

# Plural Mass Nouns and the Morpho-syntax of Number

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## 1. Introduction

### 1.1. *The mass vs. count noun distinction*

As is well known, in a number of languages nouns fall into two main groups, see Jespersen (1909):<sup>1</sup>

- |     |    |       |            |      |
|-----|----|-------|------------|------|
| (1) | a. | book  | count noun | (CN) |
|     | b. | water | mass noun  | (MN) |

The two differ in a variety of ways. First of all, CNs are compatible with plural marking, MNs are not:<sup>2</sup>

- |     |    |             |
|-----|----|-------------|
| (2) | a. | the books   |
|     | b. | #the waters |

Second, there are systematic syntactic differences between the two classes. For instance, CNs are compatible with numerals, MNs are not (3a-b); moreover, CNs can co-occur with definite and indefinite articles (3c-d), MNs only with the definite article, see Gillon (1992):

- |     |    |              |    |
|-----|----|--------------|----|
| (3) | a. | two books    | CN |
|     | b. | #two waters  | MN |
|     | c. | the/a book   | CN |
|     | d. | the/#a water | MN |

As is also well known, there is a considerable amount of 'elasticity' that enables both CNs to occur as MNs and MNs to function as CNs (see 4):

- |     |                                      |                                 |
|-----|--------------------------------------|---------------------------------|
| (4) | There are three waters in the fridge | <i>3 types/bottles of water</i> |
|-----|--------------------------------------|---------------------------------|

To explain the above distribution, the following has been proposed: the morphological realization of plural has a semantic contribution. In particular, it makes reference to sums of individuals. Concretely, nouns that allow plural morphology qualify as atomic/individual (Borer 2005, Chierchia 2008). MNs are not atomic, they rather have cumulative reference; because of this, they are incompatible with numerals, as numerals count atomic individuals (Quine 1960, Krifka 1989).

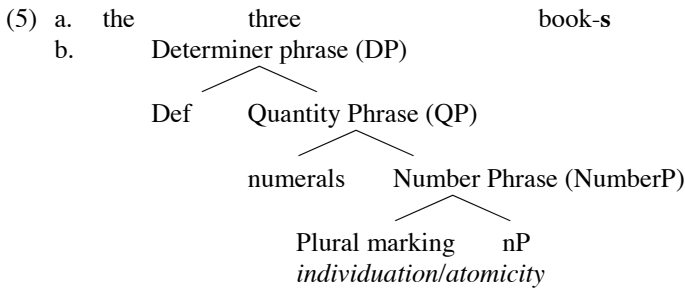
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\* Earlier versions of this paper were presented at the Conference on Converging Linguistic and Cognitive Science in Barcelona in September 2009, at the Workshop on Bare Nouns in Paris in November 2009, and at WCCFL 28 in Los Angeles in February 2010. I would like to thank the audiences for comments and discussion. My research was supported by a DFG grant to the project B1: *The formation and interpretation of derived nominals* as part of the Collaborative Research Center 732 *Incremental Specification in Context* at the Universität Stuttgart.

<sup>1</sup> Note that several researchers have argued that this distinction does not hold universally. For example, Indonesian has been argued to lack this distinction (Dalrymple & Mofu 2008), and Halkomelem Salish as well (Wiltschko 2009).

<sup>2</sup> See also Greenberg (1963), Mufwene (1981).

It is generally assumed that Number and numerals are part of the functional information within the extended projection of NP, see Grimshaw (1991), van Riemsdijk (1998), Abney (1987), Ritter (1991), Heycock & Zamparelli (2005), Borer (2005), Chierchia (2008), among many others (5a-b), but cf. Bouchard (1998), Dobrovie-Sorin (2009).



All the above crucially means that MNs are incompatible with plural morphology and/or numerals, unless type-shifting takes place, as in (4).

