

# Heads and Categories: Finding the Nominal Chimera\*

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## 1 Introduction

This paper addresses several problems in analyzing the structure of noun phrases, particularly concerning headedness. In much work in early generative grammar, the noun was assumed to be the head of the noun phrase in the sense that it defined the syntactic structure of the phrase. Starting primarily with Abney (1987), but dating back earlier than that (see for instance Hudson (1984)) a significant shift in opinion led many to treat the determiner as the head of the noun phrase (the so-called “DP” analysis). The main motivation of this shift was to explain the many similarities between nominal and sentential structure.

Each approach solves problems that the other cannot, but each opens up new problems. For example, regardless of where the headedness of the noun phrase lies, both the determiner and the noun are optional in different contexts, a typical criterion associated with headedness (cf. Zwicky (1985)).

- (1) (a) This (t-shirt) shouldn’t be left lying around.
- (b) Although most sportscasters<sub>i</sub> are still optimistic, some e<sub>i</sub> wonder if the Cubs will ever win the series.
- (c) (Some) angry wolves steal (some) rice.
- (d) There’s raccoon all over the road.

“Pronominal determiners” as in (1a) and  $\bar{N}$ -ellipsis in (1b) pose a problem for the NP theory since the head N is absent (determined pragmatically or anaphorically); bare plurals, mass nouns, and bare singulars as in (1c,d) pose a problem for DP theories since again the head is missing (with default generic/indefinite interpretation). Regardless of

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\*This paper first developed out of a study of how to do  $\bar{N}$ -ellipsis in HPSG, a theory where the N is assumed to be the head of the noun phrase and headedness is given primacy in determining syntactic structure. I’d like to thank Ivan Sag and Tom Wasow in particular for their help and guidance in developing these ideas. In addition many thanks are due to Joan Bresnan, Luis Casillas, Iván García, Dick Hudson, Chris Kennedy, Beth Levin, Melanie Owens, Stanley Peters, Satoshi Tamioka, Judith Tonhauser, and Arnold Zwicky for their support and comments. I’d like to especially thank Itamar Francez not only for his constant support and ideas but also for suggesting the topic to me in the first place (in the form of a challenge). As always any errors and omissions in this paper are entirely my own responsibility.

the headedness of the noun phrase, additional machinery is required to explain how a well-formed noun phrase can exist without a head. Often the solutions involve positing null determiners in DPs (Abney (1987), Radford (1993)), empty nouns in NPs (Jackendoff (1977), Nerbonne et al. (1989)), lexical ambiguities, categorial coercion, or pumping rules.

In this paper I propose a solution to the problem of headedness of noun phrases that doesn't involve a lot of extra assumptions, by abandoning the notions of strict headedness and strict categorization and placing a stronger emphasis on semantics for well-formedness. Specifically, I'll propose that:

- (2) (i) The D is the head of the noun phrase when present, otherwise the N is the head, with the corollary that D and N are categorially related (they share a supercategory).
- (ii) Both D and N contribute crucial, distinct, obligatory semantic pieces, and all well-formed noun phrases must have both pieces regardless of which elements are overtly realized.

I'll show first that both D and N are heads in a noun phrase, evidenced by applying some pretheoretical headedness criteria to each item, and second I'll show that both are subcategories of one supercategory which I call *nominal*, and any phrase projected by either category, at a certain level of granularity, is of the same category as the other. The difference between D and N, I will argue, is really one of semantics rather than category, and furthermore, what constrains the well-formedness of noun phrases is the semantics, wherein the semantics of both an N and a D are obligatory, even if either element is not overtly realized. Many distributional patterns of determiners and nouns, including the examples in (1), can be explained by appealing to the semantic well-formedness of the noun phrase independent of category. With these assumptions in mind, I'll sketch an analysis of several standard noun phrase structure problems in this framework, employing the typed-inheritance hierarchy of HPSG in a way that requires almost no ad hoc machinery and even offers a few simplifications of typical noun phrase analyses usually assumed in HPSG. I'll look first at noun phrase syntax in §2, exploring the headedness of noun phrases in §2.1 and the formal framework in §2.2. I'll turn next to the semantics of noun phrases in §3, motivating a semantic well-formedness constraint on noun phrases in §3.1 and integrating this into the syntactic framework in §3.2. In §4 I'll outline one possible way of analyzing "missing" element cases. I'll offer a comparison of this approach to the related approach of Netter (1994) in §5. I'll extend this analysis to possessives in §6, concluding in §7 with further areas of extension.

A note on terminology: in general I will use XP to stand for a phrase headed by category X, so a DP is a phrase headed by a determiner, and NP a phrase headed by noun. I will use "noun phrase" spelled out to refer to the pretheoretical notion of a noun phrase, realized as an NP in some analyses and a DP in others.

## 2 The Syntax of Noun Phrases

The notion of syntactic headedness is a tricky one at best, and it is not my intention here to argue for or against particular notions of headedness or discuss headedness on a general

level, relying instead entirely on previous literature. However, I would like to draw a clear distinction between two different, but related, notions of headedness:

- (3) (a) Pretheoretical head — The element in a phrase that satisfies certain linguistic criteria (possibly involving morphology, category, subcategorization, etc.), the element that is most characteristic of the phrase, the element that really determines just what kind of phrase this is.
- (b) Theoretical head — The X in  $\bar{X}$ -Syntax, the “head” in HPSG/GPSG, the (typically unique) thing that (through whatever means, e.g.  $\Theta$ -theory or argument structure) is stipulated to determine what other constituents occur in the phrase, the category of the phrase, and its features, and the thing that parcels out the information.

If the definition of a pretheoretical head seems at all vague and slippery, that’s because it is. It’s purely an intuitive idea, and as shown by a number of linguists (Zwicky, 1985, Hudson, 1987, Croft, 1993, Zwicky, 1993), there is no single criterion that really captures the pretheoretical notion of a syntactic head. The theoretical notion of a head is, naturally, much more precise, since it’s a formal analogy of the pretheoretical concept. Crucially, of course, theoretical considerations should not influence the isolation of a pretheoretical head, and this is where I think many of the problems in previous approaches to NP structure have arisen, because the two ideas are often conflated and theoretical assumptions have influenced judgments about pretheoretical headedness. In particular, unique headedness in the theoretical use has influenced some linguists’ interpretation of pretheoretical headedness, but if we carefully strip away the uniqueness assumption, it is clear that pretheoretically, both D and N show properties of heads, as I will show in the next section.

## 2.1 The Headedness of Nominal Phrases

In this section I’ll consider syntactic and morphosyntactic criteria for headedness.<sup>1</sup> The first two pretheoretical criteria for headedness I’ll look at are obligatoriness and distributional equivalence (Zwicky, 1985), two criteria usually regarded as so intimately related that they can only be discussed together (Hudson, 1987, Croft, 1993). The argument here is that the head determines the category of the phrase, and thus its distribution, and is likewise the only obligatory element in the phrase. But in the noun phrase, it turns out that neither element is syntactically obligatory. Consider the examples in (4) and (5):

- (4) Noun Phrases with no Noun:
  - (a) Those (books) record who won the 1967 World Series.
  - (b) Some (cats) prefer cat food for dinner.
  - (c) Each (dog) prefers cat for dinner.

- (5) Noun Phrases with no Determiner:

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<sup>1</sup>The other side to headedness (and, according to Croft (1993), the only side) is semantics, and I’ll return to this in §3, but my interests in this section are primarily syntactic.

- (a) (These) people know who won the 1967 World Series.
- (b) (Most) dogs prefer cat for dinner.
- (c) My mother prefers (some) rice for dinner.
- (d) Kim knows the answer.

The examples in (4) show cases of determiners that may optionally stand alone as noun phrases (i.e. deictic pronominal determiners), and (5) show several cases of noun phrases with no determiners at all. In particular, (5a,b) show plural nouns without determiners, (5c) shows the mass noun *rice* without a determiner and the singular count noun *cat* without a determiner, on the Universal Grinder interpretation (where it is interpreted as a mass noun). Finally, (5d) shows a proper name without a determiner. The semantic differences, I should note, are crucially important and something I'll return to in §3, but what's relevant here is simply their syntactic properties, wherein both elements are optional. Croft (1993) cites further data in other languages where both D and N can be missing, leaving only an adjective behind, as is the case in Quechua, for instance (compare the adjective in (6a) to the noun in (6b)):

- (6) (a) *hatun -kuna -ta*  
big -PL -ACC  
'the big ones [object]'
- (b) *alkalde -kuna -ta*  
mayor -PL -ACC  
'the mayor [object]'

Croft (1993, p.41)

In these cases either the adjective *hatun* 'big' or the noun *alkalde* 'mayor' may constitute a noun phrase all on its own. A very clear paradigm of this kind of (lack of) obligatoriness can be seen clearly in German with the noun phrase *die alten Männer* 'the old men':

- (7) (a) die alten Männer
- (b) die alten —
- (c) die — Männer
- (d) die — —
- (e) — alte Männer
- (f) — alte —
- (g) — — Männer

In these examples, any of D, N, and A can stand alone in a noun phrase, and similar patterns can also be seen in Romance languages.<sup>2</sup> Therefore, while it would be nice if obligatoriness always isolated one element, it simply doesn't.

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<sup>2</sup>This should be compared to English, where adjectives generally require obligatory nouns as in *\*some blue* vs. *some blue ones*. Although notably, superlative adjectives as in *The biggest is also the best*, nominalized adjectives as in *some blues*, and *people*-deletion as in *the old* are acceptable.

Another criterion for analyzing headedness is subcategorization, wherein the thing that is the subcategorizand is assumed to be the head. The evidence above suggested that in general D and N can occur alone, so subcategorization of one by the other is difficult to tease apart. However, not all determiners and nouns are optional. In general, excepting the Universal Grinder interpretation (which I'll return to later), in English singular count nouns obligatorily require determiners:

(8) Nouns that Require Determiners

- (a) \*(The) picture of Mary is in black and white.
- (b) \*(That) cat won't shut up at night.
- (c) \*(This) book reads easily.

None of the noun phrases with singular count nouns in (8) is acceptable without a determiner. Furthermore, there are also cases of determiners that obligatorily require nouns:

(9) Determiners that Require Nouns

- (a) The \*(umpire) just called the game.
- (b) A \*(book) is forthcoming.
- (c) Every \*(professor) must produce a book a year.

None of the determiners *the*, *a*, and *every* may occur without the presence of some noun. In terms of subcategorization we seem to have an equally mixed picture of headedness as we do with obligatoriness/distributional equivalence: in those rare cases where one element licenses the other, the licensing seems to go both ways, again not isolating a unique head.

Another sort of criterion for judging headedness is that heads are the morphosyntactic loci of the phrase, i.e. the things that show inflection, and in fact Zwicky (1985) argues that this is the only syntactic criterion valid for identifying heads. On this criterion, in English, it appears prima facia that the noun is again the head, since it is the only element of the noun phrase that shows inflection, e.g. *the dog* vs. *the dogs*, including irregular inflection *the child* vs. *the children*. However, as Hudson (1987) points out, it's quite unfair to say that in English the determiner doesn't show some sort of overt morphology for features such as number, in particular for the following reasons:

- (10) (a) Some Ds show number variation: *a/some, this/these, that/those*  
(b) Some Ns don't: *sheep, fish*.  
(c) Some Ds show case variation and person variation: *we/us (guys), you (guys)*, nouns never do (on the assumption, which I'll address later, that personal pronouns are a kind of determiner).

Evidence such as this suggests that D also has morphosyntactic loci properties. Furthermore, I feel as though this argument falls flat when confronted with cross-linguistic data, especially in languages with a richer morphology than English. Looking first at Spanish, we see that both D and N (and A for that matter) show inflection for number and gender:

- (11) (a) *Los chicos altos*  
 the.MASC.PL boys.MASC.PL tall.MASC.PL  
 ‘The tall boys’
- (a) *La chica alta*  
 the.FEM.SG girl.FEM.SG tall.FEM.SG  
 ‘The tall girl’

In each case the inflection on D, N, and A is overt and varies across the board, really obscuring any idea that one item is the locus of the morphosyntax.<sup>3</sup> The case is further obscured by looking at German, where the D is the only item that consistently shows case inflection, at least in nominative and accusative cases (e.g. *den Mann* / the-ACC man vs. *der Mann* / the-NOM man ‘the man’), whereas nouns rarely do except in genitive and dative cases (e.g. *des Mannes*/the-GEN man-GEN ‘the man’s’). Again, like all of the preceding criteria, the results don’t isolate a single head.<sup>4</sup>

So where does this leave us about headedness? Croft (1993) argues that it just goes to show you that these criteria simply aren’t useful and that we should look somewhere else. However, I think such a conclusion is only valid if you assume for theoretical purposes that there’s only one head. There’s another possibility to consider that explains all of these mixed results, namely that *both* D and N (and maybe even A) are heads in noun phrases, that is to say, both of them are characteristic of noun phrases and both of them really determine just what kind of phrase a noun phrase is. The next question is, if both elements show head properties pretheoretically, how do we pick one to be the theoretical head in theories with single heads?

In a certain sense the decision is arbitrary and based on theoretical elegance, but I’ll follow Abney (1987) and assume that the D selects for NP arguments and thus heads the noun phrase when present (analogous to INFL selecting VP complements in Abney’s analogy between sentential and nominal structure). When no D is present, the N itself is the head of the noun phrase.<sup>5</sup> However, if we accept this conclusion, we have the undesirable result that different noun phrases have different categories (DPs vs. NPs, a problem if we assume that argument selection is partially categorial in nature). A solution to this problem can be found by looking at a different literature on noun phrases structure. Much work has shown that there is little or no distinction between determiners and pronouns (Postal (1966), Jackendoff (1977), Abney (1987), Hudson (1984, 2000) among many others). Rather, the semantic and distributional properties of pronouns and determiners (and bare nouns and full noun phrases) are virtually identical in that they behave referentially and have roughly identical distributions:

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<sup>3</sup>Luis Casillas (p.c.) informs me that the data is even more elaborate than this, and that some dialects of Spanish (and other Romance languages) only show overt morphology on the D and still others only on the A.

<sup>4</sup>One could argue that it is the noun that’s really determining the number and gender on semantic grounds and the other items are simply agreeing with the noun, but this requires assuming first that agreement is semantic in nature (a matter of debate) and second that there is some directionality in agreement, a theoretical assumption for which there isn’t necessarily any overt evidence.

