# NON-FLOATING COLLECTIVE NUMERAL QUANTIFIERS IN JAPANESE[*]

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## 1.    Introduction[1]

Much has been written about *Floating Quantifiers*, and there are many views on the market: e.g., the stranding view, the adverbial view, the cognitive view (Langacker 1991, 2008), and the functional view (Takami 2001). In an attempt to contribute to the literature and provide some answers to remaining questions, the aim of this paper is to introduce a variety of numeral quantifiers in Japanese that I call Manner adverbial numeral quantifiers (MQ), as in (1).[2,3]

(1)    *Gakusei-ga sake-o    san-nin nonda.        MQ*
       student-$_{NOM}$ sake-$_{ACC}$ 3-$_{CL}$        drank
       'Three students together drank sake.'

On the surface, MQs look like Floating numeral quantifiers (FQ), which modify a nominal (a host NP) remotely (2a), and that previous studies argue have structural and/or semantic relations with DP-internal numeral quantifiers (DP-Q)(2b).

(2)    Two types of numeral quantifiers in Japanese
       a.    *Gakusei-ga kinoo    hutari neko-o mita.        FQ*
             student-$_{NOM}$ yesterday 2-$_{CL}$    cat-$_{ACC}$ saw.
             'Two students saw a cat yesterday.'

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[1] I use the term 'floating' following a convention in the literature, to describe a quantifier that modifies remotely in a surface configuration, without implying that a quantifier moves out of a host nominal.
[2] Abbreviations. ACC: accusative, CL: classifier, DP-Q: DQ-internal numeral quantifiers, FQ: floating numeral quantifiers, MQ: manner adverbial numeral quantifiers, NOM: nominative, PAST: past tense, PASS: passive, PL: plural marker
[3] A numeral quantifier consists of a number and a classifier ($_{CL}$). The latter semantically agrees with the type of noun phrase that the quantifier modifies. For instance, *-nin* is used to quantify people as in (1), but not with non-human entities. On the other hand *-hiki* is used for (relatively small) animals. The internal configurations of DP-Q vary: numeral quantifiers may precede the nominal head, intervene between the nominal head and a case marker, or follow the case marker. Syntactic and semantic differences among these varieties are not directly linked to the discussion of the present paper. I thus leave them aside.

b.  [*hutari no gakusei*]-*ga kinoo    neko-o mita.*[4]    *DP-Q*
    2-CL   of  student-NOM  yesterday  cat-ACC  saw
    'Two students saw a cat yesterday.'

I argue, however, that MQs are syntactically and semantically different from FQs. In the present paper, I propose that an MQ is an adverbial that is base-generated in the verbal domain, i.e., non-floating, and that denotes a collective action, as in (3).[5]

(3)  [TP student-NOM yesterday [[VoiceP cat-ACC [VoiceP $t_{NOM}$ [[VP MQ $t_{ACC}$ $t_V$ ] $t$ ]]] saw ]]

My analysis of MQ helps to resolve a controversy related to the distribution of FQ (Miyagawa 1989, Saito 1985, Kuroda 1988). It is widely known that FQ and the subject cannot be intervened by the object:

(4)  *\*Gakusei-ga kinoo    neko-o    hutari  mita.*
     student-NOM yesterday neko-ACC 2-CL-FQ  saw
     (Intended) 'Two students saw a cat yesterday.'

Towards this restriction, a number of counterexamples have been introduced and non-syntactic accounts have been posited instead (Mihara 1998, Takami 2001, Gunji and Hashida 1998). Demonstrating that some of these 'counterexamples' are in fact MQs, the analysis of MQ requires us to consider the possibility that not all quantifiers that seemingly modify a host noun remotely are FQs.

In what follows, after I briefly summarize the controversial issues with regard to FQ analyses (Section 2), I catalogue semantic and syntactic properties of MQs, comparing them with FQs. I illustrate that, semantically, MQs contrast with FQs in terms of collectivity, specificity, manner of quantification, and relative scopes (Section 3). In Section 4, I demonstrate differences between MQs and FQs in syntactic properties such as distribution, derivation and the possibility of appearing at the base position of the host NP. I further point out that some of the quantifiers that are labeled 'FQs' in the literature in fact seem not to be FQs, but MQs (Section 5). In so doing, I demonstrate that the controversial data introduced in Section 2, which go against traditional views, in particular the stranding view and the adverbial view, do not necessarily go against traditional analyses. The last section concludes the paper and also gives a sketch of future work that will provide a unified account for various quantifiers in Japanese.

## 2.    Background

### 2.1   Derivation of FQs

With respect to the derivation of FQs, previous studies in generative framework can be classified into two major schools: a stranding view and an adverbial view (Bošković

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[4] In the cases of two persons, *hutari* 'two persons' is used, in which the number and classifier are morphologically merged to diminish their clear boundaries. In this paper, however, I gloss it as 2-CL.
[5] I assume the obligatory object shift in Japanese (Ochi 2004, 2009). See Section 4.1 for the detail.