### 1.2. Two puzzles concerning MNs<sup>3</sup>

There are two puzzles concerning MNs that constitute the core of this paper. The first puzzle is that in Greek plural MNs can preserve their MN semantics (no type shifting takes place, see (6)).

- (6) epesan nera sto kefali mu Greek Tsoulas (2006)  
 fell-3pl water-pl on head my  
 ‘Water fell on my head’

(6) is unexpected given the remarks in section 1.1.

The second puzzle has to do with the behavior of argument structure supporting nominals. As Grimshaw (1990) argued in detail, argument structure nominals (ASNs) behave like MNs in that they disallow numerals, plural marking and are only compatible with the definite article. This behavior is illustrated in (7) below for English, but holds for Greek as well:

- (7) a. \*{the, some, a lot of} jumpings of the cow ASN  
 b. one jump, two jumps  
 c. \*One jumping of the cow was interrupted by the fireworks. ASN  
 d. One jump was disqualified.  
 e. the jumping of the cow was interrupted by the fireworks ASN  
 f. \*a jumping of the cow was interrupted by the fireworks ASN  
 g. a jump

Clearly, if plural marking on MNs is possible in a language (Greek), as seen in (6), then ASNs in this language should also allow plural marking. However, the crucial observation to be made here is that this does not hold: ASNs cannot pluralize. Pluralization is possible only under type shifting. When this happens, they are interpreted as R(eferential)-nominals.

The above distribution raises a number of questions about the function of plural marking as well as about the category Number, the morpho-syntactic structure of MNs and of the noun phrase in general and its compositional semantics.

<sup>3</sup> Early discussion of the first puzzle can be found in McCawley (1979), see also Corbett (2000), Ojeda (2005), Acquaviva (2008), Tsoulas (2006). The second puzzle has not been discussed in the literature, as far as I can tell.

### 1.3. The idea in a nutshell

In this paper, building on Acquaviva (2008), I will put forth a split analysis of plural Number. The idea is that there are two types of plural, a so-called grammatical plural and a so-called lexical plural.<sup>4</sup> The former is on the Number head in (5) and realizes a plural semantic feature. In combination with an NP it gives the interpretation 'more than one X'. The latter is on n (it is a categorizing head). It combines only with some roots, and it does not yield an interpretation 'more than one X'. On this view, plural MNs are simple nPs. The reason why ASNs are incompatible with what I call here 'lexical plural' is because both the nominalizing affix and lexical plural realize n, and hence are in complementary distribution.

## 2. Plural MNs

Plural MNs are not typologically rare (see Corbett 2000, (8-10) from Acquaviva 2008: 109ff., Kramer 2009):

- (8) The river discharges its water/waters into the lake  
 (9) xood **har-ramlaat** mən hoon *Syrian Arabic*  
 get the sand-pl here out  
 'get this sand out of here'  
 (10) **âb-â-ro** az kaf-e âšpaxune jam kon *Persian*  
 water-pl-acc from floor-prt kitchen gathering do  
 'Wipe away the water from the kitchen floor'

Note also that plural MNs are not pluralia tantum:

- (11) scissors, trousers, ...

### 2.1. The properties of plural MNs in Greek

Plural MNs have cumulative reference, pretty much like singular-MNs. Still, they agree with the verb in plural, (6). The question that arises is whether these nouns are really MNs. Tsoulas (2006) showed that this is indeed the case, as in combination with numerals and articles they behave exactly like their singular counterparts:

- (12) #Dio nera peftun apo to tavani *(possible only under type shifting)*  
 two waters fall from the ceiling  
 (13) mazepse ta rizia apo to patoma/#mazepse ena rizi apo to patoma  
 get the rice- pl from the floor/get one rice from the floor  
 'Wipe away the rice from the floor'

Tsoulas (2006) argued that plural morphology on Greek MNs is expletive. Here I present some arguments against this view. First of all, note that plural MNs do receive a different interpretation: 'a great amount of MN' (see the notion of 'greater plural' in Corbett 2000: 30f., Acquaviva 2008: 109ff.):

