The Role of Information Structure in Multiple Quantification Sentences*

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This study investigates the interpretation of sentences with multiple quantifiers in Japanese, with special consideration to the relationship between interpretation and information structure. In particular, I examine conditions under which quantified sentences exhibit distinct interpretations, and attempt to demonstrate that certain aspects of information structure play a crucial role in their determination.

*Keywords*: Information structure, distributive readings, inverse scope readings, topicality, narrow focus

1. Introduction

Sentences with multiple quantifiers (henceforth, multiple quantification sentences) are known to produce a variety of readings, such as cumulative readings and distributive readings. However, it has been reported that, among the many readings that multiple quantification sentences induce, some readings seem easier to obtain than others. Furthermore, the availability of certain readings is also known to vary from person to person and from context to context.

This paper is mainly concerned with the interpretation of multiple quantification sentences in Japanese. By demonstrating how information structure is involved in deriving distinct readings, I attempt to show in this paper (1) why it is more difficult to obtain some readings than others, and (2) why even subtle readings like inverse scope readings become fairly easy under certain conditions.

In the course of the inquiry, I also identify a variety of factors that permit us to explain three empirical phenomena often reported in the literature: (1) why scrambling of the object leads to (strong) scope ambiguity, and (2) why narrow focus on the subject clarifies scope ambiguity, and (3) why quantificational phrases (henceforth, QPs) construed as specific tend to take wide scope.

2. Initial Observations

2.1. Available Readings

It has been noted that QPs as in sentences (1) interact with each other, and produce a number of distinct readings given in (2).

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* A version of this paper was presented at the Workshop on Prosody, Syntax, and Information Structure held at Indiana University, Bloomington (April 30-May 1, 2004). I would like to thank the participants for their comments. Special thanks are due to Yoshi Kitagawa, S.-Y. Kuroda, Satoshi Tomioka, and two anonymous reviewers for their invaluable suggestions. All remaining errors are mine.
(1) **Multiple Quantification Sentences**

   a. [Dareka]-ga [daremo]-o hihansita.
      someone-NOM everyone-ACC criticized
      'Someone criticized everyone.'

   b. [Sannin no zyosee]-ga [hutari no dansee]-o paatii-ni sasotta.
      three.CL GEN woman-NOM two.CL GEN man-ACC party-to invited
      'Three women invited two men to a party.'

(2) **Available Interpretation in (1)**

   a. someone > everyone; everyone > someone
      3 women > 2 men; 2 men > 3 women; cumulative reading

   For example, sentence (1b) allows two **distributive readings**. These two interpretations can be reduced to the relative scope of each QP: one in which sannin no zyosee '3 women' scopes over hutari no dansee '2 men' (i.e., 3 women > 2 men, or "**surface scope reading**"), and the other in which the scope relation is reversed (i.e., 2 men > 3 women, or "**inverse scope reading**"). The former interpretation involves the maximum of six men in total when each of three women invites two distinct men. On the other hand, the latter reading involves the maximum of six women when two men are each invited by three different women.

   In addition to distributive readings, sentence (1b) allows a reading, which Scha (1981) calls **cumulative reading**. Sentence (1b) on a cumulative reading expresses the following: the total number of women who invited a man is three and the total number of men who were invited by a woman is two, never mind which woman invites which men.

2.2. **Some Asymmetries**

   It has been assumed in the literature (e.g., Kuroda (1970) and Hoji (1985)) that inverse scope readings (i.e., DISTR(Obj, Sbj)) are unavailable in a language like Japanese. However, Kitagawa (1990, 1994) among others observes that both surface readings and inverse readings are indeed available, noting that inverse scope readings tend to be weaker than surface scope readings. In addition to the asymmetry between distributive readings, it has often been noted that non-distributive readings, such as cumulative readings, are more

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1 It is a matter of debate whether cumulative readings are an independent interpretation. Landman (1989), for one, claims that cumulative readings are an interpretation in its own right (i.e., the grammar makes them available) whereas Roberts (1987) argues that cumulative readings are reducible to group readings (e.g., a special case of group readings available in some context).

   Instead of discussing the ontological status of these two types of readings further, let us note a crucial difference between the two. Group readings and cumulative readings are different in that a collaborative effort is assumed in the former but no such collaboration is implied in the latter. In this paper, we will limit our discussion to cumulative readings and distributive readings.

