

NP-internal agreement and the structure of the noun phrase¹

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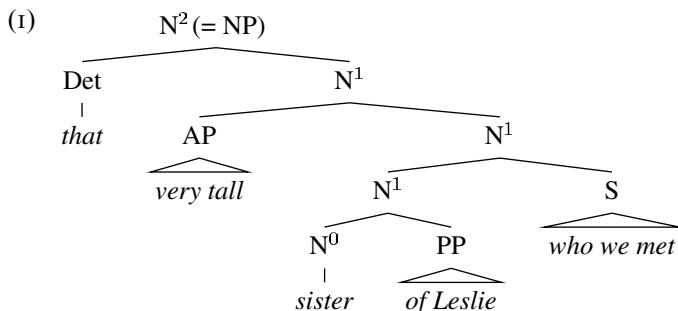
For the analysis of the noun phrase, the treatment which currently prevails in generative grammar is the one in which the head of the noun phrase is identified with the determiner, rather than with the noun. This D(et)P treatment has the advantage of providing a uniform account of all syntactic categories, both the substantive and the functional ones, and it provides a natural way to capture the co-occurrence restrictions between nouns and determiners, but it also faces a number of empirical problems. To solve them I propose an analysis in which the head of the noun phrase is identified with the noun, but in which the advantages of the DP treatment are incorporated as much as possible. This is done in two steps. First, I argue that the requirement (or the desirability) of a uniform treatment of all syntactic categories does not by itself favour the DP treatment, since there is no empirical evidence for the postulation of a separate syntactic category for the determiners. The argumentation is mainly based on an analysis of NP-internal agreement data and leads to the conclusion that the class of determiners is syntactically heterogeneous: there are the adjectival determiners, which are subject to morpho-syntactic agreement, and (pro-)nominal ones, which are exempt from this agreement. Second, I dissociate the roles of head and selector. All prenominals, both the specifying and the modifying ones, are treated as functors which select a nominal head, rather than as heads which select a nominal complement. This functor treatment accounts in a natural and straightforward way for both morpho-syntactic agreement and semantic types of agreement. The language which is used for exemplification is Dutch, but at various points comparisons are made with German and English.

I. INTRODUCTION: NP OR DP

In descriptive grammar it is common practice to treat the noun as the head of the noun phrase. This practice was also adopted in the first decades of

[1] This text is based on work which was presented at the 9th International HPSG Conference in Seoul (August 2002), the 13th CLIN Meeting in Groningen (November 2002), the 10th International HPSG Conference in East Lansing (July 2003) and the SCAN-Matrix workshop in Göteborg (October 2004). I would like to thank the reviewers of the abstracts and the respective audiences for their comments and remarks. Special thanks are due to Ivan Sag, Lars Hellan, Gosse Bouma, Valerio Allegranza, Ineke Schuurman, Vincent Vandeghinste and the anonymous referees of the *Journal of Linguistics* for their comments on previous versions of this text.

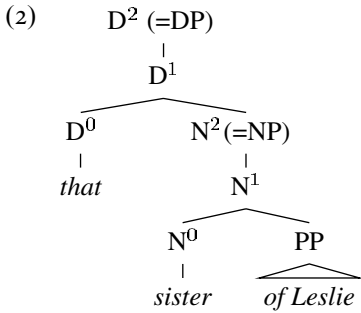
generative grammar. In Chomsky (1970), for instance, nouns head a nominal projection N^i , for $0 \leq i \leq 2$, and take dependents which are classified in terms of a threefold distinction between complements, modifiers and specifiers. An illustration of this style of analysis is the representation in (1), quoted from (Gazdar et al. 1985: 126).



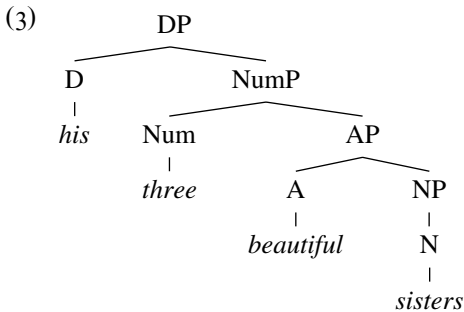
Sister belongs to the lexical category N^0 and combines with its PP complement of *Leslie*, yielding the one-bar category N^1 . The latter combines with the relative clause *who we met* and the AP *very tall*, yielding (again) the one-bar category N^1 . Finally, the nominal is combined with its specifier, the determiner *that*, yielding the double-bar category N^2 . While the addition of the complement and the specifier changes the bar level so that iterative application is excluded, the addition of the modifiers leaves the bar level unchanged. This captures the fact that the modifiers are optional and that they can be stacked. An attractive property of this analysis is that it applies uniformly to all categories. Because of this uniformity it came to be known as X-bar syntax, in which X stands for any of N, V, A and P.

By the 1980s, the principles of X-bar syntax had taken such a central position in generative grammar that an increasing number of linguists wondered why they were only applied to the substantive categories and not to the functional ones, such as Complementizer, Auxiliary and Determiner. The conviction grew that some generalization was being missed, and the efforts to repair this led to a novel analysis of various types of phrases. Clauses were modeled as CPs, headed by a complementizer (C), finite verb phrases as I(nf)Ps, headed by an auxiliary or a verbal affix (Infl), and noun phrases as DPs, headed by a determiner (D). In this analysis, the determiners are lexical heads (D^0) which take a nominal projection as their complement and which yield a DP (Abney 1987). For *that sister of Leslie*, this yields the following kind of structure.²

[2] The specifier position of D can be taken by a predeterminer, as in *all the sisters of Leslie*.



The modifiers are recursively adjoined to N² or – alternatively – treated as heads of their own phrasal projections, as in (3).



The DP treatment soon superseded the NP treatment, not only in Transformational Grammar, but also in Word Grammar (Hudson 1990) and Lexical Functional Grammar (Bresnan 2001). Its appeal is based on two factors. First, it provides a uniform treatment of all syntactic categories. Second, the assumption that the determiner selects the nominal simplifies the formulation of co-occurrence restrictions. The fact, for instance, that *every* co-occurs with singular count nouns can be naturally expressed in terms of a requirement which the determiner imposes on the noun.

These advantages, though, are offset by a number of empirical problems. To mention just one, let us take *whose house*. In this combination, the genitive *whose* is in complementary distribution with the possessive and demonstrative determiners. Following the DP logic, this implies that it is a D which takes the common noun as its complement. As a consequence, since *whose* is genitive and since the case of XP equals that of its head X, it follows that *whose house* is erroneously treated as a genitive. Other problems for the DP analysis are discussed in among others, Sadler & Arnold (1991: 202f.), Pollard & Sag (1994: 363–371) and Van Langendonck (1994).

Various attempts have been made to develop versions of DP in which these problems are solved. Klaus Netter, for instance, developed a version of the DP treatment in which the determiner inherits almost all of its syntactic properties

from its nominal complement, so that the resulting phrase indirectly inherits most of its properties from the noun. In *whose house*, for instance, the determiner inherits the category and the case value of *house*, so that the entire phrase is correctly predicted to be a standard case NP (Netter 1994, 1996). The problem with this solution, though, is that the determiner is erroneously treated as a standard case nominal as well. Another example is provided by Richard Hudson. In a reply to Van Langendonck (1994), he admits that there are cases in which it is preferable to treat the noun as the head, and that the grammar should therefore allow for both possibilities: ‘This does not mean that NP has two heads, but rather that either D or N may be the head’ (Hudson 2004: 7). This leaves us with the problem of deciding for each particular noun phrase whether its head is the determiner or the noun.

The purpose of this paper is to turn the tables: instead of modifying the DP analysis in ways which seek to overcome the empirical problems which it faces, I will revisit the NP treatment and develop a version of it which seeks to incorporate the main advantages of the DP treatment, i.e. its uniform treatment of all syntactic categories and the intuition that the prenominals select the noun, rather than the other way round.

As for categorial uniformity, the problem with the older versions of the NP treatment is that they arbitrarily exempt the functional categories from the X-bar principles. This, however, is only a problem if words which are standardly treated as members of the functional categories, such as the determiners and the numerals, do indeed belong to separate syntactic categories, and this is far from obvious. As will be argued at length in section 2, there is no clear empirical evidence for postulating such categories as Determiner, Article and Numeral. Instead, the words which are standardly treated as members of these categories will be shown to belong to independently motivated lexical categories, such as Adjective, Pronoun and Common Noun.³ This elimination of the functional categories not only exempts the NP treatment from including exception statements for the determiners, it also provides a challenge for the DP analysis, for if there is no evidence for a category D, then there is a fortiori no evidence for a category DP.

As for the treatment of selection, it will be shown in sections 3 and 4 that the NP treatment can incorporate the advantages of the DP treatment if one makes a distinction between heads and selectors. More specifically, if the prenominals are treated as selectors which take a nominal as their head rather than as their complement, one can integrate the main advantages of the DP treatment while avoiding its drawbacks. In *whose house*, for instance, the genitive pronoun selects a common noun as its head, and since the NP shares its case value with its head daughter, the NP is correctly predicted to

[3] There is a similarity with the argumentation in Gazdar et al. (1982) against the postulation of a separate functional category for the auxiliaries (Aux or Infl) and in favor of treating the auxiliaries as members of the independently motivated lexical category Verb.

be in standard case, irrespective of the case value of the determiner. In contrast to Hudson (2004), this analysis is uniform and simple: the prenominal is always the selector and the head is always the common noun.

2. FUNCTIONAL CATEGORIES IN NOMINAL PROJECTIONS

This section focusses on the categorial status of words which are commonly treated as determiners, quantifiers, articles and numerals. My main claim is that their analysis does not justify the postulation of such separate functional parts of speech as Det, Quant, Art and Num. Instead, to do justice to their morphological and syntactic properties one can better treat them as members of independently motivated substantive parts of speech, especially A and N.

This is, in itself, not a novel claim. The determiners, for instance, are commonly treated as pronouns in descriptive grammars of Dutch (Haeseryn et al. 1997), and Richard Hudson has proposed the same for the English determiners (Hudson 1990). Likewise, the possessives are standardly treated as adjectives in descriptive grammars of Italian, and the same has been argued for their Serbo-Croatian counterparts (Wechsler & Zlatić 2003: 19). The English numerals, finally, are treated as common nouns in Jackendoff (1977: 128–130) and as adjectives in Hoeksema (1983) and Allegranza (1998).

The treatment which I will develop, though, stands out in two respects. First, it is more radical, in the sense that *all* of the words which are commonly treated as determiners or numerals are argued to belong to the substantive parts of speech, including the articles. Second, it allows for more flexibility, in the sense that the determiners of some given language L are not claimed to all belong to some given part of speech X. Instead, the determiner system of any given language L will be shown to consist of elements which belong to different parts of speech, usually A or N, and most attention will go to the development of criteria which allow one to differentiate the adjectival determiners from the (pro)nominal ones.

Taking the Dutch determiners (in a broad sense) as the data set, I will argue that they are categorially heterogeneous, in the sense that some are adjectives (section 2.1), others pronouns (2.2) and still others common nouns (2.4). The argumentation is based on criteria which concern inflectional variation, morpho-syntactic agreement and modifiability. A special section is devoted to the articles (2.3). The last sections spell out the consequences for the status of the category ‘Det’ (2.5) and for the analysis of the noun phrase (2.6).

2.1 *Prenominal adjectives*

In many languages the prenominal adjectives show inflectional variation. In Dutch and German this variation concerns morpho-syntactic number and

Case	standard		genitive		dative		
	sing-n	other	sing-m/n	other	sing-f	other	
Adj	<i>goed</i>	<i>goede</i>			<i>goeder</i>	<i>goeden</i>	good
	<i>koel</i>	<i>koele</i>				<i>koelen</i>	cool
	<i>timide</i>	<i>timide</i>					timid
	<i>open</i>	<i>open</i>					open
Quant	<i>elk</i>	<i>elke</i>					each
	<i>alle</i>	<i>alle</i>		<i>aller</i>		<i>allen</i>	all
Inter	<i>welk</i>	<i>welke</i>					which
Dem		<i>deze</i>		<i>dezer</i>	<i>dezer</i>	<i>dezen</i>	this
				<i>dier</i>	<i>dier</i>	<i>dien</i>	that
Poss		<i>onze</i>	<i>onzes</i>	<i>onzer</i>	<i>onzer</i>	<i>onzen</i>	our
			<i>mijns</i>	<i>mijner</i>	<i>mijner</i>	<i>mijnen</i>	my

Table 1
The strongly declined pronominal adjectives

gender, surface case and type of declension. The strong type of declension is exemplified in table 1. In the standard case, which subsumes the nominative and the accusative, the adjectives take either no affix or the declension affix $\text{-}\text{\textcircled{a}}$ (schwa). This contrast applies not only to such prototypical adjectives as *goed* ‘good’ and *koel* ‘cool’, but also to several of the determiners, such as the quantifying *elk* ‘each’ and the interrogative *welk* ‘which’.⁴ Moreover, the use of these forms is subject to the same constraints. While the base forms combine with singular neuter nouns, as in *elk zwart paard* ‘each black horse’, their declined counterparts combine with singular nonneuter nouns, as in *elke zwarte ezel* ‘each-DCL black-DCL donkey’, and with plural nouns, as in *onze zwarte paarden* ‘our-DCL black-DCL horses’. The genitive and dative forms have a consonantal suffix, -s , -r or -n , which is often preceded by the schwa for reasons of euphony. Since the formation of genitives and datives is no longer productive in standard modern Dutch, there are many adjectives which lack one or both of them, but what matters in this context is that the relevant affixes are the same for the adjectives and several of the determiners. Moreover, it is not only the forms which are identical but also their uses. In genitive NPs, the pronominal adjectives take the -s form in combination with singular masculine and neuter nouns, as in *mijns inziens* ‘my-GEN

[4] The distinction is neutralized if the stem ends in $\text{-}\text{\textcircled{a}}$ (n), as in *timide*, *open* and *alle*. Some of the determiners lack the base form: the nondeclined counterpart of *deze* ‘this-DCL’, for instance, would be *dees*, but this form is only used in Flemish dialects. In standard Dutch, it is replaced by the pronoun *dit*.

opinion-GEN', and the *-r* form otherwise, as in the plural *proletariërs aller landen* 'proletarians all-GEN countries'. In dative NPs, the pronominals take the *-r* affix in combination with singular feminine nouns, as in *te goeder trouw* 'to good-DAT faith' and *te zijner ere* 'in his-DAT honor-DAT', and the *-n* affix otherwise, as in the singular neuter *van goeden huize* 'of good-DAT house-DAT' and the singular masculine *te allen tijde* 'at all-DAT time-DAT'.

