

Notes on the semantics of nouns and classifiers in Japanese

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5 June, 2015

Outline:

- §1 Argue against the popular view on obligatory classifiers that the semantics of nouns is (partly) responsible for the obligatory use of a classifier with a numeral in Japanese.
- §2 **On nouns:** Observe that Japanese has genuine (non-associative) plural nouns, and argue that there might even be singular count nouns as well.
- §3 **On classifiers:** Pursue the idea that classifiers are required because of the properties of numerals, rather than the properties of nouns.

(The data are drawn from Japanese, and I don't know if the results extend to Korean, Mandarin Chinese, and other obligatory classifier languages. This needs more research.)

1 Against the Popular View on Nouns and Classifiers in Japanese

- Nominals in classifier languages like Japanese have the following properties:
 - Cannot combine directly with numerals; classifiers are obligatory (we'll talk about exceptions).
 - (1) 一*(輪)の 花
ichi-*(rin)-no hana
one-CL-GEN flower
'one flower'
 - No (obligatory) singular/plural-marking, e.g. the same noun as (1) is used in the following examples.
 - (2) 五輪の 花
go-rin-no hana
five-CL-GEN flower
'five flowers'
 - (3) たくさんの 花
takusan-no hana
a.lot-GEN flower
'a lot of flowers'
 - (Bare nouns can denote kinds; Krifka 1995, Chierchia 1998a,b)

• Popular view on the semantics of nouns and classifiers:¹

- The denotations of nouns in classifier languages are incompatible with counting, and hence incompatible with direct modification by numerals.
- The function of classifiers is to turn such denotations into countable ones. Consequently, *classifier+N* is semantically compatible with a numeral.

(NB: This view is independent from the claim that classifier languages make or do not make the mass/count distinction in the noun denotations. It is widely believed by now that the semantic mass/count distinction exists in classifier languages, contra Denny 1986, Lucy 1992; see Li, Dunham & Carey 2009, Doetjes 2012, among many others. We'll see some data in Japanese later on.)

¹See Borer (2005), Bunt (1985), Chierchia (1998a,b, 2010), Krifka (2008), Li (2011), Nemoto (2005), Rothstein (2007), Scontras (2013, 2014), etc. The details of the theories vary greatly, and the literature is so copious that we can't possibly mention all, let alone review them individually.

- This view is indeed nice:
 - The analogy to mass nouns in English and other languages is often made, which are also unable to directly combine with numerals.
 - The lack of number-marking on nouns in Japanese, Korean, Chinese, etc. (save associative plurals; see Nakanishi & Tomioka 2004, Nemoto 2005) is also suggestive: if nouns themselves are incompatible with counting, there shouldn't be singular or plural marking on the nouns themselves. (But I'll argue later that there are plural nouns in Japanese)²
- I would like to challenge this view, and argue that **Japanese nouns denoting countable objects have denotations that are compatible with counting**, just as their English counterparts.³ I'll discuss the role of classifiers in §3.
- (NB: I don't have much to say about morphosyntactic constraints requiring classifiers, e.g. Cheng & Sybesma 1999, Watanabe 2006; but I'm not sure if we need such constraints to begin with)
- My arguments are based on the following observations in Japanese:

§1.1 Numerals with optional classifiers

§1.2 Counting modifiers *without* classifiers

§1.3 Quantifiers with quantity vs. counting readings

1.1 Some numerals do not require classifiers

- With certain numbers—typically, large, approximate/round numbers—classifiers are often omitted in a formal speech style.
- Some examples from the web:
 - (4) データは 約 1000の レイヤーに分けられ、 ...
 deeta-wa yaku **sen-no** reiyaa-ni wakerare, ...
 data-TOP about 1000-GEN layer-into get.divided, ...
 'The data are divided into about 1000 layers, and ...'⁴
 - (5) 地球上には 約 1500の 火山が ある
 chikyuu-joo-ni-wa yaku **sen-go-hyaku-no** kazan-ga aru.
 earth-on-LOC-TOP about 1000-5-100-GEN volcano-GEN exist
 'There are about 1500 volcanos on earth.'⁵
- Relatedly, Bale & Coon (2014) observe that in Mi'gmaq (Eastern Algonquian) and Chol (Mayan), both of which are classifier languages, certain numerals require classifiers, while others are incompatible with them.
- **Open issue:** It seems that in Japanese classifiers cannot be omitted with low numbers, or precise numbers, and that human-denoting nouns always require classifiers. I have no quantitative data or formal account of these alleged restrictions at this point.
- The above data can be seen as suggesting that nouns like *reiyaa* (レイヤー) 'layer' and *kazan* (火山) 'volcano' can actually directly combine with numerals. If so, the notations of these nouns should be compatible with counting.
- There are of course other analytical possibilities, e.g. there is a phonologically null classifier that only combines with approximate numerals.

²Cf. the **Sanches-Greenberg-Slobin Generalisation**, which states that languages with obligatory classifiers have no obligatory number marking on nouns (Doetjes 2012:§3). This is about obligatory number marking, and could well be a morpho-syntactic issue, about which I have little to say. Also, it should be noted that obligatory classifier languages with optional number-marking on nouns are known, e.g. Yucatec (Mayan).

³See Watanabe (2006), Cheng & Sybesma (1999), Bale & Barner (2009) for similar views.

⁴<http://newswitch.jp/p/554>

⁵<http://www.47news.jp/47topics/e/257733.php>

1.2 Counting modifiers without classifiers

- There are (vague) counting expressions that do not involve classifiers:

- **tasuu** (多数) 'many', **shoosuu** (少数) 'a few'

(6) 昨日の 事故では 多数の 死者が 出た ようだ
kinoo-no jiko-de-wa **tasuu-no** sisha-ga deta yooda
yesterday-GEN accident-LOC-TOP many-GEN fatality-NOM came.out EVID
'It seems that the accident yesterday resulted in many fatalities.'

(7) 少数の 裕福な 人のみが 優遇されている
shoosuu-no yuufukuna hito-nomi-ga yuuguusareteiru
a.few-GEN wealthy person-only-GEN be.treated.well
'Only a few wealthy people are treated well.'

- **nan-byaku-toiuu** (何百という) 'hundreds', **nan-zen-toiuu** (何千という) 'thousands'

(8) その 投稿に 何百という コメントが ついた
sono tookoo-ni **nan-byaku-toiuu** komento-ga tsuita.
that post-TO what-100-say comment-NOM provided
'That post got hundreds of comments.'

- These modifiers are only compatible with nouns denoting countable objects:

(9) # 太郎は 多数の 汗を かいた
Taro-wa **tasuu-no** ase-o kaita
Taro-TOP many-GEN sweat-ACC secreted
(intended) 'Taro sweated a lot.'

(10) # 太郎は 何百という 汗を かいた
Taro-wa **nan-byaku-toiuu** ase-o kaita
Taro-TOP what-100-say sweat-ACC secreted
(intended) 'Taro sweated a lot.'

(Other modifiers, such as *takusan* (たくさん) 'a lot' and *tairyoo* (大量) 'a large amount of' that are insensitive to mass/count can be used here instead)

- Relatedly, Watanabe (2006) points out that the *wh-mo* construction requires a count noun:

(11) どの家も とても 古い
dono-ie-mo totemo furui.
which-house-MO very old
'Every house is very old.'

(12) # どの汗も 洗い流した
dono-ase-mo arainagashita
which-sweat-MO washed.off
(intended) '(I) washed off all the sweat.'

Compare this to:

(13) すべての 汗を 洗い流した
subete-no ase-o arainagashita
all-GEN sweat-ACC washed.off
'(I) washed off all the sweat.'

- The most straightforward way of understanding these data is that some nouns (such as *sisha* (死者) 'fatality') are semantically countable and others (such as *ase* (汗) 'sweat') are not. If so, the semantics of these nouns need to specify whether they are countable or not, contrary to the popular view.

