The Acquisition of Disjunction and Positive Polarity in Japanese

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1. Japanese Disjunction and Positive Polarity

In English, when the disjunction operator or appears in the scope of negation, it receives a “conjunctive” interpretation. In (1), to illustrate, the truth conditions of the sentence can be recast with conjunction and presiding over both of the original disjuncts.

(1) John didn’t eat ice cream or cake.
    = John didn’t eat ice cream and didn’t eat cake

The relation between the truth conditions of the sentences in (1) closely resembles the inference scheme in one of De Morgan’s law of propositional logic, as in (2).

(2) ¬(P ∨ Q) ⇔ ¬P ∧ ¬Q

The fact that English or yields the conjunctive interpretation within the scope of negation suggests that this lexical item corresponds to Boolean inclusive disjunction. In positive contexts, the Boolean operator continues to supply the basic meaning of or, but a derived exclusive-or interpretation is computed, due to a conversational implicature (e.g., Grice 1975).

In contrast to English, Japanese appears to be less faithful to the laws of logic. The Japanese counterpart of (1), with the disjunction operator ka, does not require the conjunctive interpretation of disjunction in negative

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sentences, as illustrated in (3). The truth conditions of the sentence in (3) can only be rephrased using disjunction. To convey the conjunctive interpretation of negated disjunction, Japanese speakers use the form “...mo...mo”, as in (4). Literally “...mo...mo” is “...also...also”, and means “both…and…” in positive contexts.

(3) John-wa  aisu  ka  keki-wo  tabe-nakat-ta.
    John-TOP  ice cream  or  cake-ACC  eat-neg-past
    = John didn’t eat ice cream or didn’t eat cake

(4) John-wa  aisu  mo  keki  mo  tabe-nakat-ta.
    John-TOP  ice cream  also  cake  also  eat-neg-past
    = John didn’t eat ice cream and didn’t eat cake

Two possible accounts come to mind for the contrast between English disjunction or and Japanese disjunction ka. One supposes that Japanese ka is not logically equivalent to English or. That is, ka is not the Boolean inclusive disjunction in Japanese. Instead, it could be an enumerator of possibilities. If so, the sentence in (3) means something like: "One possibility is that John didn’t eat ice cream; another possibility is that John didn’t eat cake."

There is an alternative account of the difference in the interpretation of disjunction in English and Japanese. This account supposes that, in simple negative sentences like (3), ka is interpreted outside the scope of sentential negation. On this account, the scopal relation between disjunction and negation in (3) is the same as that in the English cleft construction, where the conjunctive interpretation of or is not available.

(5) It is ice cream or cake that John didn’t eat.
    = John didn’t eat ice cream or didn’t eat cake

These two alternative accounts of the interpretive contrast between English and Japanese are summarized in (6) and (7). We will call the account in (6) the semantic account, and the account in (7) the scope account.

(6) Or and ka have distinct semantics; the former corresponds to Boolean inclusive disjunction, but the latter does not.

1. If “...mo...mo” corresponds to Boolean conjunction, as its interpretation in positive contexts suggests, then the fact that it does not yield the “not both” interpretation in sentences like (4) is somewhat surprising. We must set this problem aside, as beyond the scope of this paper.
(7) *Or* and *ka* have distinct scope relations with local (c-commanding) sentential negation; the former is interpreted within the scope negation, but the latter does not.

Teasing apart these two proposals about adult Japanese requires complex data, including sentential embeddings. As pointed out in Goro (2003), Japanese *ka* and English *or* both yield conjunctive interpretations when they are embedded within a subordinate clause under matrix negation. In other words, the Japanese-English contrast in the interpretation of disjunction disappears in embedded contexts. The following examples illustrate the identical interpretations of *ka* and *or* when they appear in a sentential complement (8) and (9), and in a relative clause (10) and (11)².