2 DISTR(Obj, Sbj) is a shorthand notation for a reading where the object distributes over the subject; similarly, DISTR(Sbj, Obj) indicates a reading where the subject QP distributes over the object QP. In this paper, DISTR(Sbj, Obj) and DISTR(Obj, Sbj) are used interchangeably with **surface** and **inverse scope readings**, respectively.
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readily available than distributive readings. Such interpretive asymmetries are summarized in (3).

(3) Some Contrasts among Available Readings in (2)
   a. surface scope readings >> inverse scope readings
   b. non-distributive readings >> distributive readings

We will first take up (3a) in section 4, and then discuss (3b) more in detail in section 5. Although inverse scope readings are generally much weaker than surface scope readings, acceptability judgments involving inverse scope readings are quite unstable. For example, inverse scope readings seem even weaker sometime, but they seem much clearer other times. A variety of factors have been also reported to affect our judgments in this connection. In the next subsections, we will discuss some of those factors.

2.3. Some Factors that Affect Distributive Readings

As indicated in (3a), while surface scope readings are relatively easy, inverse scope readings are generally difficult if not impossible. However, as Kuroda (1970) and Hoji (1985) among others observe, scrambling of the quantified object over the quantified subject facilitates inverse scope readings, and makes the scrambled sentence more clearly ambiguous. The contrast is illustrated in (4) and (5).

(4) Effect of Scrambling
   a. [Sannin no zyosee]-ga [hutari no dansee]-o paatii-ni sasotta.
      three.CL GEN woman-NOM two.CL GEN man-ACC party-to invited
      'Three women invited two men to a party.'
   b. [Hutari no dansee]-o [sannin no zyosee]-ga paatii-ni sasotta.
      ____________

(5) Interpretation of (4)
   a. OK 3 women > 2 men, *? 2 men > 3 women
   b. OK 3 women > 2 men, OK 2 men > 3 women

The (strong) ambiguity as in (5b) has often been attributed to the presence of the trace that scrambling creates. For example, according to the Scope Principle in the sense of Aoun and Li (1993), sentence (4a) is predicted to be scopally ambiguous because *hutari no dansee* 'two men' c-commands *sannin no zyosee* 'three women,' and *sannin no zyosee* 'three women' in turn c-commands the trace of *hutari no dansee* 'two men.' In other words, such an approach treats the effect of scrambling on scope ambiguity as a purely syntactic phenomenon: ambiguity is reduced to a structural configuration/representation in covert syntax (i.e., c-command among QPs and traces). However, such a syntactic approach would fail to capture certain important empirical facts. First, as we noted earlier, even an unscrambled sentence like (4a) is ambiguous to some extent. While scope ambiguity associated with unscrambled sentences is relatively weak, the presence of ambiguity is

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3 $\alpha >> \beta$ indicates that $\alpha$ is more salient than $\beta$, where $\alpha$ and $\beta$ are distinct readings.
unexpected under an approach that makes a crucial reference to a trace. Second, it has been observed that non-syntactic factors, such as narrow focus, also induce an effect similar to scrambling in this connection. Kitagawa (1990, 1994), for example, points out that inverse scope readings are facilitated when the quantified subject is narrow-focused. A similar effect has been reported with respect to specificity. For example, Hayashishita (1999) points out that inverse scope readings are felt to be easier when the quantified object is construed as specific.

As demonstrated rather convincingly in Kitagawa (1990), a syntactic approach seems feasible to account for the effect of narrow focus on distributive readings as well as that of scrambling. However, there are a few questions that would remain unexplained. First, it seems quite difficult, if not impossible, to represent the effect of specificity in terms of structural configuration. As a matter of fact, Hayashishita himself regards the specificity effect as a non-syntactic effect, and treats it as quasi-scope phenomenon. Second, as we discussed earlier, acceptability judgments involving the interpretation of multiple quantification sentences are unstable. For example, our judgments of even the same sentence may vary from individual to individual and from context to context. In order to capture variations along these lines, it seems that we must go beyond syntax.

In the next section, I will demonstrate that certain aspects of information structure play an important role in deriving the various readings that multiple quantification sentences make available. On the basis of the observation, I will then give an alternative analysis of how the distinct readings associated with multiple quantification sentences are derived. More specifically, I will demonstrate how information structure is systematically involved to designate the relevant readings. In so doing, I will later attempt to zero in on some of the causes for our elusive acceptability judgments involving multiple quantification sentences.

