SYNTAX AND SEMANTICS OF THE JAPANESE FLOATING NUMERAL QUANTIFIER AND ITS IMPLICATIONS FOR THE THEORY OF FLOATING QUANTIFIERS

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1. Introduction

In this paper I will defend two claims about the Japanese Floating Numeral Quantifier (FNQ): First, that the Japanese FNQ is an adverb, and second, that the Japanese numeral classifier provides the restriction on the domain of quantification of the numeral.[1] This analysis is an extension to Japanese of Doetjes' (1997) claim that the general licensing condition for floating quantifiers (FQs) is that they lexically satisfy the principle of conservativity.

2. Japanese Numeral Quantifier

In Japanese, the numeral quantifier (NQ) is a combination of a numeral and a numeral classifier, in the form [Num-CL]. The Japanese NQ can appear either in the nominal domain forming a constituent with an NP, or in the verbal domain as an instance of the FQ. I will call the former a DNQ because it is DP-internal, and the latter an FNQ. I will use the term 'host NP' for the NP that is construed with the NQ. (1)

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[1] In this paper we will only be concerned with 'numeral classifiers' such as *nin* and *hon*. We will not consider 'measure classifiers' such as *guramu* 'gram' and *ton* 'ton'.

shows an example of a DNQ and of an FNQ.[2] In (1a), the NQ *san-nin* '3-CL$_{human}$' forms a constituent with the subject *gakusei* 'student' but in (1b) the NQ occupies a pre-VP position and does not form a constituent with the subject, though semantically this is its host NP:

(1) a. [**san-nin**-no **gakusei**]-ga   hon-o   katta   (san-nin: DNQ)
       3-CL-GEN student-NOM book-ACC bought
       'Three students bought a book'

   b. [**gakusei**]-ga   kyoo **san-nin** hon-o   katta   (san-nin: FNQ)
       student-NOM   today 3-CL   book-ACC bought
       'Three students bought a book today.'

As is well-known, there are two basic hypotheses about the syntax of the FQ. The stranding theory (Sportiche 1988, Kitahara 1992), a transformational analysis, claims that, underlyingly, an FQ forms a constituent with its host NP, though not in the surface form. On this view, the Japanese FNQ is really a hidden DNQ. In contrast, the adverbial analysis (Fukushima 1991, Doetjes 1997) hypothesizes that the FQ is simply a base-generated adverb. On this view, the Japanese FNQ does not derive from an underlying DNQ. I argue that the latter hypothesis is clearly the correct hypothesis.

3. The Distributive Reading of the Japanese FNQ Sentence

With regard to semantic interpretation, an important observation to make about Japanese NQs is that the DNQ and the FNQ are distinct in that the FNQ sentence generally must be interpreted with a distributive reading, while the DNQ sentence is always completely ambiguous as to distributive and collective readings. To see this point, consider the minimal pair in (3), which both have the collective predicate *form a molecule*.

(3) a. [**futa-tsu**-no **suiso-genshi**]-ga   kono ondo-de
       2-CL-GEN hydrogen-atom-NOM   this   temperature-at
       [hito-tsu-no suiso-bunshi]-o   tsukuru
       1-CL-GEN hydrogen-molecule-ACC form

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[2] Due to space limitations, we will focus on 'subject-oriented' NQs, i.e. NQs which are construed with the subject.

'Two hydrogen atoms form a hydrogen molecule at this temperature.'

b. *****suiso-genshi**-ga   kono ondo-de
hydrogen-atom-NOM this temperature-at
[**futa-tsu** [hito-tsu-no suiso-bunshi]-o   tsukuru]
2-CL   1-CL-GEN hydrogen-molecule-ACC   form
'(lit.) Two hydrogen atoms each form a hydrogen molecule at this temperature.'

