# Where—and what—is number?

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## 1. Introduction

- Ritter (1993):

  Q: "Where's gender?"

  A: It varies from language to language. Gender is on the lexical noun head in Hebrew, but on the inflectional number head in Romance.

- Clarke (in progress) makes a similar argument for aspectual features: Event is in the verb phrase in Inuktitut and Japanese, but in INFL in English (Cowper 2005a) and Greek (Kyriakaki 2006).

- This paper:

  - **Where is number?**
    There is similar crosslinguistic variation in the position of number features: they can occur on lexical noun heads, or they can head a separate inflectional projection (Ritter's (1992) Number Phrase, or #P).
  - **What is number?**
    Classifiers and plural marking represent two different ways of elaborating the basic individuation feature #.
  - Data under consideration here are primarily from English and Mandarin, with brief excursions into Armenian and Cantonese.

## 2. Features and contrast

- We assume that morphosyntactic features are privative: contrasts are between the presence and absence of a feature, rather than between $+$ and $-$ values.

- The absence of a feature from a representation is meaningful only if the representation is within the scope of the relevant contrast (*sensu* Dresher, Piggott, and Rice (1994), Dresher (in press)). E.g.:

  - In phonology: Absence of Voice may be contrastive on obstruents, but not on sonorants. An obstruent without Voice differs from an obstruent with Voice and is realized as voiceless; sonorants are not specified with Voice because they are all predictably voiced.

  - In morphology: Absence of Precedence in Infl is contrastive and is interpreted as non-past tense; absence of Precedence on DP is non-contrastive.

- Wiltschko (to appear) distinguishes between head features and adjunct features. Head features determine an inflectional paradigm, and the absence of a given head feature where it could appear is therefore meaningful; adjunct features are non-paradigmatic, and their absence is not contrastive.

We take as a starting point the assumption that Universal Grammar makes available (at least) the following features relevant to the semantic field of individuation and number (Cowper 2005b; Cowper and Hall 2006):

(1) a. #: individuated
    b. $> 1$: plural

A nominal from which # is contrastively absent is interpreted as mass. Plural ($> 1$) is semantically dependent on #, and thus is interpretable only on count nominals. A count nominal from which $> 1$ is contrastively absent is interpreted as singular. Languages differ as to which features are grammatically relevant and in how the features are mapped to syntactic structure.

## 3. Taxonomy of English nouns

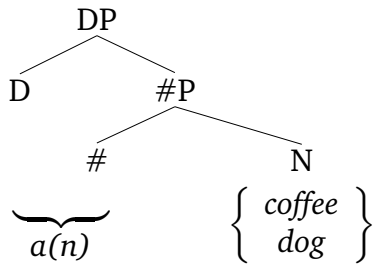
English has often been described (by, e.g., Zwicky (2006, 2008)) as permitting conversion between count and mass nominals. Contrastive underspecification permits another approach.

### 3.1 The usual pattern

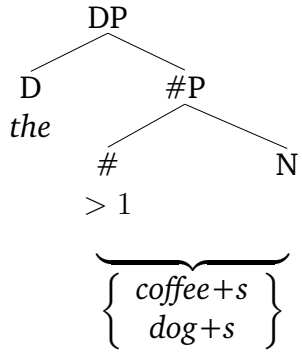
(2) a. I'd like a [$_{\#\mathrm{P}}$ coffee ], please.
    b. They grow several different [$_{\#\mathrm{P}}$ coffees ] in East Africa.
    c. There were [$_{\#\mathrm{P}}$ dogs ] in the yard.

(3) a. The cup was full of [$_{\mathrm{NP}}$ coffee ].
    b. There's a lot of [$_{\mathrm{NP}}$ dog ] in the yard.

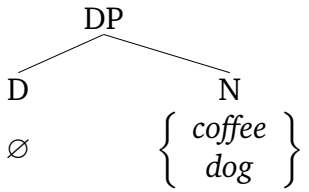
(4) a.




b.




c. *a lot of*




As shown in (4), the nouns *coffee* and *dog* are unspecified for the count-mass property. # projects syntactically in (4a) and (4b), giving a count nominal. The (contrastive) absence of the # projection in (4c) gives rise to a mass interpretation.

