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Two nouns in partitives: evidence from Japanese

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We consider the proposal that partitives always contain two positions for nouns which may be filled by silent material from the perspective of Japanese. We argue that it provides a novel account for cases of quantificational expressions that are frequently marked with genitive case in Japanese. Genitive case attached to nouns marks possession or partitivity, but on quantifiers it has been previously regarded as purely morphological. We show that genitive case on quantifiers can be analyzed as regular genitive case, and identify two distinct structures based on the two noun partitive structure. Specifically, we claim that the genitive suffix can be stranded by NP ellipsis, but when it can attach to a preceding quantifier the structure remains grammatical. Our analysis therefore supports an analysis of partitives assuming two noun positions where ellipsis can target one or both of those two nouns.

1 Introduction

The semantics of partitivity can be attributed to a preposition or case-morpheme at least in some languages: in English, the preposition *of*, and in German, genitive case or the preposition *von*. But these morphemes or case-markers frequently have other uses too, e.g. *of* in possessives (*the house of a doctor*) and with measurements (*three cups of rice*). One research question is therefore to understand how the different uses of the morphemes used in partitives are related. We take up this type of question in Japanese. In Japanese, the genitive case particle *no* occurs in partitives. We first argue below in Section 2 that in what we call *plain partitives*, the genitive case particle *no* carries the meaning of partitivity. Japanese plain partitives are illustrated by (1). In (1), *no* is attached to a noun and a quantifying expression follows.

(1) John-wa hon-no {san-satu-o / subete-o / hotondo-o} yonda
     John-TOP book-GEN {three-CL.volume-ACC / all-ACC / most-ACC} read.PAST
     'John read three / all / most of the books.'

The main concern of this paper is the *Q+no*-structure in Japanese, which is illustrated by (2). (2) uses the same lexical material as the plain partitive in (1), but the order of the noun and quantifying expression is reversed. In (2), *no* is attached to the quantifying expression, followed by the noun. In addition, the interpretation of (2) differs from the one for (1), as we discuss below.

(2) John-wa {san-satu-no / subete-no / hotondo-no} hon-o yonda
     John-TOP {three-CL.volume-GEN / all-GEN / most-GEN} book-ACC read.PAST

We argue in this paper that *Q + no*-structures like (2) should be analyzed as *reverse partitives* following Sauerland & Yatsushiro (2004). The reverse partitive analysis is based on an analysis that two nouns are present in partitives (Jackendoff 1977 and others) – we'll call this the *two noun analysis* in the following. Under this type of analysis, all the occurrences of *of* in (3) have the same semantics, and where indicated by strikeout, a silent noun is present (after Sauerland & Yatsushiro 2004: 104–105). The precise content of the silent noun is determined by general principles of ellipsis, but two options are the following: 1) it is the same lexical item as an overt noun that occurs overtly in the structure or the context (i.e. *book* in (3)), or 2) it is a bland general noun such as *things* (count) or *stuff* (mass).[1]

(3) a. two books/things of all the books Gina has
     b. two ~~books/things~~ of the books   *(plain partitive)*
     c. two books of all those ~~books/things~~ Gina has *(reverse partitive)*
     d. two ~~books/things~~ of those ~~books/things~~

(In (3a): *unit NP* labels "books/things"; *whole NP* labels "the books Gina has".)
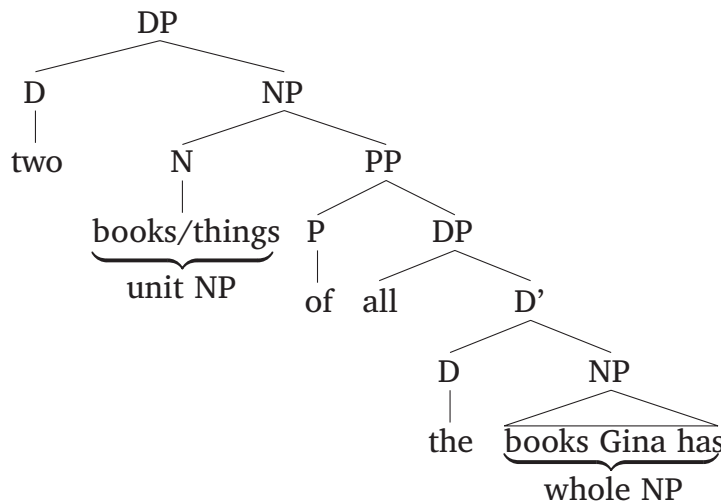
In the following, we use the terms *unit noun/NP* and *whole noun/NP* for the two nouns occurring with partitive *of* as illustrated in (3a): the whole noun/NP is part of the phrase that *of* takes as its complement, and the unit noun/NP is the sister of the phrase projected by *of*.

Are all four structures predicted to be available in Japanese as well? Japanese is predicted to allow, like English, two overt nouns as the head of the unit and whole NP, and example (4) seems to attest this possibility (see also (17) below).[2]

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[1] The two noun analysis, as we construe it here, is rather weak. It is quite conceivable that the noun in either of these positions is only a nominal feature such as [mass] or [N]. A similar case where only a feature fills a noun position comes from German demonstrative pronouns. German demonstrative pronouns involve NP-ellipsis (Patel-Grosz & Grosz to appear, and others), but a demonstrative pronouns can refer to female referents that were introduced by a grammatically neuter noun as in (i). Here the description accompanying the demonstrative pronoun must correspond to the interpreted feminine feature, i.e. the requirement of having natural gender feminine. Similarly, we regard any analysis that treats all data in (3) along the same lines as a silent-noun analysis regardless of how underspecified the elided noun is allowed to be.

(i) *German*
     Er hat ein Mädchen   gesehen. Die   war mit dem   Fahrrad unterwegs.
     he has a   girl.[NEUT] seen   the.[FEM] was with the   bike   on the road
     'He saw a girl. She was riding her bike.'

[2] Structures such as (4) and its English counterpart are felt to be marginal because of the redundancy of repeating the noun. We leave it to future work to find out when structures like (4) are acceptable.

(4)

```
          whole NP                        unit NP
     ⌢⌢⌢⌢⌢⌢⌢⌢⌢⌢⌢⌢⌢⌢⌢⌢⌢          ⌢⌢⌢⌢⌢⌢⌢
     [densya-ni notteita] hito-no    (uti)   kaisayin 3-nin
     train-on was.riding person-GEN  (among) worker   3-CL.PEOPLE
```

'Three company workers of the people who were riding the train.'

Plain partitives would also be predicted and are indeed attested: one possible analysis within the silent noun analysis of partitives is shown in (5). In this structure, the unit NP *hon* (for *hon-no san-satu-o* in (2)) is deleted. The content of the silent unit noun is restricted by the classifier in Japanese, therefore, a direct translation of the English example in (3b) where the deleted noun is understood to be *things*, for example, is not possible, and as a result, (1) could not be analyzed as deletion of *mono* ('thing(s)'), but as deletion of *hon*.

(5)

```
        whole NP      unit NP
         ⌢⌢⌢         ⌢⌢⌢⌢⌢⌢⌢⌢⌢⌢⌢⌢⌢
        hon    -no   ~~hon~~ / * ~~mono~~ san-satu-o        (plain partitive)
```

For reverse partitives the prediction is different. Consider (6): deletion of the whole NP *hon* in (3) instead of the unit NP, is expected to be ungrammatical in Japanese since it would strand the genitive case suffix *no* as predicted by the stray affix filter of Chomsky (1955).[3]

(6)   * ~~hon / mono~~-no hon san-satu-o   *(reverse partitive)*
         book/thing-GEN book 3-CL.VOLUME-ACC

But, the prediction of the two noun analysis is more intricate – it doesn't always rule out reverse partitives, but if there is a way to rescue *-no* from being stranded, reverse partive structures should become acceptable.

Our main goal in this paper is to show that the prediction of the two noun analysis for Japanese partitives is borne out: Reverse partitive structures are possible in Japanese. In fact, we claim that there are two such cases: the low-Q scenario and the high-Q scenario. The low-Q scenario arises when a quantifier is associated with the whole NP. Then the quantifier can host the suffix *-no* and thereby rescues the reverse partitive structure. We argue below that (7) exemplifies the low-Q scenario (see (37))[4].

(7)   (adapted from Inoue 1978, cited in Watanabe 2008)
         Narande   hasitteita   suu-dai-no   torakku ni-san-dai-ga
         lined-up   were-running   several-CL-GEN truck   two-three-CL-NOM
         gaadoreeru-ni butukatta
         guardrail-LOC struck
         'Two, three of the many trucks that were running abreast struck the guardrail.'

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[3] We assume that deletion of *no* is not possible since it has semantic content that cannot be easily recovered in this case. Note that the following expression, without no is grammatical, although it lacks the partitive reading:

(i)   hon 3-satu-o
      book 3-CL-ACC

[4] We have looked for cases of the low-Q scenario without an initial relative clause, but unsuccessfully so far. In particular, the almost literal translation of (3d) could have been relevant. But the demonstrative *sono*, which can be followed by overt nouns, generally doesn't seem to license NP-ellipsis unlike English *that* as shown by (ii). Hence, it is expected that only the demonstrative *sore* without NP-ellipsis can occur in (i), but this isn't relevant to the low Q scenario because *sore* is a full DP on its own.

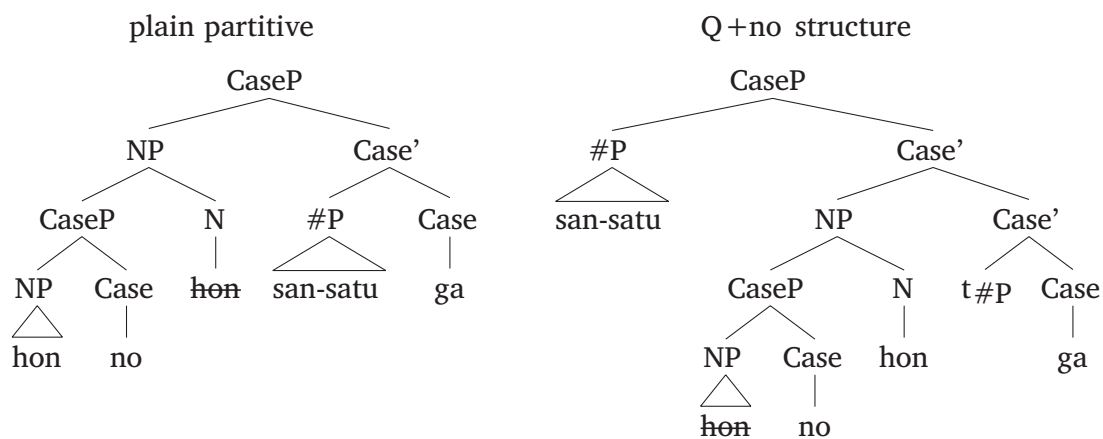(i)   sore-no   / *sono-no   ni-mai-ga   hoshii
      that-GEN   / that-GEN   two-CL.SHEETS-NOM   want
      'I want two of those.'

