

Plural semantics, reduplication, and numeral modification in Indonesian*

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Numeral classifiers provide a means to individuate relevant parts of the denotation of mass nouns in order to allow the parts to be counted. In a language like English, mass nouns like *furniture* require the presence of a classifier or measure term when they are modified by a numeral, while count nouns like *table* can be directly modified by a numeral; furthermore, count nouns but not mass nouns are marked as plural if they refer to more than one entity. In so-called “classifier languages” like Japanese and Chinese, all nouns require classifiers for individuation and counting, and plural morphology tends to be absent.

These observations underpin Chierchia’s (1998a, 1998b) theory of the semantics of bare nominals, the Nominal Mapping Parameter. The Nominal Mapping Parameter establishes a connection between plural morphology, numeral classifiers, and the ability for bare nouns to appear in argument position. It claims that in languages like Japanese and Chinese, all nouns are mass nouns, plural morphology is generally absent, classifiers are required with numerals, and bare nouns can appear as arguments to predicates. In languages like English, in contrast, nouns are either mass or count, count nouns are marked as either singular or plural, numerals can appear without classifiers, and bare mass nouns and bare plural count nouns, but not bare singular count nouns, can appear as arguments to predicates. Chierchia’s theory makes interesting predictions about correlations between morphology and syntax, and these seem to accord with established typological generalisations.

In a dissenting article, Chung (2000) proposes Indonesian as a counterexample to the Nominal Mapping Parameter. In particular, she addresses the link in Chierchia’s theory between the requirement for classifiers and the absence of plural morphology, claiming that Indonesian has classifiers but also expresses plurality as reduplication. If the connection between the presence of classifiers and the absence of plural morphology does not hold up, Chierchia’s transparent connection between morphological expression and semantic interpretation cannot be maintained in a simple manner.

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However, Chung’s argument goes through only under the assumption that Indonesian reduplication has exactly the same semantics as plural formation in a language like English. We show that this is not the case: Indonesian reduplication is different in a number of respects from English plural marking. We propose an alternative semantics for Indonesian reduplication and an alternative set of generalisations regarding plural formation, numeral modification, and classifiers that preserves the spirit of the Nominal Mapping Parameter while fitting better with data from Indonesian and other languages.

1 Numeral classifiers and plurality

Numeral classifiers appear in constructions where a numeral modifies a noun in languages like Japanese. In (1), the classifier *hon* is glossed CL:

- (1) enpitsu ni-hon
pencil 2-CL
‘two pencils’ (Japanese: Matsumoto 1993)

The numeral cannot modify the noun directly, and a numeral classifier is required to appear. Mass nouns in English require a similar construction, even when they refer to individuable entities like furniture:

- (2) a. three pieces of furniture
b. *three furnitures

This similarity between English mass nouns and Japanese nouns is an important motivation for Chierchia’s (1998a, 1998b) Nominal Mapping Parameter, which claims that all nouns in a classifier language like Japanese are mass nouns.

Plural marking in Japanese is not required when referring to more than one individual:

- (3) **Otokonoko-ga** asonde-iru
boy-NOM play-PROG
‘A boy is playing.’/‘Boys are playing.’
(Japanese: Nakanishi & Tomioka 2004)

Greenberg (1972) presents a foundational typological survey of numeral classifiers and the morphology of number, and draws an important descriptive generalisation: “Numeral classifier languages generally do not have compulsory expression of nominal plurality” (Greenberg 1972: 177). Greenberg bases this generalisation in part on the work of Sanches (1973), who makes similar claims; more recent work by Aikhenvald (2000) also supports this generalisation. The absence of plural marking in this example is accounted for by Chierchia’s Nominal Mapping Parameter: on his view, nouns in numeral classifier languages are uniformly mass nouns, which do not have the right semantics to be able to be pluralised in the same way as in English.

Indonesian also has classifiers. There are three classifiers in common use: *orang* ‘person’ for people, *ekor* ‘tail’ for animals, and *buah* ‘fruit’ for everything else.

