

Remarks on Japanese-speaking Children's Interpretation of Negative Sentences Containing Quantifiers with Contrastive *Wa*

Akiko Terunuma
University of Tokyo

YHX04426@nifty.ne.jp

1. Introduction

In Japanese negative sentences, when *zenbu* 'all' in object position appears after the ACC Case particle and is marked by contrastive *wa*, the scope relation between *zenbu* 'all' and Neg is unambiguous: *Zenbu* 'all' always takes narrow scope with respect to Neg. For example, the sentence in (1) is false in the context (2a) and true in the context (2b).¹

- (1) Taro-wa hon-o zenbu-wa yoma-nakat-ta.
Taro-TOP book-ACC all-FOC read-Neg-PAST
'Taro didn't read all the books.'
- (2) a. Every book is such that Taro didn't read it.
b. Not every book was read by Taro.

As Terunuma's (2001) experiment with truth value judgment tasks reveals, however, Japanese-speaking children, unlike Japanese-speaking adults, judge sentences such as (1) to be true in contexts such as (2a).

The aim of this note is to discuss the problems of (i) why the all > Neg interpretation is not allowed in sentences like (1) and (ii) what causes the difference between Japanese-speaking children and adults in the interpretation of such sentences, which remain to be considered in Terunuma (2001). This note is organized as follows: In section 2, I will take a look at the scope relation between quantifiers with contrastive *wa* and Neg in Japanese. In section 3, I will review three previous studies on contrastive *wa* in negative sentences, McGloin (1987), Kato (1985) and Hirose and Kaga (1997), and assume, basically following Hirose and Kaga (1997), that the implicature induced by contrastive *wa* is influential in determining the scope relation between quantifiers and Neg when the quantifiers are marked

¹ In this note I will use the following notation: TOP = topic, ACC = accusative, FOC = focus particle, PAST = past tense morpheme, CL = classifier, SFP = sentence-final particle, PRES = present tense morpheme.

by contrastive *wa*. In section 4, I will point out two conceivable analyses which explain why Japanese-speaking children, unlike Japanese-speaking adults, accept sentences such as (1) in contexts such as (2a). Section 5 contains concluding remarks.

2. The Scope Relation between Quantifiers with Contrastive *Wa* and Neg

Without contrastive *wa*, both *zenbu* ‘all’ and numerals in the position after an ACC Case particle (henceforth post-ACC position) can take either wide or narrow scope with respect to Neg in Japanese negative sentences, as (3a, b) illustrate.

- (3) a. Taro-wa hon-o zenbu yoma-nakat-ta. (OK_{all} > Neg, OK_{Neg} > all)
 Taro-TOP book-ACC all read-Neg-PAST
 ‘Taro didn’t read all the books.’
- b. Taro-wa hon-o ni-satsu yoma-nakat-ta. (OK_{two} > Neg, OK_{Neg} > two)
 Taro-TOP book-ACC two-CL read-Neg-PAST
 ‘Taro didn’t read two books.’

(3a) is ambiguous between “Every book is such that Taro didn’t read it” (all > Neg interpretation) and “Not every book was read by Taro” (Neg > all interpretation). (3b) is ambiguous between “There exist two books that Taro didn’t read” (two > Neg interpretation) and “The number of books that Taro read is not two” (Neg > two interpretation).

When marked by contrastive *wa*, however, *zenbu* ‘all’ and numerals in post-ACC position differ in their scope relation with respect to Neg.

- (4) a. Taro-wa hon-o zenbu-wa yoma-nakat-ta. (*all > Neg, OK_{Neg} > all)
 Taro-TOP book-ACC all-FOC read-Neg-PAST
 ‘Taro didn’t read all the books.’
- b. Taro-wa hon-o ni-satsu-wa yoma-nakat-ta. (OK_{two} > Neg, OK_{Neg} > two)
 Taro-TOP book-ACC two-CL-FOC read-Neg-PAST
 ‘Taro didn’t read two books.’

As is shown in (4a), *zenbu* ‘all’ in post-ACC position can only take narrow scope with respect to Neg when it is marked by contrastive *wa*. In contrast, numerals in post-ACC position can take either wide or narrow scope with respect to Neg even when they are marked by contrastive *wa*, as is shown in (4b).

