

# Seminumerals, determiners and nouns in English

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## 1 Introduction

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.<sup>1</sup> 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.

- (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)

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.

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). In this assumption a singular countable noun in English can be described as in (4) (cf. Sag et al. (2003:107), Kim (2004:1114), Kim & Sells (2008:108)).

- (4) 
$$\left[ \begin{array}{l} \text{HEAD} \left[ \begin{array}{l} \textit{noun} \\ \text{AGR} \boxed{1} [\text{N} \textit{sg}] \end{array} \right] \\ \text{SPR} \langle [\text{AGR} \boxed{1}] \rangle \end{array} \right]$$

The value of the *AGR* (AGREEMENT) feature represents information about morpho-syntactic properties of the expression. The *N* (NUMBER) value represents the information about the grammatical number, and the *sg* value indicates morpho-syntactic singularity. 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. Overall, (4) states that a singular countable noun should have a specifier which agrees with it in number. Thus it can capture generalisation (3) and account 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.<sup>2</sup>

In this paper we will first argue that the numeral quantifiers in (5) do not conform to generalisation (3). Then we will show that HPSG can provide a fairly straightforward account of the facts.

- (5) a. those *thousand* teachers  
b. these *hundred* women (BYU-BNC<sup>3</sup>)

Following Jackendoff (1977:126), we will refer to numeral quantifiers such as *hundred* and *thousand* as 'seminumerals'.<sup>4</sup> In the numerally quantified NPs in (5) the seminumeral is preceded by the plural determiner and followed by the the plural noun.

## 2 Problems

Before pointing out the problems that the numerically quantified NPs in (5) pose, we will show that seminumeral are sorts of countable nouns. First, the singular form of these words needs a determiner to be grammatical.

- (6) \*(a/the) hundred/thousand/million/billion/trillion/dozen people

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

<sup>1</sup>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*).

<sup>2</sup>\**These book* in (2b) also lacks specifier-noun agreement.

<sup>3</sup>Davies (2004-)

<sup>4</sup>Other examples of seminumeral are *million*, *billion*, *trillion* and *dozen*.

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

Thus, we can conclude that seminumerals are countable nouns.

Since a seminumeral is a type of countable common noun, the singular form requires a determiner. Now let us consider the NPs in (5) in more detail. In these NPs the only possible determiner that can satisfy the determiner requirement of the seminumeral is the one just before it: *those* in (5a) and *these* in (5b). The following data confirms it.

(8) \*(those) thousand teachers

(8) shows that the determiner is obligatory. Since *teachers* is a plural noun, it does not require its own determiner. We can conclude that the determiner is required by the seminumeral which is a singular countable noun (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) 
$$\left[ \begin{array}{l} \text{HEAD} \\ \text{SPR} \end{array} \left[ \begin{array}{l} \text{noun} \\ \text{AGR} \left[ \begin{array}{l} \boxed{1} \\ \text{N} \end{array} \right] \text{sg} \\ \text{MOD} \left[ \begin{array}{l} \text{HEAD} \left[ \begin{array}{l} \text{noun} \\ \text{AGR} \left[ \begin{array}{l} \text{N} \\ \text{pl} \end{array} \right] \end{array} \right] \end{array} \right] \end{array} \right] \end{array} \right] \right]$$

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.

Now the NPs in (5) pose two challenges for (9). First, there is no number agreement between the determiner and the seminumeral: the seminumeral is singular but the determiner is plural. The second challenge is that it looks as if the determiner agrees with the plural noun after the seminumeral. It is clear, then, that the NPs in (5) do not have the properties in (9).<sup>5</sup>

### 3 Analyses

The simplest modification to (9) would be to make the specifier agree with the plural noun that the seminumeral modifies.