- (4) a. lima orang guru
5 CL teacher
‘five teachers’
- b. lima ekor sapi
5 CL cow
‘five cows’
- c. lima buah meja
5 CL table
‘five tables’

Chung (2000) claims that Indonesian also has plural marking, realised as reduplication:

- (5) **Pulau-pulau** Bali, Lombok dan Sumbawa terletak di sebelah timur
island-REDUP and lie at side east
pulau Jawa.
island Java.
‘The islands of Bali, Lombok, and Sumbawa are located east of Java.’
(Chung 2000, citing Sneddon 1996)

The noun *pulau* ‘island’ is reduplicated in (5), and refers to more than one island. Chung’s claim that Indonesian has classifiers and also allows plural formation via reduplication seems to run counter to the Sanches/Greenberg/Aikhenvald generalisation about numeral classifier languages and plural expression, and also seems to present a problem for Chierchia’s Nominal Mapping Parameter.

In the following, we provide more evidence about the semantics of reduplication in Indonesian and its interaction with the numeral classifier system. Our data show that the semantics of reduplication in Indonesian cannot be analysed in the same way as pluralisation in a language like English. We discuss the impact of the Indonesian data on the Nominal Mapping Parameter, and propose a different set of generalisations which accounts for a wider range of data from Indonesian and other languages.

Section 2 discusses numeral modification of Indonesian nouns and reduplication in Indonesian, its interpretation, and its interaction with classifiers. Section 3 shows that there is no mass/count distinction in Indonesian; the theory of classifiers and numeral modification cannot, then, rely on such a distinction. In Section 4, we present our formal theory of nominal modification and reduplication in Indonesian.

Though our focus in the following is on numeral classifiers, it should be noted that the term ‘classifier’ has been used for a wide variety of other ways

of indicating the classification of nouns. In a comprehensive typological survey, Aikhenvald (2000) describes a variety of linguistic devices for indicating noun category which have been referred to as classifiers. For example, some languages have *noun classifiers*, which appear with nouns even when they are not modified by a numeral. Possessive constructions can also involve classifiers: for example, a *possessed classifier* can mark the possessor for noun class agreement with a possessed noun. *Verbal classifiers* appear on the verb and show noun class agreement with one of the core arguments of the verb. Aikhenvald lists a number of other devices which have been referred to as classifiers. This similarity of terminology for different classifier types has been a source of confusion in the literature: neither Greenberg’s claim nor Chierchia’s theory draw a connection between plurality and non-numeral classifiers.

2 Numeral modification and reduplication in Indonesian

Patterns of numeral modification and reduplication in Indonesian show that reduplication and the use of classifiers in numeral modification are possible but optional for all nouns. Unlike plural morphology in English, however, reduplication is not necessary in referring to more than one individual, and the use of reduplicated forms indicates that a relatively large number of individuals is involved. Finally, examples of classifiers in combination with reduplicated nouns can be found, contrary to the claims of some previous researchers, though such examples are uncommon and dispreferred.

2.1 Optionality of classifiers

As shown in example (4) above, Indonesian has three classifiers in common use, *orang* ‘person’ for people, *ekor* ‘tail’ for animals, and *buah* ‘fruit’ for everything else:

- (6) a. lima orang guru
 5 CL teacher
 ‘five teachers’
- b. lima ekor sapi
 5 CL cow
 ‘five cows’
- c. lima buah meja
 5 CL table
 ‘five tables’

For all numerals other than *se-* ‘one’, which is a prefix attached to the classifier, the classifier is optional¹ (Sneddon 1996, Chung 2000). Alongside (6), the

¹Carson (2000) claims that classifiers are obligatory in Malay numeral modification constructions; examples of numeral modification without classifiers are plentiful, however, as we show below.

phrases in (7) are also completely acceptable:

- (7) a. lima guru
5 teacher
'five teachers'
- b. lima sapi
5 cow
'five cows'
- c. lima meja
5 table
'five tables'

These patterns are surprising in light of Chierchia's claims about the strict correlation between language type and the requirement for classifiers to be used in numeral modification, and they are equally problematic for Chung's claims about Indonesian as a typical classifier language. Although the classifier is obligatory with the prefix numeral *se-* 'one'; we believe that this is best treated as a morphological fact and not a fact about the semantics of the classifier system. Chung also points out that the classifier was more frequent in earlier stages of Indonesian, but this does not mitigate the fact that the classifier is optional in contemporary Indonesian. A full analysis of Indonesian numeral modification must, then, account for the fact that numerals can combine with nouns either directly or in combination with a classifier.