3. The Function of Contrastive *Wa*

3.1 Previous Studies

McGloin (1987) claims concerning *wa* in negative sentences that the constituent marked by contrastive *wa* represents new information and hence signals the target of Neg, while the constituent marked by thematic *wa* represents given information and is outside the scope of Neg. McGloin (1987) predicts that quantifiers with contrastive *wa* always have narrow scope with respect to Neg in negative sentences. As is evident in (4a, b), this prediction is borne out in the case of *zenbu* 'all' in post-ACC position, but not in the case of numerals in post-ACC position.

Kato (1985) explains the unambiguity of the sentence in (5) from the viewpoint of the presupposition of negative sentences in general and of negative sentences containing contrastive *wa*.

- (5) Zen'in-wa repooto-o dasa-nakat-ta. (*all > Neg, OK_{Neg} > all)
 all the people-FOC paper-ACC submit-Neg-PAST
 'All the people didn't submit a paper.'

According to Kato (1985), the structure of the sentence in (5) is either (6a) or (6b), and (6a) and (6b) are interpreted as in (7a) and (7b) respectively. In both (6a) and (6b), *zen'in* 'all the people', being the focus, is first adjoined to S. Neg is then associated with higher S in (6a) and with lower S in (6b).

- (6) a. NEG [_S [zen'in] [_S x repooto-o dashi-ta]]
 b. [_S [zen'in] NEG [_S x repooto-o dashi-ta]]
 (7) a. Focus: zen'in
 Presupposition: λx (x repooto-o dashi-ta) is well-defined
 Assertion: zen'in $\notin \lambda x$ (x repooto-o dashi-ta)
 b. Focus: zen'in
 Presupposition: $\lambda x \neg$ (x repooto o dashi-ta) is well-defined
 Assertion: zen'in $\in \lambda x \neg$ (x repooto o dashi-ta)

(7a) has the Neg > all interpretation and yields a positive presupposition, while (7b) has the all > Neg interpretation and yields a negative presupposition. Kato (1985) assumes that contrastive *wa* lexically requires a positive presupposition. That is, negative sentences containing contrastive *wa*, such as (5), should be interpreted as in (8):

(8) Negative sentences with *wa*

Presupposition: $\lambda x f(x)$ is well-defined

Assertion: $\alpha \notin \lambda x f(x)$

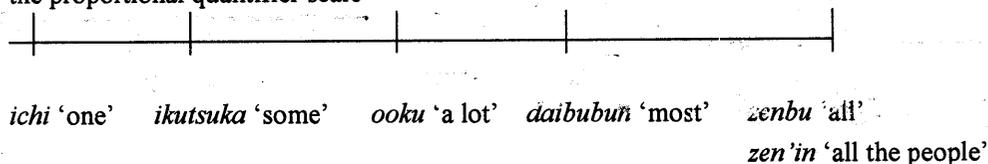
Implication: $[\exists x \neq \alpha x \in \lambda x f(x)]$

Thus, in his analysis, only the Neg > all interpretation, which yields a positive presupposition, is allowed in (5).

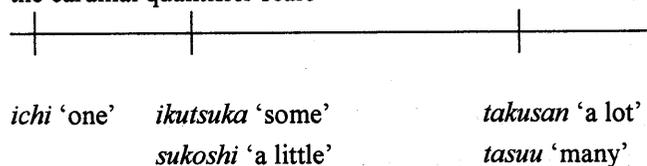
Since the Neg > Q interpretation and the Q > Neg interpretation always yield positive and negative presuppositions respectively, Kato (1985) is the same as McGloin (1987) in predicting that negative sentences containing quantifiers with contrastive *wa* only have the Neg > Q interpretation. As has been pointed out above, this prediction is contrary to fact in the case of numerals in post-ACC position.

As Kato (1985) points out, sentences containing contrastive *wa* induce a contrastive implicature. Hirose and Kaga (1997) direct their attention to this contrastive implicature in explaining why (4a) is unambiguous and (4b) is ambiguous. They assume two types of quantifier scale: the proportional quantifier scale in (9) and the cardinal quantifier scale in (10). As is indicated in (9) and (10), *zenbu* 'all' belongs to the proportional quantifier scale, and numerals can be a member of either scale depending on the context.

