

RESEARCH

Agreement, disagreement and the NP vs. DP debate

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Of special relevance for the NP vs. DP debate are nominals in which the determiner has other values for number, gender, case and/or person than the noun, for depending on whether such nominals share these values with the noun or with the determiner they provide evidence in favor of either the NP or the DP approach. This paper discusses some nominals of this kind and shows that they share the relevant feature values with the noun. It then develops an NP analysis for these nominals which is cast in the notation of Head-driven Phrase Structure Grammar. It also shows what a DP analysis would look like. A comparison reveals that the NP analyses are less complex, more uniform and less stipulative. Examples are taken from Dutch, English, German, French, Italian, Spanish, Polish and Serbo-Croatian.

Keywords: concord; index agreement; functor; determiner; Head-driven Phrase Structure Grammar

1 Introduction

Using the term in a theory-neutral sense, we assume that the bracketed strings in (1) are all nominals.

(1) [the [blue [box]]] is empty

For the analysis of nominals there are –broadly speaking– two approaches in generative grammar. One treats the noun as the head all the way through. In that analysis the largest bracketed string in (1) is an NP. The other makes a distinction between a nominal core, consisting of the noun with its complements and modifiers, if any, and a functional outer layer, comprising determiners, quantifiers and numerals. In that analysis the noun is the head of *blue box*, but the determiner is the head of *the blue box*, so that the category of the latter is DP.

The **NP approach** prevailed in generative grammar up to and including the Government and Binding model (Chomsky, 1981). It was also adopted in Generalized Phrase Structure Grammar (Gazdar et al., 1985) and has been the dominant approach in Head-driven Phrase Structure Grammar (Pollard & Sag, 1994) till the present day. The **DP approach** results from an extension of the X-bar principles to the functional categories. Initially intended for the lexical categories N, V and A (Chomsky, 1970), and extended to P in Jackendoff (1977), they got applied to Infl and Comp in the early eighties, and to Det in the mid eighties, see Hellan (1986); Abney (1987); Szabolsci (1987). This style of analysis was taken on board in other frameworks, including Word Grammar (Hudson, 1990) and Lexical-Functional Grammar (Bresnan, 2001).

The choice for one or the other approach mainly depends on which framework one adopts, and the arguments pro and con are often based on theory-internal considerations. It is therefore a welcome initiative of the editors of this volume on *New horizons in the*

study of nominal phrases to provide a forum to advocates of both approaches and to invite them to weigh the pros and cons from a more theory-neutral perspective. In keeping with that aim this paper focuses on a phenomenon for which the choice between the two approaches has empirical consequences. It concerns the issue of whether a [Det + Nom] combination shares its **number**, **gender**, **case** and **person** values with the determiner or with the noun. If they are shared with the determiner, this is a potential argument for the DP approach; if they are shared with the noun, it is a potential argument for the NP approach; if they are shared with both, the issue lacks empirical bite. The interesting cases are, hence, those in which the determiner and the noun have different values for at least one of the features. That such cases do exist is demonstrated in Section 2. It presents two combinations in which the determiner and the noun show partial disagreement. Interestingly, it turns out that in both cases the [Det + Nom] combination shares the feature values of the noun. Paving the way for an analysis, Section 3 introduces a distinction between two types of agreement, i.e. morpho-syntactic agreement, also known as concord, and index agreement. Employing that distinction we differentiate between four kinds of [Det + Nom] combinations: those in which the determiner and the noun show both concord and index agreement (A), those in which they show index agreement but no concord (B), those in which they show concord but no index agreement (C), and those in which they show neither concord nor index agreement (D). The central part of the paper provides an NP analysis of the nominals, with special attention for those of types B, C and D (Section 4). It is cast in the notation of Head-driven Phrase Structure Grammar. In a final step we show how the instances of (partial) disagreement are dealt with in the DP approach and compare this with the NP approach (Section 5). The conclusions are in Section 6.

Throughout we assume that determiners are words which are in complementary distribution with the articles. As such, they comprise both definite and indefinite determiners, and both quantifying and non-quantifying determiners. Numerals, by contrast, are not included, since they co-occur with articles in the same nominal, as in *the seven dwarfs*.

2 Disagreement

This section discusses two types of nominals in which the determiner and the noun show (partial) disagreement. Both are taken from Dutch.

2.1 Nominals with a quantifying determiner

Dutch has a number of quantifying determiners which combine with either a singular mass noun or a bare plural. They include *wat* ‘some’, *veel* ‘much/many’, *meer* ‘more’ and *genoeg* ‘enough’. Examples are given in (2).¹

- (2) a. Ze hebben [wat/veel/meer/genoeg soep] gegeten.
 they have [some/much/more/enough soup.SG] eaten
 ‘They have eaten some/much/more/enough soup.’
- b. Ze hebben [wat/veel/meer/genoeg aardappelen] gegeten.
 they have [some/many/more/enough potato.PL] eaten
 ‘They have eaten some/many/more/enough potatoes.’

These determiners are in complementary distribution with the articles: They cannot be preceded by one, as in **de wat/veel/meer/genoeg soep* ‘the some/much/more/enough soup’, nor can they be added to a nominal that is introduced by an article, as in **wat/veel/*

¹ English uses different equivalents for *veel*, depending on whether it combines with a singular mass noun (*much*) or with a plural noun (*many*).

meer/genoeg de soep ‘some/much/more/enough the soup’.² When the bracketed phrases in (2) are used as subjects, the finite verb must be singular if the nominal contains a singular mass noun, and plural if it contains a bare plural.

- (3) a. Er is/*zijn nog [wat/veel/meer/genoeg soep] in de pot.
 there is/*are still [some/much/more/enough soup.SG] in the pot
 ‘There is still some/much/more/enough soup in the pot.’
 b. Er zijn/*is nog [wat/veel/meer/genoeg aardappelen] in de pot.
 there are/*is still [some/many/enough potato.PL] in the pot
 ‘There are still some/many/more/enough potatoes in the pot.’

The agreement facts are the same if the determiner is omitted.

- (4) a. Er is/*zijn nog soep in de pot.
 there is/*are still soup.SG in the pot
 ‘There is still soup in the pot.’
 b. Er zijn/*is nog aardappelen in de pot.
 there are/*is still potato.PL in the pot
 ‘There are still potatoes in the pot.’

By contrast, if the noun is omitted, the finite verb must be singular, as shown in (5).

- (5) Er is/*zijn nog wat/veel/meer/genoeg in de pot.
 there is/*are still some/much/more/enough in the pot
 ‘There is still some/much/more/enough in the pot.’

This suggests that the determiners are singular. Confirming evidence is provided by (6), where the subject precedes the finite verb.

- (6) Veel hangt/*hangen af van hoe er morgen gestemd wordt.
 much depends/*depend of how there tomorrow voted is
 ‘Much depends on how people will vote tomorrow.’

