Null-Headed Nominals in German and English

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Abstract

In this paper we argue that certain nominal phrase constructions in German and English are best considered as having empty lexical heads. We propose a feature LP, which gives the status of the LEFT PERIPHERY of a nominal tree structure as one of three values, *empty*, *full* or *one*. A number of simple language-specific rules govern the combination of signs in terms of their LP values. For example, determiners such as *none* or *mine* are restricted to combining with $\bar{\mathbf{N}}$ constituents whose left periphery is empty [LP *empty*] while *no* and *my* require [LP *full*]. The feature provides a simple general explanation of a number of related phenomena wherein determiners or adjectives appear to "carry the weight" of DPs, including a variety of German DP constructions, certain possessive constructions in both English and German, and generics. The broad descriptive power of this feature argues that it is not an ad hoc solution. In order to justify it further, we investigate alternate explanations for the same phenomena, without using the LP feature, and argue that these approaches introduce unnecessary ambiguity and other complications.

1 Introduction

In this paper we look at a number of nominal constructions without overt nominal heads in German and English, and suggest an analysis which posits a phonologically unrealized head, which functions syntactically just as other common nouns, particularly in that it is subject to restrictive postnominal modification as in *none that I know of*. The analysis furthermore postulates that the $\bar{\mathbf{N}}$ behaves differently depending on whether its leftmost constituent is the phonologically empty noun, the overt anaphoric *one* or something else. Adjectival modification and determiner choice will be seen to be dependent on the status of the left periphery. Miller (1992) provides a mechanism for EDGE FEATURES in which we profitably cast the analysis. The necessity for such a null element arises from the postulate that $\bar{\mathbf{N}}$ constructions are headed. We further argue that alternative analyses (without the postulate of empty heads) result in unnecessary lexical ambiguity, and have difficulty supporting analyses of postnominal modifiers. As we show, the two languages operate differently in the null-headed $\bar{\mathbf{N}}$ constructions they allow, but our proposal offers a simple account of both differences and similarities.

Our analysis assumes a determiner phrase (DP) analysis along the lines of Abney (1987), where the determiner is considered to subcategorize for an $\bar{\mathbf{N}}$ (an NP in Abney's terminology), resulting in a maximal DP. We reserve the term NP to refer to a maximal projection under an NP analysis (i.e., the same constituent as DP, under another view).

2 Motivating phenomena

The phenomena which have motivated the present study are forms of null-$\bar{\mathbf{N}}$ anaphora and English *one* anaphora. In particular we consider the class of determiners whose form depends on the presence or absence of a phonologically realized $\bar{\mathbf{N}}$. This includes possessives such as *mine* as well as non-possessives such as *none*. The treatment will first correctly describe the distribution of forms such as *my*/*mine*, allowing, e.g. *my blue one*, *my dog*, *mine*(DP), and *none in the house*, while disallowing **my one*, **my* (as DP), **mine one*, **mine dog*, and **no in the house*. Second, we provide a simple account of their distribution using a general constraint on DP's which we now adduce.

We now look more closely at some of the constructions which motivate the present analysis.

2.1 German data

In constructions analogous to the English anaphoric *one* constructions, such as *I prefer the red one,* German allows a full DP to be constructed without an explicitly headed $\bar{\mathbf{N}}$ complement. That is to say, for such anaphoric reference, a determiner, or adjective, or adjective-determiner combination can be sufficient to function as a fully formed DP. Thus, as (Netter 1994) points out, any of the following are acceptable:

the	*old*	*men*	*with children*
die	alten	Männer	mit Kindern
die	alten	-	mit Kindern
die	-	Männer	mit Kindern
die	-	-	mit Kindern
-	alte	Männer	mit Kindern
-	alte	-	mit Kindern
-	-	Männer	mit Kindern

It would appear that any constituent of the full DP may be left out without affecting the grammaticality of the phrase.[1] In fact, it can be seen from the above list that any combination of constituents may be omitted, provided that not all are omitted. We call this requirement the *Nonempty Left Periphery Constraint.* It is notable that merely requiring that the nominal be in some way phonologically realized would not prevent the postnominal complement or adjunct from behaving as the nominal itself, which is not possible. A postnominal adjunct or complement alone cannot constitute a DP. This fact motivates our postulate that syntax is sensitive to the left edges of $\bar{\mathbf{N}}$'s; it is then natural to require that this edge not be empty in the case of full DP's.

[1]When the determiner is omitted the declensional ending of the adjective becomes strong. This is shown in the table. The optionality of the postnominal PP is not in doubt, and therefore is not illustrated separately.

2.2 English data

The same distribution in English is complicated by the forms of *one* and *ones*.[2] In a DP→(Det)($\bar{\mathbf{N}}$), both parenthesized elements may independently, but not simultaneously, be omitted.

In examples 1 through 6, we show how several determiners differ with regards to the $\bar{\mathbf{N}}$ complement they accept. In example 4, we see that *many* accepts all complements except the anaphoric *one*, while in example 5, *every* accepts the anaphoric *one* but not the null nominal complement. On the other hand, in example 6, the determiner *none* accepts nothing but the null complement.

(1)	which car(s)?	(2)	a car	(3)	the car(s)
	which blue one(s)?		a blue one		the blue one(s)
	which one(s)?		*a one		the one(s)
	which ⊘?		*a ⊘		*the ⊘
(4)	many car(s)	(5)	every car	(6)	*none car(s)
	many blue one(s)?		every blue one		*none blue one(s)
	*many one(s)?		every one		*none one(s)
	many ⊘?		*every ⊘		none ⊘

It is worth noting that the determiners all treat the phonologically fully realized nominal complement (here *car(s)*) in the same way that they treat the adjectivally modified anaphoric *one*. If the determiner accepts the non-anaphoric phonologically realized $\bar{\mathbf{N}}$, then it also accepts the adjectivally modified *one*, and if it rejects the former, then it also rejects the latter. Given this consistency, it appears that nominals may be divided into three classes according to which they may be selected by the determiner.