<sup>5</sup>This parallels a common treatment of Aux and V as in Pollard and Sag (1994), where Aux is the head of the sentence when present, otherwise the V is, contra the standard GB analysis that Aux (INFL) is still the head even when null.

- (12) (a) Sam<sub>i</sub>/[the guy in the corner]<sub>i</sub>/he<sub>i</sub>/each<sub>i</sub> thinks that he<sub>i</sub>'s a boon to all mankind.  
 (b) [These puppies]/they/most/folks wonder if the Cubs will ever win a World Series.  
 (c) I often rely on [some people from my co-op]/them/others/many to get my job done for me.

Second, pronouns and determiners both appear prenominal and are in complementary distribution, as demonstrated by Postal, something peculiar to just these two categories:

- (13) (a) (\*the/some/most) you men here  
 (b) (\*the/some/every) we honest policemen  
 (c) (\*the/some/every) you amusing comedians  
 (d) (\*the/some/every) You diligent Democrats shouldn't put up with lazy ones.  
 (e) Jonas didn't criticize \*(the/some/every) us intelligent workers, only dumb ones.  
 (cf. Postal (1966, (43)))

Furthermore, Hudson (2000) points out that there are many pronoun/determiner pairs that vary only morphologically (e.g. *none/no*, *mine/my*, *yours/your*, *hers/her*, *ours/our*, *theirs/their*), suggestive of the historical connection between them. The oft-proposed analysis of these similarities, dating back at least to Postal (1966), is simply to assume that determiners and pronouns are really subtypes of the same category (or even the same category altogether as argued by Hudson). This is a simple and intuitive way of understanding these similarities, and has cross-linguistic import in languages such as Spanish and German where pronouns and determiners are also morphologically identical in many cases.

I propose that the evidence we've seen so far about headedness also leads us to the same conclusion about D and N. They have equivalent distributions, meaning that argument selection by verbs and prepositions seems largely indifferent to the categorial distinctions between them, they share all of their morphosyntactic features (case, gender, number, person) cross-linguistically, and they seem to subgroup together in specific ways (D and personal pronouns, personal pronouns and N). Therefore, D and N are categorially related, and from here on out I'll assume that they share a supercategory that I'll refer to as *nominal*, and this is the category relevant for argument selection by verbs and prepositions.<sup>6</sup> Putting this back together with headedness leads us to the conclusion repeated from §1:

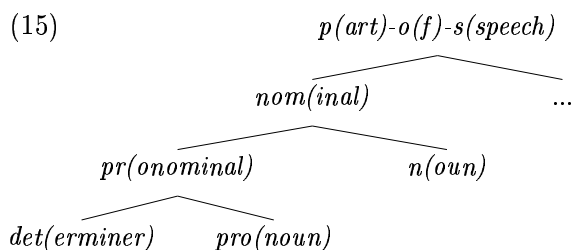
- (14) The D is the head of the noun phrase when present, otherwise the N is the head, with the corollary that D and N are categorially related (they share a supercategory).

This corollary has been assumed (see Pollard and Sag (1994)) between the analogous Aux and V categories as well, namely that they are both verbal categories. In the next section I will outline one specific implementation of this proposal in HPSG, making specific decisions about what circumstances license certain kinds of headedness, and in §3 I'll make further constraints based on semantics.

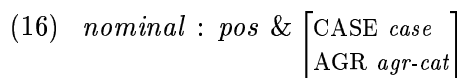
<sup>6</sup>Grimshaw (1991) proposes a similar distinction, where D and N are functional vs. non-functional versions of the same category. The proposal here is quite similar in a sense, but I will instead propose in §3 that the difference between D and N is semantic and not functional in nature.

## 2.2 The Nominal Type Hierarchy

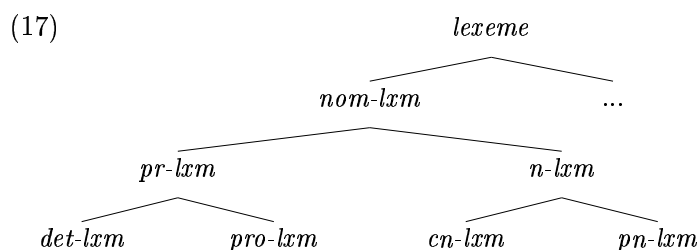
In this section I'll present one possible formalization of these ideas in HPSG, starting with the categorial relationship of D and N. That DPs and NPs are related phrasal categories has been proposed before, in particular by Radford (1993), who did so in a more Minimalist framework, and Netter (1994) (who proposed a quite different HPSG account which I'll discuss further in §5). The main advantage of an HPSG approach is that its categorial type hierarchy offers a simple, elegant, and integrated tool for stating such generalizations. I propose the following type hierarchy for HEAD types of nominal elements:



Both *determiner* and *noun* share a common supertype, *nominal*, and furthermore *determiner* and *pronoun* are grouped under a supertype *pronominal*.<sup>7</sup> I'll assume that the following features are appropriate for type *nominal*:



In other words, all nominals have case and agreement features, the relevant morphosyntactic features above.<sup>8</sup> The types in (15) only define the category (i.e. HEAD) types. Following standard HPSG convention, most of the syntactic action is formulated in a significantly richer lexeme hierarchy that associates categories with syntactic and semantic properties:



These lexeme types have the following categorial constraints:

- (18) (a) *nom-lxm* :  $\left[ \text{CAT} \mid \text{HEAD } \textit{nom} \right]$   
 (b) *n-lxm* :  $\left[ \text{CAT} \mid \text{HEAD } \textit{noun} \right]$

<sup>7</sup>I'll leave the possibility that determiners and pronouns are the same category altogether open and for the moment assume merely that they share a supertype (cf. Hudson (2000)).

<sup>8</sup>I'm adopting a HEAD value AGR only as a convenience, ignoring the issue of whether AGR should be eliminated in favor of agreement via indices.

- (c)  $pr\text{-}lxm : [CAT \mid HEAD \textit{pr}]$
- (d)  $det\text{-}lxm : [CAT \mid HEAD \textit{det}]$
- (e)  $pro\text{-}lxm : [CAT \mid HEAD \textit{pro}]$

Each lexeme type defines a lexical class based on the categories above. The type  $nom\text{-}lxm$  corresponds to all nominal lexemes, and  $n\text{-}lxm$  to nouns, where  $pn\text{-}lxm$  and  $cn\text{-}lxm$  are for common nouns and proper names respectively, and both share the HEAD value  $noun$ , i.e. they're the same part of speech (cf. Pollard and Sag (1994), Ginzburg and Sag (2000)). The type  $pr\text{-}lxm$  corresponds to what I'll call *pronominals*, where  $pro\text{-}lxms$  include personal pronouns and demonstratives (which I'll sometimes refer to as "pronominal determiners" following an older convention), and  $det\text{-}lxm$  corresponds to determiners such as *a*, *the*, *some*, *few*, etc.<sup>9</sup> Finally, I'll assume that all elements selecting noun phrase arguments select for nominal phrases, which I will abbreviate as NomP, defined as:

(19) Nominal Phrase (NomP) (Preliminary):

$$\left[ \begin{array}{l} \text{LOC} \mid \text{CAT} \\ \left[ \begin{array}{ll} \text{HEAD} & \textit{nominal} \\ \text{COMPS} & \langle \rangle \\ \text{SPR} & \langle \rangle \\ \text{SUBJ} & \langle \rangle \end{array} \right] \end{array} \right]$$

NomP is not a type; it is simply an abbreviation for the features in (19).<sup>10</sup> A nominal phrase is a phrase that is fully saturated for all its arguments, and is headed by any nominal element. Therefore the argument structure (ARG-ST) of a transitive verb such as *like* will consist of two NomPs, as opposed to two NPs as normally assumed:

$$(20) \left[ \begin{array}{ll} \textit{v-lxm} & \\ \text{PHON} & \langle \textit{like} \rangle \\ \text{ARG-ST} & \langle \text{NomP, NomP} \rangle \end{array} \right]$$

In the next section I'll propose some selectional restrictions that constrain the range of acceptable NomPs that may be generated.

### 2.3 Nominal Phrases and Argument Selection

The hierarchy in the previous section encodes the categorial distinctions (and lack thereof) between D and N. In this section I'll discuss the selectional and headedness properties of these categories in terms of their lexical types, encoding the assumption that D is the head when present and N is otherwise. To codify this I'll propose the following valency restrictions on nouns:<sup>11</sup>

<sup>9</sup>A very relevant distinction I'll not make here is between quantifiers such as *most* and definite and indefinite articles such as *a* and *the*, but I'll ignore this distinction for the moment.

<sup>10</sup>The feature SUBJ, usually reserved for subjects, will not play a role here and I'll omit it from here on out.

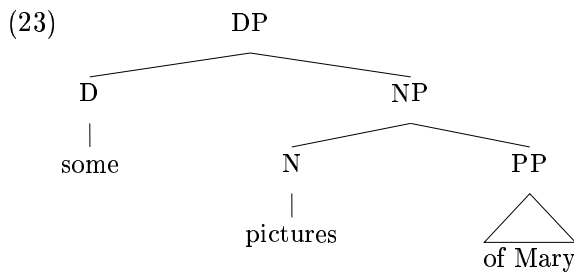
<sup>11</sup>I'll often omit full feature paths when not relevant, so the I'll omit the path SS | LOC from the feature path of CAT in (21) since it is not important to the constraints.

- (21) (a)  $n\text{-}lxm : [CAT \mid SPR \langle \rangle]$   
 (b)  $pn\text{-}lxm : [CAT \mid COMPS \langle \rangle]$

No noun takes a specifier (i.e. has an empty SPR list), although some common nouns may have complements (e.g. *picture of Mary*), but proper names may not (e.g. *\*Kim of Mary*), encoded via a constraint that proper names [COMPS <>], although in general nouns have no constraints on COMPS. Example lexical entries are given in (22) (with inherited constraints):

- (22) (a) 
$$\left[ \begin{array}{l} cn\text{-}lxm \\ PHON \langle picture \rangle \\ \\ SS \mid LOC \mid CAT \left[ \begin{array}{l} HEAD \left[ AGR \left[ \begin{array}{l} PER \ 3rd \\ NUM \ sg \end{array} \right] \right] \\ SPR \langle \rangle \\ COMPS \langle (PP[of]) \rangle \end{array} \right] \end{array} \right]$$
 (b) 
$$\left[ \begin{array}{l} pn\text{-}lxm \\ PHON \langle Kim \rangle \\ \\ SS \mid LOC \mid CAT \left[ \begin{array}{l} HEAD \left[ AGR \left[ \begin{array}{l} PER \ 3rd \\ NUM \ sg \end{array} \right] \right] \\ SPR \langle \rangle \\ COMPS \langle \rangle \end{array} \right] \end{array} \right]$$

Each inherits an [SPR <>] constraint from  $n\text{-}lxm$ , and lexically fixes appropriate agreement (AGR) features and complements. Turning now to pronominals, I'm assuming pronominals (both determiners and pronouns) head their phrases as in (23):



The first question to address is the nature of the complements of pronominals. Looking again at the data in (24) and (25), some pronominals appear to have optional complements, whereas others have obligatory complements (these optional complements are all non-elliptical, which will be relevant later):

- (24) Pronominals with optional complements:

- (a) Those (books) record who won the 1967 World Series.
- (b) You (dogs) prefers cat food for dinner.
- (c) Ain't nobody here but us (chickens).

(25) Pronominals with obligatory complements:

- (a) The \*(umpire) just called the game.
- (b) A \*(book) is forthcoming.
- (c) Every \*(professor) must produce a book a year.

(cf. 9)

In general, I'll assume that all lexemes of type *pr-lxm* by default take optional complements, and that specific determiners may override the default and take obligatory complements. In particular, although I'll not motivate this now, I'll assume that all *pro-lxms* take optional complements and all *det-lxms* take obligatory complements. This distinction will later feed into the difference between definite, non-elliptical pronominal determiners and  $\bar{N}$ -ellipsis. The second question to address is what categories of complements pronominals take. The following examples show that determiners and pronouns do not take complements headed by pronominal elements:

- (26) (a) \*Each he/him thinks Jason is an above average driver.
- (b) \*Few many (dogs) prefer cat food for dinner.
- (c) \*Many the (books) prefer cat for dinner.
- (d) (\*)We the members of this committee hereby declare this company dissolved.

None of the examples in (26) are grammatical with either pronouns or determiners heading the complement of the pronominals.<sup>12</sup> To this end I'll propose as a first pass that all pronominals take optional NP complements, i.e. nominal phrases with head type *noun*, and *det-lxms* make their complements obligatory (again, the issue of determiner lexemes without overt complements I'll address later).

- (27) (a) *pr-lxm* : *nom-lxm* &  $\left[ \text{CAT} \left[ \text{COMPS} \left\langle \langle (\text{NP}) \rangle \right\rangle \right] \right]$
- (b) *det-lxm* : *pr-lxm* &  $\left[ \text{CAT} \left[ \text{COMPS } \textit{nelist} \right] \right]$

However, the restriction on the complement type is actually not strong enough. Proper names are also NPs, since both proper names and common nouns have HEAD type *noun*. But determiners may not take proper name NP complements:

- (28) (a) (\*)Some Kim knows who won the 1967 World Series.

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<sup>12</sup>It should be noted that (26d) is grammatical on an appositive reading. Personally, I think it might even be grammatical as a genuine complement, but none of the native speakers I spoke to seem to agree.

- (b) (\*)The Kim just called the game.
- (c) (\*)I (Claudius) should never have been an emperor.

Therefore further restrictions will be needed to rule out these examples.<sup>13</sup> However, this is an issue I will address in §3 when I outline the semantic restrictions on the various nominal types. For now I'll continue to assume only that pronominals, both determiners and pronouns, take NP complements. There is one further complication in terms of agreement, where determiners and pronouns differ. Both require number agreement with their complements, which are always third person, but determiners seem to always be third person whereas pronouns have lexically idiosyncratic person:

- (29) (a) Every dog/\*dogs prefers cat food.
- (b) All cats/\*cat have a motorcycle.
- (a) Ain't nobody here but us (chickens/\*chicken).
- (c) We (men/\*man) hereby declare this bridge open.

