

An Analysis of Japanese-speaking Children's Interpretation of Adjectives with Measure Phrases*

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This paper shows that Japanese-speaking children around 6 years old interpret a Japanese comparative construction with a measure phrase like "Kono biru-wa 20 meetru takai (This building is 20 meters taller)" as absolute: the height of this building is 20 meters. Following Watanabe (2011a, b), I propose that Japanese-speaking children in the early stage of language development allow a non-comparative construction without the movement of AP whose surface structure is the same as the comparative construction.

Keywords: children's misinterpretation, comparative construction, non-comparative construction, measure phrase

1. Introduction

This paper shows new supportive evidence that the process of language acquisition is guided by an innate language faculty (the Generative Approach (Chomsky (1981, 1986, 1993)) and presents an analysis of a phenomenon peculiar to child Japanese. As shown in (1), Japanese does not have adjectival inflection indicating comparatives like *-er* in English and comparative and non-comparative adjectives have the same morphology.

- (1) a. Kono biru-wa takai.
this building-Top tall
'This building is tall.'
b. Kono biru-wa ano biru-yori takai.
this building-Top that building-than tall
'This building is taller than that building.'

When adjectives are preceded by measure phrases (MPs), they have only a comparative interpretation as shown in (2).

- (2) Kono biru-wa 20-meetoru takai.
this building-Top 20-meter tall
'This building is 20 meters taller.'

However, according to my study, Japanese-speaking children around 6 years old interpret the adjective in (2) as absolute: the height of this building is 20 meters. This is the same reading that the English sentence in (3) has.

- (3) This building is 20 meters tall.

This paper presents an analysis of the findings on Japanese-speaking children's interpretation of (2) on the basis of Watanabe's (2011a, b) analysis of word order difference between English and Japanese non-comparative constructions. Watanabe argues that Japanese has a construction where non-comparative adjectives allow MPs as in (4a).¹ (4a) corresponds to the English non-comparative construction in (4b).

* This is a shortened and revised version of my MA thesis (Arie (2010)). A part of this paper was presented at the 142th meeting of the Linguistic Society of Japan held at Nihon University and at Generative Approaches to Language

- (4) a. Subj AP MP V
 Kono biru-wa takasa 20-meetoru da. (Japanese)
 this building-Top height 20-meter Cop
 ‘This building is 20 meters tall.’
 b. Subj V MP AP
 This building is 20 meters tall. (English)

In (4), while an MP precedes an adjective in English, an MP follows an adjective in Japanese. Watanabe’s analysis of the word order difference is that Japanese requires an additional AP-movement step in contrast with English. Given Watanabe’s analysis of the word order difference, I propose that Japanese-speaking children in the early stage of language development allow the non-comparative construction without AP-movement whose surface structure is the same as (2) (an MP precedes an adjective) and that they interpret the adjective in (2) as absolute. Thus, through investigating Japanese-speaking children’s interpretation of the comparative construction, this paper clarifies the process of their acquisition of the non-comparative construction.

The organization is as follows. Section 2 reports an experiment on Japanese-speaking children’s interpretation of the comparative construction like (2). Section 3 discusses three possible explanations according to which the child subjects behaved in a non-adult-like way in the experiment for non-grammatical reasons and shows that they are not sustainable. Section 4 provides two kinds of analyses of Japanese-speaking children’s non-adult-like interpretation. Section 5 concludes.

2. Experiment on Japanese-speaking Children’s Interpretation of Adjectives Preceded by MPs

This section introduces an experiment on Japanese-speaking children’s interpretation of a comparative construction such as (2), repeated below, where MPs precede adjectives. The following subsections describe the experiment and present the results.

- (5) Kono biru-wa 20-meetoru takai.
 this building-Top 20-meter tall
 ‘This building is 20 meters taller.’

2.1. Subjects

19 monolingual Japanese-speaking children (5;3-6;3) took part in the experiment. 5 Japanese-speaking and 6 English-speaking adults were also examined as controls.

2.2. Design

I adopted the Truth Value Judgment Task (TVJT) (Crain and Thornton (1998)). The TVJT involved two parts. First, I told a story, using slides made with Power Point presented on a computer screen. At that time, a puppet (in this case Pikachu) watched the slides alongside the subjects. Next, at the end of the story, the puppet made a statement (a stimulus sentence) about what he thought had happened in the story. The subjects were asked to judge whether the puppet’s statement was ‘right,’ in which case the puppet got a strawberry as a reward, or the puppet was ‘wrong,’ in which case he got a green pepper as a punishment. When the subjects rejected the puppet’s statement, they were asked for the reason for their rejection.

Acquisition 2011 held at Thessaloniki. I am grateful to Akira Watanabe, Noriko Imanishi, Tetsuya Sano, Christopher Tancredi, an anonymous reviewer and TPL members for insightful comments and suggestions. My gratitude also goes to peer reviewers. All remaining errors are mine.

¹ Although *takasa* in (4b) appears to be the nominalized form of the adjective *takai* ‘tall,’ Watanabe (2011a, b) argues that it functions as an adjective, a point to which we will return in Section 4.2.1.

Sentences such as (6) were used as stimulus sentences. While (6a) has the comparative reading, (6b) has the absolute reading. The Japanese-speaking subjects were given (6a) and the English-speaking subjects were given (6b).

- (6) a. Japanese Stimulus Sentence
Panda-wa 1-*kirari* takai-yo.
panda-Top 1-*kirari* tall-Excl
‘The panda is 1-*kirari* taller.’
b. English Stimulus Sentence
The panda is 1 *kirari* tall.

The stimulus sentences include a novel unit of length, *kirari*, which I coined. Using the imaginary unit of measurement makes it possible to present children with a stimulus sentence which does not require them to have prior knowledge about the specific words for the units of measurement such as *meters*, *kilogram*, etc. *Kirari* was introduced to subjects by telling the story in (7).

- (7) ‘This story is about various characters who want to measure their height. They have special stones whose name is *kirari*. Strangely, all *kiraris* are of the same size. They decide to make a height measure with *kiraris* (Figure 1). They stick *kiraris* to a tall tree. Finally, their height measure has been completed.’

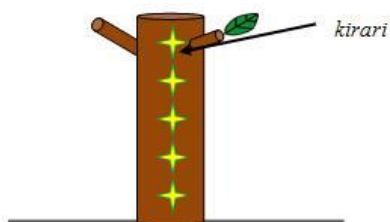


Figure 1. The Height Measure with *Kiraris*

I used three kinds of situations as illustrated in Figure 2-4: a Comparative Situation, an Absolute Situation and a Neutral Situation. In each situation, the English and Japanese stimulus sentences in (8)-(10) were used.

