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Japanese Floating Classifiers

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Japanese is well known for a phenomenon referred to as floating quantifiers and exemplified in (1). The grammatical sentences here all mean "Taroo bought three books."

(1) "Taroo bought three books"

a. *Taroo-ga* ***hon san.satu-o*** *katta*
-NOM book 3.volume-ACC bought

a' **Taroo-ga* ***hon san.biki-o*** *katta*
book 3.animals-ACC

b. *Taroo-ga* ***hon-o san.satu*** *katta*

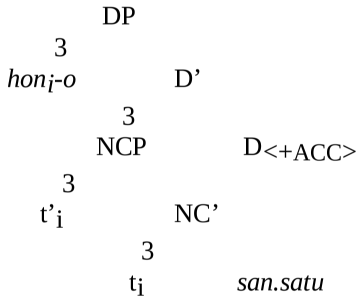
c. *Taroo-ga* ***san.satu hon-o*** *katta*

In (1a), the head noun *hon*, and the number-classifier complex *san.satu* form a single unit which receives accusative case. There is agreement between the head noun and the classifying expression, and an expression such as *hon san.biki* "book 3.animals" in (a') is ungrammatical. (1b) illustrates the basic phenomena of the floating quantifier where the classifying expression occurs to the right of the case-marker. In (1c) we see that the classifier may precede the noun as well.

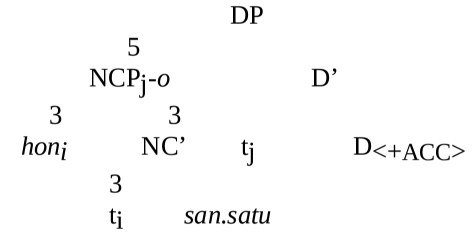
Kitahara's (1993) analysis for the sentences in (1) is shown in (2). Note that the order in (1b) is actually basic. In all three structures, the noun and its classifying expression are generated in what Kitahara calls an NCP which is selected by a DP. In (2a), the head noun moves first to the Spec of the NCP to check agreement with the classifier, and then to Spec of DP for case, giving us the *hon-o san.satu* order. In (2b), the nominal head once again moves to check agreement, but then the entire NCP raises to the Spec of DP giving us the *hon san.satu-o* order. Finally, in (2c), the NCP scrambles out of the DP to give the preposed *san.satu hon-o* order.

*Thanks are due to Veneeta Dayal, Bob Fiengo, Stanley Koike, Mana Kobuchi-Philip, and Miki Suzuki.

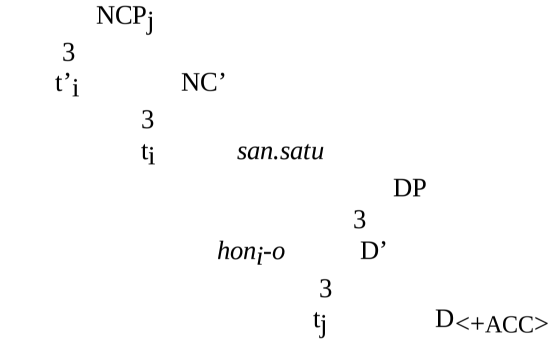
(2) a. *hon-o san.satu* (=1b)



b. *hon san.satu-o* (=1a)



c. *san.satu ....hon-o* (=1c)



The structures here are consistent with independent tests which show that the expressions *hon-o san.satu* and *hon san.satu* in (2a&b) are constituents (DPs) while the *san.satu hon-o* order in (2c) is not. Kitahara's constituency tests are given in (3) and (4). These are both taken from Kamio (1983).

(3) Conjunction (Kamio 1983)
"Taroo bought three books and three pens"
a. *Taroo-ga hon-o san.satu-to pen-o san.bon katta*
-NOM book-ACC 3.volumes-and pen-ACC 3.cylinders bought

b. *Taroo-ga hon san.satu-to pen san.bon-o katta*
-NOM book 3-volumes-and pen 3.cylinders -ACC bought

c. **Taroo-ga san.satu hon-to san.bon pen-o katta*
-NOM 3.volumes book-and 3.cylinders pen-ACC bought

(4) Pseudo-cleft (Kamio 1983)
"It is three books that Taroo bought"
a. *Taroo-ga katta-no-wa hon-o san.satu da*
-NOM bought-COMP-TOP book-ACC 3.volumes COPULA

b. *Taroo-ga katta-no-wa hon san.satu-o da*
-NOM bought-COMP-TOP book 3.volumes-ACC COPULA

c.**Taroo-ga katta-no-wa san.satu hon-o da*
-NOM bought-COMP-TOP 3.volumes book-ACC COPULA

Kitahara's analysis can also be extended to the examples in (5a&b) adapted from Fukushima (1991, 1993) which show that the range of classifier movement is wider than found in Kitahara's original paper.

