Number has traditionally been considered a property of entities, a characteristic of objects and people. Accordingly, it has usually been assumed to be an inflectional category of nouns. When number distinctions appear on other words, such as verbs or adjectives, they are often automatically classified as agreement markers, indicators of the syntactic relationship between those words and associated nouns, rather than inherent features of the words themselves. They are thus frequently described in terms of rules that copy features of nouns onto associated lexical items. For some languages, such an analysis seems adequate. For many others, however, copying rules fail to capture the essence of number marking. In these languages, the number markers that appear on different kinds of lexical items operate independently of each other and perform subtly different functions. The functional differences result in formal differences in morphological number-marking systems. In what follows, the nature of these functional and formal differences is examined and the diachronic processes behind them explored.

Frajzyngier (1985) and Durie (1986) have shown that nominal and verbal number markers operate independently in many languages. This is the case with most of the several hundred languages indigenous to North America. The problems introduced by an agreement analysis for these languages become apparent as soon as spontaneous speech is examined. In the majority of North American languages, verbs can constitute grammatical predications in themselves. Separate nominal constituents are not only unnecessary for grammaticality, they are frequently absent. Still, even when no nouns appear, verbs can bear number markers. Note the plural prefix in the verb below from Ineseño Chumash, a California language of the Chumash family.
There is no nominal source for the number specification, nothing for a copying rule to copy.

In order to maintain a strict agreement analysis, one might posit underlying nominal constituents as part of every sentence, allow copying rules to duplicate their number features on associated verbs, then permit optional nominal deletion. This analysis would run into a second set of problems, however. When separate nominals are actually present, they do not necessarily agree in number with associated verbs.

In many of these situations, plural forms of the nouns simply do not exist. In fact, in the majority of North American languages, nouns referring to nonhumans are not marked for number at all. Yet even when plurals do exist, they are not necessarily used. The Ineseño Chumash noun 'ku 'person' has a counterpart *kuhku? 'people,' but it was not chosen for the above context. Such mismatches are usually not the result of sloppiness on the part of speakers, although this possibility has sometimes been suggested by frustrated grammarians.

1. Number Marking with Different Lexical Categories

1.1 Nouns

In some languages in North America, among them Taos, Kiowa, Zuni, and the Algonquian languages, all nouns are inflected for number, just as in Indo-European. In the vast majority of North American languages, however, only certain nouns have plural forms. In most of these, only nouns referring to human beings have plurals, or only some nouns referring to humans, often kin terms. (Multiple animals that are considered 'sentient beings,' such as pets or characters in legends, are also often referred to by plural nouns.) The plurals that do exist are used only on some occasions, not every time multiple participants are discussed.
1.2 Adjectives

Many North American languages lack a special lexical class of adjectives. Modification is accomplished by stative verbs. Where adjectives do constitute a separate category, they often have plural forms, but use of these forms is usually not obligatory, independently of whether human beings, animals, or objects are described.

1.3 Verbs

Verbs typically include a variety of number markers. Number is most frequently marked on verbs by bound pronouns, stem alternations, and various derivational processes.

1.3.1 Bound pronouns In the majority of North American languages, pronouns referring to the core arguments of a predication are bound to verbs or auxiliaries as affixes or clitics. They are usually obligatory whether separate nominal constituents are present or not, as in (1) and (2). Languages vary in their repertoires of bound pronouns. Bound pronouns may represent all persons, or only first and second. They may distinguish number systematically throughout, or only for certain human referents, or, surprisingly often, not at all.

1.3.2 Stem alternation In many North American languages, verb stems alternate according to the number of participants involved. The set of alternating stems consists of a limited number of common verbs, in some languages only two or three, in others up to several dozen. They usually include intransitives such as ‘sit,’ ‘lie,’ ‘stand,’ ‘go,’ ‘walk,’ ‘run,’ ‘fly,’ ‘die,’ and transitive such as ‘take,’ ‘pick up,’ ‘carry,’ ‘throw,’ ‘kill.’ Note the complete lack of phonological resemblance between the singular and plural verbs for ‘sit’ and ‘kill’ in the languages (3) and (4), for example.

(3) ‘sit/dwell’
Shuswap (Gibson, 1973, p. 52)
Southern Paiute (Sapir, 1930, p. 242)
Haida (Swanton, 1911, p. 276)
Zuni (Newman, 1965, p. 55)
Upper Chehalis (Kinkaid, 1975, p. 48)

(4) ‘kill’
Shuswap (Gibson, 1973, p. 52)
Southern Paiute (Sapir, 1930, p. 242)
Haida (Swanton, 1911, p. 276)
Zuni (Newman, 1965, p. 55)
Upper Chehalis (Kinkaid, 1975, p. 263)

<table>
<thead>
<tr>
<th>Language</th>
<th>Singular</th>
<th>Plural</th>
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<tbody>
<tr>
<td>Shuswap</td>
<td>?ém</td>
<td>?eq</td>
</tr>
<tr>
<td>Southern Paiute</td>
<td>qari-</td>
<td>yuvwil-</td>
</tr>
<tr>
<td>Haida</td>
<td>qao</td>
<td>L!à</td>
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<tr>
<td>Zuni</td>
<td>?imo</td>
<td>tina</td>
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<tr>
<td>Upper Chehalis</td>
<td>tawilš</td>
<td>lák-š</td>
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<tr>
<th>Language</th>
<th>Singular</th>
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<tr>
<td>Shuswap</td>
<td>púl</td>
<td>ik-</td>
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<tr>
<td>Southern Paiute</td>
<td>paq-a</td>
<td>qo?i-</td>
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<td>Haida</td>
<td>tia</td>
<td>L!da</td>
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<tr>
<td>Zuni</td>
<td>?ayna</td>
<td>?ata</td>
</tr>
<tr>
<td>Upper Chehalis</td>
<td>?olq</td>
<td>-?x-</td>
</tr>
</tbody>
</table>
For intransitive verbs, the selection of a stem reflects the number of subjects involved, whether they are agents (walkers, runners, flyers) or patients (fallers, sitters, corpses). For transitive verbs, it reflects the number of objects involved: how many people are killed, how many objects are picked up, thrown, given, dropped, and so on. The pattern remains the same regardless of whether other parts of the grammar operate on an active, accusative, or ergative basis. This is no accident. The subjects of intransitives and patients of transitives share an important role: They are the participants most directly affected by an action. The primary function of stem alternation is not to enumerate entities, but to quantify the effect of actions, states, and events.

