

Numeral classifiers compete with number marking: Evidence from Dafing

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1 Introduction

- (1) *The Sanches-Greenberg-Slobin Generalization* (Greenberg 1977, Doetjes 2007)
“If a language includes ...numeral classifiers, then it will also have facultative expression of the plural. In other words it will not have obligatory marking of the plural on nouns.”
- (2) English: Obligatory plural language
three dog-s
- (3) Thai: Numeral classifier language
thúrian sääm lûuk
durian three CL:FRUIT
'three durian'
- (4) Dafing (Mande: Burkina Faso): Plurals and classifiers
- wúrú=rú*
dog=PL
'dogs'
 - wúrú dèn flá*
dog CL:-HUM two
'two dogs'
 - **wúrú-rú flá*
dog-pl two
- (5) a. Borer (2005) and Nomoto (2013) argue that classifiers and plural markers occupy the same syntactic position to mark number: Num/Clf/Div.
b. This proposal is supported by the complementarity of plurals and classifiers in Dafing (4-c) and W. Armenian (Borer 2005).

(6) *Goals of this paper*

- To show that Dafing provides evidence for Borer's analysis of classifiers as Num heads.
- To show that this analysis permits an explanation of the Sanches-Greenberg-Slobin Generalization:

(7) *Numerical classifier conjecture*: Numeral classifiers only occur in the absence of N⁰-to-Num⁰ movement¹

- “Number-marking language”
- “Numerical classifier language”



- (8) a. *Consequence 1*: Num can be pronounced as a numeral classifier
b. *Consequence 2*: Nouns remaining in N can have *general number* (Corbett 2000), i.e., are number neutral, (cf. Greenberg 1977, Chierchia 1998).
c. *Consequence 3*: Plural marking is not a nominal affix, it will have a marked plural interpretation.

¹This idea is only novel in its specific formulation. For closely related proposals, compare Doetjes (1997), Cheng and Sybesma (1999), Borer (2005) and Nomoto (2013).

2 Dafing as a numeral classifier language

- (9) a. Mande languages are mostly head-final except for a head-initial TP.
 b. Numeral classifiers have not been previously documented in any Mande languages, so we should proceed with caution.

- (10) Noun phrase order: N-Adj-Clf-Num-Dem

- a. *mètárí zánzàn 'mí*
 teacher tall this
 'this tall teacher'
- b. *mètárí zánzàn mó 'sábá*
 teacher tall CLF three
 'three tall teachers'

2.1 Numeral classifiers in Dafing

- (11) Dafing has two sortal numeral classifiers ('count classifiers')
- a. *dèn* non-humans optional derived from *dèn* 'child'
 - b. *mó* humans obligatory derived from *mó* 'person'
- (12) Diagnostics for count classifiers (vs. noun classifiers cf. Aikhenvald 2000)
- a. Occur with numerals
 - b. Are distinct from nominalizing/n heads
 - c. Are parasitic on constructions used for measuring (Cheng and Sybesma 1998, Rothstein 2011) and kind reference (Nomoto 2013)
 - d. Impossible with mass nouns (Cheng and Sybesma 1999, Doetjes 2012)
- (13) Dafing count classifiers occur with numerals
- a. *wúrú (dèn) flá/(=ʒ̥)*
 dog CL:-HUM two(=DEF)
 '(the) two dogs'
 - b. *kɔ: *(mó) 'flá/(=ʒ̥)*
 father CL:+HUM two(=DEF)
 '(the) two fathers'
- (14) *n*-heads such as the agentive nominalizer *bàà* can co-occur with classifier
- a. *níé-só bɔì*
 bicycle ride
 'ride a bike'
 - b. *níé-só-bóí-bàà*
 metal-horse-ride-AG.NOM

- (15) 'bike-rider'
- c. *níé-só-bóí-'báá' 'mó 'flá*
 metal-horse-ride-AG.NOM CL:+HUM two
 'two bike-riders'

Identical constructions are used for measure classifiers (15-b-c)

- a. *tómàti kilóó sábá*
 tomato kilo three
 'three kilos of tomatoes'
- b. *tómàti bótó 'sábá*
 tomato bag three
 'three bags of tomatoes'

