

Plural semantics, reduplication, and numeral modification in Indonesian

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Patterns of plural marking and numeral modification in Indonesian provide an interesting testbed for theories of the semantics of numeral classifiers and plurality. Crosslinguistically, the presence of numeral classifiers in a language is strongly connected with the absence or optionality of plural marking; this generalisation is the basis of Chierchia’s (1998a, 1998b) Nominal Mapping Parameter, and also accords with established typological generalisations (Greenberg 1972, Aikhenvald 2000, Corbett 2000). In Indonesian, both plural marking as reduplication and classifiers in numeral modification constructions are optional, and bare (non-reduplicated) Indonesian nouns are best analysed as exhibiting general number (Greenberg 1972, Corbett 2000, Carson 2000), rather than corresponding to the unmarked member of a singular-plural opposition.

Unlike many languages with general number, Indonesian exhibits no mass-count distinction: notionally “mass” and notionally “count” nouns do not differ in their grammatical behaviour, and participate equally in reduplication and numeral modification constructions. We provide an analysis of the semantics of reduplication, classifiers, and numeral modification in Indonesian which rests on the lack of a mass/count distinction and explains the strong dispreference for numeral modification of reduplicated nouns.

1 Introduction

Indonesian has what has been analysed as plural marking, realised as reduplication:

- (1) **Pulau-pulau** Bali, Lombok dan Sumbawa terletak di sebelah timur
island-REDUP and TER.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 (1), and refers to more than one island. Unlike plural morphology in English, reduplication is not necessary in referring to more than one individual. Bare nouns can also refer to pluralities; nonreduplicated *telur* in (2) can be interpreted as plural:

- (2) Saya merebus **telur**.
 I ME.boil egg
 ‘I am boiling eggs.’

Indonesian also has numeral classifiers, though their use is optional. In (3), the classifier *orang* is glossed CL:

- (3) lima (**orang**) guru
 5 CL teacher
 ‘five teachers’

It is often assumed that only count nouns, and not mass nouns, can appear with plural marking and in numeral modification constructions. We show that Indonesian does not have a mass/count distinction: reduplication and numeral modification, with or without classifiers, are available for notionally “mass” as well as notionally “count” nouns in Indonesian. These patterns are problematic for previous analyses of Indonesian reduplication and numeral modification (Chung 2000, Carson 2000, Sew 2007), which rely on a mass/count distinction.

2 Numeral classifiers

Indonesian has three numeral 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’

For all numerals other than *se-* ‘one’, which is a prefix attached to the classifier, the classifier is optional¹ (Sneddon 1996, Chung 2000). Alongside (4), the phrases in (5) are also completely acceptable:

- (5) a. lima guru
 5 teacher
 ‘five teachers’

¹Carson (2000) provides an analysis of classifiers in Malay, which she uses as a cover term for the closely related Western Austronesian languages spoken in Indonesia (Bahasa Indonesia, or Indonesian), Malaysia (Bahasa Malaysia), Singapore, and Brunei. All of her informants are speakers of Bahasa Malaysia. She claims that classifiers are obligatory in numeral modification constructions in Malay; however, examples of numeral modification without classifiers are plentiful in Indonesian as well as other varieties of Malay, as we show below.

- b. lima sapi
5 cow
'five cows'
- c. lima meja
5 table
'five tables'

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. The examples in (4) and those in (5) are acceptable in the same contexts, and there is no obvious meaning difference between them. Examples (6) and (7) show that use of the classifier can disambiguate ambiguous nouns:

(6) *korban* 'sacrifice/offering'/'victim':

- a. lima orang korban
5 CL (person) victim
'five victims'
- b. lima buah korban
5 CL (thing) offering
'five (religious) offerings'

(7) *madu* 'honey'/'co-wife':

- a. seorang madu
1.CL (person) co-wife
'one co-wife'
- b. sebuah madu
1.CL (thing) honey
'one (jar/comb/amount of) honey'

A successful analysis of the semantics of numerals and classifiers must allow for numeral modification either with or without the classifier, and for the classifier to contribute some semantic information about the type of individual being counted when it appears.

3 Reduplication

As in many classifier languages, plural marking is not obligatory in Indonesian: both reduplicated and nonreduplicated nouns can refer to a plurality. There do not seem to be any additional semantic effects associated with plural marking; reduplicated nouns can be definite or indefinite, and are compatible with both collective and distributive readings. Reduplicated nouns can also appear with numeral modifiers, but this is rare and dispreferred.

3.1 Optionality of reduplication

In example (1), the noun *pulau* ‘island’ is reduplicated, and refers to more than one island. However, reduplication is not obligatory for the expression of plurality: bare nouns can also refer to pluralities. In example (2), *telur* ‘egg’ can be interpreted as plural, though it is not reduplicated. Similarly, nonreduplicated *buku* in (8) can refer to more than one book:

- (8) (Apa isi peti itu?) **Buku**.
 what contents box that book
 ‘(What is in that box?) Books.’

