CHILDREN’S ABSOLUTE INTERPRETATION OF JAPANESE NUMERAL CLASSIFIER PHRASE COMPARATIVES

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1. Introduction

Arii (2012) has reported that Japanese-speaking children aged five-to-six years wrongly interpret Measure Phrase comparatives like (1) as absolute: The height of this building is 20 meters.¹

(1) Kono biru-wa 20-meetoru takai.
   this building -Top 20-meter higher
   ‘This building is 20 meters higher.’

After pointing out a possible experimental deficit of the previous study, this paper introduces new experimental data in order to examine whether children’s absolute interpretation of MP comparatives is robust. It investigates Japanese-speaking children’s interpretation of Numeral Classifier Phrase (NCP) comparatives as shown in (2) and reveals that they also interpret them as absolute.

(2) Otokonoko-no ringo-wa ni-ko ooi.
    boy-Gen apple-Top two-Cl more
    ‘The boy has two more apples.’

This finding supports Arii’s (2012) finding that Japanese-speaking children give non-adult-like interpretation to a differential comparative, where a numeral phrase expresses a differential between two sets.

2. Japanese Comparatives

As shown in (3) and (4), Japanese does not have adjectival inflection indicating comparatives like -er in English and comparative and non-comparative adjectives have the same morphology.

(3) a. Kono biru-wa takai/hikui.
    this building-Top high/low
    ‘This building is high/low.’

b. Kono biru-wa ano biru-yori takai/hikui.
    this building-Top that building-than high/low
    ‘This building is higher/lower than that building.’

* I am grateful to Akira Watanabe, Noriko Imanishi, Tetsuya Sano, Takuya Goro and TPL members for insightful comments and suggestions. All remaining errors are mine.

¹ The abbreviations used in this paper are: Cl=Classifier, Cop=Copula, Excl=Exclamation, Gen=Genitive, Q=Question Particle, Top=Topic.
(4) a. Otokonoko-no ringo-wa ooi/sukunai.
   boy-Gen apple-Top many/few
   Literal meaning: ‘The boy’s apples are many/few.’
   Intended meaning: ‘The boy has many/few apples.’

   b. Otokonoko-no ringo-wa onnanoko-no-yori ooi/sukunai.
   boy-Gen apple-Top many/few-Gen-than more/fewer
   Literal meaning: ‘The boy’s apples are more than the girl’s apples.’
   Intended meaning: ‘The boy has more apples than the girl.’

Especially when they are preceded by a numeral, adjectives have only a comparative interpretation as shown in (5).

   this building-Top 20-meter higher/lower
   ‘This building is 20 meters higher/lower.’

   b. Otokonoko-no ringo-wa ni-ko ooi/sukunai.
   boy-Gen apple-Top two-Cl more/fewer
   Literal meaning: ‘The boy’s apples are two more.’
   Intended meaning: ‘The boy has two more apples.’

We call this type of comparatives as a differential comparative because a differential between two sets is overtly expressed.

2. Previous Study

2.1 Arii (2012)

However, Arii (2012) has reported that Japanese-speaking children aged five-to-six years interpret one type of differential comparatives as absolute. She investigated children’s interpretation of MP comparatives like (6).

(6) Panda-wa ichi-kirari takai/hikui-yo.
   panda-Top one-kirari taller/shorter-Excl
   ‘The panda is one kirari taller/shorter.’

(6) includes a novel unit of length, kirari. Using a novel 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 measurements such as meter, kilogram, etc. Arii (2012) conducted two kinds of experiments on Japanese-speaking children who had been confirmed to have an ability to do simple arithmetic: takai ‘taller’ and hikui ‘shorter’ experiments. Before a main session, children have a training session where they learned how to measure the height of characters with kirari.

