

Japanese-Speaking Children's Interpretation of *Ka* and *Ya* 'Or'

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1 Introduction

Listeners interpret an *or* sentence, based on their assumption about the speaker's knowledge of the stronger alternative, 'and' sentences. For example, for statements like (1) the hearer may reach one of two conclusions. (1) John brought sushi or pasta to the party.

S/he may conclude the speaker did not know whether or not the stronger alternative was true (' $\neg K(A \wedge B)$ '), since the speaker did not use it. S/he may also conclude that the speaker is knowledgeable enough to know or believe the stronger alternative was false (i.e. ' $K\neg(A \wedge B)$ '). In the former case, (1) is interpreted inclusively, but in the latter case, exclusively, i.e. as 'John brought either sushi or pasta, but not both'. For convenience I will call the speaker's inferred uncertainty or lack of knowledge in the former case Type 1 ignorance inferences. (Sauerland 2004 refers to them as pri-

mary implicature, which precedes what he calls the ‘epistemic step’. The latter exclusive interpretation stems from scalar implicature (SI) computation, hence, $(A \vee B) \wedge \neg (A \wedge B)$. Note that (1) also gives rise to another type of ignorance inferences as to which disjunct is true. Because either one of the disjuncts should be mentioned by the speaker if s/he knows the outcome, (1) yields ignorance implicature. For convenience, I will call these inferences Type 2 ignorance inferences (see, e.g. Fox 2007 for discussion).

This study investigates whether Japanese-speaking preschoolers are able to calculate implicatures/inferences generated by the use of the connecting particles *ya* and *ka* (both meaning ‘or’) depending on the context/mode in which the particles are used. Testing the connectives in both the prediction mode (PM) and description mode (DM) will help determine whether children are sensitive to uncertainty or the role of a speaker’s knowledge in implicature/inference calculation.

This study aims to provide data 1) about Japanese children’s interpretation of *ya* as well as *ka* and 2) on their sensitivity to modes used and, to some degree, on their sensitivity to ignorance inferences involved in ‘or’ sentences (more on Type 1).

2 Previous Studies

Whether children are able to interpret sentences containing ‘or’ on a par with adults has received much attention in extensive investigations of children’s (in)ability to calculate SI. Children, unlike adults, are reported to interpret ‘or’ sentences inclusively when given in the upward-entailing (UE) contexts and tested in non-elaborate contexts (Paris 1973; Boster and Crain 1993; Chierchia et al. 2001, 2004; Crain et al. 2002; Huang et al. 2019, among others) or conjunctively as well (Paris 1973; Braine and Romain 1981; Singh et al. 2016; Tieu et al. 2017) when adults assign exclusive interpretations.

Previous studies have attributed children’s unsuccessful calculation of SIs, such as that of ‘some’ or ‘or’ statements, to two possible causes. The first is that children are insensitive to informativeness (e.g. Noveck 2001) or are tolerant of pragmatic infelicity (e.g. Katsos and Bishop 2011). The second is that despite their ability to draw pragmatic inferences, children are unable to access other more informative lexical alternatives, such as ‘and’ or ‘all’ (Chierchia et al. 2001; Singh et al. 2016, among others). In the latter approach, Singh et al. (2016) and Tieu et al. (2017) report that children incorrectly interpret disjunction conjunctively as well as inclu-

sively. Recent explanations based on the idea of 'access to alternatives' come from Singh et al. (2016), who studied English-speaking children's interpretation of *or* sentences given in the description of pictures. Their finding was that children assign both inclusive and conjunctive interpretations to disjunction (used in the object position), whether or not their subject nominal may be a single NP or a QNP every NP. As for conjunctive interpretation, children were found to reject disjunction when only one disjunct was true.¹ Following Fox (2007), Chemla (2009), Franke (2011), they attribute children's illicit conjunctive interpretation to a (child) mechanism in which *or* statements lack the conjunctive alternative, with only two disjuncts available as 'domain' alternatives. In this analysis (based on the idea of double exhaustification proposed by Fox 2007), only a subset of alternatives, with conjunction lacking as an alternative, gives rise to conjunctive interpretation on a par with free choice interpretations of disjunction in the scope of modal (Fox 2007; Chemla 2009; Franke 2011; Kratzer and Shimoyama 2004) or other world languages such as Warlpiri (Bowler 2014; Davidson 2013).² According to Singh et al., the yielded pragmatic inference of conjunctivity stems from SI, although the relevant conjunctive interpretation happens to be illicit in the case of the conjunctive interpretation children assign to 'or' sentences.

