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COUNTING AND DEGREE MODIFICATION*

ABSTRACT

This paper defends the hypothesis that number and classifiers behave differently in nominal and in verbal structures. When numerals are used in order to 'count' a number of objects or events, they interact differently with nouns and verbs (compare *three visits* with *to visit three *(times)*). Degree modifiers, on the other hand, behave rather similarly in the nominal and in the verbal domains (compare *a lot of visits* with *to visit a lot*). The paper discusses the source of this difference. In many languages, numerals require the presence of classifiers and/or number, while degree modifiers are sensitive to cumulative reference, a property shared by nominal and verbal structures. Given the hypothesis that nouns and verbs interact differently with number and classifiers, the different behaviour of numerals with nouns and verbs can be understood.

KEYWORDS

Nominal and verbal number, numerals, degree expressions, count/mass distinction, typology.

1. Outline

The goal of this paper is to make a comparison between the way counting expressions are used in nominal and in verbal structures. I will make a distinction between counting in a strict sense, as in (1a), and 'vague' counting by means of a degree expression, as in (1b):

(1) a. two elephants, three books
b. a lot of elephants, a lot of books

The main difference between these two cases is that the numerals in (1a) indicate a precise quantity, whereas the number of elephants and books in (1b) depends on a contextually given norm (see e.g. Westerståhl 1985; other degree expressions, such as *more* make use of a contextually introduced reference point).

When combined with mass nouns rather than with count nouns, the difference between the two types of expressions is striking. In order to combine a mass noun with a numeral one has to add a measure phrase or unit term, such as *gram* or *bottle*, or the noun has to be transformed into a count noun, as reflected by the use of a plural:

(2) a. two grams of salt, three bottles of beer
b. two beers

Degree expressions that indicate a quantity are usually freely combined with mass nouns.[1] However, they do not indicate a number of objects, as in (1b), but rather a global quantity:

(3) a lot of salt, a lot of wine

Turning now to the verbal domain, it may be observed that numerals cannot directly combine with verb phrases while degree expressions can. In order to count events by means of a numeral, the element *times* has to be inserted. This element resembles the unit terms *gram* and *bottle* in (2a), but has to be used with both 'count' and 'mass' VPs, as illustrated by (4a) and (4b) respectively:

(4) a. They met three times
b. He laughed three times

Degree expressions do not need insertion of *times*; they combine with count and mass VPs alike. Counting occurs in the presence of a count verb phrase.

(5) a. They met each other a lot (≈ large number of times)
b. He laughed a lot (≈ a lot of laughing)

In what follows, the two ways of counting will be compared in more detail, first for the nominal system and then for the verbal system, focusing on the role of number (singular vs. plural), the presence vs. absence of elements such as *kilo(s)* and *times*, and the count/mass distinction. Comparing the results for nouns and verbs, it will be argued that counting in the strict sense is a nominal affair.

2. The nominal domain

This section deals first with numerals in combination with count nouns. Then the use of unit terms will be discussed, and finally the distribution and meaning of degree expressions in combination with mass and count expressions. Note that the use of the terms 'count noun' and 'mass noun' will not imply that the noun has a feature [+count] or [+mass], but rather that, given the context where it is used, it has a count or a mass interpretation.

2.1. Counting in a strict sense: numerals and count nouns

When looking at the distribution of numerals in the context of count nouns, languages vary with respect to the strategy they use for combining the numeral and the noun. It seems that there are three major strategies: a. combining the numeral with a noun that is marked for number, b. combining the numeral and the noun via a so-called 'numeral classifier' and c. combining the numeral and the noun directly. The examples in (6a,b) illustrate the first two strategies, that are used in English and Mandarin respectively. Finally, there are languages such as Tagalog, where the numeral combines directly with the noun, without number or a classifier being present (6c) (see Schachter & Otanes 1972, Gil 2005).

(6)	a.	three apples		[English]
	b.	san ge	pingguo	[Mandarin]
		three cl	apple	
	c.	dalawa-ng	mansánas	[Tagalog]
		two-linker	apple	

As for mass nouns, all of these three languages require insertion of a measure term, resulting in a structure that is at least superficially similar to the one in (6b) (but see Cheng & Sybesma 1999). A *ganta* corresponds to three litres.[2]

(7)	a.	two kilos of rice	[English]
	b.	liang jin mi	[Mandarin]
		two kilo rice	

c. dalawang salop na bigas [Tagalog]
two-LINKER ganta LINKER rice
'two gantas of rice'

In the seventies, an important generalization was made with respect to the distribution of numeral classifiers (*ge* in (6b)) and number marking on the noun (plural *–s* in (6a). These generalization was put forward by Greenberg (1972: 286), citing an unpublished paper by Mary Sanches, and by Sanches & Slobin (1973).