The DNQ sentence (3a) is well-formed, requiring a collective reading due to the presence of the collective predicate. However, the same proposition cannot be expressed with an FNQ, as shown in (3b). (3b) is ill-formed because the sentence can only be interpreted distributively. The ill-formedness here is exactly the same as what is observed in an English sentence such as *Each boy gathered in the classroom*. That is, while the collective predicate requires a collective reading, the FNQ blocks this reading, forcing a distributive reading. In this paper I will provide a unified account of the semantics of the DNQ and the FNQ, arguing that, the syntactic difference between these two types of NQ is the crucial factor in explaining their difference in truth conditions, although the lexical semantic value of the DNQ and the FNQ is the same.

4. Agreement

Before examining the evidence in support of an adverbial analysis of the Japanese FNQ, let us first note that one of the arguments allegedly supporting a transformational analysis does not actually provide any support for such an analysis. As is well-known, the numeral classifier must agree with the host NP. For example, (4a) is well-formed because the classifier *nin* is the classifier for human beings and student is a kind of human being. However, (4c) is ungrammatical because the classifier *ken* is the classifier for buildings and students do not have the properties of buildings.

(4) a. **gakusei**-ga   **san-nin**   kita.   'Three **individual** students came.'
    student-NOM   3-CL   came
  b. **gakusei**-ga   **san-kumi** kita.   'Three **groups** of students came.'
    student-NOM   3-CL   came
  c. *****gakusei**-ga   **san-gen**   kita   (lit.)'Three **buildings** of students came.'
    student-NOM   3-CL   came

Some Japanese linguists take this agreement phenomenon as evidence of a syntactic agreement relation, in particular, a spec-head relation. However, the agreement here is

not syntactic at all but rather an instance of semantic selectional restriction. This is demonstrated by three properties the Japanese numeral classifier has that are never found with true cases of syntactic agreement. First, different classifiers have different meanings of their own and thus different classifiers can agree with the same host NP, as illustrated in (4a-b). Second, the choice from a set of semantically compatible classifiers depends on non-grammatical factors. If the speaker intends to refer to groups of students, he uses (4b), if individual students, (4a). The meaning of the sentence changes depending on which classifier is used. Third, a normally ill-formed classifier-host NP agreement relation can become well-formed if the context changes. For example, (5b), which is ill-formed under ordinary circumstances could in principle become well-formed, say, a context in which beer were packaged in frozen wafers, e.g. in a spacecraft:

(5) a. John-wa biiru-o   ni-hon reizooko-kara   toridashita.
      J-TOP   beer-ACC 2-CL   refrigerator-from   took out
      'John took out two bottles of beer from the refrigerator.'
   b. #John-wa biiru-o   ni-mai reizooko-kara   toridashita.
      J-TOP   beer-ACC 2-CL   refrigerator-from   took out
      'John took out two sheets of beer from the refrigerator.'

Clearly, then, the agreement between the classifier and the host NP is not syntactic but rather semantic.

5. Adverbial Properties of the FNQ

Below I review some significant data noted in the literature that show the adverbial properties of the FNQ.

5.1. Coordination

First, an FNQ may coordinate with an adverb, as shown in (5a-b). In (6a) and (6b), the subject-oriented FNQ *san-nin* '3-CL$_{human}$' and the object-oriented FNQ *san-bai* '3-CL$_{bowl}$' coordinate with the adverbs *tashikani* 'certainly' and *kireini* 'cleanly', respectively. Note that *tashikani* and *kireini* are clearly adverbs since they are morphologically marked as such by the suffix *ni*.

(6) a. **shoonin**-ga   [[**san-nin**] katsu [tashikani]] sono jiko-o mokugekishita
      witness-NOM   3-CL   and   certainly   the accident-ACC witnessed

(lit.) 'Witnesses [three and certainly] witnessed the accident.'

'Three witnesses witnessed the accident for certain.'

b. Mary-ga **raamen**-o   [[**san-bai**] katsu [kireini]]   tairageta

    M-NOM soup noodle-ACC 3-CL   and   completely   ate up

    (lit.) 'Mary ate up soup noodles [three and completely].'

