

Children's Interpretation of the Additive Particle *-Mo* in Japanese

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1. Introduction and background

When it comes to language acquisition, children display surprising precision and speed during its course, already acquiring adult-like grammar by their preschool age. What is even more surprising is that they accomplish such feat with severely limited input; the linguistic data they are exposed to are substantially lacking in quality and quantity compared to their resulting grammar.

To overcome this so-called 'poverty of stimulus', the theory of generative grammar postulates genetically endowed language faculty known as UG, and suggests a process of language acquisition supported by this 'blueprint'. What becomes crucial then for language acquisition studies conducted under the generative framework is to show that children adhere to such innate knowledge of language from the earliest observable stages. Indeed, there exists vast array of literature arguing that this is the case; these works mainly concerned with children's syntax (e.g., Crain, 1991; Otsu, 1981) but recent works also extending the findings into the realm of semantics (e.g., Crain, 2012; Gualmini, 2005).

Nevertheless, it is also the case that there exist apparent counterexamples to these findings, children's interpretation of focus particles being one of them. It has been first observed by Crain et al. (1994) that English-speaking children often interpret sentences containing subject-attached *only* as in (1a) as sentences containing VP-attached *only* as in (1b) (but not the vise-versa), wrongly accepting these sentences under context adults would deny.

- (1) a. Only the cat is holding the flag.
 b. The cat is only holding the flag.

This so-called Crain's puzzle has attracted much attention, resulting in numbers of researches exploring the domain. The finding has been replicated cross-linguistically, for example German (e.g., Müller et al., 2011), Japanese (e.g., Endo, 2004), and Mandarin-Chinese (e.g., Zhou & Crain, 2010), all reporting children's difficulty with the interpretation of the exclusive particle *only* and their cross-linguistic counterparts.

In addition to the insight they offer to the acquisition of exclusive particles, the fore-mentioned works have opened the doors into new domain of research, namely that of additive particles.

(2) a. **subject-attached -mo:**

Yuki-mo jitensha-o motte-ir-u.

Yuki-also bicycle-ACC have-STATE-PRES

'Yuki has a bicycle, too (in addition to other people)'.

b. **object-attached -mo:**

Yuki-ga jitensha-mo motte-ir-u.

Yuki-NOM bicycle-also have-STATE-PRES

'Yuki has a bicycle, too (in addition to other belongings)'.

Matsuoka (2004) and Matsuoka et al. (2006) report that Japanese-speaking children tend to interpret adnominal instances of additive particle *-mo* 'also' in a non-adult-like fashion, with great portion of children engaged in their experiment accepting both (2a) and (2b) under context where adults would mostly deny. What is intriguing about these findings is that such non-adult-like behavior of children regarding the interpretation of additive particles seems to persist beyond their preschool age, despite children's first productive use

of them being quite early.

Turning to the locus of children's error, the fore-mentioned studies argue that it is children's non-adult-like knowledge of syntax that leads to their non-adult-like interpretation of focus particles. Although this syntax based account is quite popular amongst wide number of researchers investigating the topic, more recent work by Sugawara (2016) casts doubt on such view. Sugawara argues that children's poor performance with the interpretation of exclusive particles may be due to the lack of appropriate context in which target sentences should be presented, with results of her experiment supporting the claim. Furthermore, such claim of hers seems to apply to the use of *-mo* in Matsuoka et al.'s experiments as well; their presentation of target sentences containing *-mo* is isolated from necessary contexts, making the use of *-mo* rather awkward. An important question which must be answered then would be whether or not children's performance could be improved if sufficient contextual aid were to be given.

To address the issue, we designed and conducted our own version of an experiment, with the intention of narrowing down where the locus of children's error resides. Results of our experiment, combined with supplementary corpus analysis, suggest that neither the non-adult-like syntax nor the lack of appropriate context is the source of children's error.

The paper proceeds as follows. In the next section, we will go over the meanings of sentences containing additive particles with brief description of their basic properties. The succeeding section introduces the work of previous literatures on the acquisition of focus particles. In section 4, we look at the results of Matsuoka et al.'s experiment, and discuss its potential flaw. Section 5 describes the experiment conducted in the present study, reporting its results, followed by a brief discussion. The final section concludes the paper.