The primary difference between the German and English data is the existence of the phonologically realized anaphoric *one*. It is due to the absence of this in German that the null nominal is more prevalent in the nominal head position, while its distribution is more limited in English. In English, neither of the examples in 7 are possible DP's, whereas their German counterparts in 8 constitute grammatical DP's:

(7)
*The ⊘
*The blue ⊘
*A ⊘
*A blue ⊘

[2] In fact the same puzzle arises in English in considering the optionality of determiners and $\bar{\mathbf{N}}$s: *(most)(farmers) I know* (as DP).

(8)
Die ⊘
Die blaue ⊘
Eine ⊘
Eine blaue ⊘

In further chapters, we will discuss a general treatment of these phenomena in both languages. We will account for the differences in $\bar{\mathbf{N}}$ selection requirements of various determiners and formalize the restrictions on what combination of constituents may form a valid DP.

3 Analysis

The analysis of these headless $\bar{\mathbf{N}}$'s is tied up with the analysis of empty categories in general. It is worth keeping in mind that the primary issues involving empty categories are not purely empirical. Given the analysis below, in which a phonologically empty noun is postulated, we can easily derive a weakly equivalent analysis in which no empty noun is postulated. Since the analysis makes use only of context-free elements, we could eliminate empty elements by reformulating the analysis in Chomsky normal form (or Greibach normal form).[3] The derived grammar would contain rules such as DP $\rightarrow$ Det Adj, however, which we have reason to reject. We postulate the empty element not in order to license strings which would otherwise be impossible, but rather to allow descriptions which make the most sense linguistically.

The further theoretical point which we emphasize is the sensitivity to constituent edges. This is not always foreseen in linguistic theory, but the use of "edge" features simplifies the present analysis a good deal. Furthermore, it is of benefit to analyses of both German and English.

3.1 General analysis

We shall base our account on the assumption that determiners govern $\bar{\mathbf{N}}$'s, as in Abney (1987)'s "Determiner Phrase" account (where our constituent $\bar{\mathbf{N}}$ is referred to as "NP"). This is introduced as a simplifying assumption, and is strongly motivated by declensional endings in German (see Netter (1994) for discussion). As we shall note below, empty-headed $\bar{\mathbf{N}}$'s provide further evidence for a DP analysis.

The general idea of our account is that there is a null nominal constituent which is used to head certain phrases. This null $\bar{\mathbf{N}}$ is selected by the constituent to its left, either an adjective or a determiner. Furthermore, the null constituent is restricted in its allowed position in the grammatical structure of the phrase. Specifically, constraints are postulated which ensure that it may not be the first (leftmost) element of the phrase. This effectively enforces the Nonempty Left Periphery Constraint.

The null $\bar{\mathbf{N}}$ is required (or allowed) by some determiners and adjectives, and in turn, its presence requires at least some phonologically realized constituent to

[3] The situation with more powerful theories is more complicated, but as long as there are not more than finitely many derivations of empty elements, they should be eliminable through compiling (Dymetman 1992).

Subcat value of determiner	*Sample DP's*
[LP ?]	which car(s)? which blue one(s)? which ones left? which ⊘ left?
[LP ¬*one*]	many cars many blue ones *many ones left many ⊘ left
[LP *full*]	every car every blue one every one left *every ⊘ left
[LP *empty*]	*none car(s) *none blue one(s) *none one left none ⊘ left

Table 1: Some determiners and the LP values which they subcategorize for. The LP feature classifies the $\bar{\mathbf{N}}$ according to the properties of its leftmost constituent (see below).

the left. A phonologically null $\bar{\mathbf{N}}$ head is selected by the (German) adjective or determiner that modifies or governs it. Some examples of the effects of the requirements of different determiners may be seen in Table 1. Specifications in the adjectives and determiners play an important role in our discussion of the behavior of determiners in general, and in our attempt to formalize this behavior. It is in the behavior of certain determiners that the similarity between the two languages (and hence the applicability of our suggestions to English) may be seen most clearly. As seen above, certain determiners accept both null and phonologically realized heads in German, whereas their equivalents in English accept only phonologically realized heads. Likewise, both languages have determiners (as used, e.g., in masc. nom. sg.) which select strictly for null heads. Among these determiners are such possessives as, in German, *meiner* and *unserer*, and in English *mine* and *ours*, as well as non-possessives such as *keiner*/*keines* in German and *none* in English. These behave identically to other determiners in all respects but for the fact that they are forbidden from selecting a governing head with a phonologically realized left edge. By the same token, still other determiners exist which are unspecified for this feature and may combine with either a null or phonologically realized head.

These determiners include, in German, the majority of definite and indefinite determiners as well as such determiners as *jeder*, *mancher*, and *wenige* and in English, determiners such as *either*, *any* and *those*.

As the data in section 1 show, German allows adjectival modification of the null noun without difficulty. The situation is different in English, in which *one* is normally required if there is adjectival modification (*the interesting one*, **the interesting*). But English, too, allows some adjectives to modify the null noun, such as in the case of superlatives and comparatives illustrated in section 3.5. In addition to these, there are also a small number of positive adjectives which may modify the null noun, including *favorite, first, second,* etc. and *last*. Note *the very last,* an example which indicates the adjectival status of the word *last* by the further modification by the adjectival degree modifier *very*.

The intuitive restrictions on the position of the null constituent prevent it from causing difficulties with parsing, at least in most cases. A parser need only postulate a null constituent after determiners and adjectives, since no maximal projection can begin with a null constituent, and the parser need never consider the possibility that more than one such constituent appear in a row. Thus the canonical cases of empty elements we're positing have lexical SPONSORS in the sense of Johnson & Kay (1994). They focus on heads which license empty nodes, while we foresee adjacent items as licensing them, but the minor effect on parsing is the same. A special case is the superlative/comparative, considered below, in which the intuitive sponsor of the empty head is phrasal. But even here it should be possible to cue the postulation of the empty element on the degree adverbials *more* or *most*, again guaranteeing unproblematic parsing.