(8) John didn’t say that Mary could speak English *or* Japanese.
= John didn’t say that Mary could speak English *and* didn’t say that Mary could speak Japanese

(9) John-wa [Mary-ga eigo ka nihongo-wo hanasu-to]
John-TOP Mary-NOM English or Japanese-ACC speak-Comp
iwa-nakat-ta
say-neg-past
= John didn’t say that Mary could speak English *and* didn’t say that Mary could speak Japanese

(10) John didn’t see a student who can speak English *or* Japanese.
= John didn’t see a student who can speak English *and* didn’t see a student who can speak Japanese

(11) John-wa [eigo ka nihongo-wo hanasu] gakusei-wo
John-TOP English or Japanese-ACC speak student-ACC
mi-nakat-ta
see-neg-past

2. The observation is that *ka* within a relative clause attached to the object NPs is interpreted within the scope of sentential negation in the matrix clause. This suggests that sentential negation c-commands the object position in Japanese. Another fact that leads to the same conclusion involves the interpretation of other quantificational elements, e.g., *takusan* “many” in object position of simple negative sentences. Here the narrow scope reading of *takusan* is readily available, as in (i):

(i) Taro-wa *takusan-*no hon-wo yoma-nakat-ta
  Taro-TOP many-GEN book-ACC read-neg-Past
  0homes MAY > NOT / 0homes NOT > MANY
John didn’t see a student who can speak English and didn’t see a student who can speak Japanese.

This parallelism poses a difficulty for the semantic account. Without additional assumptions, the semantic account predicts that the contrast in simple sentences like (1) and (3) should persist in other linguistic environments, but this turns out to be false. Given the parallel behavior between English or and Japanese ka in embedded contexts, it seems reasonable to conclude that these lexical items have the same semantics (inclusive Boolean disjunction), and that the interpretive contrast in simple negative sentences is reducible to a scope contrast – as the scope account (7) maintains.

A problem remains, however. Why does Japanese ka take scope above sentential negation in simple clause cases as in (3)? Following an analysis by Szabolcsi (2002), Goro (2003) argues that Japanese disjunction ka is a Positive Polarity Item (PPI), which cannot be interpreted under the scope of local negation. A crucial component of the PPI analysis of Japanese ka is the assumption that ka corresponds to inclusive Boolean disjunction which receives the conjunctive interpretation when it can appear within the scope of negation. Thus, the parallelism between or and ka in embedded contexts is a natural consequence of the logical law in (2). This logical property of Japanese ka, however, is obscured in simple clause cases, due to its polarity sensitivity; as a consequence the conjunctive interpretation of disjunction does not surface in Japanese simple sentences with negation, as in (3).

The polarity sensitivity of disjunction appears to be the locus of cross-linguistic variation. According to Szabolcsi (2002), the disjunction operators in Hungarian, Russian, and Italian show the properties of PPIs in contrast with disjunctions in English, German, and Korean. Interestingly, the semantics of disjunction are similar for all among languages (including Japanese) in certain contexts: e.g., disjunctions yield the conjunctive interpretation in embedded contexts. This is puzzling if we consider the acquisition of the semantics of disjunction. Given that positive polarity disjunctions, such as Japanese ka, do not yield the conjunctive interpretation in simple negative sentences, it would appear that children could be misled by this input, to assume that those disjunctions are not Boolean inclusive disjunction – as in the semantic account in (6). The direct evidence for children presumably must include embedded contexts, such as in (9) and (11), which may not be included in the primary linguistic data used by children (e.g., Lightfoot, 1999). In any event, the majority of the input to children is misleading at best, and could not reliably lead children...

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3. For extensive discussion on the properties of PPIs, see Szabolcsi (2004).
to conclude that the disjunction in Japanese (among other languages) is Boolean inclusive disjunction.

One way to resolve the learnability puzzle is to assume that UG limits the possible variation in the interpretation of disjunction in natural language. Specifically, let us assume that UG determines the semantics of disjunction as inclusive Boolean disjunction, without variation. Under this assumption, there is no confusion about the semantic properties of disjunction in the course of language acquisition: it is innately determined by UG. Learning is required only with respect to the polarity sensitivity of the disjunction in the target language.

In fact, previous researches on children’s interpretation of negated disjunctions have independently reached to the conclusion that the semantics of natural language disjunction is specified in UG (e.g. Crain et al. in press). There is mounting evidence of adult-like knowledge of the interpretation of negated disjunctions by English-speaking children at around age 4. First, Gualmini and Crain (2002) showed that English-speaking children correctly assigned the conjunctive interpretation to disjunction operator or within the scope of negative expressions. Crain et al. (2002) and Gualmini and Crain (2004) showed further that children were sensitive to abstract linguistic knowledge such as c-command in assigning the conjunctive interpretation to disjunctions. This combination of findings shows that English-speaking children have the adult-like conjunctive interpretation of negated or, such that or is the inclusive Boolean disjunction. For the vast majority of the primary linguistic data available to children, however, or carries an implicature of exclusivity. The familiar “poverty of stimulus” situation emerges here: children’s knowledge does not match the probabilistic properties of their input. These considerations led Crain et al. (in press) to propose that the semantics of natural language disjunction is innately specified as inclusive Boolean disjunction.