Under this view, there is no featural distinction between nouns like *coffee* and nouns like *dog*. They are equally capable of appearing in count and mass nominals, and no coercion is required in either case.

## 3.2 Deviations from the norm

### 3.2.1 Furniture, footwear, and equipment

*Furniture* and a few other nouns superficially resemble canonically mass nouns (such as *coffee*), in that they can occur as bare singulars with an unspecified-amount interpretation (5a).

However, they strenuously resist individuation by syntactic number, as can be seen in (5b) and (5c)—while *coffees* can be interpreted as 'servings of coffee' or 'kinds of coffee,' **furnitures* is simply ungrammatical.

(5) a. The room is full of furniture.
b. *I ordered a new furniture from Ikea. It has three knobs on the front.
c. *Of all the furnitures in the world, he had to pick Louis XV.
d. How much furniture did he bring?
e. How many pieces of furniture do we have?

Syntactically, *furniture* looks like a mass noun that peculiarly resists 'coercion.' Semantically, however, it denotes a collection of discrete entities.

### 3.2.2 Cattle and livestock

Nouns in this group share some, but not all, properties with those in the *furniture* class.

- They cannot be pluralized:

  (6) *How many cattles will she buy?

- They cannot be used with the indefinite article *a(n)*:

  (7) *A cattle is lowing.

- They can appear as bare nouns:

  (8) Mr. Jones is away buying cattle.

- They trigger plural agreement on verbs, and are referred to with plural pronouns:

  (9) a. The cattle are pushing and shoving one another. They must be hungry.
  b. *Cattle is grazing in the meadow.

- They resist being counted, though judgements vary:

  (10) a. *$^{(?)}$We expect three cattle to be delivered tomorrow.
  b. We expect three head of cattle to be delivered tomorrow.
  c. *$^{(?)}$There are six livestock in the barn.

### 3.2.3 People and geese

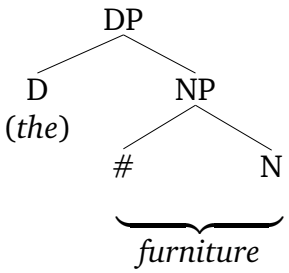
*Cattle* and *livestock* are different from ordinary irregular plurals like *people* and *geese*.

- *People* and *geese* have corresponding singular forms (*person, goose*); *cattle* and *livestock* do not.[1]
- Irregular plurals have no difficulty combining with numerals (*two people, three geese*); cf. (10a, 10c).

## 3.3 Structures

We propose that the different types of nominal have the structures shown in (11).

(11) a.

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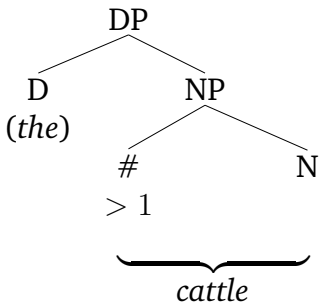
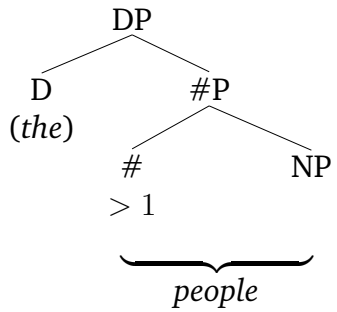



c.




The major difference between (11a) and (11b) on the one hand, and (11c) on the other, is that # is an adjunct to N in (11a,b), while it projects syntactically in (11c).

This proposal exploits Wiltschko's distinction between head features and adjunct features. However, in this case the feature that appears as an adjunct is also part of the grammatical system of the language. The presence of # as an adjunct precludes its appearance as a separate head in the same nominal projection. Just as an event can be delimited only once (Tenny 1994), a nominal can be individuated only once. (See also Borer (2005a, 2005b).)