An anonymous reviewer points out that the addition of the quantitative *er* in (7) triggers the use of a plural form for the verb.

- (7) Er zijn/*is er nog wat/veel/meer/genoeg in de pot.
 there are/*is R still some/many/more/enough in the pot
 ‘There are still some/many/more/enough in the pot.’

This, (s)he adds, suggests that the determiner is unspecified for number, rather than singular. The problem with that proposal, though, is that it does not account for the ill-formedness of the starred combinations in (5) and (6): If the determiner is unspecified for number, it is expected to be compatible with a plural verb. Moreover, the subject in (7) is not a nominal from which the noun is omitted, as in (5), but a nominal from which the noun is extracted, as made explicit in (8).

- (8) Er zijn/*is er_i nog [wat/veel/meer/genoeg N_i] in de pot.
 there are/*is R_i still [some/many/more/enough N_i] in the pot
 ‘There are still some/many/more/enough in the pot.’

² *Veel* has a declined counterpart which may be preceded by the definite article, as in *het vele werk* ‘the much. DCL work’. This is not possible, though, for the non-declined form *veel*.

Such nominals have other properties than those in (5) and (6), as will be demonstrated in more detail in Section 4.3.2.

Taking stock, the quantifying determiners *wat*, *veel*, *meer* and *genoeg* are singular, but are compatible with both singular and plural nouns. When combined, the number value of the combination equals that of the noun. This suggests that an analysis along the lines of the NP approach might be more plausible than one which adopts the DP approach.

2.2 Nominals with a genitive determiner

Genitive nominals in Dutch typically take the form of a case marked noun preceded by a determiner which shows case, number and gender agreement with it. In *'s avonds* 'the.GEN evening.GEN', for instance, the noun has the genitive affix *-s* and the determiner, which is a reduced variant of *des* 'the.GEN', shows agreement with it: In this case both are genitive, singular and masculine.³ Such genitives are mainly used as VP adjuncts and postnominal dependents, but they also turn up in prenominal position, as in (9).

- (9) a. Ken jij [[*'s lands*] grootste kruidenier]?
 Know you [[the.GEN land.GEN] largest grocer]
 'Do you know the country's largest grocer?'
- b. [[*'s werelds*] hoogste bergen] liggen/*ligt in Azië.
 [[the.GEN world.GEN] highest mountains] lie/*lies in Asia
 'The world's highest mountains lie in Asia.'

In this position they are in complementary distribution with the determiners: They cannot be preceded by one, as in **de 's lands grootste kruidenier*, nor can they be added to a nominal that is introduced by an article, as in **'s lands de grootste kruidenier*. What is interesting now in this context is that the largest bracketed phrases in (9) are not genitive: The one in (9a) is accusative and the one in (9b) is nominative. Besides, the combinations share their number and gender values with the rightmost noun. The one in (9a), for instance, is not neuter like *lands* 'land.GEN', but masculine like *kruidenier* 'grocer', and the one in (9b) is not singular like *werelds* 'world.GEN', but plural like *bergen* 'mountains', as confirmed by the agreement with the verb.

In sum, the case, number and gender values of the bracketed NPs in (9) are not shared with the genitive prenominal, but with the rightmost noun. This provides confirming evidence for the assumption that an analysis along the lines of the NP approach might be more straightforward than one which adopts the DP approach.

3 Two types of (dis)agreement

To pave the way for an analysis of the (dis)agreement data we make a distinction between morpho-syntactic agreement, also known as concord, and index agreement. This distinction was introduced in Head-Driven Phrase Structure Grammar (HPSG) in Pollard & Sag (1994) and further developed in Kathol (1999) and Wechsler & Zlatić (2003).⁴ The latter uses the scheme in (10) to define the distinction.

- (10) morphology ↔ CONCORD ↔ INDEX ↔ semantics

³ The same affix is used for singular neuter nominals, as in *mijns inziens* 'my.GEN understanding.GEN'. In singular feminine and plural nominal the determiner takes the *-r* affix, while the noun lacks an overt case marker, as in *der Nederlandse taal* 'the.GEN Dutch language' and *der Batavieren* 'the.GEN Batavians'.

⁴ The need for a distinction along these lines is also felt in Transformational Grammar. Sauerland & Elbourne (2002), for instance, employs the NUMBER feature to model morpho-syntactic agreement, and proposes another feature, MEREOLOGY, to capture something which resembles index agreement.

“We recognize two distinct grammaticalization ‘portals’, one each via semantics and morphology. These two sources of grammaticalization lead to two distinct bundles of agreement features for a given noun. The morphology-related agreement bundle will be called CONCORD (which includes case, number and gender) and the semantics-related agreement bundle will be called INDEX (which includes person, number and gender).” (Wechsler & Zlatić, 2003, 28)

An example of **concord** is the number and gender agreement between the demonstrative and the noun in the Italian (11).

- (11) a. questo libro
this.SG.M book.SG.M
b. questa scatola
this.SG.F box.SG.F
c. questi libri
this.PL.M book.PL.M
d. queste scatole
this.PL.F box.PL.F

An example of concord which also involves case agreement is provided by the Polish data in (12).⁵

- (12) a. mój brat
my.NOM.SG.M brother.NOM.SG.M
b. mojego brata
my.ACC.SG.M brother.ACC.SG.M
c. mojemu bratu
my.DAT.SG.M brother.DAT.SG.M

An example of **index agreement** concerns the co-occurrence restrictions between an anaphoric pronoun and its antecedent, as in (13).

- (13) She_i hurt herself_i/*myself_i/*themselves_i/*himself_i.

The reflexive pronoun and its antecedent refer to the same entity and must share their person, number and gender, in this case 3rd person singular feminine. Case agreement is not required. In (13), for instance, *she* is nominative, while *herself* is accusative.

The two types of agreement are distinct in the sense that concord includes case and not person, while index agreement includes person and not case, but there is also some overlap since both include number and gender. Notice, though, that the number and gender values which are relevant for concord are not always identical to those which are relevant for index agreement. To illustrate the relevance of the distinction for **gender** we take the Spanish example in (14), quoted from Corbett (1991, 225), and the Serbo-Croatian example in (15), quoted from Salzmann (2019).

- (14) Su Majestad suprema está contento.
His majesty supreme.SG.F is pleased.SG.M
‘His supreme Majesty is pleased.’

⁵ I thank one of the anonymous reviewers for these data.

- (15) Ovi stare vladike su me juce posetili.
 this.PL.M old.PL.F bishops are me yesterday visited.PL.M
 ‘These old bishops visited me yesterday.’