3. Role of Information Structure

3.1. Distributive Readings and Non-Distributive Readings

Let us examine in this section how distributive readings are obtained (as opposed to non-distributive readings). Let us take sentence (1b), repeated here as (6), as an example.

(6) [Sannin no zyosee]-ga [hutari no dansee]-o paattii-ni sasotta.
three.CL GEN woman-NOM two.CL GEN man-ACC party-to invited
'Three women invited two men to a party.'
First, notice that, when the subject QP (sannin no zyosee '3 women') distributes over the object QP (hutari no dansee '2 men'), each individual member of the set of three women establishes a "semantic relation" with a set of two men.\(^5\) This is visually represented in (7a).\(^6\) Since each and every member is counted, let us call this QP construal "**enumerated construal.**" Similarly, as shown in (7b), when the object QP distributes over the subject QP, each of the two men establishes a thematic relation with a set of three women. In other words, the quantified object is construed as enumerated in (7b). In contrast with (7a) and (7b), thematic relations are not designated to each member of three women on a cumulative reading in (7b). Recall that the cumulative reading of sentence (6) merely specifies the number of women who invite a man and the number of men who are invited by a woman; it does not count each individual member, but it only refers to the group as a whole. Let us call the QP construal illustrated in (7c) "**non-enumerated construal.**" It must be noted here that the same QP (e.g., sannin no zyosee '3 women') allows either enumerated or non-enumerated construal: enumerated in (7a) but non-enumerated in (7c).\(^7\)

(7) **Distributive vs. Non-Distributive Readings**

<table>
<thead>
<tr>
<th>a. Surface</th>
<th>b. Inverse</th>
<th>c. Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) \rightarrow 1 \rightarrow 2 \rightarrow 3</td>
<td>(a) \leftrightarrow 1 \leftrightarrow 2 \leftrightarrow 3</td>
<td>(a) \rightarrow (b) \rightarrow 1 \rightarrow 2</td>
</tr>
<tr>
<td>(b) \rightarrow 4 \rightarrow 5 \rightarrow 6</td>
<td>(b) \leftrightarrow 2 \leftrightarrow 4 \leftrightarrow 5 \leftrightarrow 6</td>
<td>(b) \rightarrow (c) \rightarrow 1 \rightarrow 2</td>
</tr>
<tr>
<td>3 women \rightarrow 2 men</td>
<td>2 men \rightarrow 3 women</td>
<td>3 women \rightarrow 2 men Non-Distributive</td>
</tr>
</tbody>
</table>

In summary, when a distributive reading is obtained, one of the QPs is construed as enumerated. More specifically, the QP that distributes over another QP (henceforth, the **distributor**) is construed as enumerated. On the other hand, when non-distributive readings arise, the QPs receive non-enumerated construal.

Notice now that, when distributivity is observed, the QP that is distributed over (henceforth, the **distributee** ) exhibits what we may call **referential variation.**\(^8\) For example, when the subject QP distributes over the object QP as in (7a), the referents of the object QP ("2 men") vary, depending on the referent of the subject QP ("3 women"): "2 men" picks out men 1 & 2 with respect to woman \(a\), men 3 & 4 with respect to woman \(b\), and men 5 & 6 with respect to woman \(c\). On the other hand, QPs do not show such

\(^{5}\) Here, a "semantic relation" is roughly taken as a thematic relation (indicated by arrows). In this case, each arrow indicates an inviting relation.

\(^{6}\) Each letter in the diagram indicates an individual woman; numbers represent men.

\(^{7}\) Although most QPs are ambiguous, there are some QPs that are obligatorily enumerated. We will take this up in section 5.

\(^{8}\) Beghelli and Stowell (1997: 87) also observe that "these intuitions about distributivity rely on the possibility that the noun phrase serving as the distributed share [=the distributee] is capable of referential variation."
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referential variation on a cumulative reading, as shown in (7c). Let us summarize what we have noted for distributive readings in the form of a generalization.

(8) *Distributive Readings*

Distributive readings are obtained when one QP is enumerated, and another QP displays referential variation.

On the basis of the above generalization, I would like to propose the following two conditions for distributive readings.