3.2 Semantic effects of reduplication

Optional plural marking has been claimed in some languages to have additional semantic effects such as definiteness or collectivity. For example, Li (1999) shows that in Chinese, a language in which morphologically unmarked nouns can refer to a plurality, the plural marker *-men* not only requires reference to more than one individual, but also expresses definiteness.² This is not the case in Indonesian, in which reduplication is compatible with both indefinite and definite readings, and with both collective and distributive readings. The reduplicated noun *emas-emas* ‘gold’ in example (9) is compatible with the demonstrative determiner, and has a definite interpretation:

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

In contrast, the reduplicated noun *anak-anak* ‘children’ in example (10) has an indefinite interpretation; this is the first mention of children in the text:

- (10) Saat malam datang, **anak-anak** bermain sepak bola di tepi
 when night come, child-REDUP BER.play kick ball in banks
 sungai Musi ini.
 river Musi this.
 ‘When the night came, children played football on the banks of the Musi river.’
 (http://wn.com/Dusk_in_10_Ulu_Senja_di_10_Ulu)

Reduplicated nouns are also possible in existential constructions:

- (11) **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/>

Both collective and distributive readings are also possible with reduplication. Example (12) exhibits a collective reading with a reduplicated subject:

²Thanks to an anonymous reviewer for helpful comments on these issues.

- (12) **Siswa-siswa** berkumpul dan melihat bagaimana instruktur
 student-REDUP BER.gather and ME.saw how instructor
 mendemonstrasikan penggunaan senjata, dengan melakukan
 MEN.demonstrate.KAN PEN.use.AN weapon, with ME.do.KAN
 berbagai tindakan pengamatan
 various act.AN PEN.observe.AN
 ‘Students gathered and saw how the instructor demonstrated using weapons,
 by using various observation techniques.’
 (http://cky78.multiply.com/journal/item/33/Metode_Demonstrasi)

Examples (13-14) also have reduplicated subjects, but exhibit distributive readings:

- (13) Ada kegiatan snacktime di mana **anak-anak** membawa snack dari
 there activity snacktime in which child-REDUP MEN.take snacks from
 rumah.
 home.
 ‘There is a snacktime activity where children take snacks from home.’
 (<http://edukasi.kompasiana.com/2010/04/01/hemat-plastik-yuuk/>)
- (14) 135.000 **anak-anak** membawa sebuah pistol atau senjata lain ke
 135.000 child-REDUP MEN.take 1.CL pistol or weapon other to
 sekolah
 school.
 ‘135,000 children took a pistol or other weapon to school.’
 (<http://abasse.blog.binusian.org/>)

Note that example (14) involves numeral modification of the reduplicated noun *anak-anak* ‘children’ with no classifier.

In most contexts, reduplicated nouns are intuitively felt to 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.

3.3 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:

- (15) Tim ini terdiri dari **empat siswa siswa** yakni Eka Afidah,
 team this TER.self 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:

- (16) Jasa bantuan pemenuhan kebutuhan sekolah ini
 service aid fulfilment needs school this
 ditujukan kepada **100 orang siswa-siswa** dari 6
 PASSIVE.aim.at.KAN to 100 CL student-REDUP from 6
 sekolah dasar di atas yang terletak di wilayah Ciumbuleuit.
 school elementary at above REL located in region
 ‘The service for the fulfilment 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. A full analysis of reduplication/plural formation and the semantics of classifiers should predict that examples of numeral modification of reduplicated nouns are rare, but are sometimes found.

4 The mass vs. count distinction in Indonesian

It has been claimed that all languages distinguish mass nouns from count nouns (Doetjes 1997, Chierchia 2010). 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; notionally “mass” nouns can be reduplicated and modified by a numeral, with or without a classifier; and both mass and count nouns participate in the same way in mensural constructions.³

Although other languages besides Indonesian have been claimed to lack a mass/count distinction, it is important to note that this is not always correlated with the presence of classifiers or the absence of obligatory plural marking. Wilhelm (2008) shows that there is a well-motivated mass/count distinction in Dëne Sųłiné, 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.

³Carson (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.

4.1 Determiner distinctions

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

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

Others must be used with mass nouns:

- (18) 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”:

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

The naturally-occurring example (21) involves modification of a notionally “mass” noun by the determiner *setiap* ‘each’, which is also used to modify notionally “count” nouns:

- (21) **Setiap air** yang dipompa dari kolam penampungan atau
each water REL PASSIVE.pump from pond reservoir or
kolam pengendapan masuk ke kolam pembesaran, ...
pond 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)

4.2 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 (22) involves reduplication, and refers to multiple specific quantities of water:

- (22) Mereka telah kemasukan air laut terlalu banyak dan
They have KE.enter.KAN sea water excessive many and
air-air itu sudah berhasil dikeluarkan.
water-REDUP 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 (23) refers to multiple quantities of *minyak* ‘oil’:

- (23) ... **minyak-minyak** itu muncrat dari manhole kapal dan membeku
oil-REDUP that stream from manhole ship and MEN.freeze
setelah membentuk seperti sabu dan mengotori pantai sekitar.
then MEN.form like bubble and MEN.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)

Examples (24–25) refer to multiple quantities of *lumpur* ‘mud’:

- (24) Air yang segar menyentuh kulit, membersihkan **lumpur-lumpur**
water REL fresh MEN.touch skin, MEN.clean.KAN mud-REDUP
yang menempel.
REL MEN.stick.
‘Fresh water touched (my) skin, and cleaned (away) [pieces of] mud which
covered (my body).’
(<http://nekopinku.multiply.com/journal/item/38>)
- (25) Hari-hari berlalu. **Lumpur-lumpur** menyembur. Saya
day-REDUP BER.pass. Mud-REDUP streamed.out. 1SG
tersentak ketika televisi menyiarkan tanggul penghalang
TER.shock when television MEN.broadcast wall PEN.block
lumpur jebol pada hari ke-74.
mud collapsed on day ORDINAL-74
‘Days passed. [Amounts of] mud streamed out. I was shocked when the
TV broadcasted that the wall/dam that blocked the mud collapsed on the
74th day.’
(<http://babang-juwanto.blogspot.com/2010/08/tempo-interaktif-cari-angin-lumpur.html>)

And example (26) refers to multiple quantities of *tanah* ‘soil’:

- (26) Aliran sungai biasanya akan menyebabkan kerusakan dalam
flow.AN river usually will MEN.cause.KAN KE.destroy.AN in
bentuk longsor tanah. **Tanah-tanah** yang berada di tebing sungai
form slide soil. Soil-REDUP REL BER.exist in side river
akan tergerus pada bagian tepinya dan masuk ke aliran sungai.
will TER.erode in part side.NYA and enter to flow river
‘The river stream usually causes destruction in the form of a mud slide.
The [amounts of] soil along the river banks will be eroded.’
(222.124.230.101/konservasi_tanah/kerusakan_tanah.htm)

4.3 Numeral modification of “mass” nouns

Chierchia (2010) claims that the “signature property” of mass nouns is their inability to be modified by numerals; however, numeral modification of notionally “mass” nouns is possible in Indonesian, with the non-animate classifier *buah* (‘fruit’) or with no classifier. Example (27) involves reference to portions of ice cream, a noun for which conventionalised portions can be identified; such examples are also found in English (“five ice creams”, “five coffees”). Crucially, examples are also found in which the mass noun does not have conventional portions: example (28) refers to geographical areas of sea water, and example (29) refers to pieces of wood.

- (27) 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>)

- (28) Seandainya masing-masing dari **dua air laut** tersebut memiliki
If each of 2 water sea TER.mention have
salinitas (kadar garam) yang berbeda atau temperature yang berbeda,
salinity (level salt) REL different or temperature REL different
apakah keduanya akan bercampur ketika bertemu di satu
QUEST ORD.two.NYA will BER.mix when BER.meet in one
tempat sehingga keadaan awal dari masing-masing (salinitas maupun
place so condition early of each-REDUP (salinity or
temperature) berubah menjadi satu keadaan salinitas dan
temperature) BER.change MEN.become one condition salinity and
temperature yang baru ?
temperature REL new?
‘If each of two (areas of) sea water mentioned has different salinity or
different temperature, will they mix when they meet in one place so that
the original salinity and temperature change into a new salinity and tem-
perature?’
([http://seremonia.net/hello/index.php?option=com_content&task=view
&id=32&Itemid=33](http://seremonia.net/hello/index.php?option=com_content&task=view&id=32&Itemid=33))

- (29) 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>)

4.4 Mensural constructions

Mensural constructions are equally acceptable with notionally “mass” and notionally “count” nouns.⁴

- (30) lima kilo **apel** / **mangga** / **tepung** / **daging**
 five kilo apple mango flour meat
 ‘five kilograms of apples / mangoes / flour / meat’

Examples of reduplicated nouns in mensural constructions can be found, but as with the cases of numeral modification discussed in Section 3.3, reduplication is rare and dispreferred in mensural constructions. Examples such as the following are possible in principle, and we present some naturally-occurring examples below:

- (31) lima kilo **apel-apel**
 five kilo apple-REDUP
 ‘five kilograms of apples’

However, although we found many examples of the pattern *[numeral] kilo [noun]* ‘[numeral] kilos of [noun]’ for the unreduplicated nouns *ikan* ‘fish’, *apel* ‘apple’, *mangga* ‘mango’, *keladi* ‘taro’, *pepaya* ‘papaya’, *jagung* ‘corn’, *tepung* ‘flour’, and *daging* ‘meat’, no examples of this pattern were found in which these nouns were reduplicated. There were also many examples of the pattern *[numeral] gelas [noun]* ‘[numeral] glasses of [noun]’ for the nouns *kopi* ‘coffee’, *jus* ‘juice’, and *teh* ‘tea’, but none in which the nouns were reduplicated. Thus, there does not seem to be a difference in availability or acceptability of reduplication of notionally “mass” and notionally “count” nouns in the mensural construction; reduplication is rare and dispreferred in almost all cases.