In the takai ‘taller’ experiment (subjects: n=15, 5;4-6;3, mean age: 5;10), an experimenter showed the picture in Figure 1 to children and pointed to the horse with a red tie, saying that the height of this horse is one kirari. Then, she gave children the stimulus sentence in (7) as a question.
Children’s Absolute Interpretation of Numeral Classifier Phrase Comparatives (T. Arii)

![Figure 1. The picture used in the experiment of Arii (2012)](image)

(7) Ni-ki\textit{ra} i takai-no-wa dore?
two-ki\textit{ra} ri taller-one-Top which
‘Which one is two \textit{ki\textit{ra} ri} taller?’
(intended meaning: ‘Which horse is two \textit{ki\textit{ra} ri} taller than this horse?’)

Responding to it, Japanese-speaking adults choose the horse with a yellow tie, which is two \textit{ki\textit{ra} ri} taller than the red one. On the other hand, children correctly chose the yellow one 35.5% (32/90) of the time. Only four children behaved in an adult-like way. Many children chose the pink one which is two \textit{ki\textit{ra} ri} tall.

The same kind of responses from children was found in the \textit{hikui} ‘shorter’ experiment (subjects: n=16, 5:2-6:3, mean age: 5:9). In this experiment, an experimenter showed children Figure 1 and pointed to the horse with a yellow tie, saying that the height of this horse is three \textit{ki\textit{ra} ri}. Then, she gave children the stimulus sentence in (8) as a question.

(8) Ni-ki\textit{ra} i hikui-no-wa dore?
two-ki\textit{ra} ri shorter-one-Top which
‘Which one is two \textit{ki\textit{ra} ri} shorter?’
(Intended meaning: ‘Which horse is two \textit{ki\textit{ra} ri} shorter than this horse?’)

Responding to it, Japanese-speaking adults choose the horse with a red tie, which is two \textit{ki\textit{ra} ri} shorter than the yellow one. On the other hand, children correctly chose the red one 45.8% (44/96) of the time. Only six children behaved in an adult-like way. Many children chose the pink one, which is two \textit{ki\textit{ra} ri} tall. Both in the \textit{takai} ‘taller’ and \textit{hikui} ‘shorter’ experiments, most children’s interpretation of MP comparatives was consistent.\footnote{Arii (2010, 2011) has reported that the presence of an explicit standard comparison such as a \textit{yori} ‘than’-phrase does not improve children’s performance when they perform poorly on truncated comparatives like (i).
}

All of the child participants knew how to measure the height of animals with \textit{ki\textit{ra} ri} and they were old enough to have adult-like knowledge of gradable adjectives and measurement system (Barner and Snedeker (2008), Syrett (2010), Syrett et al. (2010), Syrett (under revision)). Syrett et al. (2010) have reported that children as young as three years old can appropriately shift the standard of comparison for \textit{long} in conformity with context. In their experiment, children were shown two rods of unequal lengths and asked, ‘Please give me the

\textit{Panda}-wa ichi-\textit{ki\textit{ra} ri} takai-yo.
\textit{Panda}-Top one-\textit{ki\textit{ra} ri} taller-Excl
‘The panda is one \textit{ki\textit{ra} ri} taller.’

b. \textit{Panda}-wa hoka-no doubutsu-yori ichi-\textit{ki\textit{ra} ri} takai-yo.
\textit{Panda}-Top other-Gen animal-than one-\textit{ki\textit{ra} ri} taller-Excl
‘The panda is one \textit{ki\textit{ra} ri} taller than the other animals.’

The previous studies have found that Japanese-speaking children (5:9-6:3, mean age: 6:0) interpret the differential comparatives in (i) and (iib) as absolute to the same extent.
long rod.” Children were able to correctly choose the longer one regardless of whether the two rods are both long, both not long or one lone and the other not. So, Syrett et al. (2010) conclude that children as young as three years old can shift their judgment of what length counts as long in accordance with context. Moreover, Syrett (2010, under revision) has reported that children as young as four years old have the knowledge of a measurement system by showing that young children responded differently to scenarios involving subtraction form a set for attributive and pseudopartitive MPs (“Do I still have three-pound strawberries/3 pounds of strawberries?”).

Given these previous studies, Arii (2012) concludes that children’s absolute interpretation of MP comparatives is due to their non-adult-like syntactic/semantic representations of MP comparatives. She argues that children misinterpret MP comparatives as equatives. According to Winter (2005), unlike positive adjectives, negative adjectives in the positive form do not allow MP modification as shown the English and Japanese sentences in (9) and (10).