(ii) A: sono hon-ga   sukidesu.   B: boku-wa sore-ga   / *sono-ga   sukidesu.
         that book-NOM like.   I-TOP   that-NOM / that-NOM like.
      A: 'I like that book.' (pointing at book 1) B: 'And I like that.' (pointing at book 2)

The second, more controversial case of reverse partitives we propose are the Q+*no* structure like (2) mentioned above. Specifically, the reverse partitive analysis for Q+*no* structures assumes that *no* in (2) does not semantically combine with the quantifying expression, but with a silent noun that is the whole noun of a partitive structure. Our analysis assumes furthermore that the quantifying expression *san-satu* is associated with the unit noun of this partitive structure (hence our term, *the high-Q scenario*) and moves to a position in front of *no*, thereby rescuing *no* from being stranded. The reverse partitive analysis is exemplified for *san-satu-no hon-o* in (8).

(8)   san-satu [~~hon~~-no hon ~~san-satu~~]-o

Plain partitives and Q+*no* structures can have the same underlying structure as the comparison of (5) and (8) shows. The two differences are: 1) the unit noun is deleted in plain partitives, while the whole noun is deleted in Q+*no* structure, and 2) the quantifying expression moves in Q+*no*.

plain partitive

```
                CaseP
           ┌──────┴──────┐
          NP            Case'
        ┌──┴──┐       ┌───┴───┐
      CaseP    N     #P      Case
     ┌──┴──┐   │    ╱─╲       │
    NP   Case  hon san-satu   ga
    ╱╲     │
   hon     no
```

Q+*no* structure

```
                CaseP
           ┌──────┴──────┐
          #P            Case'
           │        ┌────┴────┐
        san-satu   NP        Case'
                 ┌──┴──┐    ┌──┴──┐
               CaseP   N   t#P   Case
              ┌──┴──┐  │          │
             NP   Case hon        ga
             ╱╲    │
            hon    no
```

These syntactic differences between the two structures explain other differences as we show below. In particular, the fact that the whole noun is deleted in Q+*no* structures allows it to be a bland general noun, which predicts that Q+*no* structures do not exhibit a typical partitive meaning where a proper subset relationship is apparent.

Though the bulk of the paper concerns the reverse partitive analysis of Japanese Q+*no* structures, this argument is a part of our argument for the two noun analysis of partitives. In section 2, we discuss plain partitives and other structures with quantified nouns. In section 3, we lay out the problems with the structure we call Q+*no*. In section 4, we explore the analysis of Q+*no* structures, and argue for our approach to analyze them as reverse partitives. In section 5, we discuss data from possessor raising constructions in Japanese, and argue that the restriction of possessor raising to plain partitives supports our analysis of the partitive and Q+*no* constructions. In section 6, data with non-monotonic measures are discussed, concluding that there is syntactic evidence supporting that this type of construction, although they have similar surface appearances, differs from *Q+no*-structures. The conclusion in section 7 relates our discussion of Japanese to cross-linguistic issues in the analysis of partitives.

2 Japanese plain partitives and related structures

A typical partitive noun phrase in English consists of a numeral, the genitive marker *of*, and a definite noun phrase. Consider (9). In (9), *three of the books* in (9a) is a typical partitive NP, which contrasts with the plain numeral NP in (9b), *three books*.

(9) a. John read three of the books
     b. John read three books

What is a corresponding Japanese contrast? Japanese differs from English in many ways. For one, definiteness is not marked morphologically in Japanese, and therefore, we expect that genitive case alone might mark the partitive. The contrast in (10) confirms that this expectation is borne out:

(10) a. John-wa   hon-no   san-satu-o   yonda
         John-TOP book-GEN   three-CL.VOLUME   read.past
         'John read three of the books'

      b. John-wa   hon   san-satu-o   yonda
         John-TOP book   three-CL.VOLUME   read.past
         'John read three books'

Specifically, the data in (10) are semantically parallel to that of a partitive and a plain numeral noun phrases in English: the English partitive in (9b) and the Japanese counterpart in (10a) require that there be a salient set of more than three books that the three books that John read are a part of. We call this the *Proper Parthood Requirement* in the following.[5] The proper parthood requirement doesn't obtain in English example in (9b), which lacks *of*, and (10b), where the genitive marker is absent. Japanese linguists (Inoue 1978; Haig 1980 and others) have used the term *Partitive* for examples like (10a) for good reasons. We agree with Watanabe (2008) and assume that (10a) is an *unambiguously partitive structure* of Japanese. In the following, we refer to such structures as the *Plain Partitives* as we do for the English analogous structure in (3b).

   For concreteness, we adopt the analysis of Ionin et al. (2006) for English to the Japanese plain partitives. We assume that Japanese nouns are of type $\langle e, t \rangle$, but that the silent maximality operator max in (11a) can apply to a noun and return a meaning of type e similar to the definite determiner in English. For the particle *no*, we assume the interpretation (11b), where we use the notation $\sqsubseteq$ for parthood in the mereological lattice of individuals.

(11) a. $[\![\text{max}]\!] = \lambda f_{et} . \max\{x \mid f(x) = 1\}$
      b. $[\![\text{no}]\!] = \lambda x_e \lambda y_e . y \sqsubseteq x$

Now consider the numeral and classifier *san-satu*. For our present purposes, a detailed discussion of numeral classifiers would require too much space (see Scontras 2014b and others). Instead, we simply use the semantics of English bare numerals by Spector (2013) for Japanese numerals. For example, we assume that the phrase consisting of the numeral *san* and the classifier *satu* is interpreted as the predicate that is true of entities with cardinality three or greater, as in (12).

(12) $[\![\text{san-satu}]\!] = \lambda x_e . (\#(x) \geq 3)$

With these three lexical entries, the plain partitive structures in (13a) and (13b) can be interpreted. (13b) differs from (13a) in that it contains the elided whole noun *hon*. But, the interpretation of (13a) and (13b) does not differ because the phrase *hon-no* has the

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[5] Though one reviewer reports to not perceive the proper parthood requirement for (10), we haven't found another Japanese speaker with such a judgment. Further clear evidence for this constraint comes from the contrast in (i), where the partitive suggest that the speaker has three or more eyes.

(i) me   (#-no)   futatu-ga   itai
     eyes   (#GEN)   two-NOM   hurt
     'My two eyes hurt.' vs. #'Two of my eyes hurt.'

same semantic type and even the same denotation as the bare noun *hon*, as in (10a). When *hon-no* and *hon* are combined by predicate intersection in (13b), the result is identical to (13a). The interpretation of the plain partitive of (10b) is shown in (13c).

(13)   a.   [[hon$_{et}$ max no]$_{et}$ san-satu$_{et}$
        b.   [[[hon$_{et}$ max no]$_{et}$ ~~hon~~]$_{et}$ san-satu$_{et}$
        c. $\lambda x_e(x \sqsubseteq \max\{x \mid \text{book*}(x) = 1\}$ & CARD(x) $\geq$ 3)

If we assume that the noun *hon* is true of both singular and plural entities consisting entirely of books (Sauerland et al. 2005) as indicated by the distributive *-operator in (13c), the interpretation derived in (13) is identical to that of *hon san-satu-o*. In other words, the semantics of the partitive we adopt does not directly capture the proper parthood requirement illustrated in (10). However, Ionin et al. (2006) show that the same holds for their semantics of partitive (*three of the books*) vs. the bare numeral (*three books*) pairs in English, and they argue that the proper parthood requirement is actually due to pragmatics (see also Sauerland & Yatsushiro 2004: fn. 6). Specifically note that in a situation where only three books are salient, the indefinite phrase *three of the books* violates the pragmatic principle such as maximize presupposition (Heim 1991; Sauerland 2008) and only *the three books* is predicted to be acceptable. The pragmatic approach also correctly predicts that fractions such as *100% of the books* and what Ionin et al. (2006) call pronominal partitives like *the two of us* are acceptable though *of* here can only express improper parthood.

A second parallel between English partitives and Japanese plain partitives is that both exhibit evidence for the *Partitive Constraint* (Barwise & Cooper 1981; Ladusaw 1982 and others).[6] For English partitives, the partitive constraint is motivated by the illformedness of examples like those in (14). The generalization is that the NP after *of* must be a definite.

(14)   *I met one of { both / every / most / Ø / many } child(-ren).

Because Japanese lacks overt morphology for definiteness, it is rather difficult to detect the effect of the partitivity constraint. For example, the phrases in (15) are both grammatical though the noun phrase that the partitive *-no* is attached doesn't contain an overt definite determiner.

(15)   a.   kodomo-tati-no   hitori
              child-PL-GEN   one.person
              'one of the children'

        b.   takusan-no kodomo-tati-no hitori
              many-GEN   child-PL-GEN   one.person
              'one of the many children'

Evidence for the partitive constraint in Japanese plain partitives come from the examples in (16). In all three examples, the argument of the partitive *-no* is a quantifier, specifically

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[6] A third semantic or pragmatic property of English partitives is illustrated by the illformedness of (i) (Ladusaw 1982). Barker (1998) introduces the term *Anti-uniqueness requirement* for the condition that a partitive DPs cannot be definite unless there is an additional re- strictor such as the relative clause in (ii). Since the anti-uniqueness requirement follows from the proper parthood requirement (Barker 1998), we expect it to apply in Japanese as well. However, the lack of definiteness marking in Japanese makes it impossible to actually probe for effects of the anti-uniqueness constraint in Japanese.
(i)   *I met the one of John's friends.
(ii)   I met the one of John's friends that he traveled with from Mexico.

the quantifier *ryoohoo* ('both') (16a), a universal quantifier *dono … mo* ('every') in (16b),[7] and the proportional quantifier *hotondo* ('most') in (16c).[8]

(16) a. *kodomo   ryoohoo-no hitori
          child   both-GEN   one.person

      b. dono   kodomo-mo-no   hitori
          INDETERMINATE child-universal-GEN one.person

      c. *hotondo-no   kodomo-no   hitori
          most-GEN   child-GEN   one.person

In sum, our discussion of plain partitives in Japanese showed that the particle *no* in plain partitives should be analyzed in the same way as English *of* in partitives. Specifically, we assumed that partitives contain in principle two nouns: the unit NP and the whole NP. In Japanese plain partitives the whole NP is pronounced while the unit noun is elided under identity with the whole noun.

