EXPERIMENTAL STUDY OF MORPHOLOGICAL CASE MARKING KNOWLEDGE IN JAPANESE-ENGLISH BILINGUAL CHILDREN IN CHRISTCHURCH NEW ZEALAND

A thesis
submitted in partial fulfilment
of the requirements for the Degree
of
Master of Arts in Linguistics
in the
University of Canterbury

by
Mineko Shirakawa

University of Canterbury

2013

Acknowledgement

I would like to express my sincere gratitude to my supervisors. Dr Heidi Quinn, my senior supervisor, provided constant support and insightful discussions, not only in the field of syntax, but also in every aspect of the project. She spent enormous hours in reading poorly written drafts and gave me valuable comments on how to polish it. Dr Susan Foster-Cohen, my co-supervisor, has been very influential since I began to study language acquisition. Her academic advice always drove me to strive for my best possible work. Dr Masayoshi Ogino, my associate supervisor, gave me a lot of useful tips on various aspects of the project and guided me when I was confused with the interpretation of ambiguous Japanese sentences. My gratitude extends to special people for their support. Dr Elena Moltchanova, statistics consultant, helped and advised me while I was analysing the results. Dr Kota Hattori was always there for insightful discussions and constant moral support. I received tremendous benefit from his help generating sound stimuli and handling data using R. Mistuyo Nagata, a fantastic narrator, and Yoriko Jones, an amazing illustrator, helped me generate the stimuli used in the experiment. I would also like to express my heartfelt thanks to Jacqui Nokes for the last-minute assistance with proofreading. Without their help, this study could not have been done. I am grateful to Mr Harunobu Nagano, a former principal of the Canterbury Japanese supplementary school, Mrs Kinuyo Sato, a vice-principal, and Mr Kazuhiro Matsuzaki, a former chair of a board of trustees, for their cooperation in recruiting participants. I wish to sincerely thank all the families and children who participated in this research. In Christchurch, I met 43 bilingual children in 30 English and Japanese bilingual families, and eight bilingual children in four Japanese monolingual families. They were very cooperative and the children enjoyed the tasks. The mothers provided invaluable feedback. I also met six monolingual children in six families in Osaka, Japan. Without their participation, this study could not have been done. Finally, I sincerely thank my family members, Yoshiko Hattori, Tommy Shirakawa, and Masahiro Shirakawa, for their patience and encouragement while I was writing this thesis.

Abstract

This thesis presents the results of an experimental study designed to examine whether children raised bilingually in Japanese and English from birth in Christchurch, New Zealand, exhibit the same morphological case and topic marking knowledge in Japanese as monolingual children in Japan. The participants were 34 children aged between five and eleven years who have been raised in a one-person one-language environment in an English dominant community. The study replicated previous studies on monolingual Japanese children, and involved two widely used paradigms for assessing a child's grammar: picture selection, and elicited imitation. The responses of the children in this study were different from those reported in studies of monolingual children. In the picture selection tasks, some children in this study interpreted the agent-patient relationship based on the word order cue in the object-initial types of transitive sentences, whereas previous studies have demonstrated that monolingual children five years and older are able to interpret the agent-patient relationship in the same way as adults, using the case marking cue. Moreover, in the elicited imitation tasks, many children in this study re-analysed the topic-comment construction as a genitive possessive when the particles in the stimuli were masked with noise. This pattern has not been reported in any previous study. The results also revealed that there was a great degree of individual variation. The study suggests cross-linguistic influence from English on Japanese as a possible explanation for the difference between the children in this study and monolinguals. The phenomena observed in the results satisfies two conditions for cross-linguistic influence proposed by Hulk and Müller (2000) and Müller and Hulk (2001), because (i) English and Japanese overlap at the surface level in terms of the agent position in a canonical sentence and the possessive structure, and (ii) the problematic structures for some children in this study involved the interface between syntax and pragmatics in the C-domain. The study, however, has no principled explanation for the individual variation found because of a lack of data on the Japanese input and the child's fluency, both of which are likely to affect simultaneous bilingual development.

Table of contents

List of Figures

List of Tables

List of abbreviations

ACC	accusative
ADJ	adjective
ASP	aspect
DAT	dative
GEN	genitive
N	noun
NEG	negation
NOM	nominative
NP	noun phrase
NZ	New Zealand
PAST	past
POL	polite
PRED	predicate
PRES	present
Q	question marker
SFP	sentence final particle
TOP	topic

1. Introduction

This study is concerned with the knowledge of Japanese morphological case marking in children who have been exposed to Japanese and English from birth in Christchurch, New Zealand. The purpose of this study is to investigate whether these children behave like monolingual learners of Japanese with respect to their use of the case and topic marking system, and to identify what affects the children's behaviour.

Meisel (2011) lists three characteristics of first language acquisition: (i) ultimate success, (ii) rate of acquisition, and (iii) uniformity of the course of acquisition, and argues that simultaneous bilingual acquisition is fundamentally the same as first language acquisition. That means that children who are acquiring two languages simultaneously from birth are expected to follow the same course of acquisition as monolingual children in the same languages, and that they will attain native competence in each of their languages.

However, the results of an exploratory study carried out in Christchurch suggested that children raised bilingually in Japanese and English may not be following the same course of acquisition as monolingual children in Japan (Shirakawa, 2013). For example, Suzuki (1999) found an asymmetry in case particle drop between the nominative and the accusative particles in monolingual children. The Japanese monolingual children in Suzuki's study dropped the case particle on objects more often than the case particle on subjects. Suzuki also found that case particle drop decreased with age, with the drop of the subject marker decreasing more markedly than the drop of the object marker. In contrast, the bilingually raised children in Shirakawa (2013) showed a range of patterns in case particle drop in their elicited Japanese narratives. This raises the question why the bilingually raised children in Shirakawa behaved differently from the monolingual children in Suzuki and what factor(s) affected the children's behaviour.

Further investigation revealed that non-target like grammar has been reported in a number of studies of simultaneous bilingual acquisition (Hulk & Müller, 2000; La Morgia, 2011; Yip & Matthews, 2007). Many of these researchers argue that

target-deviant grammar is due to cross-linguistic influence arising from language internal factors (Hauser-Grüdl, Arencibia Guerra, Witzmann, Leray, & Müller, 2010; Hulk & Müller, 2000; Müller & Hulk, 2001; Yip & Matthews, 2007). There are also studies claiming that language external factors, such as parental input that has undergone a change during language contact or language use at home or in the community, might be responsible (Austin, 2009; De Houwer, 2007; La Morgia, 2011; Paradis & Navarro, 2003).

The patterns reported in Shirakawa (2013) may thus be due to either the influence of English or the effect of the Japanese input the children have been exposed to. However, the dataset in Shirakawa did not provide a clear view of the exact difference between monolinguals and bilinguals, since the data was drawn from elicited narrative productions and the number of participants was too small. To address the nature of the difference, more controlled, structured data elicitation was necessary.

This study investigated the knowledge of the nominative case particle *-ga*, the accusative case particle *-o*, and the topic particle *-wa* in children raised bilingually in Japanese and English in Christchurch, and examined whether the children behave like Japanese monolingual children in previous studies. To test the children's case and topic marking knowledge and compare the results between the current study and the previous studies of monolingual children, this study replicated published studies of monolingual Japanese children, using two established experimental paradigms for assessing a child's grammar: picture selection and elicited imitation. The study also tried to identify what caused the difference in the behaviour between the children in this study and the monolingual children in the previous studies. Since there has been little attention paid to the way in which Japanese-English bilingual children learn case and topic particles, the current study aims also to further our understanding of case and topic particle acquisition by children raised bilingually in Japanese and English in an English-speaking country.

This thesis is organized as follows. Chapter 2 reviews existing studies on bilingual first language acquisition and discusses the ideas of cross-linguistic influence and effect

of input in general terms. Chapter 3 provides an overview of the characteristics of the Japanese morphological case and topic marking system as a target grammar and discusses some of the Japanese syntactic constructions that seem to challenge children's application of their case and topic marking knowledge. Chapter 4 reports on the methodology and the results of the experiment that involved two paradigms, that is, the picture selection tasks and the elicited imitation tasks, and discusses the interpretation of the results. Specifically, section 4.1 presents the research question, section 4.2 introduces the methodology, section 4.3 discusses how the children interpreted the agent-patient relationships, and section 4.4 discusses how the children analysed the topic-comment construction. Chapter 5 considers factors that may have affected the children's behaviour, and Chapter 6 concludes the thesis.

2. Studies of simultaneous bilingual acquisition

This chapter reviews existing studies on bilingual first language acquisition and discusses the ideas of cross-linguistic influence and effect of input in general terms.

2.1. Simultaneous bilingual acquisition

When a child has been exposed to two languages simultaneously from birth, both languages are considered to be acquired as first languages (De Houwer, 1990; Meisel, 1989, 2007, 2011). As regards the course and rate of acquisition of morphosyntax, De Houwer (2006) points out that bilingual development indeed resembles monolingual development: both monolingual and bilingual children 'make similar errors and produce similar types of utterances at about the same age (De Houwer, 2006: 784)' for each language. Meisel (2011) endorses the view that the Language Acquisition Device (LAD) and especially Universal Grammar (UG) are responsible for the uniformity in the emergence of first language grammar (cf. Chomsky 2002 on the LAD and UG), and maintains that simultaneous bilingual children are able to acquire native competence in both languages.

However, there are also differences between monolingual and bilingual development. As far as grammatical development is concerned, variation in the input is not an issue for children who grow up in a monolingual environment (De Houwer, 2006). In contrast, when a child grows up in an environment where there are two linguistically distinct languages in the input from birth, it is possible that the child undergoes a phase of interdependent language development (Meisel, 2011). According to Paradis and Genesee (1996), interdependent development may cause transfer, acceleration, or delay, suggesting that cross-linguistic influence may change the course and/or rate of acquisition in bilingually raised children (Meisel, 2011).

2.2. Cross-linguistic influence and language external factors

Hulk and Müller (2000) and Müller and Hulk (2001) hypothesise that there are two conditions for cross-linguistic influence in bilingual acquisition. Firstly,

cross-linguistic influence occurs in the left periphery of the sentence, C-domain, where syntax and pragmatics interface. Secondly, cross-linguistic influence occurs only if language A allows for more than one grammatical analysis from the child's perspective and language B contains positive evidence for one of those possible analyses; in other words, there has to be a certain overlap of the two systems at the surface level (Hulk & Müller, 2000: 228f; Müller & Hulk 2001: 2).

Hulk & Müller's (2000) study on object drop and root infinitives in two Romance and Germanic bilingual children indicated that cross-linguistic influence does indeed occur only when the two conditions are met as predicted. On the one hand, both a Dutch-French and a German-Italian bilingual child omitted objects in their Romance languages (French and Italian, both of which are non-topic-drop languages) more frequently and over a longer period than French and Italian monolingual children, indicating cross-linguistic influence from the Germanic languages (Dutch and German, which are both topic-drop languages) on the respective Romance languages of the bilingual children. On the other hand, there was no substantial difference between the bilingual children and the respective monolingual children in their use of root infinitives. Object drop satisfies both of Hulk & Müller's conditions, whereas root infinitives do not satisfy the second condition. There is no structural overlap between Germanic and Romance root infinitives so the input of the one language does not provide evidence that would lead to a misanalysis in the other language (Hulk & Müller, 2000: 240).

