singular relational nouns, the resulting agreement is masculine plural, as in (32c), even though each of them would trigger feminine agreement if pluralized independently.

- (32) a. [il dito e il piede] che sono stati amputati
 the finger and the foot that have been amputated.MASC.PL
 /*state amputate
 /*FEM.PL
- b. [il dito e la gamba] che sono stati amputati
 the finger and the leg that have been amputated.MASC.PL
 /*state amputate
 /*FEM.PL
- c. [il dito e il braccio] che sono stati amputati
 the finger and the leg that have been amputated.MASC.PL
 /*state amputate
 /*FEM.PL

(Acquaviva 2008, (5.26–5.27), 138)

The other prediction concerns agreement properties of anaphoric elements. If the feminine plural ending arises via defective Agree, D – which is the labeling source and in turn the source of ϕ -feature valuation for anaphoric elements – lacks individuation and is valued for feminine and plural. Furthermore, we know that relational properties can become an argument of a distributive predicate; however, they cannot be directly counted by an individuating numeral such as ‘one.’ Thus the prediction is that a distributive anaphoric element will be able to get valued by such a D. In contrast, an individuating anaphoric element will not. Both predictions are borne out as the following examples from Acquaviva (2008) demonstrate. As already discussed in Lepschy and Lepschy (1988), Bach and Jensen (1990) and Maiden and Robustelli (2000), if a distributive quantifier such as ‘each’ anaphorically refers to a relational noun, as in (33), the form of the distributive element is feminine singular. This means that the anaphoric element is able to obtain its gender value from D.⁵³ In contrast, even though relational nouns can be counted, as in (34), their plurality cannot be used as an antecedent for the individuating numeral ‘one,’ as plural D of relational nouns lacks individuation. Consequently, Agree with D fails. As we can see in (35) speakers cannot establish what gender ‘one’ should have. This is exactly what we predict under our current

⁵³Since this is a lexically distributive operator, the singular number feature is assigned from the lexicon.

account based on defective Agree.

- (33) a. le uova costano sessanta centesimi l'una
 the eggs.FEM.PL cost 60 cents each.FEM.SG
 /*l'uno
 /*MASC.SG
- b. le braccia di Ugo sono una più lunga
 the arms.FEM.PL of Ugo are one.FEM.SG longer.FEM.SG than
 dell'atra /*uno più lungo
 the other.FEM.SG /*one.MASC.SG longer.MASC.SG than
 dell'atro
 the other.MASC.SG
 'Ugo's arms are one longer than the other'
- (34) volevo due uova, e me ne hanno date
 I-wanted two eggs.FEM.PL, and me they have given.FEM.PL
 tre
 three.FEM.PL
 'I wanted two eggs, and they gave me three'
 (Acquaviva 2008, 147, (5.32))
- (35) a. %volevo due uova, e me ne hanno data
 I-wanted two eggs.FEM.PL, and me they have given.FEM.SG
 una
 one.FEM.SG
- b. %volevo due uova, e me ne hanno dato
 I-wanted two eggs.FEM.PL, and me they have given.FEM.SG
 uno
 one.FEM.SG
 'I wanted two eggs, and they gave me one'
 (Acquaviva 2008, 147, (5.33))

The crucial property of this treatment is that establishing the Agree chain is strictly dependent on valuing the divisional function, not on the number/ \pm counter. Thus, the proposed implementation provides a novel formalization of the dependency of gender on number (Greenberg 1963, Noyer 1992, Harley and Ritter 2002, among others). If the proposal is correct, it is possible that not only in Standard Italian but also in other languages, there might be no direct number-gender dependency. Instead, the apparent dependency might arise via its formal relation to the divisional

function.

Finally, if gender is dependent on the divisional function, we expect that any uncountable noun should exhibit defective behavior. Since there is no regular plural formation, we cannot easily test this prediction in Standard Italian. However, data from Italo-Romance (and Ibero-Romance) dialects show that this is indeed the case. To my knowledge, all Italo-Romance and Ibero-Romance dialects have a two-way gender system like Standard Italian. However, their mass nouns⁵⁴ systematically trigger a special agreement form.⁵⁵

Thus, for example, some dialects have three distinct singular forms of demonstratives: one for masculine singular, one for feminine singular and one for mass nouns. The examples in (36) from Servigliano demonstrate a case in which the three-way distinction is manifested by distinct affixes, accompanied by a morpho-phonemic alternation.