2. Meanings of sentences containing an additive particle

Although there still remain various questions regarding their true nature, it is of our general consensus that focus particles consist of heterogeneous classes. It has become customary to assume the following three broad classes of focus particles based off their semantics: exclusive particles such as *only* in (3), additive particles such as *also* in (4), and scalar particles such as *even* in (5) (König, 1991).

(3) John only had an [apple]_F for lunch.

‘(John had an apple and) John had nothing else for lunch’

(4) John also had an [apple]_F for lunch.

‘John had an apple for lunch (and he had something else, too)’

(5) John even had an [apple]_F for lunch.

‘John had an apple for lunch (apple was the least likely thing for him to eat)’

Since Rooth’s (1985) influential alternative semantics approach, it is widely accepted that these particles make their semantic contribution through their interaction with the set of alternatives introduced by focus.

For better explanation, let us take a look at König’s proposal. According to him, the meaning of sentences containing a focus particle is of two-folds; not only do such sentences have their ordinary semantic value as their meaning, they also have an additional meaning which is obtained by relating their ordinary meaning to their alternative meanings by applying the quantificational force of the focus particles over the set of alternatives introduced by focus. Simply put, when computing the meanings of sentences

containing focus particles, we take their ordinary meaning, in other words the relevant sentences without the particle, and contrast it with the alternative meanings of the sentences, which are constructed by replacing the focused element with its contextually salient alternatives. The ways in which the set of alternative meanings are related to the ordinary meaning and the nature of their semantic contribution differ depending on the type of particles.

For better illustration, take a look at the following examples:

- (6) John only had an [apple]_F for lunch.
 - a. John had an apple for lunch (presupposition)
 - b. John had nothing other than an apple for lunch (assertion)
- (7) John also had an [apple]_F for lunch.
 - a. John had an apple for lunch (assertion)
 - b. John had something else in addition to an apple (presupposition)

Sentence (3) repeated in (6) is an example containing the exclusive particle *only*. Here, the relevant sentence without the particle *John had an apple for lunch* is taken as a presupposition or the felicity-condition of the sentence. It will then construct additional meanings by replacing the focused object *apple* with a variable, which takes the contextually given alternatives as its value. In the case of (6), this could be any other food John could have eaten for lunch. Since the existential quantifier quantifying over the variable is negated, it results in the proposition *John had nothing other than an apple for lunch*, which becomes the assertion or the truth-condition of the sentence. Sentence (4) repeated in (7), on the other hand, is an example containing the additive particle *also*. The sentence first takes its

particle-less proposition *John had an apple for lunch* as an assertion, and then constructs additional propositions by replacing apple with alternatives under consideration. Unlike the exclusive particle, the additive particle introduces bare existential quantifier. Thus, the resulting presupposition is *John had something else in addition to the apple for lunch* for (7).

To put things short, sentences containing the exclusive particle *only* take the relevant sentences without the particle as its presupposition, and assert that none of the members of the set of alternatives to the focused element satisfies the additional proposition. Sentences containing the additive particle *also*, on the other hand, take the relevant sentences without the particle as assertion, and further presuppose that at least one of the members of the set of alternatives to the focused element satisfies the presupposition. Thus, the notion of focus and the set of alternatives they introduce become crucial when computing the meanings of focus particles.

Parting away from English, Japanese also has similar focus-sensitive particles, which Aoyagi (1999) refers to as Q-particles. Since Kuroda (1965, 1969, 1970), vast array of theoretical researches have been conducted on the topic (e.g., Aoyagi, 1998, 1999; Kishimoto, 2009; Sano, 2001, 2011). It is widely accepted in these literatures that Japanese Q-particles are synonymous to the English focus particles. Naturally, their semantic contributions seem to mirror that of the English counterparts as illustrated below:

- (8) Taro-wa sushi-dake tabeta.
 Taro-TOP sushi-only eat-PAST
 ‘Taro only ate sushi’
- a. ‘Taro ate sushi’ (presupposition)
 b. ‘Taro ate nothing other than sushi’ (assertion)

- (9) Taro-wa sushi-mo tabeta.
 Taro-TOP sushi-also eat-PAST
 'Taro also ate sushi'
- a. 'Taro ate sushi' (assertion)
 b. 'Taro ate something else in addition to sushi' (presupposition)

Just like the English *only*, *-dake* gives the reading that Taro ate nothing other than sushi, while *-mo* triggers the presupposition that Taro ate something else in addition to sushi as in the case of *also* in English. Thus, in terms of their semantic contribution, Japanese Q-particles are widely assumed as being identical to their respective counterparts in English. For the sake of simplicity, we will be referring to the Japanese Q-particles as focus particles in the remainder of the paper.