(9) the proportional quantifier scale



(10) the cardinal quantifier scale



According to Hirose and Kaga (1997), the proportional quantifier scale has the property of binary opposition in which the highest members with the meaning "all" are opposed to the lower members with the meaning "not all". *Zenbu* 'all' is among the highest members; *daibubun* 'most', *ooku* 'a lot' and *ikutsuka* 'some' are among the lower members. The cardinal quantifier scale is also binary opposition in that the higher members with the meaning "many" are opposed to the lower members with the meaning "a few" in the scale. *Takusan* 'a lot' and *tasuu* 'many' are among the higher members, while *ikutsuka* 'some' and *sukoshi* 'a little' are among the lower members. Numerals can be either a higher member or a lower

member in both scales depending on the context.

When uttering a sentence which contains contrastive *wa*, the speaker implies that a proposition which is contrastive with the assertion of the sentence is also true. In the sentence where a quantifier is marked by contrastive *wa*, the quantifier is contrasted with another quantifier in the same quantifier scale in such an implicature. According to Hirose and Kaga (1997), the contrast between quantifiers which is required in the implicature is appropriate when a higher member and a lower member are contrasted. In such a contrast, the higher member should be negated and the lower member should not be. The opposite contrast is not logically allowed, and this is the source of the unambiguity of (4a). In (4a), the contrast in which *zenbu* 'all', the highest member of the proportional quantifier scale, is negated and a lower member of the same scale is affirmed (namely, "Not every book was read by Taro, but most/some books were read by him") is possible, while the contrast in which *zenbu* 'all' is affirmed and a lower member of the same scale is negated (namely, "Every book is such that Taro didn't read it, but it is not the case that most/some books are such that he didn't read them") is contradictory. Thus, only the interpretation in which *zenbu* 'all' is negated, namely the Neg > all interpretation, is allowed in (4a). In (4b), on the other hand, a coherent contrast is obtained both when *ni* 'two' is negated and when it is affirmed because numerals can be either a higher member or a lower member depending on the context. When *ni* 'two' is a proportional quantifier, the relevant contrast is "The number of books that Taro read is not two, but one" and "There exist two books that Taro didn't read, but it is not the case that every book is such that he didn't read it". *Ni* 'two' is negated in the former and affirmed in the latter. When *ni* 'two' is a cardinal quantifier, the relevant contrast is "The number of books that Taro read is not two, but one" and "There exist two books that Taro didn't read, but it is not the case that there exist many books that he didn't read". Again, *ni* 'two' is negated in the former and affirmed in the latter without contradiction. Consequently, both the Neg > two interpretation and the two > Neg interpretation are allowed in (4b).

To sum up so far, what is claimed to be the function of contrastive *wa* relevant to the scope relation between quantifiers and Neg is to indicate the newness of information in McGloin (1987), to require a positive presupposition in Kato (1985), and to induce a contrastive implicature in Hirose and Kaga (1997). Among these three previous studies, only Hirose and Kaga (1997) explain the (un)ambiguity of both (4a) and (4b).

Hirose and Kaga's (1997) analysis is not without a problem, however. As is mentioned above, they claim that the contrast between quantifiers should be between a higher member and a lower member. In other words, they claim that the contrast between quantifiers is never between higher members or between lower members. This condition is crucial for explaining the unambiguity of the sentence in (11).

- (11) Taro-wa hon-o daibubun-wa yoma-nakat-ta. (OK_{most} > Neg, *Neg > most)
 Taro-TOP book-ACC most-FOC read-Neg-PAST
 'Taro didn't read most books.'

Daibubun 'most' is a lower member of the proportional quantifier scale, and should hence be contrasted with *zenbu* 'all', the highest member of the same scale. Since the contrast in which *daibubun* 'most' is affirmed and *zenbu* 'all' is negated (namely, "Most books are such that Taro didn't read them, but it is not the case that every books is such that Taro didn't read it") is the only coherent contrast in this case, (11) unambiguously has the most > Neg interpretation. If *daibubun* 'most' were allowed to be in contrast with another lower member of the same scale, the contrast in which *daibubun* 'most' is negated and *ikutsuka* 'some' is affirmed (namely, "Taro read not most but some books") would be possible and thus the Neg > most interpretation would be allowed in (11), contrary to fact.