Hulk and Müller (2000) and Müller and Hulk (2001) also drew attention to the following points. Firstly, considering that object drop is not a unique phenomenon in bilingual children but also can be seen in monolingual children, Müller and Hulk claim not direct but indirect influence of Germanic languages on Romance languages. They argue that children universally apply a discourse licensing strategy to object drop at early stage of learning. Children acquiring Romance languages must abandon this strategy and adopt a morphological (preverbal object clitic) licensing strategy at some stage of development. Some bilingual children, however, stayed in this transitional stage longer than monolingual children because of a much wider range of syntactic possibilities in the input, one of which is compatible with the universal strategy. Müller

and Hulk claim that the Germanic language input had the effect of hindering bilingual children in their study from mapping the universal strategy onto language-specific rules as quickly as monolingual children, and labelled this effect as *mapping induced influence* (Müller & Hulk 2001: 16f).

Secondly, Hulk and Müller (2000) and Müller and Hulk (2001) emphasize that language external factors such as language dominance are not an issue in cross-linguistic influence. The data in their study does not support the idea that language dominance determines the direction of cross-linguistic influence (Hulk & Müller, 2000: 229; Müller & Hulk 2001: 18f).

Thirdly, Hulk and Müller (2000) and Müller and Hulk (2001) found individual differences in their bilingual data, although they did not discuss this issue. They acknowledge that some bilingual children do not show any influence during the data collection period but they have no explanation for the differences between individuals (Hulk & Müller, 2000: 229; Müller & Hulk 2001: 19).

The hypothesis proposed by Hulk and Müller (2000) and Müller and Hulk (2001) puts an emphasis on language internal factors, and requires both conditions to be met, that is, (a) it occurs in the interface between pragmatics and syntax and (b) there has to be a certain overlap of the two grammatical systems at the surface level. However, there are also studies which argue that language external factors such as dominance and the quality and quantity of input promote target-deviant grammar or delay in simultaneous bilingual children.

Yip and Matthews (2007) endorsed Hulk and Müller's second condition for cross-linguistic influence and referred it as *input ambiguity*. However, they do not agree with Hulk and Müller (2000) and Müller and Hulk (2001) with respect to the effect of language dominance that, they argue, determines the direction and degree of influence in part. Here, Yip and Matthews use the term 'dominance' as unbalanced development between two languages in a single child in terms of underlying competence. In their longitudinal study of children acquiring English and Cantonese from birth, Yip and

Matthews claimed that null objects in the bilingual children's English were evidence of cross-linguistic influence of Cantonese that was due to the ambiguity of the English input such that, for children, verbs like *eat, read, teach* could be ambiguous between a transitive and an intransitive reading. They also claim that language dominance plays a role. The children's language dominance was measured quantitatively using Mean Length of Utterance (MLU) over time. They found a correlation between the frequency of null objects and the degree of dominance: The frequency was highest in the children with the greatest degree of Cantonese dominance.

Paradis and Navarro (2003) tried to find a language external factor that might promote cross-linguistic influence. They investigated the use of overt subjects in Spanish (a null-subject language) in an English-Spanish bilingual child and compared the data with those of two Spanish monolingual children and also with those of their parents, to explore not only whether cross-linguistic influence takes place in this domain but also whether cross-linguistic influence could be attributed to the nature of the language input in a bilingual family. All the data in their study were taken from the CHILDES corpus (MacWhinney, 2000). The bilingual child realized subjects in Spanish at a higher rate than the child's monolingual peers, suggesting that cross-linguistic influence manifested itself in this domain. Moreover, the rate of subject use in Spanish by the parents of the bilingual child was also higher than subject use by the parents of the child's monolingual peers. The data Paradis and Navarro considered, however, did not provide conclusive evidence that cross-linguistic influence was entirely due to being present in the contact-variety input the child was receiving, or whether internal mechanism were also operating.

Hauser-Grüdl et al. (2010) presented counter evidence to the hypothesis that cross-linguistic influence is due to the child's language input by analysing longitudinal speech data from five German-Italian bilingual children aged between 1;6 and 3;4 and their parents living in Germany. Hauser-Grüdl et al. predicted that if the contact-variety parental input was the explanation for the cross-linguistic influence, then (1) the contact-modified parental input would be found in the domain of overt subjects in Italian where the cross-linguistic influence occurs in the German-Italian bilingual

children, (2) acquisition of V2 in German main clauses in the German-Italian bilingual children would not be influenced by Italian, because the German input the children are exposed to should have no modification, (3) with respect to root infinitives, where no cross-linguistic influence is expected to occur, there would be no difference in the frequency of root infinitives in each language between the parents and the children. The data analysis failed to support any of three predictions: (1) German-Italian bilingual children over-generated overt subjects in Italian, even though there was no evidence for a contact-modified parental input; (2) Even though the German input the children are exposed to had no modification, the German-Italian bilingual children behaved differently from German monolingual children – whereas monolingual children go through a V-final stage at the early stage of development, that stage was not clearly observed in bilingual children's German; (3) German-Italian bilingual children produced root infinitives relatively frequently in German but rarely in Italian, even though root infinitives occurred with almost the same percentage in both German and Italian in the input. On the basis of these results, Hauser-Grüdl et al. conclude that cross-linguistic influence is not input-driven but grammar-based, that is, linguistically motivated.

Hauser-Grüdl et al. (2010) also considered the issue of individual variation among bilingual children. Hauser-Grüdl et al. and Müller (2008) argue that cross-linguistic influence is grammar-based, and affects the language that is more complex in a certain grammatical domain where the two systems overlap at the surface level. Therefore the child's fluency in the relevant language must be the factor that determines individual variation. For example, Müller attested that the more fluent the Italian-German bilingual child was in Italian, the fewer object omissions there were. Fluency was measured in words produced per child per minute. Because fluency varies among individuals, the degree to which cross-linguistic influence manifests itself differs among individuals. Hauser-Grüdl et al. and Müller also present evidence against the language dominance hypothesis (Yip & Matthews, 2007). In their studies, the child with German as a weaker language did not show influence on German from the Romance language in the domain of subject and object drop.

2.3. Effect of input

Researchers in addition to Paradis and Navarro (2003) and Yip and Matthews (2007) focus on the role of input in simultaneous bilingual acquisition, and suggest that there is a relationship between frequency in the input and aspects of bilingual development such as language dominance, weak language, individual variation, and incomplete acquisition (Austin, 2009; Cornips & Hulk, 2008; De Houwer, 2007; Francis, 2011; La Morgia, 2011; Mykhaylyk, 2009; Schlyter, 1993; Unsworth et al., 2012).

Note that the term 'dominance' is used to express unbalanced development such that one language is stronger than the other in a single bilingual child, whereas the definition of the term 'weak' or 'weaker' is not unified. It is used the same way as 'non-dominant' in some studies, but it is also used in the sense that development of one language is weaker than that of other bilingual children or monolingual children (cf. La Morgia, 2011).

Austin (2009) found different behaviour between Basque-Spanish bilingual children and Basque monolingual children in terms of root infinitive use, where cross-linguistic influence was predicted to be unlikely by Hulk and Müller (2000). Austin claimed that the observed difference between bilinguals and monolinguals was due to differences in the quantity of exposure to each language that bilingual and monolingual children receive. Austin examined the acquisition of verbal agreement morphology in spontaneous speech data from 20 Basque-Spanish bilingual children (aged between 2;1-3;4), 11 Basque monolingual children (2;1-3;3) and 8 Spanish monolingual children (2;9-3;4), and found that some of the bilingual children produced more root infinitives in Basque than monolingual children did, especially young bilinguals under 2;8. Moreover, the use of root infinitives in the bilingual children was highly correlated with the format of the school (mostly Basque or bilingual) that they attended. Austin also found a great deal of individual variation in both bilingual and monolingual groups, and argued that, since the relative quantities of input that the bilingual children are exposed to may vary, the rate of morphological development in bilingual children may also vary.

La Morgia (2011) is concerned with the relation between input and weak language acquisition. The weak language hypothesis states that the weaker language is fundamentally different from monolingual L1 and balanced bilingual L1 and resembles L2 acquisition (Schlyter, 1993). In a longitudinal experimental study of four Italian-English bilingual children and their parents living in Ireland, La Morgia analysed the children's Italian in terms of rate of acquisition of articles, code-mixing, production of non-target form (word-order, gender and number agreement, and verb inflection), vocabulary, mean length of utterance (MLU) and the syntax-pragmatics interface (subject realisation). The results demonstrated that in some Italian-English bilingual children, Italian was a 'weak' language (compared to monolingual children), and there was a relationship between weak language development and the quality and quantity of input that the bilingual children were exposed to. La Morgia therefore concluded that insufficient exposure results in one of two languages being a weak language.

De Houwer (2007) explored the relation between parental input patterns in bilingual families and the children's language use: The study was not concerned with children's proficiency but with whether children actually speak a particular language or not. The study consisted of a questionnaire survey of the languages spoken at home by each family member in 1,899 families in Flanders, which is a predominantly Dutch-speaking area of Belgium. The results showed that among the 422 families where both parents only spoke the minority language at home, 3% of children did not speak the parents' language; among the 198 families in the survey in which parental input followed the one parent – one language pattern, 25.8% of children did not speak the minority language at all; among the 353 families in which one parent spoke only Dutch and the other spoke both Dutch and the minority language at home, 64.3% of children did not speak the minority language at all. The results suggest that parental input pattern plays a crucial role in raising children to be active bilingual speakers.

Studies such as Austin (2009), La Morgia (2011) and De Houwer (2007) raise the question whether the acquisition of a weak language will be incomplete in an unbalanced-bilingual child who has been exposed to limited input for that language from birth.

Meisel (2007) acknowledged that one language would typically be stronger and balanced bilingualism may be the exception, and noted that the child's pattern of dominance can change repeatedly over the life span. Meisel also agreed that if exposure to one language is drastically reduced, the LAD (language acquisition device) may reach its limit (Meisel, 2007, 2011). However, Meisel (2007) rejected the weaker language hypothesis on the basis of data presented by Gawlitzek-Maiwald and Tracy (1996) and Bernardini and Schlyter (2004). These studies showed only quantitative differences in grammatical development between unbalanced and balanced bilingual children such as the rate of development, whereas the weak language hypothesis is based on the assumption that the difference is qualitative in terms of the degree of native-like competence of the speakers in each language (Schlyter, 1993).