2.2 Optionality of reduplication

Reduplication is not obligatory for the expression of plurality. In example (8), *telur* 'egg' can be interpreted as plural, though it is not reduplicated. Similarly, nonreduplicated *buku* in (9) can be interpreted as plural:

- (8) Saya merebus **telur**.
I boil egg
'I am boiling eggs.'
- (9) (Apa isi peti itu?) **Buku**.
what contents box that book
'(What is in that box?) Books.'

Like the optionality of classifiers in numeral modification, the optionality of reduplication to refer to pluralities is problematic for Chung's (2000) characterisation of Indonesian as a numeral classifier language with plural morphology.

2.3 Reduplicated nouns and numeral modification

It is difficult, though not impossible, for reduplicated nouns to appear with numerals and classifiers. Chung (2000) provides one example of this construction, and in a web search, we found several more. Reduplicated nouns can appear with numeral modification with no classifier:

- (10) Tim ini terdiri dari **empat siswa siswa** yakni Eka Afidah,
team this consist of 4 student REDUP namely
Duratu Abdiana R, Meliza Istiana, dan Diah Noianah.
and
‘This team consists of four students, namely ...’
(http://www.lamongan.go.id/Report/article_excel.cfr?articleid=4858)

We have also found examples of reduplicated nouns with a numeral and classifier:

- (11) Jasa bantuan pemenuhan kebutuhan sekolah ini ditujukan
service aid fulfillment needs school this PASS.aim.at.KAN
kepada **100 orang siswa-siswa** dari 6 sekolah dasar di atas
to 100 CL student-REDUP from 6 school elementary at above
yang terletak di wilayah Ciumbuleuit.
REL located in region
‘The service for the fulfillment of school needs is aimed at one hundred
elementary school students from six elementary schools located in the
Ciumbuleuit region.’
(<http://deathrockstar.info/2005/07/>)

However, the use of the reduplicated form in numerical modification is uncommon and dispreferred relative to the use of the nonreduplicated form, to the extent that some authors (e.g. Carson 2000) have claimed that the reduplicated form is ungrammatical in numeral modifier constructions. This is not explained on Chung’s (2000) view.

2.4 Interpretation as large number of instances

Reduplicated nouns intuitively refer to a relatively large number of instances of the noun. We found no instances of *dua orang-orang/2 orang-orang* ‘two person-REDUP’ or *dua siswa siswa/2 siswa-siswa* ‘two students-REDUP’ in a web search, and in fact such phrases are intuitively found to be unacceptable. This is puzzling if reduplication has a semantics like the English plural and simply is used when referring to more than one entity. A full analysis of the semantics of reduplication must also encompass this aspect of its meaning.

3 The mass vs. count distinction in Indonesian

It has been claimed that all languages distinguish mass nouns from count nouns (Doetjes 1997). Given this claim, we might expect that only certain nouns in Indonesian – count nouns, and not mass nouns – could be reduplicated or modified

by a numeral. However, this is not the case: there are no mass/count distinctions among determiners, and notionally “mass” nouns can be reduplicated and modified by a numeral, with or without a classifier.²

It is important to note that this is not true for every classifier language, or for every language in which plural marking is not obligatory. Wilhelm (2008) shows that there is a well-motivated mass/count distinction in Dëne Sų́líné, which has no plural marking, and Cheng & Sybesma (1999) show that the classifier language Chinese has a mass/count distinction, though plural marking is not obligatory. A fully general treatment of plural marking and classifiers cannot, then, rely on the presence or absence of a mass/count distinction.

3.1 Determiner distinctions

Chierchia (1998a) lists a number of criteria that may motivate a distinction between mass and count nouns, including the use of different determiners. In English, certain determiners are reserved for count nouns:

- (12) a. a book/*a mud
 b. each book/*each mud

Others must be used with mass nouns:

- (13) a. little mud/*little book
 b. much mud/*much book

The same is not true in Indonesian; all determiners may be used with all nouns, regardless of whether they are notionally “mass”:

- (14) a. banyak buku
 much book
 ‘many books’
 b. banyak lumpur
 much mud
 ‘much mud’
- (15) a. beberapa buku
 some book
 ‘some books’
 b. beberapa lumpur
 some mud
 ‘some mud’

²Carson (2000) also claims that there is no need to make a mass/count distinction in Malay, but on the basis of the incorrect claim that both need classifiers and cannot combine with numerals directly.