(9) *Conditions for Distributive Readings*

a. Only a QP construed as enumerated may function as a distributor, and
b. Only a QP that is capable of exhibiting referential variation (henceforth, [+r-variable]) may function as a distributee.

These two conditions are not unrelated to each other. Rather, the condition on the distributor must be satisfied for referential variation on the distributee to arise to begin with. Notice that referential variation occurs because the distributee picks out a distinct set of referents for each referent that the distributor enumerates. In other words, there would not be any room for referential variation unless the distributor enumerates its referents one by one and establishes a thematic relation between each enumerated referent and the referents of the distributee.

Also, it has to be noted here that a [+r-variable] QP is only *capable* of showing referential variation; a [+r-variable] QP may or may not actually show referential variation. This point should be clear from cases like (7a) and (7b), where the same QP displays referential variation in one case but not in the other. For example, while the QP *hutari no dansee* 'two men' does not exhibit referential variation in (7a), the same QP displays referential variation in (7b). Therefore, the QP *hutari no dansee* 'two men' is [+r-variable] although referential variation is not manifested in (7a).9 As we will see, most QPs are [+r-variable]. Whether or not a given [+r-variable] QP results in referential variation often hinges on non-syntactic factors, such as pragmatic context and focus. In the next subsection, we will discuss QPs that resist referential variation: [-r-variable] QPs.

3.2. [-r-variable] QPs

It is at least intuitively clear that a QP cannot display referential variation if a specific set of referents is given in the discourse. As a matter of fact, it seems that a QP with a definite determiner as shown in (10) does not allow for referential variation (i.e., [-r-variable]).

(10) *Specificity/Definiteness*

a. *[Sono] sannin no zyosee]-ga [hutari no dansee]-o paatii-ni sasotta.
   *that three.CL GEN woman-NOM two.CL GEN man-ACC party-to invited*
   'Those three women invited two men to a party.'

b. *[Sannin no zyosee]-ga [sono] hutari no dansee]-o paatii-ni sasotta.

9 The same also holds for *sannin no zyosee* 'three women.'
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three. CL GEN woman-NOM that two. CL GEN man-ACC party-to invited
'Three women invited those two men to a party.'

(11) Interpretation of (10)
   a. OK DISTR(3women, 2men); *DISTR(2men, 3women)
   b. *DISTR(3women, 2men); OK DISTR(2men, 3women)

Although the inverse scope reading is generally hard to begin with, it becomes just impossible when the quantified object is marked with the definite sono 'that,' as shown in (10a). On the basis of the conditions in (9), the lack of the inverse scope reading in (10a) indicates that QPs marked with a definite determiner cannot serve as a distributee because they are [-r-variable]. The absence of the surface scope reading with (10b) renders further support in this connection. Contrary to what we usually observe with multiple quantification sentences, sentence (10b) allows the inverse scope reading to the exclusion of the surface scope reading. The obviation of the surface scope reading seems to follow from the assumption that a QP marked as specific/definite is [-r-variable].

A similar effect is also observed with respect to a QP marked with the topic particle – wa, as the contrast in (12) illustrates.

(12) Topicality
   a. [Sannin no zyosee]-ga [hutari no dansee]-o paatii-ni sasotta.
      three. CL GEN woman-NOM two. CL GEN man-ACC party-to invited
      'Three women invited two men to a party.'
   b. [Sannin no zyosee]-wa [hutari no dansee]-o paatii-ni sasotta.
      three. CL GEN woman-TOP two. CL GEN man-ACC party-to invited

(13) Interpretation of (12)
   a. OK DISTR(3women, 2men); *?~? DISTR(2men, 3women)
   b. OK DISTR(3women, 2men); *DISTR(2men, 3women)

Observe that the inverse scope reading is completely absent in (12b), while it is weak but still possible in (12a). This contrast seems consistent with that in (10), and seems to indicate that a QP construed as the topic cannot serve as a distributee presumably because such a QP is [-r-variable]. Notice that, when a QP is topicialized, such it refers to a specific set of referents salient in the discourse. With a set of referents fixed in the discourse, a topic marked QP does not have room for referential variation. However, the surface scope reading is available with (12b) as predicted since the topicalized subject QP can function as a distributor when enumerated.

