

A compounding analysis of plural reduplication

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Abstract. The paper offers an analysis of plural reduplication in Japanese. I argue that reduplicated nouns are antonym compounds that have two opposite values of number features. Each member of a reduplicated noun is associated with an interpretable valued number feature, and values of the number features must not be identical to each other. I propose that two opposite values on the top node of a reduplicated noun becomes an uninterpretable valued feature in Japanese. As a result, reduplicated nouns in Japanese are not specified as singular or plural because uninterpretable features do not have any semantic import. The proposal makes the prediction that reduplicated nouns are similar to bare common nouns in the sense that they do not bear the specification of singular-plural distinction. I show this prediction is borne out. The proposal also leaves room for an analysis of typological variation of plural reduplication.

Keywords. plural reduplication; compounding; number features; Japanese

1. Introduction. This paper provides an analysis of plural interpretation in Japanese. As shown in (1a), Japanese bare common nouns are ambiguous between singular and plural. However, when a noun undergoes plural reduplication, the resulting noun is interpreted only as plural, as can be seen in (1b).

- (1) a. *Taro-ga* [*hasit-teiru hito*]-*o* *mita*.
 Taro-NOM run-ASP **person**-ACC saw
 ‘Taro saw {person | people} who {is | are} running.’
 b. *Taro-ga* [*hasit-teiru hito-bito*]-*o* *mita*.
 Taro-NOM run-ASP **person-person**-ACC saw
 ‘Taro saw people who are running.’

The unavailability of a singular interpretation in (1b) can be demonstrated by using modification by the numeral ‘one’. Due to the semantic nature, the numeral ‘one’ requires singular individuals. As shown in (2a), Japanese bare common nouns can be modified by the numeral ‘one’ because they are ambiguous between singular and plural. In contrast, reduplicated nouns are incompatible with the numeral ‘one’, as shown in (2b).

- (2) a. *Taro-ga* [*hasit-teiru hito-ri-no hito*]-*o* *mita*.
 Taro-NOM run-ASP **one**-CLS-GEN **person**-ACC saw
 ‘Taro saw one person who is running.’
 b. * *Taro-ga* [*hasit-teiru hito-ri-no hito-bito*]-*o* *mita*.
 Taro-NOM run-ASP **one**-CLS-GEN **person-person**-ACC saw
 Lit. ‘Taro saw one people who are running.’

The unacceptability of (2b) shows that reduplicated nouns cannot receive a singular interpretation. In this study, I argue that although reduplicated nouns cannot be interpreted as singular, they denote a set of individuals, including both plural and singular individuals. In this respect,

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reduplicated nouns are similar to bare common nouns. These two types of noun in Japanese denote an entire semi-lattice (Chierchia 1998, 2010), and what is special about plural reduplication is the lack of singular interpretations.

2. Japanese plural reduplication. In this section, I introduce basic properties of Japanese plural reduplication. First, Japanese plural reduplication is not fully productive. A comprehensive list of nouns that can undergo plural reduplication is given in (3). To my knowledge, there are only around fifteen nouns that can undergo plural reduplication in modern Japanese.

- (3) Japanese plural reduplication
- | | |
|---|--|
| <i>eda-eda</i> ‘branch-branch’ = branches | <i>hana-bana</i> ‘flower-flower’ = flowers |
| <i>hito-bito</i> ‘person-person’ = people | <i>hi-bi</i> ‘day-day’ = days |
| <i>husi-busi</i> ‘joint-joint’ = joints | <i>hosi-bosi</i> ‘star-star’ = stars |
| <i>ie-ie</i> ‘house-house’ = houses | <i>kami-gami</i> ‘god-god’ = gods |
| <i>ki-gi</i> ‘tree-tree’ = trees | <i>kuni-guni</i> ‘country-country’ = countries |
| <i>mura-mura</i> ‘village-village’ = villages | <i>sima-zima</i> ‘island-island’ = islands |
| <i>sina-zina</i> ‘item-item’ = items | <i>yama-yama</i> ‘mountain-mountain’ = mountains |

Second, Japanese plural reduplication exhibits sequential voicing (also known as *Rendaku*) when applicable. As shown in (4a), the first consonant of the second member of a reduplicated noun is voiced. If the first consonant of the second member is not voiced, the resulting forms are unacceptable, as can be seen in (4b).