    Mary ate up three bowls of soup noodles completely'

c. *[books] and [certainly]

Since coordination is possible only with material which is identical in grammatical function, sentences such as in (6a-b) strongly suggest that the grammatical function of the FNQ is that of an adverb. Note that, the stranding theory, which analyzes an FNQ as a residual portion of a DP, falsely predicts that the coordination of the FNQ and an adverb should be as ungrammatical as the coordination in (6c). Thus, the well-formedness of the sentences in (6a-b) is a severe empirical problem for the stranding theory.

5.2. Parallel Syntactic Behavior of FNQs and Adverbs

Next, based on Nakayama and Koizumi (1991)'s observation, Fujita (1994) shows the parallel syntactic behavior of the FNQ and the adverb with regard to the VP-cleft construction. First consider (7). (7a) and (7b) are minimally different from each other in that (7a) has a subject-oriented FNQ, while (7b) has a sentential adverb. (8) shows that the VP-cleft construction of the two sentences in (7) is ungrammatical.

(7) a. kodomotachi-ga   **go-nin**   piza-o   tabeta.   'Five children ate pizza.'

     children-NOM   5-CL   pizza-ACC   ate

b. kodomotachi-ga   **tashikani** piza-o   tabeta.   'Children certainly ate pizza'

     children-NOM   certainly   pizza-ACC   ate

(8) a. *kodomotachi-ga shita-no-wa   [**go-nin** piza-o   taberu-koto]-dat-ta

     children-NOM   did-COMP-TOP 5-CL   pizza-ACC   eat-Comp-Cop-Past

     *'What children did was five eat pizza.'

b. *kodomotachi-ga shita-no-wa   [**tashikani** piza-o   taberu-koto]-dat-ta

     children-NOM   did-COMP-TOP certainly   pizza-ACC   eat-Comp-Cop-Past

     *'What children did was certainly eat pizza.'

Now, consider (9). (9a) and (9b) are minimally different from each other in that (9a) has an object-oriented FNQ, while (9b) has a manner adverb. (10) shows that the VP-cleft construction of the two sentences in (9) is perfectly grammatical.

(9) a. John-ga   piza-o   **ni-mai**   tabeta.   'John ate two slices of pizza.'
       J-NOM   pizza-ACC 2-CL   ate
    b. John-ga   piza-o   **isoide**   tabeta.   'John ate a pizza in a hurry.'
       J-NOM   pizza-ACC hurriedly   ate

(10) a. John-ga shita-no-wa   [piza-o   **ni-mai**   taberu-koto]-da-tta
        J-NOM did-COMP-TOP pizza-ACC   2-CL   eat-Comp-Cop-Past
        'What John did was eat two slices of pizza.'
     b. John-ga shita-no-wa   [piza-o   **isoide**   taberu-koto]-da-tta
        J-NOM did-COMP-TOP pizza-ACC hurriedly eat-Comp-Cop-Past
        'What John did was eat pizza in a hurry.'

These data show the parallel behavior with respect to VP-clefting between subject-oriented FNQs and sentential adverbs on one hand, and between object-oriented FNQs and manner adverbs on the other. This is not only evidence that the FNQ is adverb, it also shows that the syntactic difference between subject- and object-oriented FNQs corresponds exactly to the syntactic difference between sentential and manner adverbs. Note also that the ungrammaticality of (8a) is another empirical problem for a stranding theoretical account of the FNQ. Under this theory, the FNQ is stranded in the VP-internal subject position. If so, the VP-cleft should always be possible. Moreover, if for some reason VP-clefting should not be possible in (8a), then it should also not be possible in (10a).