Illicit conjunctive interpretation is also reported in Tieu et al. (2017), who found that Japanese- and French-speaking children incorrectly interpret sentences containing 'or' and 'or...or' sentences (e.g. *ka* and *ka-ka* sentences in Japanese) conjunctively in the PM. To my knowledge, this is the only study which investigates Japanese-speaking children's (in)ability to calculate SI to which the Japanese disjunction *ka* gives rise, although in the PM. (Regarding the disjunction *ka* used in simple negative sentences,

¹Paris (1973) and Braine and Romain (1981) suggest that the observed conjunctivity comes from children's strategy that involves 'matching' disjuncts with items presented in the picture.

²Strengthening in Fox (2007) results from the application of a covert exhaustivity operator *exh*, being deviant from quantity-based pragmatic accounts as proposed in the Maxim of Quantity or the neo-Gricean analyses (Horn 1972). The present study takes a quantity-based pragmatic approach for SI calculation and considers that implicatures stem from the pragmatic component (Grice 1975; Gazder 1979; Sauerland 2004), without any specific commitment. A grammatical approach as taken in Fox (2007) will also need to consider when the exclusivity operator is or is not inserted, leading to exclusive or inclusive interpretation, respectively. The natural assumption in this paper is that in Fox's approach, the covert operator is attached when the speaker is considered knowledgeable enough; therefore, Fox and Singh et al. will also predict variations depending on the mode. (See Chierchia 2006; Chierchia, et al. 2012; Levinson 2000 for the semantic approach.)

the DE context, Goro and Akiba (2004) report its illicit conjunctivity [the relevant conjunctivity is licit in English].³

Children's insensitivity is also reported to ignorance inferences involved in 'or' sentences, (e.g. Hochstein et al. (2014; four-year-olds) and Barner et al. (2018)), although Chierchia et al. (2001) show children's sensitivity to DE vs. UE contexts in which 'or' sentences are presented. Barner et al. (2018) report in part of their study, 4-5-year-old children are insensitive to them (both Type 1 and Type 2 ignorance inferences in the present paper). Hochstein et al. also report similar results for the 4-year-olds. Unlike Barner et al. (2018), they report the results of ignorance inferences by classifying them as what we refer to as Type 1 and Type 2 ignorance inferences, and they found the 4-year-olds were insensitive to both types. Their results seem to indicate children do not necessarily know that 'or' statements are felicitously used in a context where ignorance inferences are made. The results raise the possibility that although children are reported to be sensitive to DE vs. UE linguistic contexts, pragmatic contexts involving the speaker's knowledge about the outcome of stories may pose a problem for children.⁴ Testing disjunction in both the PM and DM will show whether children are sensitive to modes in which the outcome is or is not certain, and therefore, are sensitive to Type 1 ignorance inferences, although this does not extend to their sensitivity to Type 2 ignorance inferences as to which disjunct was exactly true.⁵

Another question also arises as to whether the 'access to alternatives' analysis (which assumes children's ability to calculate SI) and insensitivity to ignorance inferences (and therefore, their failure to reason about the speaker's knowledge) are compatible. Note that SI does not arise in DE

³ Nitta and Nagano (1966) investigated in part of their study of connectives, whether Japanese-speaking children are able to interpret *ka* inclusively in imperative sentences, sentences in which *ka* is felicitously interpreted inclusively. They found that Japanese children assign non-adult-like interpretations to *ka*; when two sets intersected, children incorrectly chose items in intersected sets for 'v' (in the authors' classification, both *to* and *ka*), and incorrectly chose items in the union set for '^' (*de* 'and') (see also Hatano and Suga 1977).