Turning to the weak type of declension, we observe further similarities between adjectives and determiners. Typical of the weakly declined forms is that they must be preceded by another pronominal and that they show a lower degree of inflectional variation. In standard case NPs, they must be preceded by a definite determiner and invariably take the suffix *-ə*, also in singular neuter NPs, as in *mijn zwarte paard* 'my black-DCL horse'.⁵ In genitive and dative NPs, they must be preceded by a strongly declined pronominal and take the suffix *-ə* or *-n*. More specifically, if the preceding pronominal has the suffix *-s* or *-n*, the weakly declined form takes the suffix *-n*, as in *de geneugten des goeden levens* 'the pleasures the-GEN good-DCL life-GEN', and if the preceding pronominal has the suffix *-r*, the weakly declined form takes the suffix *-ə*, as in *de woordenschat der Nederlandse taal* 'the vocabulary the-GEN Dutch-DCL language'. In addition, several of the quantifying determiners have weakly declined forms. Notice, for instance, the declined forms in the singular neuter *dat ene paard* 'that one-DCL horse' and *het vele verdriet* 'the much-DCL grief', in the genitive adjunct of *een der vele mogelijkheden* 'one of-GEN many-DCL possibilities' and in the dative *ten enen male* 'to-the-DAT one-DCL time-DAT'.⁶

To top it off, it is not only the inflectional variation and the constraints on morpho-syntactic agreement which several of the determiners share with the adjectives, but also the exemptions on those constraints. One such exemption concerns adjectives in postnominal position. In that position, Dutch (and German) adjectives are invariably nondeclined. Compare, for instance, the morphologically invariant adjective in *de rivieren bevaarbaar in de winter* 'the rivers navigable in (the) winter' with its declined pronominal counterpart in *de nog bevaarbare/*bevaarbaar rivieren* 'the still navigable-DCL rivers'. Another exemption concerns adjectives in predeterminer position. Compare, for instance, the nondeclined predeterminer in *heel de dag* 'whole the day' with its declined counterpart in *de hele/*heel dag* 'the whole-DCL day'. Both of these exemptions also hold for the determiners. The first one is hard to illustrate, since determiners do not occur in postnominal position in standard

[5] The use of the base form, as in *mijn zwart paard* 'my black horse', is not impossible, but the declined form is preferred by the majority of speakers and is prescribed in normative grammars, such as Haeseryn et al. (1997).

[6] The forms *ten* and *ter* result from a fusion of the preposition *te* 'to' with the dative form of the definite article (*den* or *der*). Such fused forms also exist in German, French, Italian, Spanish, Portuguese, Greek, Welsh and Gaelic; see Hudson (2004).

modern Dutch, but they occasionally do in some of its regional and archaic varieties, and in that case they show the same lack of variation as adjectives. Compare, for instance, the nondeclined possessive in *vader ons* ‘father our’ with its prenominal counterpart in *onze/*ons vader* ‘our-DCL father’. Determiners in predeterminer position are more common. A relevant example is the quantifying predeterminer in *al zijn vrienden* ‘all his friends’. Notice, also here, the lack of the declension affix and the contrast with the declined form in *alle/*al vrienden* ‘all-DCL friends’.

Besides inflection and morpho-syntactic agreement, there is a third property which many determiners have in common with adjectives, i.e. the fact that they take the same kinds of dependents. The adverbs *bijna* ‘almost’ and *haast* ‘nearly’, for instance, combine not only with adjectives, as in *een bijna lege trein* ‘an almost empty-DCL train’ and *een haast onvindbare tekst* ‘a nearly irretrievable-DCL text’, but also with certain quantifying determiners, as in *bijna elk paard* ‘almost every horse’ and *haast alle deelnemers* ‘nearly all-DCL participants’. Similarly, the adverbs of degree, such as *heel* and *zeer* ‘very’, combine both with adjectives, as in *het zeer warme water* ‘the very warm-DCL water’, and with some of the quantifying determiners, as in *de zeer vele bezoekers* ‘the very many-DCL visitors’.

In sum, several of the Dutch determiners take the same dependents and inflectional affixes as the prenominal adjectives, and are subject to the same constraints on morpho-syntactic agreement; they even share the exemptions on those constraints.

2.2 Prenominal pronouns

While many of the Dutch determiners behave like adjectives, there are also quite a few which show the typical properties of pronouns. They show the same type of inflectional variation as the pronouns, they take the same kinds of dependents as the pronouns, and they are exempt from the constraints on morpho-syntactic agreement which hold for prenominal adjectives.

As shown in table 2, Dutch pronouns show variation for surface case, number and gender. This is similar to the inflection of the adjectives, but a closer look reveals several differences. First, there is no distinction between strong and weak declension. Second, the standard case forms are never declined: the affix in *watte*, *datte* and *ditte* is not a marker of declension but of strong emphasis. Third, the role and the expression of the number and gender distinctions are different. In the case of adjectives, they concern morphosyntactic properties of the modified noun and they are expressed in terms of affixes. In the case of the pronouns, by contrast, they concern properties of the pronoun’s referent and they are not expressed by affixes. The contrast between the neuter *wat* ‘what’ and the nonneuter *wie* ‘who’, for instance, is not marked by inflection and concerns a semantic rather than a morpho-syntactic distinction. More specifically, while the neuter pronouns

	Case Num-Gen	standard	genitive	dative	
Quant	sg,nn	<i>iedereen</i>			everyone
	sg,nn	<i>eenieder</i>	<i>(een)ieders</i>		one-every
	sg,nn	<i>iemand</i>	<i>iemands</i>		somebody
	sg,n	<i>wat</i>			something
Inter	-,nn	<i>wie</i>	<i>wiens, wier</i>	<i>wien</i>	who
	sg,n	<i>wat, watte</i>			what
Dem	-,–	<i>die</i>	<i>diens, dier, dies</i>	<i>dien</i>	that
	sg,n	<i>dat, datte</i>	<i>des</i>		that
	sg,n	<i>dit, ditte</i>			this
Poss	sg,nn	<i>mijn</i>			my
	pl,nn	<i>jullie</i>			your-pl
	pl,nn	<i>hun</i>			their

Table 2
Inflectional variation of pronouns

have an impersonal referent, the nonneuter ones have a personal referent. Similarly, the contrast between the *-s* and *-r* forms of the genitive pronouns does not concern the morpho-syntactic number and gender of the modified noun, but the natural number and gender of the pronoun's referent. *Diens* and *wiens*, for instance, are singular masculine, in the sense that they denote a single male individual, while *dier* and *wier* denote a single female individual or an aggregate.⁷

A corollary of the difference in the role of the number and gender distinctions is that pronouns are not subject to the constraints on morpho-syntactic agreement which hold for adjectives. More specifically, if a pronoun is used in prenominal position, it does not have to share the number and gender values of the modified noun. In *wiens paarden* 'whose horses', for instance, the pronoun is singular and masculine, whereas the modified noun is plural and neuter. This lack of agreement also concerns the surface case: while the pronoun is genitive, the modified noun is in standard case. An interesting minimal pair is of *mijns inziens* 'my-GEN insight-GEN' vs. *mijns gelijken* 'me-GEN equals'. The prenominal in the former is an adjectival possessive and must show agreement with the modified noun in case (genitive), number (singular) and gender (neuter). The homophonous prenominal in the latter, by contrast, is a genitive form of the personal pronoun *mij* 'me', and is, hence, exempt from morpho-syntactic agreement. This accounts for

[7] For the sake of completeness, *dies* is singular neuter, in the sense that it denotes a single impersonal entity. The interrogative *wie* lacks this form, since it is inherently nonneuter.

the fact that it is compatible with a plural noun in standard case, whereas the former is not; compare, for instance, *mijns gelijken* ‘me-GEN equals’ with **mijns kinderen* ‘my-GEN children’.

Summing up, pronouns show a different kind of inflectional variation than adjectives, and are exempt from morpho-syntactic agreement when they are used in prenominal position.

The exemption from morpho-syntactic agreement is easy to observe for the genitive pronouns, but it can also be illustrated with their standard case counterparts. As a first example, let us take the quantifying *wat* ‘some’. When it is used in subject position it requires a singular finite verb, which demonstrates that it is a singular form.

- (4) Er is/*zijn nog wat te doen.
there is/*are still something to do

When it is used in prenominal position, it combines with singular mass or plural nouns, as in *wat geld* ‘some money’ and *wat boeken* ‘some books’, but not with singular count nouns. When the modified noun is plural, the NP as a whole is plural as well:

- (5) Er zijn/*is nog wat boeken in de winkel.
there are/*is still some books in the shop

This shows that the head of the NP is the plural common noun and that the singular *wat* is its prenominal dependent. There is, hence, no agreement of number in the NP, and this demonstrates that the determiner must be prenominal, rather than adjectival.

Other determiners of this kind are the morphologically invariant *genoeg* ‘enough’ and the nondeclined *veel* ‘much’ and *weinig* ‘little’. These are singular pronouns which can be used not only in subject and complement positions, cf. (4), but also in prenominal position. In that position they require a singular mass or plural noun, and, hence, show the same absence of agreement as the quantifying *wat*. This is, in itself, sufficient to single them out as pronominal, but in the case of *veel* and *weinig*, there is a complication, for in contrast to *wat* and *genoeg* they do have a declined counterpart, as in *de vele problemen* and *het weinige geld*. This declined counterpart is not only an adjectival form, it is also subject to morpho-syntactic constraints on NP-internal agreement, see section 2.1. To account for this, I assume that the paradigms of *veel* and *weinig* are categorially heterogeneous. While the nondeclined forms are pronominal, the declined forms are adjectival. The same holds for *een* and *ene* ‘one’. While the latter is a weakly declined adjectival determiner, the former must be pronominal, for if it were a nondeclined adjective, it would not be compatible with a singular nonneuter nominal, whereas it is, cf. *een/*ene ezel* ‘one donkey’. Further evidence is provided by the fact that the nondeclined form also occurs in subject and complement positions, as in *een van hen heeft een geweer* ‘one of them has a gun’.

The coexistence of adjectival and pronominal forms is also relevant for the demonstrative determiners. That the genitives in *diens/dier hoeden* ‘that-one-GEN hat’ are exempt from agreement and, hence, pronominal, has already been demonstrated above. What complicates the matter, though, is that some of the other forms of *die* do show agreement. The datives in *van dien aard* ‘of that-DAT nature’ and *in dier voege* ‘in that-DAT way-DAT’, for instance, show the same type of morpho-syntactic agreement with the noun as pronominal adjectives, and so does the genitive in *de notulen dier vergadering* ‘the minutes that-GEN meeting’: if the feminine noun in this adjunct is replaced by a neuter noun, as in **de notulen dier gesprek* ‘the minutes that-GEN conversation’, the combination is ill-formed. This shows that the case marked forms of this demonstrative are categorially heterogeneous: while *diens* is pronominal and the dative *dier* adjectival, the genitive *dier* is ambiguous.⁸ An interesting question, now, is whether the nondeclined *die* is a pronoun or an adjective. For a start, notice that the pronominal *die* only combines with singular nonneuter and plural nouns, as in *die ezel* ‘that donkey’ and *die paarden* ‘those horses’; in singular neuter NPs one has to use *dat*. This looks like evidence for an adjectival treatment, but doubts are raised by the absence of a declension affix. This absence cannot be attributed to morpho-phonological peculiarities, since adjectives which end in a clear vowel do take the affix, as in *gedweë* ‘docile-DCL’, *cruë* ‘crude-DCL’ and *naë* ‘close-DCL’.⁹ Further doubts are raised by the fact that the contrast between *dat* and *die* is not one of declension, but of suppletion. In other words, if *die* is an adjective, it is a very unusual one. By contrast, if we treat it as a pronoun, the absence of declension is just what one expects. Moreover, this also accounts for the fact that this demonstrative is routinely used in subject and complement positions, as in *die is goed* ‘that-one is good’ and *ik ken die niet* ‘I know that-one not’. The fact that pronominal *die* is not compatible with singular neuter nouns is, hence, a matter of lexical stipulation, rather than of morpho-syntactic agreement. Summing up, the paradigm of the demonstrative *die* is categorially heterogeneous: besides the adjectival *dier* and *dien*, there are the pronominal *diens*, *dies*, *dier*, *dien* and *die*.