- In English, # projects, but its dependent feature $> 1$ doesn't.
- In English, the norm is that # projects, but it can also appear as an adjunct. In Chinese, # appears only as an adjunct.
- Only one instance of # per nominal projection.
- Cases like *these books*, with two markings of $> 1$, are accounted for by a rule of plural agreement on D. If the complement of D contains $> 1$, then that feature is copied onto D.
- The English indefinite article *a(n)* spells out $[_{\text{DP}}$ D $[_{\#\text{P}}$ #.

[1] *Cattle* potentially encompasses a mixture of cows, bulls, steers, and calves, and *livestock* is more general than *cattle* but more specific than *animals*.

While the bundling of # with N as in *furniture* and *cattle* occurs in English only on a few exceptional lexical items, this pattern is more prevalent in other languages. SAY THIS BETTER.

# 4. Chinese

## 4.1 Count nouns and classifiers

In Chinese, most nouns are lexically categorized as mass or count, as argued by Cheng and Sybesma (1999). However, in order to actually be counted, Chinese count nouns must appear with a classifier, as shown in (12). Why?

(12) Mandarin (Cheng and Sybesma 1999: 514)

a. *san ben shu*
three CL book
'three books'

b. **san shu*

We propose that count nouns in Chinese are structured like *furniture*-class nouns in English. They bear the feature # as an adjunct to N. The Chinese *san shu* is thus ungrammatical for the same reason that *one furniture* is ungrammatical in English.

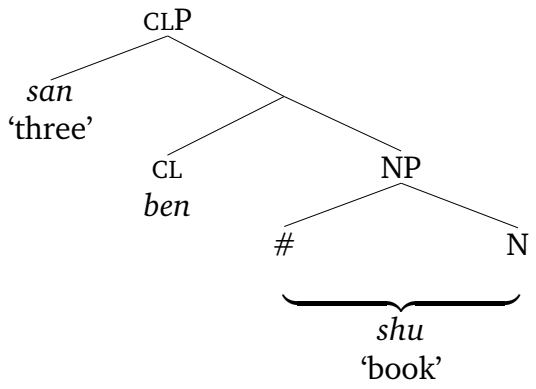
According to Cheng and Sybesma (1999: 515), classifiers "name the unit in which the entity denoted by the noun naturally occurs."

We propose that classifiers, like plural marking in English, spell out a dependent feature of # that elaborates some semantic facet of individuation. The English plural suffix spells out $> 1$, which is a grammaticalized representation of the *number* of units being referred to. Classifiers, on the other hand, spell out a grammaticalized representation of the *type* of unit. We will call this feature CL.

Each of these features is semantically dependent on #, which encodes individuation itself. In English, # is ordinarily a separate head, and the feature $> 1$ appears on this head. In Chinese, the dependency of CL on # maps onto a selection relation: CL is a head that requires an individuated complement—i.e., one that bears the feature #. In principle, this requirement could be satisfied by an English-style #P, or by an inherently individuated noun of the *furniture* type. However, # does not project syntactically in Chinese, leaving inherently individuated nouns as the only possible complement for CL.

We implement this with the structure in (13).

(13)




# in English and CL in Chinese are thus closely related projections, both of which participate in individuation in the nominal domain. We assume that numerals appear in the specifier of ClP in Chinese, in parallel to their position in English in the specifier of #P.

## 4.2 Mass nouns and massifiers

Not all Chinese nouns are lexically specified with the feature #. Those that lack #—mass nouns—cannot appear with classifiers, as predicted by the analysis sketched above.

Individuation of a mass noun in Chinese requires more than simply a morpheme naming the unit of individuation. Both individuation itself and identification of the unit of individuation are required. This is accomplished by means of what Cheng and Sybesma (1999) call "massifiers," as shown in (14).