- (4) a. *hana-bana* ‘flower-flower’ = flowers b. **hana-hana* ‘flower-flower’ = flowers
 hi-bi ‘day-day’ = days, etc. **hi-hi* ‘day-day’ = days
 hito-bito ‘person-person’ = people **hito-hito* ‘person-person’ = people
 ki-gi ‘tree-tree’ = trees **ki-ki* ‘tree-tree’ = tree

Third, only mono- or bisyllabic nouns can undergo plural reduplication, as shown in (5).

- (5) a. *hana-bana* ‘flower-flower’ = flowers b. **gakusei-gakusei* ‘student-student’ = students
 hi-bi ‘day-day’ = days **ringo-ringo* ‘apple-apple’ = apples
 hito-bito ‘person-person’ = people **otoko-otoko* ‘man-man’ = men

This morphophonological property may be related to the fact that nouns which can undergo plural reduplication is limited in Japanese. However, it is not the case that all mono- or bisyllabic nouns can undergo plural reduplication. For example, **inu-inu* ‘dog-dog’ = dogs is unacceptable.

3. Analysis. I would first like to introduce my analysis of Japanese plural reduplication, and then I provide support for the proposal in Section 4.

3.1. SYNTAX: PLURAL REDUPLICATION AS ANTONYM COMPOUNDING. I propose that reduplicated nouns are antonym compounds that have two opposite values of number features. In antonym compounds, semantically contrasted elements are combined. Examples of Japanese antonym compounds are given in (6).

- (6) Japanese antonym compounds
- | | |
|---|--|
| a. <i>tyuu-ya</i> ‘day-night’ = whole day | b. <i>dai-syoo</i> ‘big-small’ = size |
| c. <i>bai-bai</i> ‘sell-buy’ = trade | d. <i>ati-koti</i> ‘there-here’ = everywhere |

I propose that Japanese plural reduplication is an example of antonym compounding. (See Inkelas & Zoll 2005 for a compounding analysis of reduplication.) Specifically, I assume (i) that

- (14) a. *Taro-ga* [Yamada-ke-no hito-**tati**]-o atsumeta.
 Taro-NOM Yamada-family-GEN person-PL-ACC gathered
 ‘Taro got the Yamadas together.’ [bare nouns]
- b. *Taro-ga* [Yamada-ke-no hito-bito-**tati**]-o atsumeta.
 Taro-NOM Yamada-family-GEN person-person-PL-ACC gathered
 ‘Taro got the Yamadas together.’ [reduplicated nouns]

The acceptability of (14b) can be captured under the present analysis. Nouns which undergo plural reduplication do not have the singular-plural distinction, just like bare common nouns. Whatever the nature of the plural morpheme *tati*, it is not surprising that reduplicated nouns can co-occur with the plural morpheme *tati* under my analysis. (For a semantic and syntactic analysis of the plural morpheme *tati*, see Kurafuji (2004) Nakanishi & Tomioka (2004), Tatsumi (2017) and references therein.) It may be worth noting here that plural reduplication in Thai is also compatible with another plural marker. Thai has the associative/group plural marker *phûak*, which derives plural interpretations. As shown in (15), *phûak* can co-occur with plural reduplication in Thai, like Japanese. Given the similarity between Japanese and Thai, it is not unreasonable to say that the present analysis could be extended to plural reduplication in Thai.

- (15) Thai (Jenks 2011: 101-102)
- a. *phûak-dèk* jaŋ mâj tham kaan-bâan.
 group-child still not do homework
 ‘The children still haven’t done their homework.’
- b. *phûak-dèk-dèk* jaŋ mâj tham kaan-bâan.
 group-child-child still not do homework
 ‘The children still haven’t done their homework.’

4.2. PLURALITY INFERENCES. Sudo (2015) observes that Japanese reduplicated nouns can have number neutral denotations in some environments. In (16a), a reduplicated noun appears with sentential negation. In this case, the sentence is true in a situation where Taro did not pick up any flower including a single one. Without sentential negation, reduplicated nouns express the nominal plurality, as shown in (16b). (16b) is true only if Taro picked more than one flower.

