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More heads and less categories: a new look at noun phrase structure

1 Introduction

- **Strict Headedness:** Most theories of noun phrase structure (Harris, 1946, Jackendoff, 1977, Abney, 1987, Nerbonne et al., 1989, Payne, 1993, Pollard and Sag, 1994) assume the following:
 - D or N is the syntactic head.
 - Well-formed noun phrases are fully saturated DPs/NPs.
- Much debate has been concerned with whether it's the D or N.
- I argue instead that by incorporating a variety of old and new data on headedness and noun phrase semantics, we note two observations:
 - Linguistic evidence on headedness does not distinguish Ds from Ns.
 - D and N do differ semantically, and all noun phrases have the semantics of both.
- **A Semantically Grounded Alternative:**
 - (1) (i) D and N are both *nominal* categories projecting largely equivalent nominal phrases (NomPs) and differ only in terms of semantics and selectional restrictions.
 - (ii) A well-formed noun phrase is one that has both D and N-Semantics.
- **Road Map:** I discuss headedness in section §2, semantics in §3, and sub-categorization in §4 and §5. In §6 I sketch a semantically driven analysis of bare plurals and Noun Phrase Ellipsis (NPE). I'll compare this approach to alternative approaches in §7 and conclude in §8.¹

2 Headedness

- The linguistic criteria for headedness do not isolate a single head (Zwicky, 1985, Hudson, 1987, Croft, 1993, Zwicky, 1993):
 - (2) (a) Obligatoriness/Distributional Equivalence/Category determinant : the head is distributionally equivalent to the full phrase.

¹This sketch is based partly on a larger proposal in Beavers (2003) that also incorporates pronouns, possessors, possessive ellipsis, and *one*-anaphora.

- i. D and N are distributionally equivalent:
 Some dogs/dogs/some slept without dreaming.
 German: (die) (alten) (Männer) “the old men”
 Spanish: (los) (gatos) (viejos) “the old cats”
 Quechua:
 alkalde-kuna-ta ‘mayor-PL-ACC’ ‘the mayor [object]’
 hatun-kuna-ta ‘big-PL-ACC’ ‘the big ones [object]’
- (b) Subcategorizand : the head subcategorizes for (requires the presence of) the non-head.
 - i. N subcategorizing for D:
 *(The/this/that/a) picture of Mary is in black and white.
 - ii. D subcategorizing for N:
 A/the/every *(dog) slept soundly.
- (c) Morphosyntactic Locus : the head is the locus of morphosyntactic inflection/category features.
 - i. D and N show person/number morphology:
 John saw some dogs/a dog.
 - ii. D/N show case:
 German: den Mann ‘the-ACC man’, der Mann ‘the-NOM man’ “the man”, des Mannes ‘the-GEN man-GEN’ “the man’s”
 Russian:
temi poslednimi bol’šimi butylkami
 that.INST.PL last.INST.PL big.INST.PL bottle.INST.PL
 ‘with those last big bottles’
 - iii. (Pronominal) Ds show case in English:
 We/*us linguists need more sleep.
- (d) (Semantic “aboutness” : the head is the same kind of entity as the full phrase. Difficult to apply:
 - i. #“Every dog is a kind of dog.”
 - ii. #“Every dog is a kind of every).”

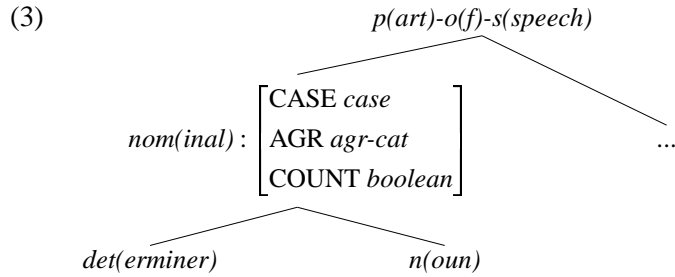
• **Typical Conclusions:**

- N or D is head anyway (interpretation of the criteria, see Zwicky (1985), Hudson (1987)).
- The criteria are no good (see Croft (1993)).