⁴ For the availability of the disjunction's licit conjunctivity in the DE context, see Chierchia et al. 2001, 2004; Gualmini et al. 2001, 2003; Crain and Khlentzos 2010; Crain et al. 2002; Gualmini and Crain 2002; Notley et al. 2012; cf. Goro and Akiba 2004 for Japanese children's illicit conjunctive interpretation assigned to *ka* in simple negative sentences.

⁵ The PM, which is tested in the present paper, may seem to be compatible with 'uncertainty' contexts which do not lead to SI. Note that participants' performance in the PM does not necessarily prove they are (in)capable of ignorance inferences. As mentioned in Sect. 1, ignorance inferences are made in two ways: one concerns the hearer's assumption that the speaker's failure to know which of the disjuncts is verified and another when it is assumed that the speaker is not knowledgeable about whether the more informative and statement is true. This study, testing *ka* in both the PM and DM, can assess whether children (and adults) vary their interpretation depending on the mode in which 'or' is used, affected by the latter ignorance/uncertainty involved in 'or' sentences.

contexts but does tend to do so in non-DE contexts (see Chierchia 2013 for discussion) and that SI yielding exclusive interpretation is calculated when the speaker is considered knowledgeable about the truth of disjuncts, whether or not one or both disjuncts are actually true. Therefore, calculating SI requires sensitivity to the context or mode in which 'or' statements are made, such as prediction, wager, or description. This study tests whether Japanese-speaking children are sensitive to the modes in which 'or' sentences are used, varying their interpretations.

3 The Interpretation of *Ka* and *Ya*, the Japanese 'Or'

In Japanese, *ka* and *ya* (both meaning 'or'), *to* (meaning 'and') and others are coordinating particles for nominals (e.g. Kuno 1973; Ohori 2004). The disjunction *ka* can be interpreted inclusively and exclusively, depending on the context in which it is used, and *ya*, inclusively and conjunctively. Using one connective gives rise to SI, in relation to other connectives as alternatives.

First, consider the use of *ka* in the PM (for example, in the subsequent complement of 'I bet' or 'I thought'), a context in which readings available in the non-UE contexts are available, as shown in (2).

- (2) Ken-ga pasuta ka sushi-o tyuumon-suru-to omotteta yo.
 Ken-Nom pasta KA sushi-Acc order-that thought particle
 '(I) thought Ken would order pasta KA sushi.'

The speaker of (2) can be taken as speaking truthfully when it is found that Ken ordered only pasta (or only sushi) (hereafter, 1-item condition), but also when Ken ordered both (hereafter, 2-item condition). However, unlike the English 'or', *ka* can also be interpreted exclusively in the PM/non-UE context.⁶

Next consider the way *ka* is interpreted in the DM, one of the UE contexts, as shown in (3).

- (3) Ken-ga pasuta ka sushi-o tyuumon-sita.
 Ken-Nom pasta KA sushi-Acc ordered
 'Ken ordered pasta or sushi.'

⁶ Some DE contexts, such as negative sentences like subordinate clauses under the scope of matrix negation necessarily require conjunctive interpretations (see Goro and Akiba 2004: 103-04). But Japanese *ka* is interpreted exclusively in simple matrix-negation sentences, such

In describing events whose outcome is clear, *ka* is interpreted exclusively, on a par with the English *or*. This is because the calculation of SI leads the listener to assume that the speaker should have made more informative *to* ‘and’ statements. Also, as with the English ‘or’, *ka* statements generally give rise to Type 1 ignorance inferences (in PM/non-UE contexts) and Type 2 ignorance inferences (in DM/UE contexts).

Ya is interpreted conjunctively or inclusively in the DE context, but conjunctively in the UE context. The connective has been considered as a lexical conjunctive (e.g. Kuro 1973; Ohori 2004). But Sudo (2014) proposes a derived conjunctive analysis of *ya* in which conjunctive interpretation stems from the SI involved.⁷ Sudo observes that the connective is interpreted inclusively (and conjunctively) in the DE contexts, such as in the antecedent of a conditional (4), but conjunctively in the UE context (5).