To sum, both English and Japanese focus particles can be classified into three broad sub-classes based on their semantics. Sentences containing an exclusive particle take their particle-less proposition as its presupposition, and construct an additional proposition via the interaction of the focus particle and the set of alternatives to the focused element, which becomes their assertion. Sentences with an additive particle, in contrast, take their particle-less proposition as its assertion, and construct an additional proposition through the interaction between the focus particle and the set of focus alternatives, which becomes their presupposition. Therefore, the exclusive and additive particles can be differentiated in terms of their semantic contribution; the exclusive particle modifies the truth-condition of a sentence, whereas the additive particle modifies the felicity-condition. Their interaction with context and difference in their semantic contribution becomes important when we discuss children's difficulty with additive particles.

3. Acquisition of focus particles

3.1. Children's difficulty with exclusive particles

As alluded to in the introduction, it is known since at least Crain et al. (1994) that English-speaking children interpret sentences containing subject-attached *only* in a non-adult-like fashion, often misinterpreting such instances of *only* as object-associated. Interestingly, no such tendency is observed for VP-attached *only*; children do not seem to misinterpret VP-attached *only* as subject-associated.

Subsequent research suggests that this pattern is quite robust; it has been replicated cross-linguistically that children seem to favor object-attached *only* regardless of the truth-value of target sentences. Such findings have led to the claim that VP-attached *only* are more basic than the subject-attached *only*. That is, children make interpretational error for sentences containing subject-attached *only* as they have yet to acquire its grammar, more specifically their syntax (Crain et al., 1994). However, recent work by Sugawara (2016) suggests that children's non-adult-like response to sentences containing the exclusive particle *only* maybe greatly influenced by their premature pragmatics.

According to Sugawara, the typical protocol of the Truth-Value Judgement Task connotes a potential problem to the investigation of children's competence of exclusive particles. Target sentences used in Truth-Value Judgement Tasks are often preceded by a lead-in of the sort of *Do you know what happened in this story*, which involves an embedded *wh*-question with sentential focus. Thus, it is expected by the hearer that the lead-in is followed by a sentence with the same sentential focus. This pattern, however, does not hold for target sentences used in Crain et al. (1994) as the succeeding sentence is of either subject or object focus. Sugawara claims that such violation of Question-Answer Congruence

(Rooth, 1985, 1992) greatly influences children's interpretation of exclusive particles with results of her experiment supporting the claim¹.

If it is the case that the lack of proper context influences children's interpretation of exclusive particles, the same might be possible for additive particles as well. We keep this possibility in mind as it becomes crucial when discussing a potential flaw in Matsuoka et al.'s work.

3.2. *Children's difficulty with additive particles*

Similar to what is observed for exclusive particles in various languages, Bergsma (2006) and Hüttner et al. (2004) report that both Dutch- and German- speaking children interpret sentences containing additive particles *ook* and *auch* in a non-adult-like manner. In Dutch and German, additive particles appearing in post-finite position could either have a subject-associated or an object-associated reading depending on what is stressed within the sentence it accompanies. Thus, the German sentence *Max will auch boot fahren* could have the following two meanings: subject-associated if the additive particle itself bears stress, and object-associated if the object DP is stressed. The same is possible for *ook* in Dutch, though *ook* could also appear in the sentence-initial position unambiguously associating with the subject like *only* in English.

To test children's ability to comprehend sentences containing post-finite additive particles, Bergsma and Hüttner et al. conducted an experiment employing a Picture Selection Task, where children were asked to choose which of the pictures shown to them

¹ For precise details see Sugawara (2016).

best matched the target sentence². Their results show that children are prone to make interpretational errors for sentences containing post-finite additive particles regardless of what is being stressed.

In Hüttner et al.'s version of the experiment, the most frequent error by children was misinterpreting object-associated *auch* as subject-associated. Such error consisted of about 50% of children's total error. It was also frequent amongst the youngest group of children (2;8-3;11) to ignore the focus particle consisting of about 30% of the group's total error. This type of error was more frequent in Bergsma's version of the experiment: about 50% of the younger children (age 4;2 to 5;4) and 40% of the older children (age 5;5 to 6;4) consistently picked the pictures which depict a scene matching the interpretation without *ook*.