5.3. Event Classifier

There is a kind of Japanese FNQ whose numeral classifier is not related to objects but rather events, e.g. *hatsu,* wich refers to blast/shots/explosions. As Fukushima (1991) notes, the NQ with an 'event classifier' cannot appear in the prenominal position:

(11) a. **pistutoru**-ga   [**ni-hatsu**   utareta].   'Two shots of a pistol were shot'
        pistol-NOM   2-CL   were shot
     b. *[**ni-hatsu**-no **pisutoru**]-ga utareta
        2-CL-GEN   pistol-NOM were shot

The event classifier *hatsu* in the FNQ in (11a) counts shots, not pistols. Thus, this NQ cannot be used as a DNQ construed with the noun pisutoru 'pistol'. In (11a), the event of shooting is expressed in the predicate. This shows that the FNQ with an event classifier is not related at all to an NP, but rather is only related to the predicate, showing the property of an adverb. It also shows that at least the FNQ sentence with an event classifier cannot possibly be derived from a DNQ sentence. This type of FNQ cannot be captured by the stranding theoretical approach, but readily can by the adverbial approach.

5.4. DNQ-FNQ Construction

A DNQ and an FNQ can co-occur in a single clause (Inoue, 1978). I will call this the DNQ-FNQ construction. Observe (12a) from Inoue (1978), which is schematically abbreviated in (12b):

(12) a. narande hashitteita **juu-dai**-no   **torakku**-ga
         in a row running   10-CL-GEN   truck-NOM
              [**san-dai**   gaadoreeru-ni butsukatta].
              3-CL   guardrail-to   hit
         'Three of the several trucks that were driving in tandem hit the guardrail.'
     b. [.... 10-dai   trucks] [**3-dai**   hit the guardrail]   (dai: CL for machineries)
         DNQ   FNQ

Note that the mere existence of the DNQ-FNQ construction is highly problematic for the stranding theory. Under this theory, a DNQ becomes an FNQ after the host NP moves up to a higher spec IP position. Thus, the stranding theory predicts that the DNQ and the FNQ should be in complementary distribution. The existence of FNQ-FNQ sentences directly falsifies this prediction. However, more importantly, the DNQ-FNQ construction reveals that the FNQ is directly related to the predicate. Specifically, in (12a), the FNQ san-dai refers to 3 dai-objects that hit the guardrail. So the numeral indicates the number of the objects which have the property denoted by the predicate. Thus, it is observed that the FNQ is directly related to the predicate. This is a property of adverbs.

5.5. Monotonicity

Finally, let us consider another semantic contrast between DNQs and FNQs recently discussed by Nakanishi (2002). In Japanese, both a DNQ and an FNQ can also function as amount terms denoting a measure function rather than quantifying over objects or

events. Of course, an amount term has a different semantics which I cannot go into here. However, the point is that the syntactic difference between the DNQ and the FNQ also affects the amount term function of a Japanese NQ. Consider the minimal pair in (13).

(13) a. mizu **san-rittoru**-ga koboreta   'Three liters of water spilled.'
        water 3-CL-NOM   spilled
     b. *mizu **san-do**-ga   koboreta   'Three degree water spilled.'
        water 3-CL-NOM   spilled

Nakanishi argues, following Shwarzschild (2002), that the ill-formedness of (13b) can be attributed to a universal monotonicity constraint on measure functions applying in the nominal domain. That is, (14a) is well-formed because a subpart of 3 liters of water, say 2 liters worth, is a smaller amount of water. In contrast, (13b) is ill-formed because a subpart of a given amount of water whose temperature is 3 degrees is not going to have a temperature lower than 3 degrees. The monotonicity constraint is satisfied in the nominal domain in (13a) but not in (13b). Nakanishi then shows that the same universal monotonicity constraint applies in the verbal domain with FNQ sentences, as in (14).

(14) a. yuki-ga   kinoo   **san-ton** John-no ie-no   yane-ni tsumotta
        snow-NOM   yesterday 3-CL   J-GEN   house-GEN roof-on piled up
        'Three tons of snow piled up on the roof of John's house yesterday.'
     b. *yuki-ga   kinoo   **san-ton** John-no ie-o   oshitsubushita
        snow-NOM   yesterday 3-CL   J-GEN   house-ACC smashed
        (intended) 'Three tons of snow smashed John's house yesterday.'