Returning to Japanese, the language-specific properties of Japanese ka (as a PPI) invites us to ask how Japanese-speaking children initially interpret ka in simple negative sentences. Under the UG-based model of the acquisition of the semantics of disjunction, the conjunctive interpretation of disjunction in the scope of negation “comes for free”, as a part of innate linguistic knowledge, and does not have to be learned from experience, irrespective of the child’s target language. In contrast, Japanese children must learn the language-specific property of ka, that is, the fact that it is a PPI. In other words, the acquisition of the knowledge that ka has the

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4. The wide-scope disjunctive interpretation of negated or in English is also possible. The interpretation is, however, strongly dispreferred, especially when or does not receive focal stress. Children’s (and adults’) adherence to the conjunctive interpretation of negated or in the experiments reported here reinforces this point.
disjunctive interpretation in simple negative sentences requires positive input showing that *ka* is not interpreted within the scope of local negation. Until Japanese children encounter sufficient amount of this positive input, their interpretation of negated disjunctions in simple sentences should essentially be the same as the interpretations assigned to such sentences by English-speaking children and adults⁵. That is, the UG-based approach predicts a stage in language acquisitions in which Japanese children interpret negated disjunctions conjunctively in simple negative sentences, in apparent disregard to the input they encounter.

Such behavior by Japanese children is totally unexpected under experience-based approaches to language acquisition (e.g., Tomasello 2003). If children’s behavior is tied to experience, as experience-based account maintain, then children’s interpretation of negated *ka* in simple sentences such as (3) should conform to that of adults, in apparent violation of De Morgan’s laws. As for the conjunctive interpretation of *ka* in embedded contexts, such as (9) and (11), it is not even clear that the interpretation is learnable from the input, because structures involving embedding may not be part of the primary linguistic data used by children (e.g., Lightfoot, 1999).

These considerations make the acquisition of Japanese disjunction in negative sentences an interesting research issue. The UG-based approach to the acquisition of the semantics of disjunction predicts that Japanese children initially assign the conjunctive interpretation to negated *ka* in simple negative sentences – a “De Morgan’s” interpretation that is never instantiated by adult uses of *ka* in simple negative sentences. The experience-based accounts would find such behavior mysterious. A series of experiments were conducted to test the prediction.

2. Experiment

An experiment was designed to test the prediction that Japanese children initially assign the conjunctive interpretation to disjunctions in simple negative sentences. Specifically, we used a Truth Value Judgment Task (Crain and Thornton 1998) with Japanese-speaking children, and had them judge sentences like (12), in a situation where the pig ate the carrot but didn’t eat the pepper.

(12) **Butasan-wa ninjin ka piiman-wo tabe-nakat-ta**
    pig-TOP carrot or pepper-ACC eat-neg-Past

⁵ In Goro and Akiba (to appear), we argue that children should initially have the English-type interpretation of negated disjunctions, as a consequence of learnability in the absence of negative data.
(Literally) "The pig didn’t eat the carrot or the pepper"

Under the narrow scope (conjunctive) interpretation of ka that is not available to Japanese adults, the sentence means "the pig didn’t eat the carrot and didn’t eat the pepper." Under this interpretation, the sentence is false in the situation, since the pig actually ate the carrot. In contrast, under the wide scope (disjunctive) interpretation of ka, the sentence means "the pig didn’t eat the carrot or didn’t eat the pepper," and is true. If Japanese-speaking children are like adults, they should access the disjunctive interpretation of negated ka, and should accept the test sentences. However, if Japanese-speaking children assign the English-type conjunctive interpretation to negated ka, then they should reject the test sentences.

In addition, a control condition needs to be included to ensure that the child subjects can access inverse-scope interpretations. An inverse scope interpretation is required to derive the adult interpretation of simple negative sentences containing ka. This is because young (English-speaking) children have been observed to experience problems in accessing interpretations in which the scope relations between negation and a quantifier do not match the surface c-command relations of these expressions. These are sometimes called “non-isomorphic” scope relations (Musolino 1998; Lidz an Musolino 2002; also see Gualmini 2003). The control condition can be established by replacing the disjunctive phrase in the target sentences, such as (12), with another quantificational expression. If Japanese children accept inverse-scope interpretations in the control condition, the observation that they continue to assign the conjunctive interpretation to ka in sentences like (12) can then be interpreted as evidence that children's non-adult performance with ka has to do with the lexical item, rather than general difficulties in accessing inverse-scope readings.