To sum, both Dutch- and German-speaking children display difficulty when interpreting sentences containing additive particles regardless of their association type. Both ignoring the focus particle and miss-associating object-associated additive particle to the subject are frequent type of errors displayed by children. As for the source of their error, we will discuss in the section to follow, where we will see that similar pattern follows for Japanese-speaking children as well.

4. Children's difficulty with the additive particle *-mo* in Japanese

In the previous section, we went over the works of Bergsma (2006) and Hüttner et al. (2004) confirming that children have difficulty interpreting sentences containing additive particles

² Bergsma tested 4- to 7-year-old Dutch-speaking children and Hüttner et al. 3- to 7-year-old German-speaking children.

in an adult-like-manner, just like they do with those containing exclusive particles. As is expected, the same pattern is reported for Japanese-speaking children by Matsuoka (2004) and its follow-up research Matsuoka et al. (2006).

In the follow-up research, Matsuoka et al. tested 60 Japanese-speaking children between age 4;7 to 6;10 (mean 5;10) on their interpretation of sentences containing the additive particle *-mo* using a Truth-Value Judgment Task³. All stories used in Matsuoka et al. (2006) were designed in such a way so that the target sentence always involved a presupposition failure; that is, there were no other contextually salient alternative to the foci which satisfies the additional proposition. After the storyteller (experimenter 1) told a story, the puppet (experimenter 2) presented the target sentence containing the focus particles to children, who were then asked to feed the puppet with either a toy ice cream or a toy green pepper depending on whether or not the puppet's utterance was correct. Similar to the English exclusive particle *only*, *-mo* can attach to wide varieties of constituents with both subject and object being a possible candidate (see Aoyagi, 1999, for details on their syntactic behavior). As such, their experiment involved both subject-attached and object-attached *-mo*, with three tokens of each types. (10) and (11) are actual examples taken from their experiment:

(10) **Subject + *mo*:**

Kono	ohanashi	de	wa,	hiyoko-san-mo	taoru-o
this	story	in	TOP	chick-PERS-also	towel-ACC
hoshi-mashi-ta.					

³ Their research was actually of two-folds, looking into children's ability to comprehend not only *-mo* but also the exclusive particle *-dake*. The present research is mainly concerned with the *-mo* session, and thus, will only go over its results.

dry-POL-PAST

‘(lit.) In this story, also the chick dried the towel’

(11) **Object + *mo*:**

Kono ohanashi de wa, kauboi-ga usi-mo
This story in TOP cowboy-NOM cow-also
tsukamae-mashi-ta.
catch-POL-PAST

‘In this story, the cowboy also caught the cow’

The starting phrase *kono ohanashi de wa* was added to control the strong preference amongst Japanese-speakers to place a topic marker *-wa* at the beginning of a simple sentence.

Their results are summarized in the table below:

Table 1: Number of Adult-Like Responses (-*mo*)

Subjects Total: 57	Mean age	Subject + <i>mo</i>	Object + <i>mo</i>
Adult-Like (N:11)	6;1	88% (29/33)	82% (27/33)
All Yes (N: 44)	5;10	8% (10/132)	8% (10/132)
Subject Orientation (N: 2)	5;7	67% (4/6)	17% (1/6)
Object Orientation (N: 0)	n.a.	n.a.	n.a.

(Matsuoka et al., 2006)

Adult-like response indicates that children were able to take note of the presupposition failure of *-mo* and deny the target sentence as adults would do, which meant they fed a toy green prepper to the puppet. Adult-like group is group of children who performed well on

both subject- and object-attached *-mo*. All yes group is group of children who consistently fed the puppet with a toy ice cream, performing poorly for both sentence types. The subject orientation group is group of children who favored subject-associated interpretation, as indicated by the contrast in the rate of their adult-like response between the two sentence types.

Looking at these results, we encounter the following immediate question: what is going on with the group of 44 children who consistently accepted both subject- and object-attached *-mo*? One possible answer to this question which falls in line with both Bergsma and Hüttner et al.'s experiments is that children are ignoring the additive particles. This could be due to children's lack of semantics of *-mo*, which leads to their interpretation of target sentences as if *-mo* did not exist. This, however, is argued to be unlikely. Matsuoka et al. report that Japanese-speaking children's first productive use of *-mo* is observed rather early: out of the 6 children who had their corpus analyzed by Matsuoka et al., 5 children made their first productive use by 2;3, with the earliest being 1;6. Even for the slowest child, his first productive use of *-mo* was observed by 2;11. Hence, it is hard to believe that these children have yet to acquire the semantics of *-mo* when children's productive use of the particle begins at such early age.