There are two sorts of exceptions to this generalisation. First, we found some examples with reduplication which exhibit a “kinds of” reading, such as the following examples, in which the nouns *beras* ‘rice’ and *rokok* ‘cigarette’ are reduplicated:

- (32) a. ... dengan uang Rp 4100,00 kita sudah dapat membeli **1**
 with money Rp 4100,00 1PL.INCL already can MEN.buy 1
kilo beras beras berkualitas rendah ...
 kilo rice REDUP BER.quality low
 ‘...with Rp 4100,00 we could have bought 1 kilogram of low quality rice...’
 (http://kitho-waskitho.blogspot.com/2009_01_01_archive.html)

⁴Thanks to Peter Austin for discussion of Indonesian mensural constructions.

- b. Mereka membawa berbagai replika bungkus **rokok-rokok**
 3pl MEN.bring various relics? packet cigarette-REDUP
 brand ternama.
 brand TER.name
 ‘They brought various well-known cigarette packets.’
 (http://www.harian-global.com/index.php?option=com_content&task=view&id=8198&Itemid=54)

The availability of a “kinds of” reading under pluralisation is a common property of mass nouns, but our data show that a “kinds of” reading with reduplication is available for both mass and count nouns.

The other exception is the noun *air* ‘water’. We found several examples of mensural phrases with the reduplicated noun *air-air*, including this one:

- (33) Kolam berisi 2,5 juta liter **air air** (660,430 gallons)
 Pond BER.content 2,5 million litre water REDUP (660,430 gallons)
 dibangun berlorong-lorong seolah goa di dasar laut.
 PASSIVE.build BER.alley-REDUP as.if cave in base sea
 ‘A pond containing 2.5 million litres of water (660,430 gallons) was built like alleys as if (they were) caves at the bottom of the sea.’
 (<http://forumbebas.com/printthread.php?tid=52821>)

In this example, the reason for the appearance of the reduplicated form of the noun may have to do with the very large quantity of water involved. Such examples were rare; almost all examples of mensural phrases with *air-air* appeared in a recipe context, such as the following examples:

- (34) a. Rebus semua bahan dengan 3 gelas **air air** sampai
 Boil all material with 3 glass water REDUP until
 tersisa 1 gelas.
 TER.remain 1 glass
 ‘Boil all the materials with 3 glasses of water until the remaining (water) is one glass (only).’ (Hariana 2004)
- b. Daun segar sebanyak 1 genggam dicuci bersih, rebus
 leaf fresh amount 1 handful PASSIVE.wash clean, boil
 dengan 3 gelas **air air** bersih sampai mendidih.
 with 3 glass water REDUP clean until MEN.boil
 ‘A handful of fresh leaves is washed clean, (and then) boil (them) with 3 glasses of clean water until (the water) steams.’
 (<http://feed.feedcat.net/loveherbal>)

We have no immediate explanation for the exceptional behaviour of the reduplicated noun *air-air* in recipe contexts in the mensural construction, other than to note that the recipe register often differs from other registers, and that this may play a role here.

In sum, 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, numeral modification, and mensural constructions. This

finding goes against some previous claims: Sew (2007) explores the count-mass distinction in Malay (by which he means Bahasa Malaysia, the closely-related variety spoken in Malaysia), and proposes a distinction between Malay count and mass nouns on the basis of reduplication patterns. He marks notionally “mass” nouns as ungrammatical if they are reduplicated, claiming that *air-air* ‘water-REDUP’, *udara-udara* ‘air-REDUP’, and *pasir-pasir* ‘sand-REDUP’ are not possible words (Sew 2007: 23). We do not agree with Sew that these are impossible words, and indeed we presented above some naturally-occurring examples of reduplicated *air-air* ‘water-REDUP’ (cf. example 22 and the examples immediately above). We have also found examples of reduplicated *udara-udara* ‘air-REDUP’ (example 35) and *pasir-pasir* ‘sand-REDUP’ (example 36, from the on-line newspaper *Malaysian Insider*, written in Bahasa Malaysia). Thus, we do not believe that Sew’s judgements reflect a difference between Indonesian and Bahasa Malaysia, since examples like these appear to be common in both varieties.

- (35) Sedangkan sebagai manusia kita seharusnya tidak
 While-KAN as human 1PL.INCL SE-must-NYA NEG
 menghirup **udara-udara** tersebut.
 MEN-ingest air-REDUP TER-mention
 ‘But as a human being we should not ingest those [amounts of] air.’
 (<http://skyindo.wordpress.com/.../pencemaran-udara-akibat-transportasi-di-jakarta/>)

- (36) Noh (gambar) yang juga Menteri Pertanian dan Industri Asas
 Noh (picture) REL also Minister Agriculture and Industry Basic
 Tani mendakwa KSSB turut memberi kemudahan kredit
 Farmer MEN-accuse KSSB take.part MEN-give KE-easy-AN credit
 kepada sebuah syarikat dan lima kontraktor untuk mengorek **pasir**
 to 1.CL association and five contractor to MEN-dig sand
pasir tanpa perlu membayar deposit.
 REDUP without need MEN-pay deposit.
 ‘Noh (pictured) who is the Minister of Agriculture and Farm Industry
 accused KSSB of involvement in giving easy credit to an association and
 five contractors to mine [amounts of] sand without paying any deposit.’
 (<http://www.themalaysianinsider.com/bahasa/article/noh-wujud-salah-guna-kuasa-pembelian-pasir-kumpulan-semesta/>)

Sew also claims that unreduplicated mass nouns as well as reduplicated mass and count nouns cannot appear in numeral modification constructions (discussed in Section 3.3) and cannot be modified by certain determiners such as *beberapa* ‘some/a few’ (discussed in Section 4.1); on this basis, he proposes to analyse reduplicated nouns as mass nouns. However, we have provided many examples showing that both notionally “mass” and notionally “count” unreduplicated nouns appear with these determiners and in numeral modification constructions. We agree with Sew that reduplicated nouns are rare in these constructions, but this is equally true for notionally “mass” and notionally “count” nouns; thus, data from these constructions does not motivate a distinction between mass and

count nouns in Indonesian.