- (36) *Demonstratives in Servigliano (Rome-Ancona corridor)*
- | | | |
|----|------------------------|------|
| a. | kwístu, kwíssu, kwíllu | M.SG |
| b. | kwésta, kwéssa, kwélla | F.SG |
| c. | kwésto, kwéssu, kwéllo | MN |
- ‘this,’ ‘that,’ ‘that (over there)’

The examples in (37) are from several dialects south of the Rome-Ancona corridor. In these dialects, so-called *raddoppiamento sintattico* (RS), i.e., morpho-phonologically triggered consonantal doubling, regularly appears only with feminine nouns. However, it may accompany a masculine noun but only if such a noun is used as a mass noun. For instance, in Neapolitan if the noun *kaffé* ‘coffee’ is counted, as in ‘the cup of coffee,’ there is no *raddoppiamento sintattico*. In contrast, if the same noun is used as a mass noun, its form changes into *kkaffé*.

- (37) *Raddoppiamento sintattico on mass M*
- | | | | |
|----|------|-----------------------|-----------------------|
| a. | (i) | o kaffé | |
| | | ‘the (cup of) coffee’ | M.SG |
| | (ii) | o kkaffé | |
| | | ‘the coffee’ | MN [+RS] (Neapolitan) |
| b. | (i) | u pá:nə | |
| | | ‘the loaf’ | M.SG |

⁵⁴The special agreement is also triggered by nominalized infinitives, however, those will not be discussed here.

⁵⁵See [left out for anonymity] for a recent discussion and literature overview.

- (ii) u ppá:nə
 ‘bread’

MN [+RS] (*Puglia*)

I argue that the observed three-way gender behavior is a result of defective intervention as predicted by the proposed system. Since in all these cases the Agree chain cannot be successfully established, the gender value assigned to the root from the lexicon is not shared by the rest of the structure. As the gender value cannot be determined by D either, the gender valuation of the Agree chain is not successful. In turn, the morpho-phonological marking of the agreeing elements reflects the defective nature of the chain.

4 Conclusions

This paper makes two major theoretical contributions. The first contribution considers what the possible sources of feature valuation are, and asks, if there is more than one source, what consequences would this have for the syntactic derivation. We have seen evidence that some features may indeed be valued from the lexicon or from the context, and this duality reflects itself in how ϕ -feature chains get valued. I argued extensively that in order to account for the range of attested variation in the domain of gender agreement, we need to distinguish between valuation from the lexicon, which takes place strictly within narrow syntax, and valuation by minimal search from CI, which takes places at the syntax-semantics interface. Furthermore, I suggested that this distinction sheds light on the relation between variable binding and Agree, and that might provide a principle explanation for the appearance of Agree being upward for semantically interpretable features such as Tense or negation.

The second major contribution concerns the cross-linguistically prevalent appearance of gender being dependent on number. This section surveys some of the major work on the topic and sketches how the reported data and suggested generalizations follow from the proposal presented in this paper.

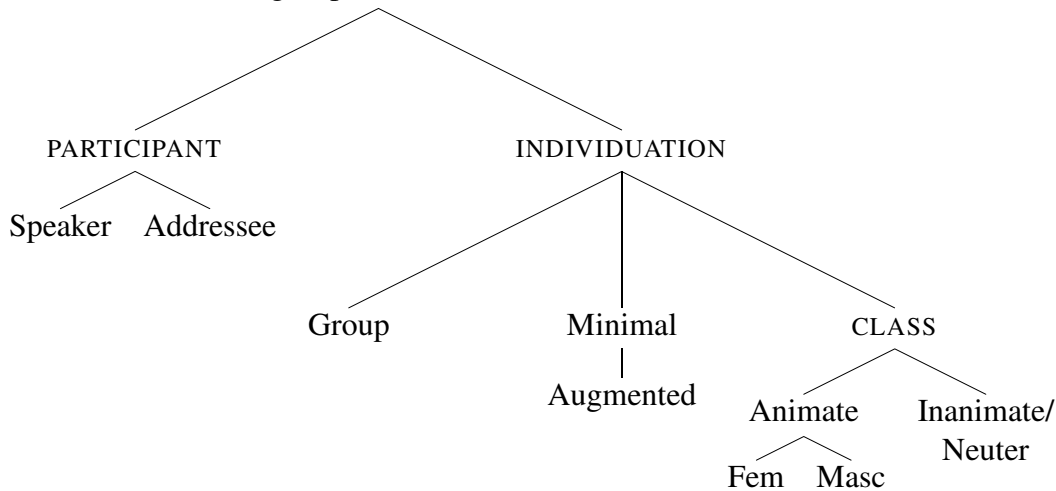
As Greenberg noticed in his observations about language universals, there seems to be a formal dependency between gender and number features (38).