(8) *The Sanches-Greenberg-Slobin generalization*
'If a language includes in its basic mode of forming quantitative expressions numeral classifiers, then […] it will not have obligatory marking of the plural on nouns' and as a result 'the classified noun itself is normally […] not marked for number'

Note that in Sanches' original version, the second part of the generalization in (8) made reference to plural marking. That is, in her view, classified nouns are singulars. Greenberg reinterprets this in terms of lack of number marking. I will follow Greenberg in this respect, and I will assume that mass nouns do not bear number either (see also section 2.2 below). Moreover, I will assume that singulars correspond to a set of singularities and plurals to a set of pluralities. Nouns that are not marked for number denote a full join semi-lattice, including both singular and plural individuals or portions of matter, and as such they are semantically underspecified for singular or plural number (cf., among others, Link 1983, Krifka 1986 and Chierchia 1998). This semantic approach allows us to distinguish between expressions that do have cumulative reference (plurals and nouns that are not marked for number) as opposed to those that do not (singulars). [3]

Greenberg argues that languages with number marking on nouns may use classifiers in combination with nouns such as *cattle*, that also lack number marking. In his view, *head*, in *two head(s) of cattle* is very close to classifiers such as *ge* in the Mandarin example in (6b). In his view, the emergence of a numeral classifier language might be due to a general use of structures of this type after a general loss of compulsory number marking on the nouns. This hypothesis has been confirmed by historical data from Mandarin (Peyraube 1995) and Kana (Ikoro 1994).

The idea that obligatory number marking on nouns and the generalized use of classifiers are mutually exclusive has been accounted for in various ways in the literature, all of which imply a certain view on the count/mass distinction. Note first that classifier-like elements play a role in creating counting units for mass nouns in non numeral classifier languages, as in *two drops of water*. This observation has lead to the assumption that the noun *pingguo* 'apple' in (6b) could actually be considered to be a mass noun as

well. According to what one could call the 'parametric account', the presence versus absence of count nouns explains the distribution of classifiers and number. In a language such as English, there are count nouns and mass nouns. Count nouns are marked by number, and may combine directly with numerals. Mass nouns need insertion of a measure word or unit term. In numeral classifier languages there are no count nouns, and as such, one needs always a classifier or a measure word to introduce countability. The parametric approach has been defended by, among others, Lucy (1992).

Borer (2005) generalizes the idea that certain languages only have mass nouns to all languages. In her view number and classifiers are two means to turn a mass meaning into a count meaning. The count/mass distinction does not play a role at a lexical level, but syntax introduces count structures (see also Kwon & Zribi-Hertz 2004).

Another way of looking at the mass-count distinction across languages in a non parametric way is by assuming that the mass count distinction plays a role in all languages, regardless of the way numerals are integrated in the syntax. I will call this the lexicalist approach. Many authors working on numeral classifier languages, including for instance Greenberg (1972), Cheng & Sybesma (1999) and Grinevald (2004), assume the existence of a lexical count/mass distinction in numeral classifier languages. In Doetjes (1997) I argue that the alternation between number and classifiers may be explained within such an approach by assuming that both number and the classifier introduce a grammatical marker of countability. Numerals in numeral classifier languages and in number marking languages would then require the presence of such a formal grammatical marker, in addition to a count meaning of the noun (see Doetjes in progress for a semantic variant of this account). In this paper I will take the lexicalist point of view as point of departure, mainly because the count/mass distinction as well as plurality do play a role in Numeral classifier languages, as illustrated in the next section.

In what follows I will discuss the distribution of numerals and plurals in the three types of languages in (6) in relation to the generalization in (8).

2.1.1. Numeral classifier languages

Given the generalization in (8), numeral classifier languages lack compulsory number marking on nouns, not number marking in general. Going back to the example of Mandarin Chinese, one can observe that all nouns have a number neutral or a mass interpretation. From a semantic point of view, all nouns have cumulative reference.

However, number is not absent from the language. It is marked for instance on pronouns. As shown by Li et al. (2006), a pronoun may determine whether its antecedent noun is interpreted as having singular or plural

reference, as illustrated in the Mandarin example in (9). When the singular pronoun *ta* is used, the plural interpretation of *bi* is excluded and this holds *mutatis mutandis* for the plural pronoun *tamen*.

(9) Wo mai-le bi. Wo ba ta/tamen songgei ni
I buy-ASP pen. I BA it/them give you
'I bought a pen/pens. I am giving it/them to you'

According to (8), the general use of numeral classifiers does not imply that the language does not have obligatory number, nor that it does not have number marking as a flexional affix on the noun. If number marking is compulsory, it should not be realized as a suffix on the noun, but as a plural clitic or a plural determiner, for instance. If a language has number suffixes on the noun, the generalisation predicts that number marking is not compulsory. One could assume that both possibilities imply that the non-plural noun is not, or not necessarily a real singular. If number marking is not realized on the noun, the noun itself is number neutral. If number marking is not compulsory, the non marked noun should be allowed to have a number neutral interpretation as well, possibly next to a singular interpretation.

