

Nominal plural: hierarchies and semantic maps; form, frequency and distribution*

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1. Nominal plural in the literature

Number marking in general

Frequent wrong beliefs about number (Corbett 2000):

- Number is just an opposition of singular versus plural
- All relevant items (nouns, for instance) will mark number
- Items which do mark number will behave the same
- Number must be expressed
- Number is only a nominal category

“It is hardly an arbitrary fact about human languages that the most familiar number oppositions are those between singular and plural...which may be augmented by a dual and more rarely also by a trial or a paucal, whereas grammatical number paradigms including, say, a viginti-dual or a nonaginta-trial are unheard of.” (Plank 1987: 179f).

Number categories: plural, dual, trial, paucal, associative plural

Related categories: collective, singulative, distributive

Further issues: Agreement, resolution rules, number suppletion (for verbs see Veselinova 2003), pluralia tantum/lexical plurals.

Animacy hierarchy

Animacy Hierarchy (Corbett 2000, Smith-Stark 1974, see also Plank 1987: 181)
speaker > addressee > 3rd person > kin > human > animate > inanimate

- The singular-plural distinction in a given language must affect a top segment on the Animacy Hierarchy
- Lexical items may be irregular in terms of number marking with respect to the Animacy Hierarchy and regular in terms of agreement, but not vice versa.
- As we move rightwards along the Animacy Hierarchy, the likelihood of number being distinguished will decrease monotonically (that is, with no intervening increase).

Functional motivation? “When we claim that number marking, in a certain language, is governed by a functional principle of formal economy, we expect, very generally speaking, that number distinctions are made *only* with those words...where such distinctions are communicatively relevant and are not inferable from the linguistic or situational context” (Plank 1987: 180)

Occurrence of nominal plurality (Haspelmath 2005)

| | | |
|---|--|--|
| No nominal plural | | |
| Plural only in human nouns, optional | | |
| Plural only in human nouns, always obligatory | | |
| Plural in all nouns, always optional | | |
| Plural in all nouns, optional in inanimates | | |
| Plural in all nouns, always obligatory | | |

Plural words (Dryer 1989, 1992, 2005)

Zapotec (Isthmus): (<http://www.sil.org/mexico/zapoteca/istmo/G023a-GramaticaZapIstmo-ZAI.htm>)

| | | | | | |
|----|--------------|--------------|-------|--------------|-------|
| ca | yoo | chupa | yoo | stale | yoo |
| PL | house | two | house | much | house |
| | ‘the houses’ | ‘two houses’ | | ‘many house’ | |

Seychelles Creole (Mark 8:4)

Son **bann** disip ti reponn li...
his **PL** disciple TENSE answer he
‘And his disciples answered him...’

Sranan (Mark 8:4)

Ma **dem** disciple piki hem taki...
but **PL** disciple answer he say

Kriol (Mark 8:4)

Wal im wekinmen **olabat** bin tok...
And he disciple **PL** TENSE say

In word order correlations, plural words are “verb patterners”, i.e. there is a correlation between VO and PlurN order (often) and between OV and NPlur order (invariably) (Dryer 1992: 104)

Branching direction theory: Verb patterners are non-phrasal (nonbranching) categories and object patterners are phrasal (branching) categories (Dryer 1992: 109).

“...it appears that plural words are more common in head-marking languages than they are in dependent-marking languages.” (Dryer 1989: 888)

Head marking vs. dependent marking (Nichols 1992, ch. 2)

| | Head | Dependent | Head marking: usually pronominal affixes | Dependent marking: usually case |
|-------------|-----------|--|---|---|
| Noun phrase | Possessum | Possessor | Possessive affixes | Genitive |
| Sentence | Verb | noun or pronoun subject, object, and indirect object | Pronominal affixes for subject, object, indirect object | Grammatical case (Nominative, Accusative, Dative, Ergative, Absolutive) |

Form of plural marker

Dryer (2005)

- Plural stem change
- Plural tone
- Plural prefix
- Plural suffix
- Plural clitic
- Plural word
- No plural
- Plural by complete reduplication
- Mixed (no method primary)

Dinka: plural stem change

nom ‘head’, *PL nhiim*

...cieth ne piu nhiim...
...walk LOC water head:PL
‘...he walked on the sea.’