(5) "Taroo bought three books at Kinokuniya"
a. ***San.satu*** *Taroo-ga* ***hon-o*** *Kinokuniya-de katta*
3.volumes -NOM book-ACC -at bought

b. *Taroo-ga* ***hon-o*** *Kinokuniya-de* ***san.satu*** *katta*
-NOM book-ACC -at 3.volumes bought

b' T-ga [$_{VP}$ **hon$_j$-o** [$_{VP}$ K$_i$-de [$_{VP}$ **san.satu** [$_{VP}$ t$_i$ t$_j$ katta]]]]

In (5a), the classifier is scrambled to the very front of the sentence. (5b) is more involved, but if we combine Kitahara's analysis with Hoji's (1985) view of clause structure and scrambling, (5b) would have the complete structure of (5b'). The original order of elements in the VP is adjunct, object, verb. First the classifier scrambles, followed by the adjunct and then the direct object.

Nevertheless, there are two potential problems for Kitahara. First, subject construal of nouns and their classifiers in (6) is almost as free as for object, and only the order in (6e) where the object intervenes between the subject and its classifier is ungrammatical. This is easily explained if we follow Saito (1985) and assume that subjects do not scramble. A possible analysis of (6e) is found in (6e'), but this is not available if subjects do not scramble. Under such an assumption, however, the grammatical (6d) should also be impossible because the analysis in (6d') also entails subject scrambling.

(6) Subject construal
"Three students bought a book at Kinokuniya"

a. ***Gakusei san.nin-ga*** *Kinokuniya-de hon-o katta*
student 3.people -NOM -at book-ACC bought

b. ***San.nin gakusei-ga*** *Kinokuniya-de hon-o katta*

c. ***Gakusei-ga san.nin*** *Kinokuniya-de hon-o katta*

d. ***Gakusei-ga*** *Kinokuniya-de* ***san.nin*** *hon-o katta*

d' [$_S$ **Gakusei$_i$-ga** [$_S$ K$_j$-de [$_S$ **san.nin** [t$_i$ t$_j$ hon-o katta]

e. ***Gakusei-ga** Kinokuniya-de hon-o **san.nin** katta*

e' [$_S$ **Gakusei$_i$-ga** [$_S$ K$_j$-de [$_S$ hon$_k$-o [$_S$ **san.nin** [t$_i$ t$_j$ t$_k$ katta]

A more general problem is raised by the fact that classifiers do not float out of adjunct expressions at all (Inoue 1978). *Mise san.ken-de* in (7a) means "at three stores," but other arrangements of the adjunct noun and its classifier are ungrammatical as we see in (7b) where it follows the particle; in (7c) where it follows the direct object; and in (7d) where it precedes the noun.

(7) "at three stores"

a. ***Mise san.ken****-de hon-o katta*
store 3-building-at book-ACC bought
"I bought a book at three stores"

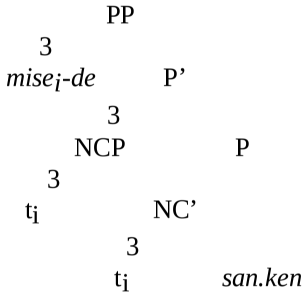
b. ***Mise-de san.ken** hon-o katta*

c. ***Mise-de** hon-o **san.ken** katta*

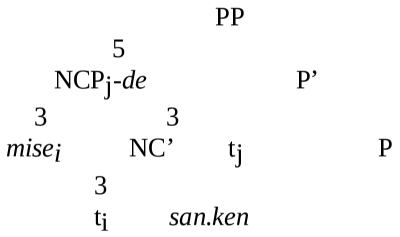
d. ***San.ken mise-de** hon-o katta*

It is not unreasonable to assume that the basic structure of *mise san.ken* is the same as *hon san.satu*. Both are NCPs, and the same agreement require-ment exists between head noun and classifier. Given that the adjunct expression is selected by a PP rather than a DP, the structures in (8) parallel Kita-hara's structures for *hon san.satu* in (2) above. What remains unclear is why only (8b) is grammatical.