An example of a numeral classifier language where number is marked on the noun in Nivkh. As predicted, number is not obligatorily present in this language (Gruzdeva 1998: 17). In Taba and Mokilese, two Austronesian languages that make general use of numeral classifiers, number is obligatorily present, but it is not realized as a suffix on the noun. In Mokilese it shows up on the demonstrative determiner. In Taba the plural marker is a clitic. It seems reasonable to assume that these languages share with Mandarin the use of number neutral nouns. Number may be marked, but there is no opposition between singular and plural *nouns*.

To conclude this brief discussion of number and classifiers in numeral classifier languages, it is clear that plurality may play a significant role in these systems. What these languages have in common is a general use of number neutral nouns.

2.1.2. Non marking languages

As already indicated above, a language such as Tagalog allows for a direct combination of nouns and numerals. In some languages number does not even play a role in the grammatical system of a language, while classifiers are not used either. This is the case in for instance Yidiŋ, where, according to Dixon 1977, the difference between singular and plural is never expressed by grammatical means. The existence of a language such as Yidiŋ and Tagalog are in accordance with the generalization of Sanches and Greenberg above. These languages lack obligatory number marking on the noun, and as in the

case of Yidiŋ, they may have hardly any reflexion of number in their grammatical system. Note that languages that do not make use of either number marking or classifiers in the context of numerals are rather frequent, in particular in the area of Australia-New Guinea (e.g. Yidiŋ, Kombai) and South East Asia (Tagalog). They also occur in West Africa (Yoruba) and South America (Quechua) (cf. Haspelmath et al. 2005).

Non marking languages are usually not taken into account in the literature on the count/mass distinction. It is clear that numerals in these languages have different properties from numerals in the other two types of languages. Within the 'lexicalist approach' adopted here, one has to assume that numerals in this type of languages differ from numerals in the other two types in such a way that they may directly combine with non marked nouns (that is, nouns that are neither singular nor plural). As these languages do seem to make a distinction between count and mass structures (cf. (6c) and (7c) above), a similar assumption has to be made within a Borer-type approach or a parametric approach.

An important property of non marking languages, which they share with the numeral classifier languages, is that they lack true singular nouns. As in numeral classifier languages, nouns in these languages are not marked for number, and contrary to singular nouns, these unmarked nouns have cumulative reference.

2.1.3. Number marking languages

In number marking languages, numerals combine with nouns that are singular or plural. English is an example of a language in which numerals combine with plurals, while Breton nicely illustrates the possibility of numerals that combine with singular forms only.

(10) a. ugent aval/ gwezenn [Breton]
twenty apple/ tree
'twenty apples/ trees'
b. *ugent gwezennoù
twenty trees

The form *gwezenn* is a so-called singulative form, which is derived from the collective noun *gwez* 'trees', which shows that we are dealing with a real singular here. The singulative can be turned into a plural, yielding *gwezzenoù* 'trees', as in the ungrammatical example (10b). In number marking languages count nouns are always marked for either singular or plural number. I assume that singulars differ from non number marked forms in that they denote a set of singularities, and as such do not have cumulative reference.

When a noun that usually has a mass reading is combined with a numeral, it has to get a count interpretation, for instance 'type of N' or 'small object made of N', and it needs to be marked for singular or plural number. Such a 'mass to count shift' is usually possible (Bunt 1985 calls this the 'universal sorter'), but not always, as illustrated by the examples in (11):

(11) a. deux riz différents [French]
two rices different+pl
b. twee verschillende *rijsten/ soorten rijst [Dutch]
two different rices/sorts rice

In order to keep a mass interpretation of the noun when it is combined with a numeral, a measure or other counting unit has to be inserted, as in (12). I will refer to these expressions by the very general notion of 'unit term', to avoid the use of the term 'classifier' in languages that do not make general use of numeral classifiers. The unit term is usually an ordinary noun, and takes number marking in the same way as other nouns.[4]

(12) two kilos of rice, a bottle of milk

Unit terms may also combine with plural nouns, as illustrated by *two kilos of peanuts* and *three pairs of shoes*. Interestingly, this implies that the unit term has scope over the plural, that is, each instantiation of the unit term consists of a plurality of N. Some unit terms combine with both mass nouns and plurals (*kilo*), while others only combine with nouns that denote a plurality (*pair*), and as such trigger a count interpretation on the noun. Quite in general, unit terms do not combine with singulars.[5] This generalization can be stated in terms of cumulative reference as well, given the definitions of singulars, plurals and unmarked nouns in section 2.1. As singulars are the only ones that lack cumulative reference, one could state that unit terms combine with expressions that have cumulative reference.