A two-noun analysis of partitives makes three predictions that need to be verified for Japanese: 1) it should be possible to pronounce a noun in the position where elided nouns occur in plain partitives; 2) if ellipsis of a unit noun that is not identical to the whole noun is licensed, different interpretations of partitives should be available, and 3) ellipsis of the whole noun instead of the unit noun should be possible.

Concerning prediction 1, we observed in 1 that English partitive *of* allows structures where the pattern of ellipsis is different from the standard partitive. For Japanese, consider first the possibility of pronouncing both a higher anda lower noun. When the nouns are both modified as shown in, it is possible to overtly pronounce the whole noun and the unit noun.[9]

(17) tosyokan-no hon-no   kooka-na   hon   10-satu
      library-GEN book-GEN   expensive book   10-CL.VOLUME
      '10 expensive books of the library books'

Next consider the second prediction noted above, namely, that ellipsis of a unit noun different from the whole NP should be possible in plain partitives when an antecedent is accessible. That this is possible in English is shown in (18). In (18), the unit noun *dozens* is elided on the basis of the interpretation.

(18) She bought two dozen of the magazines and three ~~dozens~~ of the books.

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[7] We cannot address the internal structure of quantificational noun phrases containing indeterminate pronouns in Japanese such as (16b) in this paper, but refer to the work of Shimoyama (2006), Yatsushiro (2009), and others.

[8] In English and also in Japanese, some violations of the partitive constraint become acceptable with *out of* and *uti no* respectively, as in (i). One reviewer observes a similar improvement of (16c) when *uti* is inserted in front of *hitori*.
(i)   Three *(out) of four students like the class.

[9] In Sauerland & Yatsushiro (2004), because of ill-formedness of the example in (ia), we formulated the generalization that it is not possible to pronounce both the whole and unit nouns in Japanese, and concluded that the application of NP-deletion is obligatory. We thank Yoichi Miyamoto for leading us to the example in the main text. It seems that the sequence *hon-no hon* is causing the example to be ill-formed, as insertion of *kookana* 'expensive', as in (ib), improves the grammatical status of (ia).

(i) a. *Gina-ga   motteiru (subete-no) hon-no   hon   san-satsu-o
         Gina-NOM   has   (all-GEN)   book-GEN   book   three-CL.VOLUME-ACC
     b. Gina-ga   motteiru (subete-no) hon-no   kookana   hon san-satsu-o
         Gina-NOM   has   (all-GEN)   book-GEN   expensive book three-CL.VOLUME-ACC
         'three expensive books of all the books Gina has'

Further evidence for the presence of an elided unit noun comes from grammatical gender in the German example in (19). The neuter gender on the determiner *eines* ('one') must be licensed by the presence of a neuter noun. The noun *Rose* ('rose'), however, is grammatically feminine. Hence, the neuter noun *Dutzend* ('dozen') must be covertly present.[10]

(19)　*German*
　　　Sie　　hat　zwei　Dutzend　der　　Tulpen　und　eines　　Dutzend
　　　she　　has　two　dozen.NEUT the.GEN tulips　and　one.NEUT dozen
　　　der　　Rosen　　gekauft
　　　the.GEN roses.FEM　bought.
　　　'She bought two dozens of the tulips and one of the roses.'

In Japanese, a similar argument for the presence of different elided unit nouns comes from the cases where the classifier doesn't match the whole NP as in (20).

(20)　kazoku-no　　san-nin
　　　family-GEN　　three-CL.PEOPLE
　　　'three people of the family'

Finally, consider reverse partitives, where the whole NP is elided. While this is possible in English as we saw in (3), this seems impossible in Japanese, as illustrated by the ungrammaticality of (21). But the ungrammaticality of (21) is not surprising because the genitive case suffix *-no* is stranded because there is no phrase preceding it that it could attach to. The morphological requirement of affixes to have hosts (the *Stray Affix Filter* of Chomsky 1955), hence, rules out structures like (21) in Japanese.

(21)　*John-wa　~~hon~~-no　　(hon)　sansatu-o　　yonda
　　　John-TOP　~~book~~-GEN book　three-CL-ACC　read.PAST

But, we argue in this paper that whole-NP ellipsis is possible in Japanese after all. Namely, we propose in section 4 that Q + *no* structures should be analyzed as derived from (21) by moving the quantifier *san-satu* to the position preceding *-no*. We claim that this derivation is preferable to other current account of such structures. In the following section, we introduce the Q + *no* structures.

3 The puzzle of Q+*no* structures

A Q + *no* structure uses morphemes with the same sounds as a plain partitive, but with a different word order as shown in (22) (see also (5) above). Before we address the analysis of Q + *no* structures in detail, consider briefly Japanese noun phrases and *no* more broadly.

(22)　John-wa　　san-satsu-no　hon-o　　　yonda
　　　John-TOP　3-CL-GEN　　book-ACC　read.PAST
　　　'John read 3 books'

Is the morpheme *-no* in the Q + *no* structure actually the same as the *-no* in the plain partitive? We will conclude at the end of this paper that this is indeed so, but this identity cannot be assumed without additional arguments. Most work on the Japanese DP assumes the opposite (e.g. Inoue 1978; Kobuchi-Philip 2007; Watanabe 2008, and others) as does

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[10] In English, a similar argument can be made using the mass/count distinction of nouns on the basis of data such as (i) and (ii). Because the whole NP doesn't match the determiner's mass/count selection, the elided unit noun in (i) and (ii) cannot be the whole NP, but must instead be the one indicated.
　(i)　She read much ~~content~~ of the books.
　(ii)　As for glasses, she drank many ~~glasses~~ of milk.

work on similar structures in Korean for the morpheme *-uy* (GEN) (Shin 2009).[11] Japanese *-no* seems to be a polyfunctional morpheme (Murasugi 1991 and others), so the morphophonological identity of the two occurrences of *-no* in (10) and (22a) may be accidental. (23) shows some other constructions in Japanese where *-no* occurs: (23a) shows *-no* as a possessive argument of the noun *hon* ('book'). (23b) show *-no* occurring as an empty noun following an adjective similar to *one* in English. In (23c), *-no* also is an empty noun but here follows a relative clause. And, *-no* in (23d) might be analyzed as a nominalizer similar to the English gerund *-ing* (Kuno 1983; Sakai 2000 and others).

(23) a. Lina-no   hon-ga   omosiroi.
          Lina-GEN   book-NOM   is.fun
          'Lina's book is fun.'

      b. akai-no-ga   omosiroi
          red-NO-NOM   interesting
          'The red one is interesting.'

      c. Ima   yonderu-no-ga   omosiroi
          now   read.PROG-NO-NOM   interesting
          'The one I'm reading is interesting

      d. Taroo-ga   [Mary-ga   naku]-no-o   mita
          Taro-NOM   Mary-NOM   cry-NO-ACC   saw
          Roughly: 'Taro saw Mary's crying.'

Furthermore, the possessive use of *-no* in (23a) extends further than that of Genitive*'s* and *of* in English as shown by (Saito et al. 2008: 253–255). For example, (24a) isn't directly translateable using an English possessive, and in (24b) *-no* combines with appears to be a postposition and furthermore more than once.

(24) a. ame-no   hi
          rain-NO   day
          'a rainy day' (lit. 'a day of rain')

      b. Taroo-no   Yooroppa-e-no   ryokoo
          Taroo-NO   Europe-to-NO   trip
          Taroo's trip to Europe (lit. 'Taroo's trip of direction Europe')

Finally, some occurrences of *-no* are difficult to assign to any of these categories. For instance, *-no* in (25) seems to simultaneously serve as a possessive marker and as an empty noun. Note that two occurrences of *-no* as in (25b) are ungrammatical (Poser 1984: 178).

(25) a. Lina-no-ga   omosiroi.
          Lina-NO-NOM   is.fun
          'Lina's is fun.'

      b. *Lina-no-no-ga   omosiroi.
          Lina-NO-NO-NOM   is.fun

The broad distribution of *-no* has generally motivated accounts where *-no* within the noun phrase has no specific semantic content, but should be analyzed as a morphological linker inserted at certain positions in the noun phrase (Kitagawa & Ross 1982; Saito et al. 2008; Watanabe 2010). In addition, homonymous lexical entries would account for the occurrences in (23b) to (23d). Such a stipulative account may indeed be the best one can do

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[11] Note though that the fact that both Japanese *no* and Korean *-uy* occur in plain partitive and Q + *no*-structures argues in favor of the identity of the two morphemes as we propose it.

for cases like (24), which we don't address in this paper. But note first that *no*-insertion must be limited in Japanese: *No* cannot be inserted with adjectives as shown by (26), so a restriction of -*no* insertion to NPs and some PPs excluding quantifiers as well as adjectives wouldn't be unnatural.

(26)   utukushi-(*no)   hana
         beautiful-(*NO)   flower
         'a beautiful flower'

That the Q + *no* structures seem to be still of a different kind is also shown by a comparison with English possessives. In English, *a day of rain* is still conceivable with the interpretation *a rainy day,* but *people of most* cannot be related to *most people* even in a poetic mood. Two further pieces of evidence against treating *no* in Q + *no* structures in the same way as in (24) and (25) come from interpretation and ellipsis. For interpretation, Sauerland & Yatsushiro (2004) observe that the interpretation of a Q + *no* structure sometimes differs from that of a corresponding phrase without *no* as we discuss below in section 4. Secondly, Saito et al. (2008) and Watanabe (2010) show that Q + *no*-structures differ with respect to noun ellipsis from possessives as illustrated (27). In (27a), the ellipsis of *ondo* 'temperature', which is head of the possessor phrase, is licensed, whereas in (27b), where the noun *hon* 'book' is in Q + *no* strucutre, it cannot be elided.[12]

(27)   a.   Kyoo-no   ondo-wa   kinoo-no   ~~ondo~~   yori-mo   takai
             today-NO   temperature-TOP   yesterday-NO   than   high
             'Today's temperature is higher than yesterday's.' (Saito et al. 2008: 254)

       b. *Taroo-wa   iti-niti-ni   san-satu-no   hon-o   yomu ga,
             Taroo-TOP   one-day-in   three-CL-NO   book-NO   read though,
             Hanako-wa   go-satu-no   ~~hon-o~~   yomu
             Hanako-TOP   five-CL-NO   book-ACC   read
             'Taroo reads three books in a day, but Hanako reads five.' (Saito et al. 2008: 254)

Does the difference in word order between plain partitives and Q + *no* structures preclude a partial unification the two? Possibly not, because word-order within Japanese quantified nominals is quite flexible even when -*no* doesn't occur (Inoue 1978; Miyagawa 1989; Kawashima 1998; Watanabe 2006; 2008, and others). The three orders shown in (28) are all grammatical and correspond to the same English translation. Specifically, (i) the noun can precede the numeral as in (28a); (ii) the noun and the numeral can occur the other way round as in (28b); and the phrasal case marker -o could occur following the noun, but before the numeral in the *Quantifier Float* structure as in (28c).