Further examples of categorial heterogeneity are provided by the possessives. As demonstrated in section 2.1, the forms with a declension or a case affix, such as *onze* and *mijns*, are undeniably adjectival, since they are subject to morpho-syntactic agreement, as exemplified by *onze ezel/*paard* ‘our-DCL donkey/*horse’, and *mijns inziens/*kinderen* ‘my-GEN insight-GEN/*children’. Their nondeclined counterparts, however, are not subject to morpho-syntactic

[8] The same holds for the dative *dien*, which is an adjectival determiner in *van dien aard* ‘of that-DAT nature’ and a pronoun in *van dien* ‘of that-DAT’.

[9] In some regional variants of Dutch the form can be declined, as in the Flemish *dieë frak* ‘that-DCL frock’.

agreement. *Mijn* ‘my’ and *hun* ‘their’, for instance, are compatible not only with singular neuter nouns, but also with singular nonneuter and plural ones, as in *mijn/hun ezel(s)* ‘my/their donkey(s)’. They are even compatible with genitive nouns, as in *mijn vaders huis* ‘my father-GEN house’; the possessive in this NP modifies the genitive noun *vaders*, but it does not show agreement with it. This lack of agreement, both in standard case and genitive NPs, is readily accounted for if the nondeclined *mijn* and *hun* are treated as pronouns. Applying the same reasoning to the other possessives, it turns out that the nondeclined ones are pronominal, whereas those with a case or declension affix are adjectival. Possessives which are invariably nondeclined are, hence, unambiguously pronominal. This is the case for the second person plural *jullie* ‘your’.

Apart from the inflectional variation and the lack of morpho-syntactic agreement, which the pronominal determiners share with the pronouns, there is, as a last piece of evidence, the fact that the pronominal determiners take the same kinds of dependents as the pronouns. Compare, for instance, *ik heb net genoeg rijst* ‘I have just enough rice’ with *ik heb net genoeg* ‘I have just enough’, and *hij heeft heel wat boeken geschreven* ‘he has quite some books written’ with *hij heeft heel wat geschreven* ‘he has quite some written’. Apparently, pronouns take the same kinds of dependents in nominal and pronominal positions.

The main conclusion of this section is that the determiners form a heterogeneous class. Besides the adjectival determiners, which inflect like adjectives and which are subject to the same constraints on NP-internal agreement as the pronominal adjectives, there are those which inflect like pronouns and which are exempt from the agreement constraints. From a diachronic point of view, the coexistence of adjectival and pronominal forms can be seen as the result of a gradual decrease of inflectional variation. With the disappearance of the rarely used genitive and dative forms, the nondeclined forms became increasingly used in other combinations than the singular neuter ones, reaching a point at which they were no longer subject to the usual constraints on morpho-syntactic agreement. There is, hence, a link between deflection and the transition from an adjectival to a pronominal determiner system. For a language like English, in which the determiners no longer show any adjectival inflection, it can, hence, be claimed that the determiner system is uniformly pronominal, confirming the proposal of Hudson (1990). For Dutch, however, the neutralization of inflectional variation is far from completed, and this accounts for the categorial heterogeneity of its determiner system.

2.3 *The articles*

Of all the determiners, the articles are those which seem least amenable to a treatment in terms of lexical categories. A closer look, though, reveals that

		full	reduced	
Pronoun	Pers	<i>wij</i>	<i>we</i>	we
		<i>mij</i>	<i>me</i>	me
	Poss	<i>zijn</i>	<i>z'n</i>	his
		<i>mijn</i>	<i>m'n</i>	my
	Quant	<i>één</i>	<i>een, 'n</i>	one, a(n)
	Dem	<i>die</i>	<i>de</i>	that, the
<i>dat</i>		<i>het, 't</i>	that, the	
Adjective	Dem	<i>dien</i>	<i>den</i>	that, the
		<i>dier</i>	<i>der</i>	that, the
			<i>des, 's</i>	that, the

Table 3
Full forms and reduced forms

there is some good evidence for also treating these determiners as adjectives or pronouns.

For a start, notice that most of the Dutch personal pronouns come in two varieties. Besides the full forms, such as *wij* and *mij*, there are the reduced forms, such as *we* and *me*. While the former's nucleus is a clear vowel or a diphthong, the latter's nucleus is schwa. The same factor distinguishes the possessive pronouns *zijn* and *mijn* from their reduced counterparts *z'n* and *m'n*. It is, hence, a small and indeed logical step to assume that the distinction between full forms and reduced forms is also relevant for other types of pronouns. The indefinite article, for instance, can naturally be treated as the reduced counterpart of the quantifying pronoun *één* and the definite articles *de* and *het* as the reduced counterparts of the demonstrative pronouns *die* and *dat* respectively, see table 3.

The differences between the full forms and their reduced counterparts are not limited to their phonology, but also concern their syntactic properties. The reduced forms, for instance, cannot be conjoined or topicalized, and there are further differences, discussed in Cardinaletti & Starke (1999) and Van Eynde (1999). Opinions diverge on how these differences can best be captured, but it is significant that none of the existing proposals captures them in terms of a part of speech distinction. The reduced forms *we* and *me*, for instance, are treated as personal pronouns, just like *wij* and *mij*, and the reduced *z'n* and *m'n* are treated as possessive pronouns, just like *zijn* and *mijn*.

Applying the same reasoning to the articles, it follows that their non-declined forms are pronouns too. Corroborating evidence is provided by the fact that they share several other properties with their full form counterparts.

The indefinite article, for instance, only combines with singular count nouns, just like prenominal *één*. Similarly, the definite *het* only combines with singular neuter nouns, just like prenominal *dat*, and *de* combines with singular nonneuter and plural nouns, just like prenominal *die*. The definite articles also share the property of the demonstratives that they trigger the use of weakly declined adjectives, as in *het zwarte paard* ‘the black-DCL horse’.

For the inflected forms of the articles, the reasoning is the same, but the outcome is different. The case marked *den* and *der*, for instance, are the reduced counterparts of prenominal *dien* and *dier*, and share the latter’s constraints on morpho-syntactic agreement: *den* combines with nonfeminine datives, as in *in den beginne* ‘in the-DAT beginning-DAT’, and *der* combines with feminine datives, as in *in der minne* ‘in the-DAT love-DAT’, as well as with singular feminine and plural genitives, as in *de macht der gewoonte* ‘the power the-GEN habit’. This provides unambiguous evidence for adjectival status. Completing the paradigm is the form *des* with its nonsyllabic variant *’s*; it is only used in singular masculine and neuter genitives, as in *’s avonds* ‘the-GEN evening-GEN’, and hence shows the morpho-syntactic agreement which is typical of the adjectival prenominals.

In sum, the articles can plausibly be treated as members of the same part of speech as their full form counterparts. This treatment has two advantages. First, it is in line with the independently motivated treatment of other phonologically reduced words, such as the reduced personal pronouns. Second, it provides a better understanding of why there are languages without articles, such as Latin and most of the Slavonic languages. What these languages lack is not an entire syntactic category, but just a reduced counterpart for the relevant demonstrative and/or quantifying determiners.

2.4 Prenominal common nouns

The words which I have used so far for exemplification can be characterized as determiners in the narrow sense of the term. In a broader sense of the term, the determiners also include the numerals and some other quantifying words, such as *dozen*. The treatment of these words is the central topic of this section. Using the same criteria as in the previous sections, I will argue that they are common nouns.

In terms of inflectional variation, common nouns are different from both adjectives and pronouns. As shown in table 4, the basic distinction is one of morpho-syntactic number. The plural forms have the affix *-s* or *-en* (modulo irregularities), and are not further differentiated for surface case or gender. The singular forms lack the plural affix and are further differentiated for case and gender. The genitives have the consonantal suffix *-s* or *-n*, as in *’s avonds* ‘the-GEN evening-GEN’ and *des mensen* ‘the-GEN man-GEN’. Since these are

Number Case	singular			plural	
		genitive	dative		
Noun	<i>huis</i>	<i>huizen</i>	<i>huize</i>	<i>huizen</i>	house
	<i>leven</i>	<i>levens</i>		<i>levens</i>	life
	<i>dag</i>	<i>daags</i>	<i>dage</i>	<i>dagen</i>	day
	<i>voet</i>		<i>voeten</i>	<i>voeten</i>	foot
	<i>mens</i>	<i>mensen</i>		<i>mensen</i>	man
	<i>taal</i>		<i>tale</i>	<i>talen</i>	language
	<i>tafel</i>			<i>tafels</i>	table
Num	<i>vijf</i>		<i>vijven</i>	<i>vijven</i>	five
	<i>zeven</i>		<i>zevenen</i>	<i>zevens</i>	seven
	<i>honderd</i>			<i>honderden</i>	hundred
	<i>miljoen</i>			<i>miljoenen</i>	million

Table 4
Inflectional variation of common nouns

homophonous to the plural affixes, the resulting forms may be ambiguous. Compare, for instance, the singular genitive in *des duivels* ‘the-GEN devil-GEN’ with the plural in *de rode duivels* ‘the red-DCL devils’.¹⁰ Similarly, *mensen* is singular genitive in *des mensen* ‘the-GEN man-GEN’ and plural in *die mensen* ‘those people’. The forms with a genitive affix are either masculine or neuter, but never feminine; this accounts for the absence of a distinct genitive for *taal* and *tafel* in table 4. Datives take the affix *-ə* or *-n*, as in *huize* ‘house-DAT’ and *ten voeten uit* ‘to-the foot-DAT out’. Forms without affix are used not only in standard case NPs, but also in genitive feminine NPs, as in *de macht der gewoonte* ‘the power the-DCL habit’, and in dative NPs, whenever the noun lacks a separate dative form, as in *te goeder trouw* ‘to good-DAT faith’.

Common nouns and the NPs which they project are canonically used in subject and complement positions, just like the pronouns, but the use in prenominal positions is not excluded, and in that use, they are exempt from morpho-syntactic agreement. In *vaders vrienden* ‘father-GEN friends’, for instance, the head noun is plural and in standard case, whereas the prenominal is genitive and singular. Similarly, in *aluminium buizen* ‘aluminium tubes’, the head noun is plural, whereas the modifying mass noun is singular.

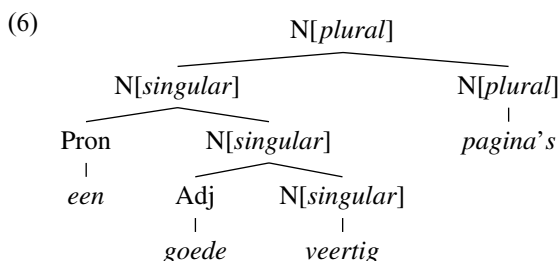
Turning now to the numerals, we find the same inflectional variation and the same lack of morpho-syntactic agreement. As shown in the bottom

[10] There is even a third possibility: in *een duivels plan* ‘a devilish plan’, *-s* is a derivational affix which combines with a nominal stem to yield an adjective. Other examples of this combination are *schools* ‘school-ADJ’ and *honds* ‘dog-ADJ’.

half of table 4, the numerals have plural counterparts, as in *honderden deelnemers* ‘hundred-PL (of) participant-PL’ and *twee zevens* ‘two seven-PL’, and they have dative *-n* forms, which are used in such PPs as *met z’n zevenen* ‘with his seven-DAT’ and (*breekt*) *in tweeën* ‘(breaks) in two-DAT’. The absence of distinctive genitive forms is due to the fact that they are feminine.

The numerals are also exempt from morpho-syntactic agreement. In *deze vier paarden* ‘these four horses’, for instance, the head noun and the NP as a whole are plural, as demonstrated by *deze vier paarden zijn/*is te koop* ‘these four horses are/*is for sale’, but the numeral is singular. The absence of agreement is also clear from the fact that plural nouns can be preceded by both singular and plural forms of the numerals: *honderd deelnemers* ‘(a) hundred participants’ and *honderden deelnemers* ‘hundreds (of) participants’ are both well-formed.

Besides the inflectional data and the lack of morpho-syntactic agreement, there is a third piece of evidence for the assumption that Dutch numerals are common nouns, i.e. the fact that they take the same kinds of dependents. Notice, for instance, the prenominals in *die zes* ‘that six’ and *elke zeven* ‘each-DCL seven’.¹¹ Moreover, the numerals can also take the same dependents as common nouns when they are used in prenominal position. To illustrate this, let us take the NP *een goede veertig pagina’s* ‘a good-DCL forty pages’. The article in this NP must apply to the numeral, since it is not compatible with a plural noun like *pagina’s* ‘pages’. The same holds for the adjective: it is not the pages which are claimed to be good, but their number. The structure of the NP is, hence, left branching, as in (6).



This analysis of the Dutch numerals confirms Jackendoff’s analysis of the English numerals as common nouns (Jackendoff 1977). The alternative of treating them as adjectives is empirically less adequate, at least for Dutch,

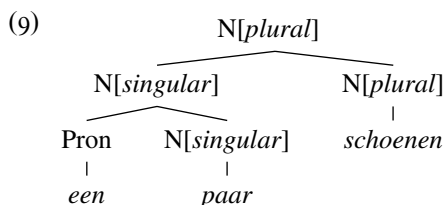
[11] The numerals are more regularly used without determiner than the other common nouns. Compare, for instance, the well-formed *drie is haar favoriete nummer* ‘three is her favorite number’ with the less felicitous *trein is haar favoriete vervoermiddel* ‘train is her favorite transportation-means’. This does not imply, though, that the numerals must belong to another part of speech. Otherwise, the plural nouns would also have to be assigned to another part of speech than singular count nouns.

since it would make the wrong predictions about inflection, agreement and modification.¹²

The common noun treatment is appropriate not only for numerals, but also for some other quantifying nouns, such as *paar* 'pair' and *dozijn* 'dozen'. To motivate this, let us take the phrase *een paar schoenen* 'a pair shoes'. This phrase is ambiguous: it can literally mean 'a pair of shoes', but it can also mean 'a few shoes' (two or three, but not much more). In the former interpretation, *paar* is the head and *schoenen* a postnominal dependent, so that the combination is singular, as in (7). In the latter interpretation, *paar* is a pronominal dependent of the head *schoenen*, so that the combination is plural, as in (8).