We examined in this section how distributive readings are derived. In the next two sections, I will attempt to demonstrate how the interpretive asymmetries in (3) can be captured in light of the analysis of distributive readings entertained above. In this connection, I will also attempt to identify possible causes for shifting acceptability judgments that we experience in dealing with quantified sentences. We will take up the
contrast between surface and inverse scope readings in section 4, and then examine the asymmetry between distributive and non-distributive readings in section 5.

4. Marked Status of Inverse Scope Readings

As we discussed above (and summarized in (3a)), surface scope readings are usually clearly dominant over inverse scope readings. In other words, everything being equal, inverse scope readings are marginal at best. In addition, there seems to be variation on the availability of inverse readings. Some speakers find inverse readings easier than other speakers; inverse scope readings seem clearer in some contexts than others; inverse scope readings may also improve for a variety reasons, such as narrow focus and scrambling. With these complicating factors, acceptability judgments of multiple quantified sentences are chaotic to say the least. In this section and the next, I hope to disentangle some of these complications.

4.1. Topicality

Let us first identify the reasons for the marked status of inverse scope readings. Given the analysis proposed in the previous section, inverse scope readings would arise when the quantified subject displays referential variation. What this suggests is that the difficulty associated with inverse scope readings comes from the resistance of the quantified subject to exhibit referential variation. Why is the subject more resistant to referential variation than the object? Recall from examples in (12) that a QP marked with the topic marker cannot exhibit referential variation, and thus cannot serve as a distributee. Given this observation, let us suppose that the marginal status of inverse scope readings is due to the inclination for analyzing the subject as part of topic. If the subject position is indeed topical by default, we would be able to capture the fact that inverse scope readings are marginal by default. In addition, we would predict inverse scope readings to improve when the subject is made non-topical. As a matter of fact, the inverse scope reading becomes much more readily available when the quantified subject is detopicalized by narrow focus. Compare (14a) and (14b).

(14) Effect of Narrow Focus
a. [Sannin no zyosee]-ga [hutari no dansee]-o paatii-ni sasotta.
   three.CL GEN woman-NOM two.CL GEN man-ACC party-to invited
   'Three women invited two men to a party.'
b. [SANNIN no zyosee]-ga [hutari no dansee]-o paatii-ni sasotta.

(15) Interpretation of (14)
   a. OK DISTR(3women, 2men);* DISTR(2men, 3women)
   b. OK DISTR(3women, 2men); DISTR(2men, 3women)

While it seems quite difficult to obtain an inverse scope reading with (14a), it is much easier with (14b), where the quantified subject is narrow-focused (in bold capitals). Since topic and focus are opposite concepts, it seems reasonable to surmise that the ease of the inverse scope reading with (14b) is due to a detopicalization of the default topic (i.e., the
subject position) by narrow focus. In other words, as we supposed, the difficulty of inverse scope readings seems to be attributed to the default topicality of the subject.

Recall from our discussion in section 2 that not only narrow focus but also scrambling facilitates inverse scope readings. In the next subsection, we will examine why narrow focus and scrambling pattern together in this respect.

4.2. Scrambling

It has often been assumed that scrambling is semantically vacuous (See Saito (1989) among others). However, the contrast between (16a) and (16b) below suggests that scrambling does have some contribution to the meaning of the sentence.

(16) Effect of Scrambling

Q: Dare-ga sushi-o tukutta-no "Who made the sushi?"

   Taro-NOM sushi-TOP made

b. A2: Sushi-wa Tároo-ga t₁ tsukutta. "Taro made the sushi."
   sushi-TOP Taro-NOM made

Sentences (16a) and (16b) are identical to each other except for the following two aspects. First, the topic-marked object has been scrambled over the subject in the latter. Second, the nuclear accent (indicated by an accent mark) is on the direct object in the former, but it is on the subject in the latter. While both of these sentences are perfectly acceptable in isolation, only the scrambled version in (16b) serves as an appropriate answer to the question in (16). Although it is difficult to detect the difference in meaning between the two sentences in isolation, it is clear in the question-answer context above that they differ in meaning. How are they different from each other?