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.
- The use of reduplicated nouns with numerals (with or without classifiers) is possible but dispreferred.
- There is no mass/count distinction.

5 Classifiers, numeral modification, and general number

5.1 General number and Greenberg’s generalisation

In many languages, numeral classifiers are required in numeral modification. Japanese is an oft-cited example of a language with obligatory classifiers:

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

The numeral cannot modify the noun directly in Japanese, and a numeral classifier is required to appear. In fact, the Indonesian pattern, with optional rather than obligatory classifiers in numeral modification, is crosslinguistically unusual.

Like many other classifier languages, plural marking in Japanese is not required when referring to more than one individual:

- (38) *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 in classifier languages like Japanese, and draws an important descriptive generalisation: “Numeral classifier languages generally do not have compulsory expression of nominal plurality” (Greenberg 1972: 177).⁵ 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. As Greenberg (1972) states:

⁵It 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; a *possessed classifier* can mark noun class agreement on a possessor with a possessed noun; and *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; Greenberg’s generalisation does not draw a connection between the morphological expression of plurality and non-numeral classifiers.

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 Sųliné). Carson (2000) and Sato (2008) argue convincingly that Indonesian nonreduplicated nouns exhibit general number, and can refer either to single entities (atoms) or to pluralities (sums). Carson (2000) provides example (39) 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 (39) 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.

- (39) 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 Sųliné.

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:⁶

- (40) a. lúban foofe
 lion.GENERAL watched.1SG
 ‘I watched (one or more) lion(s).’

⁶Although Corbett (2000: 10–11) states that the unmarked form in (40a) is “non-committal as to number” and so is an instance of general number, Corbett & Hayward (1987: 5) claim that this unmarked form, which they refer to as the “unit reference form”, is used “to denote either an individual member or the class of the referent”.

- 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.’

Pretheoretically, the semantics of number marking for general number nouns involves reference to, or individuation of, a certain number of parts of the denotation of the morphologically unmarked noun.

5.2 Theories of plural semantics and numeral modification

The observation that plural marking tends to be obligatory in non-classifier languages (like English) but not in classifier languages (like Japanese) underpins Chierchia’s (1998a, 1998b) influential 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.

Chung (2000) observes that the fact 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 particular, she addresses the connection in Chierchia’s theory between the presence of 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.

We believe Chung’s analysis to be problematic in two respects. First, the optionality of classifiers in Indonesian is surprising in light of Chung’s claims about Indonesian as a typical classifier language. Chung 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. It should be noted, of course, that this pattern is also problematic for Chierchia’s

claims about the strict correlation between language type and the requirement for classifiers to be used in numeral modification. A full analysis of Indonesian numeral modification must account for the fact that numerals can combine with nouns either directly or in combination with a classifier.

Second, Chung’s criticism of the Nominal Mapping Parameter goes through only under the assumption that Indonesian reduplication has exactly the same semantics as plural formation in a language like English. In fact, we believe that this is not the case: the optionality of reduplication to refer to pluralities is problematic for Chung’s characterisation of Indonesian as a numeral classifier language with plural morphology. Indonesian bare nouns are best classified as exhibiting general number rather than being the unmarked, singular pair in a singular/obligatory plural opposition. The equal acceptability of reduplication with notionally “mass” and notionally “count” nouns also distinguishes Indonesian reduplication from English plural marking.

In the following, we summarise the Nominal Mapping Parameter and some subsequent proposals which aim to provide a more crosslinguistically adequate account of the semantics of plural marking. We then propose a semantics for Indonesian reduplication and numeral modification which builds on this and related work on plurality and numeral modification in languages with classifiers and general number.

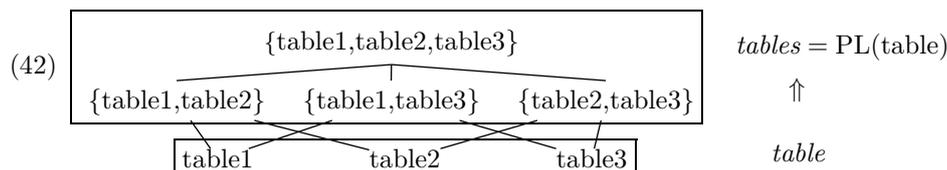
5.2.1 Chierchia 1998a,b: Classifiers and the mass/count distinction

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.