2004, Fitzpatrick 2006, Miyagawa 1989, 2012, Miyagawa and Arikawa 2007, Shlonsky 1991, Sportiche 1991, Watanabe 2008 for the former; Alam-Sasaki 1997, Bobaljik 2003, Doetjes 1997, Inoue 1978, Kobuchi-Philip 2003, 2007, Nakanishi 2004, 2007, 2008a for the latter). In the stranding view, an FQ is left behind by the subject at Spec,VoiceP, where the subject starts out. The structures in (5) schematize the derivation of a DP-Q and an FQ in (2) in the stranding view.

(5)    Derivation according to the stranding view
   a. Base   [TP            [VoiceP [DP  Q (of) student-NOM] [[VP cat-ACC see]Voice]]-PAST]
   b. DP-Q  [TP [DP Q (of) student-NOM] [[VoiceP  _tDP_  [[VP cat-ACC see]Voice]]-PAST]]
   c. FQ     [TP student-NOM [[VoiceP [DP FQ _tNOM_ ] [[VP cat-ACC see] Voice]]-PAST]]

Numeral quantifiers and a host NP form a DP at Spec,VoiceP (5a). When the subject moves up to Spec,TP to check the EPP feature of T, it has two options: going up with the quantifier, i.e., DP-Q (5b); stranding the quantifier, i.e., FQ (5c). As the result of being left behind at the base position, the quantifier looks like in the surface configuration modifying the host NP remotely.

In the adverbial view, an FQ is base-generated in the surface position as an adverbial, and it does not have a structural correlation with the host NP. This approach appoints different mechanisms for the sentence with an FQ and for the non-floating variant, i.e., DP-Q, and hence either of them is not created from the other through movement. The structures in (6) schematize the derivation of a DP-Q and an FQ in (2) in the adverbial view.

(6)    Derivation according to the adverbial view
   a. DP-Q [TP [DP Q (of) student-NOM] Adv [[VoiceP _tDP_ [[VP cat-ACC see ]Voice]]-PAST]]
   b. FQ [TP [DP student-NOM ] Adv [[VoiceP FQ [VoiceP _tDP_ [[VP cat-ACC see] Voice]]]-PAST]]

DP-Q is base-generated inside the DP, and the whole DP moves to Spec,TP (6a). FQ is base-generated as a subject-oriented adverbial at the VoiceP-level (5b), which quantifies an event (Nakanishi 2007, 2008a, 2008b).[6] In the present paper, I follow the adverbial view of FQs for ease of exposition. As far as FQs and the host noun should hold a locality relation, discrepancies between these two views are not relevant to discussion in the present paper.

## 2.3   Restrictions on distributions of FQs
Provided that a host NP and an FQ should have a locality relation, whether it is a constituency or adjacency, in a certain stage of derivation (Doetjes 1997, Bobajik 2003, Miyagawa 1989), FQs cannot appear at VP-internal positions, since the subject starts out of the VoiceP-edge as in (6) (Miyagawa 1989, Saito 1985, among many others). In

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[6] Note that 'adverbial' in the adverbial view refers to an adverbial at the VoiceP-level, while an MQ, which I discuss in the current paper, is a manner adverbial (one at the VP-level).

particular, FQs may not show up at the pre-verbal position following the object (7a) or VP-internal adverbials, in which FQs cannot hold a locality relation with the host (7b).

(7)    Restrictions on distributions of FQs
       a. *Gakusei-ga kinoo    neko-o    hutari mita.    FQ
          student-NOM yesterday neko-ACC 2-CL-FQ  saw
          (Intended) 'Two students saw a cat yesterday.'
       b. [TP [DP student-NOM ] yesterday [[VoiceP _tDP_ [[VP cat-ACC FQ see]VOICE]]-PAST]]

The derivation in (7b) does not seem felicitous since the FQ *hutari* '2-CL' may not be adjacent to the host NP *gakusei* 'student' in any stage of derivation, and hence it cannot modify the subject, i.e., it cannot be a subject-oriented adverbial.
       However, (7) is almost identical to a grammatical sentence in (1), repeated as (8) here, in which a numeral quantifier follows the object.

(8)    Gakusei-ga sake-o    san-nin nonda.    MQ
       student-NOM sake-ACC 3-CL-MQ  drank
       'Three students together drank sake.'