This stem alternation has sometimes been referred to as suppletion. In the strictest sense, suppletion refers to allomorphic alternation conditioned by a systematic inflectional distinction. A prototypical example of stem suppletion in English, where every verb is obligatorily inflected for tense, is the alternation between go and wen-. The relationship between verbs like kick and slap, by contrast, is not considered suppletive, since we do not systematically specify the instrument involved in every action. Kick and slap simply happen to include different instruments as parts of their basic meanings. The North American verbs that alternate according to the number of entities affected are related in a similar way. The implied plurality of effect is a feature of their basic meaning. Walking alone is classified lexically as a different activity from walking in a group; speaking is different from conversing; murdering an individual is different from massacring a village. The pairs of verbs are related semantically but not inflectionally.

Reactions of speakers confirm the lexical independence of these alternating stems. An excellent speaker of Central Pomo, a California Pomoan language, was asked for the plural of the verb yow ‘(one) goes.’ She supplied hlaan ‘(several are) walking.’ On another occasion, when asked for the singular form of hlaan, she provided waan ‘(one is) walking.’ Such chains are not unusual, even from the best speakers.

Not all verbs implying multiple effects even have specific singular counterparts, or vice versa. Note the asymmetry in the sets of verbs used with singular, dual, and plural subjects for ‘sit’ and ‘dwell’ in Koasati, a Muskogean language of Lousiana:

(5) Koasati

<table>
<thead>
<tr>
<th>Singulardualplural</th>
</tr>
</thead>
<tbody>
<tr>
<td>cokkō:lin</td>
</tr>
<tr>
<td>cikk:kan</td>
</tr>
<tr>
<td>i:san</td>
</tr>
<tr>
<td>a:tan</td>
</tr>
</tbody>
</table>
| āswan                   | ‘sit’
| i:san                   |

<table>
<thead>
<tr>
<th>Plural</th>
</tr>
</thead>
<tbody>
<tr>
<td>i:san</td>
</tr>
<tr>
<td>‘dwell’ (Kimball, 1985, p. 273)</td>
</tr>
</tbody>
</table>

The transitive verbs in (6) from Klamath, an Oregon language, constitute another common type of set. Different handling verbs are used depending upon the nature of the substance handled: round, flat, alive, or multiple, but not ‘multiple round’ or ‘multiple flat.’
The lexically plural verbs are not unlike English *congregate*, *disperse*, *gather*, and *scatter*. These English verbs also imply multiple subjects when intransitive and multiple patients when transitive, but it is not immediately obvious what their singular counterparts should be. Here, too, the number distinction is semantic rather than grammatical. Pants (grammatically plural, semantically singular) could not scatter, but a crowd (grammatically singular, semantically plural) could gather and disperse. (See Durie, 1986, for a detailed discussion of similar issues.)

Although verb stems implying multiple effects may appear to agree with plural nouns or pronouns, a match is not obligatory. Lexically plural verbs may denote events involving groups, not simply multiple participants. In English, if each solitary hiker who passes a bench rests there for a moment, they have not necessarily congregated; if a murderer kills three victims during his lifetime, they have not necessarily been massacred. Verbs with plural subjects or objects may contrast with lexically plural verbs. In Yurok, a California Algic language, the verb *nep* 'eat' has a counterpart *e?gah* 'have a meal together.' It also has a plural form *nepoh*, which could be used if several people ate individually. The verb *cwin kep* 'speak' has a semantic counterpart *toh kow* 'talk together, converse,' but it also has a plural *cwin kepoh* '(several) speak' (Robins, 1958, p. 42). In his grammar of Sarcee, an Athabaskan language of Alberta, Cook remarks that "like the unmarked stems, the plural stems may occur with either a singular or a plural subject. With a plural subject, *-dát* means 'three or more move,' and with a singular subject it means 'one moves in company with two or more' (1984, p. 59). Kinkaid (1975, p. 49) reports similar systems in Salish languages.

### Derivational Processes

Most North American languages show derivational processes in their verbal morphology that appear to reflect number. Compare the verbs below from Karok, a language of Northern California.

<table>
<thead>
<tr>
<th>Karok</th>
<th>English Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>ñ'ivru'-htih</td>
<td>'(one object) to be floating'</td>
</tr>
<tr>
<td>ñ'ivru'-htih-va</td>
<td>'(several objects) to be floating'</td>
</tr>
<tr>
<td>ikyi'-m-kurih</td>
<td>'(one) to fall in'</td>
</tr>
<tr>
<td>ikyimku'-rih-va</td>
<td>'(several) to fall in'</td>
</tr>
<tr>
<td>?ákunv-a?r</td>
<td>'(one) to go hunting'</td>
</tr>
<tr>
<td>?ákunvan-va</td>
<td>'(several) to go hunting'</td>
</tr>
</tbody>
</table>
The suffix -va appears to indicate a plural subject, at least with intransitive verbs. When it appears with transitive verbs, it can indicate a plural patient.

(8) Karok
pasnáp-iš(rih) 'to glue down (one)'
pasnápi'sri-h-va 'to glue down (several)'
itráa-mnihtih 'to be looking into (one object)'
itramni'hti-h-va 'to be looking into (several objects)'
(Bright, 1957, p. 92, 93)

Actually, the suffix need not pluralize any particular entities at all.

