

54. Distributive Numerals

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1. Introduction

Most languages have a series of cardinal numerals such as English *one*, *two*, *three*, and so on. Some of the ways in which such numerals are formed are described in chapter 131. In addition, most languages also have various other series of numerals, whose forms are derived from cardinal numerals, and whose denotations combine the concept of number with other concepts of a variety of different kinds. Perhaps the most well-known of these other series are the ordinal numerals, described in chapter 53. This map is concerned with one of the many other kinds of numeral series, namely, **distributive numerals**.

Consider the following English sentence, containing the cardinal numeral *three*:

(1) *John and Bill carried **three** suitcases.*

How many suitcases did John and Bill carry? Sentence (1) is ambiguous, allowing for two possible answers to the preceding question. Under one interpretation, there was just a single set of three suitcases which both John and Bill carried. But under another interpretation, there were two sets of three suitcases, one set which John carried, another set which Bill carried. Or in other words, there were three suitcases per person, for a total of six suitcases.

In English, the latter interpretation can be forced by means of operators such as *each*, as in *John and Bill carried three suitcases each*, or *apiece*, as in *John and Bill carried three suitcases apiece*. However, in other languages, there is another way of increasing the availability of this interpretation, by means of a distributive numeral, as in the following example:

(2) Georgian (adapted from Gil 1988)

Romanma da Zurabma sam-sami
 Roman.ERG and Zurab.ERG DISTR-three.ABS
čanta caiyo.
 suitcase.ABS carry.PST.3SG

(i) 'Roman and Zurab carried three suitcases each/apiece.'

(ii) 'Roman and Zurab carried the suitcases three by three.'

In Georgian, distributive numerals are formed from cardinal ones by reduplication. In the above example, *sam-sami* is a distributive numeral, derived from the cardinal numeral *sami* 'three'.

Typically, sentences containing distributive numerals also exhibit ambiguities, though of a different nature from those in sentences such as (1). For example, as indicated by the two different glosses for sentence (2) above, the distributive numeral *sam-sami* can mean either 'three ... each/apiece' or 'three by three'. Under the latter interpretation, there were actually an indefinite number of suitcases — six, nine, twelve, fifteen, or perhaps even three hundred and sixty-nine — albeit a number that is divisible by three. Or, more perspicuously, there were an indefinite number of carrying activities, with three suitcases per activity.

The meanings of sentences containing distributive numerals can be described in terms of a binary semantic relationship of distributivity that obtains between an expression containing the distributive numeral, the distributive **share**, and some other expression in the sentence, the distributive **key**. This relationship may be expressed by means of the English preposition *per*, in accordance with the formula *SHARE per KEY*. For example, in the Georgian sentence (2), the distributive numeral *sam-sami* marks the direct-object NP *sam-sami čanta* as the distributive share. The range of meanings exhibited by the sentence results from different choices of distributive key.

Thus, if the subject NP *Romanma da Zurabma* is key, there are three suitcases per carrier, resulting in interpretation (2i). On the other hand, if the verb *caiyō* is key, there are three suitcases per carrying, resulting in interpretation (2ii).

2. Feature values

This map shows which languages have distributive numerals, and, for languages that have them, the different ways in which distributive numerals are formed from cardinal ones.

@	1. No distributive numerals	62
@	2. Marked by reduplication	84
@	3. Marked by prefix	23
@	4. Marked by suffix	32
@	5. Marked by preceding word	21
@	6. Marked by following word	5
@	7. Marked by mixed or other strategies	23
	total	250

In languages of the first type, there are **no distributive numerals**. One example of such a language is English; some others include Vietnamese (own fieldwork), Kalam (Andrew Pawley p.c.) and Hupda (Patience Epps p.c.). Such languages use a variety of paraphrases in order to convey the meanings that in other languages are expressed with distributive numerals.

One might wonder why the English translations of Georgian *sam-sami* in (2) are not themselves considered to be distributive numerals. In (2i), *three ... each/apiece* is not a distributive numeral since it is not a continuous constituent. But what about the expression *three by three* in (2ii)? In fact, some sources do refer to expressions similar to these as distributive numerals. Observe, however, that *three by three* has a more limited range

of interpretations than Georgian *sam-sami*; specifically, *three by three* forces the verb to be the distributive key, while ruling out the subject NP as distributive key. Most commonly, the term *distributive numeral* is reserved for numerals which allow NPs to be chosen as distributive key; this is the terminology that is followed in this chapter. Accordingly, *three by three* is not considered to be a distributive numeral, and hence, English is characterized as a language without distributive numerals.