- Again, one could insist that these modifiers involve ‘unpronounced classifiers’, but that would be *ad hoc*, as it would not exclude the possibility of numerals that had unpronounced classifiers. Or to put it differently, the semantic explanation of obligatory classifiers would be lost, because the unacceptability of numeral+noun with no classifier (in typical cases, that is) would be based on nothing but lexical stipulation.
- Alternatively, one could concede that count nouns have countable denotations that the above modifiers can act on, but assume that they are nonetheless not of the right type for numerals (e.g. because they are number neutral) and classifiers have non-trivial semantic functions (cf. Krifka 2008). This is coherent, but the semantic explanation of the obligatory classifiers would be lost, because one could easily define the meanings of numerals that wouldn’t require classifiers. The obligatory use of classifiers would only follow from particular lexical assumptions.
- (The above data might be problematic for a view like Cheng & Sybesma’s 1999 that the mass/count distinction in classifier languages is encoded only in classifiers, as the above modifiers are sensitive to the mass/count properties of the nouns, which they predict to not exist.)

1.3 Quantifiers with quantity vs. counting interpretations

- Proportional quantifiers are compatible both with mass and count nouns and are incompatible with classifiers.
- With count nouns, they give rise to counting-based interpretations.

(14) 太郎は ほとんどの 本を 読んだ
 Taro-wa **hotondo**-no hon-o yonda.
 Taro-TOP most-GEN book-acc read
 ‘Taro read most of the books.’

- The only available interpretation of (14) is ‘Taro read most of the books’, and cannot mean ‘Taro read most of the book’ (Sauerland & Yatsushiro 2004). In particular, it presupposes that there are multiple books.⁶
- And the truth-conditions are based on the number of books (just as in English). E.g., if there are 10 books, Taro must have read seven or eight of them, *regardless of their lengths*, for the sentence to be true.

(15) There are 10 books, Book 1, Book 2, ..., Book 10. Book 1 is 500 page long, Book 2 is 190 page long, Book 3 is 100 page long, and Books 4–10 are 30 page long each.

- Situation 1** (quantity-based): **FALSE**
 Taro read Books 1, 2, and 3. (So he read 790 pages out of 1000)
- Situation 2** (count-based): **TRUE**
 Taro read all the short books, Books 4–10 (So he read 210 pages out of 1000).

- With mass nouns, proportional quantifiers can have quantity-based interpretations. Note that the count-based interpretation is also possible, in an appropriate context (which is quite similar to the mass-to-count elasticity in English, e.g. *two beers*; cf. Inagaki & Barner 2009).⁷

(16) 太郎は ほとんどの 水を 飲んだ
 Taro-wa **hotondo**-no mizu-o nonda
 Taro-TOP most-GEN water-ACC drank
 ‘Taro drank most of the water(s).’

(17) There are 10 glasses of water, Glass 1, Glass 2, ..., Glass 10. Glass 1 contains 500 ml of water, Glass 2 190 ml, Glass 3 is 100 ml, and Glass 4–10 contain 30 ml each.

⁶Interestingly, the latter interpretation can be expressed in a different word-order, as Sauerland & Yatsushiro (2004) point out. Furthermore, it would also be true in Situation 1 in (15a). I don’t have time to discuss this today, unfortunately.

⁷There’s also a ‘sub-kind’ reading, where what is quantified is a different kind; This interpretation is more prominent with nouns like *biiru* (ビール) ‘beer’.

- a. **Situation 1** (quantity-based): **TRUE**
Taro drank the water in Glasses 1, 2, and 3. (So he drank 790 ml out of 1l)
- b. **Situation 2** (count-based): **TRUE**
Taro drank the water in Glasses 4–10 (So he drank 210 ml out of 1l).

- Inagaki & Barner (2009) make essentially the same observations using comparatives (based on Barner & Snedeker 2005; see also Cheung, Li & Barner 2012 for Mandarin Chinese). The subjects of their experiments were presented pictures of two people, one with a big N and one with a lot of small N's and asked:

(18) どちらの 人が より多くの Nを 持っている でしょう？
 dochira-no hito-ga yori-ooku-no N-o motteiru deshoo?
 which-GEN person-NOM more-lot-GEN N-ACC have Q
 'Which person has more N?'