The noun *Majestad* ‘Majesty’ in (14) is morpho-syntactically feminine and the adnominal adjective must share this value: Replacing it with the masculine *supremo* would yield an ill-formed combination. At the same time, if *Majestad* denotes a male monarch, its index is masculine and it is this value that is shared with the predicative adjective *contento* ‘pleased’.⁶ Similar remarks apply to the noun *vladike* ‘bishops’ in (15). It is morpho-syntactically feminine and the adnominal adjective *stare* ‘old’ shares this value, but if the noun denotes male members of the clergy, the index of *vladike* is masculine and it is this value that is shared with the determiner *ovi* ‘this’ and the participle *posetili* ‘visited’.

To illustrate the relevance of the distinction for **number** we use the French examples in (16), quoted from Kathol (1999, 248).

- (16) a. Vous êtes loyal.
 you be.2.PL loyal.SG
 ‘You are loyal.’
 b. Vous êtes loyaux.
 you be.2.PL loyal.PL
 ‘You are loyal.’

The pronoun *vous* ‘you’ is morpho-syntactically plural and the finite verb must share that value: Replacing *êtes* with the singular *es* yields an ill-formed sentence. The number value that matters for index agreement, though, is underspecified. It is resolved to singular if the pronoun is used as a politeness form, as in (16a), and to plural if it denotes an aggregate of persons, as in (16b).

Applying the distinction between concord and index agreement to the [Det + Nom] combinations, we get four possibilities. The determiner and the noun may show both concord and index agreement (A), they may show index agreement but no concord (B), they may show concord but no index agreement (C), and they may show neither concord nor index agreement (D), see Table 1. For our purpose it is mainly the instances of B, C and D that matter. They will be given special attention in Section 4.3.

4 An NP treatment

Starting from the observation in Section 2 that an analysis along the lines of the NP approach seems more promising to deal with the disagreement data than one which adopts the DP approach, we develop an NP treatment in this section. It is cast in the framework of Head-Driven Phrase Structure Grammar. This implies that it is monostratal and surface-oriented. It also implies that it conforms to the Lexical Integrity Hypothesis: Syntactic atoms are words, rather than –possibly silent– morphemes. Representations take the form of Attribute Value Matrices (AVMs). Their use inevitably renders the presentation some-

Table 1: Four types of (dis)agreement.

	index agreement	no index agreement
concord	A	C
no concord	B	D

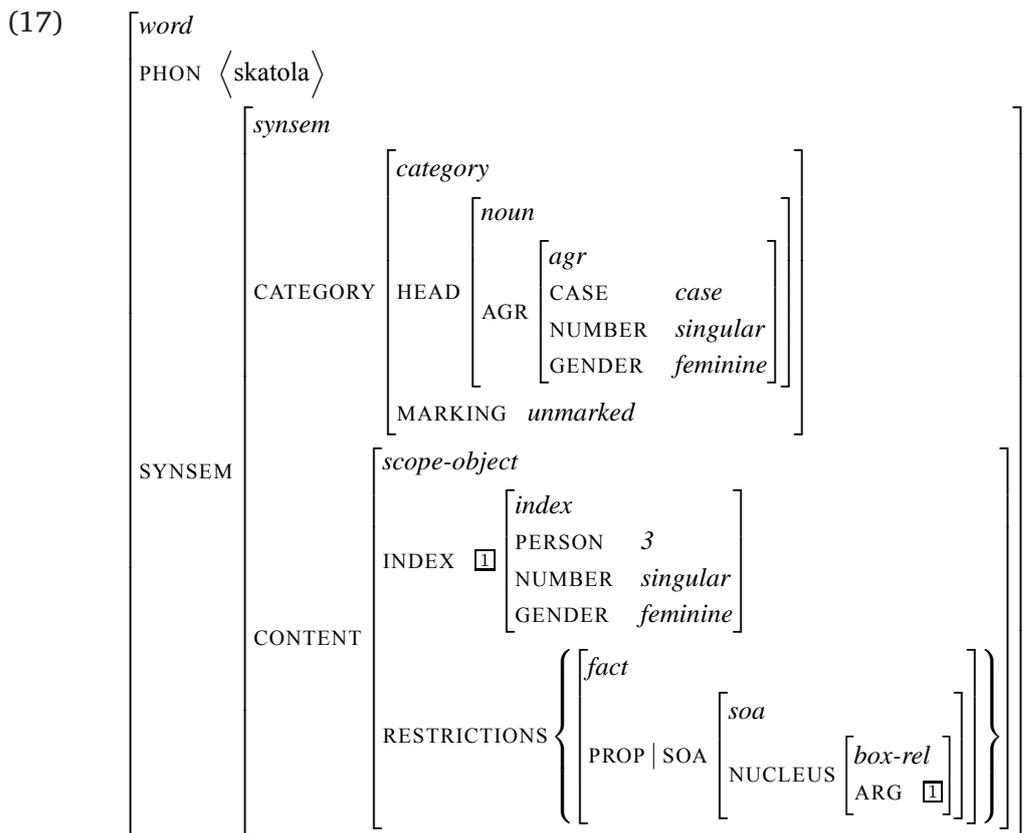
⁶ The determiner *su* is underspecified for gender.

what technical, but in order to keep it accessible we only use those bits of notation that are needed for the purpose at hand, and introduce them in a piece-meal and example-based manner. We start with the treatment of single nouns (Section 4.1), show how the addition of adnominal adjectives is modeled (Section 4.2), and then turn to the central issue of the paper, i.e. the combination of the resulting nominals with a determiner (Section 4.3).

For the sake of concreteness we adopt the functor treatment of adnominal dependents. This was first proposed in Van Eynde (1998) and Allegranza (1998) and further developed in Van Eynde (2006) and Allegranza (2006). It has also been taken on board in Sign-Based Construction Grammar (Sag, 2012).

4.1 Nouns

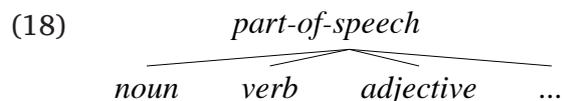
As an example let us take the Italian noun *scatola* ‘box’. Its AVM is expected to contain such information as the fact that it is a common noun, that it is singular and feminine, that it requires a determiner to be saturated, and that it denotes entities which can truthfully be called boxes. Given that HPSG is a monostratal framework, phonetic, syntactic and semantic representations do not constitute separate levels of representation, but are integrated in one AVM. The one of *scatola* is given in (17).⁷



Inspired by the Saussurean definition of the sign as a unit of form and meaning (De Saussure, 1916), words are declared to have a PHON attribute whose value is a sequence of phonemes, and a SYNSEM attribute whose value is a bundle of syntactic and semantic features. The syntactic ones are modeled by the values of the CATEGORY attribute. They are of type *category* and are declared to have (amongst others) a HEAD attribute and a

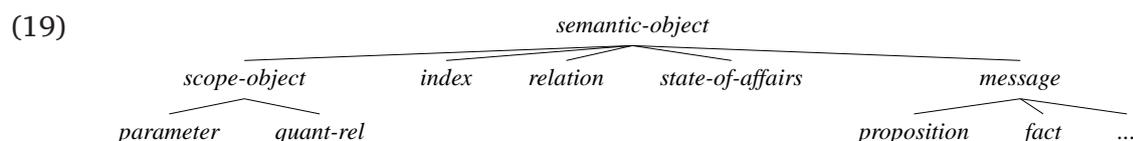
⁷ Attributes are written in small capitals and their values in italics.