Examples (16) and (17) involve modification of a notionally “mass” noun by the determiners *setiap* ‘each’ and *sedikit* ‘little’/‘few’:

- (16) **Setiap air** yang dipompa dari kolam penampungan atau kolam
each water REL PASS.pump from pond reservoir or pond
pengendapan masuk ke kolam pembesaran, ...
PEN.evaporate.AN enter to pond PEN.big.AN
‘each (amount of) water which is pumped from the reservoir pond or evaporating pond to the main pond ...’
(http://www.seafdec.org.ph/pdf/Best_Management_Practices-Bahasa.pdf)

- (17) Lebih baik memiliki **buku sedikit** tapi dibaca dan
more good MEN.have book little but PASS.read and
diamalkan isinya.
PASS.apply.KAN content.3Poss
‘It is better to have few books but [the books] are read and applied.’
(http://www.ranesi.nl/arsipaktua/indonesia060905/tak_perlu_takut_kudeta070530)

3.2 Reduplication of “mass” nouns

Reduplication of notionally “mass” nouns like *air* ‘water’ gives rise not only to the interpretation ‘kinds of water’, but also to the interpretation “(specific) amounts of water”. Chung (2000) denies that such an interpretation is possible, but we have found a number of naturally-occurring examples illustrating this possibility. Example (18) involves reduplication, and refers to multiple specific quantities of water:

- (18) Mereka telah kemasukan air laut terlalu banyak dan **air-air**
They have ingested sea water excessive many and water-REDUP
itu sudah berhasil dikeluarkan.
that have successfully PASSIVE.exit.KAN
‘They have ingested too much sea water, and those [amounts of] water have successfully been taken away.’
(<http://www.detiknews.com/index.php/detik.read/tahun/2008/bulan/02/tgl/04/time/152231/idnews/888917/idkanal/10>)

Example (19) refers to multiple pieces of *emas* ‘gold’:

- (19) Tidakkah engkau memilih **emas-emas** itu?
not.QUES you choose gold-REDUP that
‘Don’t you choose those [pieces of] gold?’
(indonesia.heartnsouls.com/cerita/n/c1372.shtml)

And example (20) refers to multiple specific quantities of *minyak* ‘oil’:

- (20) ... **minyak-minyak** itu muncrat dari manhole kapal dan membeku
 oil-REDUP that stream from manhole ship and solidify
 setelah membentuk seperti sabu dan mengotori pantai sekitar.
 then form like bubble and make.dirty beach around
 ‘The [streams of] oil streamed from the manhole of the ship and solidified,
 and then formed bubbles and polluted the beach.’
 (http://www.posmetrobatam.com/index2.php?option=com_content&do_pdf=1&id=1401)

3.3 Numeral modification of “mass” nouns

We have also found examples of numeral modification of notionally “mass” nouns, with the classifier *buah* or with no classifier. Example (21) refers to portions of ice cream, example (22) refers to geographical areas of sea water, and example (23) refers to pieces of wood:

- (21) Berapa lama waktu yang diperlukan oleh 5 anak untuk makan
 How long time REL PASSIVE.need.KAN by 5 child to eat
5 buah es krim?
 5 CL ice cream
 ‘How long does it take five children to eat five (portions of) ice cream?’
 (<http://rumiati.wordpress.com/2007/09/11/teki-teki-matematika>)
- (22) Seandainya masing-masing dari **dua air laut** tersebut
 If each of 2 water sea PASSIVE.mention
 memiliki salinitas (kadar garam) yang berbeda atau temperature yang
 have salinity (level salt) REL different or temperature REL
 berbeda ...
 different ..
 ‘If each of two (areas of) sea water mentioned has different salinity or
 different temperature ...’
 (http://seremonia.net/hello/index.php?option=com_content&task=view&id=32&Itemid=33)
- (23) Untuk satu peleg butuh sekitar **sepuluh kayu**.
 for one peleg need about 10 wood
 ‘For one peleg, ten (pieces of) wood are necessary.’
 (<http://jawapos.co.id/radar/index.php?act=detail&rid=62414>)

Thus, there seems to be no motivation to make a distinction between mass and count nouns in Indonesian, at least on the basis of patterns of determiner use, reduplication, or numeral modification.