(14a) is well-formed because a snow piling up event is monotonic: A subevent of snow piling up is still an event of snow piling up. In contrast, (14b) is ill-formed, because it violates the monotonicity constraint: A subevent of smashing John's house is not an event of smashing John's house. Note that both sentences have the same host NP, 'snow', so the grammatical distinction cannot be attributed to properties of the host NP. Note also that under the stranding theory, in which the FNQ is only syntactically different from the DNQ, the grammatical distinction between (14a) and (14b) cannot be explained, and the semantic contrast between (13) and (14) as a whole remains a mystery as well.

In sum, there is abundant evidence that the Japanese FNQ is simply a base-generated adverb. Moreover, in most cases, each fact which suggests an adverbial analysis is correct also poses an independent empirical problem for a transformational analysis.

6. Semantic Analysis

An adequate semantic analysis of the Japanese quantificational DNQ and FNQ, then, should reflect this fundamental syntactic difference, if the compositionality thesis is to be respected. In this light, I propose a new, unified, semantic analysis of the Japanese quantificational DNQ and FNQ, which accounts for the distributive reading of the FNQ sentence at the same time. (15) illustrates the proposed analysis, which shows that the crucial syntactic difference between the DNQ and the FNQ directly reflects the difference in the quantificational analysis of the two types of NQ:

(15) a. DNQ   b.   FNQ

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         S                              S
        3                          3
     2      VP             DP          2
  Num+CL   NP                      Num+CL   VP
   Q    A   B                       Q    A   B
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Here, the numeral itself is analyzed as the quantifier, rather than the NQ as a whole (e.g. Fukushima 1991). The classifier is not a part of the quantifier but is analyzed as the restrictive domain of quantification. Furthermore, because of the syntactic difference between the two, the nuclear scope is different for the DNQ and the FNQ. In the DNQ sentence the nuclear scope is the host NP, while in the FNQ sentence it is the predicate. Under this analysis, the classifier denotes a set of individuals, either objects (for object classifiers) or events (for event classifiers). For example, the numeral classifier nin denotes a set of human individuals, and the numeral classifier hatsu denotes a set of blasting events. In DNQ quantification, the numeral restricts the number of the elements in the intersection of the classifier denotation and the host NP denotation. In contrast, in FNQ quantification, the numeral restricts the number of the elements in the intersection of the classifier denotation and the predicate denotation.

Under this analysis, the classifier denotation has an important property which I call the 'atomicity condition'. This is the requirement that the elements in the set denoted by the classifier must all be atomic (or singular). Consider the sentence Three boys left with a situation that there are four boys a, b, c, and d in the domain of discourse. Assuming that the denotation of the noun boys functions as the restrictive domain of quantification for the numeral 3, suppose three elements have been selected to satisfy the truth condition, from the two possible restrictive domains of quantification, (16b) and (16c).

(16b) includes both atoms and sums in the sense of Link (1983), while (16c) includes only atoms. The three selected elements are underlined:

(16) a.   Three boys left.
     b.   {a≤b≤c≤d, a≤b≤c, a≤b≤d, a≤c≤d, b≤c≤d, a≤b, a≤c, a≤d, b≤c, b≤d, <u>c≤d</u>, a, b, <u>c</u>, <u>d</u>}
     c.   {a, <u>b</u>, <u>c</u>, <u>d</u>}

In (16b), three elements are the sum consisting of c and d, the atomic individual c, and another atomic individual d, while in (16c), three elements are b, c, and d, all atoms. The inclusion of sums in the domain of quantification in (16b) leads to a severe empirical problem since in (16b), despite the fact that three elements have been selected, the number of individuals (boys) is only two, not three. This means that the sentence in (16a) would be true even if only two boys left. This clearly would not satisfy the basic truth conditions of an NQ. On the other hand, in (16c), the number of elements necessarily matches the number of individuals, since only atoms are in this set. In order to guarantee the correct truth condition, then, it is necessary to include only atomic individuals in the domain of quantification as shown in (16c). I assume that this is a necessary, presumably universal, condition for any restrictive domain of quantification for an NQ.