(28)   a.   John-wa   hon   san-satu-O   yonda
             John-TOP   book   three-CL-ACC   read
             'John read three books.'

       b.   John-wa   san-satu   hon-O   yonda
             John-TOP   3-CL   book-ACC   read
             'John read three books.'

       c.   John-wa   hon-O   san-satu   yonda
             John-TOP   book-ACC   three-CL   read
             'John read three books.'

---

[12] Saito et al. (2008) show that some apparent possessives don't license NP ellipsis, for instance, structures like (24a). They propose an explanation based on the syntactic argument/adjunct distinction.

The order variations illustrated in (28) can also occur in the subject argument position, and the orders in (28a), (28b), and (28c) are generally interchangeable in other positions where they can occur. Hence, it is natural to try to relate the orders transformationally. The relation between (28a) and (28b) is important for what follows, but before we discuss that, briefly consider (28c). It is assumed widely that (28c) is derived by a movement transformation from either (28a) (for example, Haig 1980) or (28b) (for example, Miyagawa 1989), although others have proposed that (28c) is not transformationally related to either (28a) or (28b). According to the latter analysis, *san-satu* is an adverbial in (28c) instead. Nakanishi (2007; 2008) reviews the two sides of the argument concerning (28c). The analyses in our paper, however, is compatible with either the movement analysis or the adverbial analysis.

For the structures for (28a) and (28b), we adopt elements of Watanabe's (2006; 2008) analysis, in which (28a), (28b), and (28c) are related by movement operations. We refer to the leftward movement of quantifier as *Q-Inversion* in the following, and assume that it derives (28b) from (28a) via movement of the numeral-classifier phrase *san-satu* to the left. Watanabe argues that both (28a) and (28b) are derived from the underlying structure of the object constituent in (29), which he assumes to be at least a QP headed by an empty Q head.[13]

(29)   Structure of QP
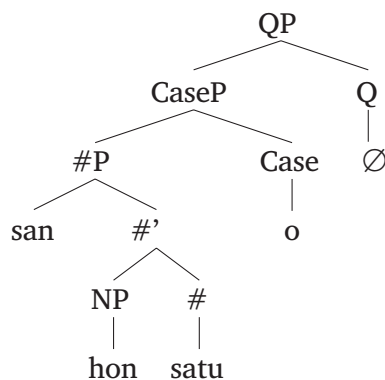
The base word-order shown in (29), however, is ungrammatical in Japanese. Watanabe proposes several instances of movement to the left that can apply to (29). The first one is obligatory in Japanese and takes the NP, *hon* in (29), to the specifier of CaseP via an outer specifier of #P. Though Watanabe assumes that this movement involves two steps, he then goes on to represent the movement as a single step, and we follow him in this respect. (30a), therefore, shows the derivation for (28a). (30b) is derived from (30a) by applying Q-inversion, which is an optional movement of the #P to a higher position in the CaseP.

(30)   a.   [hon]$_{NP}$ [san t$_{NP}$ satu-o]$_{CaseP}$

        b.   [san t$_{NP}$ satu]$_{\#P}$ [hon]$_{NP}$ t$_{\#P}$ -o]$_{CaseP}$

The derivation in (30b) creates the apparent word-order configuration of : *san-satu* precedes *hon-o*. Watanabe, however, adopts the proposal of Kitagawa & Ross (1982) that (30b) must undergo insertion of *-no* in the derivation of the phonetic form (see also Saito

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[13] Watanabe assumes a D-layer above the QP with an empty D-head. We opted not to represent this layer here but our analysis is compatible with its presence as well as its absence.

et al. 2008). As a result, (30b) is pronounced as *san-satu-**no** hon-o*, i.e. the Q + *no* structure. For Watanabe, (28b), without *no*, can only be derived by further movement from the structure in (30): namely, (28b) is derived from (30b) via two further leftward movement, first of the NP *hon* to yield (28c) and then of *san-satu*. Watanabe proposes that movement of *hon* outside of the QP blocks insertion of *-no*, and this derives (28b). We pursue instead the proposal that morphological insertion of *-no* without semantic import is restricted to non-quantifiers. This predicts correctly that (30b) can be pronounced without insertion of *-no*, i.e. as (28b). An initial motivation for this departure from Watanabe's proposal is provided by the paradigm in (31) (mentioned in passing in Sauerland & Yatsushiro 2004, fn. 3):

(31)　a.　John-wa　hon　{%ooku-o / %subete-o / %hotondo-o / san-satu-o}　yonda
　　　　　John-TOP book many-ACC / all-ACC　/ most-ACC　/ three-CL-ACC read
　　　　　'John read {many / all / most / three} (the) books.'

　　　b.　John-wa　{%ooku / %subete / %hotondo / san-satu} hon-o　　　yonda
　　　　　John-TOP many　/ all　　/ most　　/ three-CL} book-ACC　read
　　　　　'John read {many / all / most / three } (the) books.'

　　　c.　John-wa　{ooku-no　　/ subete-no / hotondo-no / san-satu-no}
　　　　　John-TOP {many-GEN / all-GEN　/ most-GEN　/ three-CL-GEN}
　　　　　hon-o　　yonda
　　　　　book-ACC read
　　　　　'John read {many / all / most / three} (the) books.'

The acceptability of the quantifiers in (31a) and (31b) varies across Japanese speakers, but seems to be correlated. Similarly, both examples are fully acceptable with the numeral. The correlations are straightforwardly explained if the two structures are transformationally related by Q-inversion. On the other hand, (31c) is grammatical for all speakers and therefore it is natural to assume that it should not be transformationally related to (31a). Watanabe doesn't address structures like (31b) in 2008, but instead, refers to Watanabe (2006), which derives (31b) for the numeral *san-satu* transformationally from (31c) by leftward movement of the CaseP *hon-o*.

　At this point, we are not sure how Watanabe (2006; 2008) would address the full paradigm in (31). According to (Watanabe 2008: 525–527), non-presuppositional quantifiers like *takusan* 'many' are base-generated in the Spec of QP. Although Watanabe does not elaborate on the exact location of the base-geerated position of these quantifeirs, other than that it is "after the case particle in narrow syntax". This results in a structure as in (32)[14].

(32)　John-wa　seito-o　　　　{zen'in　/ hotondo}　atumeta
　　　　John-TOP student-ACC　all　　/ most　　　gathered
　　　　'John gathered together {all /most } of the pupils.'

To derive (32a), Watanabe proposes a process of morphological merger (Embick & Noyer 2001; Halle & Marantz 1993) that reverses the order of the case marker *-o* and *zen'in/ hotondo*.[15] This doesn't predict the paradigm in (31), however.

　For this reason, we pursue a different analysis in this paper; one that more closely adheres to the surface morphology. Specifically, we adopt Watanabe's Q-inversion, but not

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[14] Watanabe (2008) does not specify the base-generated position for *hotondo*, but given that it is possible to undergo morphological merger, as *zen'in*, let us assume they are base-gereated in the same position.

[15] Watanabe (2006: 283–285) addresses *takusan* ('many/much') in similar structures to (31) following Ishii (1991). However, *takusan* is unusual in displaying a contrast between the orders in (33a), where it is ungrammatical, and (33b), where it is grammatical. Watanabe points out that also minimizer NPIs such as *nani-hito-tsu* ('even a single') have such a distribution, but we leave such cases for future work.

his PF-insertion of -*no* for quantifiers. Furthermore, we assume that Q-inversion applies to numeral and other quantifiers likewise.[16] For example, we assume that all variants of (31b) must be derived from (31a) by Q-inversion movement of *ooku, subete, hotondo*, and *san-satu* respectively. For some speakers, the base structure (31a) is unavailable with the non-numeral quantifiers *ooku, subete*, and *hotondo* and therefore (31b) is also ungrammatical. Even for speakers who dislike some case of (31a), the insertion of *no* yielding the partitives in (33) render the examples fully acceptable. Such speakers therefore seem to require that QP either be classifier structure or a partitive structure.

(33)   John-wa hon-no   {ooku-o   / subete-o / hotondo-o / san-satu}-o   yonda
        John-TOP book-GEN {many-ACC / all-ACC   / most-ACC / three-CL}-ACC read
        'John read {many / all / most / three } of the books.'

Our assumptions up to this point leave us without an account of the Q + *no* structures. We argue in the next section that this gap is filled by the reverse partitive analysis. One initial motivation for the proposal is that the grammaticality of (31c) could be subsumed under the generalization just mentioned: only classifier or partitive structures allow quantification (for some speakers).

4 Q+*no* structures as reverse partitives

This section addresses the Q + *no* structures in detail. (34) (repeated from (2)) shows examples of this with the quantifiers *three, all*, and *most* all bearing the genitive case particle *no*. Rather than assuming that *no* is inserted only at PF as Watanabe (2008) proposes, we want to treat *no* as a semantically contentful lexical item. The genitive marking on the quantificational expression seems to suggest that the quantifier is an argument of the noun. But, this would be puzzling from the perspective of general theories of nominal quantification (Montague 1974 [1970], and many others), because these assume that quantificational determiners are the main functors of the clause they occur in.

(34)   John-wa san-satu-no / subete-no / hotondo-no hon-o   yonda
        John-TOP three-CL-GEN/ all-GEN   / most-GEN   book-ACC read
        'John read three books / all books / most of the books.'

We propose that the quantifiers in (34) neither are arguments of the noun, nor bear genitive case. Our proposal is instead that the *no* in (34) is the same *no* as in the plain partitive constructions discussed in the previous section. The analysis of Q + *no* structures is less straightforward than that of plain partitives, and has been controversially discussed in the literature. Semantically, Q + *no* structures differ from plain partitives with respect to the proper-parthood requirement, as Haig (1980) already notes. Specifically, the reverse partitive in (35a) doesn't entail that there were also students I met but that I didn't invite. In contrast, the English partitive *several of the students I met* and the plain partitive of Japanese in (35b) lead to such an inference. A similar contrasts exists between example (10) and (34), though the presence of the relative clause in (35) makes it clearer.