The general lines of the analysis presented here are taken from a talk "Edges and Null Nominal Heads" given by John Nerbonne at the 1994 HPSG Conference in Copenhagen (Nerbonne 1994). That analysis foresaw the use of a boolean feature, "Left-Periphery Empty" [LPE±], which Netter (1996) adopted in his dissertation on German NP structures (pp. 164-70). The present paper includes English as well as German, requiring an extension of the ideas, and it reviews systematically alternatives involving nominalization, non-headed analyses and underspecification.

3.2 HPSG Formalization

In order to explore the present account in more concrete detail, it is desirable to consider a formal treatment of the ideas. We do this here in the framework of HPSG.

Addressing the issue of clitics bound to either the left or right periphery of a tree, Miller (1992) proposes a class of features called EDGE features.[4] Just as head features project (or are shared) between heads and phrases, so edge features are shared between phrases and their edges, i.e., their left- or rightmost constituents. There are two types of EDGE feature, FIRST and LAST, corresponding to the

[4]Miller's analysis was designed to account for the English possessive *'s*, whose distribution is phrasal (*The queen of England's hat*), but which shows sensitivity to its lexical host.

beginning and end of phrases, or, in writing, the left and right edges. The feature percolates up the left or right edges of its tree, depending on the edge it belongs to. This pattern of feature transmission assures the correct behavior of the null head vis-à-vis the feature LP, which we introduce here.

We adopt the FIRST feature LP, standing for "left periphery," which may take the values *empty*, *full* or *one*. We presume that only the null element is lexically specified as LP-*empty*. All other entries are lexically specified as having the value LP-*full* in their SYNSEM feature structure, except for the English anaphoric *one* which must be specified as LP-*one*. As is evident from its name, the feature LP percolates up the left edge of its tree. The crucial restriction on this feature is that the maximal projection of a DP must be LP-*full*. This precludes the possibility that a completely empty DP be considered to be fully realized, thus enforcing the Nonempty Left Periphery Constraint. In this way we allow any but not all constituents to be omissible, as should be the case. The LP-*empty* or LP-*one* constituent may take complements to the right, but it never percolates to the top of a DP, (that is to say, it may not be the leftmost element of a full DP).

In the HPSG feature geometry, the LP feature is part of the SYNSEM value of a constituent. This follows from the assumption that some determiners select certain LP values, since only SYNSEM objects can be selected. When a determiner or adjective combines with an LP-*empty* $\bar{\mathbf{N}}$, the LP of the newly formed constituent is identical to that of the adjective or determiner on the left periphery of the DP, as the Edge Feature Principle for FIRST features requires. This value is always LP-*full*, as stated. A simple tree diagram depicting the typical behavior of this feature may be seen in Figure 1.

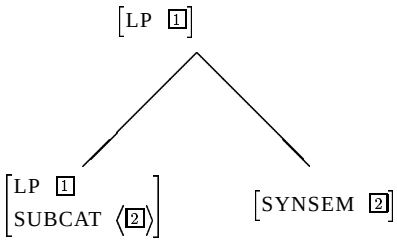

Figure 1: The basic feature-value percolation of LP in Det-$\bar{\mathbf{N}}$ constructions. The value of the feature is passed along the leftmost edge of the tree. The same configuration of LP values is required in *all* phrases.

The null nominal head is thus selected by the the determiners and adjectives with which it combines. Certain determiners, such as *none*, require the feature LP-*empty* (in the SYNSEM structure of the noun they select), and thus are only able to combine with the null nominal head. A lexical entry for such a determiner would be something like Figure 2. Most determiners and adjectives in German

would have an unspecified LP value within their SUBCAT value, allowing them to combine freely with phonetically realized nouns and the null constituent alike. In the resulting LP-*full* phrase, the leftmost edge is phonetically realized. In the case of English, many adjectives and determiners are explicitly labeled as selecting for an LP-*full* noun.

$$det\begin{bmatrix}\text{PHON} & \langle none \rangle \\ \text{LP} & full \\ \text{SUBCAT} & \left\langle \left[\text{LP } empty\right] \right\rangle\end{bmatrix}$$

Figure 2: Lexical entry for *none.* The full LP value percolates to the top of the phrase, while the SUBCAT feature assures that the selected $\bar{\mathbf{N}}$ will be null-headed.

The anaphoric *one* in English realizes nominal anaphora for adjectives and for determiners which will not accept the null noun. This has no parallel in German and constitutes a special case for certain determiners such as *a(n)* or possessives such as *my*, as can be seen from the following examples. (Note here and in subsequent examples the possible confusion between the anaphoric nominal *one* and the singular indefinite determiner *one*.)

(9)
*a one on the table
*my one on the table
*one one on the table

This distinction necessitates the third value for LP in English, namely the *one* value. We specify the anaphoric *one* in English as LP-*one* and constrain the determiners in the manner of Figure 3. In reading Figure 3, it is important to note that the LP value *one* is not the same as the PHON value *one* and that the latter, when it occurs as a determiner, specifies for the null (LP-*empty*) component. Since LP may take one of three possible mutually exclusive values, the disjunction between LP-*full* and LP-*empty* is synonymous with ¬LP-*one*.

$$det\begin{bmatrix}\text{PHON} & \langle a \rangle \\ \text{LP} & full \\ \text{SUBCAT} & \left\langle \left[\text{LP } full\right] \right\rangle\end{bmatrix} \vee \quad det\begin{bmatrix}\text{PHON} & \langle one \rangle \\ \text{LP} & full \\ \text{SUBCAT} & \left\langle \left[\text{LP } \left(full \vee empty\right)\right] \right\rangle\end{bmatrix}$$

Figure 3: Lexical entry for the indefinite determiner.