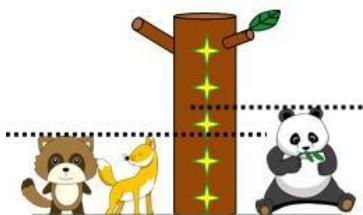


Figure 2. Comparative Situation

- (8) The Stimulus Sentences in the Comparative Situation
a. Japanese
Panda-wa 1-*kirari* takai-yo.
panda-Top 1-*kirari* tall-Excl
‘The panda is 1 *kirari* taller.’
b. English
The panda is 1 *kirari* tall.

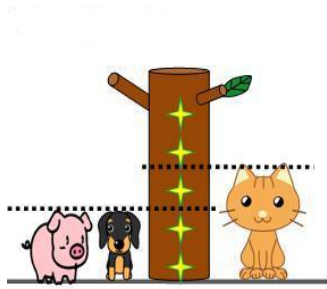


Figure 3. Absolute Situation

(9) The Stimulus Sentences in the Absolute Situation

a. Japanese

Neko-wa 3-*kirari* takai-yo.

cat-Top 3-*kirari* tall-Excl

‘The cat is 3 *kiraris* taller.

b. English

The cat is 3 *kiraris* tall.

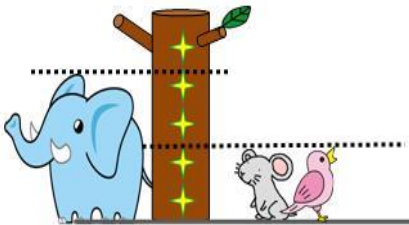


Figure 4. Neutral Situation

(10) The Stimulus Sentences in the Neutral Situation

a. Japanese

Zou-wa 1-*kirari* takai-yo.

elephant-Top 1-*kirari* tall-Excl

‘The elephant is 1 *kirari* taller.

b. English

The elephant is 1 *kirari* tall.

In the Comparative Situation, the comparative reading makes the stimulus sentences true, and (8a) is acceptable to Japanese-speaking adults because the panda is 1 *kirari* taller than the other animals. On the other hand, (8b) is unacceptable to English-speaking adults because the height of the panda is not 1 *kirari* but 3*kiraris* (“absolute reason”). In the Absolute Situation, the absolute reading makes the stimulus sentences true, and (9b) is acceptable to English-speaking adults because the height of the cat is 3 *kiraris*. On the other hand, (9a) is unacceptable to Japanese-speaking adults because the cat is not 3 *kiraris* but 1 *kirari* taller than the other animals (“comparative reason”). Lastly, in the Neutral Situation, neither reading makes the stimulus sentences true. Japanese-speaking adults reject (10a) because the elephant is not 1 *kirari* but 2 *kiraris* taller than the other animals (“comparative reason”). English-speaking adults reject (10b) because the height of the elephant is not 1 *kirari* but 4 *kiraris* (“absolute reason”).

I arranged two kinds of sessions: Session I and Session II. Session I consists of six items: two items in a Comparative Situation, two items in a Neutral Situation, and two filler items. Session II consists of six items: two items in an Absolute Situation, two items in a Neutral Situation, and two filler items. As filler items, I used *yor*i-comparatives (*than*-comparatives in English stimulus sentences) without MPs. The two kinds of Filler Situation were illustrated in Figure 5 and Figure 6 and the stimulus sentences are presented in (11) and (12). While (12) is acceptable to both of Japanese- and English-speaking adults, (11) is not.



Figure 5. Filler Situation I

(11) The Stimulus Sentences in Filler Situation I

a. Japanese

Neko-wa inu-yori takai-yo.

cat-Top dog-than tall-Excl

‘The cat is taller than the dog.’

b. English

The cat is taller than the dog.



Figure 6. Filler Situation II

(12) The Stimulus Sentences in Filler Situation II

a. Japanese

Kirin-wa koara-yori takai-yo.

giraffe-Top koala-than tall-Excl

‘The giraffe is taller than the koala.’

b. English

The giraffe is taller than the koala.

Before the Sessions, the child subjects took a pretest to confirm their simple arithmetic ability. In order to judge whether the comparative reading of the Japanese stimulus sentences matches the situations, subjects have to know the differential between characters’ height, which requires counting numbers and simple subtraction. In the pretest, shown in Figure 7, children were asked how many apples each animal had, which animal had more apples and how many more apples the elephant had than the mouse. Only children who passed the pretest took the main sessions.

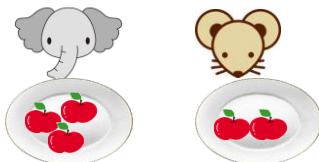


Figure 7. The Situation of the Pretest

2.3. Procedure

Children who passed the pretest had a brief training session where they learned how to measure the height of characters with *kiraris*. Then, they took part in Sessions I and II. Session I was held on the first day and Session II was held on the next day. The same children participated in the two sessions.

In the experiment on the adult controls, the pretest was omitted. In the two sessions, they were just asked whether what the experimenter said was true or false without the interaction with the puppet. When child and adult subjects rejected the stimulus sentences, they were asked for the reason for their rejection.

2.4. Results

Of the 19 children, 10 children (5;9-6;3, mean age: 6;0) passed the pretest.² In the training session, all of them learned how to measure the height of characters with *kiraris*. The percentages of the correct response to filler items in the two sessions altogether are as follows: Japanese-speaking adults (100%), English-speaking adults (100%), and Japanese-speaking children (86.7%). Reactions to the target stimulus sentences are shown below in Table 1-4. The Japanese subjects were given Japanese stimulus sentences like (13a) and the English subjects were given English stimulus sentences like (13b). Tables 1 and 3 show the acceptance rate of the stimulus sentences in Sessions I and II respectively. Tables 2 and 4 show the rejection rate for the “comparative” and “absolute” reasons in the Neutral Situation in Sessions I and II respectively.

- (13) a. Japanese: X-wa N-*kirari* takai-yo. (*comparative reading*)
X-Top N-*kirari* tall-Excl
'X is N *kiraris* taller.'
b. English: X is N-*kiraris* tall. (*absolute reading*)

Both of the Japanese and English adult subjects responded as I had expected. In Session I, all the Japanese adult subjects accepted the stimulus sentences in the Comparative Situation and rejected the ones in the Neutral Situation for the “comparative reason”: the panda is 1 *kirari* taller than the other animals in Figure 2. All the English adult subjects rejected the stimulus sentences both in the Comparative Situation and the Neutral Situation for the “absolute reason”: the panda is 3 *kiraris* tall in Figure 2. On the other hand, about half of the Japanese child subjects responded unlike the Japanese adult subjects and in the same way as the English adult subjects did. They rejected the stimulus sentences both in the Comparative Situation and the Neutral Situation for the “absolute reason.”

