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Abdelkader Fassi Fehri  
Mohammed V University Souissi, Rabat  
fassi.fehri@laposte.net

Marie-Thérèse Vinet  
Université de Sherbrooke, Canada  
[Marie-Therese.Vinet@USherbrooke.ca](mailto:Marie-Therese.Vinet@USherbrooke.ca)

### **Number and Classifier Distributions in Arabic and Chinese and their complementarity\***

It has been observed that languages which exhibit Number (Nb) marking on nouns (tend to) lack classifiers (Cl), or vice versa (cf. e.g. Greenberg (1972)). This has led some authors to postulate a systematic complementary distribution between Nb and Cl, and treat the two markings as discriminately complementary (cf. e.g. T'sou (1976), Chierchia (1998), Borer (to appear), among others). Second, the 'count-mass' dichotomy has been thought of in the literature as being the core classification of nouns (Ns), and it has also been associated with a discriminative distribution of Cl and Nb, so that e.g. Chinese Ns are solely thought of as mass, whereas English Ns can be count (in addition to mass, with count as the marked member). Third, (under)specification in interacting Nb and Cl feature values provide an important source of complementarity effects, which involve various parts of the grammar (as conceived e.g. in Bresnan (2001b), extending Jakobson's view of markedness; cf. also Ojeda (1998)), but also provide adequate bases for characterizing parametric variation.

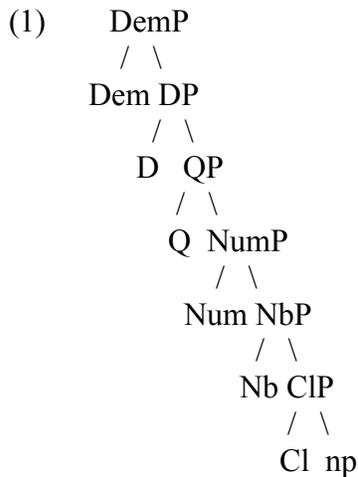
In this contribution, we first provide evidence from Arabic and Mandarin Chinese that a systematic complementary distribution between Cl and Nb (and/or plural, Pl) cannot be motivated.<sup>1</sup> Both languages exhibit various forms of classification and plurality, although the first language is thought of as a non-classifier language, and the second one as a general classifier language. Second, we show that N classification cannot be built on a count/non-count (or mass) binary distinction. Such a binary classification obviates the role played by the 'singulative/non-singulative' (or 'individuating/collective') dichotomy in characterizing Pl morphology, typically in e.g. Chinese. It also obviates the role played by singulativity in characterizing integral atomic units (or individuals), or integral kinds, as opposed to non-integral entities such as masses. Partition and integrity will then be shown to be necessary relevant ingredients for defining a classificatory system based on two attribute-value feature pairs: [ $\alpha$  atomic] and [ $\beta$  singulative]. The system characterizes four N classes traditionally documented in languages: individuals (Is), kinds (Ks), masses (Ms), and collectives or groups (Gs). Third, various forms and distributions of Pl and Cl are found, including group plural forms in Chinese, quantity plural modifiers in Arabic, and recursive classifiers, all of which point to the inadequacy of the complementarity hypothesis. We show, in particular, that markers of plurality in Chinese are generated either as overt Nb heads (that may move up

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<sup>1</sup> The article focuses on the standard variety of Arabic, although similar phenomena are productively found in colloquials.

into determiner D), or as empty Nb heads which are filled by classified Ns, moving to Nb. We claim that values of [ $\alpha$  atom] and [ $\beta$  sing] features on CIs may be affected by values of the same features on Nb, e.g. converting a [+ atom] entity to [- atom] or a [ $\emptyset$  atom] entity in the case of set plurals or kinds, respectively, or a [+ sing] entity to a [- sing] or a [ $\emptyset$  sing] in the case of group plurals. CI and Nb distributions are then not complementary in languages, and they provide no source for defining language types. In 'classifier languages', the [ $\alpha$  atom] feature is generally specified at the CI projection in the grammar, in 'number languages', it is generally specified at the Nb level.<sup>2</sup> Furthermore, the feature [ $\beta$  sing] may also be specified at the Nb level, as is the case in Chinese. For concreteness sake, we assume the following DP architecture for nominals:<sup>3</sup>



The article is organized as follows. In section 1, we provide a brief review of how and why Arabic and Chinese should be both treated (intriguingly) as classificatory systems, and show how Nb does not affect the [ $\beta$  sing] value of the classified noun. We also recapitulate the N classification argued for in Fassi Fehri (2003b). In section 2, we argue that the count/non-count distinction is inadequate, and examine why the classificatory system must be rebuilt on atomic and singulative features. In section 3, we investigate various forms of pluralities in Arabic and Chinese and show that these uses have no classifier 'flavour'. We then provide reasons why even Chinese pluralities are best thought of as involving Number, rather than Classifier. Moreover, the role played by movement in forming plural 'collectives' is characterized. In section 4, we provide an analysis of variation based on 'global' (under)specification (building on Bresnanian insights), rather than inflectional or projectional complementarity of Number and Classifier.

## 1. How different is Arabic from Chinese?

<sup>2</sup> As assumed in a number of works, variation is not language specific, but rather to be found in the characterization of functional words and/or features, in the domain of the functional lexicon (see e.g. Chomsky (1999, 2001), Kayne (2003), Holmberg & Sandström (1996), Borer (to appear). Furthermore, overt realization can alternate with overt movement, typically N-to-D, as in e.g. Longobardi (2001 a&b).

<sup>3</sup> QP might be higher than DemP. The architecture is given for the sake of concreteness, and it does not preclude a more (or less) granular decomposition of DPs.

Chinese nouns, which are normally bare, and hence not inflected for Number, can still be interpreted as singular or plural. Moreover, they are not marked for (in)definiteness either. Thus a construction like (2) is four-way (existentially) ambiguous:

- (2) wǒ kànjiàn gǒu le  
 1s see dog Asp  
 I see (a/the) dog(s).

Second, bare Ns can also be read as generic/kind, as in (3) :

- (3) wǒ xīhuan gǒu  
 1s love dog  
 I love dogs.

Another well-known important property of Chinese is that referents of nouns, whether the counterparts of English count or non-count Ns, need a CI or a measure phrase to be counted. Thus CIs such as *zhī* are necessarily mediating the counting of individuals, as in (4a &b). Numerals (Num) such as *yī* "one" or *sān* "three" must be followed by a CI N sequence, otherwise the result is ungrammatical, as in (4c):

- (4) a. wǒ kànjiàn yī zhī gǒu  
 1s see a/one CI dog  
 I saw a dog.  
 b. wǒ kànjiàn sān zhī gǒu  
 1s see three CI dog  
 I saw three dogs.  
 c. \* wǒ kànjiàn sān gǒu  
 1s see three dog  
 I saw three dogs.

Consider now Arabic bare Ns. Leaving aside the generic part and the (in)definite part, Arabic bare Ns can behave in essential ways like those of Chinese. First, construction (5) can be interpreted as an eating of one date or more (implying a singular or a plural 'date'):

- (5) ÷akal-tu tamr-an (\* three)  
 ate-I date-acc  
 I ate (one or more) dates (literally 'date').

Second, this kind of noun cannot occur with a numeral, to count 'dates'. The use of a morphological CI is needed, to refer to the 'unit' or the 'atomic' date, as in (6), where the CI -*at* is suffixed to the N:

- (6) ÷akal-tu tamr-at-an  
 ate-I date-CI-acc  
 I ate a/one date.

Note now that Arabic differs substantially from Chinese in that bare Ns are indefinite in both (5) and (6), and a (weak) singular cardinality can be involved in their interpretation. There is an important difference, however, between (5) and (6). In the cardinal reading, (5) counts only kinds, whereas (6) counts only individuals. The introduction of a plural cardinal does not change this state of affairs :

- (7) ÷akal-tu ṭalaat-a tamaraat-in

ate-I three-acc date-unit.pl-gen

I ate three (individual) dates.

(8) ÷akal-tu talaat-a tumuur-in

ate-I three-acc date.pl-gen

I ate three kinds of dates.

In (7), only the individual reading is available, and in (8) only the kind reading, despite pluralization in both cases. Note that the same contrast is found with singular indefinites above, or duals. In other words, Nb in general (and not just Pl) count units or atoms of different nature, but it has no impact on noun classification. It does not convert a kind to an individual, only a Cl does. Indeed, countability is relevant to Nb, but individuation is not. The similarity between Chinese and Arabic is then that Chinese bare Ns such as ‘dog’ behave as if referring to kinds in Arabic, and they need a classifier to be individuated.