As (12) shows, however, *daibubun* 'most' takes only wide scope with respect to Neg even when it is not marked by contrastive *wa*.

- (12) Taro-wa hon-o daibubun yoma-nakat-ta. (OK_{most} > Neg, *Neg > most)
 Taro-TOP book-ACC most read-Neg-PAST
 'Taro didn't read most books.'

If, as Kato (1985) assumes in line with Ota (1980), the idiosyncratic property of *daibubun* 'most' forces it to have wide scope with respect to Neg, the Neg > most interpretation is excluded in (11) as well as in (12) because of the property of *daibubun* 'most', and the unambiguity of (11) should not necessarily be attributed to the condition above. Then, such a condition is redundant.²

² Hirose and Kaga (1997) explain the unambiguity of (12) independently of (11). They first assume that the default scope relation between quantifiers and Neg is determined by their linear order. When quantifiers precede Neg, the default interpretation is the Q > Neg interpretation. When quantifiers follow Neg, the default interpretation is the Neg > Q interpretation. Since quantifiers never follow Neg in Japanese, the default interpretation of Japanese negative sentences is always the Q > Neg interpretation. Hirose and Kaga (1997) further assume that a marked grammatical means is needed in order to obtain an interpretation different from the default one, and that contrastive *wa* is the marked grammatical means in Japanese. In (12), *daibubun* 'most' precedes Neg and the marked grammatical means is not used. So, (12) has the default interpretation, namely the most > Neg interpretation.

This analysis, however, wrongly predicts that quantifiers without contrastive *wa* cannot take narrow scope with respect to Neg in Japanese negative sentences. As has been shown in (3a, b), *zenbu* 'all' and numerals in post-ACC position can take narrow scope with respect to Neg when they are not marked by contrastive *wa*.

3.2 The Implicature Induced by Contrastive *wa*

Although I leave the question open as to whether the contrast between quantifiers should be restricted to applying to a higher member and a lower member, I basically follow Hirose and Kaga (1997) in assuming that there are two types of quantifier scale, the proportional quantifier scale and the cardinal quantifier scale, and that the quantifier should be contrasted with another quantifier in the same scale when it is marked by contrastive *wa*. More specifically, I assume that contrastive *wa* marks the focus and induces the contrastive implicature in (13). Subscript *F* indicates that the element marked by it is a focus, and $\llbracket \quad \rrbracket^{\circ}$ and $\llbracket \quad \rrbracket^f$ are the ordinary semantic value and the focus semantic value respectively. α_F in the focus semantic value is a variable identical with α in type (cf. Rooth (1985, 1992)).

- (13) When the assertion of the sentence is $\llbracket \dots \alpha_F \dots \rrbracket^{\circ}$, one of the propositions contained in $\llbracket \neg[\dots \alpha_F \dots] \rrbracket^f$ is true.^{3,4}

In addition, I assume that, when α is a quantifier, $\llbracket \alpha_F \rrbracket^f$ denotes the set of quantifiers in the same quantifier scale that α belongs to.

Given the implicature in (13), the unambiguity of (4a), repeated below, is explained as follows:

- (4) a. Taro-wa hon-o zenbu-wa yoma-nakat-ta. (*all > Neg, OKNeg > all)
 Taro-TOP book-ACC all-FOC read-Neg-PAST
 'Taro didn't read all the books.'

When *zenbu* 'all' has narrow scope with respect to Neg at LF, the assertion of (4a) is (14a) and the implicature in (13) requires that one of the propositions contained in (14b) be true.⁵

- (14) a. $\llbracket \neg[\text{Taro read all}_F \text{ the books}] \rrbracket^{\circ}$
 b. $\llbracket \neg\neg[\text{Taro read all}_F \text{ the books}] \rrbracket^f$

The set of propositions denoted by (14b) is something like (15).