Another possibility, which is suggested by Matsuoka et al., is children's non-adult-like knowledge of *-mo*'s syntax.

- (12) Taro-mo sushi-o tabe-ta
 Taro-also sushi-ACC eat-PAST
 '(lit.) Also Taro ate sushi.'

- (13) Taro-ga sushi-mo tabe-ta
 Taro-NOM sushi-also eat-PAST
 '(lit.) Taro ate also sushi.'

In adult Japanese, the above sentences containing *-mo* cannot be interpreted as being synonymous; adnominal *-mo* can only associate with the noun phrase it is attached to. This implies that subject-attached *-mo* cannot associate with the object, and object-attached *-mo* cannot associate with the subject. Matsuoka et al., however, argues that such alternation of *-mo*'s associate is possible in child Japanese as they have yet to acquire the relevant syntax. Under Matsuoka et al.'s analysis, what seems to be the case of children ignoring *-mo* is actually them associating adnominal *-mo* with the particle-less noun phrase, which never involved a presupposition failure.

Although Matsuoka et al.'s account seems convincing at first glance, there remains an alternative account we must consider. Recall that in section 3, we briefly went over Sugawara's (2016) claim that English-speaking children's interpretation of sentences containing *only* is greatly influenced by the notion of QAC. The mismatch between the lead-in and the Question under Discussion (Roberts, 1996) evoked by the succeeding target sentences causes children to make interpretational errors. If such is the case for exclusive particles, it could also be the case for *-mo* that children's competence is hindered by the lack of appropriate context.

Indeed, it seems to be the case that Matsuoka et al.'s experiment lacks the proper context necessary for the use of *-mo* to be considered natural. The way in which Matsuoka et al. present these particles to children seems isolated from the context, making it awkward and 'out of the blue'. As we've went over in section 2, set of alternatives

introduced by focus is crucial in computing the meanings of focus particles. Without the information, the hearer cannot construct the contrastive information necessary for computing the meanings of focus particles. Intuitively, sentences containing *-mo* should be preceded by an utterance which reintroduces the hearer to the context. It might be the lack of such context that could have prevented children from inferring the contrastive information necessary for computing the meanings of *-mo* sentences, resulting in their seeming tendency to ignore *-mo*.

The above discussion leads us to the following research question:

(14) **Research question:**

Can Japanese-speaking children's poor performance with the interpretation of additive particle *-mo* be improved if target sentences were presented with appropriate context?

In the next section, we will introduce our own version of the experiment, which was designed in light of the above research question, and look at its results to see if additional contextual aid had any effect on children's performance.

5. Experiment

5.1. *Design and Method*

As we pointed out in the previous section, the findings reported in Matsuoka et al. (2006) regarding children's difficulty with the interpretation of the additive particle *-mo* in

Japanese could possibly be due to the lack of appropriate context in which the target sentence should be presented. Hence, we came across research question (14). If children's performance could be improved with better contextual aid, it would suggest that their difficulty with additive particles reported in Matsuoka et al. (2006) is due to their premature pragmatics, which prevents them from inferring the contrastive information necessary for computing the meanings of sentences containing *-mo*. To evaluate this possibility, we designed our experiment in such a way that children are reintroduced to the context before being asked to interpret *-mo* sentences.

Before we move on though, there is one issue we must take note of. Recall that additive particles make their semantic contribution by introducing additional presupposition which is interpreted as being the felicity-condition of a sentence. This means that when children are tested for their competence with sentences containing additive particles, they must be tested in terms of their felicitousness. The task employed in Matsuoka et al. (2006), however, was Truth-Value Judgement Task. As its name suggests, the task measures children's grammatical competence in regards to the truth-condition of a sentence; that is, children are being tested for their ability to detect mismatch in the truth-condition. Hence, there seems to be a sense of incongruence between what is to be measured and what is actually being measured. The nature of the task could overemphasize the truth-condition of the target sentences, overshadowing their felicity-condition.