In Fassi Fehri (2003b), four classes of nouns are cross-classified by two feature values: kinds, masses, individuals and groups. Kinds can have integral wholes as their extension (hence their [+sing] value), but they are unspecified with respect to whether they have singular or plural extensions (hence their [∅ atom] value). Individuals have integral wholes as their extension (they are [+sing]), and they are atoms (hence [+ atom]), etc. The classification is recapitulated in (9). The examples (10) instantiate Mass and Group in Arabic, and (11) provide the English four counterparts:<sup>4 5</sup>

(9) N classification

a. K = [∅ atom, + sing]

b. I = [+ atom, + sing]

c. M = [∅ atom, ∅ sing]

d. G = [+ atom, ∅ sing]

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<sup>4</sup> In Fassi Fehri (2003b), Mass, Kinds, Groups, and Individuals are taken to be ‘natural’ classes of Ns, with various cross-classifying semantico-syntactic properties, organized through a minimal *mereology*. The latter makes essential use of a *N-part* relation and a *N-integral* property of parts/wholes, thus capturing ‘atomicity’ and ‘integrity/singulativity’ of parts and wholes. A [+ atom] is an entity which has no (improper) N-part (which could make the whole-part relation symmetric and reflexive). Individuals and Groups are [+ atom], having no (improper) N-parts. Kinds and Mass, on the other hand, may have N-parts, but are not necessarily specified as such. Vagueness in specification is marked as [∅ atom]. A [+ sing] feature is a property of an entity that is ‘N-integral’. Kinds and Individuals are [+ sing] because they have integrity: if they have parts, these parts must be N-integral (i.e. cannot be divided), be they proper or not. If Kind has one or more than an N-integral part, then the part-whole relation will be improper for the first case, and proper for the second. For Individuals, the N-integral part is only improper. What is essential here is that N-integrity is a property of the part (and/or the whole). It is the integrity/singulativity property that unify Individuals and Kinds, which are otherwise different in terms of the atom property. Mass are [∅ sing]: they do not name N-integral wholes or parts. Groups are also conceptually [∅ sing] too: they may apply to a plurality of wholes, including integral wholes, but the latter are not N-integral. A ‘team’ may be composed of ‘John’ and ‘Mary’, but the whole and the parts are not in an N-part-whole relation, nor are they N-integral whole-parts. This system is made available by UG, and distinctions are expected to be manifested either in lexical classes (or roots), or in grammatical f-words (or f-features). Then the question is how much of this system is ‘inherently lexical’ (or found in the l-lexicon of roots), or functional (carried by f-words or features).

<sup>5</sup> It is important to note that Greenberg’s (1972) in his seminal article equates the ‘singulative’ with the ‘noun of unity’ in traditional Arabic grammar, i.e. our ‘individual’, and the ‘collective’ with our ‘kind’. The terms he uses do not have the same contents as Fassi Fehri’s (2003b), nor does he build his analysis on a feature system.

- (10) a. *štaray-tu zayt-a-n*  
 bought-I oil-acc-n  
 I bought (some, an) oil.
- b. *laqii-tu fariiq-an*  
 met-I team-acc  
 I met a team.
- (11) a. I like dates.  
 b. I ate a date.  
 c. I bought oil.  
 d. I met a team.

## 2. Kinds of classifiers and their distribution

Although the term 'classifier' is used quite extensively in the literature, it has no clearly established content, function, or form, nor has it a clear connection to categorization. Allan (1977: 13) takes CIs to denote "some salient perceived or imputed characteristics of the entity to which an associated noun refers". CI occurrence is claimed to be restricted to classifier constructions "which require the presence of a particular kind of morpheme, the choice of which is dictated by the semantic characteristics of the referent of the head of the noun phrase" (Aikhenvald 2000: 13). CI then qualifies as the morpho-syntactic mark (or realization) of the 'perceived' semantic characterization. CI forms often depend on categories (with which they are associated) so that (a) nominal, numeral, and D (article and deictic) CIs (including N class and gender), (b) genitive (possessive) CIs, and (c) verbal (predicate, aspectual) CIs can be distinguishingly identified (cf. Aikhenvald (2000) for discussion). In this article, we concentrate on some kinds of CIs found in the nominal domain, and investigate what could be their (more precise) content, function, and form, and what role is played by Nb (or Pl) in this phenomenology. In fact, we will ultimately limit the term CI to its narrow sense, namely to markers of individuation, in opposition to measure and similar classifying words and/or phrases.<sup>6</sup>

### 1.1. The count/mass distinction: a misnomer

As mentioned above, *all* Chinese nouns, whether the counterparts of English count or mass Ns, need a CI or a measure phrase to be counted (see the contrast in (4) above for counting individuals), as also indicated in Krifka (1995). Note that CI can also occur with quantifiers such as *jǐ* "few", or *měi* "every", as indicated in (12):

- (12) a. *jǐ gè píngguǒ*  
 few CI apple  
 few apples

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<sup>6</sup> As pointed out by a reviewer, the status of classifiers as "markers of individuation" has been formalized in the semantic literature (see e.g. Krifka (1995), among others).

- b. měi běn shū  
 every CI book  
 every book

Furthermore, the CI can occur solely without the Num, as in (3). However, this situation appears to be limited to postverbal positions, and the interpretation is always singular:<sup>7</sup>

- (13) wǒ xiǎng mǎi běn shū  
 1s want buy CI book  
 I want to buy a book.

On the other hand, referents of mass Ns can be counted or measured through the use of measure or container words, or sorts, as exemplified in (14) and (15):

- (14) a. yī bēi kāfēi  
 one CI coffee  
 a cup of coffee  
 b. sān píng jiǔ  
 three CI wine  
 three bottles of wine  
 c. yī piàn miànbāo  
 one CI bread  
 a slice of bread

- (15) tā kànjiàn sān zhǒng yóu  
 3s saw three sort oil  
 S/he saw three sorts of oil (three oils).

These measure words are also taken to be classifiers in the literature, and the postulated important function of both types of CIs is to *make Ns countable*.<sup>8</sup>

CIs are often divided into two groups. Cheng & Sybesma (1999), inspired by the references cited there, claim that (a) CIs either "create a unit of measure" (they are then called *mass-classifiers* or massifiers), or (b) CIs simply 'name the unit' in which the entity denoted by N naturally occurs (they are then *count-classifiers*). Cheng and Sybesma take it that Chinese makes a distinction between Ns that are inherently/lexically *partitioned* into countable units (count Ns) and those that are not inherently partitioned (mass Ns).

<sup>7</sup> Cf. Borer (to appear: Chap. 6) for further restrictions in this context. CIs can also be preceded by a demonstrative, with or without a numeral:

- (i) (zhèi) sān běn shū  
 (this) three CI book  
 (these) three books  
 (ii) zhèi běn shū  
 this CI book  
 this book

When the CI is necessary, then Q, Num, or Dem may co-occur with it.

<sup>8</sup> As pointed out correctly by a reviewer, mass nouns are not really counted through measure or container words, rather, they can be combined with them to be able to occur with a cardinal numeral. With measure words, the reference is not to counting, but to measuring. Counting quantifies a cardinality of a set, measuring a property other than a cardinality (e.g. temperature or volume). Counting can be applied only to sets, while measuring is applied to sets and non-sets alike. Measures do not partition, although they correlate with a set of measures. Partitioning is only needed in counting. We think that our analysis concurs with this view.