- (14) nero = water-sg vs. vivlio = book-sg *(Greek)*  
 nera = a lot of water vivlia = more than one book  
 water-pl book-pl

Second, there are a number of distributional restrictions concerning the behavior of plural MNs, which were observed for other languages in Acquaviva (2004a). For instance, plural MNs are found

<sup>4</sup> Following Acquaviva (2008), I use the term lexical plural here, cf. the distinction between "inherent vs. inflectional number" in Acquaviva (2004b). See also Lowenstamm (2007). Cf. Kramer (2009) who develops and then rejects a similar split analysis of Number in Amharic.



Merger with root implies negotiated (apparently idiosyncratic) meaning of the root in the context of the morpheme and apparent semi-productivity (better with some roots than others), while merger above functional heads implies compositional meaning predicted from the meaning of the stem and apparent complete productivity.

Here I will make use of this apparatus in order to account for the properties of MNs described in section 2.1. I propose a split-analysis of Plural number: grammatical plural and lexical plural. The former realizes atomization/individualization features and is on Number°, see also Barner, Wagner & Snedeker (2008), Barner & Snedeker (2008). It combines with an nP. Plural marking via NumberP happens outside the nP and in principle it is insensitive to the type of nP it combines with. The latter, on the other hand, is on n (the categorizing head). In other words, grammatical plural attaches to something that is a word, while lexical plural is involved in the word formation process itself. This crucially means that plural form should be separated from plural meaning (Beard 1995). Both types of plural are plural in form, but lexical plural is relatively limited in its distribution (i.e. it does not combine with all roots, but only in certain contexts and with a particular meaning):

- (18) a. Vivlia/books:  
 Number  
 Pl          n  
                 book  
 Semantics: [Pl (book)]
- b. Nera/water-pl:  
 n  
 Pl          √  
                 water  
 Semantics: [water & Pl]

From the point of view of interpretation, the plural form in (18b) does not take the reference of the predicate as its domain, it is rather part of the nP, see Acquaviva (2004a-b). Lexical plural is a realization of n, which competes with other possible n-Root combinations. The same root can combine with another [n] which is not intrinsically plural, and simply carries gender/class diacritics.

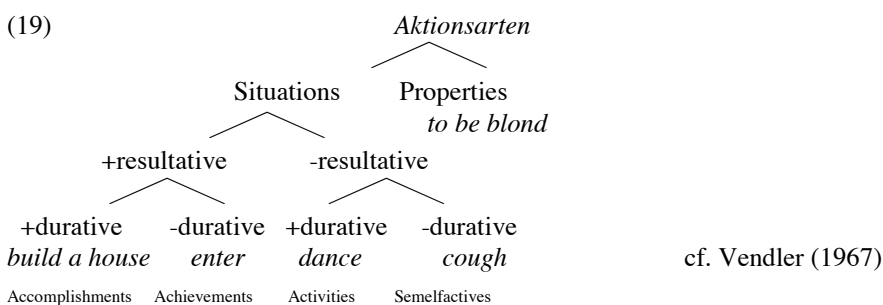
The above explains all the properties of plural MNs discussed in section 2.1, namely the distributional restrictions, the non-transparent/identical interpretation, and the fact that certain MNs are better than others. All of these properties are associated with root-cycle processes. Note that, as correctly observed in Acquaviva (2008), the hypothesis that number can be involved in word formation processes explains the existence of pluralia tantum as well as the fact that certain MNs receive an idiosyncratic interpretation, e.g. *holidays*.

Now, if plural can function as part of the nP predicate, then we expect a certain amount of interaction with other word formation processes. This becomes clear, when we turn to ASNs.