(9) Karok
taknah 'to hop'
takná-h-va 'to play hopscotch'
mah 'to see'
má-h-va 'to see'
ví-k-paθ 'to weave around (once)'
vikpá-θ-va 'to weave around and around' (Bright, 1957, p. 92)

The primary function of -va is to multiply actions. It may imply that the actions are distributed over multiple agents or multiple patients, but this is a secondary effect. The actions can just as well be distributed over time or space:

(10) Karok
ikre-myáhiš(rih) 'to start to blow'
ikre-myahiš'sri-h-va 'to blow off and on'
?ápakunih '(earth) to slide down'
?apaku'ni-h-va 'to be a landslide' (Bright, 1957, p. 92)

Multiple event or distributive suffixes do not appear every time multiple agents or patients are involved. The first verb in (11) involves a single cook, as shown by the singular pronominal prefix ?u- 'he/she.' The second involves several cooks, as shown by the plural pronominal prefix kun- 'they.' In both cases, however, the cooking is considered a single activity, so no multiple-event suffix appears.

(11) Karok
?u-mniš 'he cooks'
kun-imnis 'they cook'

The Karok multiple event suffix -va, like those in other languages, is derivational, not inflectional. It creates lexical items with specific meanings. Etymologically, takná-hva 'to play hopscotch' ('jump'-va) could just as well mean 'to hop up and down repeatedly;' or 'to hop around in different directions;' but it has been lexicalized with the specific meaning it was derived to express.
Although multiple-event or distributive markers are by far the most common verbal quantifiers in North American languages, other kinds of number markers also appear on verbs in many languages. They typically specify such features as distributive causation, collective causation, collective agency, multiple displacement, and iteration of various sorts. Coos contains special suffixes for multiple causative passives and multiple reflexives, phonologically unrelated to their singular counterparts (Frachtenberg, 1922, p. 358). The various verbal number markers do not necessarily co-occur, although they can. They quantify different aspects of the event predicated. Central Pomo, for example, exhibits extensive verb stem alternation according to the number of participants affected, and it also contains a multiple-event suffix, a multiple-displacement suffix, and a collective-agent suffix, among others. The number markers are in boldface in the commands in (12).

(12) Central Pomo

\[
\begin{align*}
\text{?nēe-} & \quad \text{la-} \quad m \\
\text{throw one object down} & \quad \text{sg imp} \\
\text{‘Throw it down!’} \\
\text{mć]\-} & \quad \text{la-} \quad m \\
\text{throw multiple objects down} & \quad \text{sg imp} \\
\text{‘Throw them down!’} \\
\text{mća-} & \quad \text{la-} \quad \text{ta-} \quad m- \\
\text{throw multiple objects down} & \quad \text{multiple event collective agency} \\
\text{me?} & \quad \text{pl imp} \\
\text{‘Throw them down!’} & \quad \text{(Frances Jack, Personal Communication)}
\end{align*}
\]

In the last command, every morpheme except the directional suffix ‘down’ quantifies some aspect of the action, but none requires the presence of any other grammatically.

A similar exuberance of verbal number markers can be seen in Southern Paiute, a Uto-Aztecan language of Utah described by Sapir (1930). Some distribute actions over time, functioning essentially as aspect markers. They indicate such things as continuous repetitive action (‘patter’) or durative iteration (‘gnaw’). Southern Paiute also exhibits verb stem alternation according to number, as well as various distributive and multiple-agency markers. They can occur singly or in combination, as in (13).

(13) Southern Paiute

\[
\begin{align*}
\text{t\‘aq\‘ui-} & \quad \text{vi-} \quad \text{nqqi-} \quad \text{qa-} \quad \text{p\‘i\‘a} \\
\text{reduce to small pieces} & \quad \text{durative iterative transitive pl agent remote past} \\
\text{‘They chipped it into small pieces.’} & \quad \text{(Sapir, 1930, p. 670)}
\end{align*}
\]
Verbal number marking is pervasive in North America, but it does not represent simple agreement with nouns. It operates independently, modifying the verbs themselves.

2. The Grammaticization of Number

The number marking typical of Indo-European nouns enumerates entities, while that of North American verbs usually quantifies aspects of events. But exactly how does this come about? Do number markers bind morphologically with noun or verb stems only when their semantic contributions are appropriate? Or do their meanings shift after they have become bound?

The synchronic morphological systems of some North American languages provide glimpses of the path of development of number marking. In several languages, phonologically similar number markers appear with words from different lexical classes. Their resemblances suggest a common diachronic source and presumably a single ancestral function.

2.1 Reduplication

The most common form of number marking over multiple lexical categories is reduplication. In some North American languages, such as those in the Algonquian and Pomoan families, only verbs are reduplicated. In many languages, however, the same reduplicative processes that mark number on verbs also appear on nouns and even adjectives.

2.1.1 The functions of reduplication in different lexical categories

The Tsimshian texts recorded by Boas on the Nass River in Northern British Columbia provide excellent documentation of the function of reduplication in that language. Verbs, nouns, and adjectives can all be reduplicated according to the same patterns. (Most of the patterns are somewhat complex, but they apply to all lexical classes.) In his grammatical sketch, Boas (1911b) simply listed the reduplicated forms as the plurals of the plain forms. An examination of the texts, however, indicates that reduplication does not produce simple plurals. Reduplication appears only a fraction of the time that multiple entities are discussed.

Verbs can bear reduplicative prefixes when multiple intransitive subjects are involved as in (14), or multiple transitive objects, as in (15).

(14) Nass Tsimshian

\[ NLk'c 'ad'a'di:k-sk'wL wi-hë'l'dEm që'wun. \]

then redup came many gull

'Now many gulls came.' (Boas, 1902, p. 103.13)
The Evolution of Number Marking

Yet verbs are not reduplicated every time multiple subjects or objects are identified. The verb *hwant* 'sit' is not reduplicated in (16).