(35)   a.   watasi-wa [kinoo   atta suu-nin-no   gakusei]-o   syootai-sita
              I-TOP   yesterday met several-CL-GEN students-ACC   invite-did
              'I invited the several students I met yesterday.' (Haig 1980: 1073)

---

[16] Though only with numeral quantifiers-classifier sequences, Watanabe's leftward NP movement in 3 would have to precede Q-inversion. Our proposal is compatible with this obligatory NP-movement for these cases, but we could also alternatively adopt obligatory base-generation of the numeral and classifier as a constituent taking the NP as its complement.

    b.   watasi-wa [kinoo   atta gakusei]-no   suu-nin-O   syootai-sita
        I-TOP   yesterday met students-GEN several-CL-ACC   invite-did
        'I invited several of the students I met yesterday.'

So, if Q + *no* structures are structurally similar to plain partitives, this raises the question why the proper parthood inference only applies to plain partitives.

    But in another way, relating Q + *no* structures to partitives is natural. In the discussion, we observed that Japanese exhibits one gap in the partitive paradigm compared to English; namely, deletion of the whole-NP. In English, (36a) (adapted from (3c)) from deletion of the whole-NP is possible, but not in Japanese (36b) (repeated from (21))

(36)   a.   John read three books of those ~~books~~
        b.   *John-wa   ~~hon~~-no   (hon)   sansatu-O   yonda
            John-TOP ~~book~~-GEN book   three-CL-ACC read.PAST

We attribute the ungrammaticality of (36b) to the stranded affix filter (Chomsky 1955): the morpheme *no* as a suffix requires a preceding host lexeme that it can attach to. The ungrammaticality of (36b) shows, furthermore, that the host of -*no* cannot be the subject *John-wa*, and we assume that the host of *no* must be within the same maximal verbal argument projection as *no* itself. Since *no* ends up at the left edge of the object constituent in (36b), it remains without a host and causes the ungrammaticality of (36b).
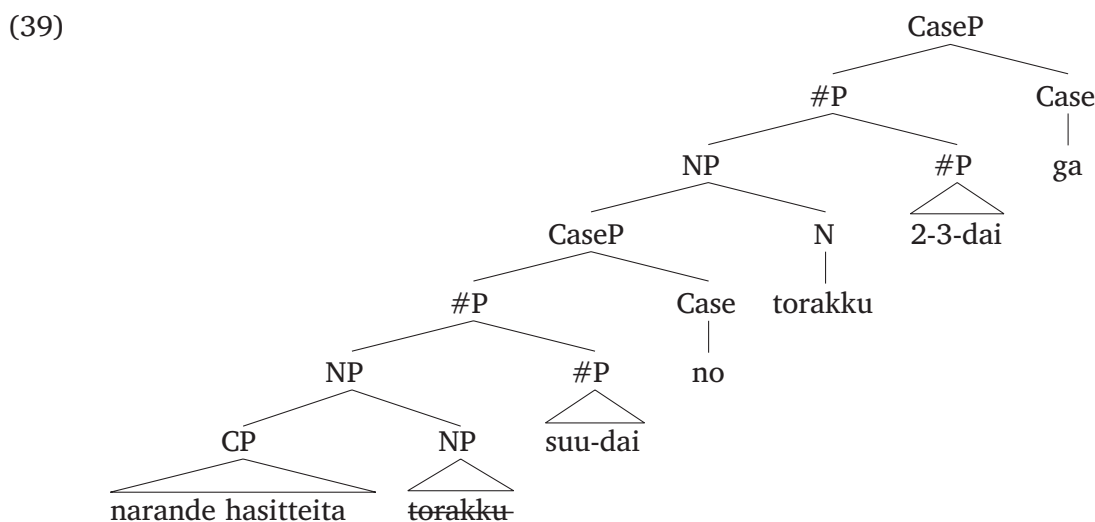
    This explanation for (36b) predicts that the whole-NP deletion should be possible in Japanese if, in the resulting structure, there was overt lexical material left that *no* can attach to. NP-deletion is independently known to be possible in Japanese (Saito & Murasugi 1990). We propose that there are at least two ways this prediction is born out. We call these the *low-Q scenario* and the *high-Q scenario*. We claim that both examples in (37) illustrate the low-Q scenario ((37a) is cited from Watanabe (2008) who credits Inoue (1978) for the example, (37b) is repeated here from (7)).

(37)   a.   Narande hasitteita   suu-dai-no   torakku-ga ni-san-dai
            lined-up were-running several-CL-GEN truck-NOM two-three-CL
            gaadoreeru-ni   butukatta
            guardrail-TO   struck
            'Two or three of the many trucks that were running abreast struck the guardrail.'
        b.   Narande hasitteita   suu-dai-no   torakku ni-san-dai-ga
            lined-up were-running several-CL-GEN truck   two-three-CL-NOM
            gaadoreeru-ni   butukatta
            guardrail-AT   struck
            'Two or three of the many trucks that were running abreast struck the guardrail.'

Both examples in (37) have a partitive interpretation as the English translations indicate. This is also supported by the observation that the example becomes semantically infelicitous if the two quantificational expressions are switched as in (38) (vs (37b)). This is predicted because just like in the English translation, the partitive requirement cannot be satisfied with this choice of quantifier.

(38)   #Narande hasitteita   ni-san-dai-no   torakku suu-dai-ga
       lined-up were-running two-three-CL-GEN truck   several-CL-NOM
       gaadoreeru-ni   butukatta
       guardrail-AT   struck
       'Many of the two or three trucks that were running abreast struck the guardrail.'

The structure we propose for (37b) is sketched below in (39). We assume that *suu-dai* is followed by an elided noun *torakku*. Therefore (37b) is an example in Japanese where the whole-NP is elided. In contrast to (21), though, the suffix *no* in (37b) can attach to the quantificational expression *suu-dai*. Therefore the stranded affix filter is satisfied, and (37b) is predicted to be grammatical. In the structure below, Watanabe's obligatory movement of NP from a #P internal position to the specifier of #P is not represented to keep the structure simple, but both boldfaced NPs would actually have undergone this movement. Essentially the same discussion applies to (37a), except that (37a) involves a floated quantifier *ni-san-dai*. Because we don't want to commit to a particular analysis of floated quantifiers here, we only show the structure of (37b), which can be adapted to either an adverbial or a literally floating analysis of (37a) without problems.

(39)

```
                                              CaseP
                                          ╱         ╲
                                        #P           Case
                                     ╱      ╲          │
                                   NP         #P        ga
                                ╱      ╲      ╱ ╲
                            CaseP       N  2-3-dai
                          ╱      ╲    torakku
                        #P        Case
                     ╱      ╲      │
                   NP        #P     no
                 ╱    ╲      ╱ ╲
               CP      NP  suu-dai
            ╱─────╲   ╱ ╲
     narande hasitteita  torakku
```

Our proposal for (37) ascribes to *no* the partitive meaning. It therefore predicts that example (37) becomes ungrammatical if *no* is omitted as (40) shows.

(40)   *Narande   hasitteita   suu-dai   torakku   ni-san-dai-ga
        lined-up   were-running   several-CL truck   two-three-CL-NOM
        gaadoreeru-ni   butukatta
        guardrail-LOC   struck

Anonymous reviewers note that, if our account of the Q + *no* construction is on the right track, we would expect to find an interpretation that lacks proper partitivity (i.e. three could be the total number of trucks among the vehicles which wererunning). This is because, according to our analysis, it should be possible to delete the noun that is not identical to the unit NP with a meaning like "vehicles." If this were the case, the sentence as in (37) should be able to be associated with the following meaning: "two or three of the trucks of several vehicles that were running abreast." This interpretation is strongly dispreferred, however.[17]

   One of the reviewers points out that the interpretation can be brought out when there is an overt pronominal expression "-no" in place of the deleted Noun, as shown in (41). The sentence is awkward, because *-no* is doubled (the first one as a pronominal expression, the second as the partitive *no*), we tend to agree with the judgment of the reviewer.

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[17] Our intuition is that with a small pause after *no*, the interpretation is less restricted, and the predicted interpretation may become available.

(41)　　Narande hasitteita　　　suu-dai-no-no　　　torakku　ni-san-dai-ga
　　　　lined-up　were-running　several-CL-PRO-GEN　truck　　two-three-CL-NOM
　　　　gaadoreeru-ni　　butukatta
　　　　guardrail-LOC　　struck
　　　　'two or three trucks of the several trucks/vehicles that were running abreast struck
　　　　the guardrail.'

It is also possible to bring out this interpretation by adding *uti* after *no* as in (42).

(42)　　Narande hasitteita　　　suu-dai*(-no)　uti　　　torakku　ni-san-dai-ga
　　　　lined-up　were-running　severa-CL-GEN　among　truck　　two-three-CL-NOM
　　　　gaadoreeru-ni　　butukatta
　　　　guardrail-LOC　　struck
　　　　'two or three trucks of the several trucks/vehicles that were running abreast
　　　　struck the guardrail.'

Given that *no* is obligatory in (42), we believe this data supports our analysis of the Q + *no* construction, although one must understand the role of *uti* in these constructions. We will need to leave this topic for future research, however.

　　A further observation about (37) is that the relative clause must be present. Omitting the relative clause results in the word-order Q + *no*, but is ungrammatical.

(43)　　*suu-dai-no　　　torakku　ni-san-dai-ga　　　　gaadoreeru-ni　butukatta
　　　　several-CL-GEN　truck　　two-three-CL-NOM　guardrail-LOC　struck

The necessity of a relative clause is also observed in English sentences with attributive uses of quantificational expressions, as Hackl (2000) and Solt (2009; 2015) discuss. The term attributive use applies to occurrences of quantifiers that follow an overt determiner. In English, attributive uses occur with quantifier *few* and *many* and definite determiners *the*, *this*, and possessive *his/her/its*. The contrast in (44) illustrates that an English example corresponding to (37) also has a preference for a relative clause to occur. Hackl suggests that speakers who accept (44b) are able to reconstruct an elided relative clause meaning titthat there are. If Hackl's suggestions is correct, English behaves just like Japanese.

(44)　　a.　Two or three of the many trucks that were running abreast struck the
　　　　　　guardrail.
　　　　b.　*?Two or three of the many trucks struck the guardrail.