The remaining six types contain languages that do have distributive numerals, providing a classification of their formal properties. The second type of languages are those that form distributive numerals by means of **reduplication**. The use of reduplication to express distributivity is clearly of iconic motivation: repeated copies of the numeral (for example *sam-sami*) correspond to multiple sets of objects (for example sets of three suitcases). Perhaps for this reason, reduplication emerges as the most common morphological strategy for the formation of distributive numerals across the world's languages. One example of a language in which distributive numerals are formed by reduplication is Georgian, mentioned above; other examples of such languages include Gã (Jonas Nartey p.c.), Burushaski (own fieldwork), and Comanche (Haugen to appear).

The next four types provide a cross-cutting classification of the distributive marker, depending on whether it is affixal (including clitics) or a separate word, and whether it precedes or follows the numeral to which it applies.

The third type contains languages in which distributive numerals are formed by **prefixation**. For example, in Tongan, distributive numerals are marked with the prefix *taki-*, as in *takitolu*, from *tolu* 'three' (own field work). Other examples of such languages include Nicobarese (Braine 1970: 120), Yami (Der-Hwa Victoria Rau p.c.), and Coast Tsimshian (Boas 1911: 381).

The fourth type contains languages in which distributive numerals are formed by **suffixation**. For example, in Maricopa,

distributive numerals are marked with the suffix *-xper*, as in *xmokxper*, from *xmok* 'three' (Gil 1982). Other similar languages include Basque (Saltarelli et al. 1988: 253), Korean (Gil 1989), and Cayuvava (Key 1967: 61).

The fifth type contains languages in which distributive numerals are formed by one or more **preceding words**. For example, in German, distributive numerals are marked with the preceding word *je*, as in *je drei* from *drei* 'three'. Other examples of such languages include Russian (Gil 1993), Modern Greek (Alexis Dimitriadis p.c.), and Tuvaluan (Besnier 2000: 578–579).

The sixth type contains languages in which distributive numerals are formed by one or more **following words**. For example, in Malagasy, distributive numerals are marked with the following word *avy*, as in *telo avy* from *telo* 'three' (Fanja Nawalone Hanitry Ny Ale–Gerull p.c.). Other similar languages include Selkup (Prokof'eva 1966: 404), Ainu (Refsing 1986: 176–177) and Wai Wai (Hawkins 1998: 128).

Finally, the seventh type is a mixed bag containing languages in which distributive numerals are formed with **combinations** of the above types of strategies, or with yet **other morphosyntactic devices**. Combinations of morphosyntactic strategies may be either paradigmatic, in which case different kinds of distributive numerals are formed with different strategies, or alternatively syntagmatic, in which case a single distributive numeral is formed by two or more strategies in conjunction. The former case is instantiated by Udihe, in which distributive numerals may be formed either by reduplication or by suffixation with *-tA*; for example, *ila-ila* or *ilata* from *ila* 'three' (Nikolaeva and Tolskaya 2001: 428–9). The latter case is illustrated by Mayo, in which distributive numerals are formed by reduplication plus suffixation with the genitive *-ri*, for example *pesri-pesri* from *pes* 'two' (Foreman 1974: 86–88). The other morphosyntactic strategies include ambifixation, intercalated reduplication and compounding. Ambifixation is instantiated by Chukchi, in which distributive numerals are

formed by application of *em-* *-yut* (or variant thereof), as in *em-ɲire-yut* from *ɲire* 'two' (Skorik 1961: 397–399). Intercalated reduplication is illustrated by Tawala, in which distributive numerals are formed by insertion of *po* 'and' between copies of the numeral, for example *emosi po emosi* from *emosi* 'one' (Ezard 1997: 81, 156). And compounding is the strategy used by Kayardild, in which distributive numerals are formed by compounding with *wuthinda* 'lots' combined with reduplication, for example *kiyarrwuthinda kiyarrwuthinda* from *kiyarr* 'two' (Nick Evans p.c.).