### 3. ASNs, Aktionsart and plural marking

#### 3.1. Aktionsart

As is well known, predicate types can be sub-classified as in (19):



Activities and properties are **atelic**, accomplishments and achievements are **telic**. A number of authors, e.g. Krifka (1989), Mourelatos (1978), Bach (1986) among others, have noted that the count-mass distinction in the domain of nouns is comparable to the ±telic distinction in the domain of verbs (related to ± cumulative reference).

The question then is how the nouns derived from these two classes behave.

### 3.2. ASNs

Several authors have pointed out that ASNs derived from telic predicates are CNs. On the other hand, nouns derived from atelic predicates are MNs, see Borer (2005), Alexiadou, Iordachioaia & Soare (2010), Barner, Wagner & Snedeker (2008). This is illustrated in (20) and (21) below for English:

- (20) a. John pushed the cart for 2 hours/\*in two hours  
 b. John pushed the cart to New York in two hours/\*for two hours
- (21) a. There was one pushing of the cart to New York by John  
 b. There was (\*one) pushing of the cart by John Borer (2005: 239f.)

### 3.3. Atelic ASNs and plural marking

In section 2, we saw that plural MNs are in principle possible in Greek (and in English). We thus expect that ASNs derived from atelic predicates (which are MNs) should be able to pluralize and still maintain their cumulative reference, i.e. there should be no type shifting involved. But, this is not borne out.

Let me illustrate this with English and Greek examples. *-ing* in English is incompatible with achievements and compatible with atelic predicates; accomplishments can combine with *-ing*, but then they receive a process-like interpretation, see Englehardt (2000), Borer (2005), Alexiadou, Iordachioaia & Soare (2010):

- (22) a. the sinking of the ships  
 b. \*the arriving of the train  
 c. the building of houses *process*

*-ing* nouns are MNs: they cannot combine with numerals, they do not tolerate plural marking and they can only occur with the definite article:

- (23) a. \*the fallings of the stock prices  
 b. \*a/one falling of the stock prices

Turning to Greek, Kolliakou (1995) noted that *-m-* affixation is a productive process to build nouns out of verbs, but it is sensitive to the type of verbal predicate it attaches to. It namely requires a durative verb.<sup>6</sup> (Note here that all nouns that contain *-m-* have neuter gender).<sup>7</sup>

*-m-* does not combine with stative predicates:

- (24) a. agapo (love-1sg)      b. pistevo (believe-1sg)  
 c. \*agapima (loving)      d. \*pistepsimo (believing) Kolliakou (1995: 211f.)

Activities are compatible with *-m-*:

- (25) a. perpatao                      b. to perpati-**m**-a  
 walk-1sg                              the walking

Accomplishments are compatible with *-m-* and receive a durative/atelic interpretation:

- (26) a. htizo ena spiti                      b. to htisimo enos spitiu  
 build-1sg a house                      the building of a house  
 c. zografizo ena kiklo                      d. to zografisma enos kiklu  
 draw-1sg a cricle                      the drawing of a circle

<sup>6</sup> See Fassi-Fehri & Vinet (2007) for a similar distribution in Arabic nominalizations.

<sup>7</sup> *-m-* and *-sim-* are allomorphs of the same morpheme, see Malikouti-Drachman & Drachman (1995). According to Ringe (2006: 61), *-m-* has its origin in the affix that used to build collective nouns in Proto-Indo-European *men*. According to Rijkhoff (1991), collective affixes realize nominal Aspect.