- **New Conclusion:** Making no additional assumptions, since D and N have the same syntactic category features and the phrases they project are interchangeable, then they are the same category and thus *both D and N can head noun phrases*.²

²See Postal (1966) for a similar argument about D and Pro; Hudson (2000) assumes that Ds are just transitive Pros, which means that if Pro and N are related categories then so are D and N.

- I propose to encode this directly in the part-of-speech type hierarchy:



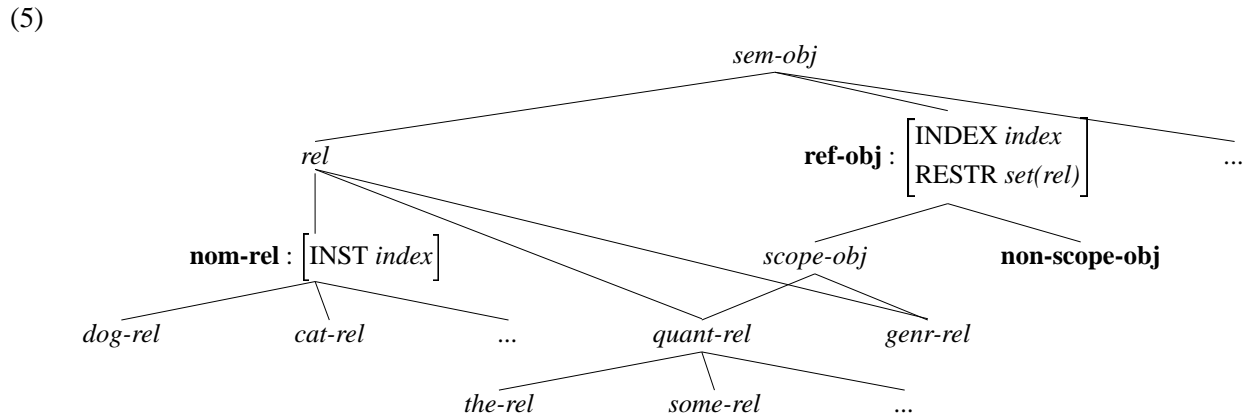
- Verbs select for Nominal Phrases (NomPs).

3 Semantics

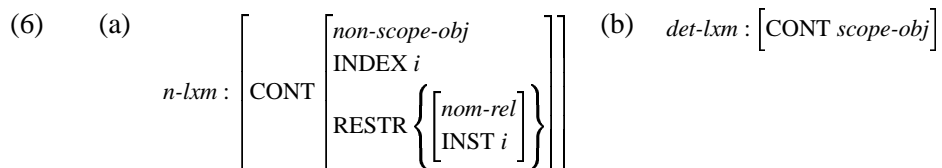
- Ds and Ns are associated with two different kinds of semantic pieces:

- (4)
- (a) D-Semantics: quantification, definiteness, indefiniteness, genericity, etc.
 - (b) N-Semantics: attributive/restrictive semantics, the restriction set (*dog'*, *cat'*, *fish'*, etc.) of some kind of quasi-quantificational operator.

- We can encode this with a type hierarchy based on Ginzburg and Sag (2000):



- The types *scope-obj* and *nom-rel* correspond roughly to D-semantics and N-semantics. I propose the following lexical constraints:



- **A Linguistic Observation:** All noun phrases have both D and N-semantics:

- (7) (a) Noun phrase with both D and N:
 i. Every fish likes the movies.
- (b) Noun phrases with no N still have N-Semantics:
 i. Although most dogs eat dog food, many *e* prefer cat for dinner. (Ellipsis)
 ii. (These (books)/they record who won the 1967 World Series. (Pronominal))
- (c) Noun phrases with no D still have D-Semantics:
 i. (Some) people know who won the 1967 World Series. (Generic)
 ii. I saw (some) dogs in the lawn. (Indefinite)
 iii. (He/Kim knows the answer. (Definite))

- This is not a new insight (it's essentially saying noun phrases are generalized quantifiers, cf. Montague (1974), Szabolcsi (1987), Longobardi (1994), Chierchia (1998)). But in the absence of categorial distinctions it allows us to state the following well-formedness condition:

- (8) **Nominal Phrase Semantic Well-formedness Condition:** All well-formed noun phrases must have both D-semantics and N-semantics.

