A Note on Japanese-speaking Children's Interpretation of Recursive Possessives*

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1. Introduction

The acquisition of recursive possessives such as *Jane's father's bike* is a topic that has been investigated in a number of studies recently (Gentile (2003; cited in Roeper (2011)), Limbach and Adone (2010), Fujimori (2010), Roeper (2011, 2013), Pérez-Leroux et al. (2012), Amaral and Leandro (2013), Hollebrandse and Roeper (2014), Nakato et al. (2015), Lima, Kayabi and Kaiabi (to appear), Terunuma and Nakato (to appear)). In the literature, it has been observed that 3- to 5-year-old English-speaking children interpret noun phrases containing two possessive phrases in a manner different from adults. In an experimental situation, as will be shown in section 2, English-speaking adults almost consistently assign *Jane's father's bike* the reading where the two possessive phrases are interpreted *recursively*: First, *Jane's* makes a constituent with *father*, where *Jane's* modifies *father*; then, the larger unit *Jane's father's* makes a constituent with *bike*, where *Jane's father's* modifies *bike*. The possessive phrase *Jane's* is interpreted as part of the larger possessive phrase *Jane's father's*.[1] English-speaking children are less consistent than adults and allow the reading where the two possessive phrases

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1 We assume that in adult grammar of English, *Jane's father's bike* has the following structure, where one possessive phrase is embedded in another one: [$_{DP}$ [$_{POSSP}$ [$_{DP}$ [$_{POSSP}$ [$_{DP}$ Jane] 's] father] 's] bike]. This structure gives rise to the recursive reading.

are interpreted *non-recursively*. The aim of this paper is to report the results of our experiment designed to investigate whether Japanese-speaking children also give non-recursive readings to noun phrases containing two possessive phrases.

2. English-speaking Children's Comprehension of Recursive Possessives

Limbach and Adone (2010) conducted an experiment on 3- to 5-year-old English-speaking children and adult native speakers of English to investigate how they interpret noun phrases containing two possessive phrases. In their experiment, the participants were first given stories such as (1), which provided information about four characters and five objects possessed by the characters. The stories were acted out for the children, and told with pictures for the adults. Then, the participants were asked to choose the object denoted by noun phrases such as (2).

(1) Jane has a nice blue bike and Jane's father Gordon has a racing bike. When they do a tour together they have another bike which they can ride together. Sam has a red bike and his father Paul has a silver bike.

(2) Jane's father's bike

The experimental setting enabled the authors to examine whether children give an adult-like recursive reading to phrases such as (2), and if not, which of the following three types of non-recursive readings they assign: the drop of the first possessive phrase (the first drop reading), the drop of the second possessive phrase (the middle drop reading), or the conjunction of the two possessive phrases (the conjunctive reading). If children assign the first drop reading to (2), they would choose Sam's father's bike. If they assign the middle drop reading, they would choose Jane's bike. If they assign the conjunctive reading, what they choose would be the bike shared by Jane and

her father.

The results are summarized in Table 1.

Table 1: Results of Limbach and Adone's (2010) experiment

Age	Correct	First Drop	Middle Drop	Conjunctive	Random	Other
3	18 (56%)	2 (6%)	6 (19%)	3 (9%)	0	3 (9%)
4	16 (70%)	1 (4%)	1 (4%)	4 (17%)	0	1 (4%)
5	19 (59%)	2 (6%)	3 (9%)	7 (22%)	0	1 (3%)
Adults	90 (83%)	11 (10%)	2 (2%)	5 (4%)	1 (1%)	41 missing[2]

These results show that although 3- to 5-year-old English-speaking children often interpreted noun phrases containing two possessive phrases in an adult-like manner, 3-year-olds assigned the middle drop reading (Jane's bike) and 4- and 5-year-olds assigned the conjunctive reading (Jane and her father's bike) much more often than adults.

Gentile (2003; cited in Roeper (2011)) has also observed that English-speaking children assign the conjunctive reading to noun phrases containing two possessive phrases: In her experiment, one-third of the 3- and 4-year-olds chose a picture of Cookie Monster and his sister when they were asked to choose Cookie Monster's sister's picture.

3. Experiment

We conducted an experiment to investigate whether the first/middle drop reading and the conjunctive reading are observed in child Japanese as well as in child English.

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2   It is not clarified in Limbach and Adone (2010) what "41 missing" means.

3.1 Participants

The participants were 29 Japanese-speaking children and 15 adult native speakers of Japanese. The children were divided into three age groups: nine 4-year-olds (age range 4;1–4;11, mean age 4;6), eleven 5-year-olds (age range 5;1–5;11, mean age 5;7), and nine 6-year-olds (age range 6;2–6;9, mean age 6;5).

3.2 Materials

We used three stories with pictures that were similar to those used in Limbach and Adone (2010). Each story was followed by three questions about the story. One was a target sentence containing a noun phrase with two possessive phrases. The other two were filler sentences. One of the stories, the picture presented with the story, and the target sentence are shown below.[3]

(3) Story (told in Japanese)

This is Kiiro, and this is Kiiro's friend. This is Pinku, and this is Pinku's friend. Look, they all have an umbrella, and these two people share another umbrella.[4]

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[3] The following abbreviations are used in the glosses: Gen = Genitive case, Top = Topic particle, Q = Question particle.