² It was unexpected that 9 children (mean age: 5;5) failed to pass the pretest because 5-year-olds are considered to be old enough to solve simple addition and subtraction problems. Even though it has been reported that knowledge of numerals emerges late in language development relative to other words, 4-years-olds understand all numerals in a count sequence that they can recite (Barner et al. (2009), Le Corre et al. (2006), Sarnecka et al. (2007), etc.). Moreover, children as young as 3 years of age are reported to have the ability to solve simple addition and subtraction problems (Starkey and Gelman (1982)). The difficulty with the pretest might have been caused by the phrases which I used as a question. In the pretest, I asked a question such as (i).

(i) Zou-no ringo-wa nezumi-no-yori ooi-ne. Dorekurai ooi?
elephant-Gen apple-Top mouse-Gen-than many-Emphasis how many many

'The elephant has more apples than the mouse. How many more apples does the elephant have?'

The latter sentence in (i) is actually similar to the stimulus sentences in the main sessions. It contains an adjective with a degree phrase 'how many.' The difficulty of interpreting the phrases might have caused their errors and the children who failed to pass the pretest are supposed to have had simple arithmetic ability. However, this defective pretest does not have any consequences on the experimental results of the main sessions because the children who passed the pretest are considered to have had arithmetic ability undoubtedly.

	Japanese children (n=10)	Japanese adults (n=5)	English adults (n=6)
Comparative Situation	50% (10/20)	100% (10/10)	0% (0/12)
Neutral Situation	0% (0/20)	0% (0/10)	0% (0/12)

- a. Comparative Situation: While the Japanese stimulus sentence in (8a) is acceptable, the English one in (8b) is not.
b. Neutral Situation: Both the Japanese and English stimulus sentences in (10a) and (10b) are unacceptable.

Table 1. Session I: The Acceptance Rate of the Stimulus Sentences

	Japanese children (n=10)	Japanese adults (n=5)	English adults (n=6)
“comparative reason”	60% (12/20)	100% (10/10)	0% (0/12)
“absolute reason”	40% (8/20)	0% (0/10)	100% (12/12)

Table 2. Session I: The Rejection Rate for the “Comparative” and “Absolute” Reasons in the Neutral Situation

In Session II, the Japanese and English adult subjects again responded as I had expected. All the Japanese adult subjects rejected the stimulus sentences both in the Absolute Situation and the Neutral Situation for the “comparative reason.” All the English adult subjects accepted the stimulus sentences in the Absolute Situation and rejected the ones in the Neutral Situation for the “absolute reason.” Here again, more than half of the Japanese child subjects responded like the English adult subjects.³

	Japanese children (n=10)	Japanese adults (n=5)	English adults (n=6)
Absolute Situation	65% (13/20)	0% (0/10)	100% (12/12)
Neutral Situation	0% (0/20)	0% (0/10)	0% (0/0)

- a. Absolute Situation: While the English stimulus sentence in (9b) is acceptable, the Japanese one in (9a) is not.
b. Neutral Situation: Both of the Japanese and English stimulus sentences in (10a) and (10b) are unacceptable.

Table 3. Session II: The Acceptance Rate of the Target Sentences

	Japanese children (n=10)	Japanese adults (n=5)	English adults (n=6)
“comparative reason”	40% (8/20)	10/10 (100%)	0/12 (0%)
“absolute reason”	60% (12/20)	0/10 (0%)	12/12 (100%)

Table 4. Session II: The Rejection Rate for the “Comparative” and “Absolute” Reasons in the Neutral Situation

To sum up, the adult controls responded as I had expected. This indicates that both the Japanese and English adult subjects handled *kirari* as a usual unit of measurement. In contrast, about half of the Japanese child subjects seem to have interpreted the adjective in the Japanese stimulus sentences as absolute.

Next, let us closely examine the response of each individual child. On the basis of the children’s responses, I classify each child’s interpretation of the adjective in the Japanese stimulus sentences as either comparative (C) or

³ I also examined Japanese-speaking children’s interpretation of the comparative construction with a *yor*i ‘than’-phrase as in (i) in the Comparative Situation and the Neutral Situation.

(i) Panda-wa hoka-no doubutu-yori 1-*kirari* takai-yo.
panda-Top other-Gen animal-than 1-*kirari* tall-Excl
‘The panda is 1 *kirari* taller than the other animals.’

They responded in the same way as in the Session II. This shows that their absolute interpretation of the comparative construction is robust and that they disregarded the *yor*i ‘than’-phrase.

absolute (A). In Session I, if a child accepted the stimulus sentences in the Comparative Situation and rejected in the Neutral Situation for the “comparative reason,” his/her interpretation is classified as C. In contrast, if s/he rejected the ones in the two situations for the “absolute reason,” his/her interpretation is classified as A. In Session II, if s/he rejected the ones both in the Absolute Situation and the Neutral Situation for the “comparative reason,” his/her interpretation is classified as C. In contrast, if s/he accepted the ones in the Absolute Situation and rejected the ones in the Neutral Situation for the “absolute reason,” his/her interpretation is classified as A. The classification is shown in Table 5.

name, age, sex	H(6;3)m	N(6;3)f	K(6;2)f	S(6;2)m	K(6;1)m	T(6;0)m	A(6;0)m	H(5;10)f	S(5;9)m	A(5;9)f
Session I	C	A	C	C	A	C	C	A	C	A
Session II	C	MIX	C	A	A	C	A	A	A	A

Table 5. Interpretation of Each Individual Child

In Session II, a child, N (6;3) accepted the stimulus sentences in the Absolute Situation but rejected them in the Neutral Situation for the “comparative reason.” Her interpretation is classified as MIX. In Session I, there was no child whose responses were mixed.

If we exclude the child subject whose interpretation is mixed, the children examined are divided into three types in terms of their interpretation, as illustrated in (14).

(14) Three Types of Japanese-speaking Children

Type I: Children consistently interpret “X-wa N-*kirari* takai” as absolute.

K (6;1), H (5;10), A (5;9) (mean age: 5;11)

Type II: Children interpret “X-wa N-*kirari* takai” both as absolute and comparative in accordance with context.

S (6;2), A (6;0), S (5;9) (mean age: 6;0)

Type III: Children consistently interpret “X-wa N-*kirari* takai” as comparative.

