Seminumerals, determiners and nouns in English

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1 Introduction

Singular countable nouns in Enligh

- A singular countable noun in English is different from a plural countable noun and an uncountable noun in that it requires a determiner to be grammatical.[1]

  (1) a. I haven't got *(a) *pen*.
  b. There were *cats* in every room.
  c. Her coat is made of pure *wool*. (Swan 2005:65-66)

- The noun *pen* in (1a), which is a singular countable noun, requires a determiner to combine with, and the determiner *a* satisfies this requirement. A plural countable noun (1b) and an uncountable noun (1c), on the other hand, can stand on their own without a determiner.

- When a determiner combines with a countable noun, they should agree in number.

  (2) a. this book/*this books
  b. these books/*these book (Huddleston & Pullum 2002:352)

- The above observations lead to a generalisation of the following sort:

  (3) A singular countable noun in English requires a determiner and they should agree in number.

Singular countable nouns in standard HPSG

- It is often assumed in HPSG that a determiner is a specifier of a head noun (Pollard & Sag 1994, Sag et al. 2003, Kim 2004, Kim & Sells 2008).

[1]Following Huddleston & Pullum (2002:355) we assume that the term 'determiner' refers to the following things: determinatives (*the tie*), determiner phrases (*almost every tie*), genitive NPs (*my tie*), plain NPs (*what colour tie*), PPs (*over thirty ties*).

(4)
$$\begin{bmatrix} \textsc{head} & \begin{bmatrix} \textit{noun} & \\ \textsc{agr} & \boxed{1}\begin{bmatrix} \textsc{n} & \textit{sg} \end{bmatrix} \end{bmatrix} \\ \textsc{spr} & \langle \begin{bmatrix} \textsc{agr} & \boxed{1} \end{bmatrix} \rangle \end{bmatrix}$$

(cf. Sag et al. (2003:107), Kim (2004:1114), Kim & Sells (2008:108))

- (4) states that a singular countable noun should have a specifier which agrees with it in number.
- The SPR (SPECIFIER) feature shows that this expression has a specifier and indicates what kind of specifier it is. Thus, the determiner requirement of a countable singular noun is encoded as a matter of valency.
- The boxed tag $\boxed{1}$ means that the specifier has the same AGR value as the head noun, representing determiner-noun agreement.
- (4) captures generalisation (3) and accounts for the unacceptability of (1a) *(*a*) *pen* and (2b) **these book*: the former lacks a specifier and the latter does not show specifier-noun agreement.[2]

Seminumerals as subtypes of countable nouns

- First, the singular form of these words needs a determiner to be grammatical.

  (5) *(a/the) hundred/thousand/million/billion/trillion/dozen people

- Second, the plural form of these words do not need a determiner.

  (6) (these) hundreds/thousands/millions/billions/trillions/dozens of people

- Thus, we can expect that seminumerals have much the same lexical properties as (4).

The aim of this talk

- In this paper we will first argue that the numeral quantifiers in (7) do not conform to generalisation (3).

  (7) a. those *thousand* teachers
  b. these *hundred* women (BYU-BNC[3])

- Then we will show that HPSG can provide a fairly straightforward account of the facts.
- Following Jackendoff (1977:126), we will refer to numeral quantifiers such as *hundred*, *thousand*, *million*, *billion*, *trillion* and *dozen* as 'seminumerals'.

[2] **This books* in (2a) also lacks specifier-noun agreement.
[3] Davies (2004–)

2 Problems

Seminumerals in HPSG

- Since a seminumeral is a type of countable common noun, the singular form requires a determiner.
- (8) a. *(a) thousand teachers
  b. *(a) hundred women
- (8a) and (8b) show that the determiner is obligatory. Since *teachers* and *women* are plural nouns, they do not require their own determiner.
- We can conclude that the determiner is required by the seminumeral (See also Hudson (2004:38)).
- Given that seminumerals are subtypes of countable nouns with the basic structure in (4), they might be analysed to have the following properties.