(16) Nass Tsimshian

*Ga-a'gL g-at hwant aL g-ilé'lix-g-è.*

*they saw man sitting at inland*

'The men who were sitting under the trees saw what he was doing.' (Boas, 1902, p. 111.12)

The fact that several men were present is clear from the choice of the verb *hwant* "(several) sit"; a different verb *dà* is used if one person sits alone. The verb 'several sit' does have a reduplicated form. It follows the same pattern as *hwilp/huwi*p ‘house/houses,’ and *hwá/huwá* ‘name/names.’ The reduplicated form appears in contexts like that in (17).

(17) Nass Tsimshian

*NLk-è huwa'nL txanètk=k L k'opÈ-ts'o' òts.*

*then redup they sat down all the little birds*

'And all the birds sat down.' (Boas, 1902, p. 124.15)

Nass Tsimshian reduplicated verbs distribute an event over multiple times or locations, including multiple participants.

The function of reduplication on nouns is interesting. The simple noun *gan* 'stick' refers to single stick in (18).

(18) Nass Tsimshian

*NLk-èt gòL gan.*

*then he took a stick*

'Then he took a stick.' (Boas, 1902, p. 68.3)

The reduplicated form *ganga'n* refers to multiple sticks in (19).

(19) Nass Tsimshian

*K-è hwil sagait-hà'p'àaL tan k-Lè-hisya'tst aL ganga'n,*

*then all together they who all over hit him with redup stick*

'Then he was attacked and beaten with sticks,

*aL ni'g-it g-a'gL g-at.* Qàm-ba'gait-bEbEsba'tsk=k L ganga'n

*and not he saw a person by themselves they were lifted redup stick*

*although he did not see a single person. The sticks moved of themselves*
Reduplicated nouns are not simple plurals, however. The noun for *stick* is unreduplicated in (20), even though we know that multiple sticks were involved from the choice of the verb *dōq* 'to take (several).' (The verb *gō* means 'to take (one).')

(20) Nass Tsimshian

\[ HuX \ dō'qdeL \ gan. \]
Again they took stick

'Again they took sticks.' (Boas, 1902, p. 97.12)

Like reduplicated verbs, reduplicated nouns function as distributives, emphasizing temporal, locative, or conceptual distribution: the separateness of the entities they identify.

Reduplicated verbs and nouns often appear to 'agree.' In (16), neither the verb 'sit' nor the noun 'person' is reduplicated. In (21), both the verb 'load' and its object 'canoes' are reduplicated.

(21) Nass Tsimshian

\[ huX \ mīx.māx.L \ mmāl. \]
Again redup they loaded redup canoe

'Again they loaded the canoes.' (Boas, 1902, p. 108.12)

These matches reflect semantic co-occurrences rather than grammatical agreement. Distributed entities are often involved in distributed actions. The multiple canoes of (21) required multiple loading. In (16), by contrast, a single group of people was seated together at one time in one place, so neither the verb nor the noun was reduplicated.

Although reduplication is highly productive in Nass Tsimshian, Boas's texts indicate that it is not applied uniformly to all verbs and nouns. It is a derivational process, used only when needed to create new lexical items. Distribution is a more important aspect of some actions and entities than of others, and it is these that can be described with reduplication. Many verbs and nouns lack reduplicated forms, so distribution is simply not distinguished for them in any context. In (14), for example, the reduplicated verb *ad₂-a'd'ik-sk=*L 'came' indicates distributed activity, but the noun for 'gull' remains unspecified for distribution.

Nass Tsimshian adjectives can also be reduplicated. The qualities they specify are distributed individually over each item described, rather than ascribed to the set as a unit. Reduplication on adjectives operates independently of the distributed status of the nouns modified. The noun for
‘salmon,’ for example, has no distributive form, so it is always unmarked for this feature. Nevertheless, the quality of fatness is distributed by a reduplicated adjective over the individual fish in (22).

(22) Nass Tsimshian

\[ DEm \text{ max-t’El’t’e’lx \ hàn aL K-san.} \]

‘The salmon of Skeena river shall always be fat.’

(Boas, 1902, p. 20.15)

A similar pattern can be seen in Southern Paiute. Here, as in other Uto-Aztecan languages, both verbs and nouns can show partial reduplication for number. The rich textual material collected by Sapir, along with his grammatical sketch, show that reduplicative prefixes on verbs function as prototypical verbal number markers: They characterize events, not things. They distribute actions over time, indicating iterative or continuous action, or over space, indicating multiple locations or participants.

(23) Southern Paiute verbs

- ivi- ‘to drink’
- i’i’p’i ‘drinks repeatedly, sips’
- nala’a’ip’iva ‘fire was burning’
- nan’a’aip’iva ‘there were fires burning’
- pampa’nA’ai ‘(they) go home in parties’
- to’qwa’ai ‘patches one’
- to’lo’q-wa’ai ‘patches several’ (Sapir, 1930, pp. 258–261)

As in Nass Tsimshian, Southern Paiute nominal reduplication is not a simple inflectional plural marker. Sapir points out that reduplicated nouns are distributive, “not plurals, though sometimes, particularly in the case of animate nouns, practically equivalent to such” (1930, p. 257).

(24) Southern Paiute nouns

- qa’nI ‘house’
- qa’qa’nI ‘houses’
- po’ ‘trail’
- po’wa’ ‘trails’
- pîqwa- ‘wife’
- pîvi’qwa-mî ‘their (visible) wives’ (Sapir, 1930, pp. 257–258)

Distributive nouns are usually plural, but not all plural nouns are distributive. Both nouns for ‘horse’ in (25) can be used to refer to multiple horses, for example, but only the second is distributive.
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Similar examples come from Maidu, a California Penutian language. Dixon (1911) remarks in his grammatical sketch that reduplication is quite frequent in verbs, where it serves a distributive function.