H (6;3), K (6;2), T (6;0) (mean age: 6;2)

Three children consistently interpreted the adjective in the stimulus sentences as absolute like English-speaking adults (Type I). On the other hand, three children consistently interpreted it as comparative like Japanese-speaking adults (Type III). The other children interpreted it both as absolute and comparative (Type II). Children of Type II interpreted it as comparative when the situation matched the comparative reading (the Comparative Situation) and interpreted it as absolute when the situation matched the absolute reading (the Absolute Situation). The mean ages of the children belonging to these types are slightly different: the mean age of Type I is the youngest and that of Type III is the oldest. Considering the difference in the mean ages and the comparative reading which Japanese-speaking children have to acquire in the end, the course of development appears to be as follows. First, children interpret the adjective in “X-wa N-*kirari* takai” only as absolute and next come to interpret it either as absolute or comparative in accordance with context. Finally, they interpret it only as comparative like Japanese-speaking adults.⁴

3. Discussion

The previous section has shown that Japanese-speaking children appear to interpret the adjective in the comparative construction like (15) as absolute.

⁴ Actually, the difference in the mean ages of the three types is quite small. This might be caused by the small number of subjects in the experiment. In order to attest the course of development, an experiment on larger number of subjects is required. On this point, further research is required.

- (15) Kono biru-wa 20-meetoru takai.
 this building-Top 20-meter tall
 ‘This building is 20 meters taller.’

However, before concluding that child Japanese has a different syntactic representation of (15) from adult Japanese, three possibilities of their having responded like English-speaking adults for non-grammatical reasons should be considered. This section considers possibilities of children’s disregard of MPs and their lack of adult-like knowledge of the measurement system and of gradable adjectives.

3.1. Disregard of MPs

The child subjects might have disregarded the MPs in the stimulus sentences. This possibility is denied because in the Neutral Situation, repeated below, every child rejected the stimulus sentences. If they had disregarded the MP, 1-*kirari* in (10), repeated as (16), they would have accepted the stimulus sentence because the elephant is clearly taller than the other animals. Thus, the child subjects did not disregard the MPs in the stimulus sentences.

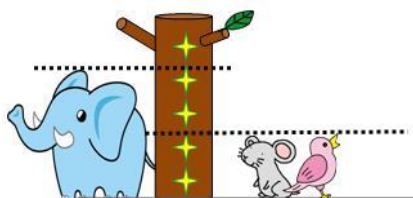


Figure 8. Neutral Situation

(16) The Japanese Stimulus Sentence in the Neutral Situation

Zou-wa (1-*kirari*) takai-yo.
 elephant-Top (1-*kirari*) tall-Excl
 ‘The elephant is (1 *kirari*) taller.’

3.2. Knowledge of the Measurement System

The child subjects might not have had adult-like knowledge of the measurement system. The knowledge of the measurement system does not refer to knowledge of specific words for units of measurement like *meter*, *kilogram*, etc. Rather, it refers to knowledge of measuring out quantity of something abstract with the units of measurement.

Concerning this point, Syrett (2010) reports that children as young as 4 years old have the knowledge of the measurement system. She investigated young children’s understanding of Attributive MPs such as 2-*cup card(s)* and Pseudopartitive MPs such as 2 *cups of cards*. These two types of phrases are highly similar, but they differ in how they measure out quantities. 2-*cup card* is an example of an Attributive MP and it indicates a card with a picture of two cups on it. 2 *cups of cards* is an example of a Pseudopartitive MP, where ‘2 cup’ indicates the amount of cards: there are 2 cups filled with cards. She found that by 4 years of age children correctly understand the difference in meaning between Attributive MPs and Pseudopartitive MPs.⁵ The findings of Syrett (2010)

⁵ Actually, Syrett (2010) conducted two kinds of experiments. Experiment I contrasts Attributive MPs such as 2-*cup cards* with noun-noun (NN) compounds such as 2 *cup-cards*. She found that children as young as 4 years old can distinguish Attributive MPs from NN compounds and that they can represent Attributive MPs correctly. On the other hand, Experiment II contrasts Attributive MPs with Pseudopartitive MPs. While children around 4 years old did well on tasks concerning the interpretation of Pseudopartitive MPs, they did poorly with tasks concerning Attributive MPs this time. Syrett (2010) claims that the bad performance reflects not their misinterpretation of Attributive MPs but their

suggest that even if they do not know many words for the units of measurement, children can measure something abstract, using units such as *cups* and that they interpret MPs on the basis of their syntactic representations.

Given Syrett's (2010) findings, the child subjects (5;9-6;3, mean age: 6;0) are considered to have had adult-like knowledge of measurement system.

3.3. Knowledge of Gradable Adjectives

Lastly, the child subjects might not have had knowledge of the fundamental semantic properties of gradable adjectives: context-dependence, polarity and dimensionality.

First, gradable adjectives in the positive form have a context-dependent property. They are interpreted in such a way that their subjects exceed a contextual standard (Kennedy (1997)). The truth value of sentences which contain gradable adjectives varies as the standard of comparison 'shifts' depending on context. For example, let us consider the expression which contains a predicative adjective in (17).

(17) This building is tall.

Suppose that the height of this building is 50 meters. Whether the expression is true or not depends on context in which it is uttered. When it is uttered with respect to a village where there are few tall buildings, it is judged true. On the other hand, when it is uttered with respect to a city where there are many skyscrapers, it is judged false.

Syrett et al. (2009) investigates whether young English-speaking children can shift the standard of comparison appropriately and reports that children as young as 3 years old can shift the standard of comparison in conformity with the context of utterance. For example, in a situation where there are two rods of unequal lengths, when they are asked, "Please give me the long rod," children can correctly choose the longer one regardless of whether the two rods are both long, both not long or one long and the other not. They can shift their judgment of what length counts as *long* in accordance with contexts.

While Syrett et al.'s (2009) findings are only concerned with attributive gradable adjectives such as 'the long rod,' the construction under consideration in this paper includes predicative gradable adjectives such as (18).

(18) This building is 20 meters tall.

There might be some difference between children's understanding of them. However, as far as I know, no studies have reported the difference between their understanding of attributive gradable adjectives and predicative ones. I assume that children as young as 3 years old can shift the standard of comparison appropriately regardless of whether the adjective is attributive or predicative. It follows that the child subjects in my experiment were old enough to have adult-like knowledge of the context-dependent property of gradable adjectives.