The role of the mass-Cl is then to 'create' units by which the amount of the mass is measured/counted. Count-Cls, on the other hand, are associated with already partitioned (countable) units. Following Croft (1994: 162), Cheng & Sybesma (*ibid*, p. 516) appeal to an 'individualizing function' of count-Cls, which enables them to "extract ... distinguished, discrete occurrences" (Iljic (1994: 104)), or to be "a mark of individuation, or singularization" (as Paris (1981: 69) put it).<sup>9</sup> The count/mass distinction, they claim, although inherently present in Ns, is grammatically reflected only at the Cl level (in addition to the role it plays in other parts of Chinese grammar).<sup>10</sup>

Note, however, that the 'counting' function which unifies count-Cls and mass-Cls is still puzzling and obscure. If massifiers operate 'partition' of mass Ns, as it is claimed, to make them countable, why are then already partitioned Ns not countable? Worse, why are supposedly partitioned Ns designated as 'count' in the first place? If partitioning is a distinguishing property between two classes of Ns, as Cheng and Sybesma argue, then it is *not sufficient* for counting, hence the necessary mediation of individuating CIs in the case of (4). Following Fassi Fehri (2003b), we take 'partitioning' to be *singulativity*. Partitioned Ns are then marked as [+ sing].<sup>11</sup>

On the other hand, Cheng & Sybesma (p. 515) note that massifiers occur not only with 'mass' Ns, but also with 'count' Ns. The examples in (16) illustrate this distribution:

- (16) a. yī qún rén  
           one Cl person  
           a group of persons  
       b. yī jīn píngguǒ  
           one pound apple  
           a pound of apples

If the role of mass-Cls is to 'partition', as they claim, how can they be associated with already 'partitioned' Ns (so-called 'count' Ns)? If even inherently partitioned Ns are in need of CIs to be counted (be they interpreted as individual units, or as parts of potentially partitioned entities, or kinds), then the 'counting' function (whatever that is)

<sup>9</sup> Cheng and Sybesma misleadingly equate this singularization function with that of D, which identifies one instance of what is denoted by N (*ibid*, p. 517). Croft, Paris and Iljic's intuitions appear to be closer to the view that we adopt here.

<sup>10</sup> Paris (1981) and Cheng & Sybesma (*ibid*) correctly observe that 'count-classifiers' and 'mass-classifiers' are distinct in two important ways, namely (a) the optional occurrence of *de* (a marker of phrasal boundary inside the DP) with 'mass-classifiers' versus its absence with 'count-classifiers' (cf. (i)), and (b) the modification of the 'mass-classifier' head with a small number of adjectives (*xiǎo* "small", *dà* "big") versus the lack of adjectival modification on 'count-classifier' heads (cf. (iib)) :

- (i) a. yī wèi lǎoshī  
           one Cl teacher  
           a teacher  
       b. \*yī wèi de lǎoshī       (Paris 1981)  
       c. yī kuāng (de) píngguǒ (Paris 1981)  
           one Cl-basket DE apples  
           a basket of apples

<sup>11</sup> Note that 'partitioning' is *necessary* for counting only if it is not equated with 'individuating', since kinds and masses can be counted (when partitioned or taxonomized), although they are not taken as individuals (cf. the contrast in (7) and (8) above, as well as Fassi Fehri (2003b) for more details and motivation).

has to be associated with both 'count-Cls' and 'mass-Cls'. It is not a property of 'count Ns', neither an exclusive property of 'count Cls'. Furthermore, the individualizing/singularizing function which is behind the countability of so-called 'count' Ns remains obscure at best. Indeed, if complementary distribution between the two types of Cls is discriminatory, as is documented in the literature, and exemplified by (17), then that could be an indication that the two Cls share a common property, which enables both to 'create' (rather than 'name', in Cheng & Sybesma's informal terms) the entities to be counted (be they individuals, measures, or amounts, etc.):

- (17) a. \*sì liàng gè qìchē  
           four Cl Cl car  
           four cars  
       b. \*yī gè bēi kāfēi  
           one Cl Cl/cup coffee  
           a (unit) cup of coffee

Cls then serve to count individuals, to measure a portion of a substance, a portion of a collective, or a part of a partitive, as in the following examples:

- (18) a. yī gè píngzi  
           one Cl bottle  
           a bottle  
       b. yī píng jiǔ  
           one Cl/bottle wine  
           a bottle of wine  
       c. yī guà zhūzi  
           one Cl pearl  
           a string of pearls  
       d. yī dī yǎnlèi  
           one Cl/drop tear  
           a tear

Their diversity in categorizing objects according to shape, animacy, size, or other perceptual or physical dimensions does not obviate their main role in *counting* (and/or quantifying; cf. e.g. Paris (1981), Krifka (1995), Cheng and Sybesma (1999), among others).<sup>12</sup>

### 1.2. A new classification of classifiers

If both types of Cls are adding extra information to that carried by (bare) Ns, and which relates to countability, then the distinction of Cls (examined so far), according to whether they are count-Cls or mass-Cls (or even worse massifiers) cannot be adequate. The classification needed has to take into account the type of information contributed by the Cl (and presumably the N it applies to). If some Chinese bare Ns are interpreted as singular or plural, and others are not (as it is the case for pure mass Ns), then that point to an inherently based distinction of Ns, according to whether they are potentially 'partitionable' or not, basically our [ $\pm$  sing], which cannot be taken as equivalent to 'count'

<sup>12</sup> Paris (1981:73) mentions that in the spoken language the 'neuter' classifier *gè* is coming to be used more and more at the expense of other classifiers, a distribution which supports the hypothesis that classifiers are more connected to quantity than to quality or categorization.

vs. 'mass'.<sup>13</sup> We identify these Ns that can be potentially partitioned and interpreted as plural or singular as *kinds* (Ks), as proposed in Fassi Fehri (2003b). Ks denote potentially an unspecified number of integral wholes or singularities. The unmarked N with respect to singulativity is thought of as being a *mass* M. M has no semantic potential of denoting singulativities (or integral partitions). The contrast at the N level is then not between 'count' and 'mass' Ns, but rather between kinds and masses. Both kinds and masses need a CI to be counted, but the entities counted are not of the same nature, depending on the nature of the CI (and the N it applies to). Individual CIs (which are typically characteristic of 'classifier languages') form individuals from kinds, whereas measure (or taxonomic) CIs or words do not operate any ontological change in the nature of kinds or masses.

What the 'counting' CI does with singulative Ns (or integral partitions) is to make precise whether there is only one integral unit (to be counted), a single *atom* named an *individual* I, or unspecified/non-atomic number of units, a kind K. These two choices of atomization values associated with CIs are exemplified in Arabic and English respectively (cf. Fassi Fehri (2003b) for discussion):

- (19) a. samak "fish; kind of fish" → samak-at "fish-I; an individual fish"  
 b. apple → apple-s "apple-K"

In these examples, specified atomization as [+ atom] through the individual CI is associated with an inherent singularity in the case of Arabic, whereas it is associated with an unspecified CI atomically (a kind CI, or a 'kindifier') in English. The Chinese singulativity appears close to the Arabic one, in that no (grammatical) mark is needed to form Kind, which is the unmarked case. Individual CIs are then needed to form individuals, as in Chinese (4) above, much more like what happens with Arabic (19a).

Note now that 'true' mass-CIs (or massifiers) are found in languages. Their role is to remove (or unspecify) the inherently positive singulative value found in Kind (its minimal counterpart), hence converting (a 'lexical') Kind to (a 'grammatical') Mass. This is illustrated in Colloquial Moroccan Arabic, where Mass can be overtly (and grammatically) derived from Kind:

- (20) bger "cattle, cows" → begr-i "cow-M; beef"

Other potential CIs to be found in this system are 'collective' or 'group' CIs, as we will see.<sup>14</sup>

CIs which have been examined so far select nominal entities which involve the singulative and atomic features and rearrange/specify their value. The outcomes may or may not be countable as integral atoms. Kinds and masses, which are unspecified atomically, can also be made countable through CIs of different nature and range. These CIs count 'sorts', 'taxonomies', 'portions' of substance, etc. They tend to be found cross-linguistically, unlike individual CIs. They are phrasal (and lexical), and they can be easily translated from one language to another. The following Arabic constructions provide examples of counting phrases for kind and mass, respectively:

<sup>13</sup> This view differs substantially from Chierchia's (1998) proposal that all Chinese Ns are mass (for similar ideas, see also Krifka (1995) and Borer (to appear), among others).

<sup>14</sup> It will be shown below that at least some Kinds and Groups in Chinese and English are Numbers (with a classifier flavour), rather than CIs.