For the control condition, we used the quantifier nanika. Nanika is an indefinite existential corresponding to English something.

(13) Butasan-wa nanika tabe-nakat-ta
Pig-TOP something eat-neg-Past
"The pig didn’t eat something"

Like ka, nanika is a PPI. Therefore the adult interpretation of (13) means "there is something that the pig didn’t eat" rather than "The pig didn’t eat anything". In short, the inverse-scope relation is required for

6. Morphologically, nanika consists of nani “what” + ka. The process that creates an indefinite NP by combining a wh-word with ka is robust in Japanese, e.g., dare “who” + ka = dareka “someone”, doko “where” + ka = dokoka “somewhere”, etc..
adults. For present purposes, it suffices to show that the inverse-scope reading is available to children with *nanika*. We review the details of the design in the next section.

2.1. Design and Participants

The experiment consists of two phases. The first phase was a partial “story”. One experimenter acted out this part of the story using paper-crafted props. The second phase was the Truth Value Judgment part. Here, a puppet, Kermit the Frog, was manipulated by a second experimenter. The puppet uttered the target sentences. These sentences were interspersed by filler trials. The task of the child subjects was to judge the truth of the test sentences, by giving Kermit different fruit toys (a strawberry for “right”; a lemon for “wrong”).

The central theme of the stories was an eating-contest. There were twelve different animals, who were each invited to eat the following foods: a piece of cake, a carrot, and a green pepper. The subject was told, first, that all of the animals like cake, but not all of them like carrots or green pepper (just like many children). Then we introduced the rules of the contest. First, if an animal eats not only cake, but also the vegetables, then it receives a shining gold medal. Second, if an animal eats cake and only one of the vegetables, then it receives a blue medal. Finally, if an animal only eats cake and does not eat any vegetables, then it gets a black cross. These rewards serve as “reminders” in the second phase of the experiment (see Crain and Thornton 1998).

After explaining the rule, the story commences. One of the experimenter acts out the eating trials for each animal. Among the twelve animals, four eat both vegetables and get a gold medal; four eat only one of the vegetables and get a blue medal, and four eat none of the vegetables and get a black cross. All of the animals eat the cake. We ask the child subjects to present a reward to each animal, and correct it when it makes mistakes. Most of the child subjects did not have any problems understanding the rules of the game, and those who made more than three mistakes in choosing a correct reward were excluded from the analysis of the data. The story phase continued until all of the twelve animals finished their trials and were presented with their rewards.

After the story phase was finished, we returned to the first animal, and the puppet started to guess how well each animal did in the game. First, the puppet said that he didn’t remember exactly what each animal ate, then he started to make guesses about this, on the basis of the color of the prizes the animals had been presented as awards. For example, the puppet uttered the test sentence (15), preceded by a lead-in in (14) for the pig, who had eaten the carrot but not the green pepper:
In this way, the design motivated the use of negation and disjunction simultaneously. First, the “contest” set up a context in which negative sentences would be used felicitously. It was pointed out by De Villiers and Tager Flusberg’s (1975) that negative statements are typically used to point out that contextually determined expectations have not been realized. Based on this observation, Gualmini (2003) demonstrated that the felicitous use of negative sentences improves children’s performance. In our experimental story, we sought to satisfy this felicity condition on the use of negation. The overarching goal of the contest was for the contestants to eat all of the foods and obtain the best prize: a gold medal. Receiving a lesser prize indicated that the requirements for getting the best prize had not been fulfilled and, therefore, this was associated with a clear sense of failure. The appearance of negation in the target sentences therefore felicitously indicated that what had actually happened did not match the expectation of what ‘should’ happen. Also, a positive lead-in to the target sentence was included, as in (14), to reduce any difficulty for children in accessing inverse-scope readings (Musolino and Lidz 2002).

Second, the two-phased structure of the design was incorporated to motivate the use of disjunction. Recall that the puppet started to make its guesses after the “contest” phase had been completed. Therefore, the puppet could not remember exactly what each animal had eaten, so its guess was based on the color of the prizes that each animal had been awarded. It is crucial here that a blue medal has been awarded only to those animals who had eaten just one of the vegetables - it did not indicate which vegetable the animal had actually ate. Given this incompleteness of information, all that the puppet could reasonably guess was something like “he didn’t eat the pepper or he didn’t eat the carrot”, which corresponds to the adult-Japanese interpretation of the target sentence. Thus, if children had an adult-like interpretation of negated disjunctions in Japanese, they should have accepted sentence like (14). However, if children assigned the conjunctive interpretation to ka, then they should have rejected the puppet’s statements, since the color of the medal revealed that the animal had eaten one of the vegetables.