4 Plural semantics and numeral modification

To summarise the previous sections, a complete analysis of reduplication and numeral modification in Indonesian must account for the following:

- Classifiers are optional in numeral modification with all nouns.
- Reduplication is optional in the expression of plurality.
- Reduplicated nouns refer to a contextually determined relatively large number of individuals.
- The use of reduplicated nouns with classifiers is possible but dispreferred.
- There is no mass/count distinction.

4.1 Nouns

Greenberg (1972) notes the tendency for classifier languages to lack obligatory plural morphology:

A considerable number of classifier languages ... have what are generally described as plural affixes. However, closer examination seems to show that in almost every instance the ‘unmarked’ singular is in fact a form which, like the collective in languages with a compulsory plural, is non-committal in regard to number. ...What is hypothesised, then, is that in the usual classifier language (i.e. without inflection for number), classifiable nouns in their isolated form, that is when not accompanied by a classifier or a plural marker, are like collectives in their semantic non-specification of number and in their avoidance of a direct number construction. (Greenberg 1972: 183–184)

Greenberg (1972) and Sanches (1973) use the term **general number** for the unmarked form of nouns in languages with nonobligatory plural morphology (see also Corbett 2000). General number is common in numeral classifier languages (see, for example, Nakanishi & Tomioka 2004 for Japanese), but is also found in languages with no classifiers (see Wilhelm 2008 for Dëne Sų́liné). Carson (2000) and Sato (2008) argue convincingly that Indonesian nonreduplicated nouns exhibit general number, and can refer either to single entities or to pluralities. On this view, the Indonesian noun *meja* ‘table’ refers indeterminately to one or more individual tables, just like the English noun *furniture*. Carson (2000) provides example (24) in support of this view, and against the view that morphologically unmarked nouns are ambiguous and refer either to a single individual (on one reading) or to multiple individuals (on the other reading). Although in (24) the same property is required to hold of both John and Bill, it may be that John saw one horse and Bill saw several, or vice versa; if the unreduplicated noun *kuda* ‘horse’ were ambiguous and expressed either a singular meaning or a plural meaning on each occasion of its use, this would not be predicted.

- (24) John melihat kuda dan Bill juga
 John see horse and Bill also
 ‘John saw a horse/horses and Bill did too [saw a horse/horses].’
 (Carson 2000: 46–47)

Similar arguments for the analysis of morphologically unmarked nouns as having general number are given by Rullmann & You (2003) for Chinese and by Wilhelm (2008) for Dëne Sų́iné.

This view fits well with Corbett’s (2000) claim that the function of number marking in languages with general number is to provide additional specification of the number of entities that are referred to. In support of this view, Corbett (2000: 10–11) cites the following data from Bayso (Cushitic), showing that while the morphologically unmarked form has general number and can refer to one or more lions, additional marking can be added to restrict reference to one, a few, or a large number of lions:

- (25) a. lúban foofe
 lion.GENERAL watched.1SG
 ‘I watched (one or more) lion(s).’
- b. lúban-titi foofe
 lion-SINGULAR watched.1SG
 ‘I watched a lion.’
- c. lúban-jaa foofe
 lion-PAUCAL watched.1SG
 ‘I watched a few lions.’
- d. lúban-jool foofe
 lion-PLURAL watched.1SG
 ‘I watched (a lot of) lions.’

The semantics of number marking for general number nouns involves reference to, or individuation of, a certain number of parts (possibly atoms) of the denotation of the morphologically unmarked noun. Such marking can in principle have other semantic effects as well: for example, Li (1999) shows that in Chinese, a language whose morphologically unmarked nouns have general number, “plural” morphology not only involves reference to more than one individual, but also expresses definiteness. Similarly, reduplicated nouns in Indonesian are used to refer to a large number of individuals, and we treat this as a part of the meaning contributed by reduplication.