- (21) a. *talaat-u ru÷uus-i □anam-in*  
 three-nom heads-gen sheep-gen  
 three heads of sheep
- b. *talaat-u qi□a<sup>c</sup>-i xašab-in*  
 three pieces wood-gen  
 three pieces of wood

But note that these ‘classifiers’ are not inflectional, unlike the individual ones. Furthermore, they are used to designate taxonomies, portions, measures, rather than to create atoms or units of some sort. They are then of a different ontological as well as a grammatical nature. Cheng & Sybesma (1999, 1998) note in this respect that even though ‘count-Cls’ and ‘mass-Cls’ are both nominals in Chinese, only ‘count-Cls’ form a closed set, with elements functioning solely as Cls (e.g. *tiáo* for counting long, flexible and narrow objects such as rivers, towels, trousers, streets, etc., *duǒ* for counting flowers, *liàng* for counting different types of vehicles, etc.):

- (22) a. *yī tiáo hé*  
 one Cl river  
 a river
- b. *sān duǒ huā*  
 three Cl flower  
 three flowers
- c. *sì liàng qìchē*  
 four Cl car  
 four cars

‘Mass-Cls’, however, can occur as Cls as well as independent Ns (e.g. *píng* ‘bottle’ as a unit for measuring wine, and *píng(zi)* ‘a bottle’ as a container), as illustrated in (14) above, repeated here as (23), for convenience :

- (23) a. *yī bēi kāfēi*  
 one Cl coffee  
 a cup of coffee
- b. *sān píng jiǔ*  
 three Cl wine  
 three bottles of wine
- c. *yī piàn miànbāo*  
 one Cl bread  
 a slice of bread

Contrary to ‘count-Cls’, ‘mass-Cls’ do not ‘categorize’. Moreover, as already observed, ‘mass-Cls’ are found in most languages, whereas much fewer languages have ‘count-Cls’ (so-called ‘classifier languages’).<sup>15</sup>

Note that this distinction which appears to be at the core of differences between so-called classifier and non-classifier languages can be captured in our classifier system, which makes typically a special room for individual formation, and cannot be so captured in systems in which only a count/non-count distinction is available. As observed, the latter

<sup>15</sup> Not all count-classifiers categorize, as pointed out by a reviewer. In some languages (e.g. Persian), a universal Cl can be used with all (transnumeral) nouns. This situation is comparable to that of the neuter classifier *gè* in Chinese (cf. fn. 12).

distinction is blind to the individual/non-individual distinction. In the next section, we will see how various forms of pluralities make use of the postulated feature distinctions.

### 3. Kinds of Number

Pl or Nb marking interacts with Cl marking in interesting ways, as widely noticed in the literature, but forms of this interaction need to be more precisely characterized. This section is dedicated to identifying various kinds of Pl/Nb uses in Arabic and Chinese, and to assess naturally expected kinds of interaction. One use of Pl might be termed a *multiplier*. Its function is to multiply individuals or sorts/taxonomies, in the sense that it generates a referential expression from the NP or classifier phrase (ClP) by mapping the nominal expression onto a *multitude* of its realizations. A second use of Pl is found in the context of so-called the 'plural of abundance' or 'the plural of the plural' (or 'double plural'), well-documented in Arabic traditional grammars. The main feature of this kind of Pl is that it applies to masses or kinds without operating a *nominal reference shift* (e.g. from a 'substance' to a 'sort'). It operates on an already formed referential expression (or a nominal term), and it has a *modification* role of emphasizing the referent's quantity or its high amount. Wiese (1999) conceives it as a mass Nb marker, but we prefer to call it an *amount-Pl*. What is typical of amount-Pl is that it does not apply to countable units, but to amounts of Kinds or Mass. A third type of Pl has some flavour of a Cl, being read as a Group or a Kind. We will argue that the latter is another sort of Pl/Nb, 'flavoured' with classification (in a sense to be made precise), rather than a true Cl. On the other hand, various forms of pluralization are used in grammars, including not only overt inflectional morphemes or reduplication, but also, as we will argue, overt syntactic movement of classifier phrases to non-overt Nb.

#### 3.1. Arabic

Consider first some instances of Pl forms found in Arabic. The following examples instantiate a multiplier Pl of atoms (individuals and groups), as in (24) and (25), and of taxonomies (masses and kinds), as in (26) and (27), respectively:

(24) *samak-at* "fish-unit; a fish" → *samak-aat* "fish-unit-pl; a multitude of integral fish units"

(25) *firqat* "team" → *firq-aat* "teams"

(26) *zayt* "oil" → *zuyuut* "oils; sorts of oil"

(27) *samak* "fish" → *÷asmaak* "sorts of fish (a multitude of fish)"

In all these cases, we take the Pl to be a multiplier, inputting an atomic individual or sort, and outputting a multitude of these entities.<sup>16</sup>

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<sup>16</sup> Borer (to appear) takes the Pl in examples equivalent to (26) to be a 'divider' of mass (a 'partitioner' in Cheng and Sybesma's terms). This then led her to think that the Pl there is a Cl which creates countable units, a view that she generalizes to all Pls. But this view cannot be correct even for (26), given that e.g. the Arabic singular *zayt* "oil" does have the reading of 'one sort of oil', rather than 'oil' (see Fassi Fehri (2003b) for discussion). Consequently, *zuyuut* "oils" is not the Pl of 'oil', but that of 'an oil', an already countable sort. That makes the Pl a multiplier (of sorts), and not a nominal reference shifter from a mass to a non-mass (or count). Note that such a reading is also available for the English Pl 'oils'.

Another form of Pl in Arabic (Standard Arabic) and Colloquial Moroccan Arabic stands for the amount-Pl variety. In Arabic (28c & d), the 'double Pl' functions as amount-Pl, whereas (28a & b) are multipliers:

- (28) a. qawl "saying" → ÷aqwaal "sayings"  
 b. qawl-at "saying-Cl; a saying" → qawl-aat "saying-Cl-Pl;  
 a multitude of sayings"  
 c. ÷aqwaal "sayings" → ÷aqaawiil "a lot of sayings"  
 d. farq "difference" → furuuq "differences" → furuuq-aat  
 a lot of differences/ various sorts of differences

Note that the amount-Pl in (28d) may have a reading of 'double plural', i.e. Pl of sorts of *furuuq* "differences", with *furuuq* itself a Pl. In Moroccan Arabic, similar patterns are found, interacting also with Cls:

- (29) a. bettix "melon, melons" → bettix-at "melon-Cl; an integral melon"  
 b. bettix-at "a melon" → bettix-aat "(many integral pieces of) melons"  
 c. bettix "melon" → betatex "a lot of melon; many sorts of melon"  
 d. šam "fat" → šam-ah "fat-Cl; a piece of fat" → šam-aat  
 "(many) pieces of fat"  
 e. šam "fat" → šum "sorts of fat; a lot of fat" → šum-aat "a lot of fat;  
 many sorts of fat"

Note that (as far as we can tell) the Pl is not used in Arabic as forming a kind, as in the case of English 'apples', where the Pl is close to the Arabic singular *tuffaa* "apple", rather a multiplier.<sup>17</sup>

These various Pl uses indicate clearly that the functions of Pl are far from being limited to classification, and hence the interactions between Pl/Nb and Cl have to be more carefully examined. In the next subsection, we show that group and kind plurals are Number, rather than Cl.

### 3.2. Chinese

Pl marking in Chinese is not as inflectionally productive as it is in e.g. Arabic, English, or Romance. A bare N may express plurality, without any morphological mark dedicated to it. However, expressed Pls/Nbs are found in Chinese, although they usually carry additional specific information, which then limits the range of their use. Among such information is 'definiteness', which has led some authors to analyze Pl forms such as *-men* as ending in D in syntactic structure, although the latter is chiefly analyzed as a Pl/Nb form (cf. e.g. Li 1999). Second, there is a 'collective' interpretation which has been claimed to be characteristic of the suffix *-men*, and which has led to a dispute on whether

<sup>17</sup> Wiese (ibid) claims the existence of a multiplier/amount Pl distinction in Persian, but also in Chinese. She illustrates the contrast by (i) and (ii), respectively:

- (i) a. ab water "water"  
 b. ab-ha water-pl "plenty of water"  
 c. ab-i water-sg "some water"  
 (ii) a. háizi child "a child; children"  
 b. háizi-men child-pl "several / a lot of children"

the latter must be analyzed as a ‘collective’/group marker (cf. Iljic 1994, 2001, Cheng & Sybesma 1999, Norman 1988, Chao 1968, Lü 1947), or just a ‘plural’ (cf. Li and Thompson 1981, Li 1999). Note that *-men* occurs normally on pronominal forms and animate or human Ns, to express a form of plurality, as illustrated in (30). The combination in (31) is not felicitous because it is used with a non-human noun (cf. Iljic (1994, 2001)):

- (30) a. wǒ-men  
       1s-MEN  
       we/us  
       b. lǎoshī-men  
       professor-MEN  
       professors  
 (31) \* yǐzi-men  
       chair-MEN  
       chairs

The marker *-xiē*, on the other hand, identifies an indefinite plurality, in e.g. *(yī)xiē* in (32a). It is not a classifier, since it can co-occur with other (prenominal) classifiers, as in (32b), where it is suffixed to a demonstrative, and it contributes plural quantity:

- (32) a. yī xiē shū  
       one XIE book  
       a few books  
       b. zhè-xiē kǔn shū  
       Dem XIE Cl book  
       Those piles of books

Third, classifiers reduplicate to express a universal quantification, as illustrated in (33). This indicates also that there is no ban on Cl recursion:

- (33) tā gègè xuésheng dōu rènde  
       3s Cl Cl student all know  
       S/he knows all the students

Fourth, and more productively, group Pls appear to be formed in syntax through a movement process, through which N first moves to the left of the Cl, and the N-Cl sequence is further moved higher to the Nb phrase. The examples in (34) and (35) illustrate the contrast between singular/individual and plural/group readings of the two DPs:

- (34) yǒu sān qún rén zài shuōhuà  
       have three SGCL people at speak  
       Three groups of people are speaking.  
 (35) rén qùn zài shuōhuà  
       people GCL at speak  
       People are speaking.