- (16) a. *Taro-wa* [niwa-no hana-bana]-o tsum-anakat-ta.
 Taro-TOP garden-GEN flower-flower-ACC pick-NEG-PST
 ‘Taro did not pick flowers in the garden.’
- b. *Taro-wa* [niwa-no hana-bana]-o tsunda.
 Taro-TOP garden-GEN flower-flower-ACC picked
 ‘Taro picked more than one flower in the garden.’

In this respect, Japanese bare common nouns behave like reduplicated nouns, as shown in (17). The sentence is true in a situation where Taro did not pick up any flower including a single one.

- (17) *Taro-wa* [niwa-no hana]-o tsum-anakat-ta.
 Taro-TOP garden-GEN flower-ACC pick-NEG-PST
 ‘Taro did not pick flowers in the garden.’

Under the present analysis, reduplicated nouns bear an uninterpretable valued number feature, and hence number neutral, just like bare common nouns. Their denotations correspond to the

entire semilattice as in (12), including singular entities, and the similarity between (16a) and (17) follows from the present analysis.

4.3. NUMBER NEUTRALITY AND ELLIPSIS. Kramer (2017) uses ellipsis as a test for number neutrality. (18) shows that an interpretation of lexically ambiguous words such as *pen* in English must be carried over to an ellipsis site. (18) is true only when Lee and Sam saw the same type of entity in a context.

(18) English (Kramer 2017: 41)

Lee saw a pen and Sam did, too.

OK^c‘Lee saw **a writing implement**, and Sam saw **a writing implement**, too.’

OK^c‘Lee saw **an animal enclosure**, and Sam saw **an animal enclosure**, too.’

*‘Lee saw **a writing implement**, and Sam saw **an animal enclosure**.’

*‘Lee saw **an animal enclosure**, and Sam saw **a writing implement**.’

On the other hand, an interpretation of number-neutral nouns can vary, regarding the singular-plural distinction. Amharic bare nouns are number neutral like Japanese. When a bare noun is used with ellipsis, the resulting sentence becomes four-way ambiguous, as in (19).

(19) Amharic (Kramer 2017: 41)

lidɜ-u mäs'haf wässäd-ä inna Tigist-imm.
child-DEF **book** take.PF-3MS and Tigist-too

OK^c‘The child took **a book**, and Tigist took **a book**, too.’

OK^c‘The child took **books**, and Tigist took **books**, too.’

OK^c‘The child took **a book**, and Tigist took **books**, too.’

OK^c‘The child took **books**, and Tigist took **a book**, too.’

The contrast between (18) and (19) shows that Amharic bare common nouns are number neutral not because they are lexically ambiguous between singular and plural. Rather, the ambiguity of bare common nouns comes from other sources. Importantly, Japanese bare common nouns behave like Amharic bare common nouns in this respect. (20) exhibits a four-way ambiguity like (19). I do not commit to any particular analysis of ellipsis in (20). Of importance here is that interpretations of Japanese bare common nouns do not have to be carried over to an elided constituent. This means that number-neutrality of Japanese bare common nouns are not lexical ambiguity.

(20) Japanese

Taro-ga [Nihon-no sima]-o otozureta si, Hanako-mo otozureta.
Taro-top Japan-GEN island-acc visited and Hanako-also visited

OK^c‘Taro visited **Japanese islands** and Hanako also visited **Japanese islands**.’

OK^c‘Taro visited **a Japanese island** and Hanako also visited **a Japanese island**.’

OK^c‘Taro visited **Japanese islands** and Hanako also visited **a Japanese island**.’

OK^c‘Taro visited **a Japanese island** and Hanako also visited **Japanese islands**.’

A detailed analysis of the four-way ambiguity in (20) requires a careful research on syntax and semantics of ellipsis, and goes far beyond the scope of this paper. However, the important point here is the fact that Japanese bare common nouns allow mismatch readings in which an elided noun and its antecedent are different from each other with respect to their number features.

Let us now consider plural reduplication in Japanese. As shown in (21), reduplicated nouns do not allow a singular interpretation, but they allow the mismatch between an elided noun and its

antecedent, like bare common nouns. Under the mismatch reading, (21) is true in a situation where Taro visited more than one Japanese island and Hanako visited one Japanese island.

(21) Japanese

Taro-ga [Nihon-no sima-zima]-o otozureta si, Hanako-mo otozureta.