Besides count nouns and mass nouns one can distinguish a third type of nouns in number marking languages. These nouns resist number marking, while they have a count-like interpretation. They have been referred to by the term 'collective nouns' above. Examples are *furniture*, *footwear* and *cattle*. As expected on the basis of their lack of number marking, these nouns cannot combine directly with a numeral. They usually require insertion of a unit term that is very similar to the count classifiers in numeral classifier languages. Recall that Greenberg suggests that collective nouns are closely related to count nouns in numeral classifier languages (section 2.1 above). *Piece* and *head* in (13) select the default unit of counting corresponding to the nouns *furniture* and *cattle* respectively. Note also that in some cases, they allow for the use of a unit term that normally combines with a plural (*pair*).

(13) one piece of furniture, three head(s) of cattle, a pair of footwear

To summarize, numerals in number marking languages combine with either singular or plural nouns; nouns that do not bear number (mass nouns and collective nouns) need the presence of a unit term. If plurals are used in combination with a unit term, the latter must have scope over it. As in the case of numeral classifiers, the noun following the unit term has cumulative reference: the noun is either not marked for number or it is a plural. True singular count nouns are excluded in this context.

2.1.4. Concluding remarks

In what precedes, the distribution of number, numeral classifiers and numerals has been discussed in the light of the Sanches-Greenberg-Slobin generalization in (8). Elaborating on the second generalization, I will assume that a noun that is not marked for number has cumulative reference, which results in a collective or mass reading. Unit terms and classifiers are found in the context of expressions that have cumulative reference; they do not occur with singulars. This additional generalization will turn out to be important when the nominal and the verbal domain are compared to one another in section 3.

2.2. (Vague) counting and degree modification

The second type of 'counting' that will be considered in this paper makes use of degree modification. Some examples are given in (14). These examples show that a degree expression such as *a lot* can correspond to 'a large number' in the context of count nouns, and in the context of collective nouns, but not in the context of a mass noun. As a result, vague counting is only found in the context of plurals and collective nouns.

(14)	a.	a lot of books	(large number of books)
	b.	a lot of furniture	(large number of pieces of furniture)
	c.	a lot of sugar	(large quantity of sugar/ no counting)

The difference between a 'counting' interpretation and a 'global quantity' interpretation has a truth-conditional effect in cases such as (15) (see Gathercole 1985, Doetjes 1997). In the first sentence, the number of chocolates that Peter ate is larger than the number of chocolates that John ate. This is not equivalent to saying that Peter ate more chocolate, as the chocolates John ate might be bigger than the ones eaten by Peter.

(15) Peter ate more chocolates than John ↛
Peter ate more chocolate than John

Interestingly, as shown by a psycholinguistic experiment reported in Barner & Snedeker (2005), collective nouns behave like plurals in this respect, as illustrated by the equivalence in (16). It is impossible to say that Barbie has less furniture than us if she has more pieces, even if the global quantity (weight, volume) of Barbie's furniture is much smaller.

(16) Barbie has more furniture than us ↔
Barbie has more pieces of furniture than us

These facts are actually quite interesting for the type of approach one would like to choose for the count/mass distinction in various languages. Somehow, the meaning of a noun like *furniture*, even though it behaves like a mass noun, must give us information about what units count as minimal *furniture* parts. This corroborates the fact that a leg of a chair cannot be called a *piece of furniture*. These observations are problematic for accounts of the count/mass distinction that do not acknowledge the existence of a difference between count and mass meanings at a lexical level.

Contrary to numerals, degree expressions in numeral classifier languages often do not take a classifier. This is illustrated in (17) for the numeral classifier languages Mokilese and Mandarin:[6]

(17) a. jipid mihnwai [Mokilese]
few foreigner
b. ooaujoangoan dir mwani arai wa
very much money they carry
c. hen duo (*ben) shu [Mandarin]
very much CL^{volume} book
d. hen duo (*wan) tang
very much CL^{bowl} soup

As shown in (17c,d), the use of the classifier is even excluded in Mandarin.

Degree expressions cannot be combined with singulars, and typically combine with expressions that have cumulative reference. In this respect, they are similar to classifiers and unit terms, which do not combine with singular count nouns either. In (18c), *book* can only be interpreted when it gets a mass reading :

(18) a. a lot of books/ more books
b. a lot of soup/ more soup
c. #a lot of book/ more book

Some very nice evidence for the difference between numerals and degree expressions comes from Breton. As shown in section 2.1.3, Breton numerals select singular noun phrases. Plurals are not allowed in this context. In the context of a degree expression, however, plurals are found, as shown in (19) (Mélanie Jouitteau, p.c., Hamon 1984) :

(19) kalz / un nebeud ger-ioù [Breton]
a.lot/ a few word-PL

To conclude this section, the source of counting in the case of 'vague' counting by means of a degree expression is not the degree expression itself, but rather the semantics of the noun : nouns introducing an atomic structure (plurals and collective nouns such as *furniture*) trigger counting, while nouns that do not (real mass nouns) yield a global quantity reading. Moreover, it was argued that degree expressions combine with nouns that have cumulative reference.