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Shilluk

“A general rule for the formation of Plurals in Shilluk cannot be given. Practically one has to learn the plural of nouns from the dictionary. We give here below some practical guide-rules.

Plurals may be formed by change in the stemvowel or by prefixes or suffixes.” (Kohnen 1933: 19)

caŋ PL *caŋi* / *cyañi* ‘day’
yith PL *yidhi* ‘ear’
cino PL *cinj* ‘hand’

dhoŋ PL *dhoŋi* ‘basket’
yath PL *yenh* ‘tree, plant’
pac PL *myer* ‘town’

jalo ‘man’ *jak* ‘men(no boys), *coww* ‘men (no women)’
dhano ‘human being’ PL *ji* ‘people’, PL *tado* ‘crowd’
PL TANTUM *pi* (*piu*) ‘water’

Swahili: plural prefix

ki-kapu ki-kubwa ki-moja ki-lianguka vi-kapu vi-kubwa vi-tatu vi-lianguka
7-basket 7-large 7-one 7-fell baskets 8-large 8-three 8-fell
‘One large basket fell-’ ‘Three large baskets fell.’

Affix or clitic?

Mari (Mark 8: 31) {Dryer: affix}

kalyk vujlatyše da pervosvjaščennik i kniga ludšo-**vlak**
people elder and chief.priest and book reader-PL
‘of the elders, and of the chief priests, and scribes’

Guaraní {Dryer: plural word}

gente **kuéra**-pe ichupe **kuéra**
people PL-to s/he:to PL
‘to the people’ ‘to them’

Neutralization

Nichols (1992: 144) four types:

- Formal number oppositions are absent from some part of speech
- The formal number opposition is available only to restricted lexical items
- The formal opposition is available, but its use is optional and marked or emphatic.
- Number categories are neutralized for some part of speech

Categorical neutralization / categorical split

Only kinship terms can have plural (Daga *wai*)

Only possessed nouns can have plural (Kâte)

Only nouns in postverbal position can have plural (Paumari)

In obviative (4th person) number is neutralized (Cree, Ojibwa)

Oblique cases do not have plural non-definite forms (Mordvin)

Accidental (?) neutralization in some declension classes

Old English: Nom/Akk Sg=Pl e.g. strong declension heavy-stem neuter *a/ŷa*-nouns: *word* ‘word(s)’, minor declension disyllabic masculine nouns in *-nd-*: *hettend* ‘enemy/enemies’, etc. (Plank 1987: 188).

“Perhaps disappointingly, the strongly universalist position that functional economy is a major influence on number marking in all languages is undermined by the synchronic and diachronic results obtained for Old English, where patterns of number neutralization are functionally often arbitrary” (Plank 1987: 233).

But some functional subpatterns can be found, e.g., in German (Plank 1987: 184)

Gatte (PL *Gatten*) ‘husband’, *Riese* ‘giant’, *Zeuge* ‘witness’, *Bote* ‘messenger’, *Knabe* ‘boy’, *Ochse* ‘ox’
Karpfen (PL=SG) ‘carp’, *Bogen* ‘bow’, *Kuchen* ‘cake’, *Schnupfen* ‘catarrh’

Swedish (Mark 8:4)

Men hans efterföljare svarade...
But his follower(s) answer:PST

Lärjung-ar-na svarade honom...
disciple-PL-DEF.PL answer:PST he:OBL
‘And his disciples answered him...’

Grammaticalization

plural word > clitic > affix > cumulation > (umlaut > ablaut >) zero
cumulation on other word in NP

Some lexical sources for plural words: ‘they’, ‘group, people, children’, ‘each, all’, ‘some’, (Ainu ‘friend’) (Heine & Kuteva 2001)

Loss of marking on head noun: French *le pomme* PL *les pommes*

Global typology of noun phrase structure?

Gil (1987): Type A (distinguish between count and mass nouns, e.g. English) and Type B languages (no count-mass distinction in nouns, e.g. Japanese)

Type A: obligatory (in)definiteness markers, obligatory plural markers

Type B: numeral classifiers, adnominal distributive numerals, free NP-internal constituency order

Postulated Universal: If a language has obligatory marking of (in)definiteness, then it has obligatory marking of nominal plurals (but not vice versa)

Difficult to determine whether there are counter-examples, because it is not obvious what obligatory exactly means. Possible counter-examples: Mapudungun, Indonesian, Tagalog, Chamorro and others.