These two facts can be captured as specific constraints on *pr-lxm* and *det-lxm* as in (30), accumulating the previously postulated constraints:

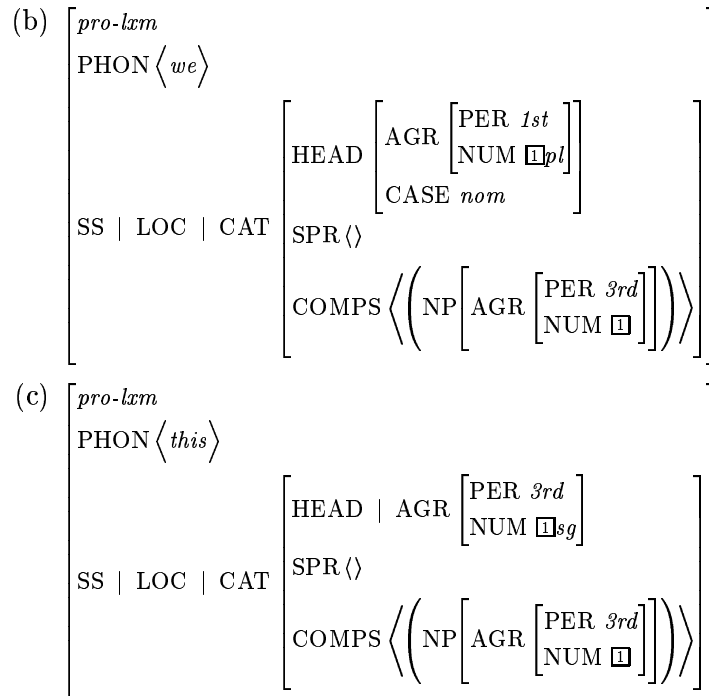
- (30) (a)  $pr\text{-}lxm : nom\text{-}lxm \ \& \ \left[ \begin{array}{l} \text{HEAD} \left[ \text{AGR} \mid \text{NUM} \square \right] \\ \text{CAT} \left[ \text{COMPS} \left\langle \left( \text{NP} \left[ \text{CAT} \mid \text{AGR} \left[ \begin{array}{l} \text{PER} \textit{3rd} \\ \text{NUM} \square \end{array} \right] \right] \right) \right\rangle \right] \end{array} \right]$
- (b)  $det\text{-}lxm : pr\text{-}lxm \ \& \ \left[ \begin{array}{l} \text{HEAD} \left[ \text{AGR} \mid \text{PER} \textit{3rd} \right] \\ \text{CAT} \left[ \text{COMPS} \textit{nelist} \right] \end{array} \right]$

Some example lexical entries are shown in (31), showing all accumulated constraints:

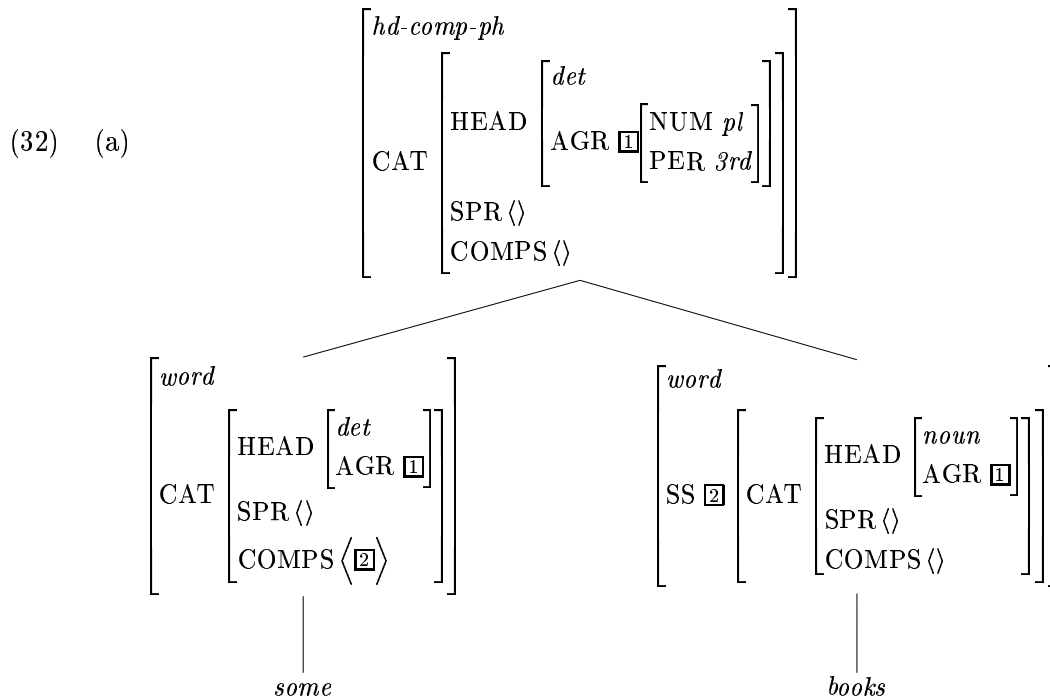
- (31) (a)  $\left[ \begin{array}{l} \textit{det-lxm} \\ \text{PHON} \langle a \rangle \\ \text{SS} \mid \text{LOC} \mid \text{CAT} \left[ \begin{array}{l} \text{HEAD} \mid \text{AGR} \left[ \begin{array}{l} \text{PER} \textit{3rd} \\ \text{NUM} \square \textit{sg} \end{array} \right] \\ \text{SPR} \langle \rangle \\ \text{COMPS} \left\langle \text{NP} \left[ \text{AGR} \left[ \begin{array}{l} \text{PER} \textit{3rd} \\ \text{NUM} \square \end{array} \right] \right] \right\rangle \end{array} \right] \end{array} \right]$

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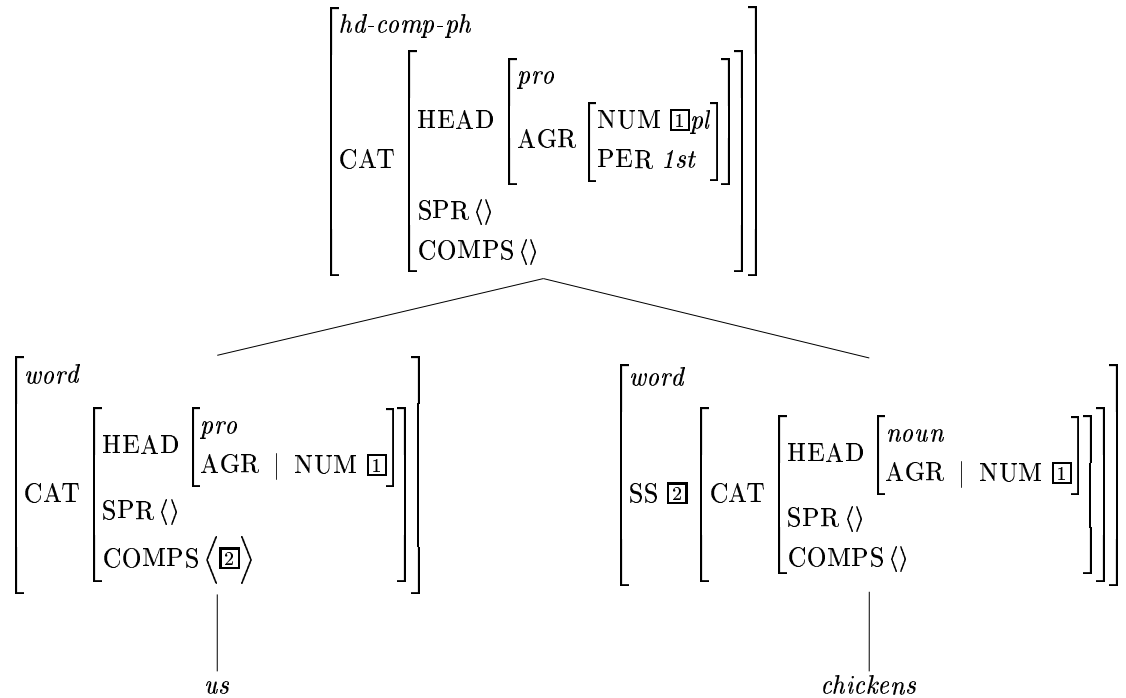
<sup>13</sup>Some of these do have good readings on the “objectification” reading, i.e. that we have many people named Kim in the room and are referring to them collectively as *Kims*, but I'll ignore that reading for the present, assuming that some lexical rule can handle these cases. Other cases like this include objectification of personal pronouns, as in the famous 1967 #1 hit single by The Seekers *I'll Never Find Another You* (Tom Wasow, p.c.). Likewise, (28c) is good on an appositive reading, thus I'll assume the proper name is not a complement.



Each lexical entry specifies its particular agreement facts, and need say nothing more about inherited constraints (e.g. that they all take NP complements, obligatory for determiners and non-obligatory for pronouns). With these selectional restrictions on determiners, pronouns, and common nouns, we can license a variety of NomPs as simply instances of the *h(ea)d-comp(lement)-ph(rase)*, as in (32):

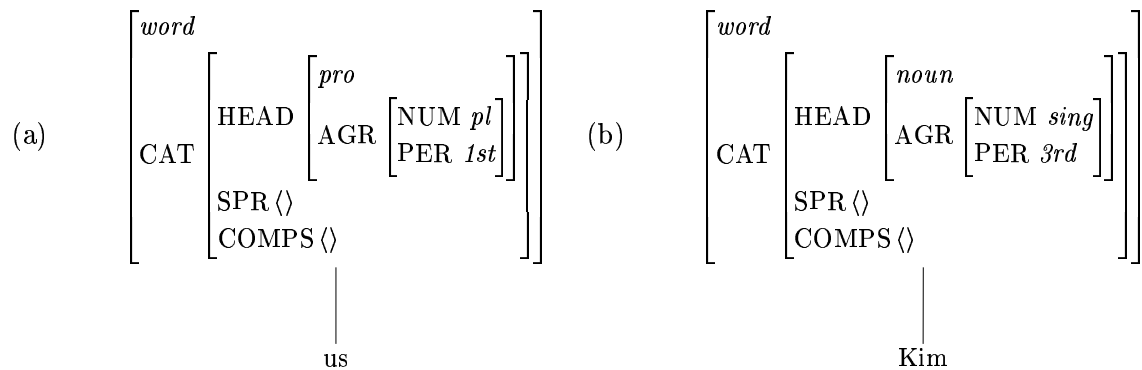


(b)

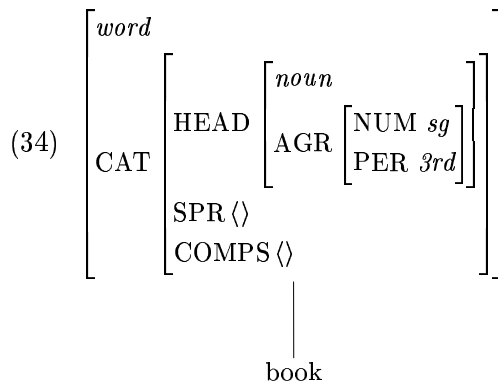


The mother nodes (the *hd-comp-phs*) in (32) are compatible with the restrictions imposed on NomP, i.e. the head is a subtype of *nominal* and the valence lists (SPR and COMPS) are empty. Likewise, *pronominal* phrases with optional complements and proper names already satisfy these requirements:

(33)



Both the pronoun *us* and the proper noun *Kim* unify with the constraints imposed by NomP (the head is *nominal* and the valence lists are empty). However, nothing we've said so far prevents singular count nouns from becoming well-formed NomPs:



The singular count noun *book* is compatible with the constraints on NomPs, thus apparently overgenerating. In fact, bare singular count nouns can become NomPs on their own, but only on a very specific semantic interpretation. I'll turn to the semantics of nominal phrases in the next section.

### 3 Semantics of Nominal Phrases

In this section I'll discuss the semantic constraints appropriate for nominal phrases and how to encode those in this grammar, based on the semantic account in Ginzburg and Sag (2000). I'll first propose that determiners and nouns have distinct semantic types, and I'll offer a pretheoretical analysis of semantic well-formedness of nominal phrases in §3.1 and incorporate this into the proposed HPSG grammar in §3.2. The semantics in this section is only intended as a rough characterization; I'm in no way proposing this as a complete and in-depth semantic analysis of nominal phrases.

#### 3.1 Determiner and Nominal Semantics

Before outlining the semantic component of this analysis, I'll review briefly a fact pointed out in §2.1, that singular count nouns seem to obligatorily require determiners, at least when not interpreted on the Universal Grinder reading:

- (35) (a) \*(The/this/that) picture of Mary is in black and white.  
 (b) \*(The/this/that) cat won't shut up at night.  
 (c) \*(The/this/that) book reads easily.  
 (cf. 8)

I propose that an explanation of this fact can be made based on an uncontroversial semantic distinction between what nouns and determiners bring to the NomP. Specifically, I propose that every well-formed NomP must be semantically complete in a certain sense. Considering first cases in which both determiners and nouns appear, both contribute uniquely to the semantics of the noun phrase:

- (36) (a) Every cat likes fish.

- (b) This book wasn't worth the paper it was written on.
- (c) An apple fell upon Newton's head.
- (d) Most dogs like cats who prefer fish.

In each of the subject noun phrases in (36), each element contributes to the semantics of the noun phrase. *Every* indicates universal quantification, *this* contributes definite deictic semantics, *an* provides the semantics of an existential quantifier, and *most* provides the semantics of a particular generalized quantifier. Correspondingly, the nouns *cat*, *book*, *apple*, and *dogs* serve to establish the restriction sets of the various quantifiers in (36). So when both elements are present, both are contributing some sort of relevant semantics: determiners contribute some sort of quantificational semantics and nouns some sort of restrictive semantics.<sup>14</sup> I'm using the terms "quantificational" and "restrictive" loosely here based on the logical notion of a quantifier as a scopal operator that binds a variable with a certain restriction within a certain scope. I'm not, however, arguing that all types of determiner semantics are quantifiers or should be analyzed as such, although (following Ginzburg and Sag (2000)) I will assume that at least as far as the grammar goes these various types of semantics can be handled similarly. Therefore, to avoid confusion, I'll refer to the various types of semantics determiners contribute to the noun phrase **D-semantics**, and I'll refer to the restrictive predicational type of semantics a noun contributes to the noun phrase as **N-semantics**.<sup>15</sup>

But what about the cases of noun phrases for which either element is missing? Looking at (37) and (38) (cf. (4) and (5)), although the nouns are optional in the former and the determiners optional in the latter, even when the optional elements are missing the noun phrases still show both D- and N-semantics:

(37) Nominal Phrases with no Noun (pronominal and elliptical):

- (a) These (books) record who won the 1967 World Series.
- (b) That (computer) hasn't worked since the 1980s.
- (c) Few (dogs) prefer cat food for dinner.
- (d) Many (dogs) prefer cat for dinner.