Kolliakou notes that even if the predicate is a telic one, as in the case of accomplishments, the *-m-* noun is interpreted as a process, i.e. it focuses on the +durative component of the event. Evidence for this comes from modification via "for-some-time"- phrases, which is in with *-m-* nouns:

- (27) to htisimo enos spitiu ja 10 hronia/\*se 10 hronia  
the building of a house for 10 years/in 10 years

Importantly, achievements are incompatible with *m*-affixation:

- (28) a. anagnorizo                      b. \*to anagnorisma              c. ftano                      d. \*to afigma  
recongnize-1sg                      the recognizing                      arrive-1sg                      the arriving

*-m-* nouns are MNs, as they are incompatible with numerals:

- (29) \*ena htisimo enos spitiu  
one building of a house

Importantly, however, unlike non-derived MNs, they cannot pluralize:

- (30) \*ta htisimata ton spition kratisan 5 hronia  
the building-pl of the house took 5 years  
(31) a. to kuboma tu paltu kratise 3 lepta  
the buttoning of the coat took 3 minutes  
b. \*ta kubomata tu paltu kratisan 3 lepta  
the buttoning-pl of the coat took 3 minutes

Plural marking is possible, but then the noun receives an R-(object) interpretation: *type shifting*. In this case, plural marking does what is supposed to do, according to Grimshaw (1990). It individualizes the noun and as a result only the R-interpretation is possible.

- (32) Agorasame diafora kubomata  
bought-1pl various buttons  
'We bought various buttons'

How can we explain this behavior within the same language? On the one hand, MNs combine with plural and are able to receive two interpretations, depending on which plural they combine with. A combination with grammatical plural leads to type shifting, while a combination with lexical plural leads to the 'a lot of' interpretation. On the other hand, ASNs, which are MNs, can only combine with grammatical plural, and as a result they always type-shift.

#### 4. The morpho-syntax of number

I noted in section 2 that the idiosyncratic interpretation of plural is found only with MNs. This led to the structural analysis in (33):

- (33) Input: Root + [ n = Plural]                      →                      nP

In section 3, I showed that *-m-/-ing* affixation is only possible with +durative predicates, it involves a change of category and is incompatible with lexical plural:

- (34) Input: VP + *-m-/-ing* on n                      →                      nP

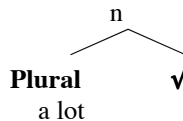
From this point of view, the similarity between lexical plurals and *-m-/-ing* is that they build new words and are not compatible with all sorts of input. As already pointed out in the previous section, MNs and atelic predicates are both cumulative (see also Rijkhoff 1991, 2002). Thus the function of *-m-*

*-ing* and lexical plural is to categorize a unit with cumulative reference. In the case of MNs, this unit is the root, in the case of ASNs this is the underlying VP, following Alexiadou (2009).

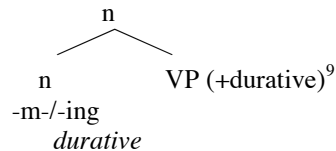
This is illustrated in the two structures in (35) and (36). As argued in section 2.2., there are two places for plurality,<sup>8</sup> plural on number (35) and plural on n (36a). If we now compare (36a) to the nominalization structure in (36b), we note that *-m/-ing* as well as lexical plural both realize an n head. They compete for insertion; since they have different conditions on insertion, a double marking is blocked.

(35) [DP [QP numerals [NumberP **Plural** [nP ]]]]

(36) a.



b.



## 5. Summary

In this paper I put forth a split analysis of plural Number marking.<sup>10</sup> Specifically, I argued that grammatical plural realizes a feature on the Number head, associated with the semantics of plurality. Lexical plural is on n, and gives rise to idiosyncratic readings of MNs. Mass nouns which are ASNs (derived from verbs) can only pluralize via grammatical plural, and are incompatible with lexical plural. This is so as both the nominalizer and lexical plural realize the categorizing head n.

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<sup>8</sup> This is similar to outer Aspect in the domain of verbs/eventualities, cf. Rouveret (1994), Rijkhoff (2002).

(i) [TP (Tense phrase)Aspect phrase]VP

<sup>9</sup> The VP here could contain a complex internal structure, see Alexiadou (2009), Borer (2005), Ramchand (2008).

<sup>10</sup> Number is not the only category that shows this duality. Recently it has been argued that diminutives also show a similar partition (de Belder, Faust & Lampitelli 2009).



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