We assume that no constraints govern the interaction of the LP feature with prepositional phrase or relative clause complements or with right adjuncts. Thus,

a LP-*empty* constituent may combine freely with complements to its right. It must combine to the left with a LP-*full* constituent somewhere below the level of maximal projection in order to be a well-formed DP. Thus, regardless of right complementation, the LP feature of the head noun (possibly the null constituent) percolates up the left edge of the tree, but may only form a full DP if it is either LP-*full* or if it is eventually selected by the SUBCAT value of a constituent to its left. Figure 4 shows how the determiner *none* and the empty constituent combine to form a constituent that is LP-*full*, making it an acceptable full DP.

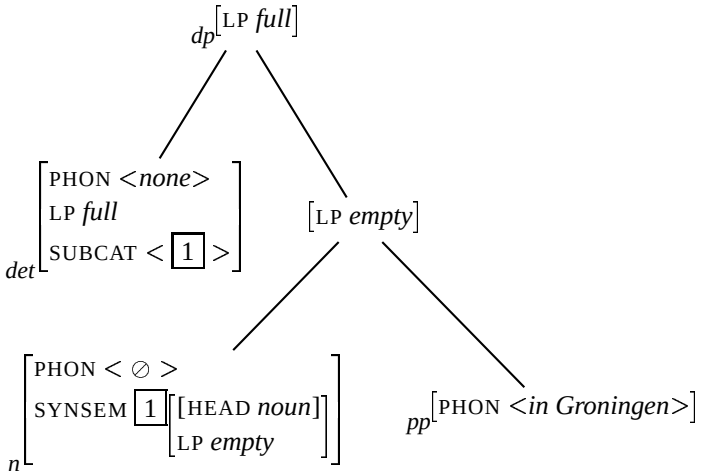

Figure 4: Construction of the full DP *none in Groningen*, with a null headed $\bar{\mathbf{N}}$ complement.

In general, adjectives in English select only for non-empty LP values, i.e. *full* or *one*. For adjectives which appear without nouns, e.g. *my favorite is peach*, it would be possible to leave the SUBCAT value unspecified for LP. A better analysis might postulate adjectival nominalization for *favorite* given the possibility of the pluralization *favorites*. It is our assessment that most English adjectives require phonologically realized nominal heads for anaphoric reference. The existence of the English *one* may make this plausible. It is the phonologically realized counterpart of the unrealizable LP-*empty* $\bar{\mathbf{N}}$.

Likewise, many determiners also impose restrictions on the $\bar{\mathbf{N}}$s they combine with. *The* and *a(n)* are both precluded from selecting an LP-*empty* nominal, whereas *mine* and *none* are bound to select LP-*empty* nominals only. Other determiners are constrained against selecting for LP-*one* constituents, such as *a(n)*, *my*, *many* and *some*. A variety of English determiners are unspecified in what sort of $\bar{\mathbf{N}}$ they govern. Determiners such as *either* and *those* we would leave unspecified, allowing them to select either phonologically realized (including *one*) or null nominals.

The necessity for the *one* value is the main difference between the English grammar and the German, where a boolean feature is sufficient. Further differences with the German grammar, include the additional case, agreement and declension features needed, and more importantly the distribution of SUBCAT values. Almost all of the determiners are allowed to select either LP value (i.e. *empty* or *full*), with the exception of that class of determiners (e.g.. nom. masc. sing. *meiner*, etc.) which require a null nominal. In further contrast to English, adjectives combine freely with null heads in German (see Section 2 for examples).

3.3 Possessives and postnominal modifiers

Jackendoff (1971) notes that independent possessive determiners combine felicitously with postnominal modifiers only in so-called "$\bar{\mathbf{N}}$-gapping constructions":

(10)
Al's relatives from Akron are here. *Bo's from Biloxi arrive tonight.
Al's relatives from Akron and Bo's from Biloxi arrive tonight.

Nerbonne, Iida & Ladusaw (1989) postulate a distinct N which is not subject to modification to account for this. In the present DP analysis, we have the option of having independent possessive determiners subcategorize for [LEX+,LP-*empty*]. What these examples show, if the judgements are correct, is that there is a difference between gapping constructions and non-gapping constructions. Our null head describes the non-gapping constructions, where postnominal complements do not occur.

The inability of determiners which take null heads to combine felicitously with the possessive *'s* in English is further support for the present analysis. Pullum (1991) noted data like the following.

(11)
Many women attended.
*None's hats were left behind.
No one's hat was left behind.
The nun's hat was left behind.

The other sentences in this example suggest that this is neither a semantic nor a phonological constraint. Restricting the null element generally from taking *'s* provides a general explanation for the behavior of such determiners.

The behavior of possessive genitives in German also suggests the presence of the null element; only one-word long prenominal genitives are allowed, while genitives dependent on other elements are less sensitive *des Broadways liebstes Kind* (Olsen 1991):

(12)
Schmidts {Antwort, Mutter, Finger, ...}
∗ Des Mannes {Antwort, Mutter, Finger, ...}

Where a null-headed nominal phrase is used, it behaves similarly to constituents

with more than one word and is required to take a postnominal position. This follows from the present analysis, which considers such a constituent as phrasal.