- (15) { $\neg\neg[\text{Taro read all the books}]$, $\neg\neg[\text{Taro read most books}]$,
 $\neg\neg[\text{Taro read some books}]$, $\neg\neg[\text{Taro read one book}]$ }

³ The focus semantic value of the sentence containing a focus is a set of propositions.

⁴ This implicature is similar to the implicature induced by Topic in Büring (1997).

⁵ The relative scope of quantifiers and Neg is read off from the structure at LF into the assertion.

The first proposition in (15), namely $\neg\neg$ [Taro read all the books], is contradictory to the assertion in (14a). However, since the other propositions in (15) are not, (4a) can legitimately assert (14a). Thus, the Neg > all interpretation is allowed in (4a). When *zenbu* ‘all’ has wide scope with respect to Neg at LF, on the other hand, the assertion of (4a) is (16a) and the implicature in (13) requires that one of the propositions contained in (16b) be true.

- (16) a. \llbracket for all_F x, such that book(x), \neg [Taro read x] \rrbracket °
 b. \llbracket \neg [for all_F x, such that book(x), \neg [Taro read x]] \rrbracket f

The set of propositions denoted by (16b) is something like (17).

- (17) { \neg [for all x, such that book(x), \neg [Taro read x]],
 \neg [for most x, such that book(x), \neg [Taro read x]],
 \neg [for some x, such that book(x), \neg [Taro read x]],
 \neg [for one x, such that book(x), \neg [Taro read x]] }

All the propositions in (17) are contradictory to the assertion in (16a). So, (4a) cannot legitimately assert (16a), and thus cannot have the all > Neg interpretation.

The ambiguity of (4b), repeated below, is also correctly explained.

- (4) b. Taro-wa hon-o ni-satsu-wa yoma-nakat-ta. (OK_{two} > Neg, OK_{Neg} > two)
 Taro-TOP book-ACC two-CL-FOC read-Neg-PAST
 ‘Taro didn’t read two books.’

When *ni* ‘two’ takes narrow scope with respect to Neg at LF, the assertion of (4b) is (18a) and the implicature in (13) requires that one of the propositions contained in (18b) be true. (18b) denotes a set of propositions like (19).

- (18) a. \llbracket \neg [Taro read two_F books] \rrbracket °
 b. \llbracket $\neg\neg$ [Taro read two_F books] \rrbracket f
 (19) { $\neg\neg$ [Taro read all the books], $\neg\neg$ [Taro read most books],
 $\neg\neg$ [Taro read some books], $\neg\neg$ [Taro read two books], $\neg\neg$ [Taro read one book] }

Since at least the fifth proposition in (19), namely $\neg\neg$ [Taro read one book], does not contradict the assertion in (18a), (4b) can legitimately assert (18a) and thus have the Neg > two interpretation. When *ni* ‘two’ takes wide scope with respect to Neg at LF, the assertion of (4b) is (20a) and the implicature in (13) requires that one of the propositions contained in (20b) be true. (20b) denotes a set of propositions like (21).

- (20) a. $\llbracket \text{for two}_F x, \text{ such that book}(x), \neg[\text{Taro read } x] \rrbracket^o$
 b. $\llbracket \neg[\text{for two}_F x, \text{ such that book}(x), \neg[\text{Taro read } x]] \rrbracket^f$
- (21) $\{ \neg[\text{for all } x, \text{ such that book}(x), \neg[\text{Taro read } x]],$
 $\neg[\text{for most } x, \text{ such that book}(x), \neg[\text{Taro read } x]],$
 $\neg[\text{for some } x, \text{ such that book}(x), \neg[\text{Taro read } x]],$
 $\neg[\text{for two } x, \text{ such that book}(x), \neg[\text{Taro read } x]],$
 $\neg[\text{for one } x, \text{ such that book}(x), \neg[\text{Taro read } x]] \}$

At least the first proposition in (21), namely $\neg[\text{for all } x, \text{ such that book}(x), \neg[\text{Taro read } x]]$, is not contradictory to the assertion in (20a), which makes the assertion in (20a) legitimate for (4b). So, the two > Neg interpretation as well is allowed in (4b).⁶

4. The Acquisition of Negative Sentences Containing *Zenbu* ‘All’ with Contrastive *Wa*

Terunuma (2001) conducted an experiment with truth value judgment tasks to investigate Japanese-speaking children’s interpretation of negative sentences containing quantifiers in post-ACC position. Among the test sentences are sentences like (22) and (23). Both (22) and (23) contain *zenbu* ‘all’ in post-ACC position. While the quantifier is not marked by contrastive *wa* in (22), it is in (23).