3 (9) a. This building is 20 meters high.
   b. *This building is 20 meters low.

   this building-Top high-sa 20-meter-Cop
   ‘This building is 20 meters high.’
   this building-Top low-sa 20-meter-Cop
   ‘*This building is 20 meters low.’

In children’s interpretation of MP comparative of (11), the negative adjective, hikui ‘lower’ allows MP modification.

(11) Kono biru-wa 20-meetoru hikui.
    this building-Top 20-meter lower
    ‘This building is 20 meters lower.’

So, Arii (2012) argues that children misinterpret the MP comparative in (11) not as (10b) but as equative, i.e., “This building is as low as 20 meters.”

2.2. Possible Problems

As we have seen, Arii (2012) has shown that Japanese-speaking children assign non-adult-like interpretation to MP comparatives. However, it is possible that their absolute interpretation resulted from an experimental deficit. In the experiment, in the training session children learned how to measure the height of characters with kirari. So, they might have thought that they had to measure the height of characters in the main session, too. Next section examines this possibility.

3. Experiment

This section examines Japanese-speaking children’s interpretation of numeral classifier phrase (NCP) comparatives like (12).

3 Although taka-sa in (10a) appears to be the nominalised form of the adjective takai ‘tall,’ Watanabe (2011) argues that it functions as an adjective. For more detail, see Watanabe (2011).
(12) Kuma-no ringo-wa ni-ko ooi/sukunai.
    bear-Gen apple-Top two-Cl more/fewer
    ‘The bear has two more/fewer apples.’

NCP comparatives do not include an MP and there is no need for children to learn to measure
unlike the experiments on MP comparatives. Instead, the NCP comparative in (12) includes a
NCP, ni-ko ‘two-Cl.’ In Japanese, numeral phrases usually consist of a numeral and a
classifier like other East and Southeast Asian languages. The classifier -ko (a shape-specific
classifier for three dimensional objects) is general and emerges before other specific
classifiers like -hiki (a classifier for small animals and insects), -mai (a classifier for two
dimensional objects), etc. According to Yamamoto and Keil (2000), children start producing
the classifier -ko by the age of four.

3.1. Participants and Design

Two kinds of experiments were conducted: ooi ‘more’ and sukunai ‘fewer’ experiments. All of child participants had been confirmed to have an ability to do simple arithmetic and understand the meaning of ooi ‘more’ and sukunai ‘fewer.’ The Truth Value Judgment Task (TVJT) (Crain and Thornton (1998)) was adopted. The TVJT involved two parts. First, an experimenter told a story by using a power-point presentation on a lap-top computer. At that time, a puppet watched the slides alongside children. Next, at the end of the story, the puppet was asked a question (a stimulus sentence) about the story and he answered it. Then, children were asked to judge whether the puppet’s statement was ‘right,’ in which case the puppet got a strawberry as a reward, or it was ‘wrong,’ in which case he got a green pepper as a punishment. When children rejected the puppet’s statement, they were invited to supply justification for their rejection.

In the ooi ‘more’ experiment (subjects: n=16, 3;10-6;6, mean: 5;3), stimulus sentences such as (13) were given after a story where two animals compete with each other for the number of a certain thing.\(^4\)\(^5\)

(13) Inu-no-wa nan-ko ooi-kana.
    dog-Gen-Top how-many-Cl more-Q
    ‘How many more fish does the dog have?’

A representative test story and the talk between the experimenter and the puppet are described in (14)

(14) Story: A dog and a cat compete with each other for fishing. The dog catches three fish
    and the cat catches two fish.
    Experimenter: “Pikachu, which one has more fish?” [translated into English]
    Pikachu: “The dog!”
    Experimenter: “That’s right. Then, how many more fish does the dog have?”
    Pikachu: “one (comparative condition)/ two (neutral condition)/ three (absolute
    condition)!”