Their results indicate:

- Nouns that denote countable objects—e.g. *kutu* (靴) 'shoe', *roosoku* (ろうそく) 'candle', *kagu* (家具) 'furniture', etc.—give rise to count-based interpretations.
- Nouns that denote mass-y objects—e.g. *karashi* (からし) 'mustard', *ketyappu* (ケチャップ) 'ketchup', *hamigakiko* (歯磨き粉) 'toothpaste'—give rise to quantity based interpretations.
- Nouns that can be either—e.g. *himo* (紐) 'string', *kami* (紙) 'paper', etc.—give rise to count-based interpretations about 50% of the time.
- These observations strongly suggest that the meanings of the count nouns already encode what counts as one unit and are inherently compatible with counting. In particular, since proportional quantifiers and comparatives are compatible with the quantity interpretation as well, it cannot be the modifiers that trigger the (obligatory) count-based interpretation.

1.4 Section Summary and Outlook

- The above observations suggest:
 1. Some nouns are semantically countable, others are semantically uncountable, and perhaps still others can be used in either 'mode' (elasticity) (see Cheng & Sybesma 1999, Watanabe 2006, Cheng, Doetjes & Sybesma 2008, Bale & Barner 2009) for similar views.
 2. If so, the primary function of classifiers is *not* to turn an uncountable noun meaning into something countable.

- In what follows I will propose/conjecture:

§2 As far as the noun denotations are concerned, there is no big difference between Japanese and English. In particular, I hypothesise that **Japanese has both singular and plural/number-neutral count nouns**, just like English, although they are (often) not morphologically distinguished.

§3 **Classifiers are required in classifier languages, because of the properties of the numerals**, not because of the properties of the nouns.

- I provide some novel data to support my claims:

§2 There are genuine plural nouns in Japanese (namely, reduplicated nouns), which have similar properties to English plural nouns.

§3 Numerals, which require classifiers cannot function as predicates, while those counting modifiers that don't require classifiers can.

2 Plural Nouns in Japanese and the Denotations of Nouns

2.1 Reduplicated Plural Nouns (N-N's)

- We observe that **Japanese has genuine plural nouns** that are formed by reduplicating the noun (with *rendaku*-voicing, when applicable). I refer to these reduplicated nouns as *N-N's*.

(19)	hana-bana	花々	flower-flower
	hito-bito	人々	person-person
	yama-yama	山々	mountain-mountain
	kuni-guni	国々	country-country
	mura-mura	村々	village-village
	hoshi-boshi	星々	star-star
	kami-gami	神々	god-god
	hi-bi	日々	day-day

The relevant morphological process is not productive, and there are only about ten N-N's in Tokyo Japanese (I don't know about other dialects or earlier stages of Japanese).

- N-N's clearly have plurality inferences (on a par with English plural nouns), e.g. (20) entails that Taro brought more than one seasonal flower.⁸

(20)	太郎は	季節の	花々を	買った
	Taro-wa	kisetsu-no	hana-bana-o	katta.
	Taro-TOP season-GEN flower-flower-ACC bought			
	'Taro bought seasonal flowers.'			

Also, N-N's are incompatible with singular expressions:

(21)	一輪の	花(#々)
	ichi-rin-no	hana(#-bana)
	one-CL-GEN	flower(-flower)
	'one flower'	

Compare this to:

(22)	たくさんの	花(々)	(23)	百輪の	花(々)
	takusan-no	hana(-bana)		hyaku-rin-no	hana(-bana)
	a.lot-GEN	flower(-flower)		100-CL-GEN	flower(-flower)
	'a lot of flowers'			'one hundred flowers'	

- Importantly, N-N's are not 'associative plurals' like *N-tachi* (Nakanishi & Tomioka 2004, Nemoto 2005). In particular, while *N-tachi* can refer to heterogeneous groups, *N-N* can only refer to homogeneous groups whose members are all describable by *N*.⁹
- This is important because the associative plural *N-tachi* is compatible with non-individuated denotations, e.g. Nakanishi & Tomioka (2004:124) assign the following meaning to *-tachi*.¹⁰

$$(24) \quad \llbracket \text{tachi}_{\langle et, et \rangle} \rrbracket = \lambda P_{\langle e, t \rangle} . \lambda Y_e . |Y| \geq 2 \wedge P \text{ represents } Y$$

P itself does not need to have countable denotations; it just needs to 'represent' *Y*. But as an (intended) side-effect, *Y* can be a heterogeneous plurality that includes non-*P* individuals (insofar as *P* 'represents' *Y*).