(38) Nominal Phrases with no Determiner:

- (a) (Some) people know who won the 1967 World Series.
- (b) (Most) men think they're above average drivers.
- (c) (Many) cats prefer cat food for dinner.
- (d) (All) dogs prefer cat for dinner.
- (e) My mother prefers (some) rice for dinner.

---

<sup>14</sup>This is not a new observation of course, and was the basis of, among other things, Montague (1974).

<sup>15</sup>So far N and D as categories have not shown many differences distributionally or in terms of morphosyntactic properties. However the semantic difference appears to be a clear one, and in fact may be the primary property distinguishing these two classes. If this is the case it offers a semantic version of the proposal by Grimshaw (1991) that D and N only differ in functionality.

- (f) (This) gruel is positively disgusting.
- (g) Kim knows the answer.
- (h) She bought herself a new car yesterday.

In (37a,b), when the N is missing both *those* and *this* seem to carry some default N-semantics related to the definite deictic reference, and in (37c,d), the noun phrases *few* and *many* may refer again to “people” or else to “cats” and “dogs” respectively, depending on context. So even when the determiner stands alone there is still N-semantics. Likewise, when the determiner is missing there is still some type of D-semantics. In (38a-f), there is an indefinite or generic reading associated with the bare plural noun phrases *people*, *men*, *cats*, and *dogs*. This indefiniteness/genericity is not contributed by the noun: when a determiner is present there is no indefinite/generic reading and instead we have only the D-semantics of the determiner, showing that overt determiners and the indefinite/generic D-semantics that arises when a determiner is not present are in complementary distribution.<sup>16</sup> Note also example (38d), where the singular count noun *cat* occurs without a determiner, but with the same semantics as regular mass nouns due to the Universal Grinder. Finally, in (38g,h) the proper name *Kim* and third person pronoun *she* lead in both cases to the type of definite semantics associated with the determiner *the*.

This observation leads to the following well-formedness constraint on nominal phrases:

- (39) Nominal Phrase Semantic Well-formedness Convention: All well-formed NomPs must have both D-semantics and N-semantics.

This generalization solves the problem that the discussion of headedness above led us to, namely that if we accept dual headedness we’ve lost some of our categorial well-formedness constraints. Up until now, singular count nouns, by default, are predicted to be valid NomPs by the theory presented here even though they typically cannot be. I’ll propose that common nouns are semantically deficient, however: they only have N-semantics and thus phrases they project are semantically ill-formed, thus violating our new well-formedness criterion. They must instead combine with overt determiners or else some process like the Universal Grinder or bare pluralization must contribute the correct semantics.<sup>17</sup>

Before codifying these constraints, I should say something about the relationship of semantics to syntactic headedness. Zwicky (1985), Hudson (1987), Croft (1993) all cite semantics as a possible criterion for headedness, but only Croft takes it as a serious basis for syntactic headedness, proposing that the head is the PRIMARY INFORMATION BEARING UNIT (PIBU) or more informally the content word. On this account, it is the noun that is the head of the noun phrase because it is the PIBU, but the notion of a PIBU is not very well defined and in fact the criteria may not yield unique solutions, as an example from Hudson shows: in *maybe leave* as in *John will maybe leave*, presumably the PIBU is

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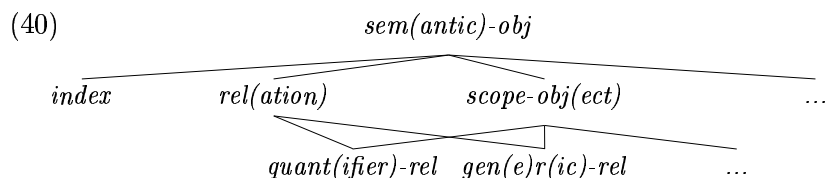
<sup>16</sup>This does provide evidence that genericity is just another sort of D-semantics. We already know this of indefiniteness since some overt determiners such as *some* and *a/an* express it.

<sup>17</sup>Another way to state this constraint, suggested to me by Ivan Sag, is to stipulate that all NomPs must have the semantics of a Generalized Quantifier, in other words (informally) that they are quantifiers who have a non-trivial restriction and are looking for a scope. In essence this is exactly the generalization captured here, and generalized quantifiers may be a cleaner and more well-known way to state this constraint, but I’ll leave the restatement in these terms (and subsequent formalization) for a future date.

*leave* because it's the content word. But since *maybe* tosses the whole VP into the realm of intensionality and possibility, arguably it's the primary information bearing unit in the same way *possibility* seems to be in *The possibility of John leaving*. Such reasoning calls into doubt the uniqueness of a PIBU, although that's probably because, as I argue, heads aren't unique, and in fact, the evidence I present here showing that both D and N-semantics are semantically obligatory seems to throw a lot of weight to the idea that both are heads, since in a certain sense both are contributing very crucial and characteristic semantics to the noun phrase, and taking this as a criterion for headedness over the PIBU approach is a bit more clear cut since it doesn't require the semantic "aboutness" that is so problematic, but rather just determining if certain semantic pieces are present. If this is correct, then I'll take this semantic treatment as further indication that both the N and D are heads, I'll encode these semantic notions into the grammar in the next section.

### 3.2 Semantic Type Hierarchy and NomPs

One straightforward approach to these semantic generalizations may be built upon the semantic hierarchy of nominals in Ginzburg and Sag (2000).<sup>18</sup> I simplified version of their semantic hierarchy is given in (40).

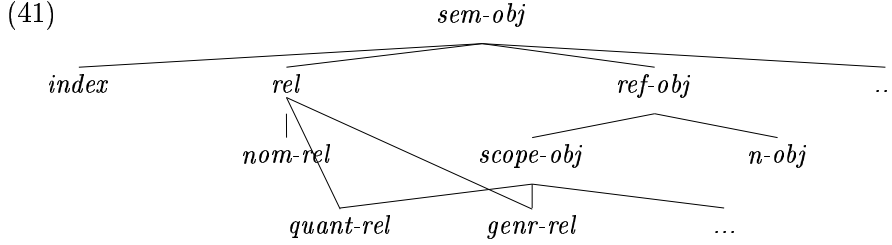


A *scope-obj* is the base CONT(ENT) type (the semantic representation) of all nominals, and is the semantics associated with operators that bind variables and participate in quantifier scoping. The most relevant subtype is *quant-rel*, the subtype associated with quantifiers, which has various subtypes including *the-rel*, *some-rel*, named after the lexemes that introduce them. Crucially, though, the CONT values of common nouns are assigned the type *scope-obj* and ultimately must be resolved to one of the subtypes of *scope-obj* depending on their participation in the semantics.

I propose an expanded semantics hierarchy based on this, where *scope-obj* is reanalyzed as the type corresponding to what I referred to as D-semantics above: this is the semantics associated only with determiners, pronouns, and proper names. Common nouns, however, do not contribute D-semantics, but instead only correspond to what I referred to as N-semantics. I'll therefore propose the following type hierarchy (ignoring irrelevant types):

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<sup>18</sup>As noted earlier, I'm not necessarily wedded to this approach to semantics, and in theory the generalization in the previous section could be implemented in a number of ways. My purpose in choosing this representation is primarily to embed this semantic theory into one in which work has already been done, particularly in areas such as ellipsis where I will later propose parallels.



I introduce the type *ref-obj* as the supertype for all nominal semantics types. The features following features are appropriate for *ref-obj* types:

(42)  $ref-obj : sem-obj \ \& \ \left[ \begin{array}{l} \text{INDEX } index \\ \text{RESTR } set(rel) \end{array} \right]$

Each *ref-obj* has an index and a restriction set, typed as a set of *rel(ations)*, where *rels* are simple predications over indices.<sup>19</sup> Specifically, the type *nom-rel* is the lexically specific relation introduced on the RESTR list of *nom-lxms*, and I'll assume relevant subtypes such as *book-rel*, *dog-rel*, etc. The additional type *n-obj* will correspond to what I referred to as N-semantics above, with the following additional constraints:

(43)  $n-obj : ref-obj \ \& \ \left[ \begin{array}{l} \text{INDEX } i \\ \text{RESTR } \left\{ \dots \left[ \begin{array}{l} nom-rel \\ \text{INST } i \end{array} \right] \dots \right\} \end{array} \right]$

In other words, all *n-objs* introduce a nominal predicate into their RESTR sets.<sup>20</sup> The lexeme types defined in (17) will have the following semantic restrictions.<sup>21</sup>

- (44) (a)  $nom-lxm : [CONT \ ref-obj]$   
 (b)  $cn-lxm : [CONT \ n-obj]$   
 (c)  $pn-lxm : \left[ \begin{array}{l} \text{LOC} \mid \text{CONT } \boxed{the-rel} \\ \text{STORE } \{ \boxed{\phantom{x}} \} \end{array} \right]$   
 (d)  $pr-lxm : \left[ \begin{array}{l} \text{LOC} \mid \text{CONT } \boxed{scope-obj} \\ \text{STORE } \{ \boxed{\phantom{x}} \} \end{array} \right]$   
 (e)  $pro-lxm : [CONT \ the-rel]$

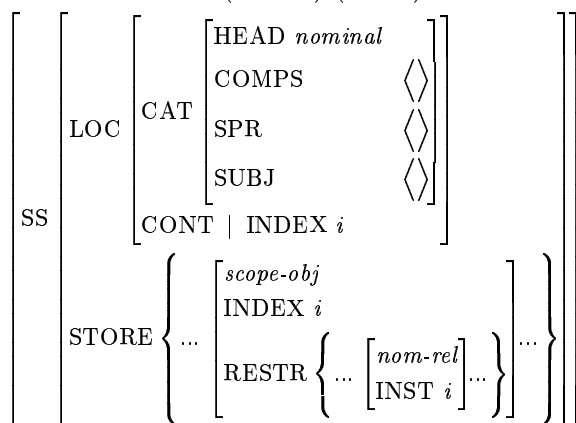
<sup>19</sup>The Ginzburg and Sag (2000) value for RESTR is as a set of *facts*, pertinent to their theory of clausal semantics, and I'll simplify this here to just *rel*.

<sup>20</sup>Two points about this: first, this is similar to a common approach in HPSG semantics (particularly Minimal Recursion Semantics) that CONT values have KEY features corresponding to the unique predicates they introduce, which are then put on their RESTR lists. Second, this type of semantics is clearly inappropriate for dummy *it* and *there*, but I'll assume their treatment differs considerably from other nouns.

<sup>21</sup>The type *the-rel* is the subtype of *scope-obj* corresponding to definite semantics.

All *nom-lxms* have a CONT value of type *ref-obj*. *Pronominal* lexemes (including *det-lxms* and *pro-lxms*) all introduce some subtype of quantifier *scope-obj* (specifically *the-rel* in the case of *pro-lxms*). Proper nouns have a CONT value of type *the-rel*.<sup>22</sup> All *scope-objs* that are introduced are placed in the STORE set, a Cooper Store for all scopal objects (where scoping is taken care of later by other principles). Count nouns, however, are defined only with a CONT value of type *n-obj*, i.e. just N-semantics, and since they do not introduce scopal objects they put nothing on STORE. Finally, I'll propose the following revisions on NomP:

(45) Nominal Phrase (NomP) (Final):



In addition to the syntactic requirements on category and valency, all well-formed nominal phrases must have a *scope-obj* in their STORE that binds the index of the nominal with a RESTR value containing a *nom-rel*. From this it should be obvious that any phrase headed by a common noun will not be a valid argument of anything selecting for a well-formed nominal phrase, because nouns project phrases with incompatible semantics. In order for a noun to be a well-formed nominal phrase it must acquire some kind of D-semantics, for instance by combining with a determiner (e.g. *some dogs*) or by some process like bare pluralization (e.g. *dogs*, which I'll discuss below in §4.1). Likewise a determiner must have a noun complement to appropriately fill its RESTR value (i.e. acquire N-semantics), but these requirements may be satisfied in other ways as well (e.g. by ellipsis as I'll discuss in §4.2).

### 3.3 Semantic Compositionality

Turning now to semantic compositionality, recall from the previous section that nouns do not select specifiers but do take NP complements. I'll propose the following semantic constraint on *pr-lxms* (i.e. determiners and pronouns, momentarily ignoring irrelevant previously postulated syntactic constraints):<sup>23</sup>

<sup>22</sup>Ginzburg and Sag type these as *param*, but I'll assume a definiteness relation for reasons I'll elaborate on shortly.