Ishihara (2001) observes that a certain type of scrambling in Japanese is an operation that moves a phrase out of a focus domain. On the assumption that a sentence has a dipartite information structure: topic and focus, movement out of the focus domain must be a movement into the topic domain. In other words, scrambling of this sort is topicalization. This conclusion seems to be consistent with the contrast in (16). Let us suppose that scrambling, as claimed in Ishihara (2001), takes a phrase out of a focus domain. The phrase *sushi-wa* 'sushi-TOP' in (16b) must have been scrambled out of the focus domain and must be in the topic domain. On the other hand, the same phrase must be still sitting in the focus domain in (16a). This asymmetry is also consistent with the assignment of nuclear stress in indicated in (16).

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10 Based on Cinque (1993), Ishiraha (2001) claims that a nuclear accent in Japanese is assigned to the most deeply embedded non-empty XP. Note here that a verb does not receive a nuclear stress because it is not a phrasal category, and that a trace does not receive a nuclear stress either because it is an empty category.

11 Ishihara (2001) discusses two types of scrambling: scrambling without stress-shifting and scrambling with stress-shifting. The kind of scrambling relevant here is the former.
With this difference in information structure in mind, notice now that, having already mentioned in the question, the phrase *sushi* must be discourse old, but it is in the focus domain (i.e., treated as new information) in (16a). Hence, we can consider the awkwardness of (16a) to result from incompatible information structure. Since no such awkwardness is detected with (16b), I surmise that scrambling has moved *sushi* into the topic domain. Hence, scrambling in (16b) is topicalization.

We have just seen that scrambling can induce the same effect as narrow focus: topicalizing effect. Interestingly, the unacceptable sentence in (16a), repeated here as (17a), can be also salvaged if the subject is narrow-focused, as illustrated in (17b).

(17) **Effect of Narrow Focus**

Q: Dare-ga sushi-o tukutta-no "Who made the sushi?"

| a. A1: | #Taroo-ga sushi-wa tukutta. "Taro made the sushi." [= (16a)] |
|        | Taro-NOM sushi-TOP made |
| b. A2: | TAROO-GA sushi-wa tukutta "Taro made the sushi." |
|        | Taro-NOM sushi-TOP made |

Kitagawa (p.c.) observes that, in contrast with (17a), (17b) is perfectly acceptable with narrow focus on the subject. Notice the absence of nuclear stress on the topic-marked phrase in (17b) due to the narrow focus on the subject. I believe that the above contrast provides further support to the idea that both scrambling of the object and narrow focus on the subject can achieve the same goal: topicalizing the object. With the above discussion in mind, let us now return to multiple quantification sentences.

### 4.3. Possible Source of Unstable Acceptability Judgments

As we saw above, the notion of topicality plays an important role in deriving different readings, whether it is manifested as topicality by default, as a consequence of scrambling, or by narrow focus. Recall that even the same sentence may produce distinct readings, depending on which part of the sentence is interpreted as topical (i.e., [-r-variable]). For example, inverse scope readings become clearer when the object is considered topical (e.g., via narrow focus on the subject); only surface scope readings become available when the subject is construed topical (e.g., with the topic marker).

Notice that, even when a sentence is not overtly marked for topicality, as in (18a), we may in principle associate any part of the sentence with topicality. On the other hand, when a sentence is overtly marked for topicality, as in (18b), there is no such "flexibility."

(18) **Arbitrary Association of Topicality**

| a. [Sannin no zyosee]-ga [hutari no dansee]-o paatii-ni sasotta. |
| three.CL GEN woman-NOM two.CL GEN man-ACC party-to invited |
| 'Three women invited two men to a party.' |
| b. [Sannin no zyosee]-wa [hutari no dansee]-o paatii-ni sasotta. |
| three.CL GEN woman-TOP two.CL GEN man-ACC party-to invited |

(19) **Interpretation of (18)**
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a. OK\text{DISTR}(3\text{women}, 2\text{men}); *\text{DISTR}(2\text{men}, 3\text{women})
b. OK\text{DISTR}(3\text{women}, 2\text{men}); \text{DISTR}(2\text{men}, 3\text{women})

As a result, whether we construe the subject or the object as topical, we may obtain either surface or inverse scope reading with (18a), as indicated in (19a). As is often reported, inverse scope readings are available to different degrees, as indicated by *?~? in (19a). This may be due to a variety of factors that allow us to construe the quantified object as topical. For example, the context may make it possible to interpret the object topical, or we may unconsciously narrow focus the subject. No such factors can interfere when the sentence is overtly marked for topicality, as in (17b). Since the quantified subject is explicitly marked for topicality with –wa (i.e., [-r-variable]), only the surface scope reading is available.

