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.

Keywords: determiner; ellipsis; proportions; quantification; measurement; monotonicity

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).  

\[
(3) \quad \begin{align*}
\text{a.} & \quad \text{two books/things of all the books Gina has} \\
\text{b.} & \quad \text{two books/things of the books} \tag{plain partitive} \\
\text{c.} & \quad \text{two books of all those books/things Gina has} \tag{reverse partitive} \\
\text{d.} & \quad \text{two books/things of those books/things}
\end{align*}
\]

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).  

\[\text{(i) German} \quad \text{Er hat ein Mädchen gesehen. Die war mit dem Fahrrad unterwegs.} \]
\[\text{he has a girl seen the bike on the road} \]
\[\text{He saw a girl. She was riding her bike.} \]

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.

\[\text{(i) German} \quad \text{Er hat ein Mädchen gesehen. Die war mit dem Fahrrad unterwegs.} \]
\[\text{he has a girl seen the bike on the road} \]
\[\text{He saw a girl. She was riding her bike.} \]

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.
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)  
\[
\text{whole NP} \quad \text{unit NP} \\
\text{hon} \quad \text{hon/} \quad \text{hon-no san-satu-o} \quad (\text{plain partitive})
\]

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).

(6)  
\[
\text{*hon/mono-no hon} \quad \text{san-satu-o} \\
\text{book/thing-GEN} \quad \text{book} \quad \text{3-CL.VOLUME-ACC}
\]

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 partitive 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)).

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

---

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)  
\[
\text{hon} \quad \text{3-satu-o} \\
\text{book} \quad \text{3-CL-ACC}
\]

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)  
\[
\text{sore-no} \quad / \quad \text{sore-no ni-mai-ga hoshii} \\
\text{that-GEN} \quad / \quad \text{that-GEN two-CL.SHEETS-NOM want} \\
\text{I want two of those.}'
\]

(ii)  
\[
\text{that book-NOM like.} \quad \text{I-TOP that-NOM / that-NOM like.} \\
\text{A: ‘I like that book.’ (pointing at book 1) B: ‘And I like that.’ (pointing at book 2)}
\]
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.

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 \( \equiv \) for parthood in the mereological lattice of individuals.

(11)  
  a. \[ \langle \text{max} \rangle = \lambda f \cdot \max \{ x | f(x) = 1 \} \]
  b. \[ \langle \text{no} \rangle = \lambda x \lambda y \cdot e \cdot y \equiv x \]

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)  
\[ \langle \text{san-satu} \rangle = \lambda x \cdot (\#(x) \geq 3) \]

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) futatsu-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).

\[
\begin{align*}
(13) & \quad a. \quad [ [ \text{hon, max no } ]_{et} \text{san-satu}_{et} \\
& \quad b. \quad [ [ \text{hon, max no } ]_{et} \text{hon } ]_{et} \text{san-satu}_{et} \\
& \quad c. \quad \lambda x (x \subseteq \text{max}(x \mid \text{book}^*(x) = 1) \& \text{CARD}(x) \geq 3)
\end{align*}
\]

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 pronominial 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). For English partitives, the partitive constraint is motivated by the illformedness of examples such as (14). The generalization is that the NP after of must be a definite.

\[
(14) \quad * \text{I met one of } \{ \text{both / every / most / } \emptyset / \text{many} \} \text{child(-ren).}
\]

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.

\[
\begin{align*}
(15) & \quad a. \quad \text{kodomo-tati-no hitori} \\
& \quad \text{child-PL-GEN one.person} \\
& \quad \text{‘one of the children’} \\
& \quad b. \quad \text{takusan-no kodomo-tati-no hitori} \\
& \quad \text{many-GEN child-PL-GEN one.person} \\
& \quad \text{‘one of the many children’}
\end{align*}
\]

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

---

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 restrictor 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 and a 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.

---

\(^7\) 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 *util no* respectively, as in (i). One reviewer observes a similar improvement of (16c) when *uti* is inserted in front of *hitori*.

\(^9\) 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 der Rosen gekauft.