- (7) Er staat een paar schoenen in de hoek.
 there stands a pair shoes in the corner
 'There is a pair of shoes in the corner'
- (8) Er staan een paar schoenen in de hoek.
 there stand a pair shoes in the corner
 'There are a few shoes in the corner.'

The structure of the latter looks as follows.



In this interpretation, the quantifying element *paar* 'pair' is a singular pronominal noun, which requires a plural count noun as its head, just like the numeral *veertig* in the previous tree.

2.5 Eliminating the functional categories

It logically follows from the argumentation in this section that there is no need for such functional categories as Det, Quant, Art and Num. As a matter of fact, the use of these categories is not only unnecessary, but also counterproductive. The postulation of Det, for instance, obfuscates the manifold differences between adjectival and pronominal determiners, and it complicates the treatment of the many properties which the adjectival

[12] The ordinals, by contrast, behave like adjectives. This implies that the affixes in *tweede* 'two-ORD' and *achtste* 'eight-ORD' are derivational, rather than inflectional. In the case of *-ste*, this is further motivated by the fact that it is also used to derive adjectives from adpositions, as in *voorste*, *achterste*, *binnenste*, *buitenste*, *onderste*, *bovenste*.

determiners share with adjectives and which the pronominal determiners share with pronouns.

Still, it could be replied that the argumentation against the use of these functional categories rests on no more than three criteria (inflectional variation, morpho-syntactic agreement and modifiability), and that there may well be other data which provide evidence in favor of postulating these categories. To assess the relevance of these data I will review the two most commonly cited arguments in favor of Det.

A classic argument for the postulation of Det is based on word order, more specifically, on the fact that determiners invariably precede the other pronominals, modulo the predeterminers. As an observation, this has some initial plausibility, at least for some languages, but as a criterion for part of speech membership, it is rather unreliable, since the class of words which it singles out as special does not correspond to the class of words which are canonically understood to be determiners. On the one hand, it excludes words which are widely treated as determiners, such as the English quantifier in *Mary's every move*, the Dutch quantifier in *zijn beide ouders* 'his both-DCL parents', and the Italian possessives in *la nostra stanza* 'the our room' and *l'unico mio amico* 'the only my friend'. On the other hand, it includes a number of words which are never thought of as determiners. The Dutch pronominals with the case affix *-s* or *-r*, for instance, cannot be preceded by any other pronominal, also if they are qualifying adjectives, as in *te goeder trouw* 'to good-DAT faith', but no grammar has ever inferred from this that *goeder* must be a determiner.

Another problem with the word order criterion concerns its reliance on the assumption that matters of linear order are linked in non-trivial ways with matters of part of speech membership. This assumption is not only left unmotivated, it is also invalidated by standard linguistic practice. Let us, for instance, take the order of the verbal dependents in SOV languages. In such languages, the subject precedes the other dependents of the verb. This, however, is not taken to provide any evidence for treating it as belonging to a separate syntactic category. Instead, the standard practice is to treat the subject as an NP, just like the (in)direct object, and to capture the linear order facts in terms of other devices, such as phrase structure rules or word order constraints. By the same token, the observation that the determiners precede the other pronominals does not of itself imply that they belong to a different part of speech.

Another commonly used argument for the postulation of 'Det' is based on the claim that determiners are obligatory, whereas the other pronominals are optional. In order to make sense, this claim needs a lot of provisos. Plural nouns and mass nouns, for instance, are routinely used without determiner, and so are most of the proper nouns. Even singular count common nouns do not always need a determiner to be well-formed. Notice, for instance, the determinerless nouns in the PPs *by train* and *in town*, in the NPs *page 5* and

chapter 6, and in the coordinate phrases *friend or foe* and *husband and wife*. In Dutch and German, the counterexamples also include singular count nouns in predicate nominals, as in *hij is leraar* and *er ist Lehrer* ‘he is (a) teacher’. Many more counterexamples can be found, of course, in languages without articles. From a descriptive point of view, then, it is simply untrue that the determiners are obligatory.

Another problem with this argument concerns its assumption that there is a non-trivial link between part of speech membership and obligatoriness. This assumption, though, is daily flouted in standard linguistic practice. For modeling verbal projections, for instance, it is standardly assumed that the addition of a VP modifier is optional, whereas the addition of a subject is obligatory, at least in finite clauses. As a consequence, if this distinction were sufficient to motivate a part of speech distinction, it would follow that subjects must belong to a different syntactic category than VP modifiers. More specifically, since subjects are NPs, it would follow that VP modifiers cannot be NPs. This, however, is at odds with the fact that VP modifiers can take the form of an NP. Notice, for instance, the frequency adjunct in *go to Brussels every week* and the temporal adjunct in *leave next Friday*.

Summing up, the two arguments which are most commonly used to motivate the postulation of a separate part of speech for determiners do not stand up to scrutiny. Combined with the evidence in favor of the claim that the determiners are either adjectives or (pro)nouns, the argumentation yields a clear and unambiguous result, i.e. the elimination of the category ‘Det’ and its cognates ‘Quant’, ‘Art’ and ‘Num’.

2.6 Exit DP

If there is no empirical evidence for the postulation of ‘Det’, then there is a fortiori no evidence for D(et)P. In a last-ditch attempt to save the ‘spirit’ of the DP analysis, one could maintain that the determiners are the head of the noun phrase, no matter what their syntactic category is. On that assumption, *deze tafel* ‘this-DCL table’ would be an AP, since the demonstrative is an adjective, whereas *dat boek* ‘that book’ would be an NP, since this demonstrative is a pronoun. This modified (and diluted) DP treatment is unsatisfactory, though, since it complicates the formulation of all rules and constraints which refer to noun phrases. Transitive verbs, for instance, can no longer be said to select an NP object, but must be said to select a phrase which is either an NP or an AP. This is not only more verbose, it also requires further stipulations, since only certain kinds of ‘APs’ would be admissible in NP positions. Compare, for instance, the grammatical *ik verkies deze tafel* ‘I prefer this-DCL table’ with the ungrammatical **ik verkies zeer duur* ‘I prefer very expensive’. Another problem concerns noun phrases with a pronominal determiner. If the pronoun is treated as the head, one makes incorrect predictions about the case and number of *wiens paarden*

'whose horses', the person and number of *jullie paard* 'your horse', and the number of *wat paarden* 'some horses'. In sum, neither the substance nor the spirit of the DP treatment can be saved.

The NP treatment, by contrast, emerges unscathed and reinforced, not only because it gets the facts right in those combinations which are problematic for the DP treatment, such as *wiens paarden* 'whose horses', *jullie paard* 'your horse', and *wat paarden* 'some horses', but also because it no longer needs to exempt Det (as well as Quant, Art and Num) from the generalizations which hold for the substantive categories (such as V, N, A and P).

3. PRENOMINALS AS FUNCTORS

In light of the conclusions of the previous section, I will treat the noun as the head of the noun phrase. At the same time, I do not advocate a return to an NP analysis along the lines of Chomsky (1970) and Gazdar et al. (1985). More specifically, I will not adopt the distinction between specifiers and modifiers, which is typical of nearly all versions of X-bar syntax (section 3.1). Instead, the prenominal dependents will be treated as functors which select a nominal head (3.3). This functor treatment will then be shown to provide a suitable framework for the analysis of NP-internal morpho-syntactic agreement (3.4). This section also includes a brief survey of the HPSG notation (3.2).

3.1 *On the distinction between specifiers and modifiers*

In the original version of X-bar syntax, the notion 'specifier' contrasts with the notions 'head', 'complement' and 'modifier', see Chomsky (1970). The application of these notions to the nominal projection has already been exemplified in the introduction. Their application to the other categories follows the same pattern. The specifiers of adjectives are identified with degree markers, as in *so/very/how tall*, and the specifiers of prepositions with measure phrases, as in *long/just/right after the explosion*. The specifiers of verbs were originally identified with the subject NP, but with the introduction of a separate projection for Infl it became more common to treat the subject as the specifier of I(nfl)P and to identify the specifier of VP with adverbs of frequency, as in *they will never/often/always miss a beat*, or with floating quantifiers, as in *they will all/both/each receive a present*.

What these different kinds of specifiers have in common is not easy to spell out. It cannot be defined in terms of syntactic function, since the same function is realized as a specifier in some projections and as a modifier in other projections. Measure phrases, for instance, are routinely treated as specifiers in PPs and APs, but not in NPs or VPs. In *five minutes before* and *five foot tall*, for instance, the measure phrase is commonly claimed to be a specifier, but in *a five-foot seal* the measure phrase must be a modifier, since

the specifier role is already assigned to the determiner. Similarly, in *they have both walked ten miles*, the measure phrase must be a modifier, since the specifier role is assigned to the floating quantifier.

Word order does not provide a common denominator either, for in spite of the fact that the specifier tends to be the leftmost dependent in the projection, there are too many exceptions to employ this as a criterion. Notice, for instance, the post-head specifiers in the Italian NP *casa mia* ‘house my’, the Dutch NP *geld genoeg* ‘money enough’ and the English AP *tall enough*. Notice also that determiners can be preceded by other words or phrases, as in *all those boys*, *such a bore*, *three times my size* and *too tall a boy*.

Equally unsuitable as a criterion is the claim that projections are incomplete without a specifier. For the nominal projections, this has already been demonstrated in section 2.5 above. For the other projections, it is even more obvious: there is no reason to assume that there is anything missing from the AP in *a tall boy*, the PP in *the panic after the explosion* or the VP in *they received some presents*.

In sum, it is hard to define in cross-categorial terms what a specifier is. Adding to the confusion is the fact that the notion has come to mean rather different things in different frameworks.

In post-*Barriers* transformational grammar it is commonly taken to stand for a syntactic position which is associated with all parts of speech, including the functional ones, and which may but need not be filled by lexical material. In this perspective, the NP *this tall boy*, for instance, has three specifier slots: one in the projection of the determiner, one in the projection of the adjective and one in the projection of the noun. They are all devoid of lexical material, but they do exist as abstract positions and may contain a feature bundle. This notion of specifier is highly theory-internal. In contrast to the kindred notions of ‘head’ and ‘complement’, which do correspond to pre-theoretical intuitions, this notion of ‘specifier’ is entirely theory-specific.

In other variants of generative grammar, the notion is either absent or used in a radically different way. In Head-driven Phrase Structure Grammar, for instance, the factor which distinguishes specifiers from modifiers is lexical selection: while specifiers are selected by their head, modifiers are not. This is meant to capture the intuition that a projection without specifier is incomplete, or at least unsaturated. This intuition, though, is not supported by empirical evidence, as indicated above. Moreover, the device of lexical selection seriously complicates the treatment of the weakly declined adjectives. To illustrate this, let us take the singular neuter noun *water* ‘water’. Since this is a mass noun, it may but need not take a determiner, and the addition of a nondeclined adjective, as in *zout water* ‘salty water’, does not change this. The addition of a declined adjective, however, triggers a change: *zoute water* ‘salty-DCL water’ is only well-formed if it is preceded by a demonstrative or possessive determiner, as in *het zoute water* ‘the salty-DCL water’. In this combination the determiner is no longer optional but obligatory and

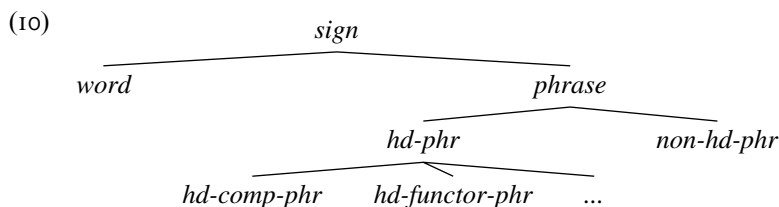
it must even be of a particular type (definite). Such a change, though, violates the general constraint that the addition of a modifier is not supposed to have any effect on the degree of saturation of a projection. This was already part and parcel of the first versions of X-bar syntax, in which the addition of an adjunct cannot change the bar level, and it is still adhered to in current HPSG, where it is captured by the Valence Principle. To resolve this conflict, I will assume that specifiers are not selected by their head. This is a consequential move, for if specifiers are not selected by their head, then there is no longer any basis (in HPSG) for the distinction between modifiers and specifiers.

To make this explicit in the terminology, I will no longer speak of modifiers and specifiers, but rather of functors. This covers both specifiers and pre-head modifiers.¹³ Prenominals will, hence, uniformly be treated as functors. To spell out the details of this treatment the presentation will by necessity become more technical.

Given the fact that a proper treatment of NP-internal agreement requires the use of a variety of interacting morpho-syntactic distinctions, I will employ a framework with a well-defined feature theory. The first proposals to integrate a feature theory into generative syntax are due to Harman (1963) and Chomsky (1965), but in more recent decades it has received most attention in non-transformational generative grammar, as initiated by GPSG (Gazdar et al. 1985) and continued by HPSG (Pollard & Sag 1987, 1994; Ginzburg & Sag 2000). It is therefore the latter's notation which I will employ for the analysis. In order to keep the presentation self-contained I include a brief survey of its leading ideas (section 3.2).

3.2 *Some background*

The HPSG approach to grammar writing can be characterized as object oriented. Linguistic units are treated as objects which belong to certain types and those types are organized in terms of hierarchies. The basic hierarchy is the one of signs.