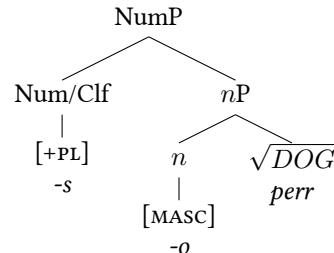
(16) Count classifiers are impossible with mass nouns

- a. *ʒè fiérén flá*
 water cup two
 'two cups of water'
- b. **ʒè dèn flá*
 water CL:-HUM two

2.2 Analysis of numeral classifiers

(17) Inflected nouns can be split into three separate projections

- a. Spanish: /perr-o-s/ 'dogs'

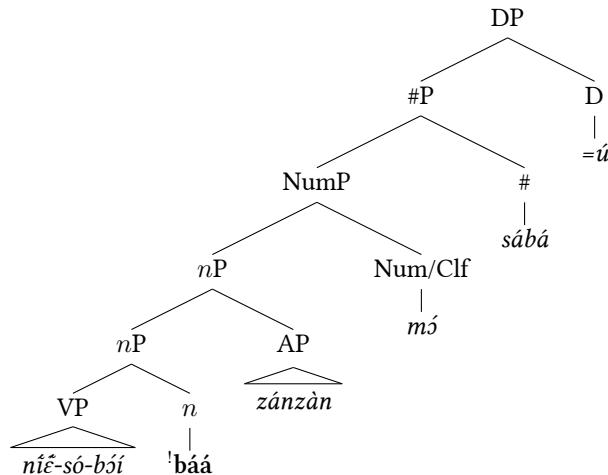


- b. *n* hosts gender (Kramer 2015) and uninterpretable number features (Wiltschko 2008, Harbour 2011, Kramer 2016).
- c. Num is the locus of *interpretable* number features (Harbour 2011, Kramer 2016) and of count classifiers (Borer 2005).

- (18) In a classifier language like Dafing, Num is spelled out as a count classifier:²

- a. *níē-só-bóí -'báá zánzàn 'mó 'sábó ='j*
 metal-horse-ride -AG.NOM tall CL:+HUM three =DEF
 'the two tall bike-riders'

b.



3 Plurality in Dafing

- (19) Recall the claim from (7), lightly revised:

If a language has numeral classifiers, then there is no n^0 -to-Num 0 /Clf 0 movement

- a. *Consequence 1:* Dafing allows free-standing classifiers because n doesn't move to Num;³ Num- n never form a morphological word.
- b. *Consequence 2:* Dafing bare n s are possible, and should allow general number interpretations (Deprez 2005, Wiltschko 2008)
- c. *Consequence 3:* Plural marking is not a nominal affix and will have a marked plural interpretation.

²I am assuming that numerals are heads in Dafing, see e.g. Cheng and Sybesma (1999), Borer (2005), Ionin and Matushansky (2006), Simpson (2005).

³For arguments for N-to-Num movement in English, see, e.g., (Wiltschko 2008).

3.1 The distribution of the Dafing plural

- (20) The Dafing plural: =ru/nu

<i>músó</i>	'woman'	<i>músó=rú</i>	'women'
<i>bà</i>	'mother'	<i>bà=rù</i>	'mothers'
<i>dèn</i>	'child'	<i>dèn=nù</i>	'children'
<i>kónin</i>	'bird'	<i>kónin=nù</i>	'birds'

- a. Consonant shape determined by nasality of preceding vowel
- b. Tone determined by tone of preceding syllable

- (21) The plural cannot occur on mass nouns

<i>dóó</i>	'beer'	* <i>dóó=rú</i>
<i>zé</i>	'water'	* <i>zé=rù</i>

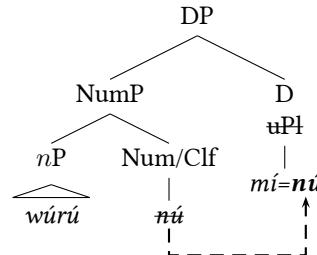
- (22) The plural is an enclitic on the noun phrase, which fuses with the definite article:

- a. *wírú='úú*
 dog=DEF.PL
 'the dogs'
- b. *wírú lwém=jù*
 dog red=DEF.PL
 'the red dogs'

- (23) The plural attaches to the right of other determiners:

- | | |
|---|---|
| a. <i>wírú mí</i>
dog this
'this dog' | b. <i>wírú mí=nú</i>
dog this=PL
'these dogs' |
| c. <i>wírú dʒ</i>
dog some
'some dog' | d. <i>wírú dʒ=rù</i>
dog some=PL
'some dogs' |

Plural-to-D movement:



- (25) Plural clitics can't occur with numerals or numeral classifiers

- a. *wúrú dèn sábá* b. *wúrú dèn sábó=’j*
dog CL:-HUM three dog CL three=DEF
'three dogs' 'the three dogs'
- c. **wúrú dèn sábá=’rú* d. **wúrú dèn sábó=’jú*
dog CL:-HUM three-PL dog CL:-HUM three-DEF.PL

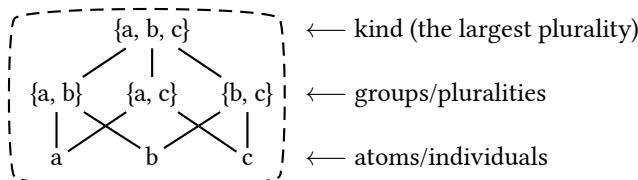
- (26) Morphological opposition on Num⁰ derives plural/classifier complementarity (Nomoto 2013); modeled with binary ±singular feature (Harbour 2011).

- a. *=ru* \iff [Num, -Singular]
- b. *mó* \iff [Num, +Singular, +Human]
- c. *dèn* \iff [Num, +Singular, -Human]

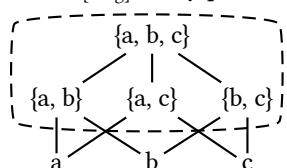
3.2 Bare nouns and general number

- (27) Extensions of bare *nP* and [\pm singular] *NumPs*:⁴

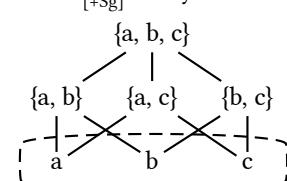
- a. Bare nouns = *nP*: General number



- b. *NumP_[-Sg]*: Only pluralities



- c. *NumP_[+Sg]*: Only individuals



→ Classifiers are necessary with numerals because pluralities get in the way of

⁴See Link (1983), Schwartzschild (1996), Chierchia (1998), Bale and Khanjian (2009), Bale et al. (2011)

counting individuals (Chierchia 1998, Ionin 2006, Bale and Khanjian 2009).

3.3 Evidence for general number

- (28) Evidence for the semantic claims above:

- a. Existential assertions
- b. Questions
- c. Ellipsis

3.3.1 Existential assertions

- (29) a. Bare nouns are used in all low-scope existential assertions, regardless of whether the existence of an individual or group is at issue.
b. To the extent that plural nouns are acceptable, my consultant reports they would only be true of groups.

- (30) Bare noun vs. plural in existential context

- a. *wúrú=ù Házàá bé*
dog=COP H. at
'Hazaar has a dog.' TRUE: if H has one dog.
TRUE: if H. has two dogs
- b. ??*wúrú=rú=ù Házàá bé*
dog-PL-cop H. at
'Hazaar has dogs.'
FALSE: if H has one dog.
TRUE: if H. has two dogs

3.3.2 Questions

- (31) Questions about existence or possession must use bare nouns, and are felicitous regardless of the number (compare Bale and Khanjian 2009 on W. Armenian):

Context: I want to know if Hazaa has any children.

Q: *dèn Házàá bé ’ré kē?*

child H. at FOC Q?

'Does Hazaa have a child?'

A1: *ðóð, dén mó cè nédàn já(← /jì-á/) bē*

Yes, child CLF one FOC-only be-3SG at

'Yes, but only one child.'

- A2: *ððð, dén mó flá já*(← /ji-á/) *bɛ*
 Yes, child CLF two be-3SG at
 ‘Yes, she has two children.’