I observe that the numeral quantifier may appear in the preverbal and VP-internal position as in (8) when the sentence has a collective reading.[7] I propose that the quantifier in these positions is in fact not an FQ, but a manner adverbial that brings a collective reading, and thus I call it a Manner adverbial numeral quantifier (MQ). Since an MQ is a manner adverbial, it appears VP-internally. It is also straightforward that MQs do not follow the locality requirement of FQs and the host NP; MQs are not FQs, and the requirement is imposed only on FQs. In what follows, I demonstrate MQs are different from FQs syntactically and semantically

## 3.    Semantics of MQs and FQs

### 3.1    Distributivity
FQ allows only a distributive reading while MQs, by definition, allows a collective reading. An FQ is incompatible with a predicate that denotes a single event such as killing X, which contradict the distributivity of the FQ (Nakanishi 2007, 2008a, 2008b):

(9)    Distributivity of FQs
       a. Gakusei-ga kinoo      san-nin Peter-o    tatita.
          student-NOM yesterday 3-CL-FQ  Peter-ACC hit
          'Three students hit Peter yesterday.'                    ok Distributive,  *Collective

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[7] Namely, the sentence in (7) is also grammatical in a collective reading such that two students together collaboratively saw a cat yesterday. (8) cannot describe a distributive action such that each of two students individually drank sake in different places (but see Miyagawa and Arikawa 2007 for FQs in the preverbal position). Although two types of quantifiers look identical on the surface form, FQs and MQs are prosodically different; in order to achieve a collective reading, the quantifier should be prosodically adjacent to the verb, and typically have a Low-High pitch. FQs are less restricted configurationally or prosodically.

b. ?? *Gakusei-ga kinoo     san-nin Peter-o     korosita.*
　　student-<sub>NOM</sub> yesterday 3-<sub>CL-FQ</sub>　Peter-<sub>ACC</sub>　killed
　　'Three students killed Peter yesterday.'　　*<sup>??</sup>Distributive,　*Collective*
　　　　　　　　　　　　　　　　　　Nakanishi (2008a: 310)

In (9b), the distributivity required by the FQ conflicts with the collectivity required by the predicate unless Peter can be killed three times. Putting the quantifier in the preverbal position, on the other hand, MQs are able to co-occur with a predicate that denotes a single event since the MQ indicates that the event happens in a collective manner:

(10) ? *Gakusei-ga kinoo     Peter-o     san-nin     korosita.     MQ*
　　　student-<sub>NOM</sub> yesterday Peter-<sub>ACC</sub>　3-<sub>CL-MQ</sub>　killed
　　　'A group of three students killed Peter yesterday.'

## 3.2　Specificity

One of the well-discussed semantic constraints on FNQs has to do with specificity, but the specificity restriction is not valid for a manner NQ. Given that FNQs are limited to a non-specific reading (Alam-Sasaki 1997, Kitahara 1993, Ochi 2012, Watanabe 2008), a pluralizer *–tati* conflicts with the FNQ since it requires the NP to be specific (Ochi 2012). This prediction is correct:

(11) a. *San-nin no kodomo-tati-ga yorokonde　kuruma-o　aratta.　　　DP-Q*
　　　　3-<sub>CL</sub>　of child-<sub>PL-NOM</sub>　joyfully　　car-<sub>ACC</sub>　washed
　　　　'The three children joyfully washed a car.'
　　　b. *?*Kodomo-tati-ga yorokonde　san-nin kuruma-o　aratta.*<sup>8</sup>　　　*FQ*
　　　　child-<sub>PL-NOM</sub>　joyfully　　3-<sub>CL-FQ</sub> car-ACC　washed
　　　　(Intended): 'The three children joyfully washed a car.'

As also predicted, MQs are not restricted in terms of the specificity, and hence it co-occurs with the pluralizer *–tati*:

(12) *Kodomo-tati-ga yorokonde　kuruma-o san-nin　aratta.　　　MQ*
　　　child-<sub>PL-NOM</sub>　joyfully　　car-<sub>ACC</sub> 3-<sub>CL-MQ</sub>　washed
　　　'A group of three children joyfully washed a car.'

## 3.3　Quantification

The fundamental semantic difference between a MQ and an FNQ has to do with the quantification involved. Namely, the two types of numeral quantifiers differ in terms of what each quantifies: FQs require an exhaustive reading or a partitive reading when the host is definite (Haig 1980, Inoue 1976, 1978), while MQs in fact do not quantify the subject. Examine (13):

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<sup>8</sup> The sentence sounds marginally acceptable if it is read in a specific and partitive reading (Hirose 2004).

(13) a. *Gakusei-ga kinoo     hutari UFO-o    mita.*
      student-$_{NOM}$ yesterday 2-$_{CL-FQ}$ UFO-$_{ACC}$ saw.
      'Two students saw a UFO yesterday.'
    b. [[$_{RelC}$ *Kyougi      ni sankasita] gakusei]-ga, ni-san-nin   UFO-o    mita.*
      competition to  joined      student-$_{NOM}$ 2-or-3-$_{CL}$    UFO-$_{ACC}$ saw.
      'Two or three (some) of the students who joined the competition saw a UFO.'

The example in (13a) describes a situation that there were two (and presumably only two) students who saw a UFO yesterday. When the host noun is definite, being modified by a relative clause, the FQ in (13b) expresses a partitive reading such that of a number of students, two or three (or some) of them saw it. (13b) implies that there are some students who joined the competition but did not see a UFO.

    Menwhile, MQ in (14a) does not necessarily indicate the number of the students since the MQ indicate the number of people who take the action together in an event. It might be the case that a number of students are divided into groups of three and each group wash a car.