[13] The term is also used in categorial (unification) grammar, where it stands for the nonhead daughter in combinations of a head with a specifier or a modifier, and for the head daughter otherwise, see Bouma (1988). This broader notion of 'functor' is also used in Reape (1994). My notion is more restricted, since it only subsumes nonhead daughters.

Signs are either words or phrases. The former are the smallest units of syntax. They often correspond to orthographic words but, in anticipation of a discussion in section 3.4, it is worth stressing that the correspondence is not always one-to-one. In Dutch and German, for instance, the combination of a verb and a particle is treated as a single orthographic unit when they are adjacent, as in *aankomt* and *ankommt* ‘arrives’, even though they are separate units syntactically, as is clear from the fact that they can be separated by any number of constituents, as in *komt elke dag om zes uur aan* and *komt jeden Tag um sechs Uhr an* ‘arrives every day at 6’. Such discrepancies between orthographic words and syntactic atoms result from the arbitrariness of some of the spelling conventions. Phrases are syntactic units which consist of at least two words.

Both words and phrases have phonological content and a variety of syntactic and semantic properties. To model these, all objects of type *sign* are assigned the following features:

$$(II) \left[\begin{array}{ll} \textit{sign} & \\ \text{PHON} & \textit{list}(\textit{phonemes}) \\ \text{SYNSEM} & \textit{synsem} \end{array} \right]$$

The PHON(OLOGY) feature takes a list of phonemes as its value, and the SYNSEM feature an object of type *synsem*. This is deliberately reminiscent of Ferdinand de Saussure’s definition of natural language signs as units of *signifiant* and *signifié* (Saussure 1916).

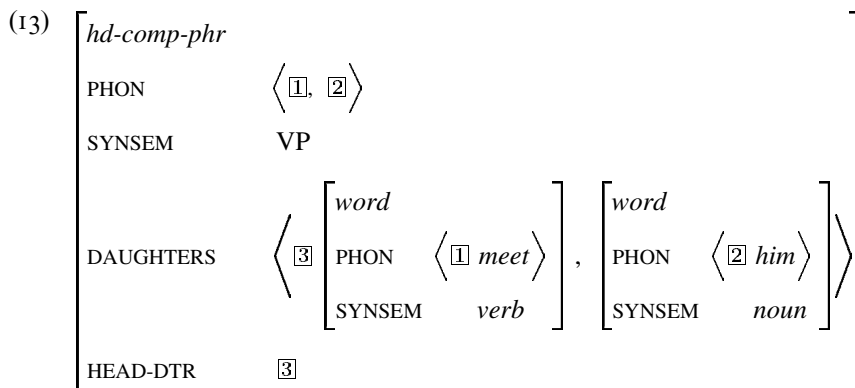
Since subordinate types inherit the properties of their supertypes, these features are associated with both words and phrases. Additionally, the subordinate types may have features of their own. Phrases, for instance, but not words, have a feature, called DAUGHTERS, whose value is a list of signs, and headed phrases also have the feature HEAD-DAUGHTER, whose value is identified with one – and only one – of the members of the list of daughters.¹⁴

$$(12) \left[\begin{array}{ll} \textit{phrase} & \\ \text{DAUGHTERS} & \textit{list}(\textit{sign}) \end{array} \right] \quad \left[\begin{array}{ll} \textit{hd-phr} & \\ \text{HEAD-DTR} & \textit{sign} \end{array} \right]$$

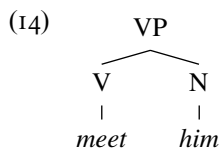
A particular subtype of the headed phrases is *hd-comp-phr*. In such a phrase, the head daughter selects its nonhead sister(s); the transitive verb

[14] Non-headed phrases lack this feature. Coordinate phrases, for instance, do not have a head daughter.

meet, for instance, selects an NP as its complement. The verb phrase *meet him* is, hence, a sign of type *hd-comp-phr*. This implies that its features include not only PHON and SYNSEM, as with all signs, but also DAUGHTERS and HEAD-DTR.



The boxed integers indicate identity. In this case, the PHON value of the head daughter (*meet*) is identified with the first element on the PHON list of the phrase and the one of the complement daughter (*him*) with the second. Moreover, the leftmost daughter is identified as the head daughter. This notation is roughly equivalent to the familiar tree-style notation.



The main reason for using the more elaborate Typed Feature Structure (TFS) notation is that it provides a more convenient format for expressing interdependencies between values of different features. This is significant in the present context, since such interdependencies play a key role in the treatment of selection and agreement. In the example above, for instance, it must be ensured that the complement is accusative, and not nominative. To model such constraints the objects of type *synsem* are associated with more specific features. The most relevant ones for our purpose are CAT(EGORY) and CONT(ENT).¹⁵

[15] I ignore the distinction between local and non-local properties, since the phenomena which the latter are intended to model, such as unbounded dependencies, are not relevant for a treatment of NP-internal structure. The path SYNSEM|CAT is, hence, an abbreviation of SYNSEM|LOCAL|CATEGORY.

(15)

<i>synsem</i>	
CATEGORY	<i>category</i>
CONTENT	<i>sem-object</i>

Objects of type *category* contain morpho-syntactic features, such as CASE, whereas those of type *sem(antic)-object* contain semantic features, such as the one for drawing the mass/count distinction. The former will be presented and employed in the rest of this section; the latter will be introduced in section 4.

3.3 An outline of the functor treatment

To spell out the functor treatment I start with objects of type *category*. These are associated with three kinds of features, i.e. the HEAD feature (section 3.3.1), the valence features SUBJ(ECT) and COMP(LEMENT)S (3.3.2) and the MARKING feature (3.3.3).

(16)

<i>category</i>	
HEAD	<i>part-of-speech</i>
SUBJ	<i>list(synsem)</i>
COMPS	<i>list(synsem)</i>
MARKING	<i>marking</i>

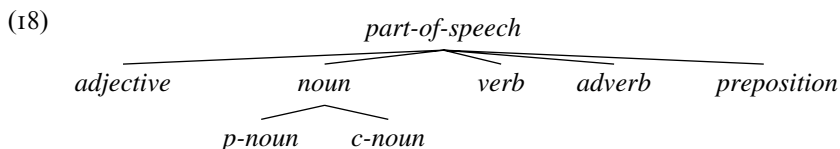
3.3.1 The HEAD feature

The value of the HEAD feature contains the morpho-syntactic information which a head daughter shares with its mother. In terms of the TFS notation this can be expressed as a constraint on the objects of type *headed-phrase*.

(17)

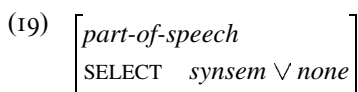
<i>hd-phr</i>					
SYNSEM	<table style="border: none; display: inline-table;"> <tr> <td style="border-right: 1px solid black; padding-right: 5px;">CAT</td> <td style="border-right: 1px solid black; padding-right: 5px;">HEAD</td> <td style="padding-left: 5px;">□ <i>part-of-speech</i></td> </tr> </table>	CAT	HEAD	□ <i>part-of-speech</i>	
CAT	HEAD	□ <i>part-of-speech</i>			
HEAD-DTR	<table style="border: none; display: inline-table;"> <tr> <td style="border-right: 1px solid black; padding-right: 5px;">SYNSEM</td> <td style="border-right: 1px solid black; padding-right: 5px;">CAT</td> <td style="border-right: 1px solid black; padding-right: 5px;">HEAD</td> <td style="padding-left: 5px;">□</td> </tr> </table>	SYNSEM	CAT	HEAD	□
SYNSEM	CAT	HEAD	□		

In words, the HEAD value of the mother of a headed phrase is identical to that of its head daughter. This is the HEAD FEATURE PRINCIPLE. It is the HPSG counterpart of the central intuition of X-bar syntax that the category of a phrase is a projection of the category of its head. The inventory of HEAD values which I will employ is the following.

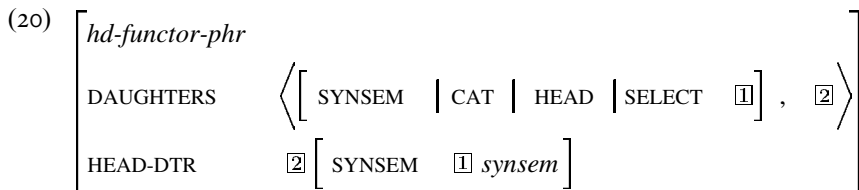


Nouns are differentiated into p-nouns and c-nouns: the former include the pronouns and the latter the common nouns.¹⁶ Notice the absence of the so-called functional parts of speech: there are no separate categories for determiners, articles, quantifiers, numerals, auxiliaries, and the like.

Besides the part of speech, there are other properties which a phrase shares with its head daughter. These are modeled in terms of features which are associated with the part of speech values. One of them is the *SELECT* feature.¹⁷



In contrast to the valence features, which capture the constraints which a head imposes on its dependents, the *SELECT* feature captures the constraints which a non-head daughter imposes on its head sister. This is useful, for instance, to express the fact that *every* requires a singular count noun as its head. This kind of selection is a defining property of phrases of type *hd-functor-phr*.



In words, the *SELECT* value of the non-head daughter ($\boxed{1}$) is required to be identical to the *SYNSEM* value of the head daughter. For ease of reference, I will call this constraint the *SELECTOR PRINCIPLE*.¹⁸ Since the *SELECT* values are of type *synsem*, and not of type *sign*, it follows that a functor can impose

[16] The proper nouns are categorially heterogeneous. Some share the characteristic properties of the pronouns and are, hence, p-nouns, whereas others share the typical properties of the common nouns and are, hence, c-nouns. For a motivation of this distinction and extensive exemplification, see Van Eynde (2003).

[17] The *SELECT* feature replaces the features *MOD(IFIED)* and *SPEC(IFIED)* of Pollard & Sag (1994) and Ginzburg & Sag (2000). In the type hierarchies of the latter, the *MOD* feature is assigned to the substantive parts of speech (A, N, V, P) and the *SPEC* feature to the functional parts of speech (Det, Marker, ...). Since I have argued against the postulation of separate functional parts of speech, I do not employ the distinction between *MOD* and *SPEC* either.

[18] The Selector Principle is a generalization of the Spec Principle of Pollard & Sag (1994).

requirements on the syntactic and semantic properties of the head, but not on its phonological properties or its internal structure. The determiner *every*, for instance, can require its head to be nominal, singular and count, but it cannot require its head to have a certain phonological shape or to be a phrase of some particular type, say *hd-comp-phrase*.

The reason why the *SELECT* feature is included in the *HEAD* value of the functor is that the selection requirements of a phrasal functor are identical to those of its head daughter. For instance, the fact that the pre-nominal Dutch AP *zeer lang* 'very long' requires a singular neuter nominal is due to the fact that its head daughter *lang* requires a singular neuter nominal.

Since the *SELECT* value is assigned to all parts of speech, it follows that every word or phrase can in principle be used as a functor. This potential, though, is not always realized. Adjectives in predicative position, for instance, do not select a nominal head sister; instead they are selected by a copular verb and are, hence, complements, rather than functors. To model this, the value of their *SELECT* feature is not of type *synsem*, but simply *none*. This distinction is also relevant for most of the pronouns. The demonstrative *that*, for instance, selects a singular noun when it is used pre-nominally, and has the *SELECT* value *none* when it is used as a subject or a complement.

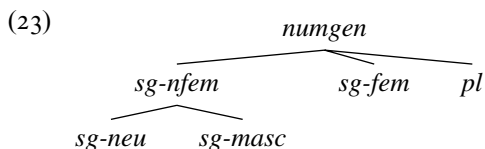
Besides the *SELECT* feature, which is assigned to all parts of speech, there are some other *HEAD* features which are assigned to specific parts of speech. The nouns, for instance, have a *CASE* feature and the c-nouns (but not the p-nouns) also have a feature for morpho-syntactic number and gender, which I will call *NUMGEN*.

- (21)
$$\left[\begin{array}{l} \textit{noun} \\ \textit{CASE} \quad \textit{case} \end{array} \right] \quad \left[\begin{array}{l} \textit{c-noun} \\ \textit{NUMGEN} \quad \textit{numgen} \end{array} \right]$$

The reason for using a single feature for number and gender is that the gender distinction is systematically neutralized in the plural (in Dutch). The relevant values have already been presented and employed in section 2.¹⁹

- (22)
$$\begin{array}{c} \textit{case} \\ \swarrow \quad \searrow \\ \textit{standard} \quad \textit{genitive} \quad \textit{dative} \\ \swarrow \quad \searrow \\ \textit{nominative} \quad \textit{accusative} \end{array}$$

[19] The intermediate types *standard* and *sing-nonfeminine* will prove useful for the treatment of agreement in section 3.4.



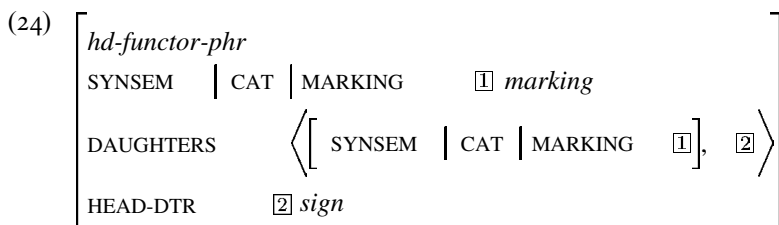
This information is included in the HEAD values, since it is shared between a nominal and its head: a plural NP, for instance, has a plural noun as its head.