Let us return now to the properties of the suffix *-men*. Although *-men* implies plurality, as is clear with pronouns in (30a), it merely indicates that the members of a particular group

should be considered together as a unit, and it "... marks a subjective location: several individuals are grouped together relative to the speaker or some other subjective origin" (as Iljic (1994: 91) put it). In this case, it is best treated as *collective* or a 'group' G, referring to a whole.<sup>18</sup> We think, however, that its grouping function does not obviate the fact that it applies to pluralities, rather than singularities.<sup>19</sup> The specific collective nature of *-men* (as distinct from that of a 'regular' Pl) is further illustrated by the fact that it suffixes to proper Ns, as in (36):

- (36) Xiǎo Qiángmen  
 Xiao Qiang-MEN  
 Xiao Qiang's group (Iljic (1994))

The suffix then serves to identify a group relative to a certain person. It can be read as a sort of an associative plural.<sup>20</sup> If *-men* forms a group Pl in the grammar, under Nb, before getting to D (in the spirit of Li's (1999) analysis, with which we concur in part here), then its grammatical Group nature makes it incompatible with simultaneous counting, as illustrated in (37b):

- (37) a. sān gè xuésheng  
 three Cl students  
 three students  
 b. \*sān gè xuésheng-men  
 three Cl students-MEN

This behaviour is compatible with the fact that the suffix is taken as forming a *whole* Group, perceived as a *singleton* atom.<sup>21</sup>

The other marker of plurality, *-xiē* "some, a few", is of different nature, since it identifies with *yi-* an indefinite plural number as in (38a), or an indefinite amount as in (38b):

- (38) a. yī xiē shū  
 one XIE book  
 a few books  
 b. yī xiē shuǐ  
 one XIE water  
 some water

*Xiē*, like *-men*, cannot co-occur with numerals:

- (39) \* sān xiē shū

<sup>18</sup> Norman (1988: 121) observes that *-men* was originally a compound nominal meaning 'every person'.

<sup>19</sup> The term *collective* has been used in the literature in a variety of ways (Corbett 2000: 117-120, Kemmer 1993: 92-94, Greenberg 1972: 19-25) and this situation has generated a lot of confusion. The internal plural value of collective markers is usually left imprecise, and the term acquires a different content, depending on the language described. Typically, there is a confusion between kinds and groups, as we construe them.

<sup>20</sup> This type of collective reading on proper nouns is far from unique. It is found in other languages, namely Tok Pisin (cf. Mühlhäusler 1981: 43) and Berbice Dutch (Kouwenberg 1994: 238). In Tok Pisin, the form *ol* (from *is* is an associative or 'group' plural, which is realized in this grammar through the "inversion of N and *ol*". In Berbice Dutch, Kouwenberg (1994: 238) notes that "the plural suffix *-apu* may also be used to mark an associative plural. Cf. also Corbett (2000:102), who discusses associative plural forms added to proper nouns, nouns for kin terms, titles and occupations in Hungarian.

<sup>21</sup> Iljic (2001: 22) notes in connection with this that "*-men* does not refer to types or groups established on a purely qualitative basis (abstract classes), but to concrete groups of people, delimited in specific situations". He also claims that this suffix crucially "pertains to the grammatical category of person" (Iljic 1994 :91).

three XIE book

It is presumably the case that *yi-* is not a Num in (38), but rather a quantifier, a sort of *some*. Its ambiguity in Chinese recalls that of *waa*□*ed* 'one, some' in Moroccan Arabic, which can be used either as a Num, or as a sort of 'some', the latter contributing indefiniteness.<sup>22</sup> *Yī* can then be seen as contributing indefiniteness, and *xiē* plurality. The latter expresses in fact a form of a plural (or mass) quantification, which is neutral with respect to (in)definiteness. Support for this treatment comes from the fact that it is possible to express definiteness with *xiē* by using the demonstrative *zhè* (Wu 1999). The outcome is then interpreted as a definite plural:

- (40) *zhè-xiē xuésheng dōu xǐhuan wǒ*  
 this-number student all like me  
 All of these students like me.

*Xiē* does not categorize semantically any particular set of Ns, and hence does not behave like classifiers. Furthermore, it can co-occur with other Cls, e.g. *gè* in (41a). With the complex form *hǎo-xiē* "a good number of", various Cls are possible even though they may be left out (the examples are from Iljic 1994: 101):

- (41) a. *Yǒu xiē gè rén bù huì shuō huà*  
 Have XIE Cl man NEG can/know speak word  
 There are some people who cannot speak (very well).  
 b. *hǎo-xiē (jiān) fángzi*  
 a good-number Cl house/room  
 Plenty of rooms  
 c. *hǎo-xiē (běn) shū*  
 a good-number Cl book  
 Plenty of books

Summarizing, *-xiē* expresses an indeterminate plural number or an indeterminate amount.<sup>23</sup>

A further form of plurality arises through Cl reduplication. In Chinese, Cl reduplication induces universal quantification, which can be viewed as a form of plurality. Universal quantification is often used as a plurality expression (cf. English *you* vs. *you all*; Melanesian Pidgin English *all man*, *all-a man* "the men" (Hall 1943)). Thus Cl reduplication yields a universal reading in (42), or a distributive reading in (43). Paris (1981: 70) points out that the reading is iterative or distributive if the reduplicated classifier is preceded by *yī* "one":

- (42) *tā gè ge xuésheng dōu rènde*

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<sup>22</sup> In e.g. (i), *waa*□*ed* contributes indefiniteness, even though it is used with a definite article:

- (i) *waa*□*ed* r-rajel ja  
 some the-man came  
 Some man came.

<sup>23</sup> Note that, as mentioned in Chao (1968: 245), *xiē* can co-occur with *-men*, as illustrated in (i) below:

- (i) *nèi xiē qiángdào-men*  
 dem XIE bandit  
 those bandits (as a group)

Furthermore, *xiē* is incompatible with the kind Cls *zhǒng* and *lèi*.

3s Cl Cl student all know

(S)he knows all the students

- (43) ... Kānchā-le yī tiáo tiao xīn hángxìàn  
 ... prospect-Asp one Cl Cl new maritime line  
 have prospected one after the other the new maritime lines

Note that the universal reading in (42) is ruled out with an indefinite. In a study on *dōu* quantification, Wu (1999: 113) explains that the role of *dōu* is “to distribute the property of a predicate over an NP”, not to measure. An indefinite cannot be quantified by *dōu* :

- (44) \* yī běn shū Zhāngsān dōu dú-le  
 one Cl book Zhāngsān all read Asp

### 3.3. Pluralization through Cl phrase movement

Plural formation in Chinese cannot be characterized solely by identifying morphological inflection (as in the cases of *-men* or classifier recursion). Its *syntactic* character is even more appealing. As a matter of fact, a general process of Cl phrase movement to Nb can be postulated in connection with the contrast (37a)-(37b) above, not only to account for N-Cl order (which is necessary for the plural reading), but also for the fact that this sequence cannot be preceded by a Num.<sup>24</sup> If the N moves to the left of the Cl, and the whole sequence to Nb, then the sequence which lands in the Nb phrase may or may not be countable, depending on its features. In this context, it is not, due either to (a) the fact that a "collective" entity has been formed in syntax, or (b) to other properties of the sequence, which excludes a Num-Nb co-occurrence. As for (a), it has been repeatedly pointed out in the literature that post-nominal Cl constructions are read as 'collective' (and/or plural), not singular, and (b) they cannot be preceded by a Num. Further examples to illustrate these two properties are provided here:<sup>25</sup>