In terms of the generative theory of Universal Grammar, mere exposure is sufficient for children to develop native grammatical competence (Chomsky, 1981, 2006; Meisel, 2007, 2011). However, there seems to be no study so far that identifies the threshold of acquisition success, i.e. how much exposure bilingual children need, to acquire native grammatical competence in the two languages (cf. Francis, 2011).

3. Target grammar

In this section, we will first review characteristics of the Japanese morphological case and topic marking system. Then existing studies of first language acquisition in Japanese children will be introduced, followed by a discussion of some Japanese constructions that seem challenging for children to apply their case and topic marking knowledge to.

3.1. Morphological case system and relevant properties of Japanese

3.1.1. Case marking system and word order

Japanese is a nominative-accusative language and the basic word order is SOV. The case marking is morphologically manifested in postpositional particles. In a canonical transitive sentence, the nominative particle *-ga* follows the subject noun phrase (the agent) and the accusative particle *-o* follows the object noun phrase (the patient), as shown in (1).

(1) SOV (canonical transitive case frame)
Usagi-ga inu-o oshi-ta.
rabbit-NOM dog-ACC push-PAST
'A rabbit pushed a dog.'

However, there are two properties that make Japanese word order flexible. Firstly, Japanese allows null subjects and objects when the speakers know what they are talking about as in (2) and (3) (Takahashi, 2008). Secondly, constituents can be reordered as in (4), which is known as scrambling. Even though there is no difference in semantic content between the canonical word order and the scrambled sentence (Saito, 2003), there are some indications that scrambling in Japanese is sensitive to information structure (see sections 3.2.2, 3.2.4 and 3.3.2).

(2) SV (null object)
A: Who pushed the dog?
B: Usagi-ga *e* oshi-ta.
rabbit-NOM push-PAST
'A rabbit pushed (it/the dog).'

(3) OV (null subject)

C: Who did the rabbit push?

D: *e* inu-o oshi-ta.

dog-ACC push-PAST

'(It/The rabbit) pushed a dog.'

(4) OSV (scrambling)

Inu$_i$-o usagi-ga t_i oshi-ta.

dog-ACC rabbit-NOM push-PAST

'A rabbit pushed a dog.'

As a consequence of processes such as constituent ellipsis in (2) and (3), and scrambling in (4), Japanese word order does not always indicate the agent-patient relationship. When a constituent is omitted or the constituents are scrambled, the case particles still signal the grammatical relation. However, case markers are optional and can be dropped, especially in casual speech, including child-directed speech (Rispoli, 1991; Tanaka & Shirai, in press). Moreover, there is no one-to-one correspondence between case particles and grammatical relations (Kuno, 1972). The nominative case particle does not always imply subject-hood. In a sentence with a stative predicate as in (5), for example, the object *hana* 'flower' is followed by the nominative marker and the subject is followed by the topic marker -*wa* (see next section). The subject and object may appear with different particles depending on the predicate type and the information structure.

(5) SOV-stative (non-canonical case frame)

Mary-wa hana-ga suki-desu.

Mary-TOP flower-NOM like-POL

'Mary likes flowers.'

According to an experimental study by Bates and MacWhinney (1989), adult native speakers of Japanese regard case marking as the most important cue to interpreting the agent-patient relationship, followed by animacy and word order. Tanaka and Shirai (in press) investigated Japanese monolingual children's cue strength in line with Bates and MacWhinney (1989). The results of Tanaka and Shirai's corpus based study indicate that monolingual children aged between three and five, unlike adults, appear to rely primarily on animacy, followed by word order: case marking is the weakest cue (see section 5.2 for more detail).

3.1.2. The topic particle

Japanese has a topic particle *-wa*, which has multiple functions (Kuno, 1972). Firstly, as already mentioned in the discussion of sentence (5), the topic particle typically follows the subject noun phrase in a stative sentence. Secondly, the topic particle topicalizes an argument noun phrase. In (6), the topic particle replaces the accusative particle following the scrambled object. Thirdly, the topic particle signals a contrastive interpretation. In (7) where the object is followed by the topic particle in situ, this *wa*-marked phrase implies contrast with some other alternative that is present overtly or covertly in the context. Lastly, the topic particle introduces a non-argument topic. In (8), the first noun is neither the subject nor the object but the topic of the sentence and the second noun is the subject of the sentence. This is called the topic-comment construction (cf. Mikami, 1976).

(6) OSV (object topicalization)
Inu$_i$-wa usagi-ga t_i oshi-ta.
dog-**TOP** rabbit-**NOM** push-PAST
'As for the dog, a rabbit pushed (it).'

(7) SOV (contrastive reading)
Usagi-ga inu-wa oshi-ta.
rabbit-**NOM** dog-**TOP** push-PAST
'A rabbit pushed the dog (but not the panda).'

(8) TopicP + SV (topic-comment construction)
Zo-wa hana-ga nagai.
elephant-**TOP** nose-**NOM** long
'As for an elephant, the trunk is long.'

The topic particle *-wa* itself does not indicate the grammatical relation of the constituent. However, it appears quite frequently on the subject or the direct object of the sentence. When this is the case, the topic marker replaces the nominative particle or the accusative particle.

Kuno (1972) listed two uses of the topic marker, 'thematic' and 'contrastive', and argued that 'themes' must be anaphoric or generic, while a non-anaphoric, non-generic noun phrase can be 'contrastive'. The two uses are illustrated in (9) and (10). If the

predicate represents a stable state as in (9), 'John-*wa*' receives a thematic interpretation. If the predicate represents a one-off event as in (10), 'John-*wa*' receives a contrastive interpretation. Kuno points out that the particle *-ga* also has functions other than nominative marking. According to Kuno, the nominative marker signals either 'neutral description' or 'exhaustive listing'. When the *ga*-subject appears with stative predicates as in (11), it can only be 'exhaustive listing', whereas when the *ga*-subject appears with active predicates as in (12), the possible reading is either 'neutral description' or 'exhaustive listing'. Kuno (1973) added that *-ga* is used for new information, whereas the topic marker is used for old (given) information which is shared among the interlocutors.

(9) Thematic *wa*
John-wa gakusei desu.
John-TOP student be
'John is a student.'

(10) Contrastive *wa*
John-wa ki-ta.
John-NOM come-PAST
'John came (but Mary didn't).'

(11) Exhaustive listing *ga* (stative predicate)
John-ga gakusei da
John-NOM student be
'It is John who is a student. (The others are not.)'

(12) Ambiguous (active predicates)
John-ga ki-ta.
John-NOM come-PAST
(neutral description) 'John came.'
(exhaustive listing) 'It was John who came. (The others did not)'

(from Kuno, 1972: 59f)

In what follows, existing studies on the acquisition of Japanese nominative, accusative and topic particles will be reviewed.

3.2. Acquisition of Japanese case and topic particles in monolinguals

Children begin to use case particles at an early stage of first language acquisition, at around their second birthday (Clancy, 1985; K. Ito, 1990; Matsuoka, 1998). Fujimoto (2008) and Matsuoka (1998) investigated the order of case particle emergence in their corpus based studies. According to their studies, the nominative particle *-ga* appears earlier than the accusative particle *-o* in all corpora. The topic particle *-wa* appears almost at the same time as the nominative particle. However, it seems to take a long time for children to produce and interpret these particles in an adult-like fashion. Many studies demonstrate that children do not seem to understand the [*ga-o*] contrast until they are five years or older (Hakuta, 1982; Otsu, 1994a, 1994b; Suzuki, 2007), and the [*ga-wa*] contrast until they are seven or older (Hatano, 1979; T. Ito, 1990).

How do we know whether children have acquired the case marking system and make use of the grammatical knowledge in comprehension and production? Many studies have tried to answer this question by examining how children identify the agent and the patient in various types of transitive sentences, because the knowledge of case marking plays an important role in interpreting the agent and patient relationship. Some studies also explored acquisition of the topic marker by comparing it with acquisition of the nominative marker. In the following sections, we will look at the methodology and the results of prior studies.

3.2.1. OV (null subject) and SV (null object)

Suzuki (2007) used a picture selection task to test the comprehension of transitive sentences in which only one of the arguments was overt (null subjects and null objects). Examples of stimulus sentences used in the tasks are shown in (13)-b and (14)-b. Children were shown two animations on a computer screen at a time; a koala is pushing a lion on the left and a koala is being pushed by a lion on the right, for example. Then, children were asked to choose the animation out of the two that matched the stimulus sentence read by the examiner. The trials were conducted twice; first without the discourse context (‘w/o D’ in Table 1), and then with the discourse context (‘w D’).

Without the preceding disourse provided by (13)-a and (14)-a, there are two cues to target interpretation in (13)-b – word order (the first noun is the agent) and case marking (nominative -*ga*), whereas there is only one cue in (14)-b, namely, case marking (accusative -*o*).

(13) SV (null object)

a. Yama-ni lion-ga i-mashi-ta. Suruto,
mountain-at lion-NOM exist-POL-PAST then
'There was a lion in the mountain. Then,'

b. Koara-ga *e* oshi-mashi-ta.
koala-NOM push-POL-PAST
'A koala pushed (the lion).'

(14) OV (null subject)

a. Yama-ni koara-ga i-mashi-ta. Suruto,
mountain-at koala-NOM exist-POL-PAST then
'There was a koala in the mountain. Then,'

b. *e* raion-o oshi-mashi-ta.
lion-ACC push- POL-PAST
'(The koala) pushed a lion.'

(from Suzuki, 2007: 66)

The participants were 36 Japanese monolingual children aged between 3;8 and 6;5. Table 1 shows the results. Even without the discourse context, Group 3 succeeded in choosing the target pictures more than 90% of the time in both the SV and the OV test. Group 3 was, therefore, excluded from the second trial with the discourse context.

Group (age range, number)	SV w/o D	SV w D	OV w/o D	OV w D
Group 1 (3;8-4;5, n=12)	65.0%	63.3%	38.3%	60.0%
Group 2 (4;7-5;6, n=12)	83.3%	85.0%	61.7%	76.7%
Group 3 (5;6-6;5, n=12)	94.2%	-	90.0%	-

Table 1: The results of Suzuki (2007)

The results suggest that monolingual children in Japan over five years of age seem to have the grammatical knowledge of the [*ga*-*o*] contrast because they were able to identify the agent and patient in one-argument sentences without the discourse context. Young children aged four or five years also seem to have knowledge of the [*ga*-*o*]

contrast because their performance was better with the discourse context. However, they may not be able to apply the knowledge in one-argument sentences without the discourse context.