To address the issue, we employed a Question-After-Story Task over the more traditional Truth-Value Judgement Task, as the former feels more coherent with what is being investigated. Unlike the Truth-Value Judgment Task which could overemphasize the significance of the truth-value, Question-After-Story Task allows children to process

sentences containing additive particles under more natural circumstances; children are not required to only evaluate the truth-condition of sentences involving these particles, but they are asked to comprehend the entire meaning of such sentences, including the felicity-condition, and give answers accordingly.

In this task, each child was introduced to simple stories by the storyteller (experimenter 1), which were accompanied by animated PowerPoint slides shown on a laptop computer. At the end of each story, a puppet manipulated by the second experimenter presented a set of *wh*-questions, one with *-mo* and one without *-mo*, which the child had to answer based on the context of the story. Children were divided into two groups, control and experimental, and engaged in the same experiment but the ordering of questions for the test trials reversed. Examples of our story and test sentences are given below:

(15) **Sample Story:**

When Doraemon, Doramichan, and Nobita came back home from playing outside, they found dorayakis and cakes for snack on the kitchen shelf. The three decided to take what they want to eat to the table. Doraemon said, "hmm, I had too much to eat for lunch so I'll just take one," and took his favorite snack dorayaki to the table. Doramichan said, "if I eat too much, I'll become fat so I'll just have one," and took the dorayaki to the table. But then Doramichan said, "It would be a waste if I don't eat the other," and took the cake to the table in addition. Nobita said, "If I eat too much and can't eat dinner, my mom is gonna scold me so I'll just have one," and asked himself what he should eat. After thinking for a while, he decided to take the cake to the table.

(16) **Question without -mo:**

Ima-no	ohanashi	de	wa,	dare-ga
now-GEN	story	in	TOP	who-NOM
dorayaki-o	hakon-da	kana?		
dorayaki-ACC	take-PAST	Q		

'In this story, who took a dorayaki to the table?'

(17) **Question with -mo:**

Ima-no	ohanashi	de	wa,	dare-ga
now-GEN	story	in	TOP	who-NOM
cake-mo	hakon-da	kana?		
cake-also	take-PAST	Q		

'(lit.) In this story, who took also a cake to the table?'

For the experimental group, the child was first asked to answer a *wh*-question which involved no instance of *-mo* such as in (16). Adult-like response to the question would be *Doraemon* and *Doramichan* as both of these characters took a dorayaki to the table. The first question would serve as sort of reintroduction to the context so that the child could retrieve the information required to compute the meanings of the additive particles more easily for the question to follow. The child was then asked to answer a second *wh*-question, this time containing the additive particle *-mo* as in (17). Although both *Doramichan* and *Nobita* took a cake to the table, the presupposition introduced by the additive particle *-mo* requires the character to have taken something else in addition to the cake for the answer to the question to be felicitous. Thus, adult-like response to (17) would be *Doramichan*. If the lack of appropriate context was the cause of children's incompetence,

the rate at which they give adult-like response should see an increase when supplied with contextual aid than no contextual aid. As such, the control group had the ordering of the questions reversed so that we have a baseline to compare to in order to evaluate its effect.

The experiment consisted of 5 target trials and 1 practice trial. The practice trial was included in the experiment to make sure that the children participating in the experiment understood the task. Only those children who gave correct answers to the practice trial were included in our analysis. In addition, children who only gave one of the two possible characters as an answer to questions without *-mo* in the target trial were also excluded from the analysis as it is likely that their response is affected by some factors other than context. This was done to reduce the amount of noise we must take into consideration to the bare minimum.

5.2. *Results and discussion*

In order to investigate the effect of contextual aid on children's interpretation of *-mo*, we tested 18 Japanese-speaking preschool children of age 4;9 to 6;6 (mean age 5;6). Out of the 18 children tested, 1 failed to answer both of the 2 characters satisfying the truth-condition of the *-mo*-less question, and hence, was excluded from the results. Table below illustrates the results of our experiment:

Table 2: Percentage of adult-like and non-adult-like responses to *-mo* questions

Subjects Total: 17	Age range	Adult-like responses	Non-adult-like responses
Control Group (N: 8)	4;10-6;5 (mean 5;8)	0 % (0/40)	100% (40/40)
Experimental Group (N: 9)	4;9-6;6 (mean 5;7)	0% (0/45)	100% (45/45)

Adult-like responses indicate that the child gave the sole character satisfying both the truth-condition and the felicity-condition of the *-mo* question, which was always the middle character in the PowerPoint slide, as the only answer. Non-adult-like responses include any other types of responses. If children's poor performance with the interpretation of *-mo* is due to the lack of context, there should be a sharp contrast down each column between control and experimental groups. This, however, was not the case. None of the children who participated in our experiment were able to give an adult-like response to the *-mo* questions. Thus, our results indicate that additional contextual aid had no effect on children's performance with the interpretation of *-mo*. What was interesting was all of the non-adult-like responses consisted of the same errors. Children gave both of the characters that satisfies the truth-condition as an answer to the *-mo* question.