(14) a. *san ping jiu*
three CL-bottle liquor
'three bottles of liquor'

b. *san ba mi*
three CL-handful rice
'three handfuls of rice'

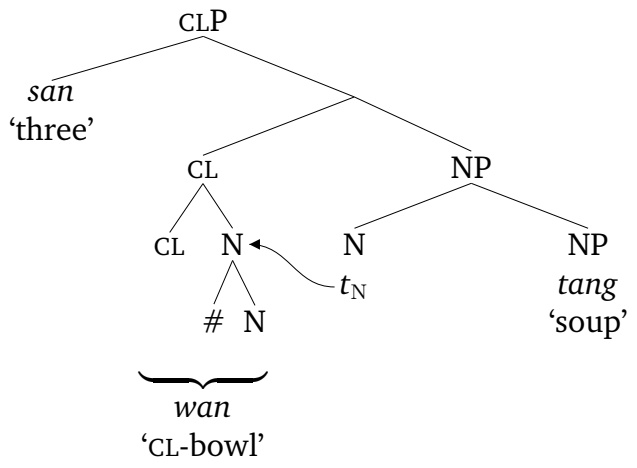
c. *san wan tang*
three CL-bowl soup
'three bowls of soup'

Massifiers have several interesting properties:

- They create, rather than simply name, a unit of measure, and can thus take mass nouns as complements.
- They can be counted without a classifier, and thus differ from other Chinese count nouns.

Cheng and Sybesma (1998) argue that massifiers are nouns that move from N to CL within CLP. The result, for us, is that they are like Edo count nouns: They bear a number feature, and that feature projects.

(15)




Count nouns can also appear with massifiers, as shown in (16).

(16) *san bang rou*
three CL-pound meat
'three pounds of meat'

## 5. On the nature of individuation

We have proposed that both $> 1$ and CL are dependents of #. However, it has been repeatedly noticed that languages that use classifiers seem not to use the singular-plural distinction, and vice versa. Why should this be?

We suggest that plurality and classification are two different dimensions of individuation, just as location, time, and person are three different dimension of deixis. Ritter and Wiltschko (2005) argue that the core function of Infl is to anchor clauses deictically, but that languages can differ as to whether that anchoring is temporal, spatial, or personal. They show that Blackfoot anchors clauses using personal deixis, and Halkomelem uses spatial deixis, while English uses the more well-known temporal deixis. Louie (2008) explores in detail the consequences of this difference for the representation of events and aspect in Blackfoot.

Returning to individuation, we can see the difference between English and Chinese as analogous to the difference between the Infls of Blackfoot, English, and Halkomelem. English elaborates individuation using plurality, while Chinese elaborates it using classification.

Are the two ways of elaborating # mutually exclusive? Languages with classifiers are often described as lacking "number." From what we've seen so far, Chinese does not appear to make use of the grammatical feature $> 1$ (although of course it has words that lexically express particular numbers of entities), and English does not appear to make use of CL (although it has words that lexically express various kinds of units). Do any languages combine the two?

## 5.1 Armenian

Armenian has both a classifier and an inflectional plural suffix, as illustrated in (17). (The Armenian data are from Borer (2005a: 94–95).)

(17) a. *Yergu had hovanoc uni-m.*
two CL umbrella have-1SG
'I have two umbrellas.'

b. *Yergu hovanoc-ner uni-m.*
two umbrela-PL have-1SG
'I have two umbrellas.'

These two forms of individuation, however, cannot be combined:

(18) * *Yergu had hovanoc-ner uni-m.*
two CL umbrella-PL have-1SG
'I have two umbrellas.'

This suggests that while a single language may make use of both CL and $> 1$, a single nominal cannot.

## 5.2 Plural marking in Chinese?

### 5.2.1 Cantonese *di*

A potential objection to the hypothesis that CL and $> 1$ cannot co-occur is that Cantonese has a classifier *di* that is often described as marking plurality, and which is, in some contexts, incompatible with a singular reading. E.g., Cheng (2009) notes that in (19), "it is necessarily more than one sweater":

(19) *Wufei di laangsaam*
Wufei CL sweater
'Wufei's sweaters' (Cheng 2009)

However, *di* displays other characteristics that are less consistent with the notion that it spells out $> 1$.