⁸For reasons I don't understand, N-N's sound generic or kind-denoting without modifiers. As I want to focus on non-generic, non-kind readings here, I will always have modifiers on N-N's.

⁹Exception: the plural first-person pronoun *ware-ware* (我々) 'me-me'.

¹⁰Nakanishi & Tomioka (2004) also postulate a type $\langle e, et \rangle$ version for cases like *Taro-tachi*.

2.2 Number Neutrality of Reduplicated Nouns (N-N's)

- So Japanese has two types of nouns:
 - Singlets N's are number-neutral, e.g. *hana* (花) 'flower'.
 - Doublets N-N's are plural, e.g. *hana-bana* (花々) 'flowers'.
- The most straightforward semantics would be:
 - Singlets N's have number neutral denotations.
 - Doublets N-N's have plural-only denotations.

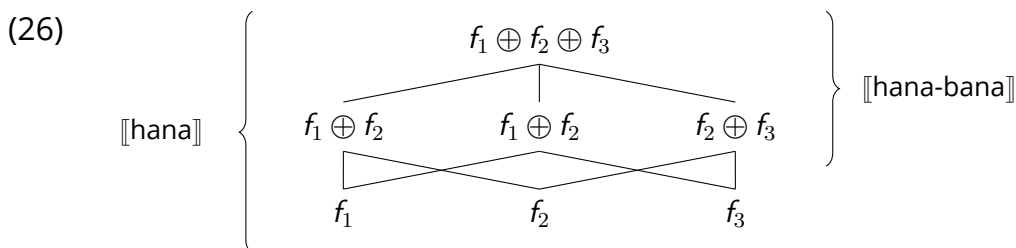
I will argue that this is wrong.

- To be more precise, let us assume that the domain of entities \mathcal{D}_e is closed with the i-sum formation operation \oplus (Link 1983). Let us also assume that noun denotations are sets of entities. E.g. if f_1 is a flower and f_2 is also a flower, we have:
 - $f_1 \in \llbracket \text{flower} \rrbracket$ and $f_2 \in \llbracket \text{flower} \rrbracket$; and
 - $f_1 \oplus f_2 \notin \llbracket \text{flower} \rrbracket$;
 - but $f_1 \oplus f_2 \in \llbracket \text{flowers} \rrbracket$
- In this setting, the above tentative hypothesis looks as follows:

(25) *Simple-minded semantics*

- $\llbracket \text{hana} \rrbracket = \{x \mid x \text{ is a single flower} \} \cup \left\{ x \mid \begin{array}{l} x \text{ is a plural entities} \\ \text{consisting of flowers} \end{array} \right\}$
- $\llbracket \text{hana-bana} \rrbracket = \{x \mid x \text{ is a plural entities consisting of flowers} \}$

This is graphically represented as follows (with three flowers in the model, f_1, f_2, f_3):



- Contrary to this, I argue that N-N's should have number-neutral denotations. My arguments are essentially identical to those previously made for English plural nouns (Sauerland 2003, Sauerland, Anderssen & Yatsushiro 2005).
- In what follows, N-N's will be systematically compared to clearly plural-only expressions, 2-CL-*ijoo-no N* 'two or more N'.

1. Recall that in a simple positive sentence, N-N's have a plurality inference.

- (27) 太郎は 季節の 花々を 買った
 Taro-wa kisetsu-no hana-bana-o katta.
 Taro-TOP season-GEN flower-flower-ACC bought
 'Taro bought seasonal flowers.'

So truth-conditionally, this is similar to (28).