Next, gradable adjectives specify the dimension of comparison (e.g. *height*, *width*, *depth*, etc.) and the direction from the standard of comparison such as positive/negative-pole adjectives (e.g. *big/little*). As for child grammar, it has been argued that while the lexical entries for gradable adjectives represent the polarity correctly, they often incompletely specify the underlying dimension of each gradable adjective (Carey (1978, 1982), Clark (1972)). Clark (1972) reports that if 3- and 4-year-old children are asked for opposites of gradable adjectives, they often err but that their errors almost always respect the polarity of the correct response. For example, to *wide*, a child responds *little*; to *short*, he responds *big*; to *low*, he responds *fat*. It seems that when a new gradable adjective is learned, its polarity is represented early but the underlying dimension of each gradable adjective is learned slowly.

In the experiment which I have presented in Section 2, all stimulus sentences contain the adjective *takai* 'tall,' which is very familiar to young children, and only one kind of dimension, that is, height is concerned. The child subjects are considered not to have been confused with the underlying dimension of the adjective in the

immature processing abilities.

experiment. Therefore, children's knowledge of gradable adjectives is not concerned with their interpretation of the comparative construction.

To sum up, the child subjects in the experiment are considered to have interpreted the adjective in "X-wa N-*kirari* takai" as absolute for grammatical reasons. Therefore, child Japanese has a different syntactic representation of (18) from adult Japanese.

4. Analyses

We have seen that child Japanese has a different syntactic representation of comparative sentences like (19) from adult Japanese.

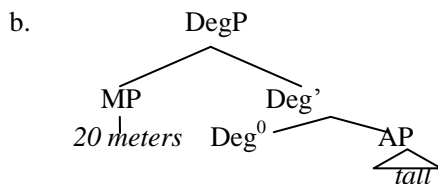
(19) This building is 20 meters tall.

Japanese-speaking children interpret the adjective as absolute. This section introduces two kinds of analyses of Japanese-speaking children's non-adult-like interpretation of it. The first subsection reviews an analysis by Snyder (1995), Snyder and Das (1995) and Snyder, Wexler and Das (1995) that Japanese has an "impoverished" Deg head unlike English and shows that their analysis is not compatible with the findings that Japanese-speaking children interpret (19) as absolute. Next, I will present an alternative analysis on the basis of Watanabe's (2011a, b) analysis of word order differences between English and Japanese non-comparative constructions.

4.1. "Impoverished" Deg Head in Japanese

Snyder (1995), Snyder, Wexler and Das (1995) and Snyder and Das (1995) assume that English has DegP, whose head takes an AP as its complement (Abney (1987)) and that English has an MP in the specifier of DegP, as illustrated in (20).

(20) a. This building is 20 meters tall.



On the other hand, they claim that the specifier of DegP is not available in Japanese on the basis of their observation of the Japanese construction like (21), which lacks the absolute reading.^{6,7}

⁶ Besides the presence of MPs within the functional architecture above AP, in order to determine whether a language has a specifier of DegP, Snyder (1995) examines whether a language has left-branch effects for *wh*-expressions of degree and whether it allows subcomparatives such as (i). However, Snyder (1995) mentions that the "subcomparative test" does not work as a clue to understanding the structure of DegP because even in English, informants vary in their willingness to judge such sentences fully grammatical.

(i) John reads more books than Mary reads magazines.

Left branch effects are not observed in Japanese questions of degree as shown in (ii), in contrast to English as in (iii) where pied-piping of the adjective is obligatory.

(ii) *Dono-gurai ie-ga ookii-no?*
 how house-Nom big-Q
 'How big is the house?'

(iii) *How_i is the house t_i big?

Snyder (1995) explains this by arguing that Japanese *dono gurai* appears to be more directly analogous to an English adverbial phrase *to what extent*, which is likewise immune from any left branch effect, than to the English degree word *how*. I adopt this analysis that Japanese *dono gurai* is an adverbial phrase in contrast with the English degree word *how*.

⁷ Fukui (1986) claims that the functional head INFL (Inflection) in Japanese is defective, having no agreement features

- (21) Kono biru-wa 20-meetoru takai.
 this building-Top 20-meter tall
 ‘*This building is 20 meters tall.’ (*absolute reading*)
 ‘This building is 20 meters taller.’ (*comparative reading*)

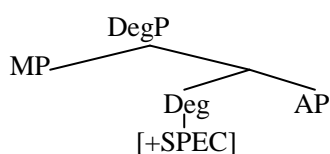
(21) has only the comparative reading. They suppose that Japanese yields the comparative reading because of a null comparative morpheme that, unlike AP, can take a degree-type argument. In order to yield the absolute reading, a circumlocution such as (22) is necessary.

- (22) John-wa sei-ga 2-meetoru da.
 John-Top height-nom 2-meters copula
 ‘As for John, his height is two meters.’ (Snyder (1995): ch.4. (27b))

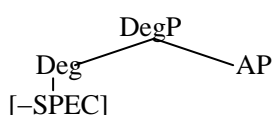
They propose a feature-based approach to account for the interpretive differences of MPs between English and Japanese: while the Deg head in English has a [+Specifier] feature, the Deg head in Japanese has a [–Specifier] feature. Unlike English, the specifier of DegP is not available in Japanese. In this sense, they claim that the Deg head in adult Japanese is “impoverished.”

Moreover, Snyder (1995), Snyder, Wexler and Das (1995) and Snyder and Das (1995) account for English-speaking children’s non-productive use of MPs accompanying an adjective in the same way as adult Japanese. Through the examination of the CHILDES transcripts of spontaneous speech for 14 English-speaking children (MacWhinney & Snow (1985, 1990)), Snyder and Das (1995) found that a majority of the children did not produce MPs accompanying an adjective like (20a) even at ages from 4 to 6. They extracted all the child utterances containing a singular or plural form of any of some 45 commonly used MPs (*year, month, day, foot, inch, story, block, mile*, etc.). Then, the extracted utterances were hand-searched for MPs which accompany an adjective. Of the 6 children whose corpora extend beyond his/her 4th birthday, only 3 children could be described as productively using MPs by the end of their corpora. For these three children, the ages of their first apparent use of MPs were 3;2, 3;9, and 4;5, respectively. The early adjective accompanying MPs was consistently either “N years old,” or “N feet tall,” which were possibly frozen expressions. On the basis of the data analysis, Snyder (1995), Snyder and Das (1995) and Snyder, Wexler and Das (1995) conclude that the Deg head in child English has a [–Specifier] feature and that young children have the “impoverished” Deg head as the initial default state.⁸ To sum up, the syntactic structures which Snyder (1995), Snyder and Das (1995) and Snyder, Wexler and Das (1995) propose are illustrated in (23), (24) and (25).