(9)
$$\begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{noun} & \\ \text{AGR} & \boxed{1}\begin{bmatrix} \text{N} & \textit{sg} \end{bmatrix} \\ \text{MOD} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{noun} & \\ \text{AGR} \mid \text{N} & \textit{pl} \end{bmatrix} \end{bmatrix} \end{bmatrix} \\ \text{SPR} & \langle \begin{bmatrix} \text{AGR} & \boxed{1} \end{bmatrix} \rangle \end{bmatrix}$$

- Here it is assumed that a seminumeral has a specifier which agrees with it and that it modifies a plural noun via the MOD feature.

Challenges for (9)

- The NPs in (7), repeated below, pose challenges for (9).

(10) a. those *thousand* teachers
  b. these *hundred* women [= (7)]

- In the NPs in (10) the only possible determiner that can satisfy the determiner requirement of the seminumeral is the one just before it: *those* in (10a) and *these* in (10b).

(11) a. *(those) thousand teachers
  b. *(these) hundred women

- First, there is no number agreement between the determiner and the seminumeral: the seminumeral is singular but the determiner is plural.
- Second, it looks as if the determiner agrees with the plural noun after the seminumeral.
- It is clear, then, that the NPs in (7) do not have the properties in (9).[4]

[4]Jackendoff (1977:133) assumes that the underlying structure of *those dozen weeks* is *those a dozen of weeks*, where the plural determiner is in the specifier position of *weeks* and the seminumeral has its own determiner

3 Possible Analyses

Simple modification to (9)

- One possible analysis would be to propose that the specifier agrees with the plural noun that the seminumeral modifies.

(12)
$$\begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{noun} & \\ \text{AGR} & \begin{bmatrix} \text{N} & \textit{sg} \end{bmatrix} \\ \text{MOD} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{noun} & \\ \text{AGR} & \boxed{1}\begin{bmatrix} \text{N} & \textit{pl} \end{bmatrix} \end{bmatrix} \end{bmatrix} \end{bmatrix} \\ \text{SPR} & \langle \begin{bmatrix} \text{AGR} & \boxed{1} \end{bmatrix} \rangle \end{bmatrix}$$

- However, examples like those in (13), where the determiners are singular, pose a problem.

(13) a. that thousand pounds (BYU-BNC: KCX S_conv)
b. this hundred houses (BYU-BNC: J8G S_interview_oral_history)

Weak/transparent head Analysis

- Another possibility would be to propose that seminumerals are 'weak heads' (Tseng 2002, Abeillé et al. 2006, Przepiórkowski 2013) or 'transparent heads' (Flickinger 2008), which preserve some important properties of their complement on the phrase.
- The data in (7) can be accounted for if we assume that seminumerals preserve the grammatical number of the complement on the phrase.
- However, examples like those in (13) pose a problem for analyses along these lines too. In (13) the seminumeral has a singular determiner. The seminumeral inherits the plural number from its complement and passes it to the phrase. The plurality of the phrase does not match the singular determiner.

4 Functor Analysis

Head-Functor Phrase

- The combination of a determiner and a head nominal is an instance of a head-functor phrase (Van Eynde 2006, Allegranza 1998).

a. Under these assumptions it is possible to avoid the problems discussed above: the plural determiner agrees with the head noun because they are in the determiner-head relationship; the determiner requirement of the seminumeral is satisfied by its own underlying determiner *a*. However, this analysis cannot accommodate the fact observed in (11a). (11a) shows that the determiner is obligatory although *teachers* is a plural countable noun, which normally does not require its own determiner. This casts doubt on the assumption that *those* is the specifier of *weeks*.