(13) ∗ Vieler ∅ {Antwort, Mutter, Finger, ...}
Die {Antwort, Mutter, Finger, ...} vieler ∅

3.4 DP vs NP analysis

For this account, we have assumed a DP analysis. In the DP framework, the percolation of features we discuss is straightforward. This is not the case if we consider the same account from the standpoint of an analysis which has the NP selecting for its determiner. In such a situation, it would appear to be necessary to introduce another feature, which we might refer to as LPSPEC, as a feature of the determiner. This feature would share a value with the determiner's SUBCAT feature and allow the NP to select a determiner with the appropriate SUBCAT feature. This approach already gives some impression of being a rather ad hoc reworking of the DP version, but the issue is furthermore complicated by the possibility of optional modifiers interposed between the determiner and its putatively selecting noun. This can be seen in Figure 5, where the problem is reflected in the mismatched feature-sharing of the $\boxed{1}$ tags. The problem arises in the apparent conflict between the syntactic principle that (optional) modification never changes selectional restrictions (we note an exception below) and the fact that the adjectivally modified anaphoric *one*, as in *blue one*, would differ in selection from the unmodified *one* in the analysis under consideration. In HPSG terms, the difficulty is to reconcile, on the one hand, the HPSG Subcategorization Principle, which requires that the SUBCAT list of a mother be the SUBCAT list of the head daughter, minus the "expended" values of the complement daughters, with the left-periphery percolation of the LP feature on the other. As can be seen in Figure 5, information is introduced in the leftmost node of the $\bar{\mathbf{N}}$, in the form of the adjective, which affects the choice of the determiner. This information appears to have no way of getting into the place where it is needed, namely the subcat list of the $\bar{\mathbf{N}}$. Thus the features marked with $\boxed{1}$, which clearly should be identical, are unable to unify. It is clear that for our purposes a DP analysis is most suitable. It remains to be seen whether a way around this difficulty might be found which would allow some version of the present account to pertain to an NP analysis.

Of course, there are cases in which optional modifiers *add* complement selections, viz., degree modifiers such as *too*, *enough*, *more* and *most*, but these only add to existing selections and form a natural class in which *blue* would be anomalous.

There are further complications which arise in all analyses of nominals in dealing with such phenomena as bare plurals, in particular in trying to remove the disjunction in the nominal category between specified and unspecified nominal phrases. We do not deal with these problems here, but look to an account of functional categories along the lines of Netter (1994) and Netter (1996) for progress in this issue.

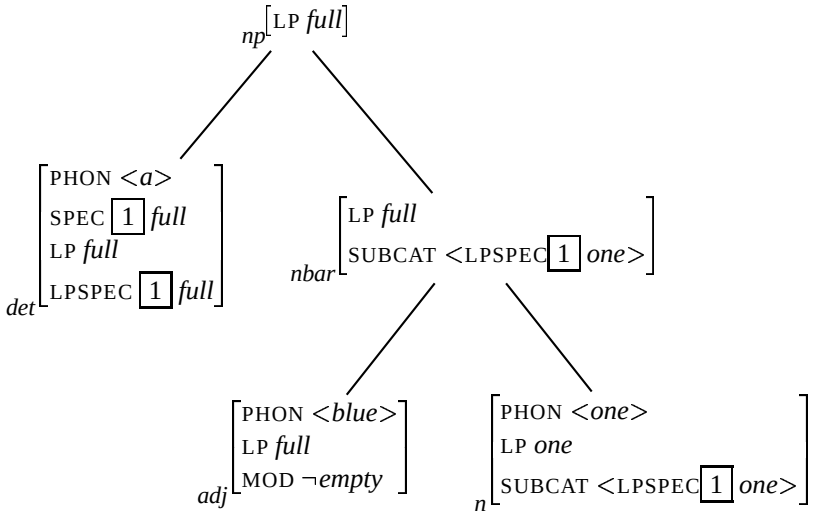

Figure 5: Difficulties in handling left-periphery percolation in the NP within the framework of an NP analysis.

3.5 Superlatives

Superlatives form a particularly interesting subclass of empty-N licensers.

(14) Paul read 20 abstracts. { The (best/most interesting) ∅ / *The (good/interesting) ∅ } were on creoles.

At least in English and German, these seem to have the same properties as the other empty-N licensers. In particular, they combine freely with postnominal modifiers of several sorts.

(15) { The best ∅ in the room / The best ∅ Paul read / The best ∅ here } were given prizes.

Marandin (1997) rejects the empty-N analysis in French for—among other reasons—the failure of parallel cases in French (*les plus chers de Marie*). This undercuts the motivation for the empty N, which is postulated to behave as an N. As we see, the Germanic case is different.[5]

[5]But note that we might conclude here, as in the case of possessives, that the French superlative adjectives add the restriction [LEX+]. This allows the construction to be treated neatly even if it can no longer be said to constitute the same degree of evidence for the analysis.

4 Related phenomena

4.1 Ellipsis

A variety of different phenomena can produce similar effects, and it is perhaps worthwhile to mention an instance where a null head might *appear* to be in use, when in fact it is not, under the present analysis. In particular, there is the ellipsis process we illustrate in 16.

(16) I prefer the red.

instead of

(17) I prefer the red one.

in a situation, for example, where someone is selecting one of several dresses. We suspect that this is an independent construction, and that it is not a general property of *red* that it can modify the null noun. In support of the constructional view, note that *the* is obligatory; even in situations where plural objects would be salient candidates as referents, we do not find *I like red*, as in the following example (Chierchia (1998) discusses this further).

(18)
Do you like the red ones?
Red ones are fine
*Red are fine

There are a number of ways for this to be analyzed, but it is our opinion that such constructions in English do not make use of the LP-*empty* null head which we have described, but rather that there is a separate construction in which the *one* is elided. This view suggests one general process and a second, more limited one, illustrated by 16, which is limited to only certain adjectives. The possibility in some cases of adverbial modification establishes the adjective in question has not undergone nominalization, as in *I prefer the very red*.

4.2 Partitives

Partitive constructions such as *none of the bananas* bear close resemblance to the phenomena discussed in this paper, although they are notably different due to their being non-anaphoric. The determiners associated with partitive phrases are conspicuously the same as those that select null-headed nominals most felicitously; even in cases where adjectives are used, it is the same class of adjectives, such as those in phrases with superlatives or superlative-like adjectives, as in *my favorite of the girls*. Not all determiners which select null-headed nominals may be used in partitive constructions, however. Possessives such as *mine* for example, which we have analyzed as selecting exclusively for null nominals, do not work well as partitives, which are restricted to nonspecific determiners.