Frequency

Tiersma (1982): local markedness, markedness reversal

Higher frequency of the plural forms may have consequences on form. If the plural is more frequent, it may prevail in analogical leveling against the singular, as in some varieties of Frisian

Frisian

| Before analogy | Plural | After analogy | Plural | |
|--------------------|------------------------|---------------|-----------------|-----------------|
| Singular | | Singular | | |
| <i>kies</i> | <i>kjizzen</i> | <i>kjizze</i> | <i>kjizzen</i> | ‘tooth, teeth’ |
| <i>trien</i> | <i>trjinnen</i> | <i>trjin</i> | <i>trjinnen</i> | ‘tear, tears’ |
| <i>hoer</i> | <i>hworren</i> | <i>hoer</i> | <i>hoeren</i> | ‘whore, whores’ |

Further diachronic reflects of locally unmarked singulars: (a) loanwords borrowed as plural forms (such as Chamorro *sapatos* ‘shoe’ < Spanish *zapatos* ‘shoes’), (b) etymologically double plurals (such as English *child.r.en*, Dutch *kind.er.en* id.), (c) irregular plural forms (English *teeth*) and (d) unmarked plural forms (English *sheep, fish*).

2. The investigation

Aims:

- Investigate correlations between distribution (frequency, among other things) and form while meaning is kept constant. How is form shaped by distributional properties?

- How much text is required to find out something relevant about cross-linguistic distribution? Can this be done on the basis of parallel texts?
- Does the animacy hierarchy emerge automatically from all data considered if explorative statistic techniques are used? (This will not be the case if non-motivated neutralization is dominant)
- Try to develop and apply standard procedures for dealing with corpus data in typology.

Text sample and its bias (Mark 8):