(10) 
$$\left[ \begin{array}{l} \text{HEAD} \\ \text{SPR} \end{array} \left[ \begin{array}{l} \text{noun} \\ \text{AGR} \left[ \begin{array}{l} \text{N} \\ \text{sg} \end{array} \right] \\ \text{MOD} \left[ \begin{array}{l} \text{HEAD} \left[ \begin{array}{l} \text{noun} \\ \text{AGR} \left[ \begin{array}{l} \boxed{1} \\ \text{N} \end{array} \right] \text{pl} \end{array} \right] \end{array} \right] \end{array} \right] \end{array} \right] \right]$$

It might appear that this description could capture the data in (5). However, examples like those in (11) pose a problem.

(11) a. that thousand pounds (BYU-BNC: KCX S\_conv)  
 b. this hundred houses (BYU-BNC: J8G S\_interview\_oral\_history)

The examples in (11) have singular determiners. Thus, there is no number agreement between the specifier (*that / this*) and the head noun (*pounds / houses*). Accordingly, we will not pursue this 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 (5) can be accounted for if we assume that seminumerals preserve the grammatical number of the complement on the phrase. However, examples like those in (11) pose a problem for analyses along these lines too. In (11) 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. We conclude, then, that the weak/transparent head approach is unsatisfactory.

<sup>5</sup>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 *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 (8). (8) 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*.

We will turn to an analysis which we think provides a satisfactory account of the data. In this analysis determiners and seminumerals are functors: non-heads which select the head (Van Eynde 2006, Allegranza 1998). Let us consider how generalisation (3) is captured in this approach.

The combination of a determiner and a head nominal is an instance of a head-functor phrase, which is subject to the constraint given in Figure 1 (Van Eynde 2006:164,166). 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). This constraint 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.

Figure 2 shows how functor *this* combines with a singular countable noun. 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 [1] 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. The *AGR*|*N* value of *pen* is *sg*, indicating that it is a singular nominal.

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, whereas the determiner-noun agreement is represented by the shared value of the *AGR*|*N* feature between the determiner and the head noun. This is in clear contrast with the standard HPSG treatment given in (4), where the determiner requirement and the determiner-noun agreement are both represented in the *SPR* specifications of the head noun.

If we adopt this approach, we can propose that seminumerals have the following syntactic properties.

$$(12) \text{ hundred: } \left[ \begin{array}{l} \text{HEAD} \\ \text{MRK} \end{array} \left[ \begin{array}{l} \text{noun} \\ \text{AGR}|N \text{ sg} \\ \text{SEL} \left\langle \left[ \begin{array}{l} \text{HEAD} \\ \text{AGR}|N \text{ pl} \end{array} \right] \right\rangle \\ \text{incomplete} \end{array} \right] \right]$$

The *SEL* value in (12) 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.

Our syntactic analysis of *those thousand teachers* is given in Figure 3. The combination of *thousand* and *teachers* is an instance of a head-functor phrase. In Figure 3 *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*. The combination of the determiner with the head nominal is an instance of a head-functor phrase. Therefore, the *MRK* value *marked* is inherited from *those* to the top node.

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.

Our functor analysis of seminumerals can give an account of the data in (11), in which the seminumeral takes a singular determiner. Figure 4 is a structure we propose for *that thousand pounds*. In this case the seminumeral first combines with the determiner as a head-functor phrase. The determiner should be singular because the head, *thousand*, is [*AGR*|*N* *sg*]. The *SEL* value of *thousand* is inherited to the mother node via the *HEAD* feature. Thus, the phrase *that thousand* can combine with the head noun *pounds* to form another head-functor phrase.