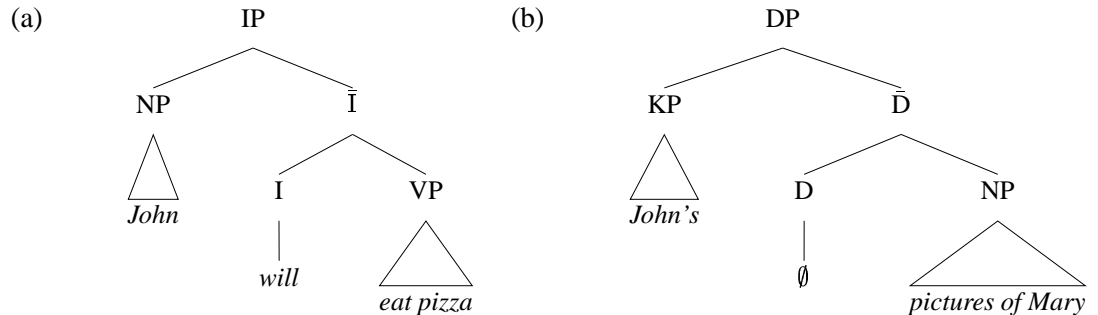
- Verbs are selecting for semantically well-formed NomPs:

- (9)
- | | | | | |
|-----|--------|--|-----|--|
| (a) | NomP = | $\left[\begin{array}{l} \text{LOC CAT} \left[\begin{array}{l} \text{HEAD } \textit{nominal} \\ \text{COMPS } \langle \rangle \\ \text{SPR } \langle \rangle \\ \text{SUBJ } \langle \rangle \end{array} \right] \\ \text{CONT} \left[\begin{array}{l} \textit{scope-obj} \\ \text{INDEX } i \\ \text{RESTR } \left\{ \dots, \left[\begin{array}{l} \textit{nom-rel} \\ \text{INST } i \end{array} \right], \dots \right\} \end{array} \right] \end{array} \right]$ | (b) | $\left[\begin{array}{l} \textit{v-lxm} \\ \text{ORTH } \langle \textit{like} \rangle \\ \text{ARG-ST } \langle \text{NomP, NomP} \rangle \end{array} \right]$ |
|-----|--------|--|-----|--|

4 Subcategorization

- Following Hudson (1984), Abney (1987), I'll assume that D subcategorizes for N.
- Abney assumes that D and INFL are parallel categories:

(10)



- He supports this by showing that noun phrases and sentences are parallel projections, on the grounds that both have AGR and related θ -grids:

– Subject/possessor-marking (Similar cases):

(11)

- (a) Hungarian: E'n nem akar-ok el-menni 'I-NOM not want-1sg.indef away-go.inf' "I don't want to go"
 az en kalap-om 'the I-NOM hat-1sg' "my hat"
- (b) Yup'ik: angute-m kiputa-a- \emptyset 'man-ERG buy-OM-SM' "the man bought it"
 anguet-m kuiga- \emptyset 'man-ERG river-SM' "the man's river"
- (c) Tzutujil: x-ix-qa-kunaaj 'aspect-2pOM-1pSM-cure' "we cured you (pl.)"
 qa-tza7n '1pSM-nose' "our nose"

(Abney, 1987)

– Agreement with subject (Similar morphology, cf. Yup'ik):

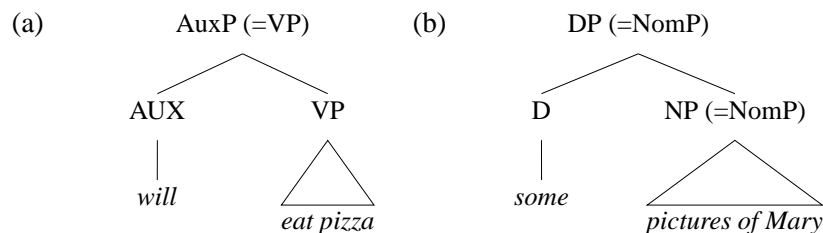
(12)