(14) *Gakusei-ga kinoo     kuruma-o san-nin    aratta.*
    student-$_{NOM}$ yesterday car-$_{ACC}$    3-$_{CL}$-$_{MQ}$   washed.
    'Students washed a car yesterday by a group of three.'

Hence, it is possible for MQs to co-occur with DP-Q:

(15) *Sanzjuu-nin no gakusei-ga kinoo     kuruma-o san-nin    aratta.*
    30-$_{CL}$       of student-$_{NOM}$ yesterday car-$_{ACC}$   3-$_{CL}$-$_{MQ}$   washed.
    'Thirty students washed a car yesterday by a group of three.'   (i.e., total 10 groups)

Note that (15) is different from the partitive reading in that all of 30 students eventually join to the washing in (15). In a partitive reading, if ever possible, 27 students did not.[9]
    Comitatives also show a difference between FQs and MQs. Examine (16) first:

(16) Quantifiers and comitatives
    a. *Gakusei-ga kinoo      san-nin    John to    sake-o    nonda.*
      student-$_{NOM}$ yesterday 3-$_{CL}$-$_{FQ}$    John with sake-$_{ACC}$ drunk
      'Three students drunk sake with John yesterday.'
    b. *Gakusei-ga John to    sake-o     san-nin   nonda.*
      student-$_{NOM}$ John with sake-$_{ACC}$ 3-$_{CL}$-$_{MQ}$    drunk
      '(Two) students with John drunk sake by a group of three.'

In (16a), FQ expresses the number of the students, and hence the sentence describes a situation where three students and John drunk sake. In (16b), MQ indicates the number of people who take the action together. The total number of students is unknown, but the sentence describes that two students each time drank sake with John.

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[9] It is a puzzle why an MQ should agree with the subject semantically even though they do not have a direct relation.

## 3.4 Relative scope

MQs and FQs differ in terms of relative scope. FQs scope over the object, but blocks the scrambling effect. MQs always scope below the object or other VP-internal elements. First, consider (17), which illustrates that scrambling enable the reverse scope (scrambling effect, Miyagawa and Arikawa 2007, Yamashita 2001).[10]

(17) a. *San-nin no gakusei-ga   ni-hiki no  neko-o  mita.*
      3-$_{CL}$    of student-$_{NOM}$ 2-$_{CL}$   of  cat-$_{ACC}$ saw
      'Three  students saw two cats.'                          *3 > 2, \*2 > 3*
   b. *Ni-hiki no  neko-o   san-nin  no gakusei-ga   t  mita.*
      2-$_{CL}$    of cat-$_{ACC}$ 3-$_{CL}$     of student-$_{NOM}$     saw
      'Three students saw two cats.'                           *3 > 2, 2 > 3*

In contrast with DP-Q in (17), FQs block the scrambling effect:

(18) a. *Gakusei-ga  kinoo      san-nin   ni-hiki no  neko-o  mita.*        FQ
      Student-$_{NOM}$ yesterday 3-$_{CL-FQ}$     2-$_{CL}$     of  cat-$_{ACC}$ saw
      'Three students saw two cats.'                           *3 > 2, \*2 > 3*
   b. *Ni-hiki no   neko-o  gakusei-ga  kinoo      san-nin  t  mita.*     FQ
      2-$_{CL}$    of  cat-$_{ACC}$ student-$_{NOM}$ yesterday 3-$_{CL-FQ}$      saw
      'Three students saw two cats.'                           *3 > 2, ??2 > 3*

MQs, as in (19), always take the lower scope. It is predictable since a MQ is in the position that is seemingly lowest possible at the end of the derivation, as in (20).

(19) a. *Gakusei-ga  kinoo       ni-dai  no  kuruma-o san-nin  aratta.*        MQ
      student-$_{NOM}$ yesterday 2-$_{CL}$    of car-$_{ACC}$    3-$_{CL-MQ}$ washed
      'A group/groups of 3 students washed 2 cars yesterday.'    *\*? 3 > 2, 2 > 3*
   b. *Ni-dai  no  kuruma-o gakusei-ga  kinoo      san-nin  aratta.*        MQ
      2-$_{CL}$    of car-$_{ACC}$    student-$_{NOM}$ yesterday 3-$_{CL-MQ}$   washed
      'A group/groups of 3 students washed 2 cars yesterday.'    *\*? 3 > 2, 2 > 3*
(20) [$_{TP}$ NOM Adv [[$_{VoiceP}$ ACC [$_{VoiceP}$ $t_{NOM}$ [[$_{VP}$ $t_{Adv}$ MQ $t_{ACC}$ V ] Voice ]]] -T ]]

Thus, FQs and MQs show contrasts with regard to many semantic properties, and the differences can be accounted for by arguing that MQs are base-generated VP-internally, while FQs are at the Voice-level.

## 4.    Syntax of MQs and FQs

## 4.1   Base position and derivation

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[10] It has been pointed out, e.g., Fukushima (1993), that non-numeral quantifiers, e.g., *subeteno* 'all', *dono-mo* 'every', show different scope facts. Hence, I exclusively discuss numeral quantifiers here.