- (38) *Greenberg’s generalizations about gender-number dependency*
- a. Universal 36: ‘[i]f a language has the category of gender, it always has the category of number.’ (Greenberg 1963, p. 95)
 - b. Universal 37: ‘A language never has more gender categories in non-

- singular numbers than in the singular.’ (Greenberg 1963, p. 95)
- c. Universal 45: ‘If there are any gender distinctions in the plural of the pronoun, there are some gender distinctions in the singular also.’ (Greenberg 1963, p. 96)

Noyer (1992) and Harley and Ritter (2002) formulated the dependency in terms of feature geometry dependencies, (39) and (40) respectively.

- (39) Noyer (1992): *Universal Feature Hierarchy*
 person features \succ number features \succ gender features \succ class features
- (40) Harley and Ritter (2002, p. 486, (6))
 Referring Expression (=Pronoun)



Even though these proposals differ in the actual technical implementation, they share the intuition that the notion of individuation is crucial for establishing the number-gender dependency. The present paper attempts to make this intuition more precise by dividing the labor between the phase head that induces Feature inheritance and the divisional function that may intervene in Feature Inheritance.

The current proposal supersedes the previous accounts in that it proposes a principled explanation of the attested interactions. As we have seen, both gender and number features can be valued either from the idiosyncratic lexical representation or via a semantically informed procedure, while being part of the same chain. Consequently, the difference between interpretable and uninterpretable syntactic features cannot be syntactically relevant, at least not in the trivial sense of the features being of categorically distinct types. Instead, I have suggested that inter-

pretability is a side-effect of combining gender/number with additional features, with PERSON in particular being the feature responsible for the interpretability of gender (cf. Percus 2011).⁵⁶

Finally, the proposal invites a cross-linguistic investigation of number-gender interaction in terms of distinct sources of feature valuation. We have known since the foundational work of Picallo (1991) and Ritter (1993) that the domain of gender valuation varies. As Ritter (1993) observed, nominal derivational morphology in Hebrew does not preserve the gender of the root noun. However, the gender of a Hebrew noun cannot switch, because of the natural gender of its referent, as it is the case in Spanish (Harris 1991). As we have seen in this paper, neither of these two facts is surprising. Natural gender-dependent switching (mating nouns) is possible only if a noun comes from the lexicon without a lexically valued gender feature.⁵⁷ While this is occasionally possible in Romance languages, Hebrew does not seem to have this option. In contrast, the fact that the lexically specified gender does not percolate through Hebrew derivational nominal morphology is not surprising. Recall our discussion of Italian V-N compounds in Section 2.8. As we saw there, if the derivational D cannot access the lexically given gender feature on the root (for reasons of locality), the overall gender is fully determined by the outer derivational morphology.⁵⁸ Similarly, if the form of the root noun is in principle independent of the lexically determined gender-feature value, it is not surprising that in languages like Hebrew, a word that appears to be a masculine noun in its surface form (meaning its phonotactic shape corresponds to what tends to be a masculine noun) can still trigger feminine agreement as can be seen in (41).

- (41) a. šana tova
 year.F.SG good.F.SG.

⁵⁶There is, of course, the intriguing question of the categorical status of neuter, be it a default, a defective value, or a third gender. Recent work, for instance, Giurgea (2008) following Cornilescu (2000) on Romanian and Quer (2001) and Picallo (2002) for Spanish, addresses some of these questions, but a careful consideration of the facts goes beyond the scope of this paper.

⁵⁷That nouns may differ in whether or not their gender feature is lexically specified has independently been argued for by Alexiadou (2004) for Romance, Greek, and Hebrew, and Riente (2003) for Italian.

⁵⁸Languages differ in how nominal derivational morphology treats gender. While languages such as German resemble Hebrew in that the gender of a diminutive is solely determined by the derivational morphology (diminutives are always neuter for German), in other languages, such as Russian, the gender of the diminutive tends to retain the lexically determined value of the nominal root. See, for example, Wiltschko and Steriopo (2007) and Matushansky (2015).

- *šana tov
year.F.SG good.M.SG.
- b. šan-im tovo
year.F.PL good.F.PL.
- *šan-im tovim
year.F.PL good.M.PL.

Ritter (1993, ex. 8, p. 799)

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