3.2.2. OSV (scrambling) and SOV (canonical transitive sentence)

Otsu (1994b) explored monolingual children's comprehension of scrambling in a study that replicated Hayashibe (1975), because Otsu questioned whether the results reported in Hayashibe were an experimental artefact. Hayashibe conducted an act-out experiment, in which 28 children between 3;1 and 5;10 were asked to demonstrate what the stimulus sentence meant by acting out the event with soft toy animals. The stimuli used by Hayashibe were (15)-b for the canonical word order and (16)-b for the scrambled counterpart (both examples are slightly modified by Otsu, 1994b, in terms of tense and polite form), in both cases without the definite marker *sono* 'the' and without the discourse context shown in (15)-a and (16)-a. The results suggested that there were ten children between 3;4 and 5;10 who interpreted the first noun in scrambled sentences like (16)-b as the agent. Hayashibe concluded that it would take possibly as long as five years to acquire the grammatical knowledge of scrambling. Otsu hypothesized that scrambling is possible when the scrambled object is a discourse topic that performs a 'bridging function (Masunaga, 1983)', and therefore replicated Hayashibe (1975) with the discourse context in (15)-a and (16)-a and the definite marker *sono* 'the' added in stimuli such as in (15)-b and (16)-b.

(15) SOV (canonical transitive case frame)

a. Kooen-ni kamesan-ga i-mashi-ta
park-at turtle-NOM exist-POL-PAST
'There was a turtle in a park.'

b. (Sono) kamesan-ga ahirusan-o oshi-mashi-ta
that turtle-NOM duck-ACC push-POL-PAST
'(The)/a turtle pushed a duck.'

(from Otsu, 1994b: 254)

(16) OSV (scrambling)

a. Kooen-ni ahirusan-ga i-mashi-ta
park-at duck-NOM exist-POL-PAST
'There was a duck in a park.'

b. (Sono) ahirusan-o kamesan-ga oshi-mashi-ta
that duck-ACC turtle-NOM push-POL-PAST
'A turtle pushed (the)/a duck.'

(from Otsu, 1994b: 256)

It turned out that the rate of target responses from 12 children between 3;1 and 4;11 in Otsu's (1994b) study was quite high (43 out of 48), suggesting that even three year old children have a knowledge of scrambling and make use of it when there is an appropriate discourse context.

3.2.3. OV (null subject) and OSV (scrambling)

Korean is known as a language with a postpositional case marking system. The basic word order of Korean is SOV, and like Japanese, Korean allows scrambling and null constituents. Kang (2005) studied scrambling and case marking in first language acquisition of Korean. Based on the generalization by Bošković (2004) that states that languages with Japanese-style scrambling always have a system of overt case-marking, Kang made the prediction that if a child is acquiring a language with Japanese-style scrambling, then overt case-marking will be acquired prior to, or concurrently with, but never significantly later than, this type of scrambling. To test the prediction, Kang conducted an experiment using picture selection. There were two pictures that involved the same characters and actions, but the roles of the characters were reversed in the second picture. The children were asked to point to the picture that matched the stimulus sentence provided by the examiner. Four types of sentences, OSV (17), SV (18), OV (19) and SOV (20) were tested. The stimuli were all presented with a discourse context.

(17) OSV (scrambling)

Supsok-e horangi-ga issess nunte, ku horangi-ul wonsungi-ga chottagaeyo
Forest-in tiger-NOM was then that tiger-**ACC** monkey-**NOM** chased
'There was a tiger in the forest. Then, a monkey chased that tiger.'

(18) SV (null object)

Kongwon-e ttokki-ga issess nunte, kubuki-ga *pro* milesseyo
Park-in rabbit-NOM be then turtle-NOM pushed
'There was a rabbit in the park. Then, a turtle pushed (him).'

(19) OV (null subject)

Kongwon-e koyangi-ga issess nunte, *pro* ttokki-ul milesseyo
Park-in cat-NOM be then rabbit-**ACC** pushed
'There was a cat in the park. Then, (he) pushed a rabbit.'

(20) SOV (canonical transitive word order)

Supsok-e taramci-ga issess nunte, ku daramchi-ga kangaci-lul coagasseyo
Forest-in squirrel-NOM be then that squirrel-NOM dog-ACC chased
'There was a squirrel in the forest. Then, the squirrel chased a dog.'

(from Kang, 2005: 136f)

Originally 50 children between 2;2 and 3;2 participated but only half of them accomplished the tasks. The responses from those 25 children were analysed. When the child successfully identified the target picture at least four out of five times with the same sentence type, this was classified as 'pass', otherwise 'fail'. All of the 25 children included in the analysis passed SV in (18) and SOV in (20). The results for the OV and the OSV test turned out as Kang predicted.

The results for the OV and the OSV test are shown in Table 2. Fifteen children, who passed the OV test in (19) also passed the scrambled OSV test in (17). In contrast, nine children who failed the OV test in (19) also failed the scrambled OSV test in (17). There was one child who passed in OV but failed in OSV, and there was no child who failed the OV test but passed OSV

		OSV (Scrambling)	
		pass	fail
OV (null subject)	pass	15	1
	fail	0	9

Table 2: The results of Kang (2005)

If a child passes the OV test, then this suggests that they have knowledge of the nominative-accusative contrast since there is no other cue than case for the correct interpretation of the OV sentences. The fact that all of the children who failed the OV

test also failed the OSV tests suggest that children understand scrambling only once they have acquired the nominative – accusative contrast. The results also demonstrate that even at the age of three years at least some monolingual children already have grammatical knowledge of case marking and scrambling, and that they are able to use this knowledge when sentences are presented in an appropriate discourse context.

3.2.4. Scrambling [O-*o* S-*ga* V] and object topicalization [O-*wa* S-*ga* V]

Sano (2004) used an act-out paradigm to investigate comprehension of scrambling [O-*o* S-*ga* V], as shown in (22), and object topicalization [O-*wa* S-*ga* V], as in (23). The participants were 50 Japanese monolingual children aged between three and six. They were divided into two groups. The children in group A were given a simple introduction of names of toys, as shown in (24)-a, followed by the stimulus. The children in group B were first given a topicalizing discourse, as in (24)-b, then the stimulus sentences with the definite marker *sono* 'the' on the first noun in keeping with Otsu (1994b) (see 3.2.2).

(21) SOV (canonical transitive case frame)

Zo-ga	buta-o	ketobashi-mashi-ta
elephant-NOM	pig-ACC	kick-POL-PAST

'An elephant kicked a pig.'

(22) OSV (a scrambled counterpart of (21))

Buta-o	zo-ga	ketobashi-mashi-ta
pig-ACC	elephant-NOM	kick-POL-PAST

'A pig, an elephant kicked.'

(23) OSV (object topicalization)

Buta-wa	zo-ga	ketobashi-mashi-ta
pig-TOP	elephant-NOM	kick-POL-PAST

'As for the pig, an elephant kicked (it).'

(24) discourse

a.

Zo	kaeru	buta-ga	i-mashi-ta.	Soshite
elephant	frog	pig-NOM	exist-POL-PAST	and

'There was an elephant, a frog and a pig. And,'

b.

Zo	kaeru-ga	i-mashi-ta.	Sokoe	buta-ga	yatteki-mashi-ta
elephant	frog-NOM	exist-POL-PAST	and	pig-NOM	come-POL-PAST

'There was an elephant and a frog. And there came a pig.'

(from Sano, 2004: 1f)

The success rates for interpreting scrambling and object topicalization are shown in Table 3. We see clear differences between the two groups. The children in group B showed high success rates for all the sentence types. There seemed no big difference between sentence types. In contrast, the children in group A performed poorly for scrambling and much worse yet for topicalization.

group	age (number, mean)	canonical N1-*ga* N2-*o*	scrambling N2-*o* N1-*ga*	topicalization N2-*wa* N1-*ga*
A	3 (N=2, mean 3;9)	100.0%	62.5%	37.5%
	4 (N=7, mean 4;6)	78.6%	50.0%	28.6%
	5 (N=7, mean 5;5)	96.4%	74.1%	57.2%
	6 (N=9, mean 6;3)	94.3%	75.0%	61.1%
	group A average	92.3%	65.4%	46.1%
B	3 (N=2, mean 3;10)	87.5%	75.0%	75.0%
	4 (N=7, mean 4;5)	89.3%	85.7%	82.1%
	5 (N=7, mean 5;6)	100.0%	92.9%	100.0%
	6 (N=9, mean 6;3)	97.2%	100%	100.0%
	group B average	93.5%	88.4%	89.3%

Table 3: The results of Sano (2004)

Sano observes that the topic marker *-wa* by itself indicates that the noun followed by *-wa* is old information. The differences between group A and B in object topicalization, however, suggest that not only the topicalizing discourse but also the definite marker is necessary for target interpretation of the object topicalization. Sano therefore concluded that young children have grammatical knowledge of scrambling and topicalization, and can comprehend such sentence structures correctly if given both the topicalizing discourse and the definite marker.

On the basis of the results for group B, Sano also concluded that object topicalization is no more demanding than scrambling when both the topicalizing discourse and the definite marker are present. At the same time, we notice that, without the discourse context and the definite marker, object topicalization is considerably more difficult than scrambling for children to process as can be seen in the results for group A.

3.2.5. Summary: acquisition of the *ga-o* contrast in monolingual children

By examining how the child identified the agent and the patient in various types of transitive sentences, the studies reviewed above have reached the following conclusions:

Young children aged around four years correctly identify the agent in a canonical SOV and SV transitive sentence without discourse context. However, they seem to interpret the agent and patient relationship on the basis of word order rather than case marking (Sano, 2004; Suzuki, 2007).

Children older than five years seem to have knowledge of the accusative marker and are able to apply this knowledge to identify the agent in OV sentences and scrambled OSV sentences without a discourse context. When given an appropriate discourse context, children under four years are also able to interpret grammatical relations in such sentences correctly, suggesting that even 4-year-old children have knowledge of the *ga-o* contrast. They are just not able to apply the knowledge to non-canonical word order when the sentence appears out of context. (Hayashibe, 1975; Otsu, 1994b; Sano, 2004; Suzuki, 2007).

Korean monolingual children are able to understand scrambling only after they have acquired knowledge of the nominative – accusative contrast. The children who understand OV also understand OSV, with only one exception. In contrast, the children who failed in interpreting OV also failed in interpreting OSV (Kang, 2005).

Children under four years old seem to have difficulties understanding object topicalization [O-*wa* SV] without the discourse. It appears, however, that if children are given the discourse context and the definite marker *sono* appears in the first noun phrase, they understand object topicalization [O-*wa* SV] and scrambled OSV sentences equally well (Sano, 2004).

3.2.6. The *wa-ga* contrast in transitive sentences

T. Ito (1990) explored the acquisition of the topic marker -*wa* by looking at how children identify the agent in a transitive sentence containing the nominative marker -*ga* and the topic marker -*wa*. Ito tested six types of transitive sentence, two of which are relevant to the current study: contrastive reading, as in (25), and object topicalization, as in (26).

(25) Contrastive reading [S-*ga* O-*wa* V]

a. Kame-**ga** inu-**wa** name-ta. [animate + animate]
turtle-**NOM** dog-**TOP** lick-PAST
'A turtle licked a dog (but not a cat).'

b. Inu-**ga** enpitsu-**wa** sawa-tta. [animate + inanimate]
dog-**NOM** pencil-**TOP** touch-PAST
'A dog touched a pencil (but not a book).'

c. Hako-**ga** inu-**wa** oshi-ta. [inanimate + animate]
box-**NOM** dog-**TOP** push-PAST
'A box pushed a dog (but not a mouse).'