Taro-TOP Japan-GEN island-island-ACC visited and Hanako-also visited

OK ‘Taro visited **Japanese islands** and Hanako also visited **Japanese islands**.’

* ‘Taro visited **a Japanese island** and Hanako also visited **a Japanese island**.’

OK ‘Taro visited **Japanese islands** and Hanako also visited **a Japanese island**.’

* ‘Taro visited **a Japanese island** and Hanako also visited **Japanese islands**.’

Under the current analysis, reduplicated nouns cannot receive a singular interpretation, because they are associated with an uninterpretable valued number feature. However, the denotation of a reduplicated noun corresponds to an entire semilattice containing singular individuals, like bare common nouns. As Karmer (2017) reported, the ambiguity in question arises with number-neutral nouns but not with lexically ambiguous nouns. If the mismatch readings in (20) come from a property of number-neutral nouns, the availability of the mismatch reading in (21) suggests that reduplicated nouns in Japanese are similar to bare common nouns, regarding number neutrality.

4.4. KIND PREDICATES. According to Chierchia’ (1998, 2010) approach to bare nominals, denotations of Japanese bare common nouns correspond to the entire semilattice as in (12), and they can function as a kind-denoting term. As can be seen in (22a), bare nouns can be used as an argument of a kind predicate. Importantly, reduplicated nouns can also function as an argument of a kind predicate, as shown in (22b). On the other hand, quantized nouns cannot be used as an argument of a kind predicate. (22c) is unacceptable because the kind predicate ‘evolve’ is incompatible with nouns other than kind-denoting terms.

(22) Japanese

a. *hati-o hikiyoseru yooni [hana-wa sinka-sita].*
bee-ACC attract to flower-TOP evolution-did
‘Flowers evolved to attract bees.’

b. *hati-o hikiyoseru yooni [hana-bana-wa sinka-sita].*
bee-ACC attract to flower-flower-TOP evolution-did
‘Flowers evolved to attract bees.’

c. *#hati-o hikiyoseru yooni [ni-hon-izyoo-no hana-wa sinka-sita].*
bee-ACC attract to two-CLS-more.than-GEN flower-TOP evolution-did
Lit. ‘Two flowers evolved to attract bees.’

Under the current analysis of plural reduplication, the similarity between bare common nouns and reduplicated nouns is expected. According to Chierchia’s analysis of bare nominals, the extension of a kind corresponds to the totality of its instances in a given world. Japanese bare common nouns and reduplicated nouns have the same denotation under the present analysis, and they behave alike.

4.5. GENERICS. There is another similarity between reduplicated nouns and bare common nouns. They can receive generic interpretations in Japanese, as shown in (23a,b). (23a,b) can be interpreted as characterizing statements about the flower-kind. On the other hand, quantized nouns cannot receive generic interpretations as in (23c).

(23) Japanese

- a. *hana-wa ne-kara mizu-o sui-ageru.*
flower-TOP root-from water-ACC suck-up
'It is a general property of flowers that they suck up water from roots.'
- b. *hana-bana-wa ne-kara mizu-o sui-ageru.*
flower-flower-TOP root-from water-ACC suck-up
'It is a general property of flowers that they suck up water from roots.'
- c. *ni-rin izyoo-no hana-wa ne-kara mizu-o sui-ageru.*
2-CLS more.than-GEN flower-TOP root-from water-ACC suck-up
'There is more than one flower that sucks up water from roots.'
* 'It is a general property of flowers that they suck up water from roots.'

Chierchia's (1998) assumes that generic sentences contain the generic operator Gn, and when a kind-denoting term is used as the subject of a generic sentence, it provides a restrictor for the generic operator, in tandem with the ^U function. Importantly, what appears in the restriction of the generic operator is a variable over instances of a given kind. Under this analysis of generic sentences, it will be predicted that Japanese plural reduplication and bare common nouns allow the generic interpretations in (23), in contrast to quantized nouns, because their denotations correspond to the entire semilattice as in (12). In this respect, plural reduplication in Thai shows a similar behavior, as shown in (24).