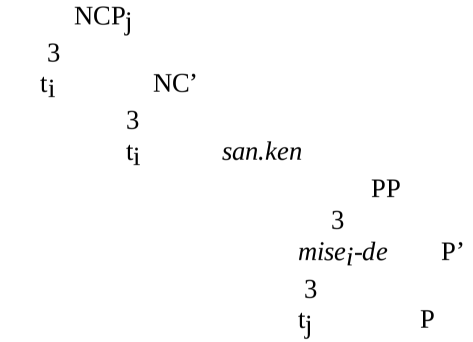
(8) a. **mise san.ken*



b. *mise san.ken-de*



c. **san.ken ....mise-de*

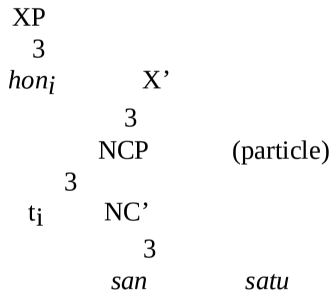


In contrast to Kitahara, Fukushima (1991, 1993) treats classifying expressions as freely generated adverbs. Such an analysis better captures the distribution of classifying expressions which is basically unrestricted (at least for argument expressions), but a different set of facts remains unexplained. First, Fukushima assumes that agreement between the head noun and the classifier is subject only to a pragmatic constraint (Fukushima 1993:218), which I take to mean that it is more or less accidental and may under the right circumstances be violated. I do not believe this to be true. Certainly, the agreement can never be violated. Second, Fukushima distinguishes formally between subject, object, and adjunct classifiers. While it is true that the distribution of classifiers construed to subjects is different from that of classifiers construed to direct objects, the classifying expressions themselves are identical and interchangeable. Given identity of form, it is not clear why they should have as many as three different semantic interpretations, and it is not clear how a classifier "knows" which interpretation is the right one. In the analysis which I offer, the subject/object/adjunct differences fall out from assumptions about the basic syntax and semantics of the entire sentence. Finally, Fukushima, makes little attempt to integrate the facts of scrambling with the phenomena of classifier float, and the sentences in (1), (5), and (6) would all be base-generated with no use of scrambling.

I begin my discussion with the syntax and semantics of Japanese case-marking. Let us say that all nominal elements in Japanese have the syntax in (9).

(9) Nominal syntax

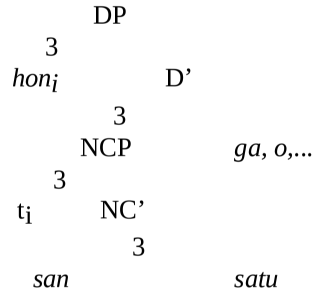
hon *san.satu*
book 3.volumes
"three books"



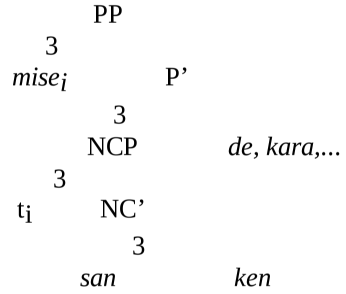
This is a head-final version of Abney's (1987) DP structure which includes a measure phrase for expressions such as *the many choices* or *a few good men* or *those six tigers*. So as not to confuse the issue, I have followed Kitahara in labeling this measure phrase NCP.

As Kitahara proposes, agreement between the NP and its classifier is determined inside the NCP by Head-Spec agreement. The head noun moves to the Spec of the XP for case. The identity of XP itself depends on the particle. Arguments (*ga, o,* sometimes *ni*) head DP as in (10a), while adjuncts (*de, kara*, etc.) head PP as in (10b). The DP structure at least is identical to one proposed by Tateishi (1989) who assumes that case particles are found in the head of D. The structure for PP is an obvious extrapolation.