[4] The participants were given colored pictures with stories. The characters were named after the color of their clothes. For example, the man wearing a yellow shirt was named *Kiiro*, which means yellow in Japanese. Such names were used so that the participants could easily remember the names.

Figure 1[5]

Pinku's friend   Pinku   Kiiro   Kiiro's friend
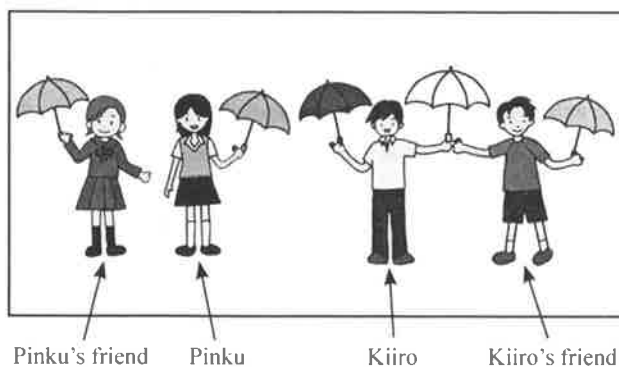
(4) Target sentence

Kiiro-san-no	tomodachi-no	kasa-wa	nani-iro	kana?
Kiiro-san-Gen	friend-Gen	umbrella-Top	what-color	Q

'What color is Kiiro's friend's umbrella?'

In Figure 1, both a picture and notes about the characters are provided for ease of understanding. In the experiment, the participants were shown only pictures. Notes about the characters were presented verbally while the relevant characters were being pointed at.

Table 2 indicates possible answers to (4) in the story/picture above and readings that give rise to those answers.

Table 2: Possible answers and readings with respect to (4)

Answers	Readings
blue (and white)	recursive reading
orange	first drop reading
red	middle drop reading
white	conjunctive reading

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[5] In the colored picture given to the participants, the umbrellas were, in order from the right, blue, white, red, grey and orange.

As shown in Table 2, two types of adult-like answers are conceivable under the recursive reading: "blue," which should be the most normal answer, and "blue and white," which is possible, yet not so common, answer. Blue is the color of the umbrella that Kiiro's friend has by himself. White is the color of the umbrella that he shares with another person. It could be said that not only the object which someone has by himself/herself but also the object which he/she shares with others are his/her belongings.[6]

3.3 Procedure

The children participated in the experiment individually in a quiet room located near their regular classroom. Their task was to answer questions after they were given stories with pictures. Three stories/pictures and three questions concerning each story/picture were given in a random order.

The adults were all together shown pictures on a screen and told the stories. They were asked to write their answers on an answer sheet.

3.4 Results

Table 3 summarizes the results for the target sentences. As mentioned in section 3.2, there are two types of correct answers to the target sentences. In Table 3, the rates at which the participants gave such answers are provided separately.

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[6]   Two of the three stories/pictures used in our experiment provide information about four characters and five objects possessed by the characters, as in (3) and Figure 1 in the text. Four of the objects are possessed by each of the four characters, and the other object is shared by two of them. The other story/picture differs from these two stories/ pictures in that the five objects in the story/picture are not actually possessed by the characters. The story/picture included four photographs of each of the four characters and a photograph of two of them together. The target sentence was the Japanese counterpart of the English sentence *Which is Pinku's brother's picture?*

Table 3: Results of our experiment

Age	Correct	Correct (uncommon)	First Drop	Middle Drop	Conjunctive	Other
4	24/27 (88.9%)	1/27 (3.7%)	1/27 (3.7%)	0	0	1/27 (3.7%)[7]
5	31/33 (94%)	1/33 (3%)	0	0	1/33 (3%)	0
6	21/27 (77.8%)	6/27 (22.2%)	0	0	0	0
Adults	27/45 (60%)	17/45 (37.8%)	0	1/45 (2.2%)	0	0

These results show that like adults, all of the three child groups assigned the recursive reading to the noun phrases containing two possessive phrases. The first/middle drop reading and the conjunctive reading were seldom observed in any of the child groups.

4. Discussion

As reviewed in section 2, it has been observed that 3- to 5-year-old English-speaking children give the adult-like recursive reading to noun phrases containing two possessive phrases at above chance level, but that they sometimes allow non-recursive readings such as the first/middle drop reading and the conjunctive reading. The results of our experiment show, on the other hand, that 4- to 6-year-old Japanese-speaking children seldom assign such non-recursive readings to noun phrases containing two possessive phrases. What has to be done in the future research is to consider why Japanese-speaking children, unlike English-speaking children, do not assign the first/middle drop reading and the conjunctive reading to noun phrases

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[7] When the participants were asked to choose Pinku's brother's picture, one child (4;3) chose a picture of Pinku and a picture of Pinku's brother. We do not regard this response as conjunctive since a picture of Pinku and her brother together was not chosen.

containing two possessive phrases and whether the results of the experiments on English-speaking children and Japanese-speaking children indicate cross-linguistic difference in the acquisition path of recursive possessives.

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