- (22) Tora-wa ninjin-o zenbu tabe-nakat-ta yo.
 tiger-TOP carrot-ACC all eat-Neg-PAST SFP
 ‘The tiger didn’t eat all the carrots.’
- (23) Mickey-wa suika-o zenbu-wa tabe-nakat-ta yo.
 Mickey-TOP watermelon-ACC all-FOC eat-Neg-PAST SFP
 ‘Mickey didn’t eat all the slices of watermelon.’

Each type of test sentence is judged against two contexts: the context where the all > Neg interpretation is true (Q > Neg context) and the context where the Neg > all interpretation is true (Neg > Q context). In the Neg > Q context, the all > Neg interpretation is false, while the

⁶ (19) and (21) are the denotations of (18b) and (20b) respectively when *ni* ‘two’ is a proportional quantifier. When *ni* ‘two’ is a cardinal quantifier, (18b) and (20b) denote (i) and (ii) respectively.

(i) $\{ \neg\neg[\text{Taro read many books}], \neg\neg[\text{Taro read some books}], \neg\neg[\text{Taro read two books}],$
 $\neg\neg[\text{Taro read one book}] \}$

(ii) $\{ \neg[\text{for many } x, \text{ such that book}(x), \neg[\text{Taro read } x]],$
 $\neg[\text{for some } x, \text{ such that book}(x), \neg[\text{Taro read } x]],$
 $\neg[\text{for two } x, \text{ such that book}(x), \neg[\text{Taro read } x]],$
 $\neg[\text{for one } x, \text{ such that book}(x), \neg[\text{Taro read } x]] \}$

When *ni* ‘two’ is a cardinal quantifier as well, the implicature in (13) is satisfied in both the Neg > two interpretation and the two > Neg interpretation.

Neg > all interpretation is true. In the Q > Neg context, however, the Neg > all interpretation as well as the all > Neg interpretation is true because the all > Neg interpretation entails the Neg > all interpretation.

In Terunuma's (2001) experiment, 24 Japanese-speaking children (3;10 – 5;1) were tested on sentences like (22) and 23 Japanese-speaking children (3;10 – 5;3) were tested on sentences like (23). As a control group, 27 Japanese-speaking adults were also tested on both types of test sentence. Tables 1 and 2 show the results. Children are divided into two groups according to their age in both Table 1 and Table 2.

Table 1: The rate of acceptance for test sentences like (22)

	Q > Neg context	Neg > Q context
children (3;10 – 4;7)	95.8%	37.5%
(4;8 – 5;1)	100%	70.8%
adults	88.9%	79.6%

Table 2: The rate of acceptance for test sentences like (23)

	Q > Neg context	Neg > Q context
children (3;10 – 4;7)	100%	87.5%
(4;8 – 5;3)	95.5%	90.9%
adults	14.8%	100%

As Table 1 shows, the younger half of the children accept the test sentences without contrastive *wa* such as (22) in the Q > Neg context and reject them in the Neg > Q context. On the other hand, they accept the test sentences with contrastive *wa* such as (23) in both the Q > Neg context and the Neg > Q context, as Table 2 shows.

Since the all > Neg interpretation entails the Neg > all interpretation, the Neg > all interpretation is true in the Q > Neg context as well as in the Neg > Q context. So, the result of the experiment that the children accept the two types of test sentence in the Q > Neg context does not necessarily show that they assign the all > Neg interpretation to the sentences. The children might indeed assign only the Neg > all interpretation to the test sentences.

If children assign only the Neg > all interpretation to the test sentences, the rate of acceptance in the Q > Neg context should be on a par with or less than that in the Neg > Q context. That is not the case, however. As can be seen in Tables 1 and 2, the younger half of the children accept the test sentences more in the Q > Neg context than in the Neg > Q context. Thus, I believe that the children who accept the test sentences in the Q > Neg context assign the all > Neg interpretation to the sentences.