An FQ is base-generated as a VoiceP-level adverbial at (or around) positions of the subject (21) (Nakanishi 2007, 2008, Doetjes 1997).

(21) [$_{TP}$ Sub   yesterday [[$_{VoiceP}$ **FQ** [$_{VoiceP}$  *t$_{Sub}$* [[$_{VP}$ Obj  V ] Voice ]]] T ]]

Hence, an FQ is VP external: it is excluded from a preposed VP (22) and also from a VP ellipsis (23).

(22) VP-preposing (FQ)  (Nakanishi 2007)
    \*[$_{VP}$ *hutari  kono  kagi de   doa-o    ake* ]$_j$-*sae kodomo-ga*   t$_j$  *sita*
       2-$_{CL}$-$_{FQ}$ this   key  with door-$_{ACC}$ open even children-$_{NOM}$    did
    (Intended) 'Even open the door with this key, two children did.'
(23) VP-ellipsis (FQ)
    *Gakusei-ga kinoo     san-nin kono hon-o    yonda. Sensei-mo      soosita.*
    student-$_{NOM}$ yesterday 3-$_{CL}$-$_{FQ}$ this  book-$_{ACC}$ read.   teacher-$_{(NOM)}$-also  did so
    'Three students read this book yesterday. Teacher(s) did so, too.'

In (22), the FQ cannot be included in the preposed domain, and as in (23) it cannot be included in the elided domain, either; the number of teachers who read the book is unknown (although a preferred reading is one teacher).
    Since an MQ is a manner (VP) adverbial, it is base-generated within a VP, and the object moves beyond it (Kishimoto 2000, Ochi 2004, 2009)[11]

(24) a. *Base*      [$_{TP}$ ____  Adv          [[$_{VoiceP}$ Sub [[$_{VP}$ MQ Obj  V ] Voice ]] T ]]
    b. *Obj. Shift* [$_{TP}$ Sub Adv [[$_{VoiceP}$ Obj [$_{VoiceP}$ *t$_{Sub}$* [[$_{VP}$ MQ *t$_{Obj}$* V ]Voice ]]] T ]]

The claim that an MQ is VP-internal is also supported by the fact that MQ is included in a preposed VP (25) and that it can be included in a VP-ellipsis (26), in contrast with FQs.

(25) VP-preposing (MQ)
    [$_{VP}$ *Kono  kagi de      doa-o   hutari    ake* ]$_j$-*sae     kodomo-ga*  t$_j$  *sita*
       this    key  with door-$_{ACC}$ 2-$_{CL}$-$_{MQ}$  open even children-$_{NOM}$    did
    'Even open the door with this key together, children did.'
(26) VP-ellipsis (MQ)
    *Gakusei-ga kinoo     kono hon-o    san-nin yonda. Sensei-mo      soosita.*
    student-$_{NOM}$ yesterday this  book-$_{ACC}$ 3-$_{CL}$-$_{MQ}$ read.   teacher-$_{(NOM)}$-also  did so
    'A group/groups of three students read this book yesterday. Teachers did so, too.'

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[11] Following Ochi (2009) but contrary to Kishimoto (2000), I assume that the object shift in Japanese is an obligatory A-movement. This movement is consistent with the scope fact in (18). I also claim that the sifted object lands on VoiceP. As shown in (i), the sifted object scopes over an instrumental subject, which Kishimoto (2013) argues stays in-situ at the edge of VoiceP (the instrumental subject is scrambled in (i)).

  (i) *San-kumi no  huuhu-de     ni-dai no  kuruma-o   aratta.*
    3-$_{CL}$     of  couple-$_{INST}$  2-$_{CL}$  of  car-$_{ACC}$    washed
    '2 couples washed 3 cars.'                    ??*3 > 2, 2 > 3*

In (26), the total number of students and of teachers are unknown, but three students read the book in a group of three, and one of the readings of the second sentence is that teachers form a group of three and read the book.[12]

## 4.2  Distribution

FQs may appear around pre- and post-movement subject positions, and an FQ by itself can be scrambled (Yamashita 2001, Alam-Sasaki 1997), whereas MQs are restricted to the pre-verbal position. Since an FQ should obey the locality relation, it typically appears at the edge of the predicate (VoiceP) or of TP (27a, b). FQs can be scrambled as well (27c, d).[13] (FQs may not appear at the base position of the subject, however (see next section for details).

(27) The distribution of FQs

    a. *Kinoo      gakusei-ga  **san-nin**  iyaiya      kuruma-o aratta.*
       yesterday student-$_{\text{NOM}}$ 3-$_{\text{CL-FQ}}$ reluctantly car-$_{\text{ACC}}$    washed
       'Three students reluctantly washed a car yesterday.'
    b. *Kinoo gakusei-ga iyaiya **san-nin** kuruma-o aratta.*
    c. *Kinoo **san-nin** gakusei-ga kuruma-o aratta.*
    d. ***San-nin** kinoo gakusei-ga kuruma-o aratta.*
    e. **Kinoo gakusei-ga kuruma-o **san-nin** aratta.* (* as an FQ)

An MQ is confined to a pre-verbal position, and it resists scrambling.