(26) Object topicalization [O-*wa* S-*ga* V]

a. Inu$_i$-**wa** rakuda-**ga** t_i sawa-tta. [animate + animate]
dog-**TOP** camel-**NOM** touch-PAST
'As for the dog, a camel touched (it).'

b. Uma$_i$-**wa** keshigomu-**ga** t_i kan-da. [animate + inanimate]
horse-**TOP** eraser-**NOM** bite-PAST
'As for the horse, an eraser bit (it).'

c. Keshigomu$_i$-**wa** kame-**ga** t_i tatai-ta. [inanimate + animate]
rubber-**TOP** turtle-**NOM** slap-PAST
'As for the eraser, a turtle slapped (it).'

(from T. Ito, 1990: 81)

To compare cue strength between case marker and animacy, inanimate entities were used as the agent or the patient in some sentences, as shown in (25)-b, c, and (26)-b, c. The noun followed by the particle -*ga* is the agent in both sentence types but SOV word order is also a cue to the target interpretation in all the sentences in (25). This means that, in the case of (25)-a, in which both nouns are animate, not only case marking but also word order is a cue to the target interpretation because of the canonical SOV order. In contrast, the case marker is the only cue to the target interpretation in (26)-a. When the animate noun is followed by the nominative -*ga* and the inanimate

noun is followed by the topic marker -*wa* as in (25)-b and (26)-c, both case and animacy lead children to the target interpretation. Moreover, in the case of (25)-b, word order also helps. However, word order is not a reliable cue for identifying the agent in (26)-c. The most problematic sentences contain the inanimate noun followed by the nominative -*ga* and the animate noun followed by the topic -*wa* as in (25)-c and (26)-b. This type sounds very odd to adult native speakers because there is a conflict between cues. In the case of (25)-c, word order and case marking conflict with animacy. In the case of (26)-b, case marking conflicts with word order and animacy.

The participants in T. Ito's study were 70 children between four and 14, and ten adults. They were asked to use soft toys to act out what the stimulus meant. The stimuli were provided without any discourse context. The results are shown in Table 4. The percentages indicate the rate of target interpretation (the noun followed by the nominative marker is the agent) for each sentence type.

group	age (number, mean)	contrastive (25)	topicalization (26)
A	4 (n=10, mean=4;7)	71.6%	35.6%
B	5 (n=10, mean=5;6)	73.3%	40.0%
C	6 (n=10, mean=6;9)	60.0%	55.0%
D	8 (n=10, mean=8;10)	55.0%	55.0%
E	10 (n=10, mean=10;9)	76.7%	68.3%
F	12 (n=10, mean=12;6)	53.3%	85.0%
G	14 (n=10, mean=14;7)	61.7%	85.0%
H	adult (n=10, mean=23;1)	50.0%	70.0%

Table 4: The results in T. Ito (1990)

Unfortunately, the more detailed results such as the difference between a, b and c in (25) and (26) were not reported by Ito. We therefore have no means of knowing, for example, how children behaved when both nouns were animate as in (25)-a and (26)-a, as opposed to when one noun was animate and the other inanimate. However, the results suggest a W-curve change in cue priority in the contrastive but not in the topicalization tests. The scores for group C and D are lower than those for the younger groups. The young children in group A and B, however, scored the lowest in the topicalization tests, suggesting that they used word order for their interpretations. The score for group E is

the highest but group F scored the second lowest for the contrastive tests. The adult group H scored the lowest in the contrastive tests. In contrast, the older the participants were, the higher they scored in topicalization. However, the adult group H again scored lower than groups F and G.

The reason for the adults' behaviour seems to be the conflict between case marking and animacy cues. Table 5 shows numbers of participants who used a particular cue 75% or more of the time when the noun was inanimate but marked with the nominative case marker *-ga*. Six out of ten children in group F identified the agent based on the case marker, and also seven out of ten in group G did so. That means that gradually with age, the children seem to use the nominative marker as a more reliable cue than animacy in identifying the agent. Adult group H, however, showed different behaviour from the children of Group F and G. Three out of ten adults used animacy in interpreting the sentence, which cannot be seen in Group G. Four out of ten used both case marker and animacy in tandem. T. Ito argues that this might be because adults have full knowledge of the functions of the particles *-ga* and *-wa* (see 3.1.2).

group	age (number, mean)	case marker	either	animacy
A	4 (n=10, mean=4;7)	0	5	5
B	5 (n=10, mean=5;6)	2	5	3
C	6 (n=10, mean=6;9)	1	3	6
D	8 (n=10, mean=8;10)	2	3	5
E	10 (n=10, mean=10;9)	5	4	1
F	12 (n=10, mean=12;6)	6	3	1
G	14 (n=10, mean=14;7)	7	3	0
H	adult (n=10, mean=23;1)	3	4	3

Table 5: Cue priority (animacy vs nominative case) in T. Ito (1990)

The study demonstrated that monolingual children six years and under use animacy and word order cues to identify the agent in *ga-wa* contrastive sentences and *wa-ga* topicalization. The case marking cue appears to be getting stronger with age. However, semantic/pragmatic factors are also important for adolescents and older speakers when it comes to interpreting *ga-wa* contrastive sentences and *wa-ga* topicalization.

3.2.7. The *wa-ga* contrast in other constructions

As shown in the adult behaviour in T. Ito (1990) above, the use of the topic marker -*wa* and the nominative -*ga* is not motivated only by syntax but is also closely associated with information structure and pragmatics. The topic marker is associated with theme, contrastive reading, old information (Kuno, 1972, 1973), and categorical judgement (Kuroda, 2005), whereas the nominative marker is linked to exhaustive listing, new information (Kuno, 1972, 1973), and thetic judgement (Kuroda, 2005).

Hatano's (1979) study of the topic -*wa* and nominative -*ga* examined whether children have the knowledge required to choose the right particle in the right place in a given context. The experimental paradigm was elicited imitation. Examples of stimuli are shown in (27). The children were asked to listen to a voice recording of the stimulus sentence, and then, repeat the sentence immediately after hearing the recording. To help children understand what the stimulus sentences were about, they were presented with picture cards (one card for three stimuli). For example, before stimulus (27)-a was played, the child was shown a picture (Picture A), which showed drawings of an elephant, a giraffe and a snake. The particles in the brackets were masked with noise. For instance in (27)-a, the noise masked the topic marker -*wa* on the first noun *zo* 'elephant'. The children were asked to look at the picture, listen to the stimulus, and then immediately repeat the complete sentence by filling in any particles that were replaced by noise.

(27) Picture A

a. Zo(-wa) hana-ga nagai [topic and comment]
elephant-TOP nose-NOM long
'As for an elephant, the trunk is long.'

b. Kirin-wa kubi(-ga) nagai [topic and comment]
giraffe-TOP neck-NOM long
'As for a giraffe, the neck is long.'

c. Hebi(-wa) karada-ga nagai [topic and comment]
snake-TOP body-NOM long
'As for a snake, the body is long.'

(from Hatano, 1979: 12)

Other examples from Hatano's study are given in (28) – (30). Hatano tested the use of *-wa* and *-ga* in the topic-comment constructions (27), the use of *-ga* in (28)-b and (29)-b, and the use of *-wa* as in (28)-c, (29)-c, (30)-a and (30)-b. Note that some stimuli were complete sentences, for example, no particle were masked in (28)-a and (29)-a.

(28) Picture B

a. Kono e-wa sukoshi hen desu-ne [complete sentences]
this picture-TOP a.bit strange POL-SFP
'This picture looks a bit strange.'

b. Neko-yori ookii nezumi(-ga) i-masu [*-ga* is masked]
cat-than big mouse-NOM exist-POL
'There is a mouse that is bigger than a cat.'

c. Hutuu neko-yori ookii nezumi(-wa) i-masen [*-wa* is masked]
generally cat-than big mouse-TOP exist-NEG.POL
'Generally, there is no mouse that is bigger than a cat.'

(29) Picture C

a. Kono e-wa sukoshi hen desu-ne [complete sentence]
this picture-TOP a.bit strange POL-SFP
'This picture looks a bit strange.'

b. Neko-o oikake-tei-ru nezumi(-ga) i-masu [*-ga* is masked]
cat-ACC chase-ASP-PRES mouse-NOM exist-POL
'There is a mouse that is chasing a cat.'

c. Hutuu nezumi(-wa) neko-o oikake-masen [*-wa* is masked]
generally mouse-TOP cat-ACC chase-NEG.POL
'Generally, a mouse does not chase a cat.'

(30) Other stimuli in which *-wa* was masked

a. Satoo(-wa) mushiba-no moto-ni nari-masu
sugar-TOP bad.teeth-GEN cause(N)-DAT become-POL
'Sugar will be a cause of bad teeth.'

b. Ushi-no ha(-wa) taira desu
cow-GEN teeth-TOP flat POL
'The cow's teeth are flat.'

(from Hatano, 1979: 12)

The results of Hatano's study are shown in Table 6. The participants were 80 children from 3:0 to 7:5 years old. The children were divided into four groups. TC in the table indicates the topic-comment construction, and OC indicates other contexts. Only the oldest group D succeeded in choosing the target particle more than 70% of the time in all the tests. Compared with the use of *-ga*, the children's success rates for the use of *-wa* were lower in all groups. The success rates in the use of *-ga* improved gradually with age, whereas there were big differences between groups C and D in the success rates for *-wa*.

group	(number	age range	mean)	*wa* in TC	*ga* in TC	*wa* in OC	*ga* in OC
A	(10	3;0-4;4	4;1)	1.7%	43.2%	19.0%	29.0%
B	(10	4;5-5;5	5;1)	15.0%	53.3%	33.8%	55.0%
C	(10	5;6-6;3	6;1)	33.5%	68.3%	37.3%	65.0%
D	(10	6;6-7;5	7;2)	75.0%	81.6%	72.0%	80.0%

Table 6: The results (success rate) in Hatano (1979)

How then did the young children in groups A, B and C respond when *-wa* was masked in the topic-comment construction (TC) and other constructions (OC)? The results of response pattern analyses for *-wa* in the TC and the OC tests are shown in Table 7 and Table 8 respectively. In the tables, 'particle ellipsis' means that the child left the masked particle unfilled, 'constituent ellipsis' indicates that the child omitted not only the particle but also the noun, and 'other' comprises any other responses such as no response, irrelevant utterance, rewording, and so forth. Particle ellipsis was the most common response to the TC and OC tests among groups A, B and C. The majority of the children younger than 6;3 simply left the particle out, rather than using any other particles. There was also some confusion between *-wa* and *-ga*, especially in the oldest group D in Table 8.

group	A	B	C	D
-*wa* (target)	1.7%	15.0%	33.5%	75.0%
-*ga*	3.2%	1.9%	1.9%	1.7%
other particle	1.7%	0.0%	0.0%	0.0%
particle ellipsis	67.0%	75.0%	55.0%	18.3%
constituent ellipsis	18.0%	8.1%	8.3%	5.0%
other	8.4%	0.0%	1.3%	0.0%
Total	100%	100%	100%	100%