(26) Maidu
witōswitōsōnoitsoia ‘he went about picking here and there’
(Dixon, 1911, p. 689)

The same reduplicative processes can be applied to nouns, adding a distributive sense. Dixon lists four reduplicated nouns.

(27) Maidu
sēw’sēuto ‘each, every river’ (se’wi ‘river’)  
hōbo’boto ‘every house, or camp’ (hōbo’ ‘house’)  
ya’manmanto ‘every mountain’  
tsas’tsato ‘every tree’ (tsa ‘tree’)

He notes, however, that few nouns seem to have reduplicated forms, and those that do are rarely used. These distributives “appear not to be used in ordinary conversation to any extent, and are rare in the texts. The above are practically all the forms that have been noted” (1911, p. 689, 708).

The same situation was reported by Hoijer for Tonkawa, a language isolate formerly spoken in central Texas.

Reduplication affects verb themes for the most part. . . . It symbolizes repeated action, plural [intransitive] subject, or rarely, vigorous or intense action. Examples: 
totop- ‘to cut repeatedly’ (top- ‘to cut’), wawana- ‘several fall forward’ (wa-na- ‘to fall forward’). . . . In noun themes, reduplicated forms occur rarely: nanto’on ‘a range of mountain’ (na:ton ‘mountain’), k-a-k-an ‘women’ (k-a-n ‘woman’), ʔo-n ‘blood veins’ (ʔo-n ‘blood’) (1946, p. 297).

Beeler described a similar system in Barbareño Chumash. Reduplication “ordinarily expresses repeated, continuing action” (ms: 31). “Nouns may show initial reduplication accompanied by glottalization and falling tone on the final syllable; this formation, though it has been called a plural, appears rather to have distributive meaning” (ms: 17).

Takelma, a language isolate of Oregon, exhibits the same characteristics. Sapir (1922) reported that
Reduplication is used in Takelma as a grammatical process with surprising frequency (p. 57).

Frequentatives, continuatives, and usitatives are formed from simpler verb forms in great part by various methods of repetition of all or part of the phonetic material of the stem... The frequentative idea may have reference to the repetition of the act itself (iterative or usitative) or to the plurality of the transitive object or intransitive subject affected (distributive); any sharp characterization of the manner of the frequentative action in each case is, however, doubtless artificial apart from the context (p. 127).

Reduplicated nouns are not frequent in Takelma, particularly when one considers the great importance of reduplication as a grammatical device in the verb (p. 220).

A few adjectives form their plural or frequentative by reduplication... That these plurals are really frequentative or distributive in force is illustrated by such forms as da' klooi-ts-lili'ii' 'red-checked,' which has reference not necessarily to a plurality of persons affected, but to the frequency of occurrence of the quality predicated (p. 264).

This pattern is common across North America. Reduplication of verbs usually serves a prototypical verbal function of distribution. In the same language, reduplication of nouns, when present, usually shares the distributive function, rather than simply pluralizing entities. Nominal reduplication is typically rarer than verbal reduplication, appearing only when the entities it quantifies are scattered (trails, rivers, veins, houses, objects individually possessed by different owners) or especially distinctive (people). Reduplication can also be extended to adjectives, still with the same basic function, distributing the quality expressed over time, space, or individuals, rather than over a static group as a whole.

2.1.2 The functional shift of reduplication over time There is evidence that, under certain circumstances, the function of reduplication can change over time, according to nature of the host lexical category. Kwakiutl, a Wakashan language of British Columbia, exhibits typical distributive reduplication in verbs and nouns. Boas notes in his grammar that the reduplicated verbal stem conveys purely the idea of distribution, of an action done now and then... The idea of plurality is not clearly developed. Reduplication of a noun expresses rather the occurrence of an object here and there, or of different kinds of a particular object, than plurality. It is therefore rather a distributive than a true plural (1947, p. 206).

Compare the use of the simple noun for 'wolf' in the first sentence in (28) with that of the reduplicated distributive noun in the second, for example.
Boas detected an incipient shift in the function of nominal reduplication:

It seems that this form is gradually assuming a purely plural significance. In many cases in which it is thus applied in my texts, the older generation criticizes its use as inaccurate. Only in the case of human beings is reduplication applied both as a plural and a distributive (1947, p. 206).

He suggests that the shift may be due to the influence of English:

There are a great many examples of the use of reduplicated plural forms for inanimate objects. The present usage is certain, but we are under the impression that the frequent use of plural forms is due to the influence of English. There are so many cases in which the absolute form is used and we have heard the reduplicated forms so often criticized as unidiomatic that we believe the old grammar would require the absolute form for all plurals in which the single objects are not individualized (1947, p. 293).

2.2 Phonologically Constant Derivational Affixes

There are also many languages in which verbs, nouns, and sometimes adjectives bear similar, phonologically constant number affixes.

2.2.1 The functions of constant derivational affixes in different lexical categories

As noted earlier, Central Pomo exhibits an elaborate array of verbal devices reflecting number. Among them is a suffix -ta- that might at first appear to indicate multiple subjects. [All of the Central Pomo examples are from Frances Jack (personal communication).]

(29) Central Pomo
   ʔaa madumač’  ‘I woke up’
   ya madumač’tam  ‘we woke up’

On transitive verbs, -ta- appears to correlate with the number of patients.