3.3.3 Bare Argument Ellipsis

Diagnostic: Lexical ambiguity must be resolved across ellipsis contexts (Rullman and You 2006).

- (32) John saw a pen and Mary did too.
 - a. OK: John and Mary saw a writing implement.
 - b. OK: John and Mary saw an animal enclosure.
 - c. *John saw a writing implement and Mary an animal enclosure.
- (33) Bare argument ellipsis in Dafing:
 - a. *Hàzàá ní wúrú 'sán*
 Hazaa PFV dog buy
 ‘Hazaa bought a dog (one or more).’
 - b. *Rásì fànà*.
 Rasi too.
 ‘Rasi did too. (bought one or more dogs).’

→ (33-b) is fine even if Hazaa bought one dog and Rasi bought three.

3.4 Summary

- (34)
 - a. Bare *nPs* include individuals and pluralities in extension.
 - b. Plural NumPs (with *=ru*) exclude individuals, only denote pluralities, due to [–singular] feature in Num.
 - c. Singular NumPs (with classifiers) only include atoms in denotations, the semantic representation necessary for counting in Dafing, due to [+singular] feature in Num.⁵
- (35)
 - a. Similar facts exist in Turkish and W. Armenian, which having semantically marked plurals (Bale and Khanjian 2009, Bale et al. 2011), and may be a general property of Mande languages.⁶
 - b. Both languages have numeral classifiers in limited contexts (Bale and Khanjian 2009, Sag 2016), and hence provide further evidence for Sanches’s Generalization.

⁵See Bale et al. (2011) and Nomoto (2013) for discussion of variation in numeral meanings.

⁶For example, Welmers (1974:p. 214), reports similar facts in Kpelle (W. Mande).

4 Classifiers are for nouns (not numerals)

- (36)
 - a. The idea that numeral classifiers are Num heads is linked to the assumption that classifiers are *for nouns*, they enable nouns to be counted (Doetjes 1997, Chierchia 1998, 2010, Cheng and Sybesma 1999, Krifka 2003, Ionin 2006, Nomoto 2013).
 - b. On the other hand, Bale and Coon (2014) argue that numeral classifiers are *for numerals*, i.e. they provide numerals with measure functions (cf. Krifka 1995, Wilhelm 2008, Sudo 2016).
- (37) Bale & Coon’s arguments come from numeral sensitivity, e.g. in Mi’gmaq:
 - a. Mi’gmaq *n* = {1, 2, 3, 4, 5} cannot occur with numeral classifiers
na’n (**te’s*) -*ijig ji’nm-ug*
 five CL -AGR man-PL
 ‘five men’
 - b. Mi’gmaq *n* > 5 require numeral classifiers
asugom *(*te’s*)-*ijig ji’nm-ug*
 six CL-AGR man-PL
 ‘six men’
- (38)
 - a. Mi’gmaq 1-5 have measure functions built-in, while *n* > 5 do not.
 - b. Bale & Coon’s argument is convincing, and I concur that classifiers may be for numerals in such languages.
- (39) Two arguments that classifiers are *for nouns*
 - Argument 1:* Noun sensitivity (the counterpart of numeral sensitivity)
 - Argument 2:* Different classifiers have different distributions
- (40) Inherent measures noun: *té*: ‘day’
 - a. *té:-rú*
 day-PL
 ‘days’
 - b. *té*: (**dén*) *flá*
 day CL:-HUM two(=DEF)
 ‘two days’

- (41) Compounds formed with the provenancial suffix *-kà*
- a. *bóbóó-kà*
'boboese, people from Bobo (Bobojulaso)'
 - b. *bóbóó-kà-rù*
'boboeses, people from Bobo'
 - c. *bóbóó-'kà (*mó) flà*
'two boboese'
- The availability of *=ru* shows that *té*: 'day' and *bóbóó-kà* are nouns.
- (42) If classifiers are *for nouns*, such irregularities are expected: Nouns like *té*: 'day' and *bóbóó-kà* 'a boboese' are semantically partitioned for counting by default, possibly because they lack pluralities in their extension.
- (43) If classifiers are *for numerals*:
- a. Classifiers would be expected to have the same distribution with all nouns
 - b. A null classifier cannot save this analysis, since such a classifier for a human noun like *bóbóó-kà* should be available for all human nouns.