<sup>23</sup>In previous HPSG approaches to noun phrases, a feature SPEC was posited on the HEAD of the determiner that was token identical to the CONT value of the noun, thus allowing, in a sense, mutual selection of the the two elements: semantic selection by the determiner and syntactic selection by the noun

$$(46) \text{ } pr\text{-}lxm : \left[ \begin{array}{l} \text{CAT} \mid \text{COMPS} \left\langle \left( \text{NP} \left[ \text{CONT} \left[ \begin{array}{l} \text{INDEX } i \\ \text{RESTR} / \text{[3]} \end{array} \right] \right) \right\rangle \right\rangle \\ \text{CONT} \text{[1]} \left[ \begin{array}{l} \text{scope-rel} \\ \text{INDEX } i \\ \text{RESTR} / \text{[3]} \end{array} \right] \\ \text{STORE} \{ \text{[1]} \} \end{array} \right]$$

Thus the pronominal adopts the INDEX and RESTR of its complement, binding the variable, and placing its CONT value in STORE. With these semantic restrictions in place, we now have a way of dealing with the problem of proper names. Recall that *pronominals* are incompatible with proper name complements, which are NPs:

- (47) (a) (\*)Some Kim knows who won the 1967 World Series.  
 (b) (\*)The Kim just called the game.  
 (cf. (28))

With the semantic framework outlined here, we can place a semantic constraint that determiners may only take NP complements that do not already have D-semantics, i.e. whose CONT values are *n-objs* (intuitively this somewhat like saying that quantifiers don't bind variables that have already been bound):

$$(48) \text{ } pr\text{-}lxm : nom\text{-}lxm \ \& \ \left[ \text{CAT} \mid \text{COMPS} \left\langle \left( \text{NP} \left[ \text{CONT } n\text{-obj} \right] \right) \right\rangle \right]$$

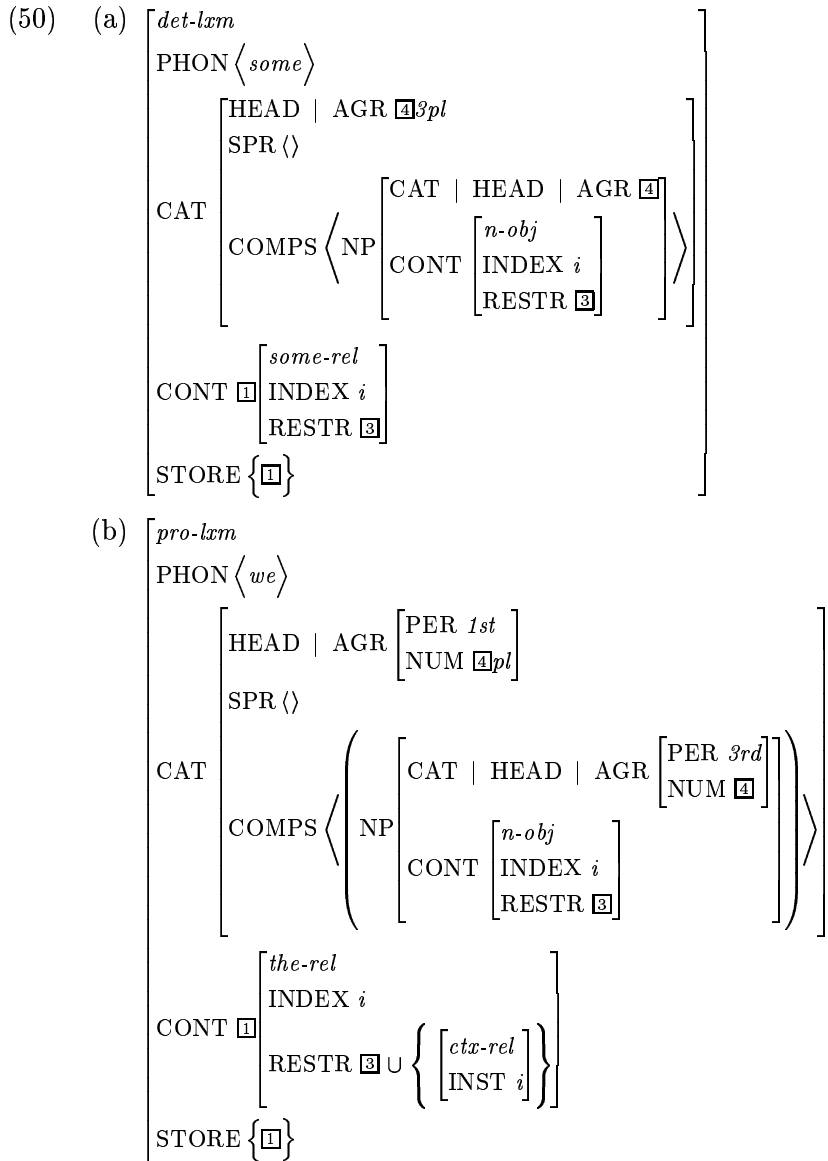
This restricts the complements of determiners to be only common nouns. Finally, for reasons I'll elaborate on in the next section, I'll assume that *pro-lxms* introduce a *nom-rel* subtype *ctx-rel* onto their RESTR lists, corresponding to the restriction that the referent is a contextually salient one:

$$(49) \text{ } pro\text{-}lxm : \left[ \begin{array}{l} \text{CAT} \mid \text{COMPS} \left\langle \left( \text{NP} \left[ \text{CONT} \left[ \begin{array}{l} \text{INDEX } i \\ \text{RESTR} / \text{[3]} \end{array} \right] \right) \right\rangle \right\rangle \\ \text{CONT} \text{[1]} \left[ \begin{array}{l} \text{scope-rel} \\ \text{INDEX } i \\ \text{RESTR} / \text{[3]} \cup \left\{ \left[ \begin{array}{l} \text{ctx-rel} \\ \text{INST } i \end{array} \right] \right\} \end{array} \right] \\ \text{STORE} \{ \text{[1]} \} \end{array} \right]$$

I'll assume that the interpretation of the *ctx-rel* (as, for instance, identical to the antecedent) is handled via some later semantic interpretation process. I'll say a more about this in §4.2. Example lexical entries are given in (50):

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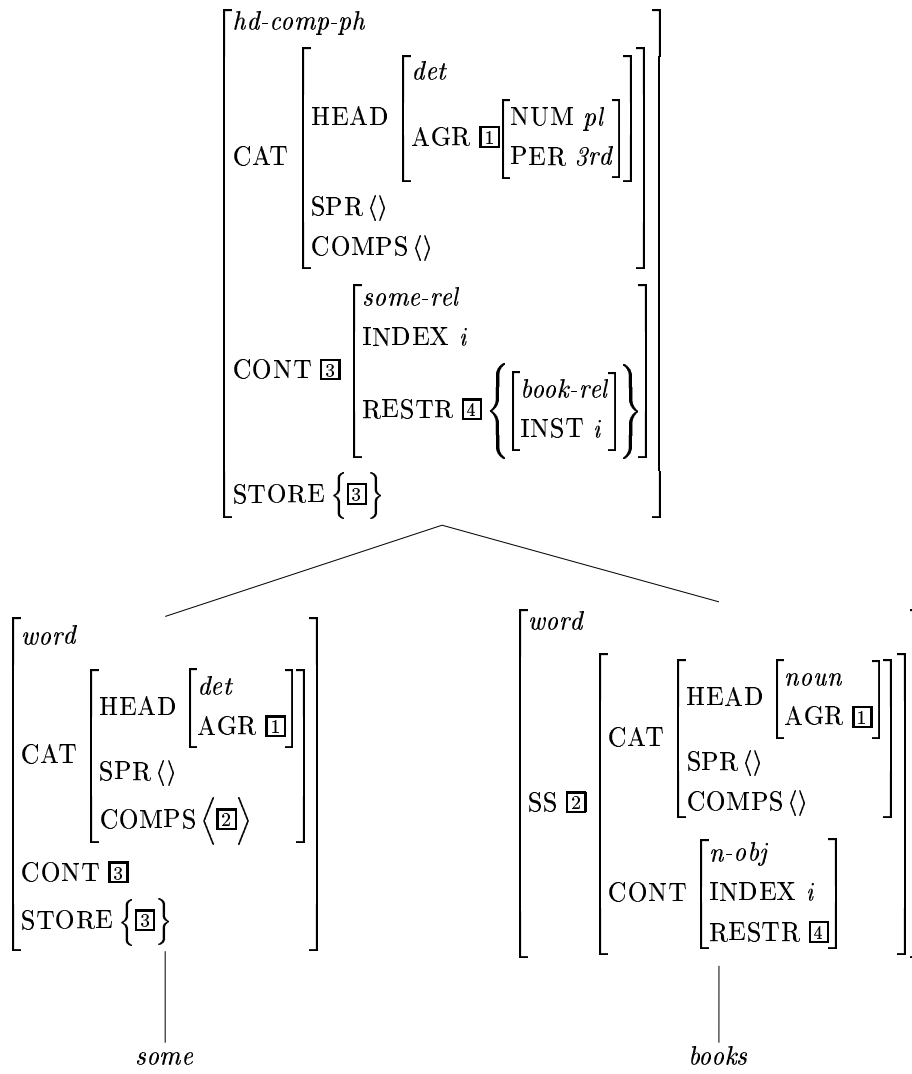
(cf. Pollard and Sag (1994), Ginzburg and Sag (2000)). However, in this analysis both semantic selection and syntactic selection for noun phrases with determiners has been shifted to the determiner, therefore rendering SPEC obsolete.



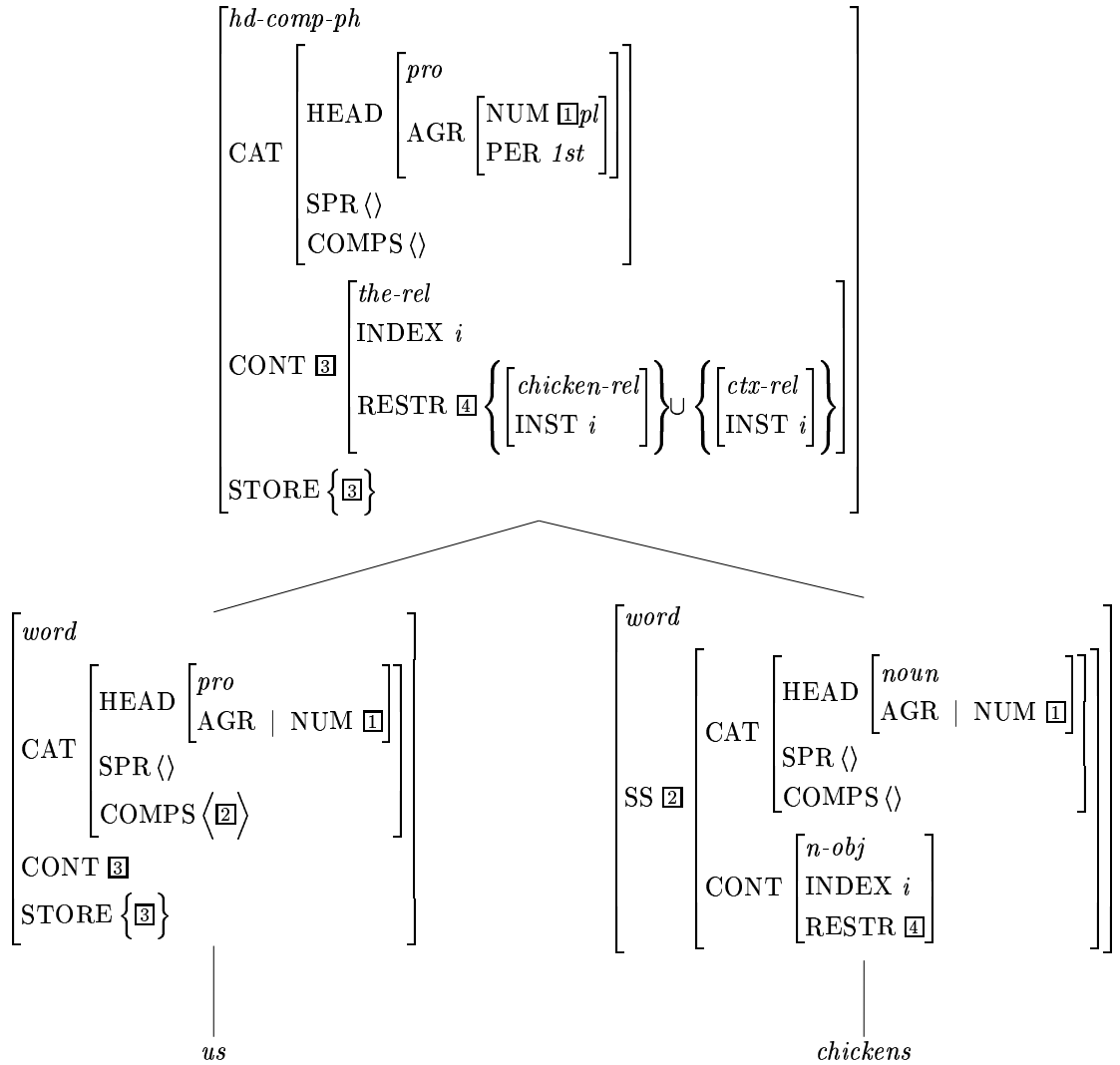
Each item selects an NP complement, binds its index and adopts its restriction list.<sup>24</sup> With all of these constraints on semantic and syntactic selection, we again see how phrases headed by pronouns and determiners may be well-formed NomPs. The examples in (32) are repeated here as (51) with fully specified semantics:

<sup>24</sup>For the sake of simplicity I'm assuming such relations as *few-rel* and *this-rel* are subtypes of *quant-rel*. A more explicit theory of quantifiers in HPSG would probably have a more elaborate type system, but nothing hinges on this here.

(51) (a)

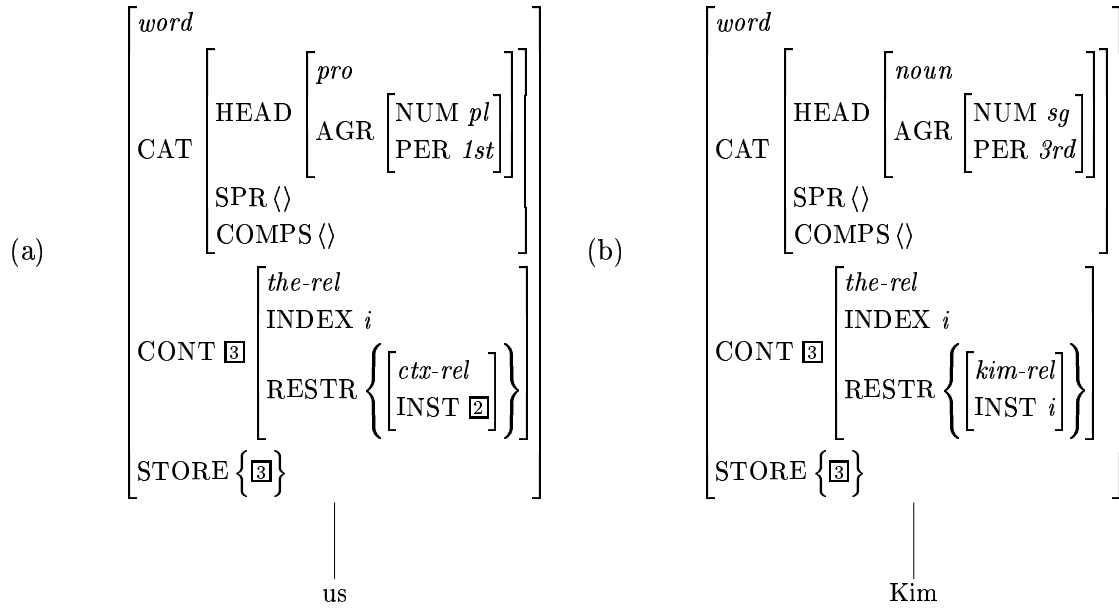


(b)

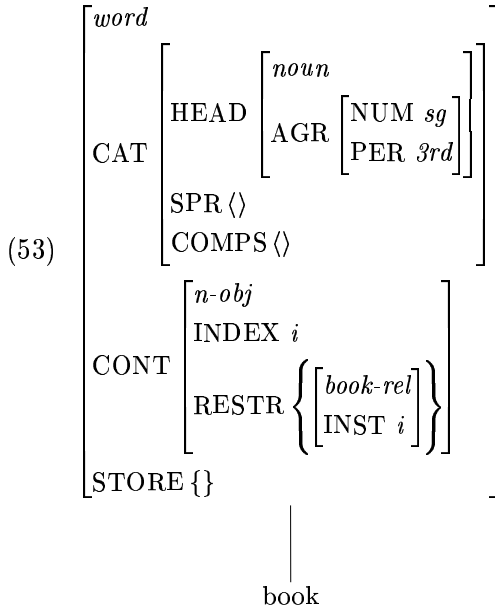


The mother nodes in both examples in (32) are compatible with the all of the restrictions imposed on NomP, i.e. the head is a subtype of *nominal*, the valence lists are empty, and the STORE value contains a subtype of *scope-obj* with an appropriate RESTR binding the nominal's index. Likewise, *pronominal* phrases with optional complements and proper names already satisfy these requirements by themselves:

(52)



And additionally, bare nouns do not satisfy the requirements imposed by NomP, because there is no scopal object contributing D-Semantics:



Licensing bare nominal phrases (headed by singular or plural count nouns) requires some additional machinery, which I will turn to in the next section.