(4) [Mosi Taroo-ga [koohii ya kootya]-o nom-eba] yoru nemur-e-nai-darou

[if Taro-Nom [coffee YA tea]-Acc drink-if] night sleep-can-neg will

‘If Taro drinks things like coffee and/or tea, he won’t be able to sleep at night.’

(5) Taroo-wa [koohii ya kootya]-o nonda

Taro-Nom [coffee YA tea]-Acc drank

‘Taro drank things like coffee and/or tea.’

Following Sudo (2014), we consider that the conjunctive interpretation of *ya* results from SI in association with *ka* statement (6) as an alternative, as shown in (7).⁸ In (7), an anti-conjunctive inference made in the alternative *ka* statement is negated.

(6) Taroo-wa coffee ka kootya-o nonda

Taro-Nom [coffee KA tea]-Acc drank

‘Taro drank coffee or tea.’

as ‘John didn’t eat A KA B’, because *ka* is a positive polarity item (Goro and Akiba 2004).

⁷ Although this paper follows Sudo in assuming that SI calculation is involved in the interpretation of *ya*, I call *ya* a(n) (inclusive) conjunction or connective, following the standard practice (Kuno 1973; Ohori 2004). This does not affect the discussion in this paper.

⁸ See also Sauerland et al. (2017) for their discussion of lexical vs. derived conjunction analysis of *ya*.

- (7) (Taro drank coffee \vee Taro drank tea) \wedge \neg (Taro did not drink both)
(adapted from Sudo 2014)

Consider also (8) for the relevant interpretations in the PM (non-UE), where Sudo's observation on interpretations available for the DE *ya* (cf. (4)) also hold true.

- (8) Ken-ga pasuta ya sushi-o chuumon-suru-to omotteta yo.
Ken-Nom pasta YA sushi-Acc order-that thought particle
'(I) thought (that) Ken would order things like pasta and/or sushi.'

The speaker of (8) can be taken as speaking truthfully in both 1-item and 2-item conditions, yielding the inclusive interpretation of *ya*.

In the DM, which is considered one of the UE contexts, *ya* statements, such as (5), are interpreted conjunctively.

Furthermore, unlike *ka*, *ya* gives rise to anti-exhaustive implicature (Sudo 2014): implicature that 'A and B, but not exclusively both'. I assume, following Sudo, that the anti-exhaustive implicature comes from SI computation in association with the conjunctive *to* statement as an alternative, as shown in (9); exhaustive inferences of conjunctive alternatives are negated.

- (9) (Taro drank coffee \vee Taro drank tea) \wedge \neg (Taro drank nothing else)
(cf. (5); adapted from Sudo 2014)

This anti-exhaustive-implicature calculation may cause *ya* to be rejected in the 2-item condition, but to be accepted in the 3-item condition.⁹

4 Experiment

4.1 Method

4.1.1 Participants

This experiment used a between-subjects design with four-to-six-year-old children, 31 children for the PM and 34 for the DM, as the final sample.¹⁰

⁹As will be reported in Sect. 4, the anti-exhaustive implicature, unlike SI leading to conjunctive interpretations, is not found to strong enough to make noncalculation of the implicatures affect acceptance or rejection of *ya* statements; Japanese adults failed to reject *ya* sentences in the 2-item conditions (see also Sauerland et al. 2017 for a similar finding).

¹⁰From the original sample, 8 children were excluded from the PM and 3 from the DM because they failed pretest trials or controls/fillers, or displayed lack of attention.

The PM group consisted of 9 4-year-olds, 11 5-year-olds, and 11 6-year-olds, and the DM group, 10 4-year-olds, 13 5-year-olds, and 11 6-year-olds. The participants were all normally-developing, monolingual Japanese-speaking children living in the central Fukuoka area, Japan. A group of ten and eight adults served as a control group for the PM and DM, respectively.