3. Counting in the verbal domain

In this section, the findings of the previous section will be compared to 'counting' in the verbal system. In section 3.1 I will first discuss degree expressions, as these turn out to behave rather similarly in the nominal and in the verbal systems. As will be shown in section 3.2 this is not true for counting in a strict sense.

In what follows, I will take as point of departure the theories of Bach (1986) and Krifka (1986), who claim that there is a similarity of the nominal and the verbal domains. Activities (*to sleep*, *to walk* etc.) are similar to mass nouns, while accomplishments and achievements are similar to count nouns.

3.1. Counting and degree modification

The examples in (20) illustrate that *a lot* results in a counting interpretation in the context of both the count predicate *to go to the movies* and the count noun *horses*. As I argued in Doetjes (2006), this is due to a plural interpretation of the predicate *goes to the movies* and *horses*. The modifier *a lot* in (20a) picks out those plural events that contain a large number of movie visits; the context determines what counts as a large number. Similarly, if *horses* may correspond to any plurality of horses, *a lot of horses* restricts this to pluralities that constitute large numbers of horses.

(20) a. Sylvia goes to the movies a lot → many visits
b. a lot of horses → large number

In the context of a mass predicate, the 'large number' reading disappears. As the predicate does not introduce an atomic structure, the way a large quantity is evaluated does not take into account the different subevents. For instance, (21a), may describe one, rather long, sleeping event. What is evaluated is the global quantity of sleeping activity by John. Similarly, in (21b), *a lot* specifies that the quantity of soup we are talking about is rather large.

(21) a. John slept a lot
b. a lot of soup

As shown in section 2.3, degree expressions do not combine with singular nouns, which has been attributed to the type of meaning of a singular (a set of singularities/ lack of cumulative reference). As its semantics does not result in a partially ordered set of sums that have various sizes, the degree expression cannot be interpreted.

In the verbal domain similar effects may be found. Individual level predicates, for instance, do not allow for a plural interpretation. De Swart (1991) treats them as *once only* predicates, and in that respect these predicates can be taken to have inherently singular reference. Other *once only* predicates are for instance *to write this book*, where *this book* has a token reading. As expected, these predicates cannot be combined with degree expressions, as shown by the French examples in (22):

(22) a. #Isabelle sait beaucoup l'anglais
'Isabelle knows English a lot'
b. #Isabelle a beaucoup écrit ce livre
'Isabelle has a lot written this book'

The *once only* predicates are comparable to nouns that have a unique reference, such as *sun*, and in that sense they correspond to a singleton set. Ordinary singulars, such as *book* denote sets of singularities that usually contain more than one member. This type of semantic structure can also be found in the verbal system, if we take into account predicates with an indefinite object in its token reading. Take for instance the example in (23).

(23) Isabelle a acheté deux kilos d'olives
Isabelle has bought two kilos of olives
'Isabelle bought two kilos of olives'

As shown by the informal representation in (24a), the predicate *buy two kilos of olives* cannot refer to more than one event of buying two kilos of olives. As soon as several subevents of buying two kilos of olives would be involved, the event as a whole would not correspond to buying two kilos of olives, but rather of buying six or eight kilos of olives, depending on the number of subevents. The only way the predicate could get a plural interpretation is by having a referential reading for *deux kilos d'olives*, as illustrated by (24b):

(24) a. acheter deux kilos d'olives^{x} + acheter deux kilos d'olives^{y} $\neq$
acheter deux kilos d'olives^{x+y}
b. acheter deux kilos d'olives^{x} + acheter deux kilos d'olives^{x} =
acheter deux kilos d'olives^{x}

Given that the referential meaning is hardly available in the context of this predicate, the predicate will usually have a singular interpretation similar to that of a noun such as *book*, that is, a set of singular events corresponding to buying two kilos of olives each. As expected, the use of *beaucoup* is not possible in combination with this predicate:

(25) #Isabelle a beaucoup acheté deux kilos d'olives
Isabelle has a lot bought two kilos of olives
'Isabelle bought two kilos of olives a lot'[7]

As shown in (26), *beaucoup* differs in this respect from *souvent*, which can be combined with a predicate that has singular reference, unless the predicate has unique reference, which explains the contrast between (26a,b) and (26c) :

(26) a. #Isabelle sait souvent l'anglais
#'Isabelle often knows English'
b. #Isabelle a souvent écrit ce livre
#'Isabelle often wrote this book'
c. Isabelle a souvent acheté deux kilos d'olives
'Isabelle often bought two kilos of olives'

In Doetjes (2006) I argue that *souvent* can be combined with a singular predicate. Contrary to *beaucoup*, it can take scope over an indefinite, much in the same way a quantified noun phrase does.