(13) corresponds to the underlined sentence in (14). Three kinds of conditions were used: a
comparative condition, an absolute condition and a neutral condition. In the comparative
condition, the puppet answered the right difference between the number of fish the dog and

\(^4\) Data from three additional children were excluded due to excessive failure on filler tasks.
\(^5\) Donaldson and Wales (1970) observe that young children use comparatives when talking about
visible objects, or in ‘competitive discourse’ situations. So, a competitive story was adopted.
the cat catch, that is, “one.” The target sentence in (13) is comparative and this answer is correct. In the absolute condition, the puppet answered wrongly, saying the number of fish the dog catches, that is, “three.” Japanese-speaking adults reject this answer, but if children interpret (13) as absolute, they would accept it. Lastly, in the neutral condition, the puppet answered wrongly, saying the number of the cat’s fish, that is, “two.” Neither the comparative nor the absolute reading of (13) makes the answer true, and every subject would reject it. By asking their justification for their rejection, we can know the subject’s interpretation of (13).

In the *sukunai* ‘fewer’ experiment (subjects: n=16, 3;10-6;6, mean age: 5;3)⁶ ⁷, stimulus sentences such as (15) were introduced after a story.

(15) Neko-no-wa nan-ko sukunai-kana.
cat-Gen-Top how-many-Cl fewer-Q
‘How many fewer fish does the cat have?’

A representative test story and the talk between the experimenter and the puppet are described in (16). (15) corresponds to the underlined sentence in (16).

(16) Story: A dog and a cat compete with each other for fishing. The dog catches three fish and the cat catches two fish.
Experimenter: “Pikachu, which one has fewer fish?”
Pikachu: “The cat!”
Experimenter: “That’s right. Then, how many fewer fish does the cat have?”
Pikachu: “one (comparative condition)/ two (absolute condition)/ three (neutral condition)”

### 3.2. Results

In the *ooi* ‘more’ experiment, in the same way as MP comparatives, many children were found to interpret NCP comparatives including *ooi* ‘more’ as absolute. Table 1 shows children’s acceptance rate of stimulus sentences in each condition.

<table>
<thead>
<tr>
<th>Comparative cnd.</th>
<th>Absolute cnd.</th>
<th>Neutral cnd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>39.9% (19/48)</td>
<td>79.1% (34/48)</td>
<td>2.1% (1/48)</td>
</tr>
</tbody>
</table>

Table 1. The rates of acceptance for stimulus sentences in the *ooi* ‘more’ experiment

In the comparative condition, children correctly accepted stimulus sentences 39.9% of the time. Children who rejected them explained that the puppet’s statement was wrong because the dog catches not one but three fish (*absolute reason*). In the absolute condition, they wrongly accepted them 79.1% of the time. Children who appropriately rejected them explained that the statement was wrong because the dog catches not three but one more fish than the cat (*comparative reason*). In the neutral condition, only one child was inattentive to a trial and wrongly accepted the test sentence once. So, the acceptance rate of the test sentences in this condition was 2.1%. As depicted in Table 2, in the neutral condition, children rejected stimulus sentences for the comparative reason 27.1% (13/48) of the time and for the absolute reason 72.9% (35/48) of the time. Most children’s interpretation was consistent.

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⁶ Data from one additional child was excluded due to excessive failure on filler tasks.
⁷ 15 children of them participated in the *ooi* ‘more’ experiment, too. The interval between the two experiments was more than a week.
Table 2. The rates of rejection for comparative and absolute reasons in the neutral condition in the *ooi* ‘more’ experiment

<table>
<thead>
<tr>
<th></th>
<th>“comparative reason”</th>
<th>“absolute reason”</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>27.1% (13/48)</td>
<td>72.9% (35/48)</td>
</tr>
</tbody>
</table>

The same kind of absolute responses from children were found in the *sukunai* ‘fewer’ experiment. Table 3 shows children’s acceptance rates of stimulus sentences in each condition.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Comparative cnd.</th>
<th>Absolute cnd.</th>
<th>Neutral cnd.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>31.2% (15/48)</td>
<td>68.8% (33/48)</td>
<td>2.1% (1/48)</td>
</tr>
</tbody>
</table>