(30) Central
   ts’ic’kam  ‘fold it’
   ts’ic’taakam  ‘fold lots of things’
The suffix -#- is actually a multiple event marker. Not all verbs involving multiple participants contain the suffix. In the second sentence in (31), the pronoun mútuuyal 'them' refers to a plural patient, but there is no multiple event suffix, since a single event is predicated.

\[
\begin{align*}
(31) \quad \text{Central Pomo} \\
a. \quad \?aa \text{ mútuuyal} \quad \text{manàač}’ \\
& I \quad \text{him} \quad \text{pay semelfactive} \\
& ‘I paid him.’ \\
b. \quad \?aa \text{ mútuuyal} \quad \text{manàač}’ \\
& I \quad \text{them} \quad \text{pay semelfactive} \\
& ‘I paid them.’ (The work crew received a single check jointly.)
\end{align*}
\]

The suffix appears only when several separate actions are predicated.

\[
\begin{align*}
(32) \quad \text{Central Pomo} \\
\?aa \text{ mútuuyal} \quad \text{manàataayťaaw} \\
& I \quad \text{them} \quad \text{pay multiple event multiple displacement aspect} \\
& ‘I paid them.’ (Each worker was paid individually.)
\end{align*}
\]

Both verbs in (33) could describe the actions of several workers. Only the second, which predicates multiple activities, contains the suffix -#-.

\[
\begin{align*}
(33) \quad \text{Central Pomo} \\
\text{bèenmaw} \quad (\text{group} \quad \text{carrying something together}) \\
\text{bètač}’ \quad (\text{several} \quad \text{each carrying something individually})
\end{align*}
\]

Another Central Pomo suffix, -y-, indicates multiple displacement. It frequently co-occurs with the multiple event suffix.

\[
\begin{align*}
(34) \quad \text{Central Pomo} \\
\text{sapáatu} \quad \text{tiqan} \quad (\text{one} \quad \text{putting on a shoe}) \\
\text{sapáatu} \quad \text{tiqan} \quad (\text{one} \quad \text{putting on a pair of shoes}) \\
\text{sapáatu} \quad \text{tiq’ama} \quad (\text{several} \quad \text{putting on their shoes})
\end{align*}
\]

The multiple event suffix and the multiple displacement suffix both function as prototypical verbal modifiers. They quantify aspects of events.

Most Central Pomo nouns have no plural forms. ‘Plurals’ can be elicited for certain nouns referring to people, as in many languages, and for the noun lòq’ ‘thing.’ The basic form of the plural suffix on nouns is -ýay. (The dental stop disappears following another consonant.)

\[
\begin{align*}
(35) \quad \text{Central Pomo} \\
máača \quad ‘\text{woman}’ \\
máačatay \quad ‘\text{women}’ \\
too \text{ č’al}‘k’e \quad ‘\text{my sibling}’ \\
too \text{ č’al}‘k’eťay \quad ‘\text{my siblings}’
\end{align*}
\]

\[
\begin{align*}
\text{qanémac}’ \quad ‘\text{relative}’ \\
\text{qanémac’ay} \quad ‘\text{relatives}’ \\
lòq’ \quad ‘\text{thing}’ \\
lòq’ay \quad ‘\text{things}’
\end{align*}
\]
The nominal suffix -Iry bears a striking resemblance to the multiple event suffix -ta-, possibly in combination with the multiple displacement suffix -y-.

As in other North American languages, 'plural' nouns are not used every time multiple human beings are discussed. In fact, they are more often absent than present. When people act jointly, the suffixes normally do not appear. Note that the nouns are the same in the singular and collective plural sentences in (36).

(36) Central Pomo
a. yōohloht čaač' waáda.
   south from person go sg continual sg
   'There's a person coming from the south.'

b. yōohlōt čaač' hladá.
   south from person go pl continual pl
   'There's a group of people coming from the south.'

The 'plural' nouns tend to appear when people act individually, at different times, in different directions, at different locations, and so on.

(37) Central Pomo
a. Cčač'uyya q'adéέmaw.
   person pl topic fight reciprocal multiple agent aspect
   'There's a bunch of people fighting.'

b. Męen ʔe ččač'uyya máa yhētač'.
   so it is person pl topic stuff do multiple event imperfective pl
   'That's how people do things.'

-ta'y- has retained a distributive function in the relatively rare contexts in which it appears on nouns. The fact that it appears with the noun for 'thing' as well as nouns referring to persons is consistent with this role. A term for 'all sorts of things' is useful in a language without inflectional number marking on nouns.

-ta'y- appears with adjectives as well, where it also serves as a distributive. Like the Tsimshian reduplicative prefixes, it appears somewhat more frequently with adjectives than with nouns, because the qualities specified by adjectives are usually distributed individually over members of a set, rather than attributed to the set as a whole.

Maidu contains a similar number suffix that appears with both verbs and nouns. Dixon notes, "this suffix, of general and very frequent use...is used in some cases to indicate iteration; in others, reciprocal action; at times it seems to point to a plural object" (1911, p. 705).

(38) Maidu
mo' tōn   'to drink repeatedly' (mon 'to drink')
yo'k-ō-tōn  'to strike repeatedly with fist'
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(yo’k-ôn ‘to strike’) yapai’-to-to-dom ‘talking to each other’ (Dixon, 1911, p. 705)

He found that -to was “also used as a nominal suffix in connection with the reduplicated distributives.” Recall that although reduplicated verbs are pervasive in Maidu, reduplicated nouns are rare.

(39) Maidu
tsA’-tsa-to ‘trees’ (Dixon, 1911, p. 705)

In Maidu, as in Central Pomo, the suffix retains its distributive function even when applied to nouns.

Coos exhibits a similar pattern. Frachtenberg (1922, p. 327) described several verbal distributive suffixes: “All the suffixes expressing distribution have the element n- in common, which consequently may be regarded as the original suffix conveying the idea of distributive plurality; the more so, as in the following instances n- actually denotes distribution.”

(40) Coos
a. dji
   IE dji’nit ‘it came’
   ‘they came (singly)’

b. cin€ri’k-E
   tsEl’n€ t€ tikane ‘they came (singly)’
   ‘you stand!’
   ‘side by side they two were standing.’
   (Frachtenberg, 1922, p. 327)

A similar suffix, also labeled a distributive by Frachtenberg, appears with nouns, although much more rarely. ‘-mI is suffixed to nouns of relationship only and expresses a degree of mutual kinship. It is etymologically related to the verbal distributives -ne’, -dni (1922, p. 371).