What we discussed in section 4 are summarized as follows:

(20) \textbf{Summary of Section 4}
\begin{itemize}
  \item a. Dominance of surface scope readings over inverse scope readings is attributable to the default construal of the subject as topical.
  \item b. Both scrambling of the quantified object and narrow-focusing of the quantified subject facilitate inverse scope readings because they topicalize the object.
  \item c. Unstable and shifting acceptability judgments we experience are (at least partly) due to arbitrary association of topicality with the sentence.
\end{itemize}

In this section, we examined the interpretive asymmetry between surface and inverse scope readings. In the next section, we will turn to the other asymmetry: the one between distributive readings and non-distributive readings.

5. \textbf{Marked Status of Distributive Readings}

As we discussed in section 2 and summarized in (3b), distributive readings (e.g., surface and inverse scope readings) seem more marked than non-distributive readings (e.g., cumulative readings). We will examine in what follows why this asymmetry arises.

5.1. \textbf{Optionally vs. Obligatorily Enumerated QPs}

In addition to the condition on the distributee, I proposed a condition on the distributor in section 3. Recall that a QP functions as a distributor only when it is construed as enumerated. Since QPs are ambiguous between enumerated or non-enumerated construal as noted in footnote 7, the same multiple quantified sentence allows either distributive or non-distributive readings. While it is true that the majority of QPs are flexible in this respect, there seem to be a small number of QPs that are \textit{obligatorily} enumerated. If obligatorily enumerated, a QP will function as a distributor, and will result in a distributive reading (to the exclusion of a cumulative reading). Compare the two types of QPs in (21) in terms of their respective interpretation in (22).

(21) \textbf{Optionally vs. Obligatorily Enumerated QPs}
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a. [Taro  to  Hanako]-ga  [sannin no hito]-o  suisenseita.
   Taro and Hanako-NOM three.CL GEN person-ACC recommended
   'Taro and Hanako recommended two people.'

b. [Taro  mo  Hanako  mo]  [sannin no hito]-o  suisenseita.
   Taro also Hanako also three.CL GEN person-ACC recommended
   'Both Taro and Hanako recommended two people.'

(22) Interpretation of (21)
   a.  OK cumulative >> OK DISTR(3women, 2men) >> OK DISTR(2men, 3women)
   b.  *cumulative, OK DISTR(3women, 2men), *DISTR(2men, 3women)

Both (21a) and (21b) involve a conjoined expression. However, (21b) does not permit a cumulative reading while (21a) allows a cumulative reading in addition to distributive readings. This contrast suggests that a QP of the type A mo B mo 'both A and B' is obligatorily enumerated because we only get distributive readings. On the other hand, it seems that a QP of the type A to B 'A and B' is only optionally enumerated: when it is actually enumerated, distributive readings are obtained; when it is not enumerated, cumulative readings result.

5.2. Ease of Non-Distributive Readings and Shifting Judgment

On the basis of the discussion in section 5.1, let us now speculate on possible reasons for the salience of non-distributive readings (e.g., cumulative readings) over distributive readings. As stated in (9), a sentence must satisfy two conditions to produce distributive readings: one for the distributor and the other for the distributee. On the basis of these conditions, I surmise that distributive readings are generally difficult to obtain because they must satisfy both conditions. In addition, in regard to the condition on the distributor, we noted that most QPs are optionally enumerated. If a QP is only optionally enumerated, the sentence would induce distributive readings only when the context imposes enumerated construal. Otherwise, non-distributive readings result. I take this to be another possible source of the dominance of non-distributive readings. Finally, unless a QP is overly specified for enumerated construal, whether we can obtain distributive readings seems dependent on the context. As we can and often do alter context unconsciously, the shifting judgment also seems to follow from this view.

6. Summary

We saw in this paper that certain aspects of information structure are involved in deriving distinct readings that quantified sentences make available. More specifically, I illustrated how topicality plays a role in allowing and suppressing certain readings. In this connection, I also speculated on reasons for two interpretive asymmetries: the marked status of inverse scope readings (section 3) and the marked status of distributive readings (section 4). Paying attention to the role of topicality, I also examined why narrow focus and scrambling both facilitate inverse scope readings.

References
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