Assuming the atomicity condition on the numeral classifier denotation which can be formally represented by means of Link's (1983) i-part operator "^{X}A', I propose the following semantic interpretation for the Japanese DNQ (17) and FNQ (18) sentences:[3]

(17) a.   san-nin-no gakusei-ga   peepaa-o   kaita   'Three students wrote a paper.'
      3-CL-GEN student-NOM paper-ACC wrote

     b. $\square$y$\square$K[Kϕ(8u$\square$v[nin'(v)ϖu^{X}Av]1gakusei') $\varpi*$K$*\exists$3$\varpi\leq$K=y]ϖpeepaa-o kaita'(y)]
                    nin   student   wrote a paper

(18) a.   gakusei-ga   san-nin peepaa-o   kaita   'Three students wrote a paper.'
      student-NOM 3-CL   paper-ACC wrote

     b. $\square$y[gakusei'(y)$\varpi$$\square$K[K$\phi$(8u$\square$v[nin'(v)$\varpi$u^{X}Av]1peepaa-o kaita')$\varpi*$K$*\exists$3 $\varpi\leq$K=y
]]
             student   nin   wrote a paper

In (18b) for the FNQ sentence, the classifier denotation and the predicate denotation intersect. Given the atomicity condition, it turns out that our analysis accounts for the obligatory distributive reading of the FNQ sentence very naturally. Due to the atomicity

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[3] For the precise details of the semantic computation, the readers are referred to Kobuchi-Philip (2003).

condition on the classifier denotation, the elements in this intersection are all atomic individuals. Thus, the property specified by the predicate applies to these elements individually. The distributivity here is simply a logical consequence of the analysis, and we do not have to assume an extra operator such as the distributivity operator (Link 1987, Roberts 1986) to account for it. Notice that the atomicity condition of the classifier denotation applies to DNQ quantification in (17b) as well. However, atomicity is restricted on the host NP denotation rather than the predicate denotation. Furthermore, the DNQ quantification generates a plural term, i.e. the sum K: 'three nin that are students' in (17b). According to Link (1984) and Landman (1989, 2000), in the nominal domain the collective reading is derived from the distributive reading by applying a group operator 8 to a sum, as shown in (19a). Thus, given the existence of the sum K in (17b), a group can be formed out of this K successfully, as shown in (19b), hence the availability of a collective reading in the case of the DNQ sentence.

(19) Ambiguous Interpretation of the DNQ sentence
    a. three students: $a \leq b \leq c$ or $8(a \leq b \leq c)$
    b. san-nin-no gakusei : $a \leq b \leq c$ or $8(a \leq b \leq c)$
       3-CL-GEN student
       'three students'

Note that the same mechanism cannot apply to the predicate modified by an FNQ because this is not a nominal domain and the group operator is restricted to the nominal domain. The fact that the group operator is restricted to the nominal domain is shown by the fact that an obligatory distributive predicate such as *walk* cannot be transformed into a collective predicate.

In sum, under the proposed analysis, the numeral classifier functions as the restrictive domain of quantification. Its extension includes only atomic individuals. In the case of the FNQ quantification, that the nuclear scope is the predicate denotation results in its obligatory distributive reading. In the case of the DNQ quantification, that the nuclear scope is the host NP denotation results in the generation of a plural term, yielding ambiguous interpretation.

7. FQ with a Nominal Element

Given the proposed quantificational analysis, let us consider what is implied about the licensing condition of the FQ in general. Doetjes (1997) suggests that the FQ *tous* 'all' in a language like French is associated with a silent nominal element that restricts the domain of quantification.

(20) Doetjes (1997): [$_{QP}$ tous [$_{DP}$ pro]]

    Obviously, this applies to Japanese directly, only that in Japanese the nominal element is not silent but overtly manifested as a numeral classifier. The presence of the nominal element with an FQ can sometimes be seen more overtly in other languages as well. (21) is an example from some dialects of French noted by Sportiche.