- (45) a. láilái wǎngwǎng de chē-liàng hěn duō  
 arrive-arrive return-return DE car-Cl very many  
 Vehicles that come and go are numerous
- b. láilái wǎngwǎng de (\*sān) chē-liàng hěn duō  
 arrive-arrive return-return DE (\*three) car-Cl very many  
 \*Three vehicles that come and go are numerous
- c. shū-běn li de zhīshi bù yíding duì  
 book-Cl in DE knowledge Neg certainly correct  
 The knowledge found in books is not necessarily right
- d. \* wǔ shū-běn li de zhīshi bù yíding duì  
 Five knowledge found in books are not necessarily right

Why is that so? How can a collective reading be correlated with the ban against a preceding Num? Clearly, the answer cannot be a (purely) semantic one. That is, the answer cannot be that groups cannot be counted. Indeed, numerals do appear *after* nouns

<sup>24</sup> For N-Cl movement involved in pluralization, cf. also Li (1999) and Yang (2004).

<sup>25</sup> A suffixing N-Cl sequence can be preceded by other material such as *xiē* and demonstrative in the following example (from Chao 1968: 508):

- (i) zhèxiē chē-liàng  
 demXIE vehicles-Cl  
 these vehicles

suffixed with CIs, as in the following examples with *-men* (from Zhang & Sang (1986: 492), after Iljic (2001: 24)), but not before them:

- (46) a. tā-men sì gè  
 3s-MEN four CI  
 the four of them
- b. zhè jiā yǒu gēmenr sān gè  
 this family have brother+MEN+R three CI  
 In the family, there are three brothers.

Although these constructions are cases of appositions, they do show that groups are not semantically incompatible with numerals. We think then that the solution must be basically syntactic. The two possibilities in (a) and (b) discussed above are then to explore.

Consider first (a). Suppose that Group formation is the general value of the feature [ $\alpha$  singulative], which is marked as [+ sing] with singular individuals. Group formation operates basically on singulative what multiplier (or kind) plurals operate on atomicity, i.e. make the value general, either negative or null, [- ,  $\emptyset$  sing]. If singulative is negative, and it is the higher feature that is manipulated, leaving the atomic feature unchanged (with a positive value), then the non-co-occurrence of Num and Nb can be attributed to a feature value conflict (or absence of agreement). This is so because the Num requires atomic entities to operate on, and the non-singulative providing no such entities. XP movement to form (group) plurals in Chinese can then be motivated by some feature checking in Nb. If Nb is valued as [ $\emptyset$  sing], in the case of Group (much like a [ $\emptyset$  atom] is the value for Kind/generic), then Group formation (through movement) to [ $\emptyset$  sing] in Nb would allow the ‘conversion’ of the [+ sing] value of the CI, much in line with the movement of an atomized N to a higher Nb, marked as [ $\emptyset$  atom] would allow the formation of (indefinite) generics in Arabic or Romance (see Fassi Fehri (2003b) for motivation). The structure of *shū-běn* would then appear as follows:

- (47)
- $$\begin{array}{c}
 \text{DP} \\
 / \quad \backslash \\
 \text{D} \quad \text{NbP} \\
 \quad / \quad \backslash \\
 \quad \text{Nb} \quad \text{CIP} \\
 \quad | \quad / \quad \backslash \\
 \text{shū-běn} \quad \text{CI} \quad \text{np} \\
 \quad \quad | \quad | \\
 \quad \quad \text{e} \quad \text{e}
 \end{array}$$

We still have to account, though, for the fact that Num cannot be projected or realized pre-nominally. We assume that cardinals cannot take [ $\emptyset$  Nb] as heads or complements. Zero does not agree with any cardinal, assuming that cardinality starts with 1. The other possibility is that an empty Nb has also an empty D feature, which then triggers necessary movement to D, hence its (in)definite specific reference. An overt Num there would then block movement to D, hence resulting in a non-converging derivation. We leave details

of technical choices for further research, highlighting only the syntactic character of plural formation.<sup>26</sup>

#### 4. Apparent complementarity of Classifier and Number

In this section, we reexamine the complementarity thesis of CI and Nb, in the form introduced by Greenberg's (1972), as a base of 'typing' languages, depending to whether they (tend to) express *either* Nb *or* CI. This complementarity is clearly stated in T'sou (1976), and has inspired Chierchia's (1998) Nominal Parameter, based on the view that CI and Pl play a parallel role in the grammar. Borer (to appear) adopts a slightly weaker position in the sense that she specifically limits the restriction to classifier and plural 'inflection', not to Classifier or Number in general: "Not only is it the case that classifier languages do not (appear to) have plural inflection, but languages which mark plural do not appear to have classifier inflection. In other words, it would appear that classifier inflection and plural inflection are in complementary distribution". She then goes even further and claims that the latter reflects the *inflectional identity* of plurals and classifiers, which then compete for insertion under the same node: CI. We first recapitulate some of the firm bases that lead us to think that the complementarity thesis is both empirically illusory, and conceptually inadequate. Furthermore, the inflectional identity thesis can be hardly maintained. Second, we turn to identify what we think is the essential source behind Greenberg's (and others) intuitions of complementarity. We claim that (contra Li (1999)), 'classifier languages' do not lack a projection of Nb, and 'number languages' do not lack a CI projection, as evidenced by Chinese and Arabic. Rather, the (often manifest)

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<sup>26</sup> Note that the suffix *-men* can co-occur with some CIs, such as *qún* "group", which has a collective G reading, but not a kind CI, such as *zhǒng* and *lěi*:

- (i) a. *zhèi qún háizi-men*  
 dem CI child-MEN  
 this group of children (Yu 1957: 3, after Iljic 2001:21)
- b. *\*zhèi zhǒng háizi-men*  
 dem type child-MEN  
 this type of children
- c. *\*yī lěi lǎoshīmen* (Iljic 2001: 21)  
 one CI teachers-MEN

Some form of 'agreement' is then going on between the CI and (the classification flavoured ) Nb.

Another property of *-men* is that it is always interpreted as a specific (definite), and never as a generic, hence the contrasts in (i) and (ii) (Rygaloff 1973):

- (i) a. *\*yǒu rén-men*  
 have man-MEN  
 There are men
- b. *yǒu rén*  
 have man  
 There is (are) somebody (some people).
- (ii) a. *\*tā-men shì lǎoshīmen*  
 they-MEN be teachers  
 They are teachers
- b. *tā-men shì lǎoshī*  
 they-MEN be teachers  
 They are teachers.

The specific character of *-men* contrasts with that of English generics/kinds as in *Dogs bark*.

complementarity is to be found in the system of feature (un)specification. Granted that both Nb and Cl may be projected in all languages (and hence be manifest in all of them), we show that if CIs and Pls manipulate values for the same features, namely atomic and singulative, then interactions between valuations of Nb and Cl features are expected, precisely because they occupy different positions in the nominal architecture respectively. Typically, Nb can be thought of as the 'complement' of the Cl in Bresnan's construal of Jakobson's theory of specification and markedness, or its unmarked general realization (cf. also Ojeda (1998)). Overtness of Nb or Cl gives then rise to different configurations of specification in the general case in generalized Nb or Cl language manifestations, although mixed overt systems are not only found (as manifested productively by Arabic, but less so by Chinese), but expected to be found under our theory, but not the identity/complementarity theory.

#### 4.1. Confirming the inadequacy of the complementarity/identity thesis

A first clear case of the inadequacy of this thesis is provided by Arabic cases where both Cl and Pl co-occur. This is exemplified by Arabic (28b) and Moroccan Arabic (29b & d) above. In this kind of examples, the Pl is a plural of individuals. Kind undergoes an overt morphological derivation to form Individuals, and Pl applies to the latter to form the individual Pl. The following derivational process accounts for the co-occurrence:

(48) tamr "date K" → tamr-at "an individual date" → tamr-aat "a set of individual dates"

Here the suffix *-at* forms the individual unit from the general kind, and the individual Pl is formed through internal vowel lengthening (*-aa* basically).