(14) Constraint for head-functor phrase (Van Eynde 2006:164,166)

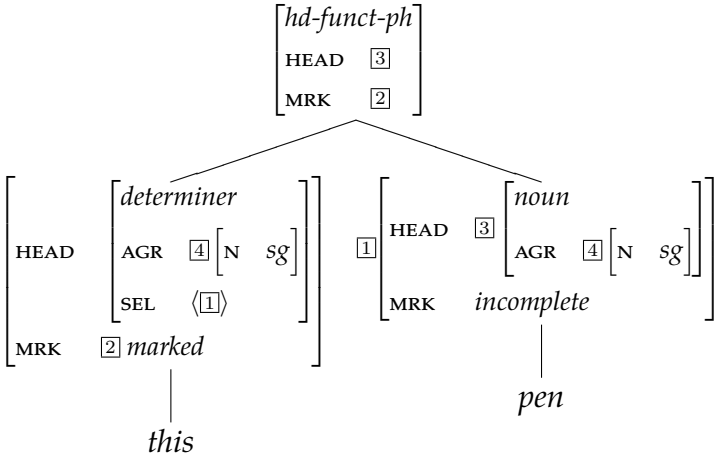
$$\textit{hd-funct-ph} \rightarrow \begin{bmatrix} \textsc{mrk} & \boxed{1} \\ \textsc{dtrs} & \left\langle \begin{bmatrix} \textsc{mrk} & \boxed{1} \\ \textsc{sel} & \langle \boxed{2} \rangle \end{bmatrix}, \boxed{3} \begin{bmatrix} \textsc{synsem} & \boxed{2} \end{bmatrix} \right\rangle \\ \textsc{h-dtr} & \boxed{3} \end{bmatrix}$$

- Constraint (14) states that in a phrase of type *hd-funct-ph* the non-head daughter selects a head daughter, and the MRK value of the mother is identical to that of the non-head daughter.
- The information about selection is indicated by the SEL (SELECT) feature of a non-head, which represents the constraints which a non-head daughter imposes on the head daughter.
- MARKING (MRK) indicates whether the expression involves a determiner or a numeral, or whether it can stand alone without these elements (Van Eynde 2006).

Example of head-functor phrase

- (15) shows how functor *this* combines with a singular countable noun.

(15)



- The combination of *this* and *pen* is an instance of a head-functor phrase, in which *this* selects the head noun and the MRK value *marked* is inherited to the mother node.
- The AGR value 4 shared between *this* and its head noun means determiner-noun agreement between them.
- The MKG feature of *pen* has a value whose type is *incomplete*, which means that the word is incomplete on its own, requiring some sort of determiner.

Generalisation (3)

- In this approach generalisation (3) is captured in terms of two separate specifications:
- The determiner requirement of a singular countable noun is represented by the *incomplete* value of the MRK feature of the head nominal;
- The determiner-noun agreement is represented by the shared value of the AGR | N feature between the determiner and the head noun.

Comparison with the standard HPSG view in (4)

- The standard HPSG treatment in (4): the determiner requirement and the determiner-noun agreement are both represented in the SPR specifications of the head noun.
- The head-functor analysis in (15): the determiner-noun agreement and the determiner requirement are dissociated from each other.

5 Proposals

Seminumerals as functors

- We propose that seminumerals have the following syntactic properties.

(16) *hundred*:

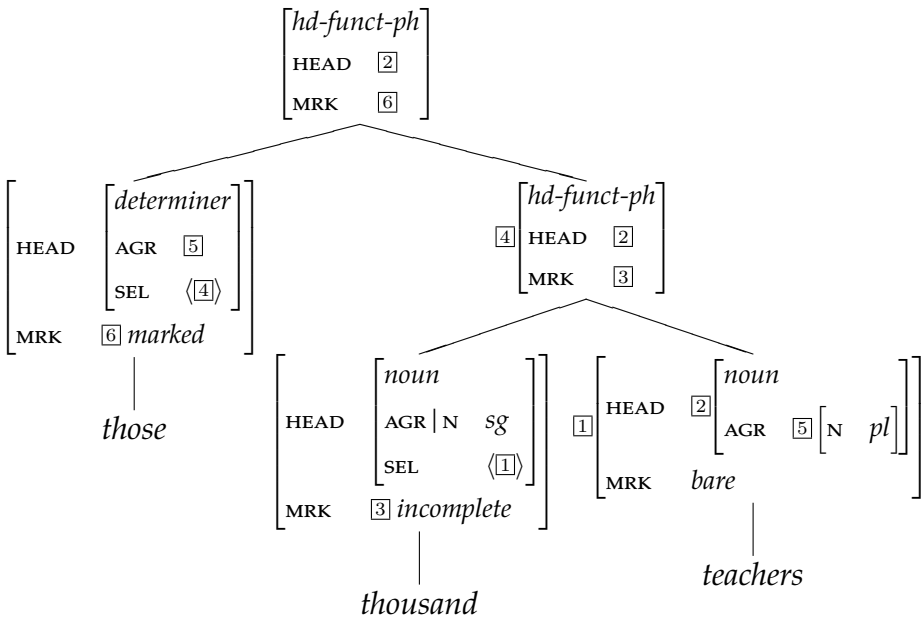
$$\begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{noun} & & & \\ \text{AGR} \mid \text{N} & \textit{sg} & & \\ \text{SEL} & \langle \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{noun} \\ \text{AGR} \mid \text{N} \quad \textit{pl} \end{bmatrix} \end{bmatrix} \rangle \end{bmatrix} \\ \text{MRK} & \textit{incomplete} \end{bmatrix}$$