(41) Coos
a. sla’atc ‘cousin’
   t€ sla’tcini ‘they two were mutual cousins’

b. h€ Lâtc ‘elder brother’
   i-n h€Ltc’ni ‘we are brothers mutually’
   (Frachtenberg, 1922, p. 371)

In the limited cases where the distributive suffix appears with nouns, it retains its primary function.

Karok also shows cross-category number marking. Recall the verbal multiple event suffix -va illustrated in examples (7) through (10). The suffix appears with other kinds of lexical items as well, still with the multiple event or distributive sense.
(42) Karok
a. axyara
   axyard-vah  ‘full’
   ‘all full (of various vessels)’
b. idê-kxaram
   idê-kxarám-vah  ‘one night’
   ‘night after night’ (Bright, 1957, p. 82)

Distribution is more often pertinent to events than to entities, and correspondingly more likely to be marked on verbs than on nouns and adjectives. As the Central Pomo, Maidu, Coos, and Karok data show, however, distributive markers can fuse with adjectives and nouns as well, while still retaining their original function.

2.2.2 The functional shift of derivational affixes over time

There is evidence that the functions of distributive affixes can change after they have become morphologically bound, under certain conditions. The Iroquoian languages contain several distributive verbal suffixes. As in other languages, the suffixes function to distribute actions over time, space, or participants. This effect can be seen in the verbs in (43) from Cayuga, a Northern Iroquoian language of Ontario. [All of the Cayuga examples are from Reginald Henry (personal communication).]

(43) Cayuga

   ehsýé:tho:?
   ‘you will plant’
   ehsýé:thwahs:o:?
   ‘you will plant a lot of different things’

Most Iroquoian nouns referring to human beings contain pronominal prefixes indicating the gender and number of their referents, but number is not normally specified otherwise in nouns. Several suffixes, however, clearly cognate with the verbal distributives, do appear on nominals.

(44) Cayuga

   a. kanyo:?
      kanyo:šô?:oh  ‘wild animal’
      ‘game’
   b. enohsonyà:tha?
      enohsonyà:tha?šô?:oh  ‘one builds houses with it, tool’
      ‘house building tools’
   c. akétkw?wëta?
      akétkw?étà?šô?
      ‘my suitcase, my handbag’
      ‘my baggage’

The suffixes do not appear every time multiple entities are referred to; they specify a variety of assortment of kind. The term translated ‘tools’ would not be used for several identical hammers. (The words for ‘game’ and ‘tools’ are morphologically verbs, but the suffix modifies them as lexicalized nominals rather than etymological verbs. The term for ‘tools’ does not mean ‘one builds various houses with it.’)

Distributive suffixes do appear systematically with certain terms referring to more than two people. They always appear with plural terms for ‘children’ or ‘old people,’ for example, although not with duals.
The suffix also appears with certain kin terms whenever they are plural.

With these nominals, the force of the suffix has moved from distribution to plurality. This is not surprising; human beings are often considered inherently individualistic and differentiated. Still, the suffix has not become a full-fledged inflectional plural marker. It does not appear systematically with all nouns referring to humans or even to kinsmen. It is lexically governed. The basic nouns for ‘men’ and ‘women,’ for example, do not contain it.

Although these patterns are normally maintained by all Iroquoian speakers in spontaneous speech, the influence of English can be seen on occasion, as teachers work at normalizing grammatical patterns for language curricula. As they search for paradigms on English models, younger, more English-dominant speakers sometimes take advantage of the distributive as an equivalent of the English inflectional plural. They still do not use distributives as general plurals in spontaneous discourse, however.

Another example of a shift in the function of a derivational affix comes from Chinook, a Chinookan language formerly spoken in southern coastal Washington. When Boas recorded the language in 1890–1891, there were only two remaining speakers. In his grammatical sketch, he described a verbal suffix -Em: “distribution at distinct times...followed usually by -x (customary)” (1911a, p. 596). The texts he recorded amply show that the suffix functioned as a verbal distributive.

Both verbs and nouns in Chinook contain pronominal prefixes distinguishing person, gender, and number. In the verbs in (48), the prefixes...
following the aorist a- refer to ergative and absolutive arguments. Pronominal prefixes similar in form to the absolutes distinguish masculine, feminine, neuter (indefinite), dual, or plural nouns. Gender is no longer biological, although Boas detected enough of a pattern to conclude that it once was. Compare the prefixes below: i- masculine singular, o- feminine singular, and t- plural.

(49) Chinook
i'kala 'man'
t-kalauks 'men'
i-goa-iné'nē 'beaver'
t-goa-iné'nē 'beavers'
i-qleyo'qxut 'old man'
o-qleyo'qxut 'old woman'
t-qleyo'qtiic 'old people'

In addition to their pronominal prefixes, some plural nouns contain suffixes. Nouns for human beings bear a suffix, -ikc or -ukc, as in the words for 'men' and 'old people' above. A particularly interesting suffix on many plural nouns is -ma. Boas considered this nominal suffix to be cognate with the verbal distributive -Em-x: "the frequent plural-suffix -ma (Kathlamet -max) seems to have been originally a distributive element. This appears particularly clearly in the words े-.xtEmai 'sometimes' (ें.t 'one'; -ma distributive; -ें adverbial); kana'mtEma 'both' (kana'm 'both, together'; -ma distributive)" (Boas, 1911a, p. 608).

The textual material from Chinook shows that the distributive force of the suffix had been generalized toward pluralization by the time Boas recorded it. Nouns that have -ma forms usually appear in the texts with the -ma whenever multiple entities are mentioned. These are only a subset of the nouns in the language, however, and they tend to refer to entities especially likely to occur distributively, such as islands, towns, houses, things, warriors, rocks, days, or elk.

