

Japanese-speaking Children's Absolute Interpretation of Differential Comparatives and Differential Verbal Expressions

Tomoe Arie (University of Tokyo/ JSPS Research Fellow)

It has been observed that children interpret a differential comparative like (1) in a non-adult-like way ([1]). For example, when a boy has three pineapples and a girl has one, (1) is true under adult's interpretation. On the other hand, many 5- and 6-year-olds judge that (1) is false, saying the boy has not two but three pineapples. That is, they interpret the comparative as absolute, i.e. the boy has two pineapples. In order to pin down the source of children's difficulty in interpreting a differential comparative, this paper investigates Japanese-speaking 5-to-6-year-olds' interpretation of a differential verbal expression like (2). A differential comparative and a differential verbal expression have similar constructions but while the former describes the difference between two sets, the latter describes the change of a set. Considering the claim of [2] that children can more easily solve a change problem, where things are added or taken away, than a comparative problem, we can expect that children can interpret a differential verbal expression more appropriately than a differential comparative. However, an experiment reveals that children also interpret a differential verbal expression as absolute.

Previous studies have reported that English-speaking children also interpret a differential comparative as absolute (cf.[3], [4]). [2] argues that the source of children's non-adult-like interpretation is static comparison expressed with a differential comparative. According to [2], children's initial conceptions of addition and subtraction are based on increasing or decreasing a quantity. So, children can easily solve a change problem (e.g. John has three apples and eats one of them. How many apples are left?), where things are added or taken away and they can understand what actions they need to carry out to solve it. On the other hand, in a comparison problem (e.g. John has three apples and one orange. How many more apples does he have than oranges?) nothing has changed. The connection between the situation and an arithmetic operation on symbolic objects that is required to solve it is not clear. [2] argues that this unclear connection causes their non-adult-like interpretation.

If the argument of [2] can explain their absolute interpretation of a differential comparative, children should be able to appropriately interpret a differential verbal expression like (2). A differential comparative and a differential verbal expression have similar constructions but while the former describes the difference between two sets, the latter describes the change of a set. If children's absolute interpretation of a differential comparative is due to their immature cognitive resources required to deal with the difference between two sets, they should be able to interpret a differential verbal expression more easily because it describes the change of a set.

In order to examine children's interpretation of the two constructions, an experiment was conducted on 15 Japanese-speaking children (5;4-6;3, mean age: 6;0). A within-subject design was adopted and the same children's interpretation of them was investigated at intervals of more than a week. In one typical trial, a participant was presented with a boy and a girl with a mysterious box. The boy and the girl each have a pineapple and they put it into their own box. Opening the girl's box reveals one pineapple and nothing has changed. Then, a puppet makes a prediction about the boy's pineapple, saying (1) or (2). Opening the boy's box reveals three pineapples. The puppet's statement is true under the adult interpretation of (1) and (2) because the boy has two more pineapples than the girl and the number of the boy's pineapples has increased by two. If a child participant assigns absolute interpretation to (1) and (2), i.e. the boy has two pineapples, he should reject the puppet's statement. As a result, children interpreted (1) as absolute 72.5% (98/135) of the time and interpreted (2) as absolute 57.8% (78/135) of the time, as shown in Figure 1. Analyzing the data with a Wilcoxon Signed Rank test, we find that there is no significant difference between the rate of children's

absolute responses to them ($p = .156 > .05$). The number of absolute responses of an individual child is represented in Figure 2. Analyzing the data with Spearman's rank correlation, children's absolute responses to the two constructions are correlated ($r = .739$). That is, children who interpret a differential verbal expression as absolute always interpret a differential comparative as absolute.

The experiment has revealed that children interpret a differential verbal expression as absolute on the same degree as a differential comparative. The expectation that children should be able to interpret a differential verbal expression more easily than a differential comparative has been disconfirmed. Therefore, whatever properties of the two constructions cause their absolute interpretation, we can conclude that their absolute interpretation is not specific to static comparison expressed with a differential comparative because they also interpret a differential verbal expression as absolute.

(796 words)

- (1) Otokonoko-no painappuru-wa ni-ko ooi. **(Differential Comparative)**
boy-GEN pineapple-TOP two-CL more
 'The boy has two more pineapples.'
- (2) Otokonoko-no painappuru-wa ni-ko fue-ta. **(Differential Verbal Expression)**
boy-GEN pineapple-TOP two-CL increase-PERFECT
 'The number of the boy's pineapples has increased by two.'

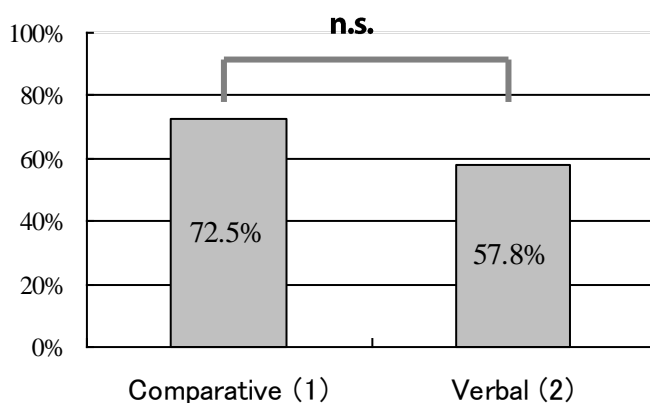


Figure 1. The percentage of absolute responses

subject	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15
age	6;3	6;3	6;2	6;2	6;1	6;1	6;1	5;11	5;11	5;10	5;10	5;8	5;4	5;4	5;4
Comparative	8/9	9/9	0/9	9/9	8/9	4/9	0/9	0/9	9/9	7/9	9/9	9/9	9/9	9/9	8/9
Verbal	1/9	9/9	0/9	0/9	8/9	0/9	0/9	0/9	9/9	8/9	7/9	9/9	9/9	9/9	9/9

Figure 2. The number of absolute responses from an individual child

References

- [1] Arii, T. (2012) "Children's Absolute Interpretation of Japanese Numeral Classifier Phrase Comparatives," GLOW in Asia IX, Mie University, September 4, 2012. [2] Nunes, T. and P. Bryant (1996) *Children Doing Mathematics*, Blackwell, Oxford, UK. [3] Hudson, T. (1983) "Correspondences and Numerical Differences between Disjoint Sets," *Child Development*, 54, 8490. [4] Riely, Mary S., James G. Greeno and Joan I. Heller (1983) "The Development of Children's Problem Solving Ability in Arithmetic," *The Development of Mathematical Thinking*, ed. by Herbert P. Ginsburg, Academic Press, New York.