Solt (2015) proposes that the relative clause requirement of the attributive uses of *the few NP* and *the many NP* is due to the semantic type of *few* and *many*. Specifically, she argues that both must take propositional scope and therefore, for example, *many/few students* in (45) must reconstruct into the relative clause in (44a) to be interpretable. Solt's analysis predicts (45) to be uninterpretable unless a relative clause is present.

(45)　　The many/few students who attended enjoyed the lecture.

Solt's analysis carries over straightforwardly to the data in (44). We think that Solt's analysis furthermore explains the Japanese data in (43). Data like (45) cannot be constructed in Japanese because definiteness is not marked overtly in Japanese. But we discussed above that the partitive constraint applies also in Japanese, and therefore the whole-NP of a partitive construction must receive a definite interpretation. We propose that the partitive constraint entails that *suu-dai* ('several') in (37) must be interpreted by reconstruction into a relative clause.

Our analysis predicts that Q + *no* structures can receive the low-Q scenario analysis only when a relative clause is present. What about examples of Q + *no* without a relative clause? Consider example (46) (repeated from (2)).

(46) John-wa   san-satu-no   hon-o   yonda
      John-TOP   three-CL-GEN   book-ACC   read.PAST
      'John read three books.'

We propose that there is a second source of Q + *no* structures: the high-Q scenario following Sauerland & Yatsushiro (2004), which is sketched below. The high-Q scenario also derives Q + *no* from a partitive structure and also applies whole-NP deletion. Whole-NP deletion, as we discussed, leaves *no* stranded, which requires some lexical material to precede it. But while in the low-Q scenario a quantifier associated with whole-NP saved *no*, in the high-Q scenario it is a quantifier associated with the unit NP. Consider the base-generated structure in (47).

(47)

$$
\begin{array}{c}
\text{CaseP}_1 \\
\diagup\quad\diagdown \\
\#\text{P}\qquad\qquad\text{Case} \\
\diagup\ \diagdown\qquad\qquad | \\
\text{san}\qquad\#'\qquad\qquad\text{o} \\
\diagup\ \diagdown \\
\text{NP}_1\quad\#\\
\diagup\ \diagdown\quad | \\
\text{CaseP}_2\ \text{N}_1\ \text{satu} \\
\diagup\ \diagdown\quad | \\
\text{NP}_2\ \text{Case}\ \text{hon} \\
|\qquad | \\
\text{hon/mono}\ \text{no}
\end{array}
$$

Let us go through the derivation. The first step is for the NP_1 to move to the Spec of CaseP_1 deriving (48a). Then the whole NP (NP2) gets deleted, and the resulting structure is (48b), which is ungrammatical because of the stranded *no*. The third step is then to move the #P to the Spec of QP (Q- inversion).

(48) a. [hon/mono-no hon] [san [hon/mono-no hon] satu]-O

      b. [~~hon/mono~~-no hon] [san [hon/mono-no hon] satu]-O

      c. [san-satu]$_{\#\text{P}}$ [~~hon/mono~~-no hon] [san t_{NP} satu]$_{\#\text{P}}$-O

We think that the high-Q and the low-Q scenario are both possible analysis of Japanese Q + *no* structures. But since the low-Q scenario is restricted to cases with a relative clause, most examples of Q + *no* structures are unambiguous. The high-Q scenario is predicted to have some restrictions itself. In particular, examples such as (37) where another quantifier is associated with the whole noun are predicted to not allow a high-Q derivation of the quantifier bearing *no*. Therefore examples such as (37) are also predicted to be unambiguous. Our analysis, however, would lead us to expect examples such as (49) to be ambiguous between two structures (the prediction also arises for Haig's Q + *no* example in (35)): the low-Q scenario, where the single quantifier is associated with the whole-NP of a partitive structure, as well as the high-Q scenario, where the quantifier is associated with the unit noun of a partitive structure. The two structures are predicted to have different interpretation, but the examples actually permit only the interpretation consistent with the high-Q scenario.

(49) a. John-wa   [Mary-ga   katta]   san-satu-no   hon-o   yonda
          John-TOP [Mary-NOM bought] three-CL-GEN book-ACC   read
          'John read the three books that Mary bought.' (high-Q)
        *'John read one/some of the three books that Mary bought.'(low-Q).

     b. Narande hasitteita   suu-dai-no   torakku-ga gaadoreeru-ni butukatta
          lined-up were-running several-CL-GEN truck-NOM guardrail-LOC struck
          'The several trucks running abreast struck the guardrail.' (high-Q)
        *'Some of the many trucks that were running abreast struck the guardrail.'
          (low-Q).

At this point, we are uncertain why the interpretation predicted by the low-Q scenario is not available in (49). The English data in (50) seems parallel to us since it has a bare noun with a partitive where the whole-NP is divided. The marked status of (50) might provide some direction for future research on this topic.

(50) a. ??John read books of the three Mary bought.
      b. ??Trucks of the many driving on the highway broke down.

Consider now the lack of a partitive interpretation of Q+*no* structures that we noted above for (35b). In cases such as (37) with a relative clause where the low-Q derivation is possible, we noted that actually a partitive interpretation is required. But with examples where the high-Q structure is available, the partitivity restriction is not observed. This lack of a partitivity restriction is predicted by our analysis since the elided whole-NP is not determined by thepronounced form. Consider the two examples in (51) from Sauerland & Yatsushiro (2004). (51a) is a plain partitive, while (51b) is a Q+*no* structure that we analyze as a reverse partitive with whole-NP ellipsis.

(51) a. Taroo-wa hon-no   san-satu-o   yomi-oeta
          Taro-TOP book-ACC san-CL-ACC   read-finished
          'Taro has finished reading three of the books.'

     b. Taroo-wa san-satu-no hon-o   yomi-oeta
          Taro-TOP san-CL-GEN   book-ACC   read-finished
          'Taro has finished reading three books.'

In (51a), the part-hood requirement applies as in English because the whole-NP is *hon* and the elided part NP must be one that can combine with the classifier *satu*. In (51b), however, *satu* relates to the overt unit noun *hon*. The elided NP in (51b), therefore, isn't constrained by any syntactic agreement relation. It is then predicted to be very easy for speakers to accommodate some very unspecific property such as *mass* in the position of the whole-NP. As mentioned above (see footnote 1), the accommodation could just involve a nominal feature. The interpretation predicted to be similar to the English *three books of all the stuff in the world*. In this way, however, the part-hood requirement can be vacuously satisfied. For this reason, the part-hood requirement is not expected to apply to Q+*no* structures when they receive the high-Q analysis.

Further support for our analysis comes from the interpretation of *hotondo* in Q+*no* constructions. The quantificational expression *hotondo* is not construed with a classifier. Therefore we expect that it can be construed with a different silent noun in the unit noun position in plain partitive structures; specifically the silent noun *mass*. In this case, the term unit noun is inappropriate since *mass* isn't quantized and we call this the *Measure Noun*. Our proposal predicts therefore that plain partitives with *hotondo* allow a mass measure that is appropriate for book-content; for example, chapter, word, or page count. That this prediction is correct was observed for examples like (52a) by Sauerland & Yatsushiro (2004). Specifically, (52a) is

felicitous when it concerns the content of single book. In the Q + *no* example (52b), however, the unit noun is pronounced according to the high-Q analysis, while the low-Q analysis isn't available. Therefore our proposal predicts that (52b) is infelicitous in a scenario with only a single book. Namely, *hotondo* must quantify over entire book-units because it combines with the quantized unit noun *hon* ('book'). Since *most* is a proportional quantifier, its application requires though that more a single entity that form its domain to be non-trivial. Therefore, (52b) is predicted to be felicitous only in a situation involving more than one book.[18]

(52) a. John-wa   hon-no   *hotondo-o*   yonda.
          John-TOP book -GEN   most-ACC   read-finished
          'John read most (mass) of the book(s).'
          'John read most (volumes) of the books.'

      b. John-wa *hotondo*-o   hon-no   yonda
          John-TOP most-CL-GEN   book-ACC   read
        *'John has read most (mass) of the book.'
          'John read most (volumes) of the books.'

In sum, we argued in this section that Q + *no* structures can have two sources in Japanese. In both cases, the Q + *no* structure derives from an underlying partitive structure where the whole-NP undergoes ellipsis. In the low-Q scenario, the quantifier is associated with the elided whole-NP of the partitive. The low-Q analysis, however, is only possible in examples like (37) when a relative clause and a second quantifier associated with the unit-NP are present. In the high-Q scenario, the quantifier is associated with the unit-NP. It is moved by Q-inversion to a position in front of the elided whole-NP and the stranded suffix *no*, resulting in the Q + *no* word order. The high-Q analysis is correctly predicted to be not available when another quantifier is construed with the overt unit NP. We furthermore showed that the assumption that the unit noun rather than the whole-NP is pronounced in Q + *no* structures correctly predicts two differences in interpretation between Q + *no* structures and plain partitives; namely, that Q + *no* structures don't exhibit the partitivity requirement of plain partitives, and that Q + *no* structures don't allow mass quantification even with potential mass quantifiers such as *hotondo*. In the next section, we explain how the analysis predicts differences between plain partitives and Q + *no* structures with respect to possessor raising. The subsequent section discusses structures with non-monotonic measures that-seem similar to Q + *no* structures, but argues that the two should receive different analyses.

5 Possessor raising in partitives

Japanese allows possessor raising from the possessives in the subject position. This means that the possessor of a noun that is normally marked Genitive can be marked Nominative in Japanese. Consider the examples in (53). In (53a), the possessor of the book, *Lina*

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[18] The data in (52) are clear to all Japanese speakers we consulted with. Data like (i) without the morpheme *no* and also (31) are subject to dialectal variation. Sauerland & Yatsushiro (2004) discuss examples with a telic verb-form *yomi-oeta* ('finished reading') instead of the simple *yonda* ('read'), where judgements seem to be uniform again. At this point, we have nothing to add to this discussion.

(i)   a. %John-wa   hon   hotondo-o   yonda
           John-TOP   book   most-ACC   read
      b. %John-wa   hotondo   hon-o   yonda
           John-TOP   most   book-ACC   read

(ii) a. John-wa   hon   hotondo-o   yomi-oeta
           John-TOP   book   most-ACC   read-finished
      b. John-wa   hotondo   hon-o   yomi-oeta
           John-TOP   most   book-ACC   read-finished

is followed by the genitive marker *-no*, whereas it is followed by the Nominative Case marker in (53b).

(53) a. Lina-no   hon-ga   omosiroi.
          Lina-GEN   book-NOM   is.interesting
          'Lina's book is interesting.'

      b. Lina-ga   hon-ga   omosiroi.
          Lina-NOM   book-NOM   is.interesting
   'Lina is such that her book is interesting.'