- It can be used with mass nouns:

  (20) *jat di seoi*
  one CL water
  'some water' (Cheng 2009)

- It cannot combine with numerals greater than one:

  (21) a. *Ngo mai zo jat di wun.*
  I buy PFV one CL bowl
  'I have bought a number of bowls.' (Au-Yeung 2007)

  b. * *Ngo mai zo saam di wun.*
  I buy PFV three CL bowl
  'I have bought three numbers of bowls.' (Au-Yeung 2007)

Au-Yeung (2007: 4) notes that *di* encodes a "fuzzy" expression of quantity and has

> [...] a non-collective property that prohibits its countability. This property unspecifies how the referents denoted by the noun phrase group together and the grouping does not provide a shape or unit for counting.

We conclude that *di* is purely a classifier, and that it does not encode plurality. Rather, it indicates a very non-specific unit of individuation, one that is compatible with mass and count nouns alike, but that is not concrete enough to permit enumeration.

### 5.2.2 Mandarin *-men*

There is one morpheme in Mandarin that looks very much like a plural suffix:

(22)

| | | | |
|---|---|---|---|
| *wo* | 'I' | *women* | 'we' |
| *ni* | 'you(sg)' | *nimen* | 'you(pl)' |
| *ta* | 'he/she' | *tamen* | 'they' |

(23) *Wo qu zhao haizi-men.*
I go find child-MEN
'I will go find the children.'

*-men* is not an ordinary plural marker:

- It appears only on nominals referring to human beings:

  (24) (from Li and Thompson 1989)

| | |
|---|---|
| *laoshi-men* | 'teachers' |
| *xuesheng-men* | 'students' |
| *pengyou-men* | 'friends' |
| *xiongdi-men* | 'brothers' |
| *jiemei-men* | 'sisters' |

- Its absence on pronouns is contrastive; its absence on nouns is not:

  (25) *Wo qu zhao haizi.*
  I go find child
  'I will go find the/some child/children.'

- It is incompatible with numerals (and with classifiers).

  (26) * *san ge xuesheng-men*
  three *cl* student-*men*
  'three students'

- It forces the nominal to be interpreted as definite, as well as plural.

  (27) a. *You ren.*
  have person
  'There is/are some person(s).'

  b. * *You ren-men.*
  have person-MEN

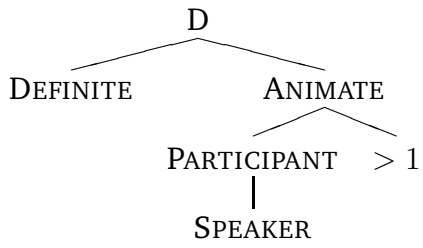
  c. *Mei you ren.*
  not have person
  'There is nobody.'

  d. * *Mei you ren-men.*
  not have person-MEN

Li (1999) argues that *-men* appears in D, not in #. Nouns can be marked with *-men* only if they move to D, which is impossible if a classifier is present.

Our proposal: Partial feature geometry of D in Chinese:

(28)




*-men* spells out [DEFINITE, $> 1$]

- While *ta* 'he/she/it' can be used to refer to both animate and inanimate objects, *tamen* 'they' is used only for animates (Ng 1997).
- All the personal pronouns except *ta* spell out ANIMATE. *Ta* is a default pronoun spelling out only DEFINITE.
- Since $> 1$ and CL are different elaborations of individuation, only one of them can appear in a given nominal. Thus, if $> 1$ is present on D, the nominal cannot contain a Classifier projection. Since numerals are merged in Spec/CLP, we predict that the plural suffix *-men* cannot appear with a numeral.

## 6. Conclusion

- UG makes available a set of number/individuation features (though not all features are realized in every language). So far, we have identified the following elements:

| | |
|---|---|
| #: | individuation |
| Cl: | defective individuation |
| $> 1$: | semantically dependent on #, may be syntactically independent |
| $> 2$: | dependent of $> 1$ in languages with dual number (see Cowper 2005b) |
| Card: | any syntactic head that is semantically dependent on # (numerals, $> 1$) |

- The different realizations of individuation (grammatical number, the mass–count distinction) arise from:
  - different lexical items spelling out the features
  - different syntactic configurations of the features
- Even within a language, we can find exceptional items that resemble the norm in other languages—e.g., English *furniture* is like a Chinese count noun.
- We expect to find the same kinds of variation in other grammatical features—e.g., tense and aspect. (See Clarke (in progress).)

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