3.3.2 *The valence features*

The valence features SUBJ(ECT) and COMP(LEMENT)S spell out the constraints which a head imposes on its dependents. A finite verb, for instance, requires a nominative NP as its subject and a transitive verb requires an accusative NP as its complement.²⁰

3.3.3 *The MARKING feature*

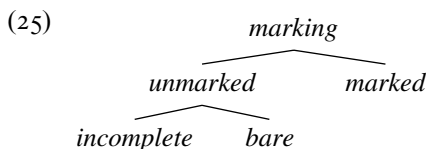
Orthogonal to the information which is included in the HEAD feature and which is, hence, shared between the mother and its head daughter, there is the information in the MARKING feature, which is shared between the mother and its non-head daughter, as specified in the GENERALIZED MARKING PRINCIPLE.²¹



In words, the MARKING value of the mother in a phrase of type *head-functor* is identical to that of its nonhead daughter. In the same way as every word and phrase has some specific value for HEAD, it also has a specific value for MARKING. The inventory of values which I will use is the following.

[20] In contrast to Pollard & Sag (1994) I do not employ a valence feature for the selection of specifiers; see section 3.1.

[21] This is a generalization of the MARKING PRINCIPLE of Pollard & Sag (1994). While the latter only applies to marker daughters, such as complementizers, this version applies to all functor daughters. In phrases of type *hd-comp-phrase*, the mother shares its MARKING value with the head daughter.

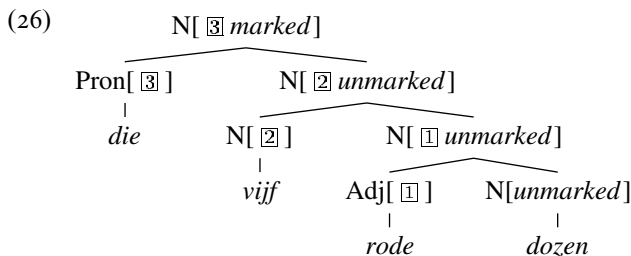


The distinction between *marked* and *unmarked* is familiar from Pollard & Sag (1994); that between *bare* and *incomplete* is new. Its purpose is to differentiate between nominals without determiner which can freely be used in NP positions, such as *zout water* ‘salty water’, and nominals without determiner which are inherently incomplete, such as the weakly declined *zoute water* ‘salty-DCL water’.

Given these distinctions we can model the construction of nominal projections in a way which is both tight and flexible. For a start, let us assume that the c-nouns are all assigned a value of type *unmarked* and the p-nouns of type *marked* (see section 3.4 for the relevant TFS). Next, let us assume that prenominals (modulo the predeterminers) select an unmarked nominal as their head. From this, it follows that the c-nouns can be preceded by any number of prenominals, whereas the p-nouns cannot. Moreover, given the GENERALIZED MARKING PRINCIPLE it follows that the addition of a prenominal c-noun to a nominal projection, as in *aluminium buizen* ‘aluminium tubes’, yields an unmarked nominal, whereas the addition of a prenominal p-noun yields a marked nominal. The addition of the interrogative *wiens* ‘whose’ to the unmarked *hoed* ‘hat’, for instance, yields the marked nominal *wiens hoed* ‘whose hat’. This accounts for the fact that the former can be preceded by another prenominal, as in *deze aluminium buizen* ‘these aluminium tubes’, whereas the latter cannot: **deze wiens hoed* ‘this whose head’.

Since the marking distinction is orthogonal to the part of speech distinction, it also applies to adjectives. The marked ones, for instance, are those which cannot be preceded by another prenominal, such as the interrogative *welk* ‘which’ and the demonstrative *deze* ‘this-DCL’. The unmarked ones, by contrast, are those which can be preceded by another prenominal. They include most of the descriptive adjectives, but also some of the quantifying ones, such as that in *de beide broers* ‘the both-DCL brother-PL’.

As an illustration of how this works, let us take the nominal *die vijf rode dozen* ‘those five red-DCL boxes’.



The common noun *dozen* ‘boxes’ is *unmarked*, and the addition of the adjective *rode* and the numeral *vijf* does not trigger any change, but the addition of the demonstrative pronoun does, since it shares its MARKING value, which is of type *marked*, with the NP. Given the assumption that pronominals select an unmarked nominal as their head, the SELECTOR PRINCIPLE correctly excludes such ill-formed combinations as **vijf die dozen* ‘five those boxes’ and **rode die dozen* ‘red-DCL those boxes’.

Just like the values of the HEAD feature, the MARKING values can be associated with other features. For the purposes of this text, I will introduce just one, called FORM.²² Its values include the following.²³

- (27) $\left[\begin{array}{l} \text{marking} \\ \text{FORM } \textit{form} \end{array} \right]$ *form*

indefinite *determinate* *universal* ...

The indefinite nominals are those which can be the subject of an existential clause.²⁴ They include most of the unmarked nominals and the nominals which are introduced by an indefinite determiner, such as *geen* ‘no’, *genoeg* ‘enough’ and the indefinite article.

- (28) (a) Er zijn (twee/geen/genoeg) paarden in de stal.
 there are two/no/enough horses in the stable
 (b) Er is een/geen paard in de stal.
 there is a/no horse in the stable

Nominals which are introduced by another kind of determiner are not allowed in this position.

- (29) (a) Er zijn *die/*zijn/*alle paarden in de stal.
 there are *those/*his/*all horses in the stable
 (b) Er is *dit/*het/*mijn/*elk paard in de stal.
 there is *this/*the/*my/*each horse in the stable

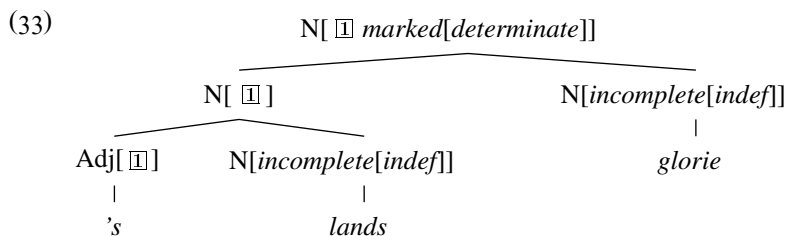
A natural way to model this is to assign the value *indefinite* to the unmarked nouns and adjectives, as well as to the indefinite determiners, and to assign another value to the other determiners. The demonstrative and possessive determiners, for instance, are assigned the value *determinate*. This is useful not only to distinguish them from the indefinite determiners, but also to have a common label for the determiners which trigger the weak

[22] Another feature which I have argued to belong in the MARKING value is the one for modeling pied piping in interrogative and exclamative clauses (WH), see Van Eynde (2004).

[23] The inventory is incomplete, since I limit it to those values which are relevant for the treatment of nominal projections.

[24] This property correlates with several others, such as the inadmissibility in partitives and the tendency to occur in the right part of the Mittelfeld.

Another example of iterative propagation concerns the genitive in *'s lands glorie* 'the-GEN country-GEN glory'.

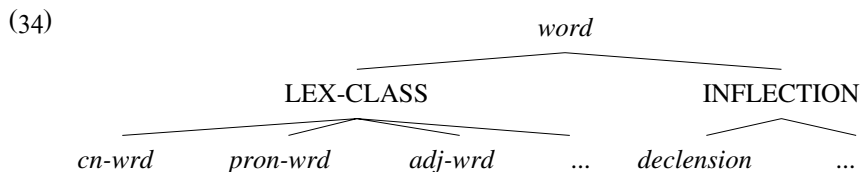


The common noun *lands* combines with the genitive article *'s*, and since the latter is marked and determinate, the resulting NP is marked and determinate as well, which in turn implies that its head daughter is of type *incomplete*. When the genitive NP is combined with the common noun *glorie* 'glory', the result is again a marked and determinate NP. This accounts for the fact that it cannot be preceded by another determiner, as in **die 's lands glorie* 'that the-GEN country-GEN glory', and that it cannot be used as the subject of an existential clause, as in **er is 's lands hoogste berg in deze provincie* 'there is the-GEN country-GEN highest mountain in this province'. Moreover, it also accounts for the fact that the genitive triggers the use of weakly declined prenominals, as in the singular neuter *'s lands grote/*groot handelsoverschot* 'the-GEN country-GEN large-DCL trade-surplus'.

This section has provided an outline of the functor treatment of the noun phrase. With this outline as a background I will now develop a treatment of NP-internal morpho-syntactic agreement.

3.4 NP-internal morpho-syntactic agreement

In HPSG the lexicon is not an alphabetically ordered list of lexical entries, but a multi-dimensional type hierarchy, see Pollard & Sag (1987). Exploiting the potential of this approach I will develop a treatment of NP-internal agreement which is based on two dimensions of classification: LEX-CLASS (section 3.4.1) and INFLECTION (3.4.2).



Individual words belong to types which inherit properties from both dimensions (3.4.3).

3.4.1 *LEX-CLASS partition*

The LEX-CLASS partition resembles the part of speech hierarchy, but its role in the grammar is different. While the part of speech values model the syntactic properties which a word shares with its projection, the function of the LEX-CLASS types is to spell out all properties which hold for a particular class of lexical items; these include not only syntactic properties, but also semantic or phonetic ones. In this respect, the LEX-CLASS types contain more information than the values of the HEAD feature. At the same time, the LEX-CLASS types have a more restricted range of application, since they only apply to words, whereas the HEAD values are also assigned to phrases. As an illustration, let us take the constraints which are associated with the LEX-CLASS type for the common nouns.

$$(35) \left[\begin{array}{c} cn-wrd \\ \\ SYNSEM \quad | \quad CAT \end{array} \left[\begin{array}{cc} HEAD & c-noun \\ MARKING & \left[\begin{array}{c} unmarked \\ FORM \quad indefinite \end{array} \right] \end{array} \right] \right]$$

Common nouns are required to belong to the the part of speech *c-noun* and to be unmarked and indefinite. Being c-nouns, they also have SELECT, CASE and NUMGEN features, but the values of these features are different for the various nouns and are, hence, left underspecified in the definition of the type *cn-wrd*. In a similar way, it is possible to capture the properties which are common to other classes of words. The pronouns, for instance, belong to the part of speech *p-noun* and are marked.

3.4.2 *The INFLECTION partition*

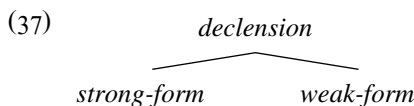
The INFLECTION dimension is added to model the different types of inflectional variation, such as declension and conjugation. In languages like Dutch and German, the variation of declension is relevant for the adjectives which combine with an unmarked nominal projection. This can be captured in terms of a constraint on the type *declension*.

$$(36) \left[\begin{array}{c} declension \\ \\ SYNSEM \quad | \quad CAT \quad | \quad HEAD \quad | \quad SELECT \quad | \quad CAT \end{array} \left[\begin{array}{cc} HEAD & c-noun \\ MARKING & unmarked \end{array} \right] \right]$$

This constraint excludes the predicative adjectives, since their SELECT value (*none*) is incompatible with that in the constraint. It also excludes

adjectives in predeterminer position, since they select a marked nominal. These exemptions are justified, since Dutch and German adjectives do not show any inflectional variation in predicative and predeterminer positions.

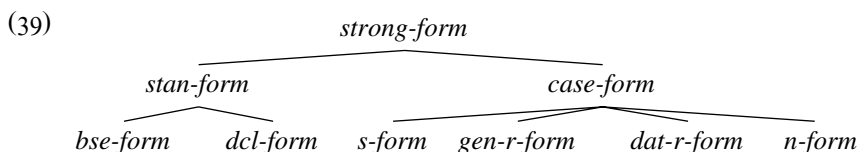
More specific conditions are associated with the various subtypes of *declension*. The basic distinction is that between strongly and weakly declined forms.



Typical of the weak forms is that they are inherently incomplete.



The strong forms, by contrast, are either bare or marked, but never incomplete. The contributions of the individual affixes are captured by some finer-grained distinctions. The strong forms, for instance, are further differentiated as follows:



The pronominals of type *stan-form* select a nominal in standard case, and the base forms (*bse-form*) are associated with the further requirement that this nominal must be singular and neuter.



The declined forms (*dcl-form*), by contrast, require the nominal to be plural or singular nonneuter. Since the selected noun cannot at the same time be singular neuter and singular nonneuter or plural, it follows that the standard forms of the pronominals must have the same form when they modify the same noun. Mixtures of base forms and declined forms, as in **elk zwarte paard* ‘each black-DCL horse’ and **elke zwart paard* ‘each-DCL black horse’, are, hence, excluded.

An apparent counterexample is the NP *bekwame industrieel ingenieurs* ‘competent-DCL industrial engineers’. The first adjective is declined, as is

normal in plural NPs, but the second is not, even though its stem is declinable, as illustrated by *industriële processen* ‘industrial-DCL processes’. To account for this anomaly, I appeal to the remark made in section 3.2 above that the basic units of syntax (the words) do not always coincide with orthographic units. More specifically, I assume that the nondeclined prenominal in *industriël ingenieurs* ‘industrial engineers’ is not an autonomous word, but part of a compound, just like the incorporated adjective in *jonge grootouders* ‘young-DCL grand-parents’. The only difference between *grootouders* and *industriël ingenieurs* is that the incorporation is sanctioned by the orthography in the former, but not in the latter. Further evidence for the incorporated status of *industriël* is provided by the fact that it cannot be separated from the noun by other prenominals and by the fact that the [Adj–N] combination cannot be paraphrased in terms of a relative clause: an *industriël ingenieur* is not an engineer who is industrial. Interestingly, the incorporated status of the adjective is sufficient to exempt it from the agreement constraints, for since incorporated elements are not of type *word*, they are not subsumed by any of its subtypes either. More specifically, the incorporated element *industriël* is not subsumed by the type *bse-form* and is, therefore, free to occur in singular nonneuter and plural NPs.