Table 3. The rates of acceptance for stimulus sentences in the *sukunai* ‘fewer’ experiment

In the comparative condition, children correctly accepted stimulus sentences 31.2% of the time. Children who rejected them explained that the puppet’s statement was wrong because the cat catches not one but two fish (absolute reason). In the absolute condition, they wrongly accepted them 68.8% of the time. Children who appropriately rejected them explained that the statement was wrong because the cat catches not two but one fewer fish than the cat (comparative reason). In the neutral condition, only one child was inattentive to a trial and wrongly accepted a test sentence once. So, the acceptance rate of the stimulus sentences in this condition was 2.1%. As depicted in Table 4, in the neutral condition, children rejected stimulus sentences for the comparative reason 31.9% of the time and for the absolute reason 68.1% of the time. Most children’s interpretation was consistent.

Most children even at the age of 6 (11 out of 16 children in the *ooi* ‘more’ experiment and 11 out of 16 children) consistently interpreted NCP comparatives as absolute. To sum up, Japanese-speaking children aged five-to-six years interpret NCP comparatives as absolute in the same way as MP comparatives.

Some children justified their answer, not saying only a numeral phrase but saying a differential comparative itself as shown in (17).

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8 One child did not make justification and we cannot know why he rejected the puppet’s statement. So, his data is not included in Table 4.

9 During the experiment, three Japanese-speaking children (3;10, 4;5, 4;8) seemed to misinterpret *ooi* ‘more’ as *sukunai* ‘less/fewer.’ When they were asked a question like (i), they consistently pointed to a character who had fewer objects.

(i) Docchi-ga *ooi*?
   *which-Nom more*
   ‘Which has more <objects>?’

On the other hand, when they were asked a question like (ii), they correctly pointed to a character who had fewer objects.

(ii) Docchi-ga *sukunai*?
   *which-Nom fewer*
   ‘Which has fewer <objects>?’

Moreover, when an adverb, *takusan* ‘more’ was used instead of *ooi* ‘more’ in a question as indicated in (iii), they correctly pointed to a character who had more objects. This is the opposite of the previous finding that children seem to interpret less as more (cf. Carey (1978), Clark (1970), Donaldson and Balfour (1968), Donaldson and Wales (1970), and Ehri (1976)). We leave this issue for future research.

(iii) Docchi-ga *takusan* motteru?
   *which-Nom more have*
   ‘Which has more <objects>?’
Some children’s justification in the neutral condition of the ooi ‘more’ experiment (absolute reason)

“Chigau-yo. Datte san-ko ooi-kara.”

Wrong-Excl because three-Cl more-because

Literal meaning: ‘He is wrong because the dog has three more fish.’

Intended meaning: ‘He is wrong because the dog has three fish.’

Therefore, we cannot say that their absolute interpretation is caused by paying their attention only to a numeral phrase.

4. Discussion

The previous experiment has disconfirmed our expectation that the finding that Japanese-speaking children misinterpret MP comparatives as absolute is an artefact. Following Arii (2012), I suggest that Japanese-speaking children misinterpret NCP comparatives as equatives, in the same way as MP comparatives. The absolute interpretation is similar to that of equatives. Moreover, as shown in (18) and (19), the equatives have the same word order as the NCP comparatives: a NCP precedes an adjective.10

(18) NCP comparative
Otokonoko-no ringo-wa ni-ko ooi.
boy-Gen apple-Top two-Cl more
‘The boy has two more apples.’

(19) Equative
Otokonoko-no ringo-wa 50-ko-no oosa/sukunasa-da.
boy-Gen apple-Top 50-Cl-Gen many/few-Cop
‘The number of boy’s apples is as many/few as 50.’

5. Conclusion

This paper has reported that Japanese-speaking children aged five-to-six years wrongly interpret NCP comparative as absolute in the same way as MP comparatives. Following Arii (2012), it suggests that the absolute interpretation is due to their non-adult-like grammar of NCP comparatives. They mistakenly assign equative interpretation to them.

References


10 Following Watanabe (2011), I take oosa and hikusa in (19) as adjectives, ‘many’ and ‘few.’