4.2 Plural semantics

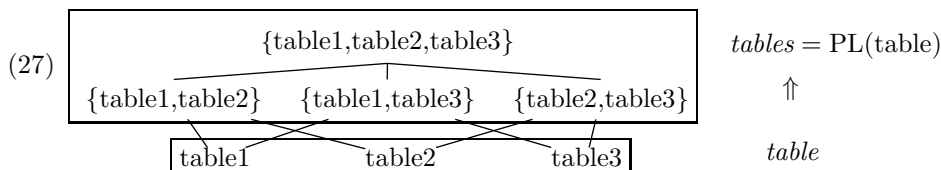
4.2.1 Chierchia: Classifiers and the mass/count distinction

Chierchia (1998a,b) analyses singular count nouns in English as denoting sets of atoms, and pluralisation (Chierchia’s PL) as an operation that produces the denotation of a plural noun by mapping a set of atoms into the set of pluralities constituted by those atoms.

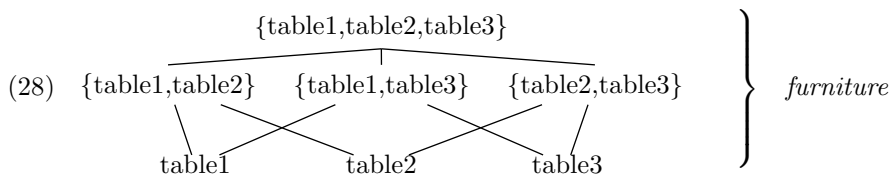
(26) $PL(A) = *A - A$

where $*A$ is the closure of A under \cup (the set of all sums of elements of A)
 (Chierchia 1998a: 59–60)

The effect of PL on a set of elements A (corresponding to the denotation of a singular noun) is to form all sums of the elements of A , and then to remove A , so that the denotation of the plural noun does not include the denotation of the singular noun. In (27), the denotation of singular *table* is the set of individual tables $\{table1, table2, table3\}$. The denotation of plural *tables* is obtained via the operation PL, which applies to the denotation of singular *table* to give the set of sets containing more than one table:



In contrast to count nouns like *table*, mass nouns like *furniture* neutralise the distinction between singular and plural – Chierchia analyses them as, in a sense, both singular and plural:



Chierchia’s PL does not apply in a sensible way to mass nouns, because there is no distinguishable set of individuals analogous to the denotation of singular *table* for PL to operate on. This means that mass nouns cannot be pluralised via PL.

To capture the generalisation that nouns in numeral classifier languages tend to resist pluralisation, Chierchia proposes that all nouns in numeral classifier languages are mass nouns. This means that numeral classifiers are required for numeral modification, since the classifier is necessary to individuate relevant parts of the mass noun to enable counting.

This proposal seems to fit reasonably well with the Indonesian data we examined above, since Indonesian has a classifier system, and does not have a mass/count distinction. However, it is not appropriate for the classifier languages Chinese and Dëne Sųłíné, since these languages do distinguish mass and count nouns. We now turn to alternative proposals for the semantics of number in languages with a mass/count distinction.

4.2.2 Rullman & You and Wilhelm: PL and the mass/count distinction

Rullmann & You (2003) and Wilhelm (2008) recast Chierchia’s proposal for the semantics of plurality with reference to Greenberg’s general number. Their proposals allow a treatment of unmarked nouns in Chinese and Dëne Sų́iné as similar to English mass nouns like *furniture*, but without discarding the semantic mass/count distinction that is needed in these languages. Rullmann & You (2003) propose an alternative definition of PL for general number nouns (see also Link 1983, Carson 2000, Wilhelm 2008):

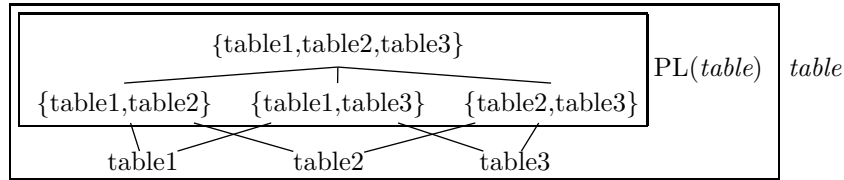
(29) Pluralisation (Rullmann & You 2003: 5):

$$PL(N) = *N - At$$

where $*N$ is the closure under union of N and At is the set of atoms.