4.3 Null-N generics

Constructions such as *the meek shall inherit the earth* illustrate another circumstance in which DP's may be composed without overtly headed $\bar{\mathbf{N}}$ complements. These constructions differ from those dealt with in this account in that their reference is generic, rather than anaphoric. Adverbial modification, as in *the desperately poor*, would appear to argue against a simple adjectival nominalization explanation, although, again, this is not to say that some similar looking cases should not be explained as such, e.g. *the good of mankind*, in which *good* seems quite clearly to be the nominal head of the phrase. Kester (1995) provides further discussion on such instances of ellipsis and notes that there are other constraints on their use, such as their being limited to descriptions of people.

In generic constructions such as these, English adjectives are much more free in their ability to modify null $\bar{\mathbf{N}}$ heads than they are in anaphoric constructions. It is our opinion that the present analysis involving the LP feature and the null nominal head may be applicable to these cases as well, although they are not its primary motivation. Additional work would certainly be required, however, as there would appear to be specific semantic triggers which allow English adjectives to select the LP-*empty* feature in cases where they would normally be precluded from such specification. We have not investigated the ramifications of applying the present analysis to such phenomena, and we wish to remain studiedly vague about them.

5 Competing analyses

We have presented our account of how the LP feature works in accordance with the Edge Feature Principle to govern the behavior of null elements in DP's. We believe that it provides a tidy account of a wide variety of cross-linguistic phenomena, but it is not the only imaginable explanation. Indeed, some of our linguistic assumptions, specifically our analysis of determiners which select exclusively LP-*empty* nominals, invite contention. In this section, we will address some of these views and attempt to defend the account put forth in this paper.

5.1 Determiners vs pronouns

In this paper we consider such words as *mine*, *yours*,and *none* in English and *einer* and *meiner* in German to be a class of determiners which select the LP-*empty* nominal head. That is to say, they require a null nominal head. Although it is not unprecedented to consider such words to be determiners (e.g., Jackendoff (1977)) it is also not entirely uncontroversial. In some analyses, these words are treated as a certain subclass of pronominals. Stockwell, Schachter & Partee (1973) refer to them as "substantive genitives", while Quirk, Greenbaum, Leech & Svartvik (1972) classifies such words as "mine" and "yours" as "possessive pronouns".

The main empirical argument supporting our view of these words as determiners stems from their behavior with regard to restrictive relative clauses, and other postnominal modifiers, which differs from that of pronominals, as the following examples indicate. The following constructions are grammatical.

(19)
None that I know of are in the window.
My colleagues are sceptical; several in Groningen are incredulous.
Take any you like.
Every man kills that which he loves.

whereas pronouns in corresponding constructions are not grammatical, as in the following sentences.

(20)
*He that I know is working this afternoon.
*My colleagues are sceptical, they in Groningen are incredulous.
*Take it you like.
*Every man kills it which he loves.

There are a few exceptions, but in general they are archaic or stylistically marked, as in the following examples.

(21)
Let he who is without sin cast the first stone.
Abandon hope, all ye who enter here.

From the evidence of these constructions, it is preferable to consider such words as *mine* and *none* as determiners. It is worth emphasizing that the distinctions above follow naturally in an account which postulates a noun subject to postnominal modification.[6] This analysis is then made more tidy and coherent by the use of the LP feature.

5.2 A "nominalization" account

If one is suspicious of empty categories in general, then this suspicion is likely to infect the view of the present analysis. An alternative is to view the $\bar{\mathbf{N}}$ lacking the canonical noun as containing a *derived* noun, one that has arisen through a word-formation rule applied to adjectives and/or determiners. In order to investigate firsthand what, if any, difficulties would arise by accounting for the constructions at hand without the use of a null element we constructed alternate grammars to generate the same constructions without the null head and LP feature. We continued to assume that all phrases are headed phrases, in particular that the Head Feature Principle of (Pollard & Sag 1994) was respected. The question of where the nominal head should be located seemed only answerable if we assumed that the adjective or determiner itself was acting as nominal head. (The only other alternative being that a complement or postnominal adjunct was, which was out of the question). In German, where the determiner or adjective occurs regularly without a noun in anaphoric reference, this required that every adjective also be a noun and that every determiner also be a pronoun. In English, to a lesser extent, the same thing occurred, where all determiners which we consider to have unspecified SUBCAT values were also required to be entered into the lexicon again as

[6] Even though the independent possessive forms allow postnominal modification, they are normally infelicitous with relative clauses '* Mine that I know of are in the window.'

pronouns. The cases of adjectival ambiguity are further complicated by the presence of adverbial modification, which can occur productively. It was beyond our resources to construct a grammar which would effectively handle nominalization of adverbially modified adjectives. We suppose that some syntactic nominalization principle would be required for this. Further complications would arise with the interaction of such a principle with a mechanism of formulating noun-noun compounds.

The additional ambiguity of the nominalization approach makes our account more attractive, and there are further difficulties which arise in this approach. To allow the determiners which select null-headed $\bar{\mathbf{N}}$'s simultaneously to be pronouns also invites the difficulties noted (in section 5.2) caused by considering determiners as pronouns, namely that these determiners simply do not behave as other pronouns do in combination with postnominal modification such as relative clauses. To consider these words to be pronouns, then, it would appear to be necessary to establish essentially a new class of pronouns to accommodate them. There is insufficient motivation to do this, notwithstanding traditional perceptions of these words as variants of pronouns. As we believe we have demonstrated in this paper, these words can be analyzed as determiners.