4.1.2 Procedure

The PM and DM of the Truth Value (or Felicity) Judgment task were used in the experiment (Crain and Thornton 1998). An experimenter told children a short story while showing a series of pictures on a PC screen. After the children heard the story, a puppet operated by another experimenter said each stimulus sentence (see Tables 1a and 1b below for the types). For the PM test, the puppet mumbled something before the outcome of each story was known, but participants were told that the puppet would show up later and explain what he was saying. The mumbling was done to remind the participants when PM items were said that the puppet was making a prediction before the outcome was known. The children's task was to judge whether the given stimulus sentence was *atteru* 'right' or *matigatteru/hen* 'wrong'/'strange', 'infelicitous' by feeding the puppet either 'cake' or 'a green pepper', respectively.

4.1.3 Stimulus Sentences

Throughout the following sections, each item type will be identified by the connective and the condition in which it was presented. For example, *ka* items given in 1-item conditions will be called '1ka'. One variable was the connective, either *ka* or *ya*, and the other variables were the conditions in which the connectives were given, either 1-item or 2-item conditions for *ka*, and 1-, 2-, and 3-item conditions for *ya* (all the within-subject factors). The 3-item conditions were intended to see if the participants calculated anti-exhaustive implicature for *ya*. Both connectives were given in PM and DM (the between-subject factor). Each item type consisted of four trials, for a total of 20 items asked (plus four control/filler items and two fillers). The control/filler items were one *ka* statement and one *ya* statement which were given when neither one of the disjuncts/conjuncts was true (the 0-item condition), and two *to* 'and' statements, one 'T', one 'F'. Two fillers had only 1 NP without any connectives. An example of the PM 1ka items is given in (11) with the story given in (10) and the final scene presented on the PC, as shown in Figure 1.

(10) Story: The Cat went grocery shopping and found what she liked, an orange and an apple. What will she buy? (The main puppet mumbles something. The experimenter tells participants 'he will show up later and tell what he mumbled'.) She decided not to buy an orange, she bought an apple.

(11) Test sentence: *neko-san-ga ringo-ka mikan-o kau-to omotteta yo*
'(I) thought the Cat would buy an orange KA a melon.'



Figure 1. Example of the PM 1ka; final picture of the story

The DM versions of stimulus sentences were given to another group of children. The same stories and pictures were used for both groups, except for the inclusion of a part of the story mentioning that the puppet mumbled something, which was made in the PM.

Tables 1a, b summarize all types of test sentences used in the main test, along with the expected adult responses.

<i>ka</i>	1 item	2 item	<i>ya</i>	1 item	2 item	3 item
inclusive	OK	OK	inclusive	OK	OK	OK
exclusive	OK	OUT	conjunctive	OUT	OK	OK

Table 1a. Interpretations of *ka* and *ya*: prediction-mode

<i>ka</i>	1 item	2item	<i>ya</i>	1 item	2 item	3 item
exclusive	OK/odd	OUT	conjunctive	OUT	OK	OUT

Table 1b. Interpretations of *ka* and *ya*: description-mode

If children are able to interpret *ka* and *ya* as adults do, their results will resemble those given in Tables 1a, b, showing their sensitivity to the modes presented.

4.3 Results

4.3.1 Adults

Generally speaking, the adults' results were within the expected range. The adults' rejections of test items are given in Table 2.

item type	prediction mode (PM)	description mode (DM)
	N=10	N=8
1ka	2/40(5%)	8/32 (25%)
1ya	19/40 (47.5%)	32/32 (100%)
2ka	20/40 (50%)	30/32 (93.8%)
2ya	4/40 (10%)	2/32 (6.3%)
3ya	8/40 (20%)	3/32 (9.4%)

Table 2. The adults' results: number and percentage of rejections

As expected, the adults' interpretation of *ka* or *ya* statements generally differed depending on the PM or DM in which each was presented. An overall analysis of the five item types showed statistical significance in rejection rates for each mode (PM: $\chi^2(4)=40.215$, $p < .0001$; DM: $\chi^2(4)=108.219$, $p < .0001$; Cochran-Mantel-Haenszel test, adjusted for participants). A sub-group analysis of item types found statistical significance in both PM and DM for all pairs ($ps < .0001$), except for pairs such as 2ya vs. 3ya.¹¹ This result shows that the connectives used and the 1 vs. 2-item conditions affected the adults' rejection rates in both PM and DM. The adults' general acceptance of 2ya and 3ya in both the PM and DM shows that they calculated anti-exhaustive implicature, but not strongly enough for them to reject 2ya in both modes.