That Cl and Pl are not incompatible is also supported by the fact that the Pl of kinds is available as well:

(49) tamr "date K" → tumuur "kinds/sorts of date"

As pointed out in Fassi Fehri (2003b), Pl formation in these cases is *ontology preserving*, in the sense that it does not operate a classification/reference shift, from a kind/sort to a unit. It is rather a multiplier of 'already' available entities, which are of different nature (sorts, as distinct from individuals). Typically, Pl does not operate classification.

A problematic case for the complementarity thesis is classifier recursion, with a number of CIs co-occurring within the same construction. A Cl construction is then not necessarily limited to one Cl. Various instances of this case are found. For example, the collective marker *qùn* can co-occur with the collective marker *-men* in Chinese, as in footnote 17, repeated here as (50), for convenience.<sup>27</sup>

(50) zhèi qùn hàizi-men  
dem Cl child-MEN  
this group of children

Likewise, CIs may reduplicate, as observed earlier with respect to (42) or (43). The following example from Cheng & Sybesma (1999) instantiates this phenomenon:

(51) tiáo tiáo dào lù tōng Beijing  
Cl Cl road connect Beijing  
All roads lead to Beijing.

<sup>27</sup> Here *-men* appears to operate more like a 'kindifier' than a 'groupier', close to what happens in the English translation of (50) above, where "children" is a kind, and "group" is a counterpart to the Chinese group Cl.

If CIs themselves are not mutually exclusive in the same construction (except when they are semantically incompatible), then there is no reason to think that Pl, even when read as CI is incompatible with another CI. The distributions mentioned are then unexpected under the complementarity thesis. They pose no problem for our non-discriminative view.

That CIs are not mutually exclusive can be supported by more subtle evidence coming from comparing Arabic, English, and French. Consider the following contrast in Arabic and English (closer to that found in (11) above):

- (52) a. *ṭalaṭat-u fuṭuu-i tawm-in*  
 b. three cloves garlic

- (53) a. *ṭalaṭat-u ruṭuus-i anam-in*  
 b. three head of sheep

In both sets of examples, the measuring words (functioning as CIs) are in the plural form, whereas the head N is in the singular form. But there is reason to think that the Ns are of different classes, the first being Mass, and the second Kind. For example, in French, the difference is manifested through Pl marking in the Kind case, and its absence in the Mass case:<sup>28 29</sup>

- (54) a. *trois gousses d'ail*  
 b. *trois têtes de moutons* (\* mouton)

Conceptually, the inadequacy of the complementarity thesis is even more striking. If Pl is of three types at least, as we have seen, and only one of them actively interacts distributively with CIs, then it is hard to see how a strong version of this thesis can be conceived. In the multiplier configuration, the complementary distribution is hardly conceivable on conceptual grounds, given that CI and Pl are playing distinct roles in the grammar. Second, as in constructions (28c & d) or (29d & e) above, Pl may play the role of *modifier* of the quantity of a Pl (already formed). There is then no unique role of Pl inflection which would parallel the unique role of CI inflection.

These pieces of evidence combined with previous ones point clearly to the inadequacy of the complementarity thesis. Furthermore, the postulated inflectional identity of CI and Nb (as in Borer (to appear)) is even hardly conceivable. If 'classifier languages' and 'number languages' were indeed to constitute two Greenbergian 'types', then presumably no macro-variation of the sort defined by the complementarity thesis can be justified. What appears to be typical are functions of Nb and CI in the two types, rather than their existence, along the lines proposed in Fassi Fehri (2003b).

#### 4.2. Cross-linguistic instantiations

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<sup>28</sup> Compare also with:

- (i) *trois troupeaux de moutons* (\* mouton)  
 (ii) *trois têtes de bétail*

<sup>29</sup> Further motivation for the empirical inadequacy of the complementarity thesis comes from Pl and Nb distributions in other 'classifier languages'. In his analysis of classifiers in Anamuxra, a language spoken in Papua New Guinea, Ingram (2003:138ff) argued that in this language nominal classifiers are used with Nb morphological marking for singular, dual and plural. Likewise, Chung (2000) showed that Pl is formed through CI reduplication in Indonesian, another 'classifier language'.

So far, we have illustrated CI operations/derivations which form a new CI ontology from another ontology by changing the value of one of its features. These derivations operate on one of the two features proposed. They either (by creating atoms, or the reverse, 'de-atomize'), ATOMIZE or SINGULATIVIZE (forming singulative entities, or the reverse, 'de-singulativize'). Here are some of these operations to illustrate:

(55) Atomize

Kind  $\rightarrow$  Individual

samak "fish"  $\rightarrow$  samak-at "individual fish"

(56) De-atomize

Individual  $\rightarrow$  Kind

apple, dog  $\rightarrow$  apples, dogs

(57) Singulativize

Mass  $\rightarrow$  Kind

xašab "wood"  $\rightarrow$  xašab "wood" (xašab-at "wood-unit")

(58) De-singulativize

Kind  $\rightarrow$  Mass

bger "cows"  $\rightarrow$  begr-ii "beef"

Note that complex operations which involve changes of the two feature values at the same time are not found (or so it appears):

(59) \* Individual  $\rightarrow$  Mass

(60) \* Group  $\rightarrow$  Mass

(61) \* Mass  $\rightarrow$  Individual

(62) \* Mass  $\rightarrow$  Group

We have found no counterexamples to (60) and (62). That would be examples of groups like "team", converted to the mass "team". Apparent counterexamples to (59) and (61) can be instantiated by 'universal grinder' and 'universal packager' discussed by Pelletier and Schubert (1989) and Jackendoff (1991), as in the following constructions:

(63) There is dog everywhere.

(64) I had three coffees.

If the individual "dog" is 'converted' to a mass "dog" in (63), or the mass "coffee" converted to an individual "coffee" in (64), then these operations, if grammatical, may be potential counterexamples to the claim that only single changes are permitted. We have found, however, no instances of (overt) grammatical CIs that operate these changes. We assume that these conversions operate rather from kinds to individuals. If true, and if ontological classification is limited only to single operations, then the system makes strong predictions, typically with respect to limitations on classification changes.<sup>30</sup>

In Arabic, instances of 'atomic' and 'singulative' ontological classifiers are found, complemented by inherently built-in ontological distinctions at the N level for both features. In Chinese, the only built-in ontological distinction at the N level appears to be 'singulative' (the Kind/Mass distinction), and 'atomic' is left unspecified. As a consequence, an 'atomic' N must be formed through an 'atomizer' (misleadingly named a

<sup>30</sup> A reviewer notes that there seems to be an instance for a derivation in the direction  $M \rightarrow I$  in Kurdish, where *cay* "tea", a mass noun, can be used in restaurant talk constructions like *du (ta) cay* "two CL tea" (with optional CI), where it refers to portions of tea. We think, however, that this case falls under the 'universal packager' option discussed above.

'count-classifier'), to enable a singulative N to become an individual I. As for Cheng & Sybesma's 'mass-classifiers', they are not necessarily ontological, since they apply equally to singulative and non-singulative Ns. Though they are necessary for counting, they may introduce units of measures or taxonomies, without affecting the ontology of the N.

If our story is on the right track, then the difference between languages like Chinese and English (or Arabic) is that the former (called a 'classifier language') has only one built-in feature distinction at the N level (the Kind/Mass singulative distinction), but English (and Arabic) has also the 'atomic' distinction built-in (although sometimes quite productively manifested by an atomic CI in Arabic). Given our classificatory feature system, differences between the two traditional 'types' can then be stated as follows:

(65) In 'classifier languages', only the [ $\alpha$  sing] distinction is built-in at the N level, in 'non-classifier languages', the [ $\alpha$  atom] feature is also (generally) built-in.

As a consequence of (65), an atomic CI is needed to form individual. But note, as observed earlier, that Nb cannot be taken as a CI in the ontological sense, because Nb is blind to the atomic/taxonomic distinction examined above, although it may also manipulate atomization. Thus although ATOMIZE can be involved both with CI and Nb, the two atomization processes should not be confused, the first one being more specific, and the second one more general. This view will be more precisely articulated below.

#### 4.4. Two levels of atomicity

The difference between CI and non-CI languages reflected at the N level correlates with a massive use of CI in type 1, and a massive use of Nb in type 2, with the apparent complementarity observed above, hence giving the impression that they belong to the same category, or share the same identity. Given that they are not, we still have to explain why PI tends not to be used with CI in Chinese, or that the CI use is less productive in Arabic than that of Nb, or even less so in English.