Winhart (1997) has developed an analysis for German in which determiners may ambiguously be nominal (p. 335ff) and in which nominalizations (p. 338ff) are invoked to explain the category of the noun phrase, but we find it inferior to the present account. The analysis of determiners as ambiguously nominal was criticized in § 5.2. We concentrate on the nominalization of adjectives here. It is useful to remind ourselves that noun phrases without nominal heads used anaphorically may be distinct from those not used anaphorically (see §§ 4.1 and 4.3). In particular we are not inclined to insist on the need for an empty noun in the case of human generics (§ 4.3). Winhart does not make this distinction, aiming to criticize Olsen (1987), who indeed foresees an empty noun in the nonanaphoric examples.

Winhart suggests that adjectival complements in the dative case and adjectival modifiers might present problems for our sort of analysis (p.340), but in this sort of analysis the adjectives have the same status with or without head nouns, which the syntactic facts seem to justify: *die ihm treu ergebenen (Samurais)*(the to-him faithfully dedicated (samurais)), *der vermutlich ermordete (Mann)*(the presumably murdered (man)). Winhart further notes that the empty-noun analysis predicts that some adjectives will seem to license *both* adjectival and nominal dependents. This will happen when one combines the adjectival dependents of the sort noted above with, e.g., postnominal adjuncts. This is indeed possible, which is compatible with empty-noun but also with nominalization accounts.

(22)
die ihm treu ergebenen (Samurais) aus Osaka
the to-him faithfully dedicated (samurais) from Osaka

But Winhart also notes examples that seem less felicitous ∗*alle für diesen Parteitag Delegierten aus Bonn*(all for this convention delegated from Bonn) (from Siebert-Ott (1992)). She notes that many native speakers accept this, but seeks an explana-

tion for the judgements of those who do not. We agree that this is indeed a nominalization. As evidence, note how difficult it is to find a candidate noun that could be felicitously inserted after *Delegierten*: ∗*alle für diesen Parteitag delegierten Menschen aus Bonn*. In general, we prefer to concentrate on cases in which the apparently empty-headed noun phrase is used anaphorically. These cases require the postulation of the empty noun. We have no inclination to deny the existence of deadjectival nouns such as *Delegierte(r)* 'delegate'. Finally Winhart appeals to an extra-theoretical generalization to support the nominalization argument, viz., only inflected words are subject to nominalization. She notes that uninflected adjectives are not found in $\bar{\mathbf{N}}$'s without N heads, an intriguing generalization. But, as she notes, uninflected numerals must also be nominalized in her analysis if no empty nouns are to be countenanced. The generalization is imperfect.

5.3 An earlier syntactic account

The analysis of Nerbonne et al. (1989) also treats the distribution of null heads as a syntactic issue, although the treatment is less general and more complex than what's proposed here. Head $\bar{\mathbf{N}}$'s are analyzed as selecting for the adjectives and determiners to their left according to constraints based on a combination of the features ±dependent, ±exceptional, and ±obligatory. The head *one*, for example, requires a +obligatory adjective to precede it if specified by a +dependent determiner such as *my*, thus ensuring the appropriate assessments of such DP's as:

(23) *my one

and

(24) my tall one

Although many of the intuitions of this analysis are in keeping with the present account, the larger number of necessary features does not seem as well motivated, and the heterodox treatment of adjectives as sometimes obligatorily selected by nouns is unnecessary. Gawron, Nerbonne & Peters (1991), Marandin (1997) and Hendriks & de Hoop (1998) have also been critical of Nerbonne, Iida & Ladusaw (1990)'s semantics for various reasons. See the publications for details.

5.4 Marandin's heterodox account

Marandin (1997) puts forward the hypothesis (for French) that similar phrases without an overt N head might best be analyzed as NP's headed by A or Det. This proposal is empirically more promising than the nominalization account, since essential categories are respected. Postnominal modifiers are simply stipulated in the rule:

$$\text{NP} \rightarrow \text{Det } \bar{\mathbf{A}} \text{ PostNomMod}$$

This is clearly only a first approximation since recursion $\bar{\mathbf{N}} \rightarrow \bar{\mathbf{N}}$ PostNomMod, $\bar{\mathbf{N}} \rightarrow \bar{\mathbf{A}}\ \bar{\mathbf{N}}$ needs to be accommodated. The required adjustments would resemble the treatment of NP's to a degree which the present account explains, rather than stipulates.

5.5 Underspecification

Another possible approach to the constructions we have looked at in this paper would be to do away with the null constituent in favor of a less specific definition of what sort of constituent may be subcategorized for by V's and VP's to fill the position of DP. We might imagine allowing saturated constituents of certain types other than nominal-selecting determiners to head a DP. It would be possible to create a new type, a subtype of HEAD, which we might call *arg-like* and define as a disjunction between types which can acceptably head a DP. In English, this would be a disjunction between types *det* and *noun* and in German it would be a disjunction between *det*, *noun* and *adj*. Then any saturated constituent of type *arg-like* would be allowed to function as a head of an DP. This would license such sentences as *none left* by considering *none* to be a determiner with an empty subcat list, and hence in itself a saturated constituent of type *det*. This would obviate our proposed Nonempty Left Periphery Constraint. Note that we have traded the categorial ambiguity of determiners examined in section 5.3 for ambiguous subcategorization: *none*, and *mine* would be analyzed as ambiguously (optionally) selecting an $\bar{\mathbf{N}}$. This ambiguity is standardly accepted in DP analyses, but it doesn't offer a solution here.

The approach would appear at first to succeed in eliminating the need for the null element, although it clearly does not eliminate the need for left-periphery sensitivity. Underspecification of this nature does not seem to be able to account for the behavior of the English anaphoric *one* in constructions such as *a blue one* and **a one*. Such instances still seem to require some notion of left-periphery sensitivity such as that outlined in this paper.