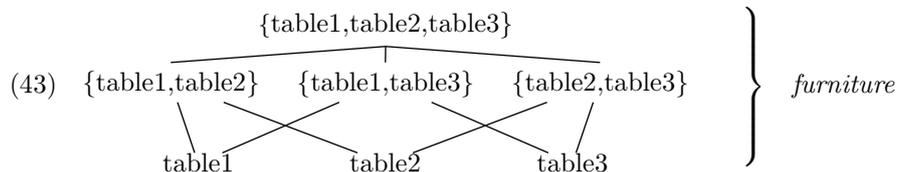
$$(41) \text{ PL}(A) = *A - A$$

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 (42), the denotation of singular *table* is the set of individual tables $\{\text{table1, table2, table3}\}$. 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 pluralisation via PL is not possible in such languages, and 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 many other classifier languages, including Chinese and Dëne Sųliné, since these languages do distinguish mass and count nouns.

5.2.2 PL and general number

Rullmann & You (2003) and Wilhelm (2008) recast Chierchia’s (1998a, 1998b) 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 Sųliné 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):

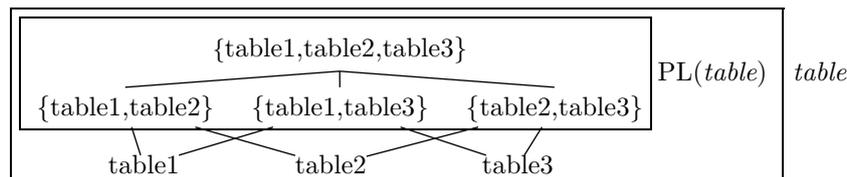
(44) Pluralisation (Rullmann & You 2003: 5):

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

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

This definition differs from that of Chierchia (1998a,b) 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:

(45) Rullmann & You’s PL:



This definition works for Rullmann & You’s analysis of Chinese, since the operation of pluralisation can appeal to a well-defined set of atoms in the denotation

of the nouns to which it applies. But it is still not 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, numerals + classifiers, and reduplication in Indonesian **individuate** parts of the denotation of the noun as well as specifying the number of individuals involved.

5.2.3 Inclusive and exclusive plural readings

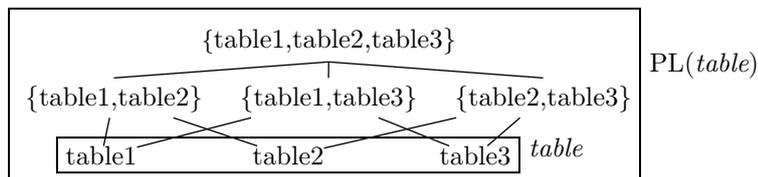
Another wrinkle in the interpretation of the Indonesian plural relates to the distinction between what Farkas & de Swart (2010) call the “inclusive plural” vs. the “exclusive plural” sense of plural nouns. Building on work by Krifka (1989), among others, Farkas & de Swart explore the “inclusive plural” reading of plural nouns in English and Hungarian in certain contexts, in which the denotation of a plural noun ranges over atoms as well as sums. They present the examples in (46) to illustrate this pattern:

- (46) a. Have you ever seen horses in this meadow?
 b. If you have ever seen horses in this meadow, you should call us.
 c. Sam has never seen horses in this meadow.
 (Farkas & de Swart 2010: 3)

The response to (46a) is “yes” if the addressee has seen even one horse; in (46b) the addressee is expected to call even if only one horse is seen; and in (46c) Sam is claimed never to have seen even one horse. The analyses of plurals proposed by Chierchia (1998a,b) and Rullmann & You (2003) do not allow for the inclusive reading of plural nouns, since Chierchia’s (1998a, 1998b) PL operator produces a plural noun whose denotation does not include individuals, and Rullman & You’s (2003) PL operator removes the set of atoms from the denotation of the plural noun. Chierchia (2010) acknowledges that these data present a problem for his earlier proposal for PL, and proposes the following definition of pluralisation, which assumes that plurals include atoms in their denotation:

- (47) Pluralisation (Chierchia 2010: 114):

$$PL(N) = \lambda x. \exists Q. Q \subseteq N \wedge x = \cup Q$$



This proposal and related proposals (Sauerland et al. 2005, Farkas & de Swart 2010, Spector 2007) require an additional principle to ensure that plural nouns do not refer to atoms in examples such as “We saw horses in the meadow”, which requires that more than one horse was seen. We return to a discussion of inclusive/exclusive plural readings and the semantics of plurality in Section 5.4 below.