The puppet made its guesses for all twelve animals. The test sentences consisted of four fillers (for animals with a gold medal), four target sentences with ka (two for animals with a blue medal; two for those with a
black cross), and four control sentences with …mo…mo as in (4) (two for animals with a blue medal; two for those with a black cross). Sentences with …mo…mo were included to make sure that children understood the task, especially the rule for awarding the prizes.

In addition to the main experiment, we carried out a control experiment using test sentences containing nanika as in (13). The control experiment aimed to see whether or not Japanese children can access inverse-scope readings of an object QP. In the control experiment, disjunctive phrases (A ka B) in the target sentences were replaced with nanika; similarly A mo B mo phrases were replaced with nanimo (anything). In addition, we used three different vegetables, rather than a piece of cake and two vegetables, in order to create a situation in which sentences like (16) were true:

(16) Butasan-wa nanimo tabe-nakat-ta
    pig-TOP anything eat-neg-Past
    “The pig didn’t eat anything”

All other details were similar to those of the main experiment.

Thirty Japanese-speaking children (Age: 3;7 - 6;3, Mean: 5;3) participated in the main experiment, and another thirty Japanese-speaking children (Age: 3;7 - 6;3, Mean: 5;4) participated in the control experiment. The children were recruited at Totsuka Sumire Kindergarten, Yokohama, and were tested individually. In addition, an adult control group (N=10, age 29 - 32, Japanese monolingual non-linguists) participated in the main experiment.

2.2. Results

Let us review the results in turn. First, the results on the crucial test cases show the predicted contrast between adults and children. The crucial test cases are the puppet’s guess about those animals with a blue medal, that is, those who ate only one of the vegetables. Under the situation, the adult control group accepted the test sentences with disjunction, as in (15), 100% of the time (20/20). This result clearly shows that the experiment was properly designed so that the crucial test sentences were in fact judged to be true by those who have the disjunctive interpretation of negated ka. In contrast to the pattern of results for adults, children only accepted the crucial test sentences under the same situation 25% of the time (15/60). Among the thirty children, only four (age: 4;11, 5;5, 5;10, and 6;2) were adult-like in consistently accepting the test sentences. The remainder of the children consistently rejected the test sentences 87% of the time. When these children were asked to explain the reason for their negative judgments, most children said e.g., either “because the pig did eat one of the
vegetables” or “because it is only one of the vegetables that the pig didn’t eat”.

The negative judgments of the vast majority of children, combined with these children’s explanation for their negative judgments, suggest that Japanese children are assigning the conjunctive interpretation to *ka* in simple negative sentences. Furthermore, when sentences like (15) were uttered as a guess about the animals who had received a black cross, i.e., those who had eaten none of the vegetables, children accepted the sentences for 78% of the time (47/60). Assuming that the 75% rejection in the blue-medal condition corresponds to the rate that children assigned the conjunctive interpretations to negated *ka*, the 78% acceptance rate in the black-cross condition makes sense: in the situation, the sentences with *ka* were true under the conjunctive interpretation of negated *ka*.

Another finding was that children performed almost without error in the *…mo…mo* control conditions. Remember that negative sentences containing *…mo…mo* yield a “neither” interpretation in adult Japanese. For those animals who had gotten a blue medal, children correctly rejected the sentences containing *…mo…mo* 95% of the time (57/60); for those animals who had gotten a black cross, they correctly accepted the sentences 100% of the time (60/60). Adults in the control group rejected these sentences 100% of the time (20/20) in the blue-medal condition, and they accepted the sentences 95% of the time (19/20) in the black-cross condition. In short, Japanese children showed adult-like performance in interpreting *…mo…mo* in simple negative sentences. Furthermore, the high level of accuracy in these conditions suggests that the children in our experiment understood the task well, including the rule for awarding rewards.

A third set of findings comes from the control sentences with *nanika*. Here, children did not show the same non-adult performance as the children in the main experiment. For those animals who had gotten a blue medal, children in the control group correctly accepted the test sentences such as in (13) 88% of the time (53/60). This result shows that Japanese children in our experiments did not experience general problems in accessing inverse-scope interpretations of object QP.