An analysis of the adults' responses to each item type depending on the mode found that the mode caused statistically significant variations in their rejection rates of 1ya and 2ka, respectively (1ya: $\chi^2(4)=11.845$, $p < .001$; 2ka: $\chi^2(4)=8.392$, $p < .005$).

4.3.2 Children's Results: the Children's vs. Adults' Results

All the children's results are given in Table 3. (This section reports all the children's group results not according to age group because statistical results obtained from the children as a group also generally patterned with those from each age group in important respects.)

¹¹ Statistical results of comparisons irrelevant to the interpretation of *ka* or *ya*, such as 1ka vs. 2ya and 2ka vs. 3ya, are not discussed.

item type	prediction mode (PM)	description mode (DM)
	N=31	N=34
1ka	56/124 (45.2%)	48/136 (35.3%)
1ya	68/124 (54.8%)	87/136 (64.0%)
2ka	19/124 (15.3%)	21/136 (15.4%)
2ya	3/124 (2.4%)	2/136 (1.5%)
3ya	39/124 (31.5%)	47/136 (34.6%)

Table 3. The children's results: number and percentage of rejections

To investigate how the children's interpretation of ka and ya in the PM and DM compared with the adults', each item type was evaluated using the Cochran-Mantel-Haenszel test (an ordinal scale was set for the number of rejections, based on the way each child and adult responded to each item type. The results showed statistical significance between the two groups for 1ka and 2ka in the PM (1ka: $\chi^2(4)=7.690$, $p < .01$; 2ka: $\chi^2(4)=8.275$, $p < .005$) and 1ya and 2ka in the DM (1ya: $\chi^2(4)=9.068$, $p < .005$; 2ka: $\chi^2(4)=18.727$, $p < .0001$).

Regarding anti-exhaustive implicature to which ya gives rise, the results from the children's group were on a par with those of the adults'. The children's general acceptance of 3ya showed that they did calculate implicature, but not strongly enough to reject 2ya items.

4.3.3 The Children's Individual Data

To consider interpretations each child assigned to ka or ya in each mode, we categorize interpretations as plausible based on each child's responses to the 1- and 2-item conditions, following the scheme given in Tables 1a,b.¹²

An overall analysis of all the children's responses did not find statistical significance between the modes for ka or ya (ka: $\chi^2(3)=1.931$, $p = .586$; ya: $\chi^2(3)=4.251$, $p = .119$ [Cochran-Mantel-Haenszel test, adjusted for ages]). This was generally on a par with the group results reported in 4.3.2.

The non-significant difference found for both ka and ya, along with the group results (cf. 4.3.2), show that, unlike the adults, the children did

¹² This way of categorization does not consider the possibility that more than one interpretation (exclusive, inclusive, and illicit conjunctive) for the PM ka is possible. It is assumed that children consistently assign one interpretation in the 1- and 2-item conditions.

not vary their interpretation of the connectives depending on the mode presented.

5 Discussion

This study made four significant findings concerning the children's non-adult-like interpretations of *ka* and *ya* in each mode.

1) The *ka* results showed that exclusive interpretation, and therefore, SI calculation, posed problems for children. The children accepted 2*ka* in PM and DM and rejected 1*ka* in PM—all at non-adult frequencies. The children interpreted *ka* conjunctively or inclusively in both modes. The availability of the inclusive conjunction *ya* in Japanese did not affect children's assigning inclusive or conjunctive interpretations to *ka* licitly or illicitly. The results paralleled Singh et al.'s and Tieu et al.'s findings. Children were also found to have problems with assigning inclusive or exclusive interpretations to *ka* in PM. Children's difficulty with inclusivity in PM is a novel finding in SI studies.