1 Anomis dienomis, susirinkus gausiai miniai ir žmonėms neturint ko valgyti, Jėzus, pasišaukęs savo mokinius, tarė: 2 “Gaila man minios! Jau trys dienos žmonės yra su manimi ir neturi ko valgyti. 3 Jei paleisiu juos namo alkanus, jie nusilps kelyje, nes kai kurie yra atėję iš toli”. 4 Mokiniai Jam atsakė: “Iš kur dukymoje gauti duonos sušėti ant žemės. Paėmęs septynis kepalus, palaimino, laužė ir davė mokiniams dalyti, ir tie padalijo miniai. 7 Jie dar turėjo kelias žuvelės. Jis palaimino jas ir taip pat liepė dalyti. 8 Žmonės pavalgė iki soties, ir jie surinko dar septynias pintines likučių. 9 O valgytojų buvo apie keturis tūkstančius. Jėzus paleido juos 10 ir tuojau, išėdęs su mokiniais į valtį, nuplaukė į Dalmanotos sritį. 11 Čia priėjo fariziejų ir pradėjo su Juo ginčytis. Mėgindami Jį, jie reikalavo ženklą iš dangaus. 12 Atsidusęs iš dvasios gilumos, Jis tarė: “Ir kam šita karta reikalaus ženklą? Iš tiesų sakau jums: ženklą šiai kartai nebus duota!” 13 Ir, palikęs juos, Jis vėl sėdo į valtį ir nuplaukė į kitą krantą. 14 Mokiniai buvo pamiršę pasiimti duonos. Jie teturėjo su savim valtyje vieną kepalą. 15 Jėzus juos įspėjo: “Žiūrėkite, saugokitės fariziejų raugo ir Erodo raugo”. 16 Jis svarstė tarpusavy, sakydami: “Tai todėl, kad nepasiėmėme duonos”. 17 Tai supratęs, Jėzus tarė: “Kam jūs tariatės neturį duonos? Argi vis dar neišmanote ir nesuprantate ir jūs širdys vis dar užkietėjusios? 18 Turite akis, ir nematote; turite ausis, ir negirdite? Argi neatsimenate, 19 jog penkis kepalus Aš sulaužiau penkiems tūkstančiams? O kiek pilnų pintinių trupinių pririnkote?” Jie atsakė: “Dvylika”. 20 “O kai septynis kepalus sulaužiau keturiems tūkstančiams, kiek pilnų pintinių trupinių pririnkote?” Jie atsakė: “Septynias”. 21 Tada Jis tarė: “Tai kaipgi vis dar nesuprantate?!” 22 Jie ateina į Betsaidą. Ten atveda pas Jėzų neregį ir prašo jį palytėti. 23 Jis paėmė neregį už rankos ir nusivedė už kaimo. Ten spjovė jam į akis, uždėjo ant jo rankas ir paklausė: “Ar ką nors matai?” 24 Šis apsižvalgęs tarė: “Regiu žmones. Lyg kokius medžius matau juos vaikščiojančius”. 25 Jis vėl rankomis palietė jo akis ir liepė apsižvalgyti. Ir šis tapo sveikas ir viską aiškiai matė. 26 Jėzus išsiuntė jį namo, sakydamas: “Neužėik į kaimą ir niekam ten nepasakok!” 27 Jėzus su savo mokiniais išėjo į Pilypo Cezarėjos kaimus. Kelyje klausė mokinius: “Kuo mane žmonės laiko?” 28 Jie atsakė: “Vieni Jonu Krikštytoju, kiti Eliju, tretvienu iš pranašų”. 29 Tada Jis paklausė: “O jūs kuo mane laikote?” Petras Jam atsakė: “Tu esi Kristus”. 30 Tada Jėzus griežtai įsakė niekam apie Jį nekalbėti. 31 Jis pradėjo juos mokyti, jog Žmogaus Sūnus turės daug iškentėti, būti vyresniųjų, aukštųjų kunigų bei Rašto žinovų atmetas, nužudytas ir po trijų dienų prisikelti. 32 Jis tai kalbėjo visiškai atvirai. Tada Petras, pasivadinęs Jį į šalį, ėmė Jį drausti. 33 Jėzus atsigręžęs pažūrėjo į mokinius ir sudraudė Petrą: “Eik šalin, šėtone, nes tu maštai ne apie tai, kas Dievo, o kas žmonių!” 34 Pasišaukęs minią ir savo mokinius, Jėzus prabilo: “Jei kas nori eiti paskui mane, teišsižada pats savęs, teima savo kryžių ir teseka manimi. 35 Kas nori išgelbėti savo gyvybę, tas ją praras; o kas praras savo gyvybę dėl manęs ir dėl Evangelijos, tas ją išgelbės. 36 Kokia gi žmogui nauda, jeigu jis laimėtų visą pasaulį, o pakenktų savo sielai? 37 Arba kuo žmogus galėtų išsipirkti savo siela? 38 Jei kas gėdīs manęs ir mano žodžių šios svetimaujančios ir nuodėmingos kartos akivaizdoje, to gėdysis ir Žmogaus Sūnus, kai Jis ateis savo Tėvo šlovėje su šventaisiais angelais”.