- (a) kiputta- \emptyset "he bought it" kuiga- \emptyset "his river"
 (b) kiputaa-t "they (dual) bought it" kuiga-t "their (dual) river"
 (c) kiputaa-k "they (plural) bought it" kuiga-k "their (plural) river"
- (Abney, 1987, (8),p.16)

– Preservation of θ -role assignments in nominalization: *The Romans destroyed the city/the Roman's destruction of the city.*

- If you assume S/Noun Phrase parallel D and INFL fall into same slot.
- No AGR/INFL in HPSG but the S/Noun Phrase parallel has an HPSG analog:

(13)



- **Additionally:** Ellipsis data shows that AUX and D license ellipsis in identical ways.

(14)

		NPE		VPE		
		anaphoric	non-anaphoric	anaphoric	non-anaphoric	
overt		<i>one</i>	NP	overt	<i>so, it</i>	VP
covert		ellipsis	∅	covert	ellipsis	n/a

(15)

		NP	VP
(a)	overt, ana (overt ellipsis):	that one	did it/so
(b)	covert, ana (ellipsis):	some <i>e</i>	did <i>e</i>
(c)	overt, non-ana (full XP):	some book	did leave
(d)	covert, non-ana (deictic):	that <i>e</i>	???

- NPE and VPE have similar distributional restrictions:
 - Both may take pragmatic antecedents (i.e. are “deep anaphora”, in terms of Hankamer and Sag (1976)).³
 - Do not need to be in a command/sisterhood relationship with their antecedents (cf. Jackendoff (1971), Chao (1988)).⁴
- Based on this evidence, we can assume Ds select for Ns:

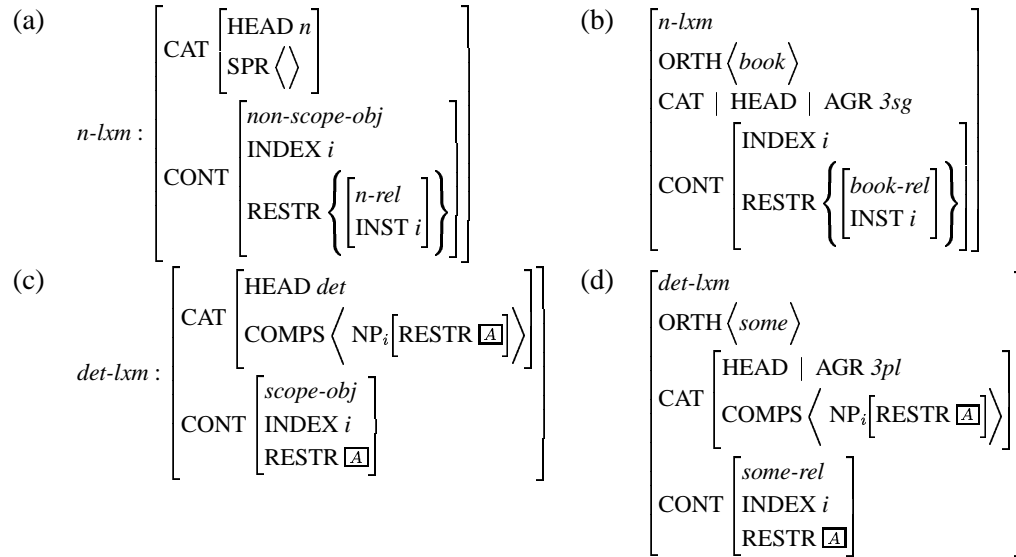
(16) (a) Ns do not take specifiers.
 (b) Ds take obligatory NP complements.⁵
- These constraints encode these subcategorization restrictions:

³Hankamer and Sag (1976) do not classify VPE as deep anaphors, but some evidence since then has indicated that it may be possible in some contexts, see Williams (1977), Hankamer (1978), Chao (1988).