(28) The distribution of MQs

    a. *Gakusei-ga kinoo    neko-o  **hutari**   mita.*
       student-$_{\text{NOM}}$ yesterday cat-$_{\text{ACC}}$ 2-$_{\text{CL}}$-$_{\text{MQ}}$ saw
       'A pair of students (together) saw a cat yesterday.'
    b. **?Gakusei-ga kinoo **hutari** neko-o mita.*
    c. **Gakusei-ga **hutari** kinoo neko-o mita.*
    d. ***Hutari** gakusei-ga kinoo neko-o mita.*

This distribution is consistent with a sentence containing a secondary predicate, which is base-generated between object and a verb:

(29) *Gakusei-ga kinoo    isu-o     hutari  akaku nutta.*
     student-$_{\text{NOM}}$ yesterday chair-$_{\text{ACC}}$ 2-$_{\text{CL}}$-$_{\text{MQ}}$ red    painted
     'A pair of students (together) painted a chair red yesterday.'

The grammaticality of (29), in which an MQ and verb is separated by a secondary predicate *akaku* 'red', is predicatable with the assumed structure and derivation in (30).

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[12] Since adverbs can be excluded from an elided domain (Takahashi 2008), (24) also allows readings such that a teacher read the book, and that some teachers read the book individually.
[13] Based on the specificity and distributivity, a numeral quantifier immediately preceding the subject (27c) is not a variety of DP-Q, but is in fact structurally separated from the subject, i.e., an FQ.

(30) [$_{TP}$ NOM Adv [[$_{VoiceP}$ ACC [$_{VoiceP}$ $t_{NOM}$ [[$_{VP}$ MQ [[ $t_{ACC}$ Adj ] V ]] Voice]]] T ]]

An MQ is base-generated above the object that passes over it. A secondary predicate is originally a sister of the object, being preceded by it. Unless the secondary predicate is scrambled, the MQ necessarily precedes it.

## 4.3   Passives

In direct passive sentences, FQs and MQs show clear contrast with respect to the location they may occupy. An FQ may not appear at/around the base position of a host nominal (i.e. a VP-internal position) in passives, (contra Bobaljik 2003, Miyagawa 1989, Saito 1985). Examine the following  examplefirst:

(31) *Gakusei-ga   yorokonde  ker-are-ta.*
     student-$_{NOM}$   joyfully      kick-$_{PASS}$-$_{PAST}$
     'Students were joyfully kicked.'

The passive sentence in (31) is ambiguous in terms of which predicate the adverb modifies: main verb or passive morpheme. When the adverb modifies the main verb, the agent of the action, which is not mentioned in the sentence, is joyful (32a). When the adverb modifies the passive morpheme, the sentence describe that being kicked was joyful for the subject, i.e., the student(s) (32b).

(32)  a. Adv $\rightarrow$ V:     [$_{TP}$ NOM [[$_{PassP}$ [$_{VP}$ **Adv** $t_{NOM}$ V ] -Pass] -T ]]
      b. Adv $\rightarrow$ Pass:  [$_{TP}$ NOM [[$_{PassP}$ **Adv** [[$_{VP}$ $t_{NOM}$ V ] -Pass]] -T ]]

This ambiguity vanishes, however, when the subject is modified by an FQ, as in (33), in which the adverb may not modify the main verb.

(33) *Gakusei-ga   yorokonde san-nin    ker-are-ta.*
     student-$_{NOM}$   joyfully       3-$_{CL}$-$_{FQ}$   kick-$_{PASS}$-$_{PAST}$
     'Three students were joyfully kicked.'
   a. *Adv $\rightarrow$ V:  [$_{TP}$ NOM [[$_{PassP}$ [$_{VP}$ **Adv** [[ *FQ* $t_{NOM}$ ] V ]] -Pass] –T ]]
   b. Adv $\rightarrow$ Pass: [$_{TP}$ NOM [[$_{PassP}$ **Adv** *FQ* $t_{NOM}$ [[$_{VP}$ $t_{FQ+NOM}$ V ] -Pass]] –T ]]

If the FQ in (33) is at or around the base position of the surface subject, the adverb is likely to be VP-internal as well and should be able to modify the main verb. The fact as in (33a) that an adverb may not modify the main verb beyond an FQ in direct passives suggests that the FQ is outside of the VP (34), which in turn requires the adverb outside of the VP as well, resulting in that the adverb can modify only the passive morpheme.