Haitian Creole

Menm epòk sa a, yon gwo foul moun te sanble ankò. **Yo** pa t' gen anyen pou **yo** manje. Jezi rele dispip li **yo**, li di **yo** konsa: 2-Kè m' fè m' mal pou moun sa **yo**. Sa fè twa jou depi **yo** la avè m', **yo** fin manje tou sa **yo** te pote. 3Si m' voye **yo** al lakay **yo** konsa san manje, y'a tonbe feblès nan chemen paske gen ladan **yo** ki soti byen lwen. 4Disip li **yo** reponn li: -Nan dezè sa a, ki bò poun jwenn pen pou plen vant tout moun sa **yo**? 5Jezi mande **yo**: -Konbe pen nou gen la a? **Yo** reponn: -Nou gen sèt pen. 6Lè sa a, li fè foul moun **yo** chita atè; li pran sèt pen **yo**; li di Bondye mési, li kase **yo** an moso, li renmèt **yo** bay dispip li **yo** pou **yo** mache bay tout moun. Disip **yo** mache bay tout moun pen. 7Te gen kèk ti pwason la tou. Jezi di Bondye mési pou **yo** tou, li mande dispip li **yo** mache bay tout foul moun **yo**. 8Tout moun te manje vant plen. **Yo** plen sèt panyen pote ale avèk moso ki te rete. 9Te gen katmil (4.000) moun konsa antou. Apre sa, Jezi voye **yo** ale. 10¶ Touswit apre sa, li moute nan kannòt la avèk dispip li **yo**, li ale nan yon peyi **yo** rele Dalmanouta. 11Farizyen **yo** vin rive. **Yo** tanmen diskite avèk Jezi: **yo** te vle pran li nan pèlen. **Yo** mande l' pou l' fè yon mirak ki pou moutre se Bondye ki ba li tout pouwva sa a. 12Jezi bay yon gwo soup pou nan kè l', li di **yo** konsa: -Poukisa moun alèkile **yo** renmen mande mirak konsa? Se vre wi sa m'ap di nou la a: **yo** p'ap jwenn okenn mirak. 13Apre sa, li vire do l' ba **yo**, li tounen nan kannòt la; li pati pou lòt bò lanmè a. 14Men, dispip **yo** te bliye pran lòt pen: **yo** te gen yon sèl grenn pen avè **yo** nan kannòt la. 15Jezi ba **yo** lòd sa a: -Fè atansyon. Pran prekosyon nou avèk ledven farizyen **yo** ansanm avèk ledven Ewòd la. 16Disip **yo** pran pale pou kont **yo**, yonn t'ap di lòt: -Se paske nou pa gen pen kifè l' di nou sa. 17Jezi vin konnen sa **yo** t'ap di konsa. Li mande **yo**: -Poukisa n'ap

di: se paske nou pa gen pen? Se konnen nou pa konnen? Nou poko ka konprann toujou? Se bouche lespri nou bouche konsa? 18Gen lè nou pa wè nan je nou? Nou pa tandè nan zòrèy nou? Se bliye nou gen tan bliye? 19Lè m' te separe senk pen bay senkmil (5,000) moun **yo**, konbe panyen plen moso nou te pote ale? **Yo** reponn li: -Douz panyen. 20Jezi mande **yo** anko: -Lè m' te separe sèt pen bay katmil (4,000) moun **yo**, konbe panyen plen moso nou te pote ale? **Yo** reponn li: -Sèt panyen. 21Lè sa a li di **yo**: -Nou pa konprann toujou? 22 Apre sa, y' ale Betsayda. **Yo** mennen yon nonm avèg bay Jezi. **Yo** mande li pou l' te manyen li.

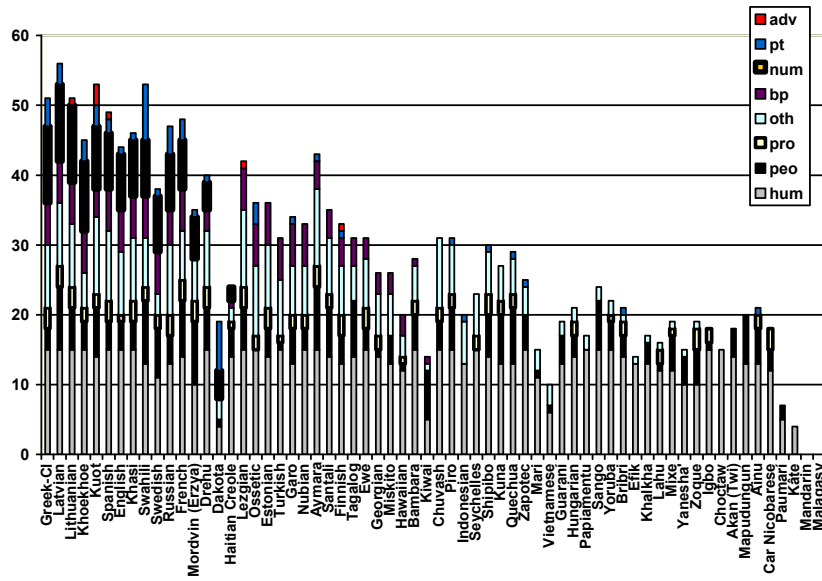
Language sample and its bias (with “literalized” frequency)