MARKING attribute. The value of HEAD is a type that stands for the part-of-speech, such as *noun* or *verb*:



The subtypes may have additional attributes. Nouns, for instance, have an AGR(EEMENT) attribute whose value is a type that has CASE, NUMBER and GENDER attributes.⁸ The inventories of these values are language specific. Latin, for instance, has six CASE values (nominative, vocative, genitive, dative, accusative, ablative), while German has four (nominative, genitive, dative, accusative). Similarly, Latin and German have three GENDER values (masculine, feminine, neuter), while French and Italian have two (masculine, feminine). The value of MARKING is a type that registers the degree of saturation. In the case of nominals the value is *unmarked* for those that do not contain a determiner, such as *scatola* ‘box’, and *marked* for those that contain a determiner, such as *questa scatola* ‘this box’. It is also *marked* for those that are fully saturated by themselves, such as the pronoun *she*.

The semantic properties are modeled in terms of the CONTENT values. They come in a variety of subtypes, some of which are included in (19), which is an abbreviated version of Ginzburg & Sag (2000, 386).



In the case of nouns the relevant type is *scope-object*. It has an INDEX attribute and a RESTR(ICTIONS) attribute. The value of the former is of type *index*. It stands for a discourse referent and is comparable to a Predicate Logic variable, but in contrast to the latter it has PERSON, NUMBER and GENDER attributes. For most nouns, the NUMBER and GENDER values in the index are identical to the NUMBER and GENDER values in the AGR feature, as in (17), but there are exceptions, as will be shown in Section 4.3. The value of RESTR(ICTIONS) is a set of facts. Facts are propositions that are presupposed to be true. Propositions consist of a state-of-affairs whose nucleus is a relation, in this case the relation *box-rel*. Relations have one or more arguments. In this case there is only one, and its value is identified with the index. The identification is made explicit by the boxed integer: The recurrence of $\boxed{1}$ expresses the fact that the values of INDEX and ARG(UMENT) are identical. This is comparable to the recurrence of the Predicate Logic variable in $\{x \mid \text{box}(x)\}$, where x stands for any entity for which it is true that it is a box.

A conspicuous property of the AVM in (17) is the amount of internal structure that it displays. The various attributes that it contains are not just listed, but organized in terms of a fine-grained hierarchy of types. HEAD features, for instance, are distinct from MARKING features, and within the HEAD feature the AGR features are distinct from other HEAD features. This is motivated by the fact that these distinctions facilitate the formulation of generalizations in the modelling of phrase formation and semantic composition, as will be shown in Section 4.2.

⁸ At the lexical level, the values are not always fully specified. In the AVM of *scatola*, for instance, the CASE value is underspecified.

4.2 Nominal phrases

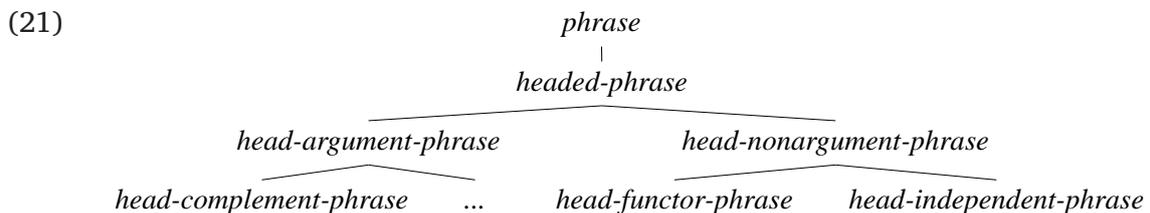
Continuing with the Italian example, let us add an adnominal adjective, as in *scatola bianca* ‘white box’. The result is a phrase, and phrases are signs, just like words. This implies that they have PHON and SYNSEM attributes. Besides, they also have a DAUGHTERS attribute. Its value is a list of signs, where the latter can be words or phrases. In this case the daughters are *scatola* ‘box’ and *bianca* ‘white’, as shown in (20).⁹

$$(20) \left[\begin{array}{l} \textit{phrase} \\ \text{PHON } \boxed{A} \oplus \boxed{B} \\ \text{DAUGHTERS } \left\langle \left[\begin{array}{l} \textit{word} \\ \text{PHON } \boxed{A} \langle \textit{skatola} \rangle \end{array} \right], \left[\begin{array}{l} \textit{word} \\ \text{PHON } \boxed{B} \langle \textit{bjanka} \rangle \end{array} \right] \right\rangle \end{array} \right]$$

The PHON value of the phrase is the concatenation of the PHON values of the daughters. The order on the PHON list reflects the surface order, with the adjective following the noun. English has the opposite order. Likewise, the CATEGORY and CONTENT values of phrases are derived from the CATEGORY and CONTENT values of the words which they contain. This is modeled in terms of constraints on phrase formation and semantic composition.

4.2.1 Phrase formation

Phrase formation is modeled in terms of cross-categorial constraints on phrase types. These types are organized in a hierarchy, part of which is given in (21).



The basic distinction is that between headed and non-headed phrases. The former have an extra attribute, called HEAD-DAUGHTER, whose value is a sign, i.e. a word or a phrase.¹⁰ A general constraint on headed phrases is that they share the HEAD value of their head daughter. This is known as the **Head Feature Principle**.

$$(22) \textit{headed-phrase} \Rightarrow \left[\begin{array}{l} \text{SYNSEM} \mid \text{CATEGORY} \mid \text{HEAD } \boxed{\textit{part-of-speech}} \\ \text{HEAD-DTR} \mid \text{SYNSEM} \mid \text{CATEGORY} \mid \text{HEAD } \boxed{\quad} \end{array} \right]$$

Since (22) concerns the whole of the HEAD value it not only requires the sharing of the part of speech value, but also of all attributes that are declared for it. In the case of *scatola bianca* ‘white box’, for instance, the phrase not only shares its nominal nature with *scatola*, but also its AGR value and, hence, its number, case and gender.

⁹ The members of the DAUGHTERS list are separated by commas. Boxed Roman capitals are conventionally used for objects of type *list*. \oplus stands for concatenation.

¹⁰ Non-headed phrases do not have a head daughter. They include amongst others coordinate phrases, such as *Bill and Mary*.