‘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


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...
work on similar structures in Korean for the morpheme -uy (GEN) (Shin 2009).\textsuperscript{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).

\begin{enumerate}
\item[	extit{a}.] Lina-no hon-ga omosiroi.  
Lina-GEN book-NOM is.fun  
\textquoteleft Lina’s book is fun.’
\item[	extit{b}.] akai-no-ga omosiroi  
red-NO-NOM interesting  
\textquoteleft The red one is interesting.’
\item[	extit{c}.] Ima yonderu-no-ga omosiroi  
now read.PROG-NO-NOM interesting  
\textquoteleft The one I’m reading is interesting.’
\item[	extit{d}.] Taroo-ga [Mary-ga naku]-no-o mita  
Taro-NOM Mary-NOM cry-NO-ACC saw  
Roughly: ‘Taro saw Mary’s crying.’
\end{enumerate}

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.

\begin{enumerate}
\item[	extit{a}.] ame-no hi  
rain-NO day  
\textquoteleft a rainy day’ (lit. ‘a day of rain’)
\item[	extit{b}.] Taroo-no Yooroppa-e-no ryokoo  
Taro-NO Europe-to-NO trip  
Taroo’s trip to Europe (lit. ‘Taroo’s trip of direction Europe’)
\end{enumerate}

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).

\begin{enumerate}
\item[	extit{a}.] Lina-no-ga omosiroi.  
Lina-NO-NOM is.fun  
\textquoteleft Lina’s is fun.’
\item[	extit{b}.] *Lina-no-no-ga omosiroi.  
Lina-NO-NO-NOM is.fun
\end{enumerate}

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

\textsuperscript{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 structure, 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

\[
\text{QP} \rightarrow \text{CaseP} \rightarrow \text{NP} \rightarrow \text{hon} \rightarrow \text{satu} \]

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. \([\text{hon}]_{\text{NP}} [\text{san t}_{\text{NP}} \text{satu-o}]_{\text{CaseP}}\)

b. \([\text{san t}_{\text{NP}} \text{satu}]_{\#P} [\text{hon}]_{\text{NP}} [\text{t}_{\#P} \text{o}]_{\text{CaseP}}\)

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

\[13\] 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  
‘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} 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 takusun ‘many’ are base-generated in the Spec of QP. Although Watanabe does not elaborate on the exact location of the base-generated position of these quantifiers, 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-generated in the same position.

\(^{15}\) Watanabe (2006: 283–285) addresses takusun (‘many/much’) in similar structures to (31) following Ishii (1991). However, takusun 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.\(^\text{16}\) 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.

\[(33) \quad \text{John}-\text{TOP \{ooku-o / subete-o / hotondo-o / san-satu\}-o yonda} \]
\[
\text{John-top book-gen \{many-ACC / all-ACC / most-ACC / three-cl\}-ACC read} \\
\text{‘John read \{many / all / most / three\} of the books.’} \\
\]

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.

\[(34) \quad \text{John}-\text{TOP san-satu-no / subete-no / hotondo-no hon-o yonda} \]
\[
\text{John-top three-cl-gen / all-gen / most-gen book-ACC read} \\
\text{‘John read three books / all books / most of the books.’} \\
\]

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.

\[(35) \quad a. \quad \text{watasi-wa [kinoo atta suu-nin-no gakusei]-o syootai-sita} \]
\[
\text{I-TOP yesterday met several-cl-gen students-ACC invite-did} \\
\text{‘I invited the several students I met yesterday.’} \quad (\text{Haig 1980: 1073}) \\
\]

\(^{16}\) 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

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)

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 were running). 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.  

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 that 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)

Let us go through the derivation. The first step is for the NP₁ to move to the Spec of CaseP₁ 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] #P [hon/mono-no hon] [san #P satu] #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-[Mary-ga katta] san-satu-no hon-o yonda
    ‘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 torakkku-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 the pronounced 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-NOM book-ACC three-CL-ACC read-finished
    ‘Taro has finished reading three of the books.’

    b. Taroo-wa san-satu-no hon-o yomi-oeta
    Taro-NOM three-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 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

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

(53)  
\begin{enumerate}
\item Lina-no hon-ga omosiroi.  
\begin{tabular}{ll}
Lina & GEN \\
book & NOM \\
is & interesting \\
\end{tabular}  
‘Lina’s book is interesting.’
\item Lina-ga hon-ga omosiroi.  
\begin{tabular}{ll}
Lina & NOM \\
book & NOM \\
is & interesting \\
\end{tabular}  
‘Lina is such that her book is interesting.’
\end{enumerate}

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)  
\begin{enumerate}
\item Hon-no san-satu-ga omosiroi.  
\begin{tabular}{ll}
book & GEN \\
three & CL-NOM \\
is & interesting \\
\end{tabular}  
‘Three of the books are interesting.’
\item Hon-ga san-satu-ga omosiroi.  
\begin{tabular}{ll}
book & NOM \\
three & CL-NOM \\
is & interesting \\
\end{tabular}  
‘Books are such that three of them are interesting.’
\end{enumerate}
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-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)

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

```plaintext
gon
```
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 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*. 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)

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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-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 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 division 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)  
  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)  
      [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-kō-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 partitive 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 terakku suu-dai]-no terakku
    [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
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

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**Competing Interests**

The authors have no competing interests to declare.

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