In the case of the test sentences with contrastive *wa* such as (23), children allow the all >

Neg interpretation, while adults do not. Why do children differ from adults in this way? Based on the proposal in section 3.2 that contrastive *wa* induces the implicature in (13), repeated below, two analyses are conceivable.

(13) When the assertion of the sentence is $\llbracket \dots \alpha_F \dots \rrbracket^o$, one of the propositions contained in $\llbracket \neg[\dots \alpha_F \dots] \rrbracket^f$ is true.

One analysis is to assume that children do not know that contrastive *wa* induces the implicature in (13). In adult Japanese, as is discussed in section 3.2, when *zenbu* ‘all’ has wide scope with respect to Neg at LF, (23) asserts (24a) and the implicature in (13) requires that one of the propositions contained in (24b) be true. (24b) denotes a set of propositions like (25).

- (24) a. $\llbracket \text{for all}_F x, \text{ such that slice of watermelon}(x), \neg[\text{Mickey ate } x] \rrbracket^o$
 b. $\llbracket \neg[\text{for all}_F x, \text{ such that slice of watermelon}(x), \neg[\text{Mickey ate } x]] \rrbracket^f$
- (25) $\{ \neg[\text{for all } x, \text{ such that slice of watermelon}(x), \neg[\text{Mickey ate } x]],$
 $\neg[\text{for most } x, \text{ such that slice of watermelon}(x), \neg[\text{Mickey ate } x]],$
 $\neg[\text{for some } x, \text{ such that slice of watermelon}(x), \neg[\text{Mickey ate } x]],$
 $\neg[\text{for one } x, \text{ such that slice of watermelon}(x), \neg[\text{Mickey ate } x]] \}$

Since all the propositions in (25) are contradictory to the assertion in (24a), (23) cannot legitimately assert (24a). Thus, (23) cannot have the all > Neg interpretation in adult Japanese. If Japanese-speaking children lack the knowledge of the implicature in (13), no proposition in (25) is required to be true and the contradiction between the assertion and the implicature does not arise. Thus, (23) is allowed to have the all > Neg interpretation in child Japanese.

Another conceivable analysis is to assume that Japanese-speaking children do have the knowledge of the implicature in (13), but that the contradictory implicature does not override the assertion in child Japanese, unlike in adult Japanese. Under this analysis, when *zenbu* ‘all’ has wide scope with respect to Neg at LF, (23) asserts (24a) and, due to the implicature in (13), one of the propositions contained in (24b) is also considered to be true in child Japanese. Although all the propositions contained in (24b) contradict (24a), the assertion in (24a) is not blocked by the contradictory implicature in child Japanese. Thus, Japanese-speaking children allow the all > Neg interpretation in (23).⁷

⁷ Concerning the results in Tables 1 and 2, another problem remaining to be considered is why the younger half of the children reject the test sentences without contrastive *wa* such as (22) but accept the test sentences with contrastive *wa* such as (23) in the Neg > Q context. Terunuma (2001) claims that the Isomorphism Principle leads the quantifier in post-ACC position to have only wide scope with respect to Neg at LF in child Japanese, which makes Japanese-speaking children reject the test sentences like (22) in the Neg > Q context. Together with Terunuma (2001), the two analyses in the

In order to investigate children's knowledge of the implicature induced by contrastive *wa*, Kobayashi (1992) conducts an experiment on Japanese-speaking children who are in the first grade (around seven years old), the third grade (around nine years old) and the fifth grade (around eleven years old). Affirmative sentences such as (26) are used as test sentences.

- (26) *watashi-wa koppu-wa arai-masu*
I-TOP glass-FOC wash-PRES
'I wash the glass.'

As a result, Kobayashi (1992) points out that it is not until the third grade that Japanese-speaking children come to understand the implicature induced by contrastive *wa*. The result of Kobayashi's (1992) experiment might lead us to choose the first analysis above. However, Kobayashi (1992) suggests the possibility that children can understand the implicature induced by contrastive *wa* in negative sentences earlier than in affirmative sentences. To clarify whether Japanese-speaking children can understand the implicature induced by contrastive *wa* in negative sentences, the experiment with the test sentences such as (27) should be carried out.