Within the class of headed phrases a further distinction is made between those in which the head daughter selects its dependent(s) (*head-argument-phrase*) and those in which it does not (*head-nonargument-phrase*). A subtype of the former is *head-complement-phrase*. It models the combination of a head with its complement, as in *eat mushrooms*, where the verb selects an NP complement, and *wait for me*, where the verb selects a PP complement. Another subtype of *head-argument-phrase* is *head-subject-phrase*. More relevant in the present context is the *head-nonargument-phrase* type. It subsumes amongst others the combination of a head with a modifier, as in *white box* and *run quickly*. The distinction between the two types of headed phrases is relevant for the constraints which model the sharing of the MARKING value, as spelled out in the **Marking Principle**.

$$(23) \quad \textit{head-argument-phrase} \Rightarrow \left[\begin{array}{l} \text{SYNSEM} \mid \text{CATEGORY} \mid \text{MARKING} \quad \boxed{1} \textit{marking} \\ \text{HEAD-DTR} \mid \text{SYNSEM} \mid \text{CATEGORY} \mid \text{MARKING} \quad \boxed{1} \end{array} \right]$$

$$(24) \quad \textit{head-nonargument-phrase} \Rightarrow \left[\begin{array}{l} \text{SYNSEM} \mid \text{CAT} \mid \text{MARKING} \quad \boxed{1} \textit{marking} \\ \text{DAUGHTERS} \left\langle \left[\text{SYNSEM} \mid \text{CAT} \mid \text{MARKING} \quad \boxed{1} \right], \boxed{2} \right\rangle \\ \text{HEAD-DTR} \quad \boxed{2} \textit{sign} \end{array} \right]$$

What this says is that a head-argument-phrase shares its MARKING value with the head daughter, while a head-nonargument-phrase shares it with the non-head daughter. The latter makes it possible for a modifier to leave a mark on the resulting phrase. A subtype of *head-nonargument-phrase* is *head-functor-phrase*. The defining characteristic of that phrase type is that the non-head daughter selects its head sister. The adjective in *scatola bianca* ‘white box’, for instance, selects an unmarked nominal as its head and requires it to be singular and feminine. To model this we add an attribute, called SELECT, to the objects of type *part-of speech*, and require its value to be identical to the SYNSEM value of the head daughter, as in (25).

$$25 \quad \textit{head-functor-phrase} \Rightarrow \left[\begin{array}{l} \text{DAUGHTERS} \left\langle \left[\text{SYNSEM} \mid \text{CAT} \mid \text{HEAD} \mid \text{SELECT} \quad \boxed{1} \right], X \right\rangle \\ \text{HEAD-DTR} \mid \text{SYNSEM} \quad \boxed{1} \textit{synsem} \end{array} \right]$$

Another subtype of *head-nonargument-phrase* is *head-independent-phrase*. In that combination neither daughter selects the other.

An illustration of the functor treatment is the analysis of *scatola bianca* ‘white box’ in (26).¹¹

$$(26) \quad \begin{array}{c} \text{[HEAD } \boxed{1} \textit{noun}, \text{ MARKING } \boxed{2} \textit{unmarked}] \\ \hline \boxed{3} \text{[HEAD } \boxed{1}, \text{ MARKING } \boxed{2}] \quad \text{[HEAD|SELECT } \boxed{3}, \text{ MARKING } \boxed{2}] \\ \quad \quad \quad | \quad \quad \quad | \\ \quad \quad \quad \textit{scatola} \quad \quad \quad \textit{bianca} \end{array}$$

The noun is treated as the head and the adjective as a functor. Technically, the nominal shares its HEAD value with the noun ($\boxed{1}$) because of the Head Feature Principle and its MARKING value with the adjective ($\boxed{2}$) because of Marking Principle. Besides, the adjective selects an unmarked nominal ($\boxed{3}$) and shares its MARKING value with that of the noun

¹¹ The AVM is converted into a tree, since that format is more familiar to syntacticians.

(2). Since the resulting phrase is unmarked, it is compatible with another adnominal adjective, as in *scatola bianca pesante* ‘heavy white box’. For languages in which adnominal adjectives show concord with the noun, such as Italian, adjectives are declared to have the AGR attribute, just like nouns, and are required to share the value of that attribute with the selected noun, as in (27).

$$(27) \left[\begin{array}{l} \textit{adjective} \\ \text{AGR } \boxed{\mathbb{1}} \textit{agr} \\ \text{SELECT | CATEGORY | HEAD } \left[\begin{array}{l} \textit{noun} \\ \text{AGR } \boxed{\mathbb{1}} \end{array} \right] \end{array} \right]$$

Since the SELECT attribute is part of the HEAD value, its value is shared with the AP if the adjective has dependents of its own. The SELECT value of the AP in *scatola molto pesante* ‘very heavy box’, for instance, is identical to that of *pesante* ‘heavy’.

4.2.2 Semantic composition

Semantically, *scatola bianca* ‘white box’ is an instance of intersective modification. It denotes entities for which it is true that they are a box and that they are white. In Predicate Logic this is represented by a formula in which both predicates apply to the same variable, as in $\{x \mid \textit{box}(x) \ \& \ \textit{white}(x)\}$. In AVM notation it is represented as a scope-object in which the index is shared with both daughters and in which the RESTR value is the union of their respective RESTR values, as spelled out in (28).¹²

$$(28) \left[\begin{array}{l} \textit{phrase} \\ \text{SYNSEM | CONTENT } \left[\begin{array}{l} \textit{scope-object} \\ \text{INDEX } \boxed{\mathbb{1}} \textit{index} \\ \text{RESTR } \boxed{\Sigma_1} \cup \boxed{\Sigma_2} \end{array} \right] \\ \text{DAUGHTERS } \left\langle \left[\begin{array}{l} \textit{word} \\ \text{scope-object} \\ \text{INDEX } \boxed{\mathbb{1}} \\ \text{RESTR } \boxed{\Sigma_1} \left\{ \left[\begin{array}{l} \textit{fact} \\ \dots \\ \left[\textit{box-rel} \right] \\ \text{ARG } \boxed{\mathbb{1}} \end{array} \right] \right\} \right], \left[\begin{array}{l} \textit{word} \\ \text{scope-object} \\ \text{INDEX } \boxed{\mathbb{1}} \\ \text{RESTR } \boxed{\Sigma_2} \left\{ \left[\begin{array}{l} \textit{fact} \\ \dots \\ \left[\textit{white-rel} \right] \\ \text{ARG } \boxed{\mathbb{1}} \end{array} \right] \right\} \right] \right\rangle \end{array} \right]$$

The sharing of the index between the phrase and the noun is captured in terms of a general constraint on headed phrases, known as the **Semantic Inheritance Principle**:

$$(29) \textit{headed-phrase} \Rightarrow \left[\begin{array}{l} \text{SYNSEM | CONTENT | INDEX } \boxed{\mathbb{1}} \textit{index} \\ \text{HEAD-DTR | SYNSEM | CONTENT | INDEX } \boxed{\mathbb{1}} \end{array} \right]$$

Notice that this sharing includes the values of the attributes that are declared for the indices, i.e. PERSON, NUMBER and GENDER. If the index is also shared with the non-head daughter, as in *scatola bianca*, there is index agreement between the daughters.