⁴Note that Chao (1988) proposed a division of ellipsis types between VPE, sluicing, and Null Complement Anaphora (NCA) vs. gapping and stripping, where the former are H+ ellipsis, meaning the head of the phrase licensing the ellipsis is still present, and the latter are H- ellipsis, where the head has been elided. She shows a systematic set of distributional properties between the two. NPE patterns exactly like H+ ellipsis like VPE on these grounds. If her typology is correct, then this is another argument that Ds head DPs since they are H+ ellipsis.

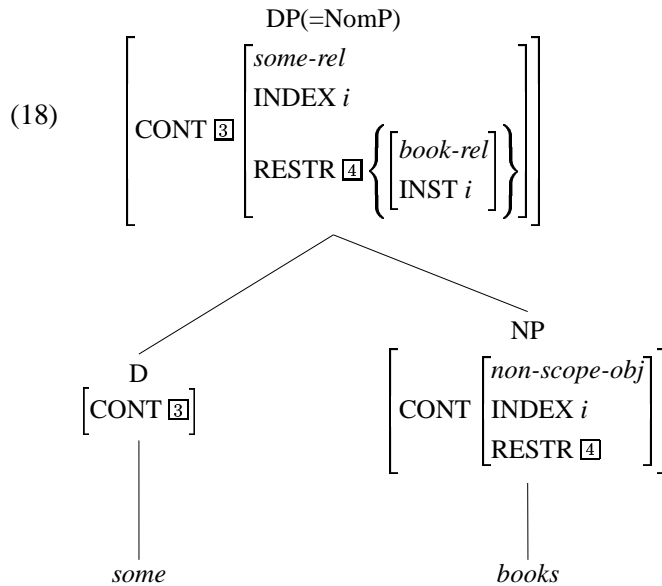
⁵This is a simplification from the fuller analysis in Beavers (2003), where Ns do take possessor specifiers. Also, following Abney (1987), Hudson (2000), the difference between Ds and Pros is in their transitive vs. intransitive nature, i.e. optionality of their NP complement. However, both possessors and pronouns are outside the scope of this discussion.

(17)



5 Putting the Pieces Together

- Regular DPs are well-formed NomPs syntactically and semantically:



6 Missing Elements

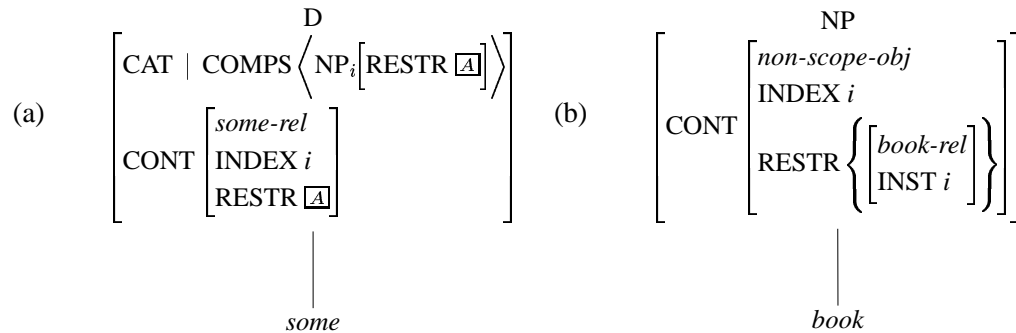
- We still need to account for data like (19).

- (19) (a) (Some) angry wolves steal (some) rice. (Bare plural/mass N, non-overt D)
 (b) There's squirrel all over the road. (Bare count N (via Universal Grinder), non-overt D)

- (c) Although most sportscasters are still optimistic, some *e* wonder if the Cubs will ever win the series. (Ellipsis, non-overt N)
- (d) (This (t-shirt) should be folded and put away. (Pronominal D, non-overt N))

- Ds and NPs are not well-formed NomPs:

(20)



- I argue that the conditions governing this are semantic:
 - Bare N with indefinite/generic reading (bare plural/mass interpretation adds D-semantics).
 - Bare D with “sense”-anaphoric semantics (ellipsis supplies N-semantics).