Summarizing the findings in this section, the use of *beaucoup* as a modifier of the VP is only possible if the predicate has cumulative reference, that is, the predicate should be either interpreted as a mass or as a plurality; if this type of interpretation is not available, the use of *beaucoup* is blocked. Comparing the nominal and the verbal systems, it is clear that there are differences between the way mass and count, singular and plural come about, but on the other hand, the distribution of the degree expressions with respect to the type of meaning found for the modified noun or verb phrase is similar.

3.2. Strict counting

Consider now the examples in (27), where numerals are used. It is clear that neither English, nor French nor Dutch allows for a direct combination of the noun and the verb phrase, independently of whether the predicate is mass or count:

(27) a. John went to the movies *three* **times** [English]
b. John slept *three* **times**
a'. Jean est allé *trois* **fois** au cinéma [French]
b'. Jean a dormi *trois* **fois**

a''. Jan is *drie* **keer** naar de bioscoop gegaan [Dutch]
b''. Jan heeft *drie* **keer** geslapen

At first sight, these facts can be explained by the following hypothesis: English, French and Dutch behave like numeral classifier languages in as far as the verbal domain is concerned. There is no opposition between singular and plural (only number agreement with the subject) and at the same time one has to always use a numeral classifier (*fois*, *times*, *keer*). This hypothesis basically presupposes that the Sanches-Greenberg-Slobin generalization may be extended to the verbal system. In what follows, I will first discuss the predictions of this first hypothesis, and I will show that they do not seem to be borne out. Then I will present an alternative, which presupposes that the Sanches-Greenberg-Slobin generalization is about the nominal system only.

The hypothesis according to which English, French and Dutch are like Mandarin in as far as their verbal system is concerned makes two important predictions. In the first place, if there are numeral classifier languages in the verbal system, one might expect to find 'number marking languages' and 'non marking languages' as well. In the second place, given that classifiers combine with expressions that have cumulative reference, one would expect the verb phrases that are modified by an expression of the form 'numeral + time(s)' to have cumulative reference as well.

As for the first prediction, it is not surprising that the three languages considered in (27) are all of the 'numeral classifier' type, even though these languages do not make use of numeral classifiers in the nominal system. Given that the numerals in these languages need countability to be marked on the expression they modify and given that none of these languages makes use of semantic number marking on verbs, one may predict that these languages behave like numeral classifier languages as far as their verbal system is concerned. But this leaves unanswered the question of whether 'verbal' number marking languages exist. Below a few languages will be examined that have semantic number in their verbal system.

A first example of such a language is Hausa. Hausa is known to have so-called 'pluractional' verbs (Newman 1990). The phenomenon of verbal plurality is often compared to that of nominal plurality, even though most authors are fully aware of the differences between pluractionality and number flexion in a language such as English (see Corbett 2000). Hausa pluractionals, as in many other languages, are formed by reduplication. For instance, *taaràa* 'to gather' can be pluralized into *tattàaraa* 'gather many/ many times'. Without specifying the more precise – and rather complicated – semantic effects of pluractionality, I will only consider the way pluractionals interact with counting in the verbal system. As noted by Newman (2000), numerals may be used to modify verbal predicates in two different ways. In the first

place, the unit term *sàu* 'time' may be used, and in the second place, a cognate object structure may be used, in which the verb is followed by a verbal noun, which is directly modified by the numeral (both strategies are found in other languages as well). The two types are illustrated in (28) :[8]

(28) a. Sun ci jarràbâawaa sàu ukù
they eat exams time three
'They passed exams three times'

b. Taa zàagee shì zaagìi ukù
she insult him insulting three
'She insulted him three times'

It is clear that the Hausa pluractionals should not be compared to flexional number morphology on the noun in a language such as English. The impossibility to directly combine the numeral and a pluractional is in accordance with the common assumption that the pluractional is not flexional but rather a productive derivational process.

West Greenlandic is another language that is often discussed in relation to plurality on verbs (Van Geenhoven 2005). This language makes use of a structure that comes close to direct modification of the verb by means of a numeral. The example in (29a) illustrates the verbal plural, and (29b) offers a structure in which the number of times the action takes place is specified (Fortescue 1984 cited in Van Geenhoven 2005).

(29) a. nuka ullaa-p tunga-a tama-at
uka.ABS morning-ERG direction-3SG.SG.ABS all-3SG
sanioqqut-tar-puq
pass-**PL**-IND.[-TR].3SG
'Nuka went by repeatedly for the whole morning'

b. Marlu-riar -lu-ni quirsur-**tar**-puq
two -do.times -INF-3SG.PROXcough-**PL**-IND.[-TR].3SG
'He coughed twice'
or 'He repeatedly coughed, each time doing it twice'

The example in (29b) is quite interesting, and deserves further research. What is clear though, is that the numeral is not part of the second verbal complex, which also contains the 'plural' verb form. Rather, there is a specific auxiliary, that Fortescue and Van Geenhoven gloss as 'do.times' in which the numeral incorporates. It is clear that neither Hausa nor West Greenlandic qualifies as a case of 'verbal' number marking languages.