(34) [$_{TP}$ NOM [[$_{PassP}$ Adv *FQ* $t_{NOM}$ [[$_{VP}$ $t_{NOM}$ V ] -Pass]] –T ]]  (= 33)

In (34), the FQ is base-generated outside of the VP, and is licensed by the subject, establishing the locality relation, at the higher predicate level, i.e., Spec,PassP, where the subject drops by on the way to the surface subject position, Spec,TP. [14]

In contrast, when an MQ appears in the pre-verbal position in direct passives, the ambiguity sustains with respect to which predicate the adverb modifies:

(35) *Gakusei-ga* (*sensei-niyotte*) *yorokonde san-nin ker-are-ta.*
  student-$_{NOM}$ teacher-by  joyfully  3-$_{CL}$-$_{MQ}$ kick-$_{PASS}$-$_{PAST}$
  'A student was joyfully kicked by a group of 3 teachers.'
  a. Adv → V:  [$_{TP}$ NOM [[$_{PassP}$ [$_{VP}$ **Adv** *MQ*  *t$_{NOM}$* V ] –Pass ] –T ]]
  b. Adv → Pass: [$_{TP}$ NOM [[$_{PassP}$ **Adv** [[$_{VP}$ *MQ t$_{NOM}$* V ] –Pass ]] –T ]]

The ambiguity in (35) is straightforward since the MQ is base-generated in the VP-internal position and cannot be scrambled. The adverb may appear either VP-internally or in the higher predicate level (PassP).[15]

An MQ might modify the passive morpheme, meaning in a sentence in (35) that a group of three students experienced an event together. As expected, when the MQ modifies the passive morpheme, the ambiguity vanishes, since the adverb is necessarily outside of the VP, the MQ being at the higher predicate level:

(36) [$_{TP}$ NOM [[$_{PassP}$ **Adv** *MQ* [[$_{VP}$ *t$_{NOM}$* V ]-Pass ]] –T ]]

Thus, FQs and MQs show diverse syntactic properties that can be explained by the supposed structures and derivations: FQs are VP-externally, and can be scrambled; MQs are VP-internally, and cannot be scrambled.

## 5    "FQs" in the past studies and MQs

In this section, I briefly demonstrate how the analysis of MQs can be applied to analyses of numeral quantifiers in the past literature. In particular, I point out that some examples that were introduced in order to refute the locality restriction of FQs might in fact be MQs, and hence those examples should not be considered as a counterargument to the locality requirement. As mentioned repeatedly, an FQ should have a locality relation with the subject. The sentence in (37) is ungrammatical since the locality relation cannot be established.

(37) *\*Gakusei-ga kinoo  neko-o  hutari  mita*. (= 4)
  student-$_{NOM}$ yesterday neko-$_{ACC}$ 2-$_{CL}$-$_{FQ}$  saw
  (Intended) 'Two students saw a cat yesterday.'

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[14] This observation predicts that an FQ cannot be stranded in the base position in unaccusatives. It is not borne out as in (i), however, though the sentence does not sound fully natural.

(i) ?? *Gakusei-ga office-ni yorokonde **san-nin**  kita.*
  student-$_{NOM}$ office-to joyfully  3-$_{CL}$-$_{FQ}$  came
  'Three students joyfully came to the office.'

[15] This example shows another difference between FQs and MQs, namely, the latter may be associated with a nominal within PP (*by*-phrase in the example), while the former may not be associated with a host noun within PP (Inoue 1978, Miyagawa 1989, Okutsu 2007, Shibatani 1977).

Towards this restriction, a number of counterexamples have been introduced, arguing against the locality requirement of FQs (Downing 1993, Gunji and Hashida 1998, Mihara 1998, Naito 1995, Takami 2001, Tanaka 2008):

(38) ? *Gakusei-ga* <u>*sake-o*</u>   *imamadeni* **san-nin** *nonda.*
     student-<sub>NOM</sub> sake-<sub>ACC</sub> so.far     3-<sub>CL</sub>     drank
     'Three students so far drank sake.'     Gunji and Hashida (1998:57)
(39) *Kodomo-ga* <u>*butai de*</u> **zjuu-nin** *odotta.*
     child-<sub>NOM</sub>     stage at  10-<sub>CL</sub>     danced
     'Ten children danced at the stage.'     Takami (2001:129)
(40) *Kongakki-wa*     *nihonjin-ga*  *watasi no* <u>*koosu-o*</u>  **hutari** *zyukoositeiru*
     this.semester-<sub>TOP</sub> Japanese-<sub>NOM</sub> I     of  course-<sub>ACC</sub> 2-<sub>CL</sub>    taking
     'This semester, two Japanese are taking my course.'     Naito (1995:221)

Based on these observations, Takami (2001) and many others propose conditions and requirements of FQs: aspectual requirement, information (focus) structure, etc. In so doing these authors argue against syntactic accounts, in particular, based on the locality, of the derivation of FQs, and claim to shed light on semantic, pragmatic, or other understudies aspects of FQs.