- (28) 太郎は 二輪以上の 季節の 花(々)を 買った
 Taro-wa ni-rin-ijoo-no kisetsu-no hana(-bana)-o katta.
 Taro-TOP two-CL-or.more-GEN season-GEN flower(-flower)-ACC bought
 'Taro bought two or more seasonal flowers.'

2. However, N-N's give rise to number neutral readings in negated sentences.

- (29) 太郎は 季節の 花々を 買わなかった
 Taro-wa kisetsu-no hana-bana-o kaw-anakat-ta.
 Taro-TOP season-GEN flower-flower-ACC buy-NEG-PAST
 'Taro didn't buy seasonal flowers.'

The truth-conditional difference between (29) and (30) is palpable: (30), but not (29), is true if Taro bought one seasonal flower.

- (30) 太郎は 二輪以上の 季節の 花(々)を 買わなかった
 Taro-wa ni-rin-ijoo-no kisetsu-no hana(-bana)-o kaw-anakat-ta.
 Taro-TOP two-CL-or.more-GEN season-GEN flower(-flower)-ACC buy-NEG-PAST
 'Taro didn't buy two or more seasonal flowers.'

3. Similarly for questions:

- (31) 太郎は 季節の 花々を 買った の？
 Taro-wa kisetsu-no hana-bana-o katta no?
 Taro-TOP season-GEN flower-flower-ACC bought Q
 'Did Taro buy seasonal flowers?'

If Taro bought one seasonal flower, the answer to (31) is YES (maybe with a qualification that it's only one), while the answer to (32) is clearly NO.

- (32) 太郎は 二輪以上の 季節の 花(々)を 買った の？
 Taro-wa ni-rin-ijoo-no kisetsu-no hana(-bana)-o katta no?
 Taro-TOP two-CL-or.more-GEN season-GEN flower(-flower)-ACC bought Q
 'Did Taro buy two or more seasonal flowers?'

4. Number-neutral readings crop up in other contexts, e.g. in the scope of distributive quantifiers, conditionals. I omit the data here (because they involve additional complications in the explanation, not because they cannot be explained).

- These data necessitate a number-neutral semantics for N-N's.

2.3 Consequences on Nominal Denotations in Japanese

- Now, the puzzle is:

- Singlet N's in Japanese are clearly number-neutral. Also it should be noted that the singlet versions of (29) and (31) have the identical readings.
- Doublet N-N's are number-neutral in above contexts, but clearly have plurality inferences in simple sentences.

- The behaviour of N-N's is essentially identical to the behaviour of English plural nouns.

- Plurality inferences in simple sentences.

- (33) John bought flowers. ⇒ John bought more than one flower.
 (synonymous with: John bought two or more flowers)

- No plurality inferences in negative sentences and questions.

- (34) John didn't buy flowers.
 (not synonymous with: John didn't buy two or more flowers.)

- (35) Did John buy flowers?
 (not synonymous with: Did John buy two or more flowers?)

- (Similarly for distributive quantifiers and conditionals)

- Additionally, both Japanese N-N's and English plural nouns have plurality inferences in the upward-monotonic part of the meaning in non-monotonic contexts (cf. Spector 2007).

- (36) 太郎だけが 季節の 花々を 買った
 Taro-dake-ga kisetsu-no hana-bana-o katta.
 Taro-only-NOM season-GEN flower-flower-ACC bought

'Only Taro bought seasonal flowers.'

This means that Taro bought two or more seasonal flowers, while everybody else bought none (NOT: everybody else bought two or more). The same 'partial plurality inference' is observed for the English translation.

- How do we account for the difference between singlets (N's) and doublets (N-N's) in Japanese with respect to the plurality inference? Here I borrow the ideas from the previous literature on plural nouns in English:

- Putting the details aside, Sauerland (2003), Spector (2007), Zweig (2009) and Ivlieva (2013), among others, develop alternative-based theories of the plurality inferences of plural nouns in English.¹¹ While the details of the accounts vary, the common idea is that plural nouns compete with singular nouns and end up having a plurality inference in simple sentences.