- All the structures in (20) need are a little extra semantics.

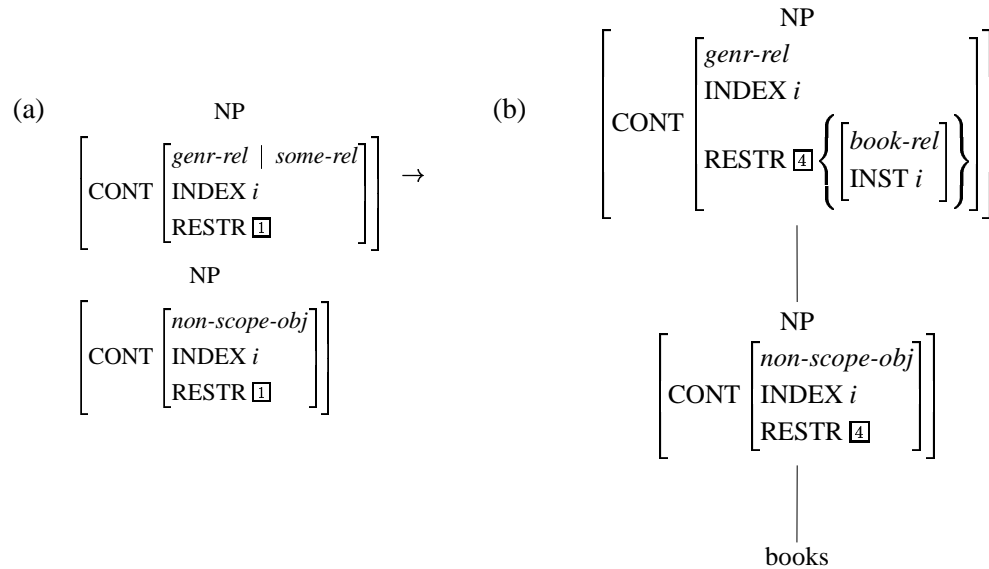
- I propose the following analysis of missing Ds and Ns:⁶

- (21) (i) The overt D or N is the syntactic head and supplies D or N-semantics.
- (ii) One of two specific interpretative processes (indefinite/generic pluralization or ellipsis) must supply the missing semantics to satisfy well-formedness.

- These can be encoded in a number of ways. I’ll sketch two possibilities. First, we can modify the bare nominalization analysis of Ginzburg and Sag (2000) (ignoring AGR/COUNT features):

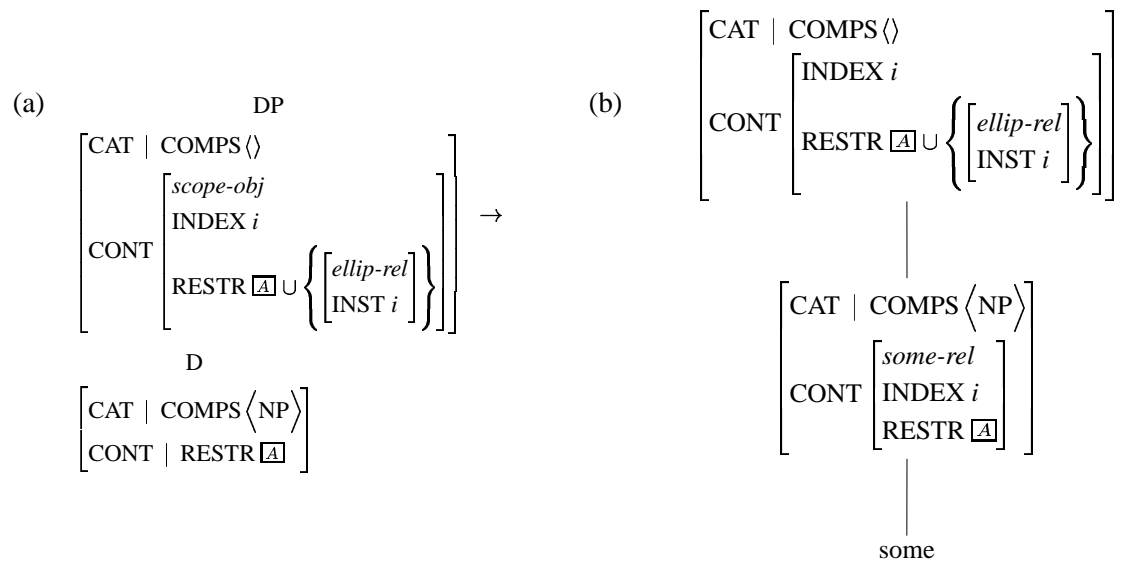
⁶Although I’m not discussing proper names and pronouns (including deictic and pronominal determiners) it’s worth pointing out that they satisfy a third part of this paradigm since they appear to come lexically packaged with D-semantics (definiteness) and only differ in whether they lexically have N-semantics (as in proper names) or acquire them through anaphoric reference (pronouns).