Summarizing the results, we found that Japanese-speaking children assigned the conjunctive interpretation to negated *ka* in simple negative sentences, as predicted by the UG-based approach to the acquisition of disjunction. In interpreting negated disjunctions, Japanese children behave like English-speaking children, rather than like Japanese-speaking adults. The results from various controls undermine the possibility that non-adult performance with *ka* is simply an experimental artifact. Furthermore, the result from the control experiment with *nanika* confirmed that the non-adult behavior of Japanese children is not due to general problem in accessing
inverse-scope interpretations. The implications of the results are discussed in the next section.

3. Discussion

In our experiments with Japanese-speaking children, we found that they interpreted *ka* conjunctively in simple negative sentences. First, we would like to point out that the data poses a serious challenge for any input-matching approach to language acquisition (e.g. Tomasello 2003). Beginning with Gualmini and Crain (2002), the findings from studies of children acquiring disjunction have consistently challenged such models. Recall that Gualmini and Crain (2002) found that English-speaking children adhered to the conjunctive reading of negated disjunction despite the fact that the overwhelming majority of adult uses of *or* carry an implicature of exclusivity (Crain et al. in press). This finding was interpreted as indicating that the semantics of disjunction is innately specified as inclusive Boolean-*or*. The data from Japanese-speaking children strengthen this conclusion. The “poverty of stimulus” situation is even worse in Japanese, because the adult Japanese disjunction *ka* does not yield the conjunctive interpretation in simple negative sentences. Nonetheless, Japanese children showed the same adherence to the conjunctive reading of negated disjunctions as English-speaking children in interpreting *ka* within simple negative sentences. The behavior by these children clearly does not match the input, so input-driven learning approaches would be hard-pressed to explain the findings of the present experiments.

Instead, the experimental results provide strong support for the UG-based approach to the acquisition of the semantics of disjunction. The fact that Japanese children assign the conjunctive reading to negated *ka* shows that they know *ka* corresponds to Boolean inclusive disjunction, as we saw in Section 1. It is highly unlikely that children have learned the semantics of *ka* from input: the input is highly misleading, because *ka* does not instantiate De Morgan’s laws in simple sentences, and would not provide enough grounds to preclude incorrect hypothesis such as the “semantic account” described above in (6). We conclude, for these reasons, that Japanese children’s non-adult behavior with negated *ka* is presumably another instance of the realization of innate linguistic knowledge (Crain, Goro, and Thornton to appear).

The fact that children accepted the wide-scope reading of *nanika* in the control experiment suggests that Japanese children’s non-adult behavior in interpreting scope relations is specific to the disjunction operator *ka*, rather than reflecting a general problem in accessing inverse-scope interpretations. Children’s adult-like behavior in response to *nanika*, a PPI in adult Japanese, also demonstrates that the children in our experiments did not
experience problems in interpreting negative sentences containing a PPI. Consequently, their non-adult behavior in interpreting negated *ka* should be attributed to their lexical knowledge, rather than to a general difficulty with certain types of grammatical structures. We assume, then, that most of Japanese children in our experiments have not learned that *ka* is a PPI, and therefore, their interpretations of negated *ka* is essentially the same as English children’s interpretations of negated *or*.

One remaining question is why acquiring the adult interpretation of negated *ka* takes so long time. We observed that even a 6-year-old child manifested the non-adult interpretation of negated *ka*. One possibility is that the long delay in the acquisition of the adult interpretation is due to the sparseness of crucial data. In order to learn that *ka* is a PPI, children must encounter cases in which a negated disjunction is used to express “not A OR not B”, which is generally associated with speaker’s uncertainty. As we have seen, however, negation is generally used to express mismatches between what is expected and what actually happened. Thus, a pragmatically felicitous use of negation generally presupposes that the speaker knows what actually happened. In daily life, knowing what happened is not usually associated with uncertainty. In other words, negation and disjunction with the disjunctive interpretation have somewhat contradicting pragmatic conditions on their uses. We expect that contexts that satisfy the conditions for both negation and disjunction simultaneously, such as the context we made up for our experiments, are relatively rare in natural speech. Consequently, the frequency of the crucial data for children to learn that *ka* is a PPI will be quite low, which could lead to delays in the acquisition of the correct interpretation of negated *ka*.

References


7. We assume that direct evidence is required to acquire the relevant lexical knowledge. Recall that the children in our experiments showed adult-like performance in interpreting *…mo…mo* and *nanika* in simple negative sentences. This suggests that having adult-like knowledge about these expressions does not directly help children to identify the interpretive properties of *ka*. 
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