- English nouns have the following denotations:

- (37) a. *Singular*
 $\llbracket \text{flower} \rrbracket = \{ x \mid x \text{ is a single flower} \}$
 b. *Number-Neutral Plural (w/ Plurality Inference)*
 $\llbracket \text{flowers} \rrbracket = \{ x \mid x \text{ is a single flower} \} \cup \left\{ x \mid \begin{array}{l} x \text{ is a plural entities} \\ \text{consisting of flowers} \end{array} \right\}$

(37b) includes singular flowers, but the plurality inference of (37b) arises (when it does) in competition with (37a) (roughly, don't use (37b), if you could use (37a)).

- Let us extend this story (whichever version you like) to the case of Japanese N-N's. In order to do so, we need singular nouns.
- Let us hypothesise that there are actually singular nouns in Japanese that are homophonous with number-neutral singlets (N's). Thus, we have the following three kinds of nouns in Japanese:

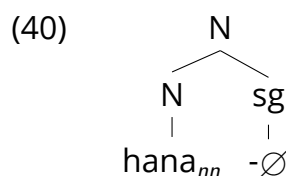
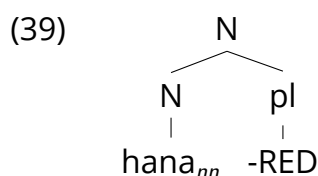
- (38) a. *Singular Singlet*
 $\llbracket \text{hana}_{sg} \rrbracket = \{ x \mid x \text{ is a single flower} \}$
 b. *Number-Neutral Singlet*
 $\llbracket \text{hana}_{nn} \rrbracket = \{ x \mid x \text{ is a single flower} \} \cup \left\{ x \mid \begin{array}{l} x \text{ is a plural entities} \\ \text{consisting of flowers} \end{array} \right\}$
 c. *Number-Neutral Doublet (w/ Plurality Inference)*
 $\llbracket \text{hana-bana} \rrbracket = \{ x \mid x \text{ is a single flower} \} \cup \left\{ x \mid \begin{array}{l} x \text{ is a plural entities} \\ \text{consisting of flowers} \end{array} \right\}$

- Let's furthermore stipulate that (38a) and (38c) compete (just like in English), but (38a) and (38b) do not. Then, (38c), but not (38b), will have a plurality inference (when it does).

- The next question is: Why is it that (38b) and (38c) differ in this particular way? I have no insightful answer here, but one possibility is that (38a) and (38c) might be structurally as complex, while (38b) is simpler.

- If you take the surface form at face value, N-N's should be structurally complex. We could assume that it is formed by suffixing a plurality marker to the number-neutral singlet, as in (39).

- Now let us conjecture that the singular singlet is also derived from the number-neutral singlet, but with a phonologically null singularity suffix, as in (40) (cf. Singularity markers or 'singulatives' in languages like Welsh; Grimm 2012).



¹¹But some concerns have been raised by Magri (2011), Ivlieva & Sudo (to appear).

- Then it seems natural to assume that items of the same structural complexity count as alternatives to each other, although it still does not really explain why the number-neutral singlet does not compete with the singular singlet.¹²

2.4 Section Summary

- Observation:** Japanese N-N's are genuine plural nouns. They are semantically number-neutral, on a par with English plural nouns.
- Proposal/Conjecture:** Building on the previous studies on the plurality inference of English plural nouns, I analysed Japanese N-N's as having number-neutral denotations, and postulated singular (singlet) nouns that are homophonous with number-neutral singlet nouns. See (38).

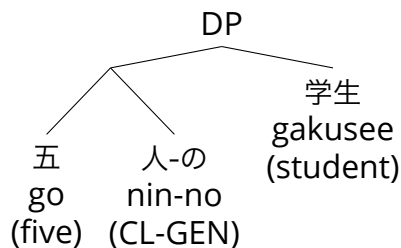
3 Numerals and Classifiers in Japanese

- We concluded that Japanese has count nouns that are semantically compatible with 'counting'. Then, why is it that classifiers are (largely) obligatory in this language?
- I hypothesise that it's the properties of numerals that require classifiers (see Bale & Coon 2014 for a similar view; see also Krifka 1995).
 - Numerals in Japanese denote numbers (of type n), and they cannot function as modifiers by themselves.
 - Classifiers turn numbers (of type n) to modifiers (of type $\langle et, et \rangle$).¹³ E.g., the classifier for humans, *-nin* (人), looks like (41) (with the sortal restriction being a presupposition).