(22)



- Note that the rule operates purely on CONT values, making it largely semantic.
- Turning to ellipsis NPE and VPE can now be handled in parallel. Again, one simple account would be to adopt the VPE rule in Ginzburg and Sag (2000) as in (23a):

(23)



- Ideally, VPE and NPE could be done by one rule (“E”) (as proposed in Jackendoff (1971)).⁷

⁷This could be done by assuming an AUX-like feature for Ds.

- The rule in (23a) is likewise largely interpretative, except for the syntactic component of emptying COMPS. It might be possible to eliminate the syntactic component entirely.⁸
- If the syntax goes the pumping rules might, too, depending on the semantic representation (e.g. resolution of underspecified MRS structure (Copestake et al., 1999)).
- **An All Semantic Approach:** With the categorial and syntactic distinctions neutralized, well-formedness can be localized largely or entirely within semantics (thus validating (8)).
- **Why All Semantics?** Not all languages have determiners (Estonian, Finnish, Japanese, Russian, etc.). Interpretation of D-semantics often contextual, pragmatic, and distributional. The semantic approach here falls in line with this without unnecessary syntactic operations.

7 Alternative Proposals with Multiple Heads

- One strand of theories has assumed that Ds and Ns share headedness duties (Hudson, 1990, Radford, 1993, Netter, 1994).
- Radford in particular proposes that D, N, Q, and A are all “nominal” categories. The HPSG analysis here provides a precise way to encode this notion.
- One very similar approach is Netter (1994):
 - D and N are functional and non-functional versions of the same category and well-formed noun phrases must be “functionally complete” projections (Netter (1994), see also Chomsky (1986), Abney (1987), Grimshaw (1991, 2000)).
- My approach has several advantages over Netter’s:
 - Conceptually, the notion of “functional completeness” has been replaced with something grounded in semantics (see Hudson (2000) for a critique of functional categories).
 - Minimal extra types (a part-of-speech supertype *nominal* and three extra semantic types above and beyond Ginzburg and Sag (2000), cf. Netter’s extensive type hierarchy) and no additional features (cf. Netter’s SPEC, FCOMPL, N, V, MAJOR, MINOR).⁹

⁸One possibility would be assuming optional complements for AUXs/Ds, with ellipsis operating on CONT only.

⁹This SPEC is a boolean feature indicating whether something has picked up its specifier, not to be confused with the SPEC feature which passes semantic information from Ns to Ds in Pollard and Sag (1994).

8 Conclusion

Advantages over NP approaches common in HPSG:

- Ellipsis handled naturally (without null elements or category changing rules, cf. Nerbonne et al. (1989), reducing the heterogeneity of grammatical information.
- Eliminates feature SPEC (Pollard and Sag, 1994), towards eliminating SUBJ/SPR distinction.

The real advantages to this approach aren't so much empirical as conceptual:

- Directly incorporates categorial relationship between D and N.
- Makes no unattested categorial claims about noun phrase headedness.
- Paves the way for capturing the similarities between D and AUX.
- Grounds generalizations about well-formedness entirely in semantics. Dove-tails with languages without Ds (Estonian, Japanese, Russian, Finnish, etc.).

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