Table 7: The results of response pattern analysis for -*wa* in TC in Hatano (1979)

group	A	B	C	D
-*wa* (target)	19.0%	33.8%	37.3%	72.0%
-*ga*	7.7%	5.0%	3.7%	12.0%
other particle	5.0%	5.0%	0.0%	0.0%
particle ellipsis	39.0%	48.7%	50.0%	15.0%
constituent ellipsis	12.7%	5.0%	4.5%	0.0%
other	16.6%	2.5%	4.5%	1.0%
Total	100.0%	100.0%	100.0%	100.0%

Table 8: The results of response pattern analysis for -*wa* in OC in Hatano (1979)

The results of response pattern analyses for the masked -*ga* in the TC and OC tests are shown in Table 9 and Table 10 respectively. Particle ellipsis was again a common response, but the most common response in all groups was the target particle -*ga*. There was very little confusion between -*ga* and -*wa*. However, the oldest group D in Table 10 responded more frequently with -*wa* than the younger speakers.

group	A	B	C	D
-*ga* (target)	43.2%	53.3%	68.3%	81.6%
-*wa*	0.0%	1.7%	0.0%	1.7%
other particle	1.7%	5.0%	1.7%	0.0%
particle ellipsis	31.7%	23.3%	18.3%	13.3%
constituent ellipsis	1.7%	5.0%	5.0%	0.0%
other	21.7%	11.7%	6.7%	3.4%
total	100.0%	100.0%	100.0%	100.0%

Table 9: The results of response pattern analysis for -*ga* in TC in Hatano (1979)

group	A	B	C	D
-*ga* (target)	29.0%	55.0%	65.0%	80.0%
-*wa*	0.0%	2.5%	2.5%	5.0%
other particle	0.0%	0.0%	0.0%	0.0%
particle ellipsis	23.0%	22.5%	32.5%	7.5%
constituent ellipsis	15.0%	12.5%	0.0%	0.0%
other	33.0%	7.5%	0.0%	7.5%
total	100.0%	100.0%	100.0%	100.0%

Table 10: The results of response pattern analysis for -*ga* in OC in Hatano (1979)

On the basis of these results, Hatano summarized the course of acquisition of the particles -*wa* and -*ga* as follows: (i) -*ga* seems to be acquired earlier than -*wa*. (ii) Children above four years old are able to use -*ga*. (iii) Children above six are able to use -*wa*. (iv) The [N-*wa* N-*ga* Predicate] pattern (topic and comment construction) was considered to be a natural pattern of utterance not only in adults' but also in children's language behaviour. Children past preschool age (i.e. seven years and older) have the same competence of the *wa*-*ga* contrast as adults.

3.2.8. Summary: acquisition of the *wa*-*ga* contrast in monolingual children

Even though young children five and under correctly identify the agent in contrastive sentences of the form [S-*ga* O-*wa* V], it seems that they use word order or animacy as a cue for interpretation (T. Ito, 1990).

Children seem to acquire the use of -*ga* at an earlier stage than the use of -*wa* (-*ga* at around four years and older, -*wa* at around six years and older). Children aged seven and older are able to make use of their knowledge of the *wa*-*ga* contrast in an adult like fashion (Hatano, 1979).

An interesting finding is that in both T. Ito (1990) and Hatano (1979), an unstable stage in the usage of -*wa* was observed. In T. Ito (1990), the group of ten-year-old children had a 76.7% success rate for the contrastive reading [S-*ga* O-*wa* V] tests, which was the highest in all the groups including the adult group. However, the success rate for the group of 12-year-old children was the second lowest, with 53.3%. Moreover,

the success rate for the adult group was only 50%, which was the lowest of all the groups. In the tests of the use of *-wa* in constructions other than transitive sentences and the topic-comment constructions in Hatano (1979), even though the children in the oldest group had the highest success rate with 72%, they also had the highest rate of confusion between *-wa* and *-ga*.

3.3. Problematic structures

In the previous section, we reviewed the studies on the acquisition of the *ga-o* contrast and the *wa-ga* contrast in monolingual children. Without a discourse context, young children seem to use word order as a cue to identify the agent in a transitive sentence even if they have knowledge of the *ga-o* contrast. This suggests that children appear to have difficulty applying their case knowledge in non-canonical transitive structures such as null subjects (OV) and OSV scrambling.

It also takes children some time to understand the *wa-ga* contrast. Considering that the success rate in the *wa-ga* tests was lowest for the adult group in T. Ito's (1990) study, it appears that without a discourse context, the sentence itself does not convey clearly what the speaker intended to convey. This suggests that not only syntactic but also discourse-pragmatic knowledge is required to understand the *wa-ga* contrast.

What are the properties of non-canonical word order and *wa-ga* constructions that could be affecting the child's comprehension of these structures? The next section presents theoretical approaches to Japanese null subjects (OV) and scrambling (OSV), and also the function of the topic particle, since these theoretical approaches may shed some light on this question.

3.3.1. Null subjects (OV)

There are several approaches to null arguments in Japanese, especially null objects (Hoji, 1998; Takahashi, 2008; Zushi, 2003). This section, however, concentrates

on the analysis of null subjects because it is null-subject OV constructions that children seem to have difficulty applying their case marking knowledge to.

Languages such as Italian and Spanish are known as null subject languages. The subject position in these languages is considered to be filled with a phonologically null element (*pro*) that functions syntactically as a pronoun, and is for example able to bind an anaphor. This approach is underpinned by the extended projection principle (EPP: clauses must have subjects), and the pro-drop parameter. English and French are considered to be non-pro-drop languages that do not permit null subjects in tensed clauses, whereas Italian and Spanish are pro-drop languages that allow null subjects in tensed clauses. These pro-drop languages have a rich system of agreement. Rizzi (1986) proposed that *pro* is formally licensed through Case assignment by a designated head (Infl in the case of subjects in Italian), and that its content is recovered through binding by grammatical features on the licensing head. The recovery procedure determines the use of *pro*: non-argumental use if no content is recovered, non-referential use if only number is recovered, and the full range of uses if both person and number are recovered. Rizzi (1986) also mentioned that, in languages that do not have an agreement system and do not use φ-features in general, such as Japanese, the recovery procedure is not operative, and therefore, *pro* has the full range of uses.

For the purpose of the current study, the most important thing to note here is that in this approach, the empty element must be identifiable, that is, there needs to be an identifiable antecedent in the discourse or real world context. This may explain why young monolingual children in Suzuki's (2007) study had difficulty in the comprehension tasks without the discourse context (section 3.2.1). This approach also predicts that children who are acquiring Japanese will set the *pro*-drop parameter to allow null subjects at some stage of development in order to correctly interpret the null subject OV sentence (cf. Murasugi & Sugisaki, 2008).

3.3.2. Scrambling (OSV)

Japanese scrambling is characterised as follows (Snyder, 2007). Firstly, an argument can be scrambled not only within a clause (clause-internal scrambling) but also across a clause boundary (long-distance scrambling). Secondly, more than one argument in the same clause can be scrambled. Thirdly, scrambling of adjuncts is more restricted than scrambling of arguments. Fourthly, scrambling is semantically vacuous.

Again, there are several approaches to scrambling. Many approaches assume that a scrambled sentence is derived from a canonical sentence by overt movement (Ishihara, 2001; Mahajan, 1990; Miyagawa, 2003, 2005; Saito, 2003, 2005; Takano, 2010). For the purpose of the current study, I will focus on two papers that seem to illuminate the children's behaviour reported in existing studies introduced in section 3.2: one is a paper by Miyagawa (2003) that examines the syntactic aspects of clause-internal scrambling, and the other is a paper by Ishihara (2001) that is concerned with the semantic/pragmatic aspects of scrambling.

Miyagawa (2003) observed properties of clause-internal scrambling containing the quantifier *zen'in* 'all' and negation, as in (31) and (32), that supported Mahajan's (1990) claim that clause-internal scrambling can be either A-movement or A'-movement.

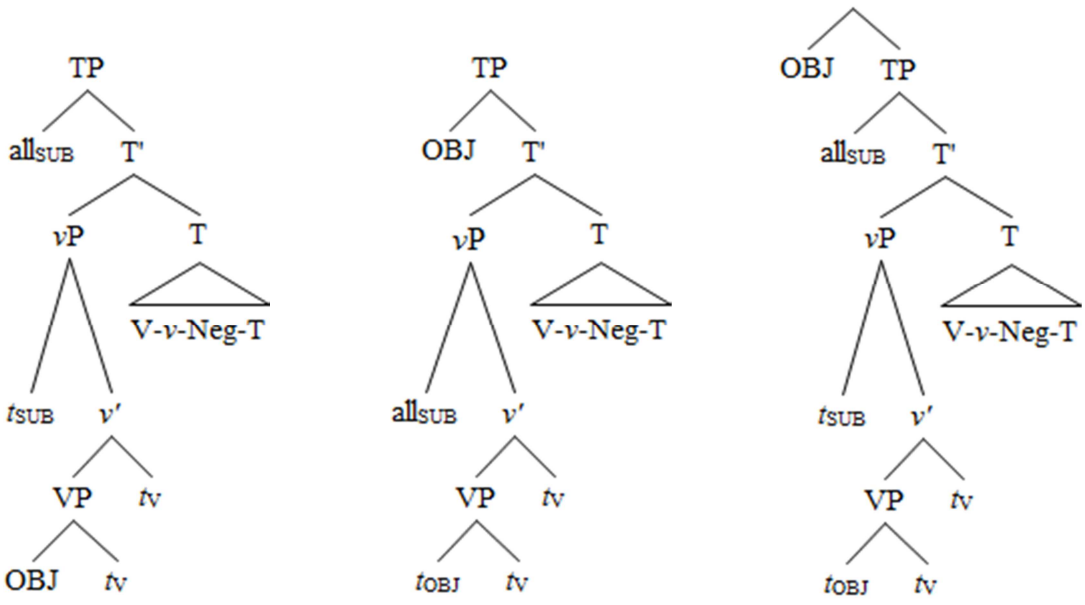
(31) Zen'in-ga sono tesuto-o uke-nakat-ta
all-NOM that test-ACC take-NEG-PAST
'All did not take that test.'
*not all, all not

(32) Sono tesuto-o$_i$ zen'in-ga t_i uke-nakat-ta
that test-ACC all-NOM take-NEG-PAST
'That test, all did not take.'
not all, all not

(from Miyagawa, 2003: 183f)

The interpretation of (31) is that nobody took that test; no exception. The quantifier *zen'in* 'all' in the subject position is outside the scope of Neg as in Figure 1-a,

which results in the ‘all not’ reading. Example (32) is a scrambled counterpart of (31). The interpretation of (32) is ambiguous. It can be interpreted as total negation, and thus the same as (31). However, another possible reading for (32) is that some took the test but some did not (partial negation). Miyagawa explained that the different readings come from the consequence of A-movement vs. A’-movement of the scrambled object. In the case of A-movement, as shown in Figure 1-b, the object moves to Spec TP, an argument position. As a result, the subject *zen’in* ‘all’ stays inside the scope of negation, and partial negation ‘not all’ becomes possible. In contrast, A’-movement of the object results in total negation because the object moves up to a non-argument position above TP. The EPP requires the subject to move to Spec TP, where it is outside the scope of negation as in Figure 1-c, yielding the interpretation ‘all not’.



a.‘all not’ b.‘not all’ c.‘all not’

Figure 1: Syntactic trees from Miyagawa (2003: 183-185)

The main point of Miyagawa’s (2003) approach is that SOV as well as the scrambled OSV word orders (clause-internal scrambling) involve a single obligatory movement triggered by the extended projection principle (EPP). Miyagawa assumes overt V-raising to T in Japanese, and claims that at the point of V-to-T raising, the

subject and the object are equidistant from SpecT. The EPP feature on T therefore can attract either the subject (nominative) or the object (accusative).