(23) Adult English



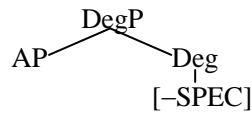
(24) Child English



associated with it. Snyder (1995), Snyder and Das (1995) and Snyder, Wexler and Das (1995) extend this line of argument to the Japanese Deg head.

⁸ Snyder and Das (1995) claim that in child English a Num(Number) head also does not license a specifier. This accounts for English-speaking children’s sporadic omission of plural-marking on semantically plural nouns. They take their claim to be compatible with Hyams’ (1994, 1996) claim that children have an impoverished system of functional categories until a relatively late age. For more detail, see Snyder and Das (1995).

(25) Adult Japanese



However, this analysis that young children have the “impoverished” Deg head as the initial default state is not compatible with Japanese-speaking children’s interpretation of (21) because MPs can combine with non-comparative adjectives in their grammar like the English construction in (20a). Moreover, direct instruction about words for the units of measurement is not formally introduced until entering school and English-speaking children’s non-productive use of them is not so surprising. Thus, we need an alternative analysis in order to explain Japanese-speaking children’s non-adult-like interpretation of (21).

4.2. An Alternative Analysis

4.2.1. Word Order Difference between English and Japanese Non-comparative Constructions

Before presenting an alternative analysis, we will review Watanabe’s (2011a, b) analysis of word order differences between English and Japanese non-comparative constructions, on which the alternative analysis is based.

Contrary to the observation of Snyder (1995), Snyder and Das (1995) and Snyder, Wexler and Das (1995), Watanabe (2011a, b) points out that Japanese has a construction where non-comparative adjectives allow MPs. (26) has the absolute reading.

- (26) Kono biru-wa takasa 20-meetoru da.
 this building-Top height 20-meter Cop
 ‘This building is 20 meters tall.’

Watanabe argues that *takasa* in (26), which appears to be the nominalized form of the adjective *takai* ‘tall,’ functions as an adjective. Indeed, it is possible to attach the nominative case marker *-ga* to *takasa*, as shown in (27).

- (27) Kono biru-wa takasa-**ga** ni-juu-meetoru da.
 this building-Top height-Nom twenty-meter Cop
 ‘This building is twenty meters tall.’ (Watanabe (2011b): (24))

However, (26) cannot be analyzed as a derived nominal through the omission of the case marker. As (28) shows, the nominative case particle cannot be omitted in predicative sentences. Watanabe (2011b) argues that (26) is structurally different from (27), which uses the derived nominal, and *takasa* in (26) functions as an adjective.⁹

- (28) Taroo-wa musuko*(-ga) isha da.
 Taroo-Top sun-Nom doctor Cop
 ‘As for Taro, his sun is a medical doctor.’ (Watanabe (2011a): (25))

Given that *takasa* in (29a) is an adjective, (29a) corresponds to the English non-comparative construction in (29b).

⁹ Following Watanabe (2011a, b), I will continue to gloss *takasa* in question with a nominalized form for explanatory convenience.

- (29) a. Subj AP MP V
 Kono biru-wa takasa 20-meetoru da. (Japanese)
 this building-Top height 20-meter Cop
 ‘This building is 20 meters tall.’
 b. Subj V MP AP
 This building is 20 meters tall. (English)

While an MP precedes an adjective in the English construction, an MP follows an adjective in the Japanese construction. Following Corver (2009), it is also proposed in Watanabe (2011a, b) that (29a) and (29b) have different word order because the AP undergoes movement over the MP in Japanese in contrast with English. The structural basis is considered to be the layer of functional projections in (30).¹⁰

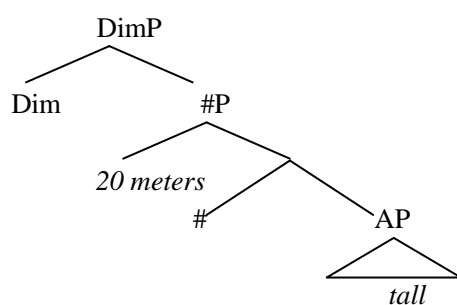
- (30) [DegP Deg° [DimP Dim° [#P MP #° AP]]] (Watanabe (2011a: (17a)))

Watanabe argues that English and Japanese non-comparative constructions have syntactic structures in (31) and (32) respectively.^{11,12}

- (31) a. English

This building is 20 meters tall.

b.



- (32) a. Japanese

Kono biru-wa taka-sa 20-meetoru da.
 this building-Top height 20-meter Cop
 ‘This building is 20 meters tall.’

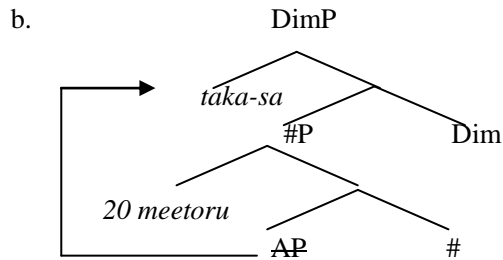
¹⁰ The role of the Dim(Dimension) head is to distinguish the temporal and spatial dimensions.

¹¹ A major motivation for this analysis comes from comparison with PP syntax. See Watanabe (2009, 2011a) for more discussion.

¹² Besides English and Japanese, Watanabe (2011a, b) considers the word order of non-comparative constructions in Dutch, French and Italian below.

- | | | | |
|------|---------------------------------------|-----------|------------------------|
| i. | Dit brood is drie dagen oud. | (Dutch) | (Corver (2009): (42a)) |
| | this bread is three days old | | |
| ii. | La voiture est longue de deux mètres. | (French) | (Corver (2009): (33a)) |
| | the car is long of two meters | | |
| iii. | Gianni è alto due metri. | (Italian) | (Corver (2009): (89)) |
| | Gianni is tall two meters | | |

While an MP precedes an adjective in Dutch like English, an MP follows an adjective in French and Italian like Japanese. This is also taken to be because an AP undergoes movement over an MP in French and Italian in contrast with Dutch.



Considering the particular form of the Japanese adjective ending with *-sa* in (32a) and the ungrammaticality of the version without AP-movement in (33), Watanabe (2011b) speculates that a feature having to do with dimension of measurement is responsible for the morphological shape and the movement of AP.¹³

- (33) *Kono biru-wa ni-juu-meetoru takasa da.
 this building-Top twenty-meter height Cop (Watanabe (2011b): (28))

The Dim (Dimension) head mediates relations between MPs and gradable adjectives. If a wrong kind of measure noun is used, sentences are ungrammatical as in (34).