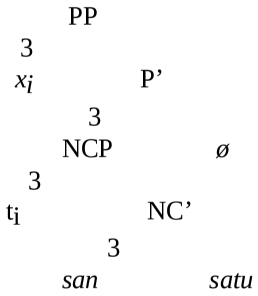
(10) a. Argument



b. Adjunct



c. Adverbial



Like Fukushima, I assume that floated QPs are base-generated adverbs. I further assume that they are predicated of a variable *x*, and that they are selected by an adverbial PP with an empty head as in (10c). Classifiers are but one type of adverb, however, and other such expressions are headed by overt an particle such as *ni* or *to* as well.

I would argue that the syntax in (10) is in some sense maximally simple, capturing the fact that all nominal phrases in Japanese have the same basic syntax (noun-classifier-particle). Agreement between the noun and classifier is checked in the same way in all of these structures. Contra Kitahara, I do not allow the NCP to scramble because it is not clear to me why the NCP can scramble out of a DP in (10a) while it cannot scramble out of a PP in (10b). Rather, the differences between these various expressions will be found in the semantic content of the X-head (D or P). The question I must answer is how agreement is checked between a particular noun and the classifier in an adverbial PP in (10c), given that there is no formal syntactic link between them.

Adopting the event semantics of Kratzer (1996) (where external arguments are introduced separately and all predicates are in some sense intransitive), I propose that the accusative case marker *o* has the semantics in (11a) so that the expression *hon-o* has the semantics in (11b).

(11) a. **o***= λxλQλe[Q(x)(e)]

b. (**hon-o**)*= λQλe[Q(book)(e)]

Of course, the structure in (10a) actually puts the classifying expression at the bottom of the tree. I will take the view that a classifier such as *san.satu* has the semantics in (12).

(12) (**san.satu**)* = λx[(volume)(x) and |x| =3]

(12) means simple that there is a noun which is an instance of a *volume* and that the number of these instances is three. Under this view, simple nouns in Japanese are all treated as entities (contra Krifka (1995) as well as someone like Chierchia (1997) who would treat all nouns in a language like Japanese as kinds). It is also worth mentioning that while Japanese does not distinguish between mass and count nouns in the manner of English, the two noun types are clearly distinguishable. Japanese classifiers are traditionally divided into one of two types: *instances* and *containers*. *Satu* "volume" is an example of an instance. *Hai* "cup" is an example of a container. Instances correspond basically to the English notion of count noun while containers measure mass nouns (Miki Suzuki, personal communication). The derivation of *hon san.satu-o kau* is given in (13).

(13) *hon san.satu-o kau* "buy three books" (= 10a)

a. (**san.satu**)* = λx[(volume)(x) & |x|=3]

b. **o***= λxλQλe[Q(x)(e)]

c. (**san.satu-o**)* =
λxλQλe[Q(x)(e) & (volume)(x) & |x|=3]
by Variable Identification
(cf. Event Identification in Kratzer 1996)

d. **hon*** = book

e. (**hon san.satu-o**)* =
λQλe[Q(book)(e) & (volume)(book) & |book|=3]
by Functional Application

f. (**kau**)* = λxλe[buy(x)(e)]

g. (**hon san.satu-o kau**)* =
λe[buy(book)(e) & (volume)(book) & |book|=3]
by Functional Application

(14) Event Identification (Kratzer 1996)

f	g		h
<e, <s, t>>	<s,t>	→	<e, <s, t>>
λxλe	λe		λxλe

The structure in the last line of (13) is exactly what we might expect an event semantic representation of the predicate to look like. It says that there is an event of buying one or more books, that books are categorized as *volumes*, and that the number of books is three. What Fukushima calls the pragmatics of the agreement between the noun and classifier is captured formally in line (13c). According to Kratzer's Event Identification (shown in (14)), two discrete elements may conjoin if their event arguments are identical. While Kratzer speculates that other kinds of conjunction might be possible, I would propose that two elements may conjoin as long as the variables of one element are a subset of the other. In (13a), we have an expression λx. In (13b) we have an expression λxλQλe. The two expressions will conjoin in (13c) if and only if the two *x*'s are identical. This of course forces the variable *x* to be an argument of the verb and to be an argument of the right physical type. It is this requirement which gives us agreement. The rest of the derivation is straightforward Functional Application.