This definition differs from Chierchia’s in that the set of atoms is subtracted from the result of forming all sums of the elements of N , rather than the set N itself. Rullmann & You (2003) provide the following diagram as an illustration of the difference between Chierchia’s PL and theirs (see also Carson 2000, Wilhelm 2008):

(30) Rullmann & You’s PL:



This definition works well for Rullmann & You’s analysis of Chinese, since Chinese has a well-defined distinction between mass and count nouns (see also Cheng & Sybesma 1999), and the operation of pluralisation can thus appeal to a well-defined set of atoms in the denotation of the nouns to which it applies. But it is not quite what we want for Indonesian, which does not have a mass/count distinction; we have seen that it is possible to reduplicate mass nouns like *air* ‘water’, which do not have distinguishable atoms in their denotation. Instead, our analysis requires that numeral modifiers, numeral + classifiers, and reduplication in Indonesian **individuate** parts of the denotation of the noun as well as specifying the number of individuals involved.

To set the stage for our analysis of Indonesian reduplicated nouns, we first discuss the semantics of numeral modifiers and classifiers in Dëne Sų́iné and Indonesian, following Wilhelm (2008).

4.3 Numerals and classifiers

Wilhelm (2008) proposes that numerals in different languages can make different semantic contributions depending on the presence or absence of classifiers in the

language. Wilhelm gives the following semantics for numerals in Dëne Sųłiné, which does not have classifiers, and English (Wilhelm 2008: 55; see also Krifka 1995):

- (31) English ‘three’, Dëne Sųłiné *taghe* ‘three’:
 $\lambda P.\lambda x.[P(x) \wedge OU(x) = 3]$
 a function from a set P of atoms and sums onto that subset of P containing the sums of three object units/atoms

Wilhelm’s analysis, following a suggestion by Krifka (1995), assumes that numerals incorporate a classifier OU which counts the number of ‘object units’ or atoms contained in a plurality. On her view, OU does not **create** atoms, but instead **accesses** the atoms or minimal units in the noun’s denotation. This analysis is similar to the proposal by Cheng & Sybesma (1999) for the treatment of Chinese count-classifiers for count nouns, which “name the unit in which the entity denoted by the noun naturally occurs” as opposed to what they call **massifiers**, which create a unit of measure.

This works well for Wilhelm’s analysis of Dëne Sųłiné, since in that language there is a clear distinction between mass and count nouns, demonstrated by the fact that numerals combine only with count nouns (which have accessible atoms in their denotation) and cannot appear with mass nouns. However, it is not adequate for Indonesian, since Indonesian does not exhibit a mass/count distinction. We propose the following semantics for Indonesian noun phrases in which a noun is modified by a numeral and by a numeral + classifier:³

- (32) Numeral modification: *lima meja* ‘five tables’:
 $\lambda x.[table(x) \wedge CL(x) = 5]$
 the pluralities constituted by tables which comprise 5 “portions” of table, where “table portions” (individual tables) are specified conventionally or contextually by the generic classifier CL
- (33) Numeral + classifier modification: *lima buah meja* ‘five tables’:
 $\lambda x.[table(x) \wedge buah(x) = 5]$
 the pluralities constituted by tables which comprise 5 “buah” of table, as specified conventionally or contextually by the classifier *buah*

Unlike Wilhelm’s OU, which counts the number of atoms in a plurality, CL in the examples above acts as a massifier, **individuating** portions of the denotation of the noun, creating rather than accessing atoms. This view is compatible with Chierchia’s (1998b: 347) view of numeral classifier and measure phrases as serving to “map mass noun denotations into sets of atoms”.

³Carson’s (2000) proposal for the semantics of the numeral + classifier + noun combination is broadly similar to (33), but she proposes a different compositional semantics, based on her claim that the classifier is obligatory in numeral modification. As we have seen, this claim does not match the Indonesian data we have observed.

This analysis depends on the following semantic contributions for numerals and classifiers:⁴

(34) *lima* ‘five’: $\lambda C.\lambda P.\lambda x.[P(x) \wedge C(x) = 5]$
 optionally: $\lambda x.CL(x)$ [where *CL* is the generic classifier]

(35) *buah* (classifier): $\lambda x.buah(x)$

Indonesian numerals do not simply denote a number, but require as their first argument a classifier meaning. Unlike Dëne Sųłiné, English, or Japanese, a default classifier may be contributed by the numeral itself: if no overt classifier is specified, the default generic classifier contribution is used as the first argument to the numeral.