- (34) a. *Kono kontena-wa omosa go-meetoru da.
 this container-Top weight five-meter Cop
 ‘*This container weights five meters.’
 b. Kono kontena-wa omosa go-ton da.
 this container-Top weight five-top Cop
 ‘This container weights five tons.’ (Watanabe (2011b): (32))

Moreover, there is also a cross-linguistic variation with respect to the set of adjectives that allow MPs. While a gradable adjective, *heavy*, does not allow MPs in English, the corresponding Japanese adjective, *omosa*, allows them, as shown in (34b) and (35).

- (35) *This container is five tons heavy. (Watanabe (2011b): (33))

Thus, agreement with the Dim head is supposed to be responsible for the morphological shape as well as AP-movement.

4.2.2. Children’s Optionality of AP-movement

On the basis of Watanabe’s (2011a, b) analysis of the English and Japanese non-comparative constructions, without AP-movement like English, the Japanese non-comparative construction could have the same word order as the Japanese comparative construction where MPs precede adjectives as shown in (36).

- (36) a. Kono biru-wa taka-sa_i 20-meetoru *t_i* da.
 this building-Top height-sa 20-meter Cop
 ‘This building is 20 meters tall.’

¹³ Watanabe (2011a) argues that the default adjectival stem-forming suffix is *k(u)*, which is used when the other stem-forming suffix *-sa* is not attached to the root. For example, after Vocabulary Insertion takes place cyclically as (i), we get *takai* ‘tall’ in the present form.

(i) takak-Pres => takak-i (=> taka-i) (Watanabe (2011a): (30ii))

- b. Kono biru-wa 20-meetoru takai.
 this building-Top 20-meter tall
 ‘This building is 20 meters taller.’

Moreover, without AP-movement, the adjective would not get the *-sa* suffix and it would also have the same morphology as the adjective, *takai*, in the comparative construction.

Considering that Japanese-speaking children interpret the comparative construction in (36b) as absolute, I propose that Japanese-speaking children in the early stage of language development allow non-comparative constructions without AP-movement just like the English construction in (37). In other words, they take (36b) as a non-comparative construction without AP-movement.

(37) This building is 20 meters tall.

Besides the experiment on Japanese-speaking children’s interpretation of (36b), I conducted another experiment on their interpretation of (36a). Again, sentences such as (38) were used as stimulus sentences.

- (38) Panda-wa takasa 3-*kirari*-da-yo.
 panda-Top height 3-*kirari*-Cop-Excl
 ‘The panda is 3 *kirari*s tall.’

The child subjects in the previous experiment also participated in this experiment. I found that Japanese-speaking children around 6 years old (5;9-6;3, mean age: 6;0) can interpret (38) appropriately. The findings indicate that young children allow non-comparative constructions with and without AP-movement (the Japanese version in (36a) and the English version in (37)). In the early stage of language development, the parameter for whether AP undergoes movement or not in the non-comparative constructions is not specified and child grammar allows both settings.¹⁴

It can be concluded that the value of the parameter for AP-movement is unspecified as the default state. This supports the Generative Approach ((Chomsky (1981, 1986, 1993)) in that we have an innate language faculty and it guides the process of language acquisition. If children get English input, the parameter for AP-movement is set to [–AP-movement]. If they get Japanese input, it is set to [+AP-movement].^{15,16}

We have seen that Japanese-speaking children allow both non-comparative constructions with and without AP-movement. Then, why can’t they interpret (36b) as comparative? The experimental results show that there are

¹⁴ AP-movement is supposed to be triggered by a feature having to do with dimension of measurement, the nature of which I will not pursue here. In this paper, for explanatory convenience, the parameter related to AP-movement is introduced.

¹⁵ I have yet to explain why children take a relatively long time to set the parameter for AP-movement in (36a). The experiment has shown that even 6-year-olds optionally allow AP-movement. I speculate that the relatively late setting of the parameter is related to children’s knowledge of dimensionality of measurement. As we have seen in Section 3.3, children learn dimension of each gradable adjective slowly and even 4-year-olds are confused with the underlying dimensions of adjectives. Given children’s late acquisition of dimensionality of gradable adjectives, their knowledge of dimensionality of measurement can be also acquired slowly. Moreover, Watanabe (2011b) speculates that the feature having to do with dimension of measurement is responsible for AP-movement. If the knowledge of dimensionality of measurement is not matured, the parameter for AP movement cannot be set. Thus, children’s late acquisition of dimensionality of measurement is supposed to have some consequences on their late setting of the parameter for AP-movement.

¹⁶ This analysis predicts that English-speaking children allow a non-comparative construction with AP-movement like “This building is tall 20 meters.” However, they are not expected to produce such expressions in their spontaneous speech. Children are considered to be “conservative learners” in that at least in their spontaneous speech, they do not make productive, spontaneous use of a new structure until they have both determined that the structure is permitted in the adult language and identified the adult’s grammatical basis for it (Snyder (2007)). Thus, even if their grammar allows the non-comparative construction with AP-movement, they are supposed not to produce such expressions.

three types of Japanese-speaking children with respect to their interpretation of (36b) as shown in (39).

(39) Three Types of Japanese-speaking Children

Type I: Children consistently interpret “X-wa N-*kirari* takai” as absolute.

Type II: Children interpret “X-wa N-*kirari* takai” both as absolute and comparative in accordance with context.

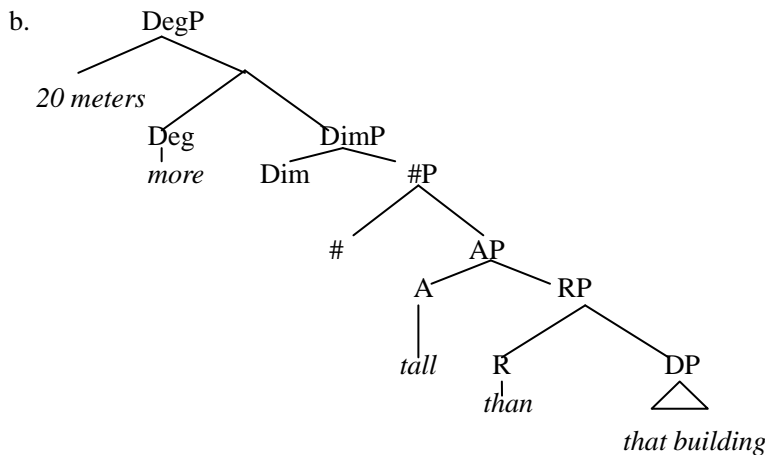
Type III: Children consistently interpret “X-wa N-*kirari* takai” as comparative.