The functions of number markers can thus shift after they have become bound to nouns, toward a distinction that is more generally pertinent to nouns: pluralization. It is easy to see how the shift might come about. Distributive markers on nouns tend to recur with certain semantic classes: those that are highly differentiated. Since human beings are often considered inherently individuated, highly distinct by their very nature, nouns referring to them might easily bear distributive markers nearly every time multiple human beings are involved. The reinterpretation of the distributive marker as a plural under such conditions is a short step. It also serves a useful function: Speakers and hearers are usually more interested in the number of people involved in events than in the number of objects. Data from Kwakiutl, Cayuga, and Chinook
indicate that the shift may continue one step further under special conditions. Under heavy influence from a language like English, where plural is an inflectional category of nouns, number marking may be reinterpreted as a more general category and extended to more contexts.

3. The Predominance of Verbal Number Markers in North America

North American number-marking systems still remain strikingly different from those found in many other parts of the world. Throughout North America, verbal number markers are generally more pervasive, productive, and elaborate than nominal number markers. The nominal number markers that do exist are usually verbal in origin and in character, signaling distribution rather than simple plurality. These tendencies are probably not unrelated to other characteristics of the languages themselves. A surprising proportion of North American languages share certain structural traits, although they are not demonstrably related genetically. As a whole, they are predominantly verb centered. Verbs are typically elaborate morphologically, containing bound pronouns referring to core arguments, as well as numerous locative, temporal, and other adverbial distinctions, and often even incorporated noun stems. Verbs can usually function as self-contained sentences in themselves. When they contain third person referential pronouns, separate nominal constituents are not syntactically bound to verbs as they are in English. They function more as appositives to the bound pronouns, supplying identification where necessary. It is not surprising that these appositional nominal adjuncts should fail to be inflected systematically for number.

4. Inflection, Derivation, and the Lexicon

Number distinctions in North America are typically not only verbal, they are usually lexical and derivational rather than inflectional. This is no accident. As Bybee (1985) points out, inflectional distinctions are obligatorily specified on all members of a lexical class or subclass. In English, number is marked inflectionally on all count nouns, and tense on all finite verbs. We know that every singular count noun has a plural counterpart, and every present tense verb has a past tense, although we may not know exactly what the forms are. Inflectional categories must therefore be sufficiently general in meaning to be applicable to all members of a lexical class or subclass.

The distinction between singular and plural number may be equally applicable to all nouns, but it is not equally pertinent to all verbs. For some events, number can be central: One bird flitting by can be conceived of as a different event from a flock flying by in formation; picking up one object
can be classified as a different motion from gathering up a lot of objects. Such distinctions can be sufficiently important to be encoded lexically, and in North America, events of this type are frequently expressed by means of different verb stems. Such classifications can of course be culture specific, but the similarities across North America are striking. Languages differ more in the number of verb roots that encode number than in the types of verbs that do. Most common are verbs of position (‘sit,’ ‘stand,’ ‘lie’), of handling (‘put,’ ‘take,’ ‘pick up,’ ‘drop,’ ‘throw’), of basic motion (‘go,’ ‘walk,’ ‘run,’ ‘fly,’ ‘swim’), and killing and dying. Also typical are certain social activities, such as conversing, eating, and crying (mourning).

In many cases, number may not be a sufficiently central aspect of an event to be encoded in a distinct verb root, but it may be pertinent enough to motivate the creation of a special lexical item. Hitting a man once and giving him a beating might be classified as subtypes of the same basic activity, so they might be expressed with verbs based on the same root. If the repeated hitting corresponds to a recognizable, conceptually unitary event, speakers might exploit their derivational morphology to create a word for this concept. Similarly, doing laundry may be simply categorized as washing, or a special term may be created, perhaps with multiple event suffix, for this special activity. Like all derivational processes, these devices vary in productivity from language to language.

Verbal number distinctions rarely become inflectional, because the pertinence of number varies so greatly from one type of event to another. As Bybee points out, once the most important number distinctions are expressed lexically, and other significant number distinctions expressed derivationally, there is little motivation to extend number specification to the remaining verbs in a language.

Basically verbal number distinctions are sometimes extended to nouns, but they seldom spread to all nouns, because of their specialized function. Distributive markers retain a distributive meaning, serving to emphasize the distribution or separateness of the entities referred to by nouns. In some cases, they eventually appear with all nouns referring to multiple human beings, since people can be considered inherently individualistic and differentiated. At this point, they can function essentially as plural markers, but still, only within the range of nouns referring to people. This is not an unstable state; the number of human beings involved in an event is generally more interesting to speakers than the number of inanimate objects. Even languages with no inflectional or derivational number marking at all on nouns often contain separate noun stems for ‘person’ and ‘people,’ ‘man’ and ‘men,’ ‘woman’ and ‘women,’ ‘child’ and ‘children.’

5. Conclusion

Number is thus not necessarily a nominal category or even an inflectional one. In many North American languages, it is primarily a verbal category:
Number markers appear predominantly on verbs and quantify aspects of events. On occasion, basically verbal number markers are extended to nouns and adjectives where appropriate, but they retain their basic functions, usually marking distribution.

Once distributives are extended to nouns, their functions can shift. Because people can be viewed as inherently differentiated, distributives often come to appear with all nouns referring to multiple human beings. At this point, the markers may be reinterpreted as plurals, but only in this restricted domain. The next step, the extension of the plural function to all nouns, apparently occurs only under the heavy influence of another language with a general inflectional plural, such as English.

The functional difference between nominal and verbal number markers results in a formal difference. Plurality is a sufficiently general feature of entities to be applicable to all count nouns. It is thus often inflectional. Verbal number distinctions, by contrast, vary widely in their importance and applicability to events. They rarely become inflectional. Instead, they are encoded lexically, derivationally, or not at all.

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References