| LANGUAGE | CONT | FAM | FORM | FREQ | LANGUAGE | CONT | FAM | FORM | FREQ |
|-------------------|------|-----|------------|------|-------------------|------|-----|------------------|------|
| Khoekhoe | A | | Inf | 45 | Chuvash | E | TU | N-sem/ | 31 |
| Nubian | A | | N-(i)(gi) | 33 | Khasi | E | AA | ki N | 46 |
| Swahili | A | NC | Cl-N | 53 | Santali | E | AA | N-ko | 35 |
| Ewe | A | NC | N-wo | 31 | Car Nicobarese | O | AA | yip/yik N | 18 |
| Bambara | A | NC | N-w | 28 | Vietnamese | O | AA | các N/ | 10 |
| Sango | A | NC | a-N | 24 | Garo | E | ST | N-rang | 34 |
| Yoruba | A | NC | awon N | 22 | Lahu | O | ST | N hui / te` hpa_ | 16 |
| Akan (Twi) | A | NC | N-fo | 18 | Mandarin | O | ST | N-men | 0 |
| Igbo | A | NC | ndi N | 18 | Drehu | O | AN | ange/ite/lao N | 40 |
| Efik | A | NC | m-N | 14 | Tagalog | O | AN | mga N | 31 |
| Haitian Creole | C | CR | N yo | 24 | Indonesian | O | AN | Redupl | 20 |
| Seychelles Creole | C | CR | bann N | 23 | Hawaiian | O | AN | poe/mau N | 20 |
| Papiamentu | C | CR | N-nan | 17 | Malagasy | O | AN | | 0 |
| Lezgian | E | | N-ar/er | 42 | Kuot | G | | N++p | 53 |
| Georgian | E | | N-eb/ | 26 | Kiwai | G | | Irreg | 14 |
| Ainu | E | | N utara | 21 | Kâte | G | | N-fác-POSS | 4 |
| Khalkha Mongol. | E | | N nar/ | 17 | Zapotec (Isthmus) | N | | ca N | 25 |
| Estonian | E | U | N-d/N-de-/ | 36 | Dakota | N | | N-pi | 19 |
| Mordvin (Erzya) | E | U | N-t/ | 35 | Choctaw | N | | N Ahleha | 15 |
| Finnish | E | U | N-t/N-i- | 33 | Mixe | N | MZ | N ajcxy | 19 |
| Hungarian | E | U | N-k/ | 21 | Zoque | N | MZ | N-ta'm | 19 |
| Mari | E | U | N-vlak | 15 | Aymara | S | | N-naca | 43 |
| Latvian | E | IE | Inf | 56 | Shipibo | S | | N-bo | 30 |
| Greek-Cl | E | IE | Inf | 51 | Quechua | S | | N-cuna | 29 |
| Lithuanian | E | IE | Inf | 51 | Miskito | S | | N nani | 26 |
| Spanish | E | IE | N-s | 49 | Mapudungun | S | | pu N | 20 |
| French | E | IE | ART N | 48 | Guarani | S | | N kuèra | 19 |
| Russian | E | IE | Inf | 47 | Paumari | S | | adani N | 7 |
| English | E | IE | N-s/ | 44 | Piro | S | AR | N-Vne/ | 31 |
| Swedish | E | IE | Inf | 38 | Yaneshá' | S | AR | N-eshá' | 15 |
| Ossetic | E | IE | N-tæ | 36 | Kuna | S | CH | N kan/mar | 27 |
| Turkish | E | TU | N-lar/ler | 31 | Bribri | S | CH | N-pa | 21 |

Database

| | | LIT | GRC | TAG |
|---------|----------|-----------|-----------|------------|
| 08.01.0 | day | dienomis | HMERAIS | mga araw |
| 08.01.1 | people | žmonėms | | mga tao |
| 08.01.2 | disciple | mokinius | MAQHTAS | mga alagad |
| 08.02.0 | people | žmonės | | mga tao |
| 08.02.1 | 3day | dienos | HMERAI | |
| 08.03.0 | house | | | |
| 08.03.1 | many | kai kurie | TINES | |
| 08.04.0 | disciple | Mokiniai | MAQHTAI | mga alagad |
| 08.04.2 | bread | | ARTWN | |
| 08.05.0 | ?loaf | kepalų | ARTOUS | |
| 08.06.0 | people | | | mga tao |
| 08.06.1 | 7loaf | kepalus | ARTOUS | |
| 08.06.2 | thanks | | | |
| 08.06.5 | disciple | mokiniams | MAQHATAIS | mga alagad |
| 08.07.0 | fish | žuvelės | IXQUDIA | |

Semantic Profile



Frequency profile of nominal plural in Mark 8 in 64 languages (ordered according to frequency of number of plurals with numerals, plurals of body parts, and plurals of other non-animate nouns)

Anomalies:

Dakota (Boas & Deloria 1939: 66f)

“Many nouns are verbal forms with the plural ending *-pi*: Some of them have lost their verbal function and are used as nouns only while others are rather felt as verbal forms.”