- (27) *Mickey-wa mikan-wa tabe-nakat-ta yo.*
Mickey-TOP orange-FOC eat-Neg-PAST SFP
'Mickey didn't eat the orange.'

Such an experiment is needed to decide which of the two analyses above is adequate.

text would explain the problem just mentioned in the following direction. When the quantifier is not marked by contrastive *wa* as in the test sentences like (22), the quantifier has wide scope with respect to Neg at LF because of the Isomorphism Principle in child Japanese. In the test sentences like (23), however, the presence of contrastive *wa* somehow enables the quantifier to have narrow scope as well as wide scope with respect to Neg at LF in child Japanese. Thus, the test sentences like (22) are rejected and the test sentences like (23) are accepted in the Neg > Q context by Japanese-speaking children.

Under the second analysis in the text, there would be still another direction of explanation. Due to the Isomorphism Principle, *zenbu* 'all' in the test sentences like (22) and (23) is led to have only wide scope with respect to Neg at LF in child Japanese. In the case of the test sentences like (22), this is why the sentences are rejected in the Neg > Q context by Japanese-speaking children. In the case of the test sentences like (23), however, since *zenbu* 'all' is marked by contrastive *wa*, Japanese-speaking children with the knowledge of the implicature in (13) consider one of the propositions contained in a set of propositions such as (24b) to be true as well. The Neg > Q context is compatible with such a proposition. Thus, Japanese-speaking children accept the test sentences like (23) in the Neg > Q context. This line of explanation amounts to saying that the test sentences like (23) are accepted in the Neg > Q context by Japanese-speaking children even though the quantifier contained in the sentences takes wide scope with respect to Neg at LF.

5. Concluding Remarks

This paper has investigated the acquisition of Japanese negative sentences containing *zenbu* 'all' with contrastive *wa* in post-ACC position. Although *zenbu* 'all' with contrastive *wa* in post-ACC position cannot have wide scope with respect to Neg in adult Japanese, it can in child Japanese. Under the assumption that the implicature induced by contrastive *wa* blocks the all > Neg interpretation in adult Japanese when *zenbu* 'all' is marked by contrastive *wa*, I have pointed out two conceivable analyses which explain why *zenbu* 'all' with contrastive *wa* can take wide scope with respect to Neg in child Japanese. In order to choose between the two analyses, further investigation is required.

References

- Büring, Daniel (1997) *The Meaning of Topic and Focus: The 59th Street Bridge Accent*, Routledge, London.
- Hirose, Yukio and Nobuhiro Kaga (1997) *Nichieigo Hikaku Sensho 4: Shiji to Shooooo to Hitei*, Kenkyusha, Tokyo.
- Kato, Yasuhiko (1985) *Negative Sentences in Japanese*, *Sophia Linguistica: Working Papers in Linguistics* 19, Sophia University, Tokyo.
- Kobayashi, Tomoko (1992) "Acquisition of the Relative Scope of Neg and Quantifiers in Japanese Children," *Sophia Linguistica: Working Papers in Linguistics* 31, 29-47.
- McGloin, Naomi Hanaoka (1987) "The Role of *Wa* in Negation," *Perspectives on Topicalization: The Case of Japanese Wa*, ed. by John Hinds, Senko K. Maynard and Shoichi Iwasaki, 165-183, John Benjamins Publishing Company, Amsterdam.
- Ota, Akira (1980) *Hitei no Imi: Imiron Josetsu*, Taishukan, Tokyo.
- Rooth, Mats (1985) *Association with Focus*, Doctoral dissertation, University of Massachusetts at Amherst.
- Rooth, Mats (1992) "A Theory of Focus Interpretation," *Natural Language Semantics* 1, 75-116.
- Terunuma, Akiko (2001) "A Note on the Acquisition of Quantifier-Neg Interaction," *Linguistic Research: Working papers in English Linguistics* 18, 97-122, the University Tokyo English Linguistics Association, Tokyo.