¹² Boxed Greek capitals are used for objects of type *set*.

What this says is that the determiner selects a nominal whose index i is related to –but different from– its own index j . The relation is one of possession, in a broad sense of the term. Given the Semantic Inheritance Principle, it is the index of the noun that is shared with the phrase. This accounts for the fact that the anaphoric pronoun in (32) must be third person plural rather than first person singular.

(32) [My _{j} brothers _{i}] _{i} have hurt themselves _{i} /*myself _{i} .

The lack of index agreement does not imply a lack of concord, though. The Italian possessive *nostro* ‘our’, for instance, shows the same number and gender agreement with the noun as adnominal adjectives.

(33) a. *nostro zio*
 our.SG.M uncle.SG.M
 b. *nostra zia*
 our.SG.F aunt.SG.F
 c. *nostri zii*
 our.PL.M uncle.PL.M
 d. *nostre zie*
 our.PL.F aunt.PL.F

In terms of the distinctions made in Section 3, it is of type C, showing concord but no index agreement. The same holds for the other Italian possessives *mio* ‘my’, *tuo* ‘your.SG’, *vostro* ‘your.PL’, and *suo* ‘his/her/its’. An exception, though, is the third person plural *loro* ‘their’, which does not show concord.

(34) a. *loro zio*
 their uncle.SG.M
 b. *loro zia*
 their aunt.SG.F
 c. *loro zii*
 their uncle.PL.M
 d. *loro zie*
 their aunt.PL.F

It is, hence, of type D, showing neither concord nor index agreement. In this case the difference coincides with a part of speech distinction. While *loro* is a pronoun, the other possessives are adjectives. Confirming evidence is provided by the fact that *loro* is also used as a personal pronoun, meaning ‘them’, whereas the other possessive determiners are not used in that way, as shown by the contrast in (35).

(35) *Luigi ha dato dei fiori a loro/*nostro/*mio/*tuo/*vostro/*suo*
 Luigi has given flowers to them/*our/*my/*your/*his
 ‘Luigi gave them flowers.’

Their well-formed counterparts take the form of formally distinct personal pronouns, as in (36).

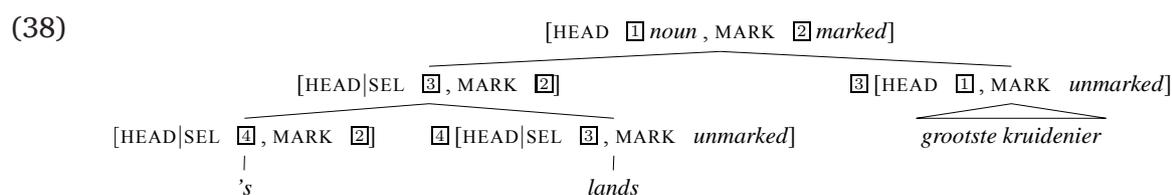
(36) *Luigi ha dato dei fiori a noi/me/te/voi/lui/lei*
 Luigi has given flowers to us/me/you.SG/you.PL/him/her
 ‘Luigi gave flowers to us/me/you/him/her.’

Interestingly, the assumption that determiners can be adjectives or pronouns would be an anomaly in an analysis that treats D as a separate part of speech, but in the present treatment no such anomaly arises, since the class of determiners is not defined in part of speech terms, but in terms of their SELECT and MARKING values. More specifically, they are marked selectors of an unmarked nominal, and this suffices to differentiate them from unmarked adnominal adjectives, such as *bianca* ‘white’.¹⁴

Another [Det + Nom] combination in which the determiner shows neither concord nor index agreement concerns the Dutch genitive NPs in (9), repeated in (37).

- (37) a. Ken jij [['s lands] grootste kruidenier]?
 Know you [[the.GEN land.GEN] largest grocer]
 ‘Do you know the country’s largest grocer?’
- b. [['s werelds] hoogste bergen] liggen/*ligt in Azië.
 [[the.GEN world.GEN] highest mountains] lie/*lies in Asia
 ‘The world’s highest mountains lie in Asia.’

These genitives have the same kind of relation with the noun as the possessive determiners, and are in complementary distribution with them: **zijn ’s lands grootste kruidenier* and **’s lands zijn grootste kruidenier*. Their structure is more complex, though, since they do not consist of a single word, but of a common noun preceded by the article ‘s. To model this we adopt a left branching structure, as in (38).



The top node shares its HEAD value with the rightmost nominal (1) and its MARK(ING) value with the genitive NP (2). The latter shares its HEAD value and hence its SEL(ECT) value (3) with the noun *lands* ‘country.GEN’ and its MARKING value with the article (2). Moreover, the article selects an unmarked nominal (4). Both combinations are instances of the type *head-functor-phrase*, but in terms of agreement, they are at opposite ends of the spectre: While the article shows both concord and index agreement with the genitive noun (type A), the prenominal genitive NP shows neither concord nor index agreement with its nominal sister (type D).

4.3.2 Index agreement without concord

An instance of index agreement without concord (type B) is provided by the Serbo-Croatian (15), repeated in (39).

- (39) Ovi stare vladike su me juce posetili.
 this.PL.M old.PL.F bishops are me yesterday visited.PL.M
 ‘These old bishops visited me yesterday.’

While the AGR|GENDER value of *vladike* ‘bishops’ is unambiguously feminine, its INDEX|GENDER value is underspecified: It can be masculine or feminine, depending on

¹⁴ Further evidence against the practice of treating D as a separate part of speech is provided in Abeillé et al. (2004), who argue that the French quantifying *beaucoup* ‘much/many’ and *combien* ‘how much/many’ are adverbs.

whether it refers to a male or female bishop (whether the latter is at all possible is a matter of religion, not of language). This is made explicit in (40).

- (40)
$$\left[\begin{array}{l} \textit{synsem} \\ \text{CATEGORY | HEAD | AGR | GENDER } \textit{feminine} \\ \text{CONTENT | INDEX | GENDER } \textit{gender} \end{array} \right]$$

The adjective *stare* ‘old’ shows concord with the noun, while the demonstrative *ovi* ‘these’ shows index agreement. Since its index is masculine, its addition resolves the underspecified INDEX|GENDER value of the noun, and since the noun is the head of the NP, the latter’s AGR|GENDER value is feminine while its INDEX|GENDER value is masculine. As a consequence, since predicative adjectives and participles show index agreement with the subject (Van Eynde, 2015, 184), the choice of a masculine form for the participle is accounted for. Similar remarks apply to the Spanish (14), repeated in (41).

- (41) Su Majestad suprema está contento.
his majesty supreme.SG.F is pleased.SG.M
‘His supreme Majesty is pleased.’