2) The children interpreted the DM *ya* both inclusively and conjunctively, whereas the adults almost always interpreted it conjunctively. The results showed that children had difficulty with SI for *ya* and therefore with interpreting *ya* conjunctively. When they had difficulty with SI, the children substituted inclusive interpretations, another novel finding.

3) The children's interpretations of *ya* or *ka* did not vary with the mode used, which seems to suggest that they are not sensitive to the role of the speaker's knowledge in calculating implicatures, such as ignorance inferences (Type 1, in particular). This partly supports Hochstein et al.'s and Barner et al.'s findings; there was no direct evidence regarding Type 2 ignorance inferences.

4) The individual classification data showed that children interpret both *ka* and *ya* conjunctively (illicitly for *ka*) or inclusively (licitly or illicitly) at higher frequencies than adults. Therefore, children interpreted *ka* and *ya* somewhat similarly, although the individual classification results also showed that children distinguish *ka* from *ya* to some extent by assigning more conjunctive interpretations to *ya*.

The overall results (findings 1, 2, and 4) seem to lend further support to Singh et al.'s idea that the differing sets of alternatives which are available to children and adults affect each group's interpretations of 'or'.

As for 'or', recently, Huang et al. (2019) and Huang and Crain (2020) argue that because of the exhaustive implicature of 'or', the felicitous use of the connective requires more objects/individuals in the experimental discourse than those denoted by the disjuncts. Their proposal has important relevance to *ka* in this study because the stories for *ka* used in the experiment did not specifically mention third objects/individuals other

than those mentioned with the disjuncts (except for some cases in which pictures of grocery stores and zoos, for example, showed other fruits or animals).

Recall, however, that the adults' and children's calculation of *ya*'s anti-exhaustive implicature was not sufficient to make both groups reject 2*ya* and that neither did the groups tend to reject 1*ka* in DM. The children in fact had a tendency to accept the DM 1*ka* (the rejection rate: 35.3 percent); they generally accepted the DM 2*ka*.¹³ (Note that Huang and Crain suggest that the lack of felicity condition for 'or' in experimental discourse leads to rejection of 'or' in 1-item conditions.) Therefore, the results of my study show that when children and adults rejected 1*ka* to some extent, the rejection was not caused by the experimental discourse lacking exhaustive implicature and therefore not being felicitous. I tentatively assume, until follow-up experiments are done, that as shown in the adults' and children's insensitivity to anti-exhaustive implicatures for *ya*, sensitivity to (anti-)exhaustive implicatures generated by *ka* and *ya* were not strong enough to make the adults and children to reject *ka* sentences, based on the non-fulfillment of such implicatures. This paper focused on the way the children differ from the adults in their interpretation of *ka* or *ya* in the same experimental setting.

6 Conclusion

The present study found that Japanese adults interpret *ka* and *ya*, generally as expected, except for some insensitivity to anti-exhaustive implicatures generated by *ya*. It found that Japanese-speaking children interpret *ka* and *ya* inclusively (illicitly or licitly) or conjunctively (always illicitly for *ka*) but do not vary their interpretations depending on the mode in which the particles are presented. These results were compatible with Singh et al.'s, Tieu et al.'s, and Fox's proposals. These results were also compatible with the aforementioned studies because the availability of the inclusive conjunction *ya* did not affect children's (illicit) interpretations assigned to *ka*. Children were also found to assign non-adult inclusive interpretations to *ya*, showing that they also have problems with another connective called *ya*. Another finding about children's insensitivity to the modes was novel. The present study showed that when computing inferences/implicatures (Type 1 ignorance inferences, in particular), the children were insensitive to the role of the speaker's knowledge. This seems to show that children do not compute SI on a par with adults. It may be that children have knowledge of SI, but pragmatic components associated with

¹³ This paper does not emphasize the DM 1*ka* results because of its pragmatic infelicity. The children tended to reject the 1*ka* slightly more than in DM.

the speaker's knowledge/opinion may develop late, as widely argued in the literature.

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