- The SEL value in (16) indicates that the seminumeral selects a plural noun.
- The MRK feature of seminumerals has a value whose type is *incomplete*, which means that the word is incomplete on its own, requiring some sort of determiner.

Structure for *those thousand teachers*

- Our syntactic analysis of *those thousand teachers* is given in (17).

(17)



- In (17) *thousand* as a functor daughter selects the head daughter *teachers*, and the MRK value of the functor daughter is propagated to the mother node.

- The MRK feature has a value whose type is *incomplete*, which means that the expression is incomplete on its own, requiring some determiner.
- The *pl* value of AGR | N, which is propagated from *teachers* via the HEAD feature, enables this phrase to combine with the plural determiner *those*.
- It is important to note here that the determiner requirement of the seminumeral is fully satisfied by the plural determiner.
- Agreement mismatch does not occur here because the determiner and the seminumeral do not have a determiner-head relation. The determiner has an agreement relation with the plural noun *teachers* via the AGR | N feature.
- The plural agreement with the verb is accounted for in terms of the plurality of the head noun.

(18) a. (...), and when he's drunk **those hundred things** *become* a thousand.
(COCA[5]: FIC Bk:AftertasteNovel)

b. (...) **these thousand pages** *have* been gathered, (...)
(COCA: 2011 FIC Bk:GreatCircleMayfield)

c. **These dozen men** *have* been close enough to hear them.
(COCA: 1995 MAG SportingNews)