What about non marking languages? In the case of Tagalog, numerals cannot combine directly with verbs, but if they are prefixed by *maka-*, a frequentative numeral is created, which directly modifies a verb phrase (Schachter & Otanes 1972: 214). Next to this strategy, the language also uses 'numeral + time'. Interestingly, this strategy is found in other non marking

languages as well. Kari'nya (Carib), uses the suffix *mboto* (Hoff 1968: 282).

On the basis of what precedes, it is clear that many issues deserve further research. One would like to know more about the nature of the affixed forms, for instance, and the question whether it is true that these are uniquely found in non marking languages. The examples above illustrate 4 strategies for counting in the verbal system: a. insertion of *times*, b. use of a nominal structure with a cognate object, c. use of a special auxiliary, and d. affixation. I would like to hypothesize that a fifth option that parallels the type of number marking known from the nominal system, is not available. This would imply that the first prediction of the hypothesis according to which the examples in (27) are numeral classifier structures is not borne out.

The second prediction of this hypothesis is that the VP modified by 'numeral + time(s)' has cumulative reference. As argued in section 2.1, classifiers and unit terms are found with nouns that have cumulative reference, either because they lack number marking (mass nouns, collective nouns such as *furniture* and Chinese count nouns), or because they are plural. What is excluded is a true singular, that is a noun that denotes a set of singularities. The question is then, whether the verb phrases modified by 'numeral + time(s)' have cumulative reference as well: *three pieces of cheese* would be similar to *to sleep three times*, and *three pieces of furniture* to *meet three times*. It is clear that *cheese* (mass, no number) and *furniture* (count, no number) have cumulative reference, and given that *sleep* (mass, no number) and *meet* (count, no number) may be modified by a degree expression, one might suppose at first that this second prediction is borne out.

(30) a. Elle a dormi trois fois 'She slept three times'
b. Elle a beaucoup dormi 'She slept a lot'
c. Elle l'a rencontré trois fois 'She met him three times'
d. Elle l'a beaucoup rencontré 'She met him a lot'

However, what needs to be shown is that 'numeral + time(s)' is incompatible with a predicate that forces a singular interpretation. In the previous section, two types of 'singular' predicates have been discussed: *once only*-predicates, and predicates containing an indefinite that is not interpreted referentially. *Once only*-predicates preclude a 'several times' reading by definition, and as such we do not expect to find modifiers such as *two times* in the context of these predicates. Predicates containing a non referential indefinite are quite interesting, though, as they denote a non singleton set of singular events, and in that respect their denotation resembles that of a singular count noun. As shown in (31), these predicates may be combined with an expression such as *trois fois*, contrary to our second prediction (cf. (25)): *trois fois* behaves like *souvent* in (26c).

(31) Elle a acheté trois fois deux kilos d'olives
he has bought three times two kilos of olives
'She bought two kilos of olives three times'

The reading one gets for (31) corresponds to the distributive reading of a plural noun phrase. Further examples that illustrate that *trois fois* introduces a distributive reading while *three pieces* does not, are given in (32). In (32a), *trois fois* takes scope over *different*: each time corresponds to a different answer. Even though *different* is in the syntactic scope of *pieces*, it cannot get this type of reading. The furniture must be compared to other furniture mentioned in the context.

(32) a. [trois fois [donner une réponse différente]]
three times give an answer different
b. [three pieces of [different furniture]]

In what preceded I argued that it cannot be maintained that languages such as English, French and Dutch are 'numeral classifier languages' with respect to their verbal domain. The modifiers of the form 'numeral + time(s)' are combined with verb phrases that have singular reference (that is, they denote a set of singular events). Classifiers and unit terms that are found in the nominal system do not combine with singulars, because these lack the property of cumulative reference.

This leads us to positing an alternative explanation to the data in (27). Even though the first hypothesis appeals to one's imagination much more easily, a more down to earth hypothesis imposes itself: numeral structures seem to be fundamentally nominal. In the verbal domain, the numeral and the unit term form together a distributive noun phrase that is adjoined to the verb phrase (or occupies an adverbial position otherwise integrated in the structure, depending on theoretical preferences).

In classifier languages, nouns used for currencies, time units and *time* may be directly modified by a numeral. According to Greenberg (1977: 294), these are classifier structures without a noun rather than nouns without a classifier. Some Kana examples are given in (33b); (33a) illustrates the numeral classifier character of the language (Ikoro 1994).

(33) a. zi̲ì té fa [Kana]
one CL boat
b. zi̲ì zúá,zi̲ì sɔ
one year one time

I assume that 'numeral + time(s)' are full noun phrases that are made up by a numeral and a unit term, without a following noun. However, they behave like quantified noun phrases, and as such may introduce a distributive

reading, and may take scope over indefinites. The collective reading is probably excluded because the semantics of *time* does not allow for it. I leave this issue for further research.