    Introducing MQs is one of the possible accounts for counterexamples against distributional restrictions on FQs in (37). First, recall that (37) is acceptable when the sentence has a collective reading, i.e., the numeral quantifier functions as an MQ, such that a pair of two students together saw a cat yesterday. Similarly, some of the 'counterexamples' against the locality requirement of FQs in the literature, as in (38) through (40) in fact looks like MQs rather than FQs. Consider the following examples:

(41) a. *Kodomo-***tati**-*ga butai de* **zjuu-nin** *odotta.*    cf. (39)
       child-<sub>PL-NOM</sub>     stage at  10-<sub>CL</sub>     danced
       'The 10 children danced at the stage.'
   b. *Kodomo-ga* *2-tu no butai de* **zjuu-nin** *odotta.*
       child-<sub>PL-NOM</sub> 2-<sub>CL</sub> of  stage at  10-<sub>CL</sub>     danced
       'The 10 children danced at 2 stages.'        ***2 > 10, \*10 > 2***
   c. ?? *Korodomo-ga butai de* **zyuu-nin** <u>*kinoo*</u>    *odotta.*
        child-<sub>NOM</sub>     stage at  10-<sub>CL</sub>    yesterday danced
        'Ten children danced at the stage.'

The quantifier in (41) shows some properties that are observed with MQs: it is consistent with the specific reading that is brought by the pluralizer *–tati* (41a, Section 3.2); it does not cause the scrambling effect, and rather take scope below the VP-internal adverbial (41b, Section 3.4); it should be adjacent to the verbal predicate (41c, Section 4.2). Thus, the seemingly contradictory examples against the locality requirement are in fact MQs. If this analysis is on the right track, (at least some of) the counterarguments in the past studies with the data in (38) through (40) make much less sense.

    However, the same caution should go to one of the counterarguments against counterexamples, which is posited in Miyagawa and Arikawa (2007) to explain such data

as (38) throuth (40) and to defend account of FQs based on the locality.[16] Miyagawa and Arikawa argues that putting a pause after the object, a numeral quantifier may appear at the pre-verbal position:

(42) ? *Gakusei-ga sake-o* [**PAUSE**] SAN-NIN *nonda.*
     student-$_{NOM}$ sake-$_{ACC}$       3-$_{CL}$      drank
     'Three students drank sake.'         Miyagawa and Arikawa (2007: 651)

They further argue that the grammaticality of (42) is in fact achievable if we assume that both subjects and objects are scrambled, as in (43), although in so doing we further need to assume that the subject can be scrambled (contra Saito 1985) and the object can satisfy the EPP feature of T (Miayagwa 2001).

(43) [$_{TP}$ Sub [$_{TP}$ Obj [[$_{VoiceP}$ [$_{DP}$ FQ $t_{Sub}$ ] [[$_{VP}$ $t_{Obj}$ V] Voice]] T ]]]

In (43), After the object moves up to Spec,TP and check the EPP of T, the subject is scrambled over the object, leaving behind the quantifier. (Bobaljik 2003, Miyagawa 2001, 2010, 2012, Miyagawa and Arikawa 2007). However, The sentence is deteriorated when the quantifier is intervened by other VP-internal element, even though a pause is put before the quantifier:

(44) *? *Gakusei-ga sake-o* [PAUSE] SAN-NIN *gakkoode nonda.*
     student-$_{NOM}$ sake-$_{ACC}$       3-$_{CL}$     school at  drank
     'Three students drank sake at school.'      (*? for both FQ/MQ readings)

The fact that the quantifier and the verb cannot be intervened by a VP-internal adverb suggests that the quantifier is not an FQ, but in fact an MQ.[17]

## 6    Summary

I have demonstrated that, besides DP-Q and FQ, there is another type of numeral quantifier, i.e., Manner adverbial numeral quantifiers (MQ). I have catalogued syntactic and semantic properties of MQs, and demonstrated that MQs are different from FQs in many aspects. The table below is a brief summary of the properties discussed so far and of the comparison between MQs, FQs and DP-Qs (the properties of DP-Qs are cited from the past literature).

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[16] For another counterargument against the counterexamples, see Miyagawa (2012), which successfully and persuasively refute the counterexamples.
[17] Fascinatingly, a pitch pattern of a numeral quantifier that Miyagawa and Arikawa (2007: 664) presents through an experiment seems to be a Low-High pattern, which I assume the pattern of MQs, and which differentiates them from FQs.

(45)  3 types of quantifiers

|  | Dist/Coll | Specificity | Exhaustivity | Scope | Base | Derivation | Scrambling | Scr. effect |
|---|---|---|---|---|---|---|---|---|
| Section | 3.1 | 3.2 | 3.3 | 3.4 | 4.1 | 4.1 | 4.2 | 3.4 |
| **DP-Q** | Both | +/-- | +/-- | > Obj | Sub DP | Stay inside DP | * (ok for the whole DP) | * |
| **FQ** | Dist | -- | + | > Obj | VoiceP | Base-generated | ok | + |
| **MQ** | Coll | +/-- | +/-- | < Obj | VP | Object Shift | * | ?? |

These properties and differences between MQs and FQs are well accounted for by arguing that MQs are VP-level adverbial while FQs are VoiceP-level adverbial, and that each type of the quantifiers is subject to its own rule. I also demonstrated that some examples labelled FQs are in fact not FQs, but MQs. In so doing, I pointed out that numeral quantifiers that (seem to) modify a host noun remotely are not necessarily FQs.

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