Ishihara (2001) claims that scrambling creates potential focus domains that differ from those found in canonical word order. Ishihara observed that the main stress position in a Japanese sentence falls on the preverbal phrase, which is the object in a canonical SOV sentence and the subject in a scrambled OSV sentence. Applying Cinque's (1993) 'null theory' that states that the stress falls on the most deeply embedded phrase with overt phonological content, and Reinhart's (1995) 'focus rule' that the focus of IP is a constituent containing the main stress of IP, Ishihara proposed that scrambling in (34) creates a focus domain that differs from that of canonical word order (33). Ishihara argues that the preverbal phrase, the object noun phrase *hon-o* 'book-ACC' in (33), receive the focus interpretation, whereas the scrambled material receives a NON-focus interpretation, which Ishihara labels as *given*. The scrambled object noun phrase *Hon-o* 'book-ACC' in (34), therefore, bears *given* interpretation.

(33) Focus domain in canonical SOV = the object NP 'a book'
a. What did Taro buy?
b. Taro-ga hón-o ka-tta
Taro-NOM book-ACC buy-PAST
'Taro bought A BOOK.'

(34) Focus domain in scrambled OSV = the subject NP 'Taro'
a. Who bought a book?
b. Hon-o$_i$ Táro-ga t_i ka-tta
book-ACC Taro-NOM buy-PAST
'TARO bought the book.'

(from Ishihara, 2001: 169)

The term 'givenness' is generally used in contrast to 'newness' (Halliday, 1967). Chafe (1974) defined 'given' material as what is assumed to be in addressee's consciousness and 'new' as what is assumed not to be in addressee's consciousness (Chafe, 1974: 112). Although Ishihara does not give a definition of 'given', I assume that he is using this term in the sense defined by Chafe.

Ishihara refers to Miyagawa's (2003) study as a corroborating approach, since V-to-T raising is necessary for the subject noun phrase in (34) to receive the main stress. The subject must be in-situ [SPEC, *v*P] to be the most deeply embedded phrase. Ishihara's (2001) approach explains why the discourse context and a demonstrative help young monolingual children with interpreting scrambling because according to Ishihara, the scrambled object must be *given* (assumed to be in addressee's consciousness).

Filler-gap dependency

How might the special characteristics of scrambling affect children's comprehension? Previous studies demonstrated that adult native speakers of Japanese take a longer time to process a sentence containing a gap (e.g. in the object trace *t* in the case of OS*t*V), suggesting that a scrambled sentence is more costly to comprehend than a sentence with canonical word order (Mazuka, Itoh, & Kondo, 2002; Sakamoto, 2002). When adult native speakers encounter a potential filler (O in the case of OSV), they start looking for a gap (a filler-gap dependency). In Japanese, however, there are two possibilities. An accusative-marked initial noun phrase could either be an in-situ object in a null-subject OV sentence, or a moved object in a scrambled sentence. In this sense, the sentence is ambiguous until the parser finds the gap. At the gap position, the ambiguity is resolved as the sentence-initial NP turns out to be the moved object in the scrambled OSV sentence.

Suzuki (2012) investigated the effects of filler-gap dependencies, reversibility of the roles of the agent and the patient, and case markers in children's scrambled sentence processing. The paradigms were speeded picture selection and self-paced listening. Four types of transitive sentences (35) – (38) were tested.

(35) SOV-R (reversible)

Kinoo	kooen-de	inu-**ga**	buta-**o**	oshi-mashi-ta.
Yesterday	park-at	dog-**NOM**	pig-**ACC**	push-POL-PAST

'Yesterday in a park, a dog pushed a pig.'

(36) SOV-N (non-reversible)

Kinoo	kooen-de	inu-**ga**	ichigo-**o**	tabe-mashi-ta.
Yesterday	park-at	dog-**NOM**	strawberry-**ACC**	eat-POL-PAST

'Yesterday in a park, a dog ate a strawberry.'

(37) OSV-R (reversible)

Kinoo	kooen-de	buta$_i$-**o**	inu-**ga**	t_i	oshi-mashi-ta.
Yesterday	park-at	pig-**ACC**	dog-**NOM**		push-POL-PAST

'Yesterday in a park, a dog pushed a pig.'

(38) OSV-N (non-reversible)

Kinoo	kooen-de	ichigo-**o**	inu-**ga**	t_i	tabe-mashi-ta.
Yesterday	park-at	strawberry-**ACC**	dog-**NOM**		eat-POL-PAST

'Yesterday in a park, a dog ate a strawberry.

(from Suzuki, 2012: 125)

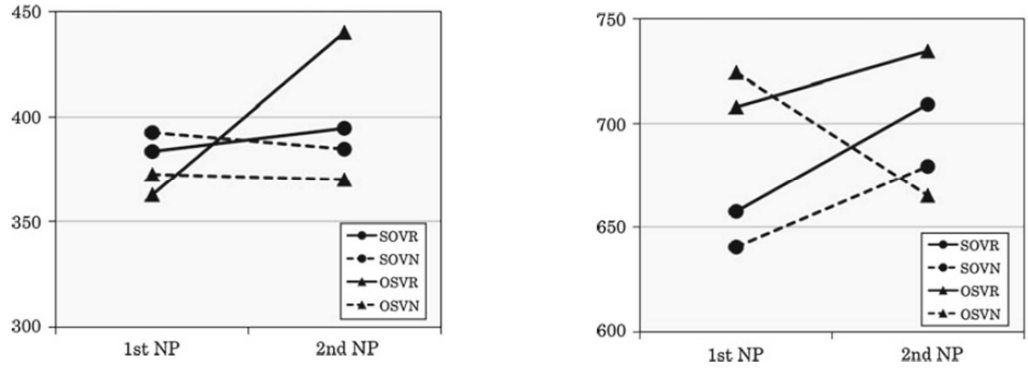
The results for the speeded picture selection task are shown in Table 11. Among both the adults and the children, the success rates were highest for the OSV-N and the SOV-N tests and lowest for the OSV-R tests. The processing time was longest for the OSV-R tests followed by the SOV-R tests, suggesting that scrambled sentences are hard to process when there is no animacy cue.

		SOV-R	SOV-N	OSV-R	OSV-N
Adults	success rate	96.7%	99.2%	85.0%	99.2%
(n=30, 19;11-25;3, mean=21;6)	times (ms)	1549	1123	1996	1187
Children	success rate	85.2%	98.9%	70.5%	98.9%
(n=26, 5;9-6;7, mean=6;3)	times (ms)	4000	2270	4954	2260

Table 11: The results for speeded picture selection in Suzuki (2012)

The reaction times for self-paced listening are shown in Figure 2. The adults' results clearly showed a filler gap dependency effect because it was only the second NP in the OSV-R tests that adults took considerably longer to process than all other noun phrases, as shown in Figure 2-a. However, in the OSV-N tests, there was no difference in the reaction times between the first and the second NPs, which seems to indicate that the animacy cue and the filler-gap effect cancel each other out. In contrast, a filler-gap dependency was not observed in the children's results, which are shown in Figure 2-b. There was no difference in trend between SOVs and OSV-R. The first NP was

processed faster than the second NP in all sentence types except OSV-N, where the second NP was processed more quickly than the first NP.



a. listening time by adults b. listening time by children

Figure 2: The results of self-paced listening in Suzuki (2012: 128f)

Suzuki hypothesized that the filler-gap dependency effect was cancelled out for OSV-N in the children's results because the accusative marker on the first NP in the scrambled OSV sentence was processed too slowly. Suzuki therefore analysed the self-paced listening data from the children who succeeded more than 85% of the time in the speeded picture selection, on the assumption that these children processed the accusative markers on the first NP as quickly as adults. The results were as predicted: A filler-gap dependency effect was observed, like in the adult group. The results of Suzuki (2012) indicate that the scrambled OSV sentence poses two processing challenges for children; the accusative marker on the first noun and the filler-gap dependency.

Interestingly though, another study reported that a filler-gap dependency effect was not observed in children's comprehension of relative clauses. Suzuki (2011) investigated knowledge of subject and object relative clauses in a study using picture selection with discourse, which involved 30 children between 5;1 and 6;8. If a filler-gap dependency affected children's comprehension of relative clauses, we would expect higher accuracy for the subject relative clause in (39) than the object relative clause in (40), as the structural distance (the number of nodes) between the gap and the head of the relative cause (in this case, *panda*) is greater in (40) than in (39). Adult native

speakers do indeed read a subject relative clause faster than an object relative clause (Miyamoto & Nakamura, 2003).

(39) Subject relative clause
[_____ Kuma-o hikkaita] panda [ ]: relative clause
bear-ACC scratched panda
'The panda which scratched a bear.'

(40) Object relative clause
[Kuma-ga _____ hikkaita] panda
bear-NOM scratched panda
'The panda which a bear scratched.'

(from Suzuki, 2011: 1085)

The results for the children in Suzuki's (2011) study were the other way around. The success rates were 60.8% for (39) and 83% for (40). Possible interpretations are that there is no gap in the children's relative clause, or that children find it easy to process the gap that is linearly closer to the head. It could also be that children more readily interpret an animate initial NP as an agent because they tend to rely on word order and animacy cues.

3.3.3. Topicalization and the topic-comment construction

In this section, I will focus on an approach proposed by Neeleman, Titov, van de Koot, and Vermeulen (2009) and Vermeulen (2008).

Neeleman et al. (2009) and Vermeulen (2008) claim that clause initial *wa*-marked phrases can be classified into two types: non-contrastive topics (unstressed) as in (41), that bear a [topic] feature, and contrastive topics (stressed) as in (42) that bear [topic, contrast] features. This classification is basically the same as 'thematic' and 'contrastive' uses discussed by Kuno (1972). That is, 'thematic' and 'contrastive' noun phrases marked by -*wa* are non-contrastive (aboutness) topics and contrastive topics, respectively.