Somewhat surprisingly, Indonesian reduplicated nouns also exhibit an inclusive plural reading in these contexts. This is illustrated in example (48), where *anak-anak* ‘children’ is in the scope of negation, and the denotation of *anak-anak* includes single children:

- (48) Kami tidak melihat **anak-anak** di sana. Kami hanya melihat
 we NEG ME.see child-REDUP in there. We just ME.see
 ribuan dan ribuan orang muda, laki-laki dan wanita dari
 thousand and thousand people young, man-REDUP and woman from
 banyak warga negara.
 many citizen country.
 ‘We did not see children there. We just saw thousands and thousands of
 young people, men and women from many countries.’
 (<http://lucky77khoe.wordpress.com/.../pewahyuan-di-neraka-06/>)

This example means that no children were seen, not even one; it does not describe a situation where no more than one child was seen. Inclusive plural readings can also be found in questions; examples (49-50) can be answered ‘yes’ if the addressee has one relevant child, and (51) can be answered ‘yes’ if the addressee has bought one book:

- (49) Apakah anda memiliki **anak-anak** yang bermasalah?
 Quest 2SG MEN-have child-REDUP which BER-problem
 ‘Do you have children who have problems?’
 (<http://anaksuper.schools.officelive.com>)
- (50) Apakah Anda memiliki **anak-anak** yang tinggal di rumah
 Quest-KAH 2SG MEN-have child-REDUP which live in house
 Anda?
 2SG
 ‘Do you have children who live in your house?’
 (<http://solusibangunanmu.com/index-mod-info-opt-vwInfo-id-116.html>)
- (51) Apakah anda telah membeli **buku-buku** islam untuk memahami
 Quest 2SG have MEN-buy book-REDUP Islam to understand
 islam?
 Islam
 ‘Have you bought Islamic books to understand Islam?’
 (<http://blog.aldohas.com/muhasabah-harian-setiap-muslim/>)

Inclusive plural readings are also found in downward-entailing environments such as the restrictor of a universal quantifier like *setiap* ‘each’; the requirement to prepare a party holds even for parents with one child in (52), and example (53) refers to people who buy at least one precious stone:

- (52) Setiap orang tua yang mempunyai **anak-anak** usia sekolah
 Each person old REL MEN-have child-REDUP age school
 kadangkala juga mempersiapkan sebuah pesta ulang tahun untuk
 often also MEN-prepare 1.CL party birthday for
 anak-anak mereka, ...
 child-REDUP 3PL

‘Each parent who has school-age children has to prepare a birthday party for their children, ...
 (<http://http://kontesseopertama.blogspot.com/.../meriahkan-pesta-ulang-tahun-bersama.html>)

- (53) Setiap orang yang membeli **batu-batu** permata, maka
 Each person REL MEN-buy stone-REDUP jewelry, then
 orang-orang Banjarlah yang menjadi juru
 person-REDUP Banjar-FOC REL MEN-become expert
 taksirnya.
 interpret-3SG.POSS

‘Every person who buys precious stones, the Banjar people who will be the interpreter of the price.’
 (<http://bubuhan-bubuhan.blogspot.com/>)

5.3 Numerals and classifiers

To set the stage for our analysis of Indonesian reduplicated nouns, we first propose a semantics for Indonesian numeral modifiers and classifiers, following Wilhelm’s (2008) proposals for the semantics of numerals and classifiers in English and Dëne Sʉliné.

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 Sʉliné, which does not have classifiers, and English (Wilhelm 2008: 55; see also Krifka 1995):

- (54) English ‘three’, Dëne Sʉliné *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 Sʉliné, 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:⁷

⁷Carson’s (2000) proposal for the semantics of the numeral + classifier + noun combination is broadly similar to (55), 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.

(55) 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, if no conventional specification is available, contextually by the generic classifier CL

(56) 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, if no conventional specification is available, 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”, and is similar in spirit to Borer’s (2005) characterisation of cardinal numerals in some languages as both “counters” and “dividers”.

This formulation privileges conventionally specified individuation of the noun denotation over contextual specification.⁸ We must allow for the numeral or numeral + classifier to be interpreted relative to contextually specified portions in examples like (28), repeated here, since there are no conventional ways of dividing sea water into portions that can play a role in the interpretation of this example.⁹

(57) Seandainya masing-masing dari **dua air laut** tersebut memiliki
 If each of 2 water sea TER.mention have
 salinitas (kadar garam) yang berbeda atau temperature yang berbeda
 salinity (level salt) REL different or temperature REL different
 ‘If each of two (areas of) sea water mentioned has different salinity or
 different temperature ...’

However, when conventional portions exist, the numeral or numeral + classifier construction must be interpreted as referring to them, rather than to ad-hoc, contextually specified portions. An example like (58a) means ‘five (individual) apples’; it cannot mean ‘five groups/kilos/piles/bags of apples’, even if this is strongly suggested by the context. Similarly, example (58b) means ‘five teachers’, not ‘five groups of teachers’:

(58) a. lima buah apel / lima apel
 five CL apple five apple
 ‘five apples’ (not ‘five groups/kilos/piles/bags of apples’)

⁸We are grateful to Peter Svenonius for discussion of this issue.

⁹Note that the contextual specification of relevant units involved in numeral modification is different from the “granularity” parameter which Champollion (2010) shows to be relevant for the interpretation of mass nouns, though granularity may also be specified contextually: although example (57) involves a contextually specified division of sea water into two portions, sea water has a much smaller granular structure, since a very small portion of sea water still counts as sea water.

- b. lima orang guru / lima guru
 five CL teacher five teacher
 ‘five teachers’ (not ‘five groups of teachers’)

Our analysis depends on the following semantic contributions for numerals and classifiers:¹⁰

(59) *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]

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

Indonesian numerals combine with a classifier meaning and a noun meaning, and also optionally contribute a generic classifier meaning *CL* to individuate the denotation of the noun. That is, unlike Dëne Sųliné, 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. This is similar to Champollion’s (2010) unpronounced [MANY] contribution in numeral modification constructions, which combines with the numeral to produce a cardinality requirement, though we do not assume that the optional classifier contribution occupies a position in the phrase structure tree.