## 4 Licensing Missing Elements

In the previous section the semantic well-formedness condition imposed on NomPs forced all NomPs to contain both a determiner and a noun. In this section I will outline analyses

of processes that license missing elements of one kind or the other. In general, I argue that two conditions must be met for an element to be missing:

- (54) (i) The overt element must be the syntactic head of the NomP  
(ii) Some specific process must supply the missing semantics

I'll discuss cases of bare NPs (i.e. missing determiners) in §4.1 and cases of pronominal determiners and  $\bar{N}$ -ellipses (i.e. missing nouns) in §4.2.

#### 4.1 Determiner-less Nominal Phrases

In the case of bare noun phrases acting as NomPs, some process must introduce the appropriate D-semantics, usually either an indefinite or generic semantics. The standard approach to determinerless NPs in HPSG is to posit a phrasal pumping rule that fixes appropriate semantics and empties the SPR of the  $\bar{N}$  (cf. Pollard and Sag (1994), Ginzburg and Sag (2000)). In this approach, we can assume a simpler version of the same analysis by positing a special pumping rule that takes a noun with an *n-obj* CONT value and creates an appropriate output with a *scope-obj* CONT value, adding the new *scope-obj* to the STORE:<sup>25</sup>

(55) *bare-nom-ph*:

$$\left[ \begin{array}{l} \text{SS} \left[ \begin{array}{l} \text{LOC} \left[ \begin{array}{l} \text{CONT } \boxed{\mathbb{E}} \left[ \begin{array}{l} \textit{genr-rel} \mid \textit{some-rel} \\ \text{INDEX } i \\ \text{RESTR } \boxed{\square} \end{array} \right] \\ \text{STORE } \{ \boxed{\mathbb{E}} \} \end{array} \right] \end{array} \right] \\ \text{DTRS} \left\langle \left[ \begin{array}{l} \text{CAT} \mid \text{HEAD } \textit{noun} \\ \text{CONT} \left[ \begin{array}{l} \textit{n-obj} \\ \text{INDEX } i \\ \text{RESTR } \boxed{\square} \end{array} \right] \end{array} \right] \right\rangle \end{array} \right]$$

(cf. Ginzburg and Sag (2000))

It is useful to introduce two subtypes of this rule: *bare-pl-ph* which handles bare count plurals and *bare-mass-ph* for bare mass nouns, where COUNT is a grammatical HEAD feature indicating countness of a noun (for the moment I'll ignore the specific types of semantics associated with mass vs. count nouns, assuming that this rule or system of rules will ultimately need to account for this):

(56) (a) *bare-pl-ph*: *bare-nom-ph* &

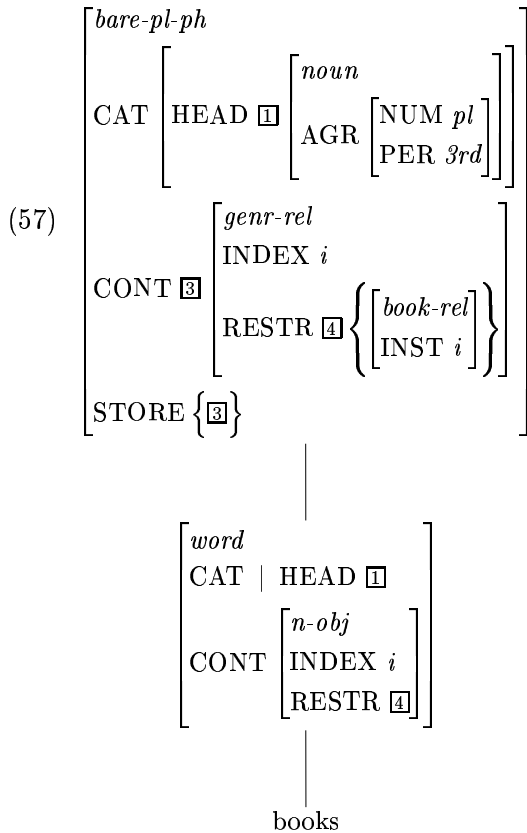
$$\left[ \text{DTRS} \left\langle \left[ \text{CAT} \mid \text{HEAD} \left[ \begin{array}{l} \text{AGR} \mid \text{NUM } \textit{pl} \\ \text{COUNT } \textit{true} \end{array} \right] \right] \right\rangle \right]$$

---

<sup>25</sup>This rule is formulated as a feature structure rather than as a rule, where the (single) element on the D(AUGH)T(E)RS list is the input and the sign itself is the output.

- (b) *bare-mass-ph: bare-nom-ph* &  
 $\left[ \left\langle \left[ \text{CAT} \mid \text{HEAD} \mid \text{COUNT } \textit{false} \right] \right\rangle \right]$

Thus the bare plural NomP *books* can be formed by such a rule (assuming the plural inflection is handled by a separate inflectional system):



The mother phrase is compatible with the constraints imposed by the well-formedness of NomP. The case of bare singular count nouns is perhaps a bit different, since the process seems to involve a conversion from a count noun to a mass noun, the Universal Grinder principle. This can be implemented as a simple lexical rule, although I'll ignore the semantics for the moment:

- (58) universal-grinder:  
 $\left[ \begin{array}{l} \text{CAT} \mid \text{HEAD} \mid \text{COUNT } \textit{true} \\ \text{DTRS} \left\langle \left[ \text{CAT} \mid \text{HEAD} \left[ \begin{array}{l} \textit{noun} \\ \text{COUNT } \textit{false} \end{array} \right] \right] \right\rangle \end{array} \right]$

This rule merely converts a count N to a mass N, and bare phrases may be produced by *bare-mass-ph* (likewise, this also gets right the determiner restrictions on items that undergo the Universal Grinder, cf. *There is some/\*a dog on the road* on the intended

reading).<sup>26</sup> Thus we have captured the semantic well-formedness of NomPs headed by bare nouns, ensuring that only bare NPs that have received the appropriate semantics may be acceptable, in a way that involved no additional mechanism except for a handful of specific, previously motivated phrasal types. In the next section, I'll turn to the opposite problem, namely how to license determiner only NomPs.

## 4.2 Noun-less Nominal Phrases

There are two distinct classes of noun-less nominal phrases: pronominal determiners and  $\bar{N}$ -ellipsis. Examples of ellipsis are shown in (59):

- (59) (a) Some dogs prefer cat food but most \_ prefer steak.  
 (b) Although several \_ handed it in late, most of the students aced the final.  
 (c) A: The Yardbirds had three such amazing guitar players!  
 B: Yeah, and each \_ had his own unique talent.  
 (d) I've personally bought several \_ myself.  
 (e) Few \_ would deny that some leaders are tyrants.

As noted above, each of the elliptical nouns is interpreted via some kind of “sense”-anaphora, where the NomP is not coreferential with its antecedent but merely shares a similar sort of restriction.<sup>27</sup> This is similar to *one*-anaphora:

- (60) (a) This book sucks but that one is pretty good.  
 (b) Some dogs are cute and lovable but that one's a killer.  
 (c) A: I'm not too sure about boa constrictors as pets.  
 B: But the ones at the pet store are so adorable!

The same type of anaphoric effect as in (59) is seen but the  $\bar{N}$  is realized overtly via the pronominal *one*. In (60a), the anaphor *one* is related to *books*, and in (60c), the anaphor *ones* is related to *boa constrictors* prior in the discourse. Pronominal determiners, both demonstratives and personal pronouns as in (61), do not show this kind of anaphoric semantics, but are instead definite and directly referential (and are often accompanied by pointing):

- (61) (a) I haven't read this \_, yet.  
 (b) These \_ are the worst tasting oats I've ever eaten.  
 (c) I've seen that \_ before and I don't think it's very well designed.  
 (d) We \_ have just seen *Bowling for Columbine* and it's fantastic.

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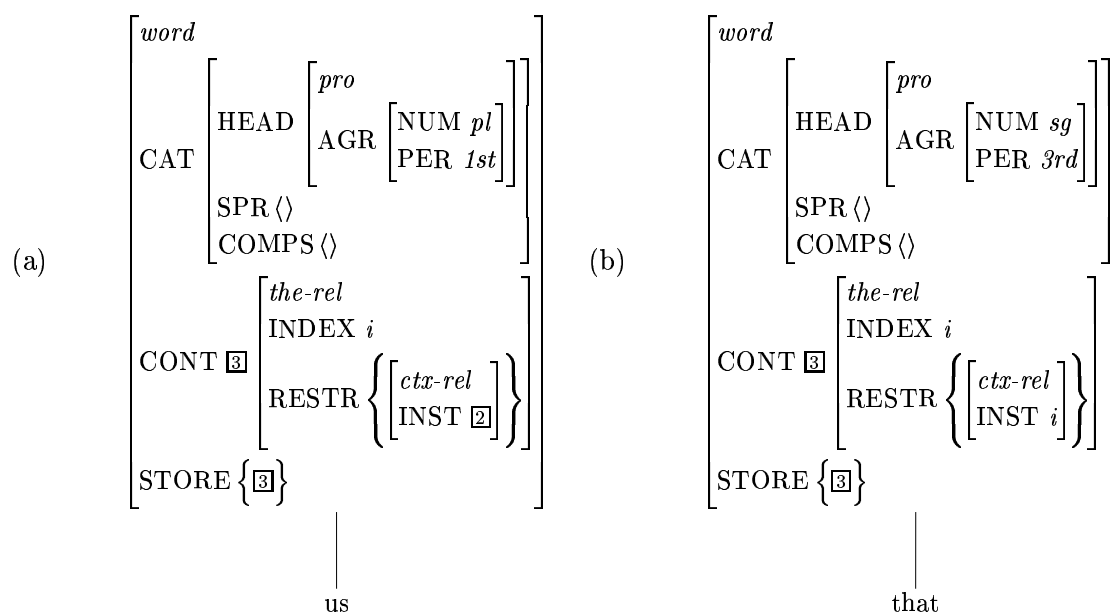
<sup>26</sup> An alternate treatment of mass nouns, proposed by Borer (2002), suggests that all nouns are lexically underspecified for mass/count and receive their interpretation by context. This approach seems acceptable as well under the assumptions I make here.

<sup>27</sup> The case in (59) is often referred to as *people*-deletion, which for the sake of simplicity I'm treating as ellipsis.

In (61a), for instance, *this* is referring directly to some contextually salient entity but not as a “sense”-anaphora. I will not consider pronominal determiners as ellipsis but rather as definite pronouns, presupposing that the “sense”-anaphora typical of ellipsis will be a requirement for calling a determiner without an  $\bar{N}$  a case of ellipsis (and as seen above the optionality of their complement is encoded directly into their selectional restrictions). These are analogous to personal pronouns, which are definite and anaphoric, but not as “sense”-anaphora. For purposes of this analysis I’ll assume that ellipses and pronominal determiners (personal and demonstrative) require different implementations.<sup>28</sup>

Looking first at pronominal determiners, we’ve already seen how these can be stand-alone NomPs. Examples of such phrases are repeated as (62):

(62)



Since their nominal argument is optional, and each of these introduces a *ctx-rel* relation indicating the contextual interpretation of the referent, they satisfy the requirements on NomP (the ultimate interpretation of the *ctx-rel* I’ll assume is handled by some more explicit semantic process). In other words, pronouns introduce both D and N-semantics lexically and their complement is only optional (following on an extremely vague intuition that somehow stand alone pronouns, unlike ellipsis, are naturally occurring NomPs rather than the result of a some grammatical process).

Turning to ellipsis, some elliptical process must provide the appropriate semantics for the missing noun. This could be analyzed in a variety of ways, but for the moment I’ll

<sup>28</sup>One other related phenomenon is what Jackendoff (1971) refers to as N-gapping:

- (i) (a) Mary wrote two books on syntax and John wrote one on semantics.
- (b) Although the dog with fleas needed that bath, some without fleas are needlessly dipped every day.