4.2 Argument 2: Different distributions of classifiers

Different classifiers have distinct distributions in the noun phrase:

- (44) The subkind classifier *sí* 'kind, group' can occur with determiners like *vjé* 'all' and *mín* 'this', which are impossible with count classifiers:
- a. *wúrú sí flá*
dog CL:KIND two
'two kinds/groups of dogs'
 - b. *wúrú sí vjé*
dog CL:kind every
'all kinds of dogs'
 - c. *wúrú sí mín*
dog CL:kind this
'this kind of dogs'
 - d. *wúrú (*dèn) vjé*
dog CL:-HUM all
'all dogs'
 - e. **wúrú sí-rù*
'types of dogs'

- (45) Mensural classifiers like *bótó* 'bag' occur with determiners and plural clitics:
- a. *tómàti bótó flá*
tomato μ:bag two
'two bags of tomatoes'
 - b. *tómàti bótó vjé*
tomato μ:bag every
'all bags of tomatoes'
 - c. *tómàti bótó mí*
tomato μ:bag this
'this bag of tomatoes'
 - d. ?*tómàti bótó=rú*
'bags of tomatoes'

Mensural classifiers cannot co-occur with count classifiers, so they are 'true' classifiers:

- a. *bótó dèn sábá*
bag CL:-HUM three
'three bags'
- b. **tómàti bótó dèn sábá*
tomato bag CL:-HUM three

These facts follow directly if classifiers are *for nouns*:

- a. Because *sí* 'kind' changes the domain in which the noun refers (Nomoto 2013), it is required for quantification over subkinds.
- b. Because measures like *bótó* 'bag' retain their nominal syntax, they can occur either in Clf/Num or as compound nouns.

These facts are unexpected if classifiers are *for numerals*; we wouldn't expect classifiers to supply predicates for pluralization or to restrict quantifiers.

4.3 Classifier-plural competition redux

Recall that plural clitics can't occur with classifiers in Dafing (25):

- | | |
|------------------------------|-------------------------------|
| a. <i>wúrú dèn sábá</i> | b. <i>wúrú dèn sábó='jú</i> |
| dog CL:-HUM three | dog CL three=DEF |
| 'three dogs' | 'the three dogs' |
| c. * <i>wúrú dèn sábá=rú</i> | d. * <i>wúrú dèn sábó='jú</i> |
| dog CL:-HUM three-PL | dog CL:-HUM three-DEF.PL |

- (50) Two explanations for classifier-plural complementarity
- Semantics: Dafing plurals and classifiers have contradictory semantics.
 - Syntax: Dafing plurals and classifiers realize different features of Num.
→ These are not incompatible; they should go together!
- (51) a. Classifier-plural complementarity follows from the *classifiers for nouns* hypothesis, as both plurals and classifiers are manipulating noun semantics.
 b. Classifier-plural complementarity is unexpected under the *classifiers for numerals* hypothesis.
 c. In contrast, Mi'gmaq and Chol both have plurals co-occurring with numeral classifiers, indicating either that their plurals are uninterpretable, in *n*, that classifiers are for numerals, or both.
- (52) Two kinds of classifier languages?
- Type 1** (Dafing): Plural marking competes with classifiers, which are 'for nouns' (true in most 'traditional classifier languages')
 - Type 2** (Mi'gmaq/Chol): Plural marking does not compete with classifiers, which are 'for numerals'

5 Summary

- (53) *Sanches-Greenberg-Slobin Generalization* (final version): In Type 1 classifier languages, plural reference is possible without overt plural morphology on the noun.
- (54) An explanation:
- Numerical classifiers and plural marking occurs in Num in the absence of *n-to-Num* movement.
 - Because *n* does not move to Num in such languages, bare *nPs* will be available, which will be interpreted with general number.
- (55) This explanation relies on some unstated assumption:
- Head-movement is always obligatory, leading to obligatory inflection.
 - In contrast, morphologically and syntactically independent heads can be freely omitted, *as long as semantically appropriate*.
 - This proposal offers a potential explanation why functional words are often freely omitted in many analytic languages.

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