(21) **Les enfants** ont [**chacun d'eux**] acheté une voiture.   (Sportiche 1988)
    the children have each of- them bought a car
    'The children each bought a car.'

    An overt nominal element with an FQ can also be seen in (22a). Note that the form of the quantifier in (22a) cannot take the pre-determiner position as shown in (22b).

(22) a. **Les enfannts** sont [**tous les trois**] allés à la plage   (Doetjes 1997)
        the children are all the three gone to the beach
        'All three of the children went to the beach.'
    b. *[**Tous les trois**] (**les**) **enfants** sont allés à la plage   (Doetjes 1997)
        all the three the children are gone to the beach

These data show that the FQ can contain an overt nominal in French.
    In addition, in Dutch, the FQ *allemaal*, i.e. *alle* 'all' + *maal* 'times', in which *maal* is obviously a nominal element, can only appear in the FQ position and cannot be a determiner as shown in (23).

(23) a. **De kinderen** zijn **allemaal** gekomen   (Doetjes 1997)
        the children are all come
        'The children all came.'
    b. ***Allemaal de kinderen** zijn gekomen   (Doetjes 1997)
        all the children are come

    Japanese *minna* behaves like Dutch *allemaal*: *Minna* can appear as an FQ as in (24a) but not in the prenominal position as in (24b). In the case of *minna*, however, its association with lexical nominality is even clearer, since it can be a full argument as in (24c).

(24) a. kodomo-ga **minna** kaetta   b. ***minna**-no kodomo-ga kaetta
        child-NOM all left   all-GEN child-NOM left
        'All the children came.'
    c. **minna**-ga kaetta
        all-NOM left
        'All left.'

These data also show that the quantifier that can float is lexically associated with a nominal element.

Now let us consider English. In English Q-float is only seen with the lexical elements *all*, *each* and *both*, as shown in (25a). These quantifiers happen to be strong quantifiers, but a strong quantifier *every* cannot float, as shown in (25b).

(25) a. The boys **all**/**each**/**both** took a card.　　b. *The boys **every** took a card.

The difference between the English floatable quantifiers and *every* can be argued to be that the former can be used as independent nominal elements as shown in (26a), while *every* is strictly a determiner as shown in (26b).

(26) a. All/Each/Both took a card.　　　　　b. *Every took a card.

Note that a possible alternative hypothesis that the sentence in (26a) is associated with an independent empty category, as shown in (27a), is untenable since it falsely predicts that (26b) should be grammatical, assuming the same empty category.

(27) a. All/Each/Both *e*　took a card.　　　　b. *Every *e*　took a card.

Thus, I hypothesize for English that if a quantifier lexically contains a silent nominal element, it can float. It is important to note that this nominal element cannot be provided overtly in English, as shown in (28):

(28) a. *The boys everybody left.　　　　　b. *The flowers everything bloomed.

The reason that the quantifier with an overt nominal element cannot float in English seems to follow from the violation of a parameteric setting of Case theory in English.

To sum up, the quantifier can float in English if it is lexically associated with a silent nominal element since this can function as the restrictive domain of quantification and the quantification computation can successfully proceed in relation to the predicate denotation. On the other hand, an English quantifier that does not intrinsically contain a nominal element cannot occur in the adverbial position, since it would lack a restrictive domain of quantification, violating the UG principle of conservativity.

8. Conclusion

In this paper, I showed that the FNQ is an adverb, thus DNQ and the FNQ are syntactically distinct. In order to account for the obligatory distributive reading of the Japanese FNQ sentence, I hypothesized that the Japanese numeral classifier functions as the restrictive domain of quantification. Assuming this quantificational analysis. I showed that Doetjes' (1997) licensing condition of the FQ can be well-supported.

Generally, the FQ is licensed because it is associated with a nominal element, precisely because this can facilitate the restrictive domain of quantification. Moreover, assuming that the atomicity condition on the restrictive domain of quantification as a general principle, the distributive reading of the FQ sentence can be accounted for as a general phenomenon across languages.

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