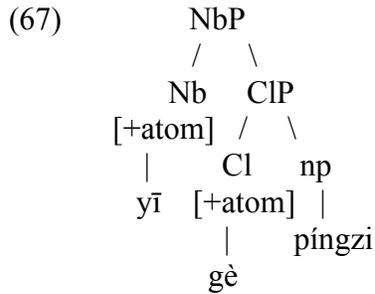
That Nb and CI are not in complementary distribution in Chinese is clearly instantiated by the structure of indefinite singulars, as in (18a) above, repeated here as (66), for convenience:

(66) *yī gè píngzi*  
       one CI bottle  
       a bottle

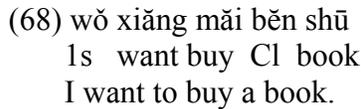
In (66), *yī-* can be taken as overtly realizing Nb, *yī-* being the counterpart to "a" in English, as argued above (see also Chen (2003)). In the singular case then, both CI and Nb are projected.<sup>31</sup> It is then reasonable to think that ATOMIZE is valued at two different projection levels in the grammar: the CI level and the Nb level. At the former, the entity formed is (an atomic) individual, and at the latter a singular (or atomic) number of this individual. Note that the [+atom] value for both CI and Nb is overtly realized (and/or marked), compared to the negative or null values ([ $\emptyset$  atom] or [- atom] for either the CI

<sup>31</sup> If one regards *yī-* as a cardinal numeral in all uses, and rejects Chen's multiple interpretation of it, namely as a singular indefinite (or a number marker), one would not have both Nb and CL in (66). Only a numeral is there, with a CI (the standard case). We do not think, however, that the unique interpretation option, suggested by a reviewer, is descriptively adequate (see also *yī-xie* interpretation in (38) above).

or the Nb, which is unmarked and not phonetically realized. The architecture for (66) is then as follows:



It is then the case that the two kinds of atomicity can be overtly realized in Chinese, in conjunction with the projection of both Nb and Cl. But such 'double' realization of atomization can be supplemented by only one, as in (13) above, repeated here as (68) for convenience, where only Cl is realized:



Here *běn shū* is interpreted as a singular (atomic) individual. Cl specification and Nb specification then interact, presumably by some default (percolation) mechanism, to license covert Nb. This situation is close to that of *samak-at-un* 'fish-unit, a fish' in Arabic, where the interpretation is also singular, in the absence of an overt marker of Nb. What is important to observe though is that even in the covert singular Nb, the higher atomicity is still different in nature from the lower one in that it does not form a class (of individuals). It is blind to classification, as illustrated by the Arabic examples (5), (6), and (10), where covert singulars occur for all classes, yet singular number (and/or weak cardinality) is involved in the interpretation.

Consider now the plural case. Pl at first sight appears to be overtly expressed in Chinese (with very specific information, as is the case with *-men*), but not generalized. But a general process of pluralization does exist though, as we have observed in subsection 3.3. It involves Cl phrase movement to Nb. It is also (generally) blind to classes, in comparison with *-men* formation. The Cl-to-Nb movement appears then to be the overt manifestation of plural, compared to singular, where no such a movement takes place, and the number receives its atomic value from that of the Cl, by default (and/or percolation). The difference between Arabic and English then appears to be a difference between languages that mark (specific) atomicity overtly at the Cl level in the form of singulars, and those that mark (general) atomicity overtly (in morphology) in the form of plurals. The generality of Pl in English is manifested by the fact that there is no distinction between 'dogs' and 'oils' in terms of Pl formation, yet the two entities are distinguishable in terms of singulativity interpretation. The same is true of the singular marker *a*, which behaves essentially like *yi-* in Chinese. In Fassi Fehri (2003b), it is proposed that a (vertical) directionality accounts for this variation. In Chinese, the atomic (under)specification appears to be *oriented from bottom to top* (i.e. from Cl to Nb, or from specific to general). In English, it is *oriented from top to bottom* (i.e. from the general Nb atomicity to the specific atomicity of the Cl). Individual units or sorts are then formed at the Cl level, depending on their singulative value. Arabic is a mixed

system, although it is closer to English than to Chinese, in that atomicity of the general type. But when atomicity is expressed overtly at the Cl level, the general atomicity of the Pl overrides that of the Cl. Likewise, movement to Nb of the classifier phrase in Chinese enables the (general) atomic value of the Pl to override the specific atomic value of the Cl. That is to say, Chinese does have a Pl with a (general) content value (as in English), and its 'overt' realization is manifested by movement. It is worth noting that this Pl is often associated with 'specific' definiteness, by default, pointing to the fact that D is projected in the structure (with content), although not phonetically overt.

As for specific plural uses like those of *-men*, typically in the 'collective' reading, so-emphasized in the literature, we assume that plurality formation, when interpreted as a Group, is not manipulating atomicity, but rather singulativize. What (general) grammatical group formation does, we assume, is override the specific (positive) value of singulativity, and make it general (or unspecified, hence acquiring a negative or a zero value). The (positive) atomicity of the Cl is left unaffected. This accounts for the fact that the Pl might be a grouper, just as it is a 'multiplier' or a 'partitioner', or even a 'kindifier' or a generic, depending on which of the two features it overrides. We leave unanswered the specifics of the limitations found in Chinese, be they inherently lexical or contextual.

## 5. Summary and conclusion

To sum up, we have shown that Cl and Nb do 'complement' each other, but in ways very distinct from the (inflectional and/or projectional) complementary distribution assumed by some authors, or the shared inflectional identity. Cl and Pl are *both projected* in the languages examined, and they are *both overtly realized*, either via morphology or syntactic movement. The overt morphological realization of either Cl or Nb in the general case, which is basic to 'typing', finds its source in the distinct uses made of the specific vs. general specification of the two features assumed, and the interaction between Nb, Cl, and N projections and specifications (much in line with Bresnan's (2001) insights about 'global' specification, elaborating on Jakobson (1957); cf also Ojeda (1998)). As far as atomicity is concerned, languages (generally) either mark the specific (positive) value via Cl, or the general (negative or zero) value, its 'complement', via Pl, as found in Chinese and English, respectively. Arabic is a mixed system, where both can be marked, the general higher atomicity then overriding the lower one. But Arabic is closer to English in the general case.

Singulativity is assumed to be universally available at the N level, and Cl and Pl concur for valuing the atomic feature. If atomicity is specified at the Cl level, there is no specific need to re-specify it at the Nb level, if projection interaction is taken advantage of. If it is specified at the Nb level, the same principle applies. The general tendency is then limited to two grammatical options, characterizing the general variation, as stated in (69):

(69) ATOMIZE at the Cl *or* the Nb level.

Note that (69) is an over-simplification, given not only clear mixed systems like Arabic, but also other forms of micro-variation found in Chinese. It is presumably the case that more micro-variation parameters are involved rather than macro-variation (cf. e.g. Kayne (2003), Homlberg & Sandström (1996), Chomsky (2001), Bresnan (2001 a & b)). Note

also that singulativity (vs. collectivity) is in need of more integration in systems of Cl/Nb specification than previously thought. Chinese appears to be a language where such an option is made use of at the Nb level, and a tentative parametrization parallel to (69), is expected to receive wider motivation:

(70) SINGULATIVIZE at the Cl *or* the Nb level.

Parallelisms between verbal and nominal architectures are presumably helpful in determining precisely how both are structured. It is striking that a similar 'global' system of specification is found in aspectuo-temporal systems, where systems that tend to specify *Aspect* (perfective) do not tend to specify *Tense* (perfect/past), and vice versa (although mixed systems are also found). This distribution has also led some authors to classify languages according to whether they are 'aspect languages' or 'tensed languages' (cf. Fassi Fehri (2003a, 2004) for refutation of this classification, references on this matter, as well as arguments for the directionality of specification). Second, verbs have often been classified in four classes based on two features, another striking parallelism if correct.<sup>32</sup>

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<sup>32</sup> In Fassi Fehri (in progress), it is shown that the nominal feature system adopted here can be naturally extended to the four Vendlerian verb classes as follows:

(i) V classification

- |                          |                  |
|--------------------------|------------------|
| a. Achievement (= I):    | [+ atom, + sing] |
| b. Accomplishment (= G): | [+ atom, ∅ sing] |
| c. Activity (= K):       | [∅ atom, + sing] |
| d. State (= M):          | [∅ atom, ∅ sing] |

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