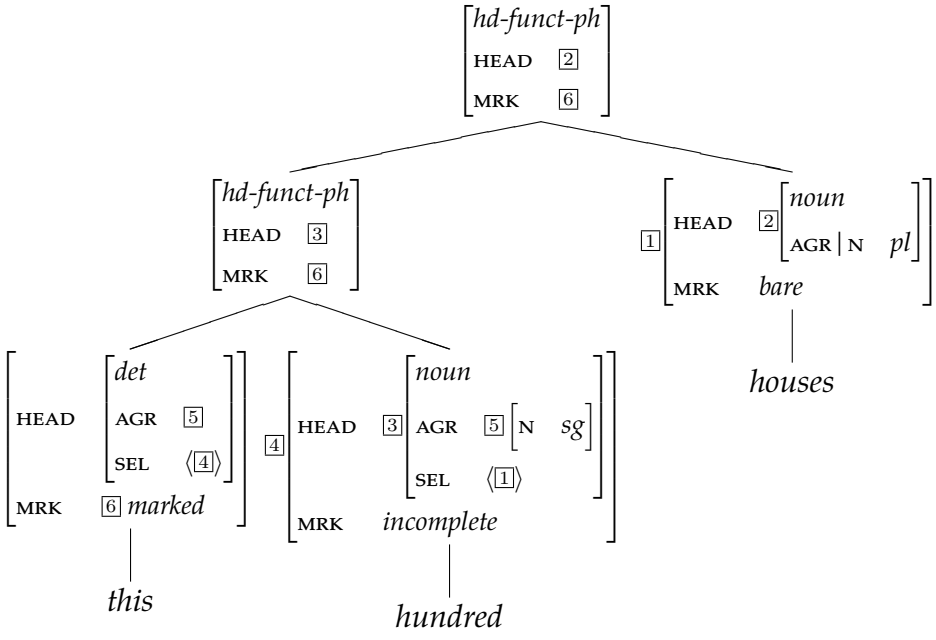
Structure for *this hundred houses*

- Our functor analysis of seminumerals can give an account of the data in (13), in which the seminumeral takes a singular determiner.

(19) a. that thousand pounds
b. this hundred houses [= (13)]

- (20) is a structure we propose for *this hundred houses*.

(20)



[5]Davies (2008–)

- The seminumeral first combines with the determiner as a head-functor phrase.
- The determiner should be singular because the head, *hundred*, is [AGR | N *sg*].
- The SEL value of *hundred* is inherited to the mother node via the HEAD feature.
- The phrase *this hundred* combines with the head noun *houses* to form another head-functor phrase.
- The subject-verb agreement can be accounted for in terms of the number of the head noun.

  (21) Let's see what **this hundred women** *make* of the question, do men hate women?
  (BYU-BNC: FL7 S_brdcast_discussn)[6]

- The following NPs have much the same structure as (20).

  (22) a. **A dozen men** *move* back and forth, (...) (BYU-BNC: G0F W_fict_prose)
  b. In Bombay, for instance, **every thousand people** *have* only 0.1 hectares of open space – and this includes traffic islands.
  (BYU-BNC: B7E W_non_ac_nat_science)

6 Further Data

'Plural Determiner plus *Sort*-Noun Construction' (PDSNC) (Maekawa 2015)

- In (23) the singular countable nouns *sort*, *kind* and *type* are preceded by the plural determiner.

  (23) a. these *sort* of skills
  b. those *kind* of pitch changes
  c. these *type* of races (Keizer 2007:170)

- A PDSNC subject causes plural agreement with the verb.

  (24) Well I'd actually expect that **those sort of courses** *are*/**is* very uh heavily subscribed uh, heavy just like **these sort of problems** *are*/**is* very hard to solve.
  (Keizer (2007:175); adapted from ICE-GB)

- The determiner can be singular, but the verb is plural.

  (25) a. **This kind of rankings** *have* given ammunition to conservatives (...)
  (COCA: 2001 NEWS CSMonitor)
  b. (...) **this type of women** *like* to be around rich and powerful men.
  (COCA: 2008 SPOK Fox_Gibson)

[6] If the head noun of the subject is a measure noun, the plural subject combines with a singular verb.

(i) **Five pounds** *is*/**are* a lot of money. (Hudson 1999:174)

The singular verb in the following example can be accounted for along the same lines.

(ii) ..., but **that thousand pounds** *is* not a sum that the firm can afford to lose.
(BYU-BNC: EV1 W_fict_prose)

7 Remaining Issues

- Spurious ambiguity

  (26) the hundred people

- Complex numerals (cf. Smith (1999))

  (27) a. two thousand students
  b. *two thousands students

- Slavic languages

  (28) Te / Tych tysiąc osób już
  these-PL,ACC / these-PL,GEN thousand-ACC people-GEN already
  przyszło.
  came-3RD,SG,NEUT
  'The thousand people already came' [Polish] (Przepiórkowski 1999:195)

8 Conclusion

- In HPSG it has been normally assumed that the SPR feature represents the constraints which the head imposes on the determiner, including the information about the determiner requirement of a singular countable noun and determiner-noun agreement.
- In the functor analysis, however, determiner-noun agreement and the determiner requirement are dissociated from each other: the former is represented as part of constraints which the determiner imposes on the head daughter, and the latter is encoded as the *incomplete* value of the MRK feature of the head daughter.
- This enables the plural determiner to satisfy the determiner requirement of a singular seminumeral while agreeing with the plural head noun in examples like *those thousand teachers*.

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