## 4 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*.

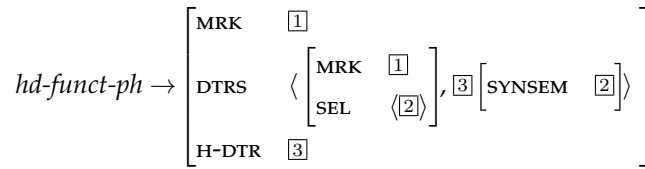


Figure 1: Constraint for head-functo phrase (Van Eynde 2006:164,166)

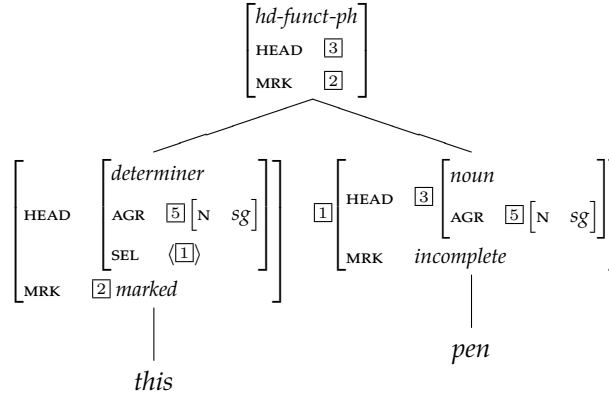


Figure 2: *this pen*

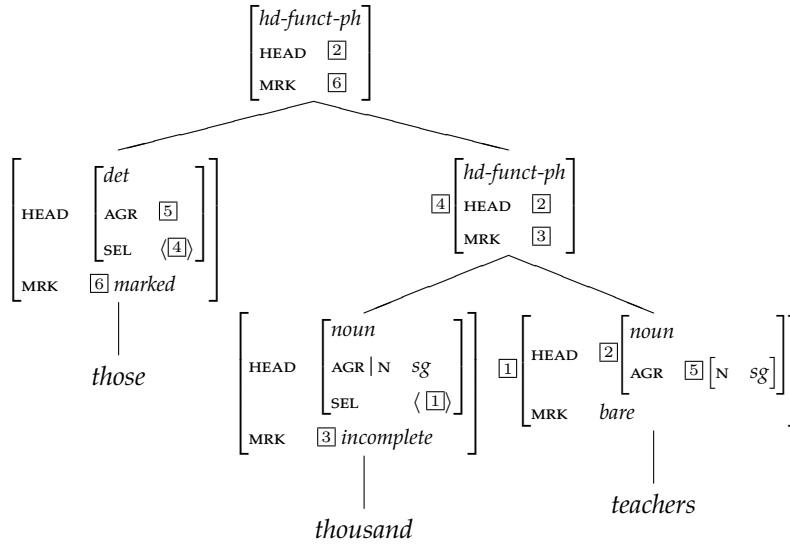


Figure 3: *those thousand teachers*

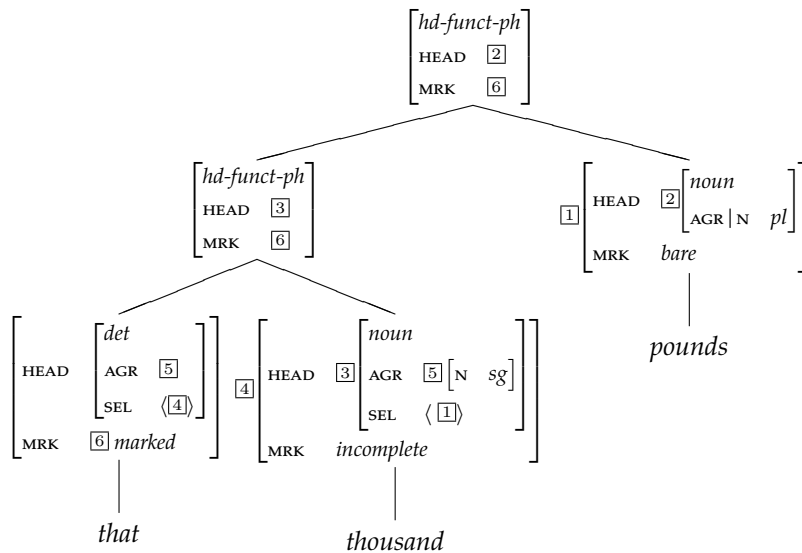


Figure 4: *that thousand pounds*

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