(24) Thai (Jenks 2011: 109)

- dèk-dèk tàm kwaa phûu-jaj*
child-child short exceed adult
'The (group of) children are shorter than adults.' [non-generic reading]
'Children are shorter than adults' [generic reading]

Jenks (2011) reports that (24) is ambiguous between the generic interpretation and the non-generic interpretation. In Japanese, although the non-generic interpretation is possible in (23a,b), the generic interpretation is strongly preferred over a non-generic interpretation like 'A group of flowers suck up water from roots'. The preference of the generic interpretation in Japanese may arise from the presence of the topic marker *-wa*, but a full analysis of the preference goes beyond the scope of this paper. What is noteworthy about (23a,b) is that the reduplicated noun can receive the generic interpretation, like bare common nouns.

To recapitulate, the data in this section show that Japanese reduplicated nouns and bare common nouns behaves alike in many respects. The similarity can be seen as support for the present analysis in which reduplicated nouns bear an uninterpretable valued number feature.

5. Implication and typological variation. Nomoto (2013) reports that plural reduplication in Malay is incompatible with kind predicates as in (25a), whereas bare common nouns can co-occur with kind predicates as in (25b).

(25) Malay (Nomoto 2013: 31)

- a. *#Telefon-telefon di-cipta oleh Alexander Graham Bell pada tahun 1876.*
telephone-telephone PASS-invent by Alexander Graham Bell at year 1876
'The telephone was invented by Alexander Graham Bell in 1876.'
- b. *Telefon di-cipta oleh Alexander Graham Bell pada tahun 1876.*
telephone PASS-invent by Alexander Graham Bell at year 1876
'The telephone was invented by Alexander Graham Bell in 1876.'

The contrast between (23b) and (25a) shows that the process of plural reduplication is not uniform. A similar typological variation is observed with respect to generic sentences. Unlike plural reduplication in Japanese and Thai, it has been reported that plural reduplication in Indonesian and Javanese cannot receive generic interpretations, as shown in (26) and (27).

- (26) Indonesian (Sato 2008: 252 see also Sneddon 1996: 17)
Anjing-anjing menggonggong.
 dog-dog bark.RED
 OK ‘There is more than one dog that {barks | is barking}.’ [non-generic reading]
 * ‘It is a general property of dogs that they bark.’ [generic reading]
- (27) Javanese (Sato 2008: 263)
Asu-asu njegug.
 dog-dog bark
 OK ‘There is more than one dog that {barks | is barking}.’ [non-generic reading]
 * ‘It is a general property of dogs that they bark.’ [generic reading]

Under the present analysis, there may be some room for the cross-linguistic variation of plural reduplication. Harbour (2014) proposes that there is a parameter with respect to the availability of feature recursion as in (28).

- (28) Feature Recursion Parameter (Harbour 2014: 200)
 Both values of [$\pm F$] may cooccur on X^0 .

Based on Harbour’s proposal, I suggest that Japanese and Thai do not allow feature recursion of number features on a single head. In these languages, two opposite values of number features result in an uninterpretable valued number feature on the top node of a reduplicated noun, as represented in (7b). On the other hand, Indonesian, Javanese and Malay may allow feature recursion of number features, and two opposite values of number features do not yield an uninterpretable valued feature on the top node of a reduplicated noun. In other words, reduplicated nouns will retain two opposite values of interpretable number features in these languages. I leave a detailed analysis of plural reduplication in Indonesian, Javanese and Malay for future research. However, the current analysis of plural reduplication at least can provide room for the typological variation of plural reduplication. It may be worth noting here that classifiers are obligatory with numerals in Japanese and Thai, whereas they are optional in Indonesian and Malay. This contrast may also be related to the typological variation of plural reduplication. Moreover, the present analysis can make a prediction that a process of reduplication can be associated with nominal plurality only in languages where bare nouns are ambiguous between singular and plural.

6. Summary. In this paper, I argued that Japanese reduplicated nouns are antonym compounds that have two opposite values of number features. Based on Harbour (2011), I proposed that two opposite values yield an uninterpretable valued number feature on the top node of a reduplicated noun. Uninterpretable features do not have any semantic import, and the proposal predicts that reduplicated nouns are similar to bare common nouns in the sense that they do not bear the singular-plural distinction. I showed that reduplicated nouns in Japanese indeed behave like bare common nouns in many respects. Moreover, the proposed analysis can provide room for typological variation of plural reduplication, and it makes a typological prediction about the

availability of plural reduplication. I leave for future research a detailed analysis of the typological variation and an investigation of the prediction.

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