These are similar to  $\bar{N}$ -ellipsis but in these cases some parts of the  $\bar{N}$  after the N are still non-elided. Following Jackendoff I’ll assume these are a distinct phenomenon from  $\bar{N}$  ellipsis (which he calls N-deletion), although they are clearly highly related and will require consideration in future work.

propose one analysis that parallels the approach in Ginzburg and Sag (2000) for Verb Phrase Ellipsis (VPE), wherein auxiliary verbs license ellipsis by a process of ellipsis that elides their VP complement and inserts the appropriate semantics (specifically, an *ellip-vp* subtype of *hd-comp-ph* specifies the VP complement of an [AUX +] head as an instance of an *ellip-ss*, which introduces the appropriate semantics and LOCAL features but is not overtly realized). The treatment of  $\bar{N}$ -ellipsis will be exactly identical. I'll posit a rule *ellip-np*, analogous to *ellip-vp*, a subtype of *hd-comp-ph*, to introduce the appropriate semantics, fix the daughter's complement list to only have elliptical *synsems* on it, and empty the complements list of the mother:

(63) (a) *ellip-np*: *hd-comp-ph* &

$$\left[ \begin{array}{l} \text{SS | LOC} \left[ \begin{array}{l} \text{CAT | COMPS } \langle \rangle \\ \text{CONT} \left[ \begin{array}{l} \text{scope-obj} \\ \text{INDEX } i \\ \text{RESTR } \boxed{\Delta} \cup \left\{ \left[ \begin{array}{l} \text{ellip-rel} \\ \text{INST } i \end{array} \right] \right\} \end{array} \right] \end{array} \right] \\ \text{DTRS } \left\langle \left[ \begin{array}{l} \text{expression} \\ \text{CAT} \left[ \begin{array}{l} \text{HEAD } \textit{det} \\ \text{COMPS } \textit{list}(\textit{ellip-ss}) \end{array} \right] \\ \text{CONT | RESTR } \boxed{\Delta} \end{array} \right] \right\rangle \end{array} \right]$$

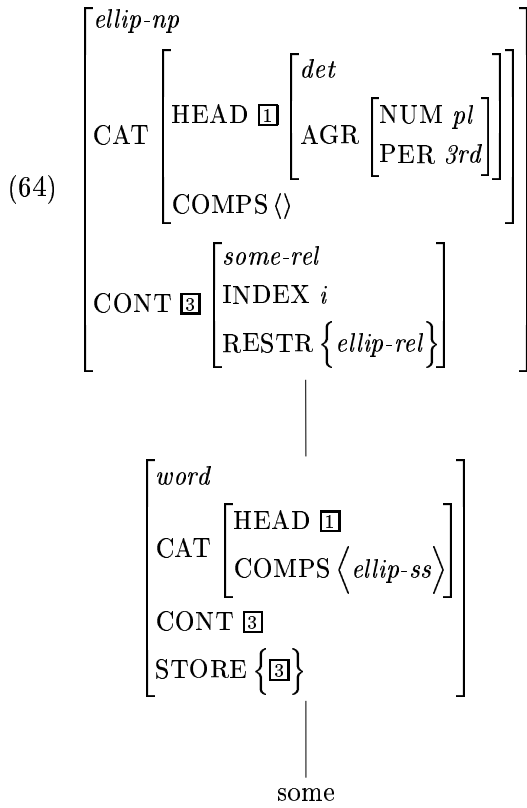
(b) *ellip-ss* : *non-canon-ss* &

$$\left[ \begin{array}{l} \text{synsem} \\ \text{SLASH } \{ \} \\ \text{LOC} \left[ \begin{array}{l} \text{CAT} \left[ \begin{array}{l} \text{COMPS } \langle \rangle \\ \text{SPR } \langle \rangle \end{array} \right] \\ \text{STORE } \{ \} \end{array} \right] \end{array} \right]$$

The purpose of the elliptical *synsem* is to ensure that any constraints on the COMPS of the daughter can be (usually vacuously) satisfied.<sup>29</sup> The constraint that the daughter be a head *det* ensures that this process only applies to proper determiners, and not demonstratives and personal pronouns (i.e. things with [HEAD *pro*]). Finally, I simply assign a semantic relation *ellip-rel*, a subtype of *nom-rel*, to represent the anaphoric semantics of an elided  $\bar{N}$ .<sup>30</sup> An example of such a construction is given in (64):

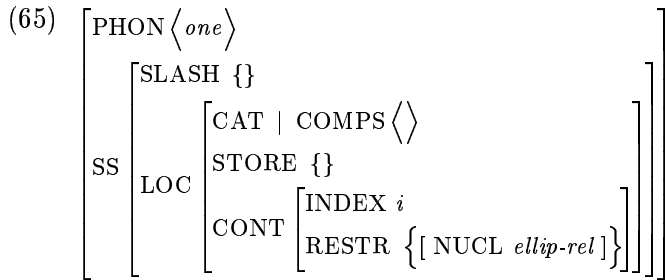
<sup>29</sup>Such constraints include things like the semantic inheritance, SLASH inheritance, etc., all of which are irrelevant here.

<sup>30</sup>Just as I am not concerned with the interpretation of *ctx-rel* above, I will not attempt to offer a treatment of the resolution of ellipsis here.



The mother node of the *ellip-np* is compatible with the constraints on NomP, and the semantics in the restriction list is an anaphoric type associated with ellipsis. The type *ellip-ss* is identical to that employed in Ginzburg and Sag (2000) for the elliptical *synsem* in VPE, thus unifying the two approaches somewhat. A more unified approach would attempt to resolve the *ellip-vp* and *ellip-np* types to one construction as well, although I will not attempt to do so here (this is analogous to Jackendoff (1971) who proposed that both could be handled by a rule  $\bar{X}$ -deletion).<sup>31</sup>

Finally, the *one* in *one*-anaphora may be supposed to introduce the same type of semantics as above but be lexical with overt phonology:



<sup>31</sup>One interesting puzzle left unsolved here is the status of ellipsis with *the*, *a*, and *every*, which may never have elided  $\bar{N}$ . One possible solution (suggested to me by Ivan Sag) would be to scrap the pumping rule model of ellipsis and replace it with something akin to the Argument Realization Principle of Ginzburg and Sag (2000), wherein by a set of constraints on ARG-ST non-canonical elliptical *synsems* are removed from the COMPS list of elements that license ellipsis. Then the constraint on *the*, *a*, and *every* could simply be that their COMPS values are all canonical and thus must may not be elided.

*One-anaphora* phrases may then be realized as *hd-comp-phs*. Thus the facts of noun-less nominal phrases, like determiner-less nominal phrases, can be captured largely in terms of semantics, without positing additional features, null elements, or any lexical or phrasal rules that aren't independently motivated or otherwise already assumed.

## 5 Netter and Functional Completeness

Before concluding, I will illustrate the parsimony of this account by comparison with Netter (1994), a related HPSG approach to noun phrase structure. Netter likewise assumes that both nouns and determiners project phrases that are categorially related subject to certain well-formedness criteria. He distinguishes a type *dp* which is roughly equivalent to NomP, and different NPs and DPs may be *dps* provided they meet the criterion of being “functionally complete”, the parallel to the semantic well-formedness criterion. Functional completeness is based on the distinction between functional and substantive categories (Chomsky, 1986, Abney, 1987), wherein Netter proposes that all lexemes are partly functional and partly substantive and that a property of maximal projections is that they are functionally complete, a property they can arrive at either by being headed by a functional category (like D) or by certain processes like pluralization.

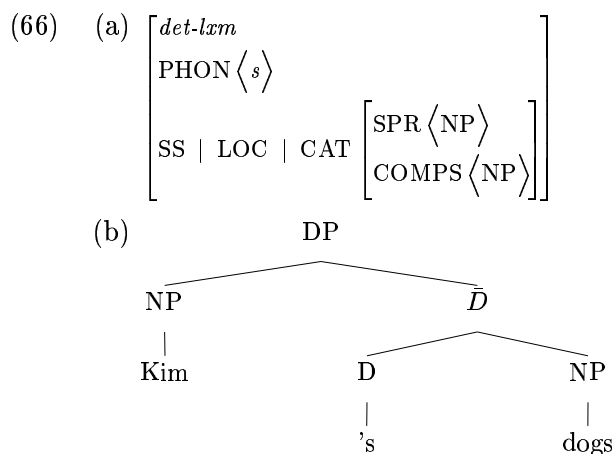
Although Netter's account successfully accounts for a similar set of data (excepting ellipsis), it fails on two grounds. First, it requires a plethora of types and features and is massively redundant. He proposes a nominal type hierarchy with over a dozen additional types above and beyond those typically assumed (as in Pollard and Sag (1994); compare to the two or three additional types in this account, including both part of speech and lexical types). Furthermore, his account posits a significant number of additional features, including a boolean feature FCOMPL to represent functional completeness, two head features MAJOR and MINOR which encode substantive and functional head properties respectively, two boolean MAJOR features N and V encoding the standard Chomsky four-way N/V distinction, and a feature SPEC to indicate phrasal bar-level. The biggest source of redundancy is that his type hierarchy parallels the features he introduces, for instance the type *f-compl-cat* is for *signs* that have [FCOMPL +], and *f-incompl-cat* is for *signs* that have [FCOMPL -], etc. In the approach outlined here, no additional features are introduced, and in fact one feature (SPEC) has been eliminated from Pollard and Sag (1994), Ginzburg and Sag (2000), and no redundancy between features and types occurs. In this sense the approach proposed here is significantly more parsimonious, only requiring a few additional types above those previously motivated in HPSG.

The second problem with Netter's approach is more serious, namely that his notion of functional completeness is circular and entirely ad hoc. The distinction between functional and substantive categories is itself debatable (see Hudson (2000) for a critique), but the functional completeness criterion only serves the purpose of distinguishing *dps* from non-*dps* and otherwise has no motivation. Netter proposes that “[t]he basic idea behind this concept is that saturation of subcategorization requirements does not always suffice to define a maximal projection, but that specification through functional categories may have to be taken into account” (Netter, 1994, p.310). However, he offers no independent linguistic evidence whatsoever that these different *dps* form a natural class. On the other hand, the approach adopted here derives the validity of NomPs from otherwise unrelated semantic

distinctions that are neither vacuous nor circular, and also do not require additional features like FCOMPL, but instead fall out of certain semantic configurations of NomPs. In general, the account proposed here encounters none of the pitfalls of Netter’s account and is therefore preferable.

## 6 Possessors and Possessive Ellipsis

In this section I’ll extend the proposed treatment of noun phrase structure to an additional phenomenon. The subject of possessives receives a natural treatment here as well. An extremely quick and easy approach would be to suppose that *'s* is a determiner with a complement and specifier as in (66a), yielding structures as in (66b) (cf. Radford (1993) for a similar proposal):



However, although this lends itself quite easily to the ellipsis analysis in the previous section since it looks just like any other determiner, there are several disadvantages to this approach. First, it predicts constituents like *'s dogs*, which are very odd from a conceptual and phonological point of view. In fact, such constituents do not seem to coincide with coordination data:

(67) John’s and Mary’s dogs left.

In this example the two coordinated entities are not predicted to be constituents by this analysis. One could argue that these cases, are similar to right node raising of verbal complements, e.g. *Kim cooked and Sandy ate the pizza*, but the prosody patterns of RNR cases do not seem to be like those in (67). Furthermore, binding considerations also contradict this analysis:

- (68) (a) John<sub>i</sub>’s picture of himself<sub>i</sub>  
 (b) \*John<sub>i</sub>’s picture of him<sub>i</sub>

The examples in (68) show that prepositional arguments of the possessed noun are subject to Principles A and B with respect to the possessor, but on this proposed approach

they do not appear on the same ARG-ST.<sup>32</sup> On the basis of these objections, I think this analysis is clearly not correct. There is an alternative, though, that gets all the above facts right, namely that *'s* heads the specifier of the noun (cf. for example Pollard and Sag (1994)). On this approach, the possessive *'s*, which for the sake of argument we'll still regard as a determiner, has an entry like (69a), common nouns now look like (69b), selecting PossP specifiers, giving structures as in (69c):<sup>33</sup>

- (69) (a) 
$$\left[ \begin{array}{l} \text{det-lexm} \\ \text{PHON} \langle s \rangle \\ \text{SS} \mid \text{LOC} \mid \text{CAT} \left[ \begin{array}{l} \text{SPR} \langle \text{NP} \rangle \\ \text{COMPS} \langle \rangle \end{array} \right] \end{array} \right]$$
- (b) 
$$\text{cn-lexm} : \left[ \text{SS} \mid \text{LOC} \mid \text{CAT} \mid \text{SPR} \langle \langle \text{PossP} \rangle \rangle \right]$$
- (c)
- ```

      NP
     /  \
  PossP  N̄
  /  \   |
NP   Poss dogs
|
Kim
  
```

This approach gets the correct constituent structure, straightforwardly captures the co-ordination facts, and also gets the binding right, since now the possessor outranks (precedes on ARG-ST) other arguments of the same noun (e.g. the ARG-ST of *picture* is  $\langle (\text{PossP}), \text{NP} \rangle$ , see Pollard and Sag (1994) on binding). Therefore on syntactic grounds this analysis seems to be the better candidate.<sup>34</sup> The next question is how the semantics works, and in this case a straightforward analysis would be to posit definite quantification of the possessed on the possessor as in (70), following common intuition, yielding derivations as in (71):<sup>35</sup>

<sup>32</sup>Binding data is notoriously slippery, especially in *picture*-NPs (Keller and Asudeh, 2000), but the judgments here, at least to me, are strikingly strong.

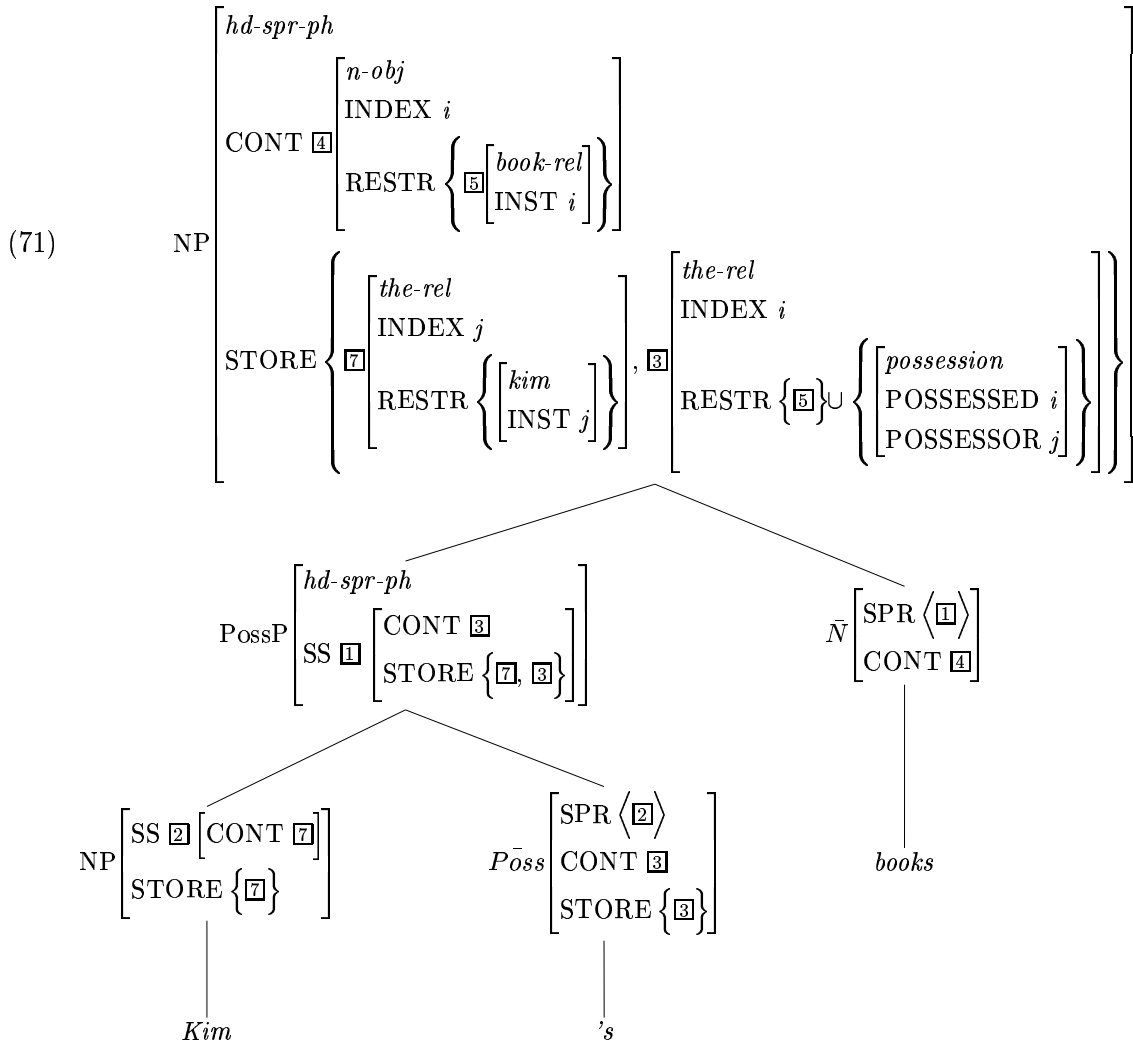
<sup>33</sup>The label PossP is just a shorthand for a kind of DP that is headed by a possessive D, although I'll forego stating exact feature constraints here.