Although such results could be taken as a supporting evidence for the claim that children lack the semantic knowledge of *-mo*, the possibility of being so seems quite slim. Recall that Matsuoka et al. had conducted a corpus analysis in addition to their experiment, which looked into how early children began producing utterances containing *-mo*; even the slowest child analyzed by Matsuoka et al. began using *-mo* by age 2;11. To further support

Matsuoka et al.'s claim that children are capable of using *-mo* productively, we also analyzed the corpora of 3 Japanese-speaking children found in the CHILDES database (Aki, Ryo, and Tai) on their use of *-mo*, counting the numbers of child utterances containing adnominal *-mo*. Using the CLAN combo program, we extracted all child utterances containing *-mo*, and manually counted the frequency of their adnominal use.

The results are summarized in the table below:

Table 3: Corpus Analysis on Children's use of *-mo* (adnominal)

	File range	Age	Adnominal
Aki	9-56	2;0-3;0	188
Ryo	38-81	2;2-3;0	82
Tai	1-77	1;5-3;1	648

Our analysis shows that children use the focus particle *-mo* quite productively, producing sentences with *-mo* attached to various DPs with demonstratives being the most common. Given how productively children use DP-attached *-mo* at such early ages, it seems unlikely that children tested in our experiment have yet to acquire the semantics of *-mo*.

Moreover, the supplementary corpus analysis combined with the results of our experiment makes one crucial suggestion regarding children's difficulty with *-mo*. It was proposed by Matsuoka et al. (2006) that a likely possibility behind children's error with *-mo* is that they freely associate the particle between subjects and objects regardless of syntactic position, as they have yet to acquire adult-like syntax. Results from our experiment, however, suggest that this is not the case. Intuitively, *-mo* attached to a *wh*-phrase is not interpreted as a *wh*-phrase, but is rather interpreted as being the equivalent of *nobody* in

English, at least in adult Japanese. Under very limited circumstances where the speaker is caught by surprise and is trying to clarify who else came could an utterance such as *dare mo kita no* 'also who came' be interpreted as a *wh*-question. As expected, we found no such instance of *-mo* in the child corpora analyzed above. Thus, it is hard to imagine that children tested in our experiment misinterpreted object-attached *-mo* as associated with the subject *wh*-phrase *dare*.

Taking these findings into account, none of the fore-mentioned possibilities, the lack of appropriate context, the lack of semantics, nor non-adult-like syntax, seems to be the source of children's non-adult-like response. As for the exact identity of the source of children's error, we are unable to give definite answer to the question at this point. One possibility which came to our mind is *-mo*'s phonological similarity to the Japanese accusative case marker *-o*, though we have yet to give it a serious consideration. What is crucial to our study is that we've found out that contextual aid does not seem to improve Japanese-speaking children's poor performance with the interpretation of additive particle *-mo*, successfully answering our research question.

6. Conclusion

Ever since Crain et al. (1994), children's comprehension of sentences containing focus particles has become one of the central issues in the acquisition of semantics. The topic has been investigated by numerous researchers, with similar pattern of errors observed in various languages and also for other types of focus particles. Likewise, Matsuoka et al. (2006) reported that Japanese-speaking children have difficulty interpreting sentences

containing adnominal *-mo*, arguing that it is children's non-adult-like syntax that leads to their interpretational error. Yet, more recent work by Sugawara (2016) on children's interpretation of *only* suggests another possibility: children's non-adult-like response could stem from the lack of appropriate context in which *-mo* sentences must be presented. To address the issue, we conducted our own version of an experiment to see whether or not children's performance could be improved if proper context were given.

The results of our experiment suggest that, unlike the case of *only*, providing appropriate context did not improve children's performance with their comprehension of *-mo*. These results, combined with the supplementary analysis of the child corpora conducted in the present research, suggest that there seems to be some unique characteristics of *-mo* which prevents children from interpreting them in an adult-like manner. As for what exactly this unique properties of *-mo* may be is left for future research.