Even though this second hypothesis is not really spectacular, its consequences for the parallelism between nominal and verbal structures is quite important. Numerals seem to pertain to the nominal system in many languages, as well as obligatory number marking on nouns and the use of count classifiers. If certain categories, such as pluractional morphology, are similar to number marking in some respects, this does not seem to extend to the function they may assume with respect to numerals.

An important issue for further research is the status of non marking languages. In some of the cases considered here, numerals may bear a prefix or a suffix, which makes 'adverbial' use of the numeral possible. On the one hand, one may want to argue that these affixes are similar to classifiers. On the other hand, I argued in section 2.1.2 that numerals in these languages differ from numerals in the other types of languages, so it might be the case that they do not need to resort to a nominal structure in order to satisfy the requirements of the numeral.

4. Conclusions

In this paper I contrasted two types of counting in linguistic structures. The first type, counting in a strict sense involves the use of numerals, while the latter may occur with degree expressions.

In the case of strict counting, counting is forced by the numeral. As a result, mass nouns can only be used in the context of numerals if they adopt a count meaning. Moreover, in many languages numerals only combine with nouns that are marked for number, or they require the presence of a classifier. Following the Sanches-Greenberg-Slobin generalizations, languages with obligatory number marking on the noun never have a generalized use of numeral classifiers. Languages that mark number by other means (e.g. plural clitics, determiners) or that have non-obligatory number morphology on the noun, may make use of numeral classifiers, but they may also allow for direct combination of numerals and nouns.

As for vague counting by means of a degree expression, a 'counting' interpretation is not due to the semantics of the degree expression itself, but rather comes from the denotation of the noun it combines with. In the context of a plural or a collective noun, a counting interpretation emerges. When the noun is mass, the degree expression indicates a global quantity.

In the second part of the paper I argued that degree modification is rather similar in the nominal and in the verbal systems. In both cases the type of interpretation (counting vs. global quantity) depends on the semantics of the predicate.

The use of numerals, however, is very different in nominal and in verbal structures, as is the role played by number and classifiers. Both verbal number and classifier-like structures occur, but these do not have the same properties as obligatory number marking on nouns or a generalized use of numeral classifiers in the nominal system.

NOTES

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1. From a semantic point of view, *many* and *few* are also degree expressions. Contrary to for instance *a lot*, they only combine with plurals, and as such they are syntactically similar to cardinals. In this paper, I focus on the large majority of degree expressions that may combine with mass nouns, and leave cases such as *many* and *few* aside.
2. Structures of the type *a two floor building* are not taken into account. For a discussion of measure structures of this type as opposed to the ones I am dealing with here, see Schwarzschild (2005).
3. Informally, if a predicate with cumulative reference holds for two different entities *a* and *b*, it also holds for the sum of *a* and *b*. This is not true for singular predicates, given that they denote a set of singularities.
4. Certain Dutch or German unit terms may lack number marking as in *twee kilo rijst* LITT.: 'two kilo rice', 'two kilos of rice'.
5. Expressions such as *type* and *sort* are different in this respect. They allow for all types of nouns, including singulars (e.g. *a type of car*). The reason why expressions meaning 'type' differ from ordinary unit terms is beyond the scope of this paper.
6. One of the reviewers points out that *ji* 'a few' requires the presence of a classifier as in *ji *(ge) pingguo* 'a few/several apples'. As already mentioned in footnote 1, some degree words are not compatible with mass nouns, and as such they behave more like cardinals from a syntactic point of view. Incompatibility with mass nouns correlates with the impossibility to be used with verbs.
7. For some reason, the English translation does not have the same problem as the example in (25). As I argue elsewhere, this seems to be a particular property of *a lot*, that in some cases allows for the reading 'a lot of times'. Other degree expressions in English (e.g. *more*) do not share this property, and behave like French *beaucoup*. See Doetjes (2006) for discussion.
8. Many thanks to Malàmi Buba for providing me with (28a); (28b) is taken from Newman (2000).

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RÉSUMÉ

Dans cet article, nous défendons l'hypothèse selon laquelle le nombre et les classificateurs se comportent d'une manière fondamentalement différente dans les domaines nominal et verbal. L'emploi des numéraux dans une expression qui 'compte' une quantité d'individus ou d'événements est différent selon que la catégorie modifiée est nominale ou bien verbale (*trois visites* vs. *visiter trois *(fois)*). Par contre, les expressions de degré s'utilisent de manière similaire dans les domaines nominal et verbal (*beaucoup de visites* vs. *beaucoup visiter*). Cette différence semble trouver son origine dans l'interaction de ces deux types d'expressions de quantité avec le nombre et les classificateurs. Si, dans beaucoup de langues, les numéraux s'utilisent uniquement en combinaison avec la morphologie du nombre ou avec un classificateur, les expressions de degré se combinent plutôt avec des expressions à référence cumulative.