'agu'yapi ‘they cause it to be scorched > bread’, *wak'a'lyapi* ‘something they make hot > tea, coffee’

Aymara

“En general, el aymara misionero y patrón marcan el plural tanto en los nombres como en los verbos con mucha frecuencia y regularidad, en contraste con el aymara descrito en los otros capitulos de este libro” (Briggs 1993: 382).

Semantic maps (Haspelmath 2003, 1997, van der Auwera & Plungian 1998, Kemmer 1993, Croft 2001)

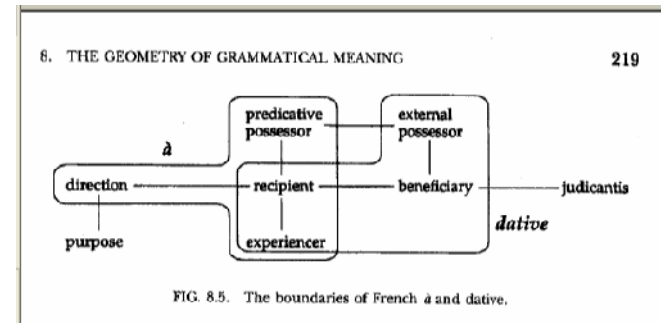
Multifunctionality

- Goethe went **to** Leipzig as a student. (direction)
- Eve gave the apple **to** Adam. (recipient)
- This seems outrageous **to** me. (experiencer)
- I left the party early **to** get home in time. (purpose)

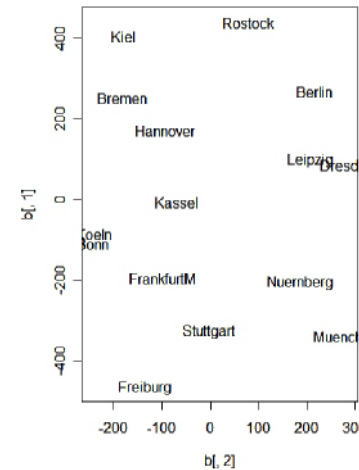
monosemist position, polysemist position, homonymist position

semantic maps: “method for describing and illuminating the patterns of multifunctionality of grammatical morphemes that does not imply a commitment to a particular choice among monosemic and polysemic analyses. Semantic maps crucially rely on *cross-linguistic comparison*...”

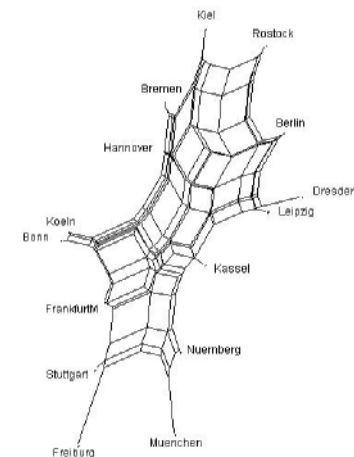
“A semantic map is a geometrical representation of functions in ‘conceptual/semantic space’ that are linked by connecting lines and thus constitute a network. The configuration of functions shown by the map is claimed to be universal.”