Children of Type II and Type III can interpret the adjective in (36b) as comparative, though children of Type II interpret it as comparative only when the comparative reading matches a situation. On the other hand, children of Type I interpret it only as absolute. The analysis that young children allow optional AP-movement in the non-comparative construction can explain the non-adult-like interpretation of the children of Type II. However, their optional AP-movement does not completely prevent them from interpreting (36b) as comparative.

For the better understanding of children’s inability to interpret (36b) as comparative, let us consider the syntactic structures of the English and Japanese comparative constructions. On the basis of the syntactic structures for the non-comparative constructions proposed by Watanabe (2011a, b) in (31) and (32), syntactic structures for the English and Japanese comparative constructions are proposed as in (40) and (41).

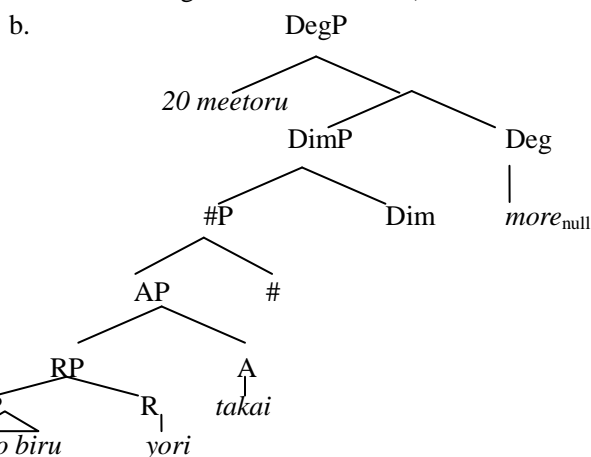
(40) a. English

This building is 20 meters taller (than that building).



(41) a. Japanese

Kono biru-wa 20-meetoru (ano biru-yori) takai.
 this building-Top 20-meter that building-than tall.
 ‘This building is 20 meters taller (than that building.)’



Following Klein (1980) and Kennedy (1997), comparative constructions are assumed to contain the standard of comparison, whether it is implicit or explicit. The standard of comparison is explicitly introduced as *-than* phrases in English and as *-yori* phrases in Japanese as shown in (40a) and (41a). A comparative morpheme, *more* (*more_{null}* in Japanese), which is the head of DegP, requires the standard of comparison. In (40b) and (41b), *than* and *yori* respectively constitute a R(eference) head, which is originally proposed by Watanabe (2009) for locative PPs. He claims that the role of RP is to enable a DP to function as a reference object. In the case of comparatives, it serves to determine the degree exhibited by the standard of comparison. For example, in (40a) and (41a), the height of *this* building is determined relative to the height of *that* building.

Following Kikuchi (2002), MPs are supposed to be in a higher position than the standard phrase. As a piece of evidence for that, Kikuchi shows *wh*-questions such as (42).

- (42) John is 5 inches taller than Mary.
 a. ? How many inches taller than Mary is John?
 b. ? How many inches taller is John than whom?
 c. * Than whom is John how many inches taller? (Kikuchi (2002))

As shown in (42a), it is possible to ask the differential between John's tallness and Mary's, and (42b) shows that asking both the differential and the standard of comparison is also possible. On the other hand, the unacceptability of (42c) can be accounted for by the superiority condition, if the MP is generated in a higher position than the standard phrase.¹⁷ Assuming that English and Japanese comparatives have the same syntactic structures, he claims that an MP is generated in a structurally higher position than that of the standard phrase both in English and Japanese.

In contrast with the syntactic structures for the non-comparative constructions in (31b) and (32b), MPs are base-generated in the specifier of DegP in (40b) and (41b). With these structures, we can capture the fact that while non-comparative adjectives allow MP modification only idiosyncratically, all comparative adjectives allow MP modification, as illustrated in (43) and (44).

- (43) a. *100 tons heavy
 b. *200 dollars expensive
 (44) a. 100 tons heavier
 b. 200 dollars more expensive.

In (40b) and (41b), before the merger of the MPs, the adjectives have become comparative. When the adjectives are comparative, all MPs can combine with them. In contrast, in (31b) and (32b), bare adjectives have restrictions on their selection of MPs. I do not have a solid explanation for how the restrictions on the selection of MPs are imposed on the adjectives and will not pursue this issue here.

Unlike English, Japanese does not have adjectival inflection to mark comparatives, which is caused by the null comparative morpheme *more_{null}*. When *-sa* suffix does not attach to gradable adjectives, that is, adjectives have the default stem-forming suffix *k(u)* (see footnote 13), adjectives modified by MPs are always comparative.

Let us turn back to Japanese-speaking children's inability to interpret the adjective in (45) as comparative.

- (45) Kono biru-wa 20-meetoru takai.
 this building-Top 20-meter tall
 'This building is 20 meters taller.'

¹⁷ The superiority condition is proposed by Chomsky (1973). Translated into a current framework, it stipulates that when two *wh*-phrases are included in the same CP, the superior (structurally higher) *wh*-phrase must move to the specifier of CP.

As we have seen, Japanese adjectives are not inflected to mark comparatives, and comparative and non-comparative adjectives have the same morphology. Moreover, the standard of comparison is not overtly expressed in (45). Hearing the utterance such as (45), hearers have to make up for the implicit standard of comparison by themselves on the basis of context. For these reasons, it might be difficult for young children to identify the adjective as comparative.

To sum up, child grammar allows AP-movement optionally in the non-comparative construction and Japanese-speaking children take (45) as non-comparative. Moreover, they have difficulty in identifying (45) as comparative because of the lack of a comparative marker on adjectives and overtly expressed standard of comparison. Thus, Japanese-speaking children in the early stage interpret the adjective in (45) as absolute.

5. Conclusion

This paper has reported that Japanese-speaking children around 6 years old interpret comparative adjectives preceded by MPs as absolute. This indicates that Japanese children's grammar is different from adults'. On the basis of Watanabe's (2011a, 2011b) analysis of word order difference between the English and Japanese non-comparative constructions, I have proposed that child grammar has an unspecified parameter for AP-movement in the non-comparative construction as the default state and that Japanese-speaking children in the early stage take the comparative construction as the non-comparative construction without AP-movement. Moreover, it is difficult for them to identify the comparative construction as comparative because of the lack of a comparative marker on adjectives and overtly expressed standard of comparison.

In this way, through examining Japanese-speaking children's interpretation of the comparative construction, the process of their acquisition of the non-comparative construction has been revealed. I would like to study their acquisition of the comparative construction itself in the future. Moreover, in order to confirm the analysis I have presented, we have to find whether child grammar allows optional AP-movement in other constructions. I would like to pursue this issue in the further research.

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