<sup>34</sup>A third possibility is that possessors are modifiers, something which has a bit more support in Romance languages which have so-called adjectival possessives (e.g. Spanish *el libro mio* 'the book mine' vs. *mi libro* 'my book' vs. *el libro de yo* 'the book of mine'). Such an analysis only fails on the binding grounds, which are difficult to test for in Romance languages. For the moment I'll just opt for the specifier analysis.

<sup>35</sup>I'll abbreviate syntactic details of valence and category with appropriate node labels NP, DP, etc.

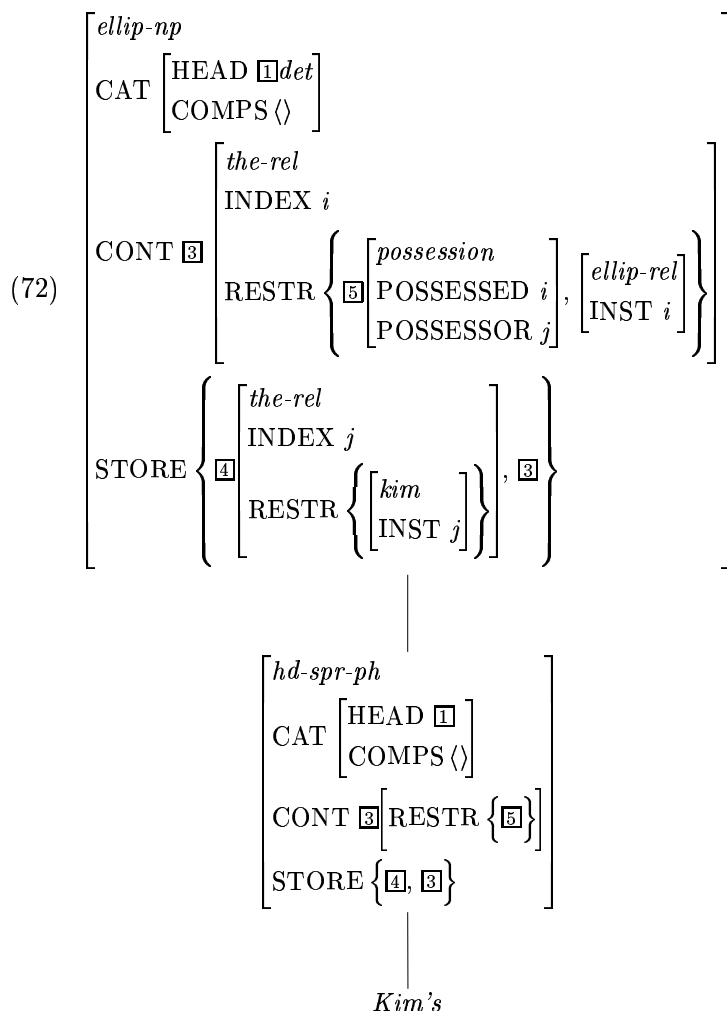
(70) (a) 
$$\left[ \begin{array}{l} \text{det-}lxm \\ \text{PHON} \langle s \rangle \\ \text{SS | LOC} \left[ \begin{array}{l} \text{CAT} \left[ \begin{array}{l} \text{SPR} \langle \text{NP}_j \rangle \\ \text{COMPS} \langle \rangle \end{array} \right] \\ \text{CONT} \left[ \begin{array}{l} \textit{the-rel} \\ \text{INDEX } i \\ \text{RESTR} \left\{ \begin{array}{l} \textit{possession} \\ \text{POSSESSED } i \\ \text{POSSESSOR } j \end{array} \right\} \end{array} \right] \end{array} \right] \end{array} \right]$$

(b) 
$$cn-lxm : \left[ \begin{array}{l} \text{SS | LOC} \left[ \begin{array}{l} \text{CAT | SPR} \langle \langle \text{DP}_i \rangle \rangle \\ \text{CONT | INDEX } i \end{array} \right] \end{array} \right]$$



Here the resulting phrase satisfies the conditions on NomP and contains two *scope-objs* on STORE, one corresponding to the possessor and one corresponding to the possessed, where the restriction is introduced by the nominal *books* and additionally the possession relation is introduced by *'s*.

Next are cases of ellipsis. Although DPs formed by *'s* are NomPs as well and introduce *scope-objs* on STORE that bind their indices, unlike other determiners with obligatory complements there is no *nom-rel* to provide N-Semantics on the RESTR list, and thus by themselves possessive DPs are not valid NomPs. However, the *ellip-np* rule above applies to these cases as well, introducing the correct elliptical semantics. The only difference between the application of that rule to other determiners and to possessive DPs is that the possessive DPs have an empty COMPS list, but since the constraint on *ellip-np* only specifies that its daughter have a COMPS that is a *list-of-ellip-ss*, the constraint is satisfied since an empty list is (vacuously) a list of elliptical *synsems*. An example derivation is shown in (72):



Thus despite the different syntactic structure assigned to possessive phrases, the ellipsis facts are handled identically. The same conditions that license ellipsis above do here, as well: the elided element is not the head of the phrase (since in these cases the headedness has

been shifted to the possessive marker) and the appropriate semantics had to be introduced to make the NomP well-formed.

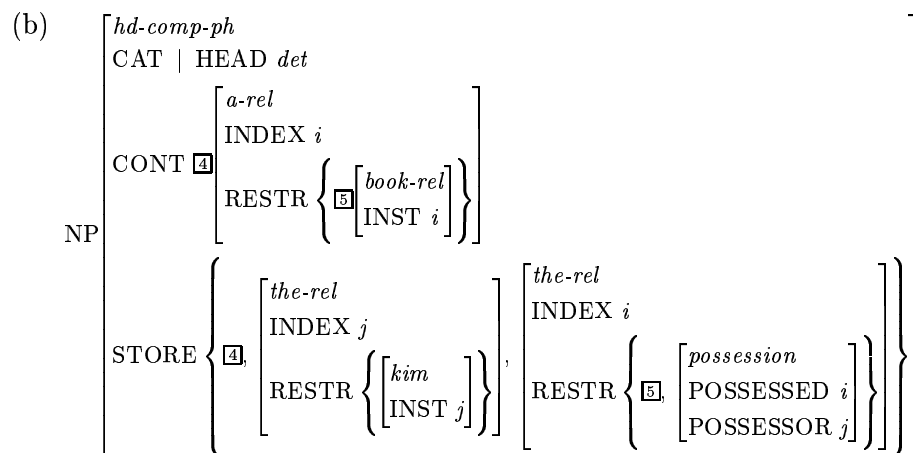
One question about the structure of possessives remains. A famous observation about possessives and other determiners is that they are in complementary distribution:

- (73) (a) \*The/a/one/each/every John's dog slept.  
 (b) \*The/some/many/few John's dogs slept.

The common assumption that explains these facts is that 's and other determiners share a structural position. In NP analyses of noun phrase structure, this fact is usually formalized by saying that the possessive 's is a determiner heading a DP which is the specifier of the noun, so that no other determiner is licensed. A typical DP approach is to say, on the contrary, that 's is a determiner that takes a specifier possessor and a complement possessed, and so no other determiner may appear in the nominal phrase. The approach I adopt does neither: a determiner could still pick up the NomP in (71) as a complement.

However, recent work by Haspelmath (1999) suggests, based on extensive cross-linguistic evidence, that the structural account of the determiner/possessive complementarity is erroneous, since many languages can indeed have both in one noun phrase, with acceptability based not on structural matters but on a variety of functional and processing concerns. Haspelmath proposes a diachronic functional explanation for the complementarity in languages in which it occurs. The nature of his explanation is irrelevant here, but his data does indicate that synchronically the complementarity doesn't have a lot of cross-linguistic generality, thus supporting the approach I adopt. So how do we explain the apparent complementarity? Following Haspelmath's proposal, the answer here is likely due to semantic rather than syntactic constraints. Since the possessor introduces definite semantics (here encoded as the same relation *the* introduces) any other determiner or process that would introduce in other D-semantics would produce a structure in which the index of the noun phrase is multiply bound. For instance, the NomP in (74a) would yield the structure in (74b):

- (74) (a) \*a Kim's book



Here, the index *i* of *book* is bound both by the definite and indefinite scope relations. We can eliminate constructions like this by assuming that they are semantically ill-formed.

This need not be encoded directly into the grammar as the semantic well-formedness of NomPs was before, but rather no semantic interpretation (say, by the interpretation function in Ginzburg and Sag (2000)) can be assigned to this feature structure and thus it is not well-formed. This solution somehow feels less than ideal since we'd like to have a clear-cut grammatical constraint, and maybe one is available, but again it's not clear that the structural argument is the best argument for the complementarity of possessors and determiners in languages that show it.

## 7 Conclusion

In this paper I've argued that the headedness of noun phrases is not reserved strictly for either the determiner or noun category, but rather that both categories are different sub-categories of a larger super-category, *nominal*, and that on pretheoretical grounds, both head the phrase. The main difference between the categories D and N is in their semantics (contra alternative proposals that the difference is one of functional vs. substantive categories). The question of theoretical headedness is another matter, and proposed that headedness is best understood on a case-by-case basis: D is the head when it is present, and N is the head otherwise, where argument selection for nominal arguments is simply for NomPs which include DPs and NPs. The mystery as to what licenses the variety of noun phrases with and without determiners and nouns is a semantic one. The semantics associated with both nouns and determiners, N-semantics and D-semantics, are obligatory pieces of a noun phrase regardless of which elements are overtly realized, and if either element is missing some process (bare pluralization or ellipsis for instance) must supply the missing semantics, thus explaining the limited types of semantic interpretations associated with missing elements.

One advantage of the HPSG implementation is that it relies almost exclusively on the type hierarchy, where many grammatical generalizations are made in HPSG, further requiring no additional features or change to the feature geometry as assumed in Ginzburg and Sag (2000), and in fact eliminating at least one feature commonly assumed in NP analyses in HPSG, namely the *det* feature SPEC. Furthermore, unlike previous approaches, the well-formedness of noun phrases is not pinned down to structural, categorial, or functional criteria, many of which are largely theory-specific or non-linguistic and/or require a considerable amount of extra machinery (in terms of ad hoc features and null categories) but instead requires only a well known semantic distinction about the roles of determiners and nouns. The specific encoding I employed here seems particularly parsimonious, however it is only a sketch. Several pieces of noun phrase structure were ignored for time considerations, but deserve mention. The first concerns  $\bar{N}$  modifiers, which may show up with pronominal determiners and elided  $\bar{N}$

- (75) (a) Some who left yesterday have returned.  
 (b) Few on this team have any idea how to steal a base.

How this would pan out in the analysis presented here is still up for grabs, although these have a flavor of the types of structures seen in  $\bar{N}$ -gapping:

- (76) (a) Mary wrote two books on syntax and John wrote some on semantics.

- (b) Although the dog with fleas needed that bath, some without fleas are needlessly dipped every day.

Both of these phenomenon are matters of future work. A second set of data to consider concerns the placement of adjectives and numerals and post-determiner quantifiers in the noun phrase, as in (77):

- (77) (a) Mary read these (two) (big) books on syntax.  
(b) John played the (last) guitar in the shop.

A treatment of the related phenomenon of comparatives and superlatives also deserves attention, most particularly because they, more so than adjectives, can participate in elliptical constructions:

- (78) (a) Mary read the [most expensive]/biggest book in the store.  
(b) Mary read the [most expensive]/biggest.

On the standard assumption that comparatives adjoin to the  $\bar{N}$ , this presents something of a puzzle. Abney (1987) proposes to deal with these cases by assuming the degree modifier (or comparative/superlative morphology) heads such phrases, which in turn select phrases headed by adjectives, etc., forming a chain of maximal types from DP to NP (something also assumed by Radford (1993)). Whether this approach is the right one is yet to be seen, but these are data that need to be accounted for. However, if something similar to this is assumed, then it would potentially render the two features SPR and SUBJ somewhat redundant. On the assumption that predicative NPs and APs can have both specifiers and subjects, both valence features are required, but if the weight of headedness is distributed among specifiers and substantives as in this approach, then the need for separate SPR and SUBJ features may well be eliminated, reducing the valence features to just SPR and COMPS. A more well-developed analysis would need to be considered to verify this.<sup>36</sup> And in general, more and more complicated noun phrase structures must be dealt with, so this analysis is far from complete.<sup>37</sup>

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<sup>36</sup>One point of contention may be in certain facts in binding theory that might require a difference between subjects and specifiers (Ivan Sag, p.c.).

<sup>37</sup>See Pollard and Sag (1994, Chap. 9) for a discussion of many obstacles a DP analysis will face.

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