For concreteness, we adopt a movement analysis of possessor raising (Landau 1999 and others). We assume that the possessor occupies an argument of the NP, and that Genitive case *no* is licensed in this position.

(54)   Lina-no hon-ga omosiroi
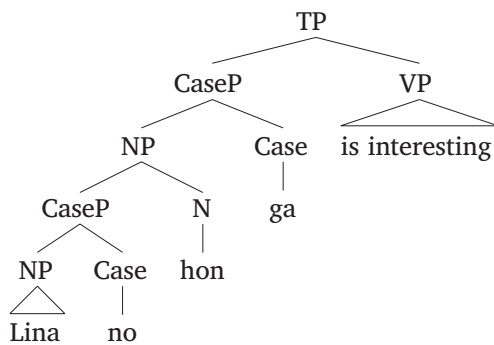
We assume that Nominative case cannot be licensed in this NP-internal position, however. To get (53b), the lower possessor CaseP raises to the outer specifier position of TP, from the NP-internal position, as shown in (55).

(55)   Lina-ga hon-ga omosiroi.
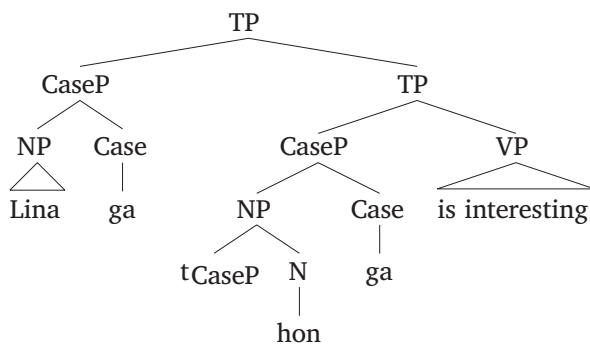
Possessor raising exhibits differences within partitive structures. (56a) shows a plain partitive with the whole-noun (*hon*) marked by Genitive case. But as (56b) shows, the whole-noun can also occur with Nominative case. (56b) therefore shows that possessor raising can apply in plain partitives.

(56) a. Hon-no   san-satu-ga   omosiroi.
          book-GEN   three-CL-NOM   is.interesting
          'Three of the books are interesting.'

      b. Hon-ga   san-satu-ga   omosiroi.
          book-NOM   three-CL-NOM   is.interesting
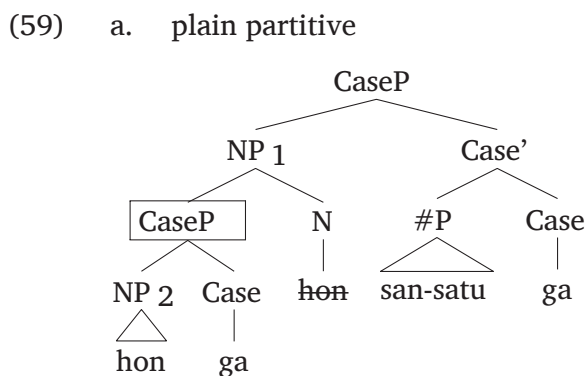   'Books are such that three of them are interesting.'

Q + *no*-structures differ from plain partitives: possessor raising is not allowed as shown by (57). (57a) shows a grammatical Q + *no*-structure. (57b) illustrates that ungrammaticality results when the genitive *no* of the Q + *no*-structure is changed to the nominative *ga*.
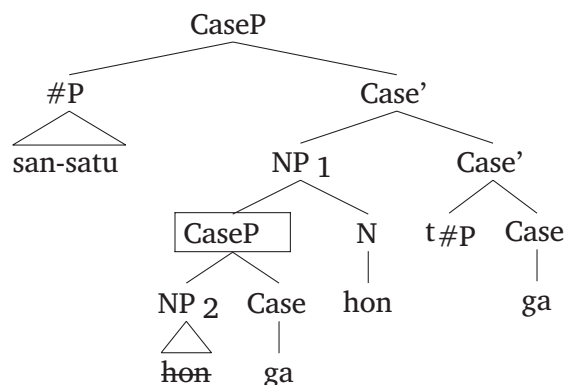
(57) a. san-satu-no   hon-ga   omosiroi.
          three-CL-GEN   book-NOM   is.interesting
          '3 books are interesting.'

      b. *san-satu-ga   hon-ga   omosiroi.
          three-CL-NOM   book-NOM   is.interesting

The clear difference between plain partitives (56b) and the Q + *no* structure (57b) hasn't been discussed before, but requires an explanation in our opinion. We show now that the contrast between (56b) and (57b) receives a straightforward explanation within our analysis. We have argued that both (56a) and (57a) are derived from the same underlying structure, shown in (58). However, in the Q + *no*-structure, (57a), the quantifier *san-satu* and the genitive *no* don't form a syntactic constituent according to our analysis.

(58)

$$
\begin{array}{c}
\text{CaseP}_1 \\
\diagup \qquad \diagdown \\
\#\text{P} \qquad\qquad \text{Case} \\
\diagup \quad \diagdown \qquad\qquad | \\
\text{san} \qquad \#' \qquad\qquad \text{o} \\
\qquad \diagup \quad \diagdown \\
\qquad \text{NP}_1 \qquad \# \\
\qquad \diagup \quad \diagdown \qquad | \\
\text{CaseP}_2 \quad \text{N}_1 \quad \text{satu} \\
\diagup \quad \diagdown \qquad | \\
\text{NP}_2 \;\; \text{Case} \quad \text{hon} \\
\triangle \qquad | \\
\text{hon} \qquad \text{no}
\end{array}
$$
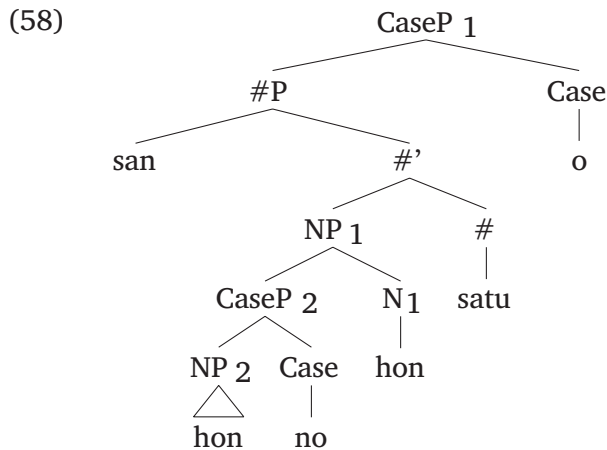
We provide the relevant structures below in (59). In both structures, Watanabe's obligatory movement of the NP from a #P internal position to the specifier of CaseP isn't represented for ease of presentation. In both structures, the CaseP that needs to undergo possessor raising to the verbal Spec of TP position for licensing of nominative case is surrounded by a box. The relevant CaseP of the plain partitive contains the overt noun *hon* in addition to the case particle, and therefore after possessor raising the case suffix *-ga* would be stranded.

(59) a. plain partitive

$$
\begin{array}{c}
\text{CaseP} \\
\diagup \qquad\qquad \diagdown \\
\text{NP}_1 \qquad\qquad\qquad \text{Case}' \\
\diagup \;\; \diagdown \qquad\qquad \diagup \quad \diagdown \\
\boxed{\text{CaseP}} \;\; \text{N} \qquad \#\text{P} \quad \text{Case} \\
\diagup \;\; \diagdown \quad | \qquad\quad \triangle \qquad | \\
\text{NP}_2 \; \text{Case} \;\; \text{hon} \;\; \text{san-satu} \;\; \text{ga} \\
\triangle \qquad | \\
\text{hon} \qquad \text{ga}
\end{array}
$$

b.   Q + *no* structure (high Q scenario)

```
                         CaseP
                       /        \
                    #P            Case'
                   /  \          /      \
              san-satu        NP 1        Case'
                             /    \       /    \
                        [CaseP]   N    t#P    Case
                        /    \    |            |
                     NP 2  Case  hon           ga
                     /\     |
                   hon     ga
```

In sum, our proposal predicts the different behavior of the *no* in Q + *no* structures when it comes to possessor raising – while the *no* in possessives and plain partitives can be exchanged for nominative *ga*, the one in Q + *no* structures cannot.

6 Non-monotonic measures

Nakanishi (2007) points out that non-monotonic measures, at least on the surface, require a Q + *no* structure as in (60a) in Japanese. She furthermore suggests that that other Q + *no* structures should also receive an account similar to non-monotonic measure (Nakanishi 2007: 35 on *subete-no* ('all-GEN') and 110 on *san-rittoru-no* ('three liters-GEN')). For the discussion of the monotonicity of measures, formal concepts from mathematical order theory (Davey & Priestley 2002 and others) have been found to be useful for linguistic research (Krifka 1989; Schwarzschild 2006). For our purposes it suffices to note some examples. An example of a non-monotone measure is the *degree* measure in the dimension of temperature because a proper subpart of an entity of temperature d could have either a higher or lower temperature. In contrast, the mass measure *kilogram* is monotone since a proper subpart of an entity x has a strictly lower mass than x.[19] Finally, length measures such as *centimeters* can apply in different dimensions, e.g. the length or diameter of a cable. For a given piece of cable, variation along the dimension of length is more salient though than variation in diameter since dividing up a cable into parts usually means parts of different length, but of the same diameter. Therefore, *centimeters* as in 1 *cm of cable* is understood to measure the length dimension, in which the cable is monotone. But a *1 cm cable* is readily understood to measure the diameter dimension, which is non-monotone for subparts along the length dimension, but it could also be understood to refer to the length dimension.

   The Japanese examples in (60) illustrate the non-monotonic temperature measure of *do* ('degree') and a non-monotonic use of *senti* ('centimeter') measuring diameter. (60b) just like the English phrase *a three centimeter cable* is ambiguous between a length and a diameter interpretation.

(60)   a.   [san-do-no   mizu]-ga   tukue-no   uede   kobore-ta.
             [three-degree-GEN water]-NOM   table-GEN   above   spill-PAST
             'Three degree water spilled on the table.' (Nakanishi 2007: 51)

       b.   John-ga   kinoo   [san-senti-no   keeburu]-o   kat-ta
             John-NOM   yesterday   [three-centimeter-GEN   cable]-ACC   buy-PAST
             'John bought three centimeters of cable yesterday.'
             'John bought a three centimeter cable yesterday.' (Nakanishi 2007: 51)

---

[19] Putting aside mass-less elementary particles.