A crippling difficulty with the underspecification account concerns postnominal modification. Above, we noted the difference between pronominals such as *he* and determiners such as *none* in combining with postnominal modifiers. In a DP analysis with underspecification, both constructions would be classified identically as saturated determiners capable of heading a DP. Their different behavior with respect to relative clauses would require further explanation, presumably by addition of distinguishing features. The present account eliminates the need for such *ad hoc* features while maintaining the intuitive distinction between headless determiners and pronouns.

6 Grammar implemenatation

To test the analysis in more detail, we used the graphical prolog environment of van Noord's Hdrug (van Noord & Bouma 1997). We constructed a typed definite clause grammar designed to mimic the behavior of our approach to HPSG. The

feature LP was assigned one of three values, *full*, *empty*, or *one*. General rules and principles such as the Edge Feature Principle and the rule requiring LP-*full* DP's were implemented by including appropriate features on DP rules. This led to unavoidable redundancy but was effective on a small scale at obtaining the desired results.

The grammar for English, as would be expected, was simpler than that of German, as fewer other DP features were required to interact with the one we were studying. The absence of such factors as gender, case and declension in standard DP's made the English grammar fairly straightforward. One PS rule allowed N to rewrite as empty on the condition that its LP value be instantiated as *empty*. All nouns were lexically specified as *full* for the LP value, except for the English anaphoric *one* which was specified as LP-*one*. Thus the head noun constituent (aside from *one*) is either phonologically realized and LP-*full*, or it is null and LP-*empty*. No restrictions were made on this feature's interaction with prepositional phrase complements (which were the only complements dealt with explicitly in our grammar) and it is assumed likewise that no constraints would be put on the LP feature with regard to other complements, such as relative clauses. Thus, regardless of right complemenation, the head N (and more specifically, its LP value) percolates up the left periphery until it is selected by the SUBCAT value of a determiner or the MOD value of an adjective. In our implementation of the English grammar, we used a simplified version of the SUBCAT feature which we required to have an identical value to the LP feature of the noun it selected.

Our implementation did not include any semantic modeling, and so we did not cover the generic null-N cases, wherein some semantic trigger would be necessary to allow adjectives to select LP-*empty* heads. In anaphoric reference, we opted to disallow such constructions.

Case and agreement are important in the composition of a DP in German, but of only tangential importance to our project, so, to the extent we could, we ignored `case` and `agr`, presuming all DP's to be in the masculine nominal form. Number agreement in both German and English added some complications worth mentioning: namely, the problem of accounting for bare plurals. Among the ways to deal with these are the use of a null determiner, the postulation of a unary branching rule, or verbal subcategorization rules which accept two different types of constituent, namely a determiner phrase *or* an $\mathbf{\bar{N}}$, providing the $\mathbf{\bar{N}}$ is plural or non-count. In our simple grammar, we opted for a unary branching rule, but concede that this would not be optimal in a more extensive implementation. For a full HPSG grammar, we would prefer something along the lines of (Netter 1994)'s functional completeness account. In any case, this does not impinge upon the present account of null-headedness, provided we avoid the ill-motivated null determiner option. The rule requiring full DP's to be LP-*full* applies equally to bare plurals, in both English and German.

The last difference between German and English grammars was the additional constraint of declension (strong/weak). This merely restricts the allowable DP constructions further. The rules governing the LP feature maintain their influence.

An example of a rule in our German grammar is as follows:

```
rule(DP,[Det,Nbar]) :-
       DP => dp,
       Det => det,
       Nbar => nbar,
       Det:agr <=> Nbar:agr,
       DP:agr <=> Det:agr,
       Det:case <=> Nbar:case,
       DP:case <=> Det:case,
       Det:dec <=> Val1,
       Nbar:dec <=> Val2,
       dif(Val1,Val2),
       Det:subcat <=> Nbar:lp,
       Det:lp <=> DP:lp => full.
```

This rule describes the composition of the DP from the determiner and $\bar{\mathbf{N}}$. The first three lines of the body of the rule assign the values DP, Det, and Nbar to the appropriate types. The next four lines assure that the agreement and case features of the determiner and the $\bar{\mathbf{N}}$ correspond and that these values furthermore percolate up to the DP level in a way analogous to that following the HPSG head feature principle. The 8th-10th lines of the body guarantee that the declension values of the $\bar{\mathbf{N}}$ and the determiner are compatible (i.e. not the same). The most pertinent lines are the final two lines of the rule, which describe the behavior of the LP feature. In the first of these two lines the determiner's SUBCAT value selects the $\bar{\mathbf{N}}$'s LP feature. Thus, determiners, such as those we claim are restricted to taking nominal heads with LP-*full* or restricted to taking nominal heads with LP-*empty* features, are specified in this respect in their value to this feature, whereas other determiners are unspecified (the feature value LP-*one* as mentioned, does not occur in German). Being "unspecified" in the present dcg environment consists of simply leaving out the constraint clause in the lexical entry for the determiner. The final line of the above rule accomplishes two things: it requires that the correct left-peripheral percolation occurs by stating that the determiner's LP value is the same as that of the DP, thus mimicking the feature-sharing pattern of the Edge Feature Principle, and the line precludes a fully formed DP from being LP-*empty* by specifying that the LP value attached to Det and DP be *full*.

7 Conclusion

In this paper we have made use of a null nominal head and a corresponding left periphery feature to provide a general account for several phenomena occurring in English and German DP's. In particular, we have discussed anaphoric constructions in German which appear to lack a clear nominal head, and a class of determiners in both German and English which occur without overt nominal heads. Our account gives a coherent explanation of these phenomena, as well as of the *one* anaphor in English and its corresponding constraints, and also points to possible explanations for further phenomena such as certain generic constructions which

also seem to lack overt nominal heads. The broad cross-linguistic descriptive power of this account justifies the use of the null constituent and shows that it is not an ad hoc solution to a specific problem. To strengthen our argument, we have implemented a small grammar handling the same constructions, but without the use of the null constituent or the feature LP and have concluded that although this is partially successful, it introduces ambiguity and requires unnecessary detail in the grammar.

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