Wilhelm (2008) observes that the assumption that numerals in English and Dëne Sųliné include a classifier contribution correctly predicts that numerals in these languages can be used pronominally, since numerals in these languages do not denote just a number, but a particular amount of some substance. In Chinese, the numeral + classifier combination can be used pronominally, but numerals alone cannot. In Indonesian, either numerals without a classifier or the numeral + classifier combination can be used pronominally. This is as expected if Indonesian numerals contain an optional default classifier.

(61) 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

It is also possible to use numbers predicatively in Indonesian, as shown in example (11), repeated in (62). This is unsurprising given their relatively rich semantics:

¹⁰Separate 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.

- (62) 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/](http://almuslimah.wordpress.com/2008/03/31/dukun-dan-tukang-ramal-penciduk-agama-dan-harta/)

5.4 Reduplication, mass nouns, and inclusive/exclusive plurality

We now turn to the semantics of reduplicated nouns. We treat reduplication as a massifier, individuating portions of the denotation of the nonreduplicated noun in a way similar to the classifier: reduplicated *air-air* 'water-REDUP' refers to individual amounts of water, just as reduplicated *buku-buku* 'book-REDUP' refers to individual books. Our semantics for reduplication must also account for the "inclusive" plural readings of reduplicated nouns in certain contexts, allowing reduplicated nouns to have atomic reference as well as sum reference. Finally, we must account for the fact that reduplicated nouns in upward-entailing contexts generally refer to a relatively large number of individuals, where the relevant amount is contextually determined (somewhat like "several" or "many" in English).

Many previous accounts of plural semantics have assumed that the exclusive reading of plural nouns arises in competition with the meaning of singular nouns. Sauerland et al. (2005) and Spector (2007) assume that plural nouns can refer to individuals as well as sums, and that a principle such as Maximise Presupposition applies to strengthen the interpretation of a plural noun to exclude atomic reference in many contexts, since if atomic reference had been intended, the singular form would have been used. Farkas & de Swart (2010) also provide an account based on competition, which attempts to correlate morphological markedness with semantic markedness; they present a set of OT constraints which have the effect that nominals with plural morphology must include sums in their denotation, while the interpretation of an unmarked form in competition with a marked plural form is atomic reference. A serious problem that the Indonesian data present for these approaches is that the unmarked, unreduplicated Indonesian noun has general number, and does not compete with the reduplicated noun in the same way as in English. That is, the fact that the reduplicated noun cannot refer to individuals is not functionally motivated by competition with an unmarked form with exclusively singular reference. Farkas & de Swart's claim that morphological markedness is correlated with semantic markedness, and their reliance on a competition-based view of the interpretation of marked, plural nouns, make it particularly difficult to explain why both unmarked and marked/reduplicated Indonesian nouns can have sum reference, while the morphological contrast between English marked and unmarked nouns gives rise to a singular/plural distinction; that is, the morphological basis of their account makes it difficult for them to distinguish unmarked singular nouns from nouns with general number.

We agree with these authors that a principle is needed to resolve the competition between inclusive and exclusive senses of plural nouns, even in Indonesian. We propose the following disjunctive semantics for reduplicated nouns in Indonesian, and follow Farkas & de Swart (2010) in appealing to the Strongest Meaning Hypothesis (Dalrymple et al. 1998) in selecting the appropriate reading for a reduplicated noun in a given context:

(63) 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, if no conventional specification is available, contextually by the generic classifier CL. Optionally, N is specified as a relatively large number in the given context.

As above, CL is a massifier, individuating portions of the denotation of the noun. Reduplicated nouns refer to a relatively large number of individuals, where the relevant amount is contextually determined; our semantics for reduplication optionally includes this aspect of its meaning. This optionality corresponds to the inclusive vs. exclusive sense of the plural: with the optional component, the denotation of the reduplicated noun ranges only over (relatively large) sums, while without the optional component, there is no requirement for N to be large or, indeed, greater than one. Exactly as in Farkas & de Swart’s approach, inclusion of the optional meaning component *N is relatively large* produces a stronger meaning in upward-entailing contexts, since the meaning with the specification that *N* must be large asymmetrically entails the meaning without this specification. According to the Strongest Meaning Hypothesis, the optional meaning component is included to strengthen the meaning in upward-entailing contexts. In downward-entailing contexts, the meaning without the optional component (corresponding to the inclusive plural sense) is stronger, and is chosen according to the Strongest Meaning Hypothesis in these contexts.

5.5 Reduplication and numeral modification

The fact that reduplicated nouns are less acceptable with numerals and classifiers, discussed in Section 3.3, 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:

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

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.

6 Conclusion

Indonesian provides evidence that numerals, classifiers, and plural morphology in different languages can have 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 semantics of nouns, number marking, and numeral modification must be examined carefully in each language to determine their particular individual contributions.

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