Multi-dimensional scaling



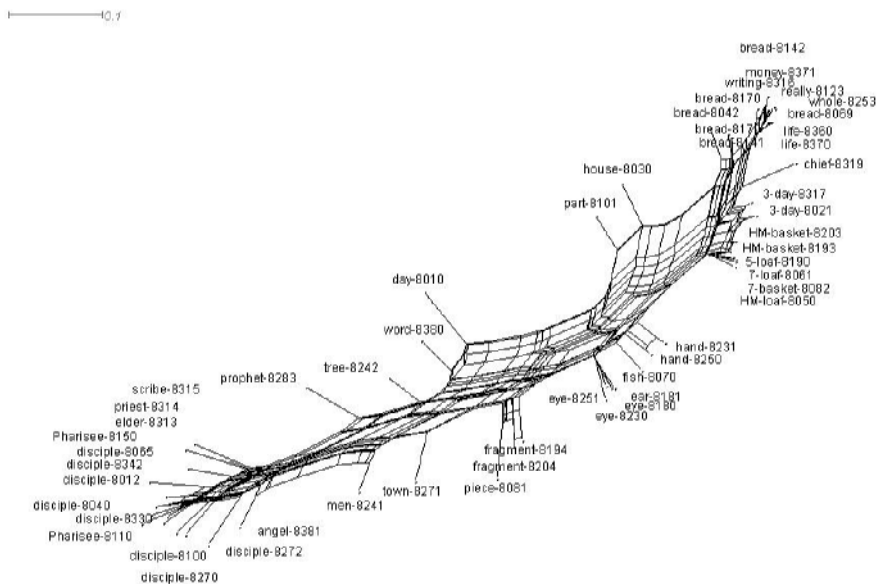
NeighborNet graph analysis



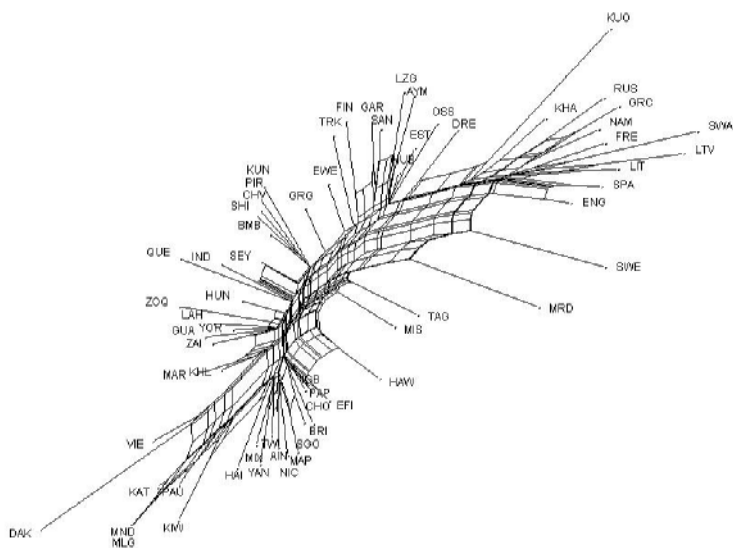
Kuot (Lindström 2002; dual forms not listed below)

| SG | PL | |
|----------------|-----------------|----------------|
| <i>kakok</i> | <i>kakokup</i> | ‘snake’ |
| <i>laukima</i> | <i>laukip</i> | ‘tooth’ |
| <i>kapuna</i> | <i>kapunəp</i> | ‘dog’ |
| <i>makabun</i> | <i>makauləp</i> | ‘woman’ |
| <i>nirobu</i> | <i>nurələp</i> | ‘coconut palm’ |
| <i>leibam</i> | <i>leibəp</i> | ‘paddle’ |
| <i>pianam</i> | <i>pialap</i> | ‘village’ |
| <i>bonim</i> | <i>bop</i> | ‘name’ |
| <i>lukuan</i> | <i>lukuap</i> | ‘house’ |

Network of passages.

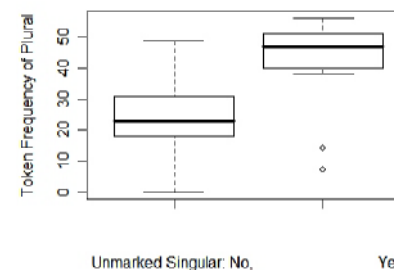


Network of languages.

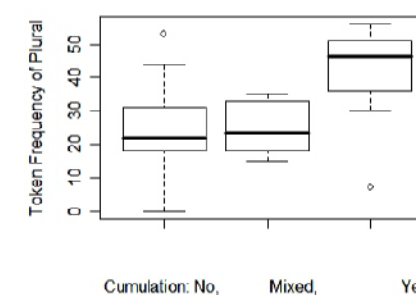


Testing correlations

Marking and frequency



Cumulation and frequency



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Statistics programs used: R: <http://www.r-project.org/>, SplitsTree4: <http://www.splitstree.org>