Wilhelm (2008) observes that the assumption that numerals in English and Dëne Sųłiné incorporate a classifier correctly predicts that numerals in these languages can be used pronominally; in Chinese, where classifiers are required, numerals cannot be used pronominally. In Indonesian, numerals can be used pronominally, either with or without a classifier:

(36) Saya meminjam sepuluh buku dan mengembalikan...
 I MEN.borrow.KAN ten book and MEN.return.KAN
 ‘I borrowed ten books and returned...’

a. ... satu buah
 1 CL

b. ... satu
 1

c. ... dua buah
 2 CL

d. ... dua
 2

This is as expected, if Indonesian numerals contain an optional default classifier which appears in the absence of an overt classifier. It is also possible to use numbers predicatively in Indonesian, which is unsurprising given their relatively rich semantics:

(37) Kunci-kunci perkara ghaib itu ada **lima** dan ...
 clue-REDUP matter magic that be 5 and ...
 ‘There are five clues to that magic matter and...’
<http://almuslimah.wordpress.com/2008/03/31/dukun-dan-tukang-ramal-penciduk-agama-dan-harta/>

⁴Separate obligatory and optional semantic contributions of numerals are easily specifiable in the “glue” semantic approach described in Dalrymple (1999, 2001), though we do not provide an explicitly worked out treatment here.

4.4 PL as a massifier

With these tools in hand, we propose the following semantics for Indonesian reduplicated nouns:

(38) Reduplication: *meja-meja* ‘tables’:

$\lambda x.[table(x) \wedge CL(x) = N \wedge N \text{ is relatively large}]$

the pluralities constituted by tables which comprise N “portions” of table, where “table portions” (individual tables) are specified conventionally or contextually by the generic classifier CL, and N is a relatively large number in the given context

As above, CL is a massifier, individuating portions of the denotation of the noun. Section 2.4 noted that nouns refer to a relatively large number of individuals, where the relevant amount is contextually determined (somewhat like “several” or “many” in English). Our semantics for reduplication includes this aspect of its meaning.⁵

4.5 Reduplication and numeral modification

The fact that reduplicated nouns are less acceptable with numerals and classifiers, discussed in Section 2.3, follows from a compositional semantic treatment: examples in which a reduplicated noun is modified by a numeral involve redundant individuation of the noun’s denotation. An example such as *lima (buah) meja-meja* ‘five table-REDUP’ would have the following compositional meaning:

(39) $\lambda x.[table(x) \wedge CL(x) = N \wedge N \text{ is relatively large} \wedge buah(x) = 5]$

Reduplication contributes the information that the number of “table portions” is some relatively large N, while the numeral and classifier contribute the information that the number of “buah” of table is independently specifiable as five. This involves individuation of the same “table substance” by two different means, CL and *buah*, and we believe that this is the source of the perceived unacceptability, and the rarity, of such examples.

5 Conclusion

We have shown that the problems that Chung (2000) outlined for Chierchia’s Nominal Mapping Parameter can be resolved by considering Indonesian bare nouns to exhibit general number; Chierchia’s proposal to treat general number nouns uniformly as mass nouns is workable for Indonesian, but does not extend to Dëne Sʉlíné and Chinese, which have general number nouns but also exhibit a mass/count distinction. Indonesian provides an additional piece of evidence that numerals, classifiers, and plural morphology in different languages can have

⁵We treat this aspect of reduplication as a semantic rather than a pragmatic fact, though more research is needed to determine whether a pragmatic treatment might in fact be preferable.

different semantics: the semantics of plural morphology in English is quite different from the semantics of reduplication in Indonesian, and the semantics of numerals in a language in which classifiers are required is different from the semantics of numerals in a language like Indonesian, where classifiers are optional. Even given a cross-linguistically relatively uniform semantics for noun phrases in which a noun is modified by a numeral, the individual contributions of nouns, number marking, and numeral modification must be examined carefully in each language to determine their particular individual contributions.

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