The forms with an overt case affix require a nominal which is either genitive or dative, and have the peculiarity that they cannot be stacked. If they are followed by another prenominal, the latter must be weakly declined. In terms of the feature hierarchy, this implies that they select a nominal which is marked as *incomplete* and that their own MARKING value is of type *marked*.

$$(41) \left[\begin{array}{l} \textit{case-form} \\ \text{SYNSEM} \mid \text{CAT} \left[\begin{array}{l} \text{HEAD} \mid \text{SELECT} \mid \text{CAT} \mid \text{MARKING} \textit{incomplete} \\ \text{MARKING} \quad \textit{marked} \end{array} \right] \end{array} \right]$$

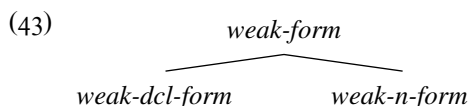
The constraints which they impose on the case, number and gender of the selected nominal are associated with the individual affixes. The *-s* forms, for instance, combine with singular masculine or neuter genitives.

$$(42) \left[\begin{array}{l} \textit{s-form} \\ \text{SYNSEM} \mid \text{CAT} \mid \text{HEAD} \mid \text{SELECT} \mid \text{CAT} \mid \text{HEAD} \left[\begin{array}{l} \text{CASE} \quad \textit{genitive} \\ \text{NUMGEN} \quad \textit{sg-nfem} \end{array} \right] \end{array} \right]$$

There are similar constraints for the *-n* forms, which require nonfeminine datives, and the genitive and dative *-r* forms.

Since the various subtypes of *strong-form* contain quite specific information about the selected nominals, the addition of a prenominal often has the effect of resolving ambiguity or underspecification. The common noun *pad*, for instance, is ambiguous: it means ‘path’ when it is neuter, and ‘toad’ when it is masculine. As a consequence, when it is combined with the base form of a declinable prenominal, as in *elk pad*, it must be neuter and, hence, mean ‘path’. Conversely, if it is combined with a declined form, as in *elke pad*, it must be nonneuter and, hence, mean ‘toad’. The resolution of ambiguity and underspecification can also work in the other direction. The ambiguity of the prenominal *-r* forms, for instance, is resolved if they are combined with a noun which is unmistakably dative, as in *van ganser harte* ‘of whole-DAT heart-DAT’.²⁵

The weakly declined forms show less variation. They are marked by either *-ə* or *-n*.



Since they must be preceded by a prenominal which is either marked for case or of type *determinate*, and since these prenominals contain detailed information about the case, number and gender of the NP, the constraints on the weak forms themselves can be left underspecified. The type *weak-dcl-form*, for instance, does not have any other constraints than those which it inherits from its immediate supertype *weak-form*, and the type *weak-n-form* only adds that the selected nominal’s *CASE* value be different from *standard*. As such, it subsumes the use of the *-n* forms in the genitive *des goeden levens* ‘the-GEN good-GEN life-GEN’ and the dative *ten eeuwigen dage* ‘to-the-DAT eternal-DAT day-DAT’.

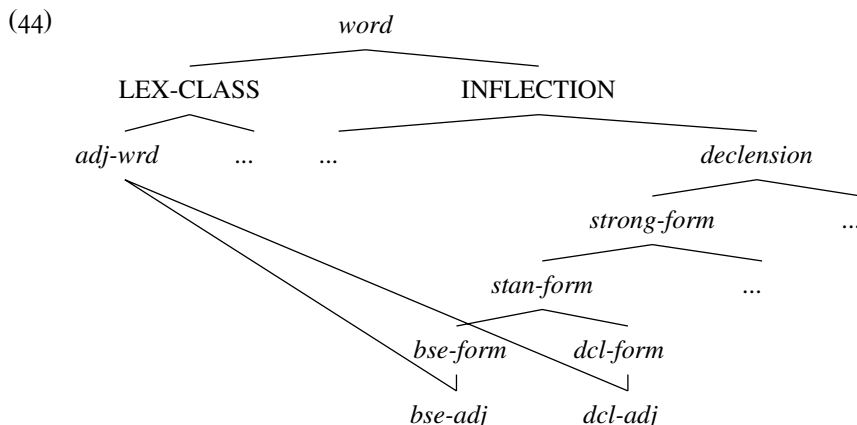
Since the weakly declined forms are homophonous with the strongly declined *-ə* and *-n* forms, there is a nearly systematic ambiguity. The adjective in *zwarte ezel(s)* ‘black-DCL donkey(s)’, for instance, is subsumed by both *dcl-form* and *weak-dcl-form*. This ambiguity can be resolved by a preceding prenominal. If that prenominal is of type *determinate*, as in *mijn zwarte ezel(s)* ‘my black-DCL donkey(s)’, the nominal’s *MARKING* value and, hence, the *MARKING* value of the prenominal adjective must be *incomplete*. By contrast, if the preceding prenominal is not of type *determinate*, as in *elke zwarte ezel* ‘each-DCL black-DCL donkey’, the ambiguity is resolved to *bare*. If there is no preceding prenominal, the ambiguity is resolved by the external selector of the NP. Verbs and prepositions, for instance, which select an NP as their

[25] The resolution of ambiguity and underspecification cannot but be partial, if one only considers the NP and its internal structure. The distinction between nominative and accusative, for instance, can hardly ever be made on the basis of information which is contained in the NP alone, but requires an analysis of the context in which the NP is used.

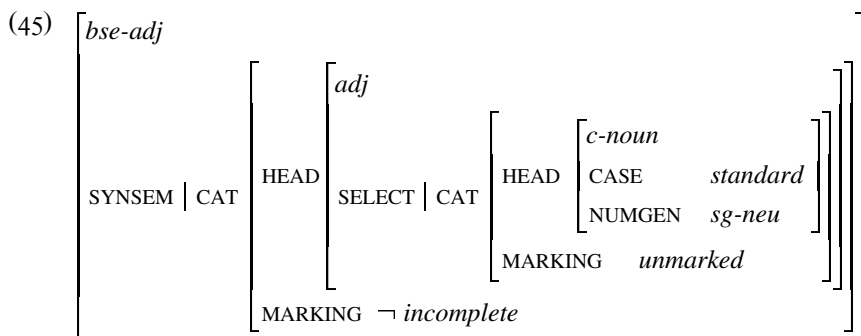
complement can require the NP to have a MARKING value which is different from *incomplete*.²⁶ As a consequence, if *zwarte ezels* is used without determiner in complement position, its marking value will be resolved to *bare* and the adjective will be subsumed by *dcl-form*, rather than by *weak-dcl-form*.

3.4.3 Multiple inheritance

Since the partitions of LEX-CLASS and INFLECTION are mutually independent, we can define types which inherit from both.



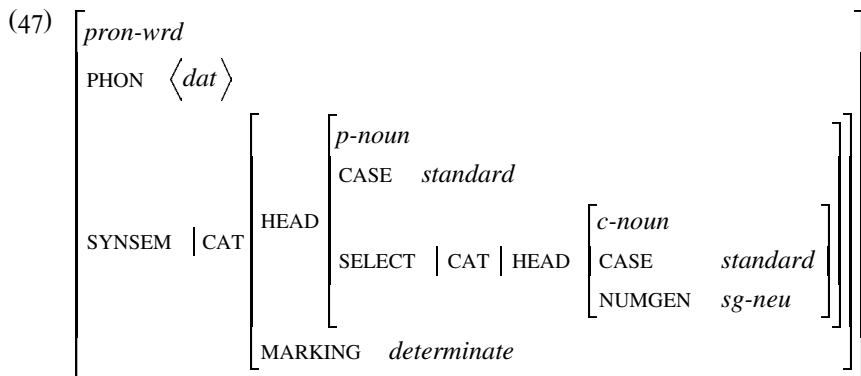
The base forms of the pronominal adjectives, for instance, inherit from the types *adj-wrd*, on the one hand, and *bse-form*, on the other hand, and the resulting type *bse-adj* has all the properties which it inherits from its supertypes.



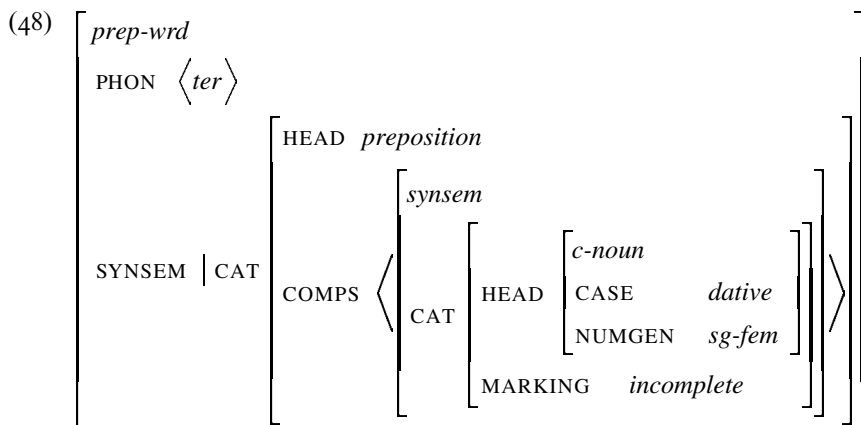
The part of speech is inherited from *adj-wrd*, the selection of an unmarked nominal from *declension*, the MARKING value from *strong-form*, the restriction

[26] Exceptional in this respect are the fused prepositions, see 3.4.3.

they are exempt from NP-internal agreement. As a consequence, if they impose any restrictions on the CASE or NUMGEN values of the nominals which they select, these restrictions have to be stipulated in their lexical entries. The fact, for instance, that the pronominal pronoun *dat* ‘that’ requires a singular neuter nominal in standard case cannot be attributed to inheritance from *bse-form*, but must be spelled out in its lexical entry.



Something similar holds for the fused prepositions *ter* and *ten*. They both select a dative nominal, and while the former requires this nominal to be singular and feminine, as in *ter voorbereiding van het feest* ‘to-the-DAT preparation of the party’, the latter requires it to be different from singular feminine, as in *ten dele* ‘to-the-DAT part-DAT’. These restrictions are identical to those which are associated with *dat-r-form* and *n-form*, respectively, but they cannot be inherited from these types, since the fused preposition is not a head selecting functor. Instead, it is a complement-selecting head of a PP, and this implies that the relevant restrictions belong in the COMPS value of its lexical entry.



Just like prenominals of type *case-form*, the fused prepositions require the selected nominal to have a MARKING value of type *incomplete*. They are, hence, the only external selectors of NPs which require their complement to be incomplete, see footnote 26.

3.5 *Summing up*

This section has spelt out the details of an analysis in which NPs are headed by nouns and in which the prenominals are head-selecting functors. By dissociating the roles of head and selector we have been able to take on board the advantages of the DP treatment without being burdened by its disadvantages. The resulting treatment can also deal in a straightforward and elegant way with the phenomenon of NP-internal morpho-syntactic agreement. What is not yet covered, though, is a treatment of the more semantically oriented types of agreement, such as the fact that *every* requires a singular count noun. This is the topic of the next section.

4. NP-INTERNAL INDEX AGREEMENT

In order to model the more semantically oriented types of agreement we have to venture into the interface between syntax and semantics. In terms of the HPSG feature geometry, this is the realm of the CONTENT values. I will first present those parts of the feature geometry which will be employed in the analysis (section 4.1) and then discuss two types of NP-internal index agreement (4.2 and 4.3).

4.1 *Background*

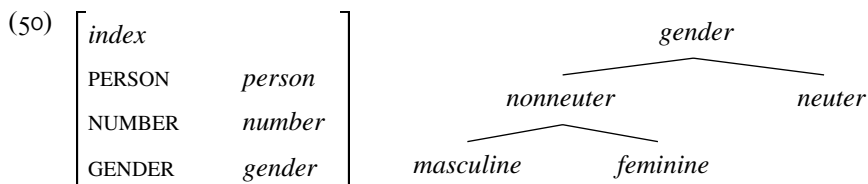
In Ginzburg & Sag (2000) the CONTENT values of nouns and their projections are of type *scope-object*, and such objects consist of an index and a set of restrictions on that index. The common noun *horse*, for instance, has the following CONTENT value.²⁷

$$(49) \left[\begin{array}{ll} \text{scope-obj} & \\ \text{INDEX} & \mathbb{I} \textit{index} \\ \text{RESTR} & \left\{ \textit{horse-rel} \quad (\mathbb{I}) \right\} \end{array} \right]$$

The noun expresses a relation (*horse-rel*) which takes an argument of type *index*. Indices resemble the variables of predicate logic, but serve a wider

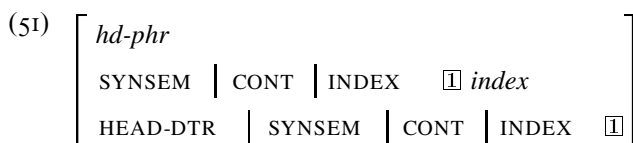
[27] This feature structure is the abbreviation of a more complex one, in which the restriction takes the form of a fact, which is a particular type of message; see Ginzburg & Sag (2000: 136).

range of functions. Besides the role which they play in semantic composition, they also play a role in the treatment of binding, control and certain types of agreement. To serve this purpose the indices are enriched with a number of features, such as PERSON, NUMBER and GENDER. The values of the former two features are the obvious ones; for GENDER I employ the type hierarchy in (50).