Also here, the noun’s AGR|GENDER value is unambiguously feminine, while its INDEX|GENDER value is underspecified, and also here the adjective *suprema* ‘supreme’ shows concord, while the predicative adjective shows index agreement, resolving the noun’s underspecified INDEX|GENDER value to *masculine*.¹⁵

Another instance of determiners that show index agreement but no concord are the Dutch quantifying determiners in (2), repeated in (42).

- (42) a. Ze hebben [wat/veel/meer/genoeg soep] gegeten.
they have [some/much/more/enough soup.SG] eaten
‘They have eaten some/much/more/enough soup.’
b. Ze hebben [wat/veel/meer/genoeg aardappelen] gegeten.
they have [some/many/more/enough potato.PL] eaten
‘They have eaten some/many/more/enough potatoes.’

When used adnominally, they share the index of the nominal they select: The discourse referent of *wat soep* ‘some soup’, for instance, is not another one than that of *soep* ‘soup’. This implies that they show index agreement. They do not show concord, though, for while they are singular themselves, they do not require their nominal sister to be singular. Their SELECT value, hence, contains a condition on the index of the nominal, but not on its AGR value, as in (43).

- (43)
$$\left[\begin{array}{l} \textit{synsem} \\ \text{CATEGORY | HEAD } \left[\begin{array}{l} \text{AGR | NUMBER } \textit{singular} \\ \text{SELECT | CONTENT | INDEX } \boxed{\text{I}} \end{array} \right] \\ \text{CONTENT | INDEX } \boxed{\text{I}} \textit{index} \end{array} \right]$$

¹⁵ A difference with the Serbo-Croatian example is that the determiner *su* is underspecified for number and gender.

When the quantifying determiners are used nominally, they do not select a nominal, so that their INDEX|NUMBER value remains underspecified. Their AGR|NUMBER value, though, is unambiguously singular, and this accounts for the agreement with the finite verb in (5) and (6), repeated in (48).

- (48) a. Er is/*zijn nog wat/veel/meer/genoeg in de pot.
 there is/*are still some/much/more/enough in the pot
 ‘There is still some/much/more/enough in the pot.’
 b. Veel hangt/*hangen af van hoe er morgen gestemd wordt.
 much depends/*depend of how there tomorrow voted is
 ‘Much depends on how people will vote tomorrow.’

An interesting issue, raised independently by two of the reviewers, concerns the use of the quantifying determiners in partitive constructions, such as (49).

- (49) a. Er staat/*staan nog [wat/veel/meer/genoeg van dat lekkere
 there stands/*stand still [some/much/more/enough of that good
 bier] in de koelkast.
 beer.SG] in the fridge
 ‘There is still some/much/more/enough of that good beer in the fridge.’
 b. Er staan/*staat nog [wat/veel/meer/genoeg van die lekkere
 there stand/*stands still [some/much/more/enough of that good
 taartjes] in de koelkast.
 cake.PL] in the fridge
 ‘There are still some/much/more/enough of those good cakes in the fridge.’

The verb shows number agreement with the noun, but the latter is rather deeply embedded in the nominal, separated from the determiner by the preposition *van* ‘of’. To model this we start from the observation that the combinations are also well-formed if the determiner is omitted.

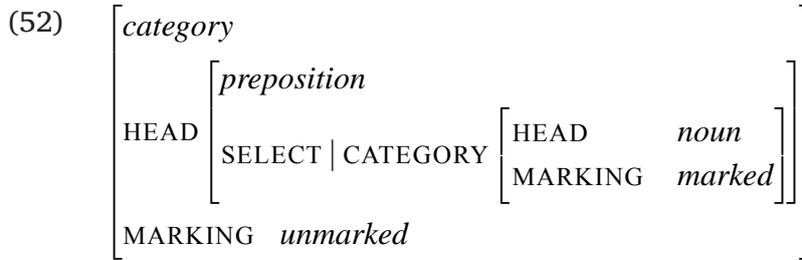
- (50) a. Er staat/*staan nog [van dat lekkere bier] in de koelkast.
 there stands/*stand still [of that good beer.SG] in the fridge
 ‘There is still of that good beer in the fridge.’
 b. Er staan/*staat nog [van die lekkere taartjes] in de koelkast.
 there stand/*stands still [of those good cake.PL] in the fridge
 ‘There are still of those good cakes in the fridge.’

A peculiar property of the bracketed strings in these examples is that they have the distribution of an NP, rather than of a PP: They are not only used as subjects, as in (50), but also as complements of transitive verbs and prepositions, as in (51).

- (51) a. Heb jij nog [van dat lekkere bier] in je koelkast?
 Have you still [of that good beer.SG] in your fridge
 ‘Do you still have some of that good beer in your fridge?’
 b. Ze zijn dol op [van die lekkere taartjes].
 they are fond of [of those good cake.PL]
 ‘They are fond of those good cakes.’

This suggests that the head of the bracketed strings is not the preposition *van* ‘of’, but the nominal which follows it, respectively *dat lekkere bier* and *die lekkere taartjes* (Van Eynde,

2004, 42–47). Another peculiarity of these combinations is that *van* ‘of’ affects the definiteness of the NP: While *dat lekkere bier* is definite, the addition of *van* makes it indefinite. This is not only clear from its semantic interpretation, but also from its admissibility in the subject position of existential clauses, as in (50). To account for these peculiarities we assume that *van* ‘of’ is not the complement selecting head of a PP in these examples, but rather a functor which selects a marked NP as its head sister and whose own MARKING value is of type *unmarked*, as in (52).¹⁷



The net result is that the phrases which are introduced by this *van* are unmarked nominals whose HEAD and INDEX values are shared with the noun. Such nominals can be combined with a quantifying determiner without further ado: Nothing need be changed or added to the AVMs of the determiners to model their combination with a partitive *van*-phrase and to account for the agreement facts in (49).

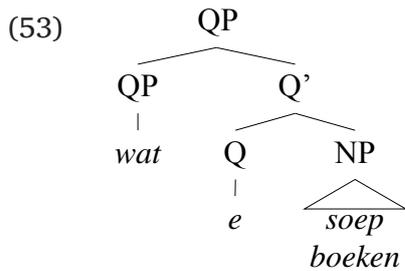
4.4 Summing up

This section has presented an NP analysis of nominals, with special attention for combinations in which the determiner shows (partial) disagreement with the noun. It may be worth stressing that the functor treatment, on which it builds, has not been developed specifically to deal with disagreement data. Instead, it has been used to deal with a broad range of phenomena that are relevant for the analysis of nominals, including nominals with idiosyncratic properties. The Big Mess Construction, for instance, as exemplified by *that long a bridge*, is analyzed along the lines of the functor treatment in Van Eynde (2007), Kim & Sells (2011), Kay & Sag (2012) and Van Eynde (2018). The same is done for the Binominal Noun Phrase Construction, exemplified by *her nitwit of a husband*, in Kim & Sells (2014) and Van Eynde (2018), for the *sort/kind/type of* Construction, exemplified by *those kind of problems*, in Maekawa (2015), for the interaction of determiners with numerals and predeterminers in Italian nominals in Allegranza (2006), and for the Dutch *wat voor* Construction, as exemplified by *wat voor een man is dat?* ‘what kind of man is that?’, in Van Eynde (2004, 47–50). The latter also explores the application of the functor treatment to complementizers, modeling them as words which select an unmarked verbal projection and which share their MARKING value with the combination.