Note that in both examples in (60) the measure noun is followed by the genitive marker *no* and then the substance noun. In the following, we use the term *Non-monotonic Measure Structure* for examples exhibiting a measure noun with the genitive case marker *no* as in (60). This term is motivated by the observation of Nakanishi's that non-monotonic measures are ill-formed when combined with the measured substance in any way other than (60). Specifically, a non-monotonic measure in a plain partitive as in (61a) results in a comparable oddness as in the English translation given in (61a). Also the non-partive structure illustrated by (61b) is ill-formed with non-monotonic measures.

(61) a. #[mizu-no   san-do]-ga   tukue-no   uede   kobore-ta.
          [water-GEN three-degree]-NOM table-GEN above spill-PAST
          #'Three degrees of water spilled on the table'

      b. [mizu   san-do]-ga   tukue-no   uede   kobore-ta.
          [water-GEN three-degree]-NOM table-GEN above spill-PAST

Non-monotonic Measure Structures contrast with other structures of Japanese where a measure can occur in the following way: all other structures impose a monotonicity requirement. This is shown in (62a), where the monotonic measure *kiro* ('kilogram') occurs following the substance noun *niku*. As (62b) illustrates, the multidimensional measure *senti* ('centimeter') can also occur in such a structure, but is then restricted to the dimension where it is monotonic, i.e. the length interpretation. Finally, (62c) shows a partitive variant of (62a).

(62) a. John-ga   kinoo   [niku nizyu-kiro]-o   motiage-ta
          John-NOM   yesterday   [meat twenty-kilo]-ACC   lift-PAST
          'John lifted twenty kilos of meat yesterday.' (Nakanishi 2007: 49).

      b. John-ga   [keeburu san-senti]-o   kinoo   kat-ta.
          John-NOM [cable   three-centimeter]-ACC yesterday   buy-PAST
          'John bought three centimeters of cable yesterday.' (Nakanishi 2007: 46)
          *'John bought a three centimeter cable yesterday.'

      c. John-ga   kinoo   [niku-no   nizyu-kiro]-o   motiage-ta
          John-NOM   yesterday   [meat-GEN twenty-kilo]-ACC   lift-PAST
          'John lifted twenty kilos of the meat yesterday.'

Why are non-monotonic measure structures relevant to the discussion of Q + *no* structures? As Nakanishi (2007) notes, the sequence of numeral, measure noun, *no*, and substance noun in (60) is reminiscent to the sequence of numeral, classifier, *no*, and noun in Q + *no* structures like (63) (repeated from (2)).

(63) John-wa   san-satu-no   hon-o   yonda
      John-TOP   three-CL-GEN   book-ACC   read.PAST
      'John read three books.'

Nakanishi suggests that because of this parallel appearance, the measure structures in (62) and the Q + *no* structures like (63) should receive a unified analysis, which, we agree, is an intriguing possibility. However, neither Nakanishi nor anyone else as far as we know has provided such a unified analysis. In the remainder of this section, we want to outline some challenges for such a unification. Our conclusion at this point is that measure structures with *no* may be an additional source of Q + *no* structures in some cases, but that the core cases of our analysis, such as (63), cannot be accounted for as non-monotonic measure structures.

We suspect that Moltmann (2009) is correct that at least some properties of substances can be conceptualized as independent entities – Moltmann adopts the term *Tropes* for such properties from the philosophical literature for these. We speculate that tropes can actually occur also in structures that look like possessives, not only in Japanese, but also in English and German. Specifically we have in mind examples like (64a) from English and (64b) from German.

(64)   a.   ?Water of three degrees temperature spilled on the table.
         b.   *German*
              Wasser von drei Grad Wärme floss   auf den Tisch aus.
              water   of   three degree warmth flowed on the table out
              'Water of three degrees of warmth spilled on the table.'

But it seems that the possessive structure is limited to properties that are minimally non-monotonic: the examples in (65) are infelicitous. Within the analyzes of degrees as tropes, this restriction can be captured as an ontological gap. The devision between the types of degrees that easily define tropes and other degrees seems analogous to that between natural kinds and other kinds (see also Scontras 2014a; 2014b for arguments that degrees are kinds).

(65)   a. ??John diagramed sets of cardinality three.
         b.   *German*
              *John hat Mengen von Anzahl drei   gezeichnet.
              John has sets   of   count   three diagramed

The data in (66) show that once the measure is non-monotonic, as the property of being a trilogy is for book-series, the acceptability the possessive structure with tropes improves.

(66)   a.   John read a book series of numerosity three.
         b.   *German*
              ??John hat eine Buchreihe   der Anzahl drei   gelesen
              John has a   book series of   count   three read

At this point, we have to leave a fuller understanding of the data in (64), (65), and (66) to future work. For the evaluation of the analysis of Q + *no* structures as non-monotonic measures, the contrast between (65) and (66) has an important consequence. Namely, we see that English and German require an account of non-monotonic measures as in (65) that doesn't carry over to numerosity. So, that makes it plausible that also the analysis of Japanese non-monotonic measure constructions doesn't carry over to Q + *no* structures.

A second argument of a similar nature arises from the Japanese data in (67) and (68) with the copula *dearu* ('be'). (67) shows that *dearu* relative clauses in Japanese are possible with non-monotonic measures, including the non-monotonic interpretation of numerals.

(67)   a.   san-do-dearu   mizu-ga   tukue-nouede kobore-ta.
              [three-degree-be water]-NOM table-on   spill-PAST
              'Three degree water spilled on the table.'

         b.   John-wa   san-satu-dearu hon-o   yonda
              John-TOP   three-CL-BE   book-ACC   read.PAST
              'John read one or more trilogies'

But (68) shows that a monotonic measure is not possible in a *dearu* relative clause.

(68) #John-wa   138-ko-dearu   ringo-o   tabe-ta
       John-TOP   138-CL-BE   apple-ACC   eat-PAST

The contrast between (67) and (68) also argues that Q+*no* structures require an account independent of non-monotonic structures. Concretely, assume just for the sake of argument the following analysis of the non-monotonic construction in Japanese: they derive from structures like those of (67) by deletion of *dearu*. Then a separate account of Q+*no* structures would still be needed, since the *dearu*-deletion account would make wrong predictions of Q+*no* structures: *Dearu* deletion would incorrectly predict that (2) should be restricted to the non-monotonic, trilogy interpretation just as (67b) is. And *dearu* deletion could not predict that (69) is felicitous in contrast to (68).

(69)　John-wa　　138-ko-no　　ringo-o　　tabeta
　　　　John-TOP　138-CL-GEN　appl-ACC　eat-PAST
　　　　'John ate 138 apples.'

The same arguments apply to other accounts that try to analyze all Q+*no* structures as non-monotonic structures, as far as we can see. Hence, we conclude that some Q+*no* structures – specifically, examples incompatible with a non-monotonic structure are (69) and also (2) with a monotonic interpretation do not share the same underlying structure.

　In sum, we conclude that Nakanishi's (2007) suggestion to reduce Q+*no* structures to non-monotonic structures at least faces problems with monotonic cases of the Q+*no* structure. Since we don't see a way of overcoming these problems at this point, we conclude that the analysis of Q+*no* structures as reverse partitives is still needed.

7 Conclusion

This paper explored different occurrences of the partive marker *no* in Japanese. We first discussed the uses of *no* in what we called plain partitives and argued that these are parallel to English partitives. This parallel entails that *no* and the English partitive preposition *of* are also parallel. Specifically we argued that *of* and *no* both denote the part-of relation in a mental mereology of the world.

　How can other occurrences of *no* be linked to partitive *no*? The greatest challenge of the Japanese data to such an analysis of *no* are cases where *no* is attached to a quantifier – we call these Q+*no* structures. Because nouns are semantically the arguments of a quantifier in generalized quantifier theory, the placement of *no* on the quantifier is surprising. While previous accounts generally treat *no* in Q+*no* structures as meaningless and Watanabe (2008) even suggests PF-insertion to explain its presence, we argue that there are three systematic derivations for Q+*no* structures. One derivation is from a possessive structure, as we discuss in section 6. This is restricted to non-monotonic measures similar to the English *a series of three volumes*. Two other derivations are both reverse partitive structures, i.e. partitives where the whole-NP is elided like the English *three books of those five books*. The first one of the reverse partitive derivations, thelow-Q derivation, is restricted to structures like (70) (repeated from (37)) with a relative clause and two quantifiers as discussed in 4. The structure we propose for (70) is as indicate one where the noun *torakku* in the whole-DP argument of partitive *no* is elided. The quantifier *suu-dai* is associated with the elided noun.

(70)　[Narande　hasitteita　　~~torakku~~　suu-dai]-no　　　torakku
　　　　[lined-up　were-running　truck　several-CL]-GEN　truck
　　　　ni-san-dai-ga　　　　gaadoreeru-ni　butukatta
　　　　two-three-CL-NOM　guardrail-LOC　struck
　　　　'Two or three of the many trucks that were running abreast struck the guardrail.'

The second of these, the high-Q derivation, is generally available where there aren't two quantifiers, for example in example (71) (repeated from (49) except that the relative

clause is omitted). We defended the analysis of Sauerland & Yatsushiro (2004) of (71) indicated in (71): The whole-NP that is the argument of *no* is elided stranding the suffix *no*, but the quantifier *suu-dai* is associated with the overt, higher noun. The surface word order of (71) involves leftward movement of *suu-dai* so that the suffix *no* can attach to a preceeding morpheme.

(71) suu-dai   [~~norimono~~-no] torakku-ga   gaadoreeru-ni butukatta
      several-CL   [~~vehicle~~-GEN] truck-NOM   guardrail-LOC   struck
      'Several trucks running abreast struck the guardrail.'

Our analysis provides new support for an analysis of partitives where two noun positions are available; the unit noun above the partitive marker and the whole-noun below the partitive marker. Generally, one of the two nouns tends to be elided. We argued that in Japanese such an analysis solves the puzzle of apparently superfluous *no* that occurs attached to quantifiers. Namely, we argued that the partitive case marker *no* can be stranded by ellipsis of the whole-noun and then due to independently motivated word order flexibility can end up on a quantifier. To the extent that our analysis of Japanese is successful, it therefore supports the idea that there are two nouns in partitive noun phrases.

Abbreviations

ACC = accusative, CL = classifier, DAT = dative, GEN = genitive, LOC = locative, NOM = nominative, PL = plural, Q = quantifier/quantificational, TOP = topic, PROG = progressive

Acknowledgements

Competing Interests

The authors have no competing interests to declare.

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