The semantic derivation of an adjunct such as *mise san.ken de hon-o kau* "buy a book at three stores" is found in (15). The semantics of the particle *de* is given in line (15b), with Variable Identification allowing for the structure in (15c). Comparing (13) and (15), however, a difference does emerge in line (e). Specifically, the predicate in (13e) must be unsaturated, while the predicate in (15e) must be saturated (i.e. is the first argument Q(x)(e) or Q(e)?). This difference forces the verb in (15) to combine with the direct object before it combines with the adjunct expression. The semantics of the adjunct expression gives us a result which is consistent with Hoji's claim that adjuncts are generated above direct objects.

(15) *mise san.ken-de hon-o kau* "buy a book at three stores" (= 10b)

a. (**san.ken**)* = λx[(building)(x) & |x|=3]

b. **de***= λxλQλe[Q(e) & at(e)=x]

c. (**san.ken-de**)* =
λxλQλe[Q(e) & at(e)=x & (building)(x) & |x|=3]
by Variable Identification

d. **mise*** = store

e. (**mise san.ken-de**)* =
λQλe[Q(e) & at(e)=store & (building)(store) & |store|=3]
by Functional Application

f. (**kau**)* = λxλe[buy(x)(e)]

g. (**hon-o kau**)* = λe[buy(book)(e)]
by Functional Application

h. (**mise san.ken-de hon-o kau**)* =
λe[buy(book)(e) & at(e)=store & (building)(store) & |store|=3]
by Functional Application

Note further that if we assume that an adjunct is basically a predicate of events, any number of adjuncts can combine with a saturated predicate by the process of Variable Identification.

(16) *Mokuyoobi-ni mise san.ken-de hon-o kau*
"buy a book at three stores on Thursday"

a. (**mokuyoobi-ni**)* = λQλe[Q(e) & on.Thursday (e)]

b. (**mise san.ken-de hon-o kau**)* =
λe[buy(book)(e) & at(e)=store & (building)(store) & |store|=3]

c. (**mokuyoobi-ni mise san.ken-de hon-o kau**)* =
λe[buy(book)(e) & at(e)=store & (building)(store) & |store|=3]
& on.Thursday (e)]
by Functional Application

I turn now to the adverbial expression in (10c). The semantics for the empty adverbial head is found in line (b) of (17).

(17) *hon-o san.satu kau* "buy three books" (= 10c)

a. (**san.satu**)* = λx[(volume)(x) & |x|=3]

b. **ø*** = λQλxλe[Q(x)(e)]

c. (**san.satu-ø**)* = λQλxλe[Q(x)(e) & (volume)(x) & |x|=3]
by Variable Identification

d. (**kau**)* = λxλe[buy(x)(e)]

e. (**san.satu-ø kau**)* =
λxλe[buy(x)(e) & (volume)(x) & |x| = 3]
by Functional Application

f. (**o**)* = λxλQλe[Q(x)(e)]

g. [**hon-o**)* =
λQλe[Q(book)(e)]
by Functional Application

h. (**hon-o san.satu-ø kau**)* =
λe[buy(book)(e) & (volume)(book) & |book| = 3]
by Functional Application

In line (c), the empty head combines with the classifying expression by Variable Identification. This combines with the verb in line (e). The fact that the same variable is an argument of the verb and an argument of the classifying expression in line (e) is what forces the eventual agreement between the noun and the classifier. Variable Identification and the resulting semantic structure forces surface agreement before the argument has actually been inserted. If this agreement is not realized, the final derivation in line (h) will be ill-formed because of an agreement mismatch.

Crucially, of course, the analysis in (17) will not work with an adjunct expression as we see in (18) and (19). While PP-internal classifiers may be interpreted, floated classifiers cannot be construed with PP-internal nouns.

(18) **mise-de san.ken hon-o kau* "buy a book at three stores"

a. (**hon-o kau**)* = λe[buy(book)(e)]

b. (**san.ken-ø**)* =
λQλxλe[Q(x)(e) & (building)(x) & |x| = 3]

× c. (**san.ken-ø hon-o kau**)* = ??
Functional Application type mismatch

The derivation in (18) results in a type mismatch because the adverbial VP cannot combine directly with the verb and direct object combination. In contrast, (19) is semantically correct, but only if it means "buy three books which are buildings at the store." The agreement mismatch makes the sentence ungrammatical.