5 Comparison with the DP treatment

Having developed an NP treatment for the instances of disagreement that were presented in Section 2, we now turn to the issue of how they are dealt with in the DP treatment. For the quantifying *wat* ‘some’ there is a proposal in Barbiers et al. (2010, 6–9). It involves the use of an empty quantifier which takes a nominal as its complement, and *wat* as its specifier, as in (53).

¹⁷ That the selected nominal must not only be marked but also definite can be modeled in two ways. Either, one can add *definite* as a subtype of *marked*, or one can add an attribute, say DEFINITENESS, to objects of type *marking* and treat *definite* as one of its possible values.



The reason that is given for treating *wat* as the specifier of Q, rather than as Q itself, is that it can be used as the specifier of an overt quantifier, as in (54).

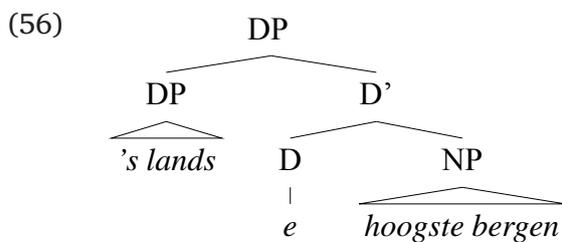
- (54) Ik heb wat veel boeken gelezen.
 I have some many books read
 ‘I have read quite a bit too many books.’

Barbiers et al. (2010) does not address the issue of how the number value of the higher QP in (53) is determined, but an anonymous reviewer points out that Q can be made to share the number value of its NP complement. On that analysis the number value of *wat* itself does not matter. It matters, though, when there is no NP complement, as in (5), repeated in (55).

- (55) Er is/*zijn nog wat in de pot.
 there is/*are still some in the pot
 ‘There is still some in the pot.’

To deal with this the authors “assume a privative system with the features [plural], [non-neuter] and [definite]. For an item to bear no specification for these features means that this item is not endowed with the relative features.” (Barbiers et al., 2010, 7–8) *Wat* is claimed to lack all three of them, and in order to account for the ill-formedness of the starred combination in (55) the authors add: “If *wat* is not combined with anything and appears on its own, it is interpreted by default rules: singular in the absence of [plural].” (Barbiers et al., 2010, 8) Given the structure in (53) this implies that the higher QP shares the number value of the lower QP, and (by projection) of the empty Q.

For the prenominal genitive, as in *'s lands hoogste bergen* ‘the.GEN country.GEN highest mountains’, an anonymous reviewer suggests to treat it along the same lines as the English Saxon genitive in *the country's highest mountains*. To model the latter Adger(2003: 256–258) employs an empty D that takes an NP as its complement and a DP as its specifier. When applied to the Dutch genitive, this yields the structure in (56).



The reason that is given for treating the genitive as a specifier of D, rather than as D itself, is that heads are required to be X⁰ rather than XP. Another reason is that the position of D may be filled, as in (57), where *every* takes the D position.

(57) The Emperor's every wish was immediately carried out.

The issue of how the case and number values of the higher DP are identified is not addressed in Adger (2003), but an anonymous reviewer suggests that D “possibly inherits agreement properties from the noun (via feature sharing).”

Having shown how the DP approach can be made to deal with the [Det + Nom] combinations that were discussed in Section 2, it is time now for a comparison with the NP approach. This reveals various differences. One concerns the structures themselves. The NP analyses do not employ empty Ds or Qs, and treat the unmarked nominal (which corresponds to the NP in (53) and (56)) as a daughter –rather than as a granddaughter– of the top node.

Another difference concerns the feature sharing. In the NP analyses the sharing of the AGR values between the nominal and the top node follows from the Head Feature Principle and the sharing of the indices follows from the Semantic Inheritance Principle, both of which are independently motivated. In the DP analyses the relevant features are first shared between the empty D (or Q) and its NP complement, and then projected to DP (or QP). This sharing is not only more complex, it also lacks independent motivation, since heads normally do not share the case, number and gender of their NP complement. The verb in *eats potatoes*, for instance, does not share the number value of its NP complement, and the noun in the German *die Vernichtung des Abendlandes* ‘the annihilation the.GEN evening.country.GEN’ does not share the case of its genitive NP complement, nor its gender.

A third difference concerns the definition of syntactic categories. In the NP analyses categories are decomposed and represented as Attribute Value Matrices. Part of speech is one of the relevant attributes, but the SELECT and MARKING values are relevant as well, and provide the possibility to differentiate categories in other terms than part of speech distinctions. Determiners, for instance, are defined as marked selectors of an unmarked nominal, and not as members of a separate part of speech. This not only facilitates the capturing of finer-grained distinctions, as that between adjectival and pronominal determiners, it also provides the means to generalize where appropriate. Nominal phrases, for instance, are uniformly treated as NPs, rather than as a disjunction of DP and QP.

In sum, while the DP approach can be made to fit the facts, the NP approach does so in a way that is simpler (no empty Ds or Qs), less stipulative (no sharing of feature values between head and complement), and more uniform (no disjunctive statement for referring to nominal phrases).

6 Conclusion

An interesting case for the NP vs. DP debate is the treatment of [Det + Nom] combinations in which the determiner does not show agreement with the noun. We have identified a number of such combinations and demonstrated that they share their case, number, gender and/or person values with the noun (Section 2). Paving the way for an analysis we have made a distinction between morpho-syntactic agreement, also known as concord, and index agreement. In terms of that distinction we have differentiated four types of [Det + Nom] combinations, depending on whether or not they show concord and whether or not they show index agreement (Section 3). In a next step, we have developed an NP analysis of the [Det + Nom] combinations. It is cast in the notation of Head-driven Phrase Structure Grammar and adopts the functor treatment of adnominal dependents, as proposed in amongst others Van Eynde (2006) and Allegranza (2006). Special attention was paid to combinations which show (partial) disagreement (Section 4). In a last step we have shown how these combinations are dealt with in the DP approach. A comparison

with the analyses in the NP approach shows that the latter are simpler, less stipulative and more uniform (Section 5).

Abbreviations

2 = second person, ACC = accusative, DAT = dative, F = feminine, GEN = genitive, M = masculine, N = noun, NOM = nominative, PL = plural, R = R-pronoun, SG = singular

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Competing Interests

The author has no competing interests to declare.

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