(41) $\llbracket nin \rrbracket = \lambda n. \lambda P_{et}. \lambda x: x \text{ is a human. } P(x) = 1 \text{ and } x \text{ consists of } n\text{-many } P\text{-atoms}$

- I tentatively assume the following structure. In particular, the numeral and classifier form a constituent to the exclusion of the noun (cf. Tang 1990, Fukui & Takano 2000, Watanabe 2006), although nothing crucial hinges on this assumption.¹⁴

(42)



- As is well known, many nominal modifiers function also as predicates (Heim & Kratzer 1998, Morzycki 2014). This is either due to type-shifting from, or to, the modifier, or possibly due to the semantics of the copula. I won't try to solve this.
- But I observe that those counting modifiers that don't require a classifier can function as predicates, while numerals cannot.

- Numerals can appear bear in identificational sentences (optionally with a classifier).

(43) 学会開催に 必要な 学生の 数は 15(人)だ
gakkai-kaisai-ni hitsuyoona gakusee-no kazu-wa juu-go(-nin)-da.
conference-hosting-DAT necessary student-GEN number-TOP 10-5(-CL)-COP
'The number of students necessary to host a conference is fifteen.'

- If the subject does not denote a number, a classifier is required.

¹²See Katzir (2007), Fox & Katzir (2011), Breheny, Klinedinst, Romoli & Sudo (in preparation) for more discussion on structural alternatives.

¹³Or to possibly $\langle et, \langle et, t \rangle \rangle$, which might be necessary for non-upward monotonic cases (cf. Van Benthem's problem).

¹⁴Doetjes (2012) discusses some evidence that classifiers and nouns should form a constituent, at least in some classifier languages (that are not Japanese).

(44) 学会開催に 必要な 学生は 15*(人)だ
 gakkai-kaisai-ni hitsuyoona gakusee-wa juu-go*(-nin)-da.
 conference-hosting-DAT necessary student-TOP 10-5*(-CL)-COP
 'Fifteen students are necessary to host a conference.'

- Those modifiers that do not require classifiers can function as predicates without classifiers, including approximate, large numerals.

(45) このうち これまで 不正アクセスの 被害を 受けた
 kono-uchi koremade fusei-akusesu-no higai-o uketa
 this-among so.far unauthorised-access-GEN damage-ACC received
 アカウントは 約 1500だ
 akaunto-wa yaku sen-go-hyaku-da.
 account-TOP about 1000-5-100-COP
 'Among these, so far, about 1500 accounts have had unauthorised access.'

(46) ヘブライ語を 話せる 日本人は ごく 少数だ
 heburai-go-o hanas-eru nihon-jin-wa goku shoosuu-da
 Hebrew-language-ACC speak-can Japanese-person-TOP extremely few-COP
 'Japanese people who speak Hebrew are very rare.'

(47) 本当の ことを 知らない 人が ほとんどだ
 hontoo-no koto-o shir-anai hito-ga hotondo-da.
 truth-GEN thing-ACC know-NEG person-NOM most-COP
 'People who don't know the truth are the majority.'

- **Side note:** In English, numerals can function as modifiers, and also as predicates, at least in some contexts (NB: We are not interested in the age interpretation):

- (48) a. Soon we will be three.
 b. He normally sat at the counter, but because they were three they took a booth.
 (from *The Cut* by George pelecanos)

(It's conceivable that the predicative use of numerals in English is subject to some constraints, e.g. animacy restrictions, etc. I don't know what the empirical facts are at the moment.)

- **Conjecture:** The semantic function of a classifier is to turn a type-*n* number into a modifier (which can also be used as a predicate via type-shifting or with the copula). It indeed seems that modifiers that can function as predicates do not require classifiers.

4 Summary (see the section summaries)

Acknowledgements: Part of this work based on stimulating conversations with Ziren Zhou, for which I thank her. All the errors are mine, of course.

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