3. Geographical distribution

Distributive numerals display some striking geographical patterns. To begin with, one may contrast the distribution of the first type of languages, those without distributive numerals, with the remaining types of languages, all of which have distributive numerals of various kinds. Languages without distributive numerals predominate in two parts of the world, mainland South–East Asia, and a rather curious contiguous zone which might be referred to as peripheral Europe, extending from Finnish via English, Spanish and Modern Standard Arabic all the way to Persian. Elsewhere, languages without distributive numerals occur sporadically in New Guinea, Australia and South America, areas which are more generally characterized by relatively underdeveloped numeral systems. Conversely, there are two very large contiguous zones in which almost all languages have distributive numerals of one kind or another. One such zone encompasses all of sub-Saharan Africa. The other covers the Eurasian landmass to the exclusion of peripheral Europe and Southeast Asia; this zone also extends out, with gradually weakening force, into insular Southeast Asia and the Pacific.

Among languages with distributive numerals, the particular morphosyntactic strategies that are used in their formation create a number of additional geographical patterns.

Reduplication is the predominant strategy in sub-Saharan Africa, the Caucasus and the South Asian subcontinent; moreover, it is also common in Indonesia and in North America, where it is interspersed with other strategies.

Prefixation is almost entirely limited to the Austronesian language family, where it occurs in two disparate areas, Taiwan plus the Philippines, and Fiji plus Polynesia. (It should be noted that most of the languages of mixed type in the Philippines also use prefixation, in combination with reduplication.) Outside of Austronesian, prefixation is found in the adjacent Nicobarese, and in the Pacific Northwest, which, from a global perspective, is also relatively close to Austronesian.

A remarkable pattern is displayed by languages which form distributive numerals by means of a preceding word. With the single exception of Tuvaluan (in which the word in question is clearly cognate to the prefixes of other Polynesian languages), all languages of this type are found in a single compact area encompassing central and eastern Europe; a closer look at this area is provided in the first blow-up map. A particularly interesting pattern is displayed by Dutch, German and Yiddish. Limiting attention to the standard languages, the boundary between language types passes between standard Dutch, which has no distributive numerals, and standard German, which, as mentioned above, forms distributive numerals with the preceding word *je*. However, turning to the colloquial varieties, a somewhat richer pattern emerges. In Germany and Austria, colloquial dialects differ from the standard language in that there is no distributive numeral construction; in this respect, these dialects resemble their Dutch counterparts further to the west. Only in Swiss dialects of German does the *je* construction occur colloquially. However, further to the east, dialects of German make use of other words to form distributive numerals.

For example, in the Timișoara dialect of German, the quantifier *jeder* 'each' has undergone reanalysis as a distributive numeral formative (Gabriella Hermon p.c.). Similarly, in the Lodz dialect of Yiddish, the preposition *zu* 'to' has been co-opted as a marker of distributive numerals, in an obvious calque on the Slavic preposition *po* 'to' with similar function (Feygl Infeld Glezer, Wolf Krakowski p.c.). Thus, with the exception of the outlier Swiss dialects, the non-standard varieties form a pattern similar to that of the standard languages, with absence of distributive numerals in the west giving way to distributive numerals formed by a preceding word as one moves further to the east.

What this shows, then, is that non-standard language varieties may exhibit geographical patterns mirroring those of their standard counterparts, albeit with a certain amount of variation. Thus, in their formation of distributive numerals by means of a preceding word, eastern dialects of German and Yiddish differ from otherwise closely related dialects to the west, instead belonging to the same isogloss as Russian and Greek. More generally, in possessing distributive numerals of one kind or another, eastern dialects of German and Yiddish lie at one end of a contiguous isogloss that stretches all the way across Asia and out into the Pacific.

4. Theoretical issues

Distributive numerals have attracted relatively little attention in the linguistic literature. An extensive description and analysis of distributive numerals is provided in Gil (1982) and further elaborated in Gil (1987, 1988, 1989, 1992, 1993). Some attempts to account for distributive numerals within formal theories of semantics are made in Link (1986a, 1986b) and Choe (1987). The relatively minor role that distributive numerals have played within theories of natural language quantification casts doubt on the purported universality of such theories, which tend

to be handicapped by the disproportionate influence of one particular language without distributive numerals spoken in the upper left-hand corner of this map, namely English.