The NUMBER and GENDER features in the index are similar to the NUMGEN feature in the CATEGORY values, but their role is different. While NUMGEN concerns a morpho-syntactic property of the noun itself, the NUMBER and GENDER features in the index concern the mode of individuation of the noun's referent. For most of the common nouns, the value of NUMGEN corresponds to those of NUMBER and GENDER, but there are also cases of divergence. The Dutch noun *meisje* and its German equivalent *Mädchen* 'girl', for instance, are morpho-syntactically invariably neuter, but their index can also be feminine. Other examples of this kind are discussed in e.g. Kathol (1999), Wechsler & Zlatić (2000, 2003), Casillas Martinez (2003) and Van Eynde (2003). Besides the existence of such discrepancies, there is another reason for distinguishing the NUMBER and GENDER features from the morpho-syntactic NUMGEN feature, i.e. the fact that the p-nouns lack the latter, but contain the former. This accounts for the fact that the number and gender distinctions which they express concern the mode of individuation of their referent, and not a morpho-syntactic property of the p-noun itself; section 2.2.

The propagation of INDEX values is modeled by the SEMANTIC INHERITANCE PRINCIPLE, quoted from Sag & Wasow (1999: 116).



In words, the index of the mother is identical to that of its head daughter. Because of the propagation of the index throughout the nominal projection, the prenominals can impose restrictions on a nominal's index, in much the same way as they can impose restrictions on its CASE and NUMGEN values. This provides us with the means to model some semantically oriented types of agreement. I will discuss two cases of this type of agreement.

4.2 *The mass/count distinction*

Since the indices concern the mode of individuation of a nominal's referent, they are the natural locus to host the distinction between count nouns and mass nouns. To this end I add the feature COUNT(ABILITY) to the NUMBER values in the index.

$$(52) \left[\begin{array}{cc} \textit{number} & \\ \text{COUNT} & \textit{countability} \end{array} \right] \quad \begin{array}{c} \textit{countability} \\ \diagdown \quad \diagup \\ \textit{count} \quad \textit{mass} \end{array}$$

A nominal has an INDEX|NUMBER|COUNT value of type *count* if its referents are individuated as discrete and, hence, as countable. The common noun *horse*, for instance, is a count noun, since it can be combined with the numeral *one* in the singular and with *two* in the plural. By contrast, *furniture* is a mass noun, since it cannot be used in this way: **one furniture* and **two furnitures* are not well-formed. The distinction is also applicable to plural nouns: the noun *oats*, for instance, is a mass noun, since it cannot be combined with *two* and since it lacks a singular counterpart. While most nouns are either count or mass, there is also a subset which can be either: *glass*, for instance, is a mass noun if it denotes a kind of material, as in *lots of glass*, and a count noun if it denotes an object which is made of that material, as in *a glass of beer*. Such nouns get the underspecified value *countability*.

Since the prenominals select their nominal head, they can impose restrictions on the NUMBER and COUNTABILITY values of the nominal's index, see table 5. There is, for instance, a small group of quantifying determiners which require their nominal head to be singular and count. It includes the adjectival *elk* 'each' and *ieder* 'every' and the indefinite article *een* 'a(n)'. There is also a group of determiners which require a plural count noun. These include the adjectival *beide* 'both-DCL' and *ettelijke* 'several-DCL', all of the numerals except *één*, and some other quantifying common nouns, such as *(een) paar* in the sense of *a few*, see 2.4.²⁸ They are not compatible with plural mass nouns, as in **beide ingewanden* 'both-DCL intestines' and **twee hersenen* 'two brains', and can, hence, be used to discriminate the plural mass nouns from the plural count nouns. A third group of determiners are those which require a noun which is either singular mass or plural. It includes the adjectival *alle* 'all' and *vele* and the pronominal *veel*

[28] It may be worth stressing that the (pro)nominal quantifiers have an index of their own and that this index need not be identical to that of the selected noun. All numerals except *één*, for instance, have a singular index, but require a nominal with a plural index. This is comparable to the analysis of NPs with a possessive: in *my friends*, for instance, the possessive has a first person singular index, while its head has a third person plural index; see Pollard & Sag (1994: 52).

	Adjective	Pronoun	Common Noun
sing-count	<i>elk</i> <i>ieder</i>	<i>een</i>	
plur-count	<i>beide</i> <i>ettelijke</i>		<i>twee</i> <i>een paar</i>
¬ sing-count	<i>alle</i> <i>vele</i>	<i>veel</i> <i>weinig</i>	

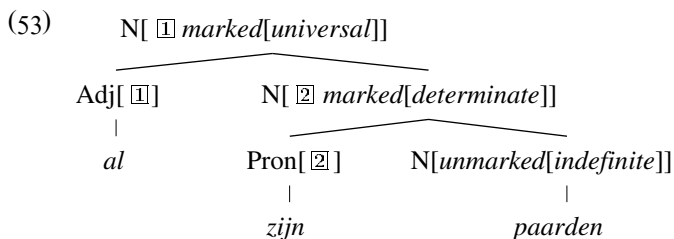
Table 5
Three types of quantifying determiners

‘much/many’ and *weinig*. In singular NPs, they combine with mass nouns, as in *veel aandacht* ‘much attention’, but not with count nouns, as in **veel ezel* ‘much donkey’. In plural NPs, they combine both with count nouns, as in *veel paarden* ‘many horses’, and with mass nouns, as in *alle ingewanden* ‘all intestines’.

Because of these restrictions, the addition of a pronominal may have the effect of resolving underspecification. The noun *glas* ‘glass’, for instance, must be a count noun if it is preceded by a pronominal of the first type, as in *elk glas* ‘each glass’, and it must be a mass noun if it is preceded by a pronominal of the third type, as in *veel glas* ‘much glass’.

In short, the SELECT feature and the SELECTOR PRINCIPLE, which were introduced to model NP-internal morpho-syntactic agreement, can also be used to model NP-internal index agreement. The uniformity of their treatment of the two kinds of agreement also makes it easy to spell out their differences. First, while morpho-syntactic agreement applies uniformly to pronominal adjectives and nonfinite verbs, no matter what they mean, index agreement is limited to a small subset of pronominals with quantifying meanings. Second, while morpho-syntactic agreement is restricted to certain syntactic categories (adjectives and nonfinite verbs), index agreement also applies to pronominal nouns and pronouns. Third, there is a difference in scope. While morpho-syntactic agreement is restricted to pronominals which select an unmarked nominal, index agreement also applies to pronominals which select a marked nominal. The predeterminers in *al zijn paarden* ‘all his horses’ and *(ge)heel de stad* ‘whole the town’, for instance, are exempt from morpho-syntactic agreement, as shown in 2.I, but not from index agreement. *Al*, for instance, combines with singular mass NPs, as in *al de aandacht* ‘all the attention’, and with plural NPs, as in *al zijn paarden* ‘all his horses’, but not with singular count NPs, as in **al de stad* ‘all the town’. Conversely, *(ge)heel* combines with singular count NPs, as in *(ge)heel de stad*, but not with plural NPs, as in *(*ge*)heel de steden ‘whole the cities’. This illustrates that index agreement has a wider scope than NP-internal morpho-syntactic

agreement. Technically, the analysis of the predeterminers can be modeled as follows:²⁹



The predeterminer *al* ‘all’ selects a plural or singular mass NP which is marked and *determinate*, and yields a marked NP of type *universal*. This change of the MARKING|FORM value accounts for the impossibility of stacking.

4.3 A case of hybrid agreement

Having differentiated between morpho-syntactic agreement and index agreement, I now turn to a case of agreement which can be classified as hybrid, since it shows a mixture of both types of agreement. To exemplify it, let us compare the NPs *een grote toneelspeler* ‘a tall-DCL actor’ and *een groot toneelspeler* ‘a great actor’. The former complies with the usual constraints on morpho-syntactic agreement, but the latter does not. This does not imply, though, that it is ungrammatical; instead, it has a slightly different meaning. While the declined pronominal is understood to apply to the referent of the selected noun, its nondeclined counterpart applies to the referent of the noun in a certain role or function. More specifically, while the adjective in *een grote toneelspeler* says something about the physical size of an actor, its counterpart in *een groot toneelspeler* says something about the quality of the actor in his role as an actor.

This use of the nondeclined pronominals is limited to certain types of combinations, see Haeseryn et al. (1997: 409–411). First, the head noun must denote a person’s profession, title or function; it cannot be a noun with a non-human referent, as in **een groot tafel* ‘a great table’. Second, the head noun must be singular, as demonstrated by the ungrammaticality of **alle groot toneelspelers* ‘all great actors’. Third, the nondeclined pronominal can be preceded by an indefinite or universal determiner, as in *een/elk groot toneelspeler* ‘a/each great actor’, but not by a demonstrative or

[29] This analysis is preferable to the left-branching alternative, *inter alia* because it provides a uniform treatment of the predeterminers in *(ge)heel de stad* ‘whole the town’ and *(ge)heel Utrecht* ‘whole Utrecht’.

possessive, as in **die/haar groot toneelspeler* ‘that/her great actor’. This last constraint is not unexpected: since these determiners trigger weak declension, they are not compatible with nondeclined pronominals; see (30) above.

To model the exceptional pattern of agreement I assume that the indices with a GENDER value of type *nonneuter* are assigned an extra feature, called MODE, with the following possible values:

$$(54) \left[\begin{array}{cc} \textit{nonneuter} & \\ \text{MODE} & \textit{mode} \end{array} \right] \quad \begin{array}{c} \textit{mode} \\ \diagdown \quad \diagup \\ \textit{person} \quad \textit{role} \end{array}$$

The distinction is, hence, only relevant for nominals with a nonneuter (personal) referent. Nouns which allow both uses, such as *toneelspeler* ‘actor’, have the underspecified value *mode*. This can be resolved to either *person* or *role*, depending on whether the pronominals are declined or not. Other nouns with underspecified values are the masculine *man* ‘man’ and *politicus* ‘politician’, and the feminine *toneelspeelster* ‘actress’. Nouns which have a personal referent, but which cannot be combined with a nondeclined pronominal, receive the value *person* in the lexicon. This is, for instance, the case for *vrouw* ‘woman’ and *moeder* ‘mother’, since they are only compatible with the declined forms, cf. *een goede/*goed vrouw* ‘a good-DCL/*good woman’.

In addition, we also need a constraint which allows the combination of nondeclined pronominals with singular nonneuter nouns. For this purpose, I extend the hierarchy of DECLENSION values with an extra type, called *role-bse-form*.

$$(55) \quad \begin{array}{c} \textit{stan-form} \\ \diagdown \quad \diagup \\ \textit{bse-form} \quad \textit{dcl-form} \quad \textit{role-bse-form} \end{array}$$

This new type inherits the properties of *stan-form* and is associated with the more specific constraint that the selected nominal’s index must be singular and of type *role*.

$$(56) \left[\begin{array}{c} \textit{role-bse-form} \\ \\ \text{SS} \mid \text{CAT} \mid \text{HEAD} \mid \text{SELECT} \mid \text{CONT} \mid \text{INDEX} \left[\begin{array}{c} \text{NUMBER} \quad \textit{singular} \\ \text{GENDER} \quad \left[\begin{array}{c} \textit{nonneuter} \\ \text{MODE} \quad \textit{role} \end{array} \right] \end{array} \right] \end{array} \right]$$

The pronominals of type *role-bse-form* are, hence, compatible with nominals with a singular nonneuter index whose type is either *role* or the underspecified *mode*. They are not compatible, though, with nominals with an

index of type *person*. This accounts for the contrast between *een goed man* ‘a good man’ and **een goed vrouw* ‘a good woman’.

A consequence of the addition of *role-bse-form* is that the base forms are systematically ambiguous between *bse-form* and *role-bse-form*. When they are combined with some specific nominal, though, this ambiguity is nearly always resolved. For instance, if the nominal is singular nonneuter, the prenominal cannot be of type *bse-form*, and if it is singular neuter, its index is likely to be neuter too, and in that case the prenominal cannot be of type *role-bse-form*.

The reason why this is a hybrid type of agreement is that it imposes restrictions on both the CONTENT|INDEX and the CATEGORY value of the selected nominal. The restrictions on the CATEGORY value are not spelled out explicitly in the *role-bse-form* constraint, but they follow from the fact that it is a subtype of *stan-form*.

4.4 *Summing up*

This section has shown that the functor treatment of the prenominals can also deal with some semantically oriented types of agreement. To model them I have employed and refined the device of index agreement. Besides the conceptual and technical differences between morpho-syntactic agreement and index agreement, there is yet another difference, hitherto unmentioned, but too salient to ignore, i.e. the fact that morpho-syntactic agreement is limited to certain languages, whereas index agreement is attested in nearly all languages. The English prenominals, for instance, lack the inflectional variation which is a prerequisite for morpho-syntactic agreement, but they do show index agreement: *each*, *every* and the indefinite article, for instance, require a singular count noun, just like their counterparts in Dutch.

5. CONCLUSION

For the analysis of the noun phrase, the treatment which currently prevails in generative grammar is that in which the head is identified with the determiner. The main advantage of this DP treatment is that it provides a uniform account of all syntactic categories and a natural way to capture the co-occurrence restrictions. These advantages, though, are offset by a number of empirical problems. Attempts to overcome these problems have so far proved unconvincing. As an alternative, I have developed an analysis in which the noun is identified as the head of the noun phrase, and in which the determiners are treated as members of independently motivated lexical categories, especially Adj and Pron. I have also neutralized the distinction between specifiers and modifiers, and replaced the classical X-bar analysis with a treatment in which all prenominals are treated as head-selecting functors. This treatment combines the strengths of the canonical NP and DP

treatments, and can deal in a straightforward manner with various types of NP-internal agreement, including morpho-syntactic agreement, index agreement and hybrid agreement.

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