Acknowledgement

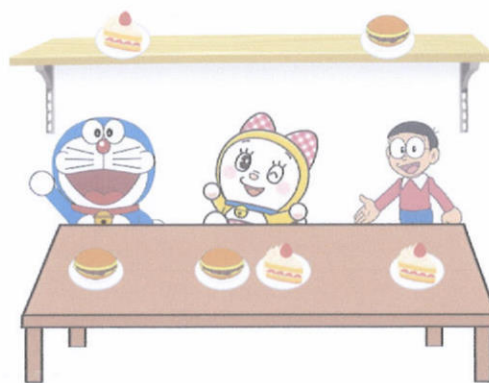
I would like to express my gratitude to the children at Tsu Aijien and their parents for their willing participation. My gratitude also goes to the teachers and staff members at Tsu Aijien for their cooperation and support.

Appendix

Below are the PowerPoint slides and questions used in our experiment. Each question began with the same phrase *imano ohanasi de wa* (in the story) to control the strong preference of Japanese-speakers to place a topic marker in the beginning of simple sentences, just as in the case of Matsuoka et al. (2006).

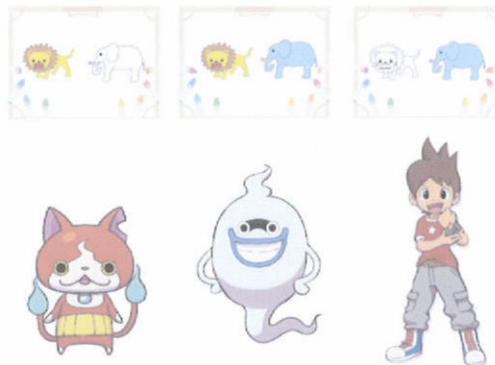


- Q1: dare-ga boushi-o kat-ta kana?
 who-NOM hat-ACC buy-PAST Q
 'who bought a hat?'
- Q2: dare-ga mafuraa-o kat-ta kana?
 who-NOM scarf-ACC buy-PAST Q
 'who bought a scarf?'
- Q3: dare-ga tebukuro-o kat-ta kana?
 who-NOM gloves-ACC buy-PAST Q
 'who bought gloves?'



Q4: dare-ga dorayaki-o hakon-da kana?
 who-NOM dorayaki-ACC take-PAST Q
 'who took a dorayaki (to the table)?'

Q5: dare-ga cake-mo hakon-da kana?
 who-NOM cake-also take-PAST Q
 '(lit.) who took also a cake (to the table)?'



Q6: dare-ga raion-o nut-ta kana?
 who-NOM lion-ACC color-PAST Q
 'who colored a lion?'

Q7: dare-ga zou-mo nut-ta kana?
 who-NOM elephant-also color-PAST Q
 '(lit.) who colored also an elephant?'



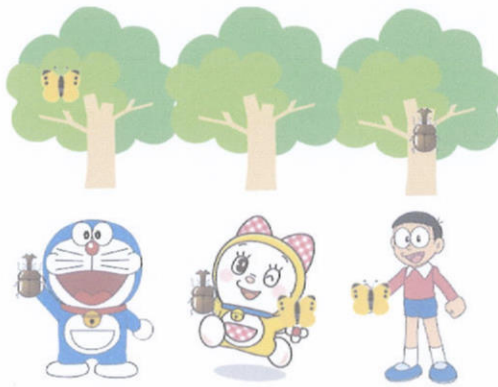
Q8: dare-ga nuigurumi-o kat-ta kana?
 who-NOM -ACC buy-PAST Q
 'who bought a toy bear?'

Q9: dare-ga hikouki-mo kat-ta kana?
 who-NOM airplane-also color-PAST Q
 '(lit.) who bought also an airplane?'



Q10: dare-ga turu-o tukut-ta kana?
 who-NOM crane-ACC make-PAST Q
 'who made a crane?'

Q11: dare-ga kabuto-mo tukut-ta kana?
 who-NOM helmet-also make-PAST Q
 '(lit.) who made also a helmet?'



Q12: dare-ga kabutomushi-o tukamae-ta kana?

who-NOM beetle-ACC catch-PAST Q

'who caught a beetle?'

Q13: dare-ga chouchou-mo tukamae-ta kana?

who-NOM butterfly-also catch-PAST Q

'(lit.) who caught also a butterfly?'

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