(19) **mise-de hon-o san.ken kau*

a. (**san.ken-ø**)* =
λQλxλe[Q(x)(e) & (building)(x) & |x| = 3]

b. (**san.ken-ø kau**)* =
λxλe[buy(x)(e) & (building)(x) & |x| = 3]

c. (**hon-o**)* = λQλe[Q(book)(e)]

× d. (**hon-o san.ken kau**)* =
λe[buy(book)(e) & (building)(book) & |book| = 3]
Agreement mismatch

This is the basic account. I turn now to a couple of other facts associated with floating classifiers. First, the analysis is consistent with the observation that a fronted classifier has moved there by scrambling (which is to say, after it has been semantically interpreted (Saito 1989)). As we see in (20), direct semantic interpretation of the expression is not possible and (20c) is simply uninterpretable. (This is basically what went wrong in (18) as well.)

(20) *san.satu hon-o kau* "buy three books"

a. (**hon-o kau**)* = λe[buy(book)(e)]

b. (**san.satu-ø**)* = λQλxλe[Q(x)(e) & (volume)(x) & |x| = 3]

× c. (**san.satu-ø hon-o kau**)* = ??
Functional Application type mismatch

Second, why is it that a subject classifier may not be found between the direct object and the verb (in (6e))? Recall that Fukushima excludes this possibility by giving separate semantic interpretations to subject and object classifiers.

(21) **Gakusei-ga hon-o san.nin katta*
student-NOM book-ACC 3.people bought
"three students bought a book"

a. (**san.nin**)* = λy[(person)(y) & |y|=3]

b. **ø*** = λQλyλe[Q(y)(e)]

c. (**san.nin-ø**)* = λQλyλe[Q(y)(e) & (person)(y) & |y|=3]
by Variable Identification

d. (**kau**)* = λxλe[buy(x)(e)]

× e. (**san.nin-ø kau**)* = λyλe[buy(y)(e) & (person)(y) & |y|=3]
Agreement mismatch

× e' (**san.nin-ø kau**)* =λyλxλe[buy(x)(e) & (person)(y) & |y|=3]

(20e) is derived by Functional Application (and not by Variable Identification). However, the resulting sentence forces the classifier *san.nin* to agree with the direct object and not with the subject. Semantically, the interpretation is fine but it does not mean what the sentence means, and there will be an agreement mismatch as soon as the direct object is inserted (since a *hon* is not an instance of a *person*). What we want is something like (20e') with both a variable *x* and a variable *y*, but this cannot be produced with the semantic tools we are using.

In short, the analysis depends crucially on the fact that an adverbial classifying expression is a predicate of individuals (and not of events). It can combine with a verb only when the argument of the adverbial and the argument of the verb are identical. This contrast is made explicit in (22).

(22) a. *stab x in the back*
λxλe[stab(x)(e) & in.the.back(e)]

b. *buy three x's*
λxλe[buy(x)(e) & (classifier)(x) & |x|=3]

In Neo-Davidsonian Event Semantics (cf. Parsons 1990), adverbial expressions are generally treated as predicates of events, as in (22a). In contrast, I am proposing that some adverbs are predicates of individuals as in (22b). It is this difference which explains why only argument classifiers may be realized as adverbials (and to "float way" from their head nouns). The principle of Event Identification which allows the two elements in (22a) to combine (because of a common event argument) is generalized to Variable Identification for both (22a & b). Two elements may combine if the variables in one are a subset of the variables in the other, and formally, there is no difference between basing conjunction on the identity of a variable *e* (in 22a) or a variable *x* (in 22b). In (22b) agreement between the adverb and the verbal argument is triggered not by a particular structural relationship (which is to say not by syntax), but because the adverb and the verb are both predicated of the same individual. In syntax, they may actually be quite far apart. In Japanese specifically then, it is possible to argue that all NPs have a single syntactic structure and that the differences in their behavior are located in the combinatorial properties of the X-head (D or P). Such an analysis can also be shown to be consistent with generally held views of Japanese word order and scrambling facts.

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