(41) Non-contrastive topic (aboutness topic):

(Speaker A) *Tell me about that book. (What about that book?)*

(Speaker B) a. sono hon$_i$-wa John-ga e_i katta.
that book-TOP John-NOM bought

b. # John-ga sono hon-wa katta. (# indicates infelicity)
John-NOM that book-TOP bought
'Speaking of that book, John bought it.'

(42) Contrastive topic:

(Speaker A) *Who bought those books?*

(Speaker B) *I don't know about this book but,*

a. SONO HON$_i$-WA John-ga t_i katta.
that book-TOP John-NOM bought

b. John-ga SONO HON-WA katta.
John-NOM that book-TOP bought
'John bought that book. (John didn't buy another book)'
(from Vermeulen, 2008: 1f)

Neeleman et al. and Vermeulen propose that (i) [topic] is licenced in clause-initial position, and (ii) [contrast] licences A'-movement. They argue that non-contrastive topics, such as *sono hon-wa* (41)-a, which bear just a [topic] feature, are base-generated in a left-peripheral, non-thematic, dislocated position and associated with an empty/resumptive pronoun, while contrastive topics such as SONO HON-WA (42)-a, which bear [topic, contrast] features undergo A'-movement to clause-initial position and leave a trace behind. Neeleman et al. (2009) argue that there are no fixed landing sites for topic and focus movement.

Now, let us consider object topicalization and the topic-comment construction from the perspective of Neeleman et al. (2009) and Vermeulen (2008). Example (43) is a repetition of (23) used in Sano's (2004) study introduced in 3.2.4. The sentence initial *wa*-phrase *Buta-wa* 'pig-TOP' in (43) can be either a non-contrastive topic or a contrastive topic. According to Neeleman et al. and Vermeulen, when it is the answer to the request 'Tell me about the pig', then, the sentence initial *wa*-phrase *Buta-wa* is interpreted as a non-contrastive topic bearing a [topic] feature. In this case, *Buta-wa* is base-generated in a non-argument position above TP with an empty (null) pronoun in the object position. In contrast, when example (43) is the answer to the question 'What happened to the rabbit and the pig?', there may be a preceding sentence like 'I don't

know what happened to the rabbit, but…', and then the sentence initial *wa*-phrase *Buta-wa* will have an emphatic stress on it and will be interpreted as a contrastive topic bearing [topic, contrast] features. In this case, Neeleman et al. and Vermeulen's approach predicts that the object of the sentence, *buta* 'pig', leaves a trace behind in its base position and moves up to a Spec XP that is a non-argument position above TP, where the topic marker *-wa* replaces the accusative particle *-o*.

(43) Object topicalization used in Sano (2004: 1)

Buta$_i$-wa	zo-ga	e_i / t_i	ketobashi-mashi-ta
pig-TOP	elephant-NOM		kick-POL-PAST

'As for the pig, an elephant kicked.'

In the framework of Neeleman et al. and Vermeulen, in both cases, the sentence initial *wa*-phrase *Buta-wa* is located in a non-argument position above TP, there is a gap in the object position (a null pronoun or a trace), and *Buta-wa* is licenced by a [topic] feature. Neeleman et al. and Vermeulen define the [topic] feature as 'aboutness' that is established in the discourse context. This seems to explain why, without the discourse context and the demonstrative *sono* 'that' on the topicalized object, the children in Sano's (2004) study exhibited a greater difficulty in processing this construction than scrambling. The results of Sano's study also suggest that the acquisition of the 'contrastive topic' use of *-wa* follows the acquisition of the syntactic property of scrambling.

As for the topic-comment construction, Neeleman et al. (2009) and Vermeulen (2008) schematised the information structure as in (44)-a. The first part of the structure is a non-contrastive topic that conveys what the sentence is about. The second part is a comment, where a focus-background structure can be embedded. The focus is the new information predicated on the topic or the part of the sentence being contrasted with alternatives. The remainder of the comment makes up the background.

(44) a. topic [comment FOCUS [background ... ...]]

b. Zo-wa hana-ga nagai
elephant-TOP nose-NOM long
'As for an elephant, the trunk is long.' (Hatano, 1979: 12)

Example (44)-b is a repetition of (27)-a, which was tested in Hatano's (1979) study introduced in 3.2.7. The adjective *nagai* 'long' in (44)-b is a one-place predicate, which has a subject *hana* 'nose' that is an only argument. This means that the sentence initial *wa*-phrase is not an argument but a topic of the sentence. In the framework of Neeleman et al. and Vermeulen, the sentence initial *wa*-phrase *Zo-wa* 'elephant-TOP' in (44)-b is a non-contrastive topic because it is base generated in a left-peripheral, non-argument position above TP.

The children aged between 6;6 and 7;5 in Hatano's study succeeded in reproducing this construction 75% of the time, whereas the children under the age of 6;6 succeeded only 33.5% of the time (see Table 6 in 3.2.7), suggesting that the acquisition of the topic comment construction takes a considerably long time. However, we cannot predict whether this construction will be easier or more difficult for children to comprehend than object topicalization. In both constructions, the surface structure is [N1-*wa* N2-*ga* PRED (V or ADJ)]. We might hypothesize that once the child has acquired the *wa-ga* contrast, there will be no big difference between the two constructions in terms of complexity of interpretation. However, object topicalization and the topic comment construction are quite different in many aspects, for example, in object topicalization, both noun phrases are arguments and there is a gap between N2 and the predicate, whereas N1 in the topic comment construction is a non-argument and there is no gap in the sentence. As far as I know, there is no existing study that predicts whether these characteristics of the two constructions affect the child's comprehension in different ways.

Lastly, as far as *wa*-phrases in non-clause-initial position are concerned, Neeleman et al. (2009) and Vermeulen (2008) classified them into two types: contrastive (stressed) and discourse anaphoric (unstressed). They are not a topic of the sentence. Therefore, the object followed by *-wa* in-situ, if stressed, is not a topic but a contrastive element that implies the existence of the alternatives. Vermeulen argues that contrastive *wa*-phrases in-situ do not involve A'-movement to clause-initial position.

T. Ito (1990) tested this ‘contrastive’ in-situ use of *-wa*, as discussed in 3.2.6. The young children in his study exhibited relatively high accuracy, since they use the word order cue, whereas the adult group exhibited the lowest accuracy among all the age groups. This was considered to be due to cue conflict between case marking and animacy, and also full knowledge of the functions of *-wa* and *-ga*. On the basis of the results of T. Ito’s study, we can predict that a child will undergo several phases in acquiring adult like grammar. In the first phase, the child uses word order as a cue to interpreting a sentence containing a contrastive *wa*-phrase in-situ, which leads the child to the target interpretation. In the second phase, the child changes cue strength and uses the case marking cue to interpret a sentence containing a contrastive *wa*-phrase in-situ. The child readily interprets a *ga*-marked noun phrase as an agent if s/he has not acquired the *ga*-*wa* contrast and the additional functions of *-wa* and *-ga* yet, so the case cue from *-ga* also leads the child to the target interpretation. In the third phase, once the child has acquired the *ga*-*wa* contrast and full knowledge of the additional functions of *-wa* and *-ga*, then, without the discourse context, s/he may misinterpret a sentence containing a contrastive *wa*-phrase in-situ because *-ga* is no longer seen just as a case marker.

4. Case and topic marking knowledge in bilingually raised children

4.1. Research question

The question addressed here is whether children who have been exposed to English and Japanese from birth behave like monolingual learners of Japanese with respect to the case and topic marking system. For any differences that were detected, the current study also tried to identify what affected the children's behaviour.

Meisel (2011) would predict that the children who participated in the current study would follow the same course of grammatical development as monolingual children since they are acquiring English and Japanese simultaneously from birth. However, Meisel (2011) also predicts that simultaneous bilingual learners might undergo a phrase of interdependent language development. Hulk and Müller (2000) and Müller and Hulk (2001) make the prediction that cross-linguistic influence might be expected to occur when two conditions are met. The first condition is that the domain where cross-linguistic influence occurs is in the left periphery of the sentence where syntax and pragmatics interface. The second condition is that cross-linguistic influence occurs only if one language allows for more than one grammatical analysis and the other language contains positive evidence for one of those possible analyses, which means that there is an overlap between two languages at the surface level.

The current study is concerned with the children's knowledge of the use of the particles *-ga*, *-o* and *-wa*. To be more precise, the study focuses on the contrast between *-ga* and *-o* (nominative-accusative), and between *-ga* and *-wa* (nominative-topic), because this is an area of grammar where there is a potential for cross-linguistic influence. There is an overlap between English and Japanese when it comes to expressing the agent-patient relationship at the surface level. With regard to the linear order of the agent and the patient in a sentence, the agent basically precedes the patient in both English and Japanese. However, Japanese has more flexible word order, as explained in chapter 3, and the linear order of the agent and the patient changes according to discourse-pragmatic factors. This is therefore a domain where syntax and

pragmatics interface. If we assume that the prediction by Hulk and Müller (2000) and Müller and Hulk (2001) is valid, cross-linguistic influence is highly likely to occur.

According to Bates and MacWhinney (1989), English monolingual children under five rely on (i) word order, (ii) animacy, (iii) stress and (iv) agreement as cues for agent assignment. For adult speakers of English, the order of cue strength does not change except in that they appear to regard agreement as more helpful than stress. In the case of Japanese monolingual speakers, the order of cue strength in children is (i) animacy, (ii) word order (iii) case marking in the early stage of development (Tanaka & Shirai, in press), whereas it is (i) case marking, (ii) animacy, (iii) word order in adults (Bates & MacWhinney, 1989). As discussed in chapter 3, the results of existing experimental studies suggest that many young monolingual children identify the agent on the basis of word order when both the agent and the patient are animate, while children five years and older were able to identify the agent in various types of sentence such as the null subject OV sentence, the scrambled OSV sentence, the object topicalized *wa-ga* sentence. This suggests that in monolingual Japanese speakers, the order of cue strength changes to become adult like at around five years and older.

How about bilingually raised children? Do children raised bilingually in English and Japanese also use the case marking cue to identify the agent in Japanese from around the age of five? Is this a domain where cross-linguistic influence manifests itself as Hulk and Müller (2000) and Müller and Hulk (2001) predict? If cross-linguistic influence does indeed occur, how does this influence affect the children's behaviour?

To address this question, the current study conducted an experiment involving two types of tasks. Since the purpose of the study was to explore the behaviour of bilingually raised children and compare it with that of monolingual children, the most suitable methodological choice was a replication of previous studies. Accordingly, the first task in this study was picture selection task that adopted the protocol of Suzuki (2007). The results from Suzuki (2007, 2012), Kang (2005) Sano (2004) were used as comparative data. The second task was an elicited imitation task that replicated Hatano (1979), whose results were used as comparative data.

4.2. Participants

The participants were 34 children aged between four years 11 months old and 11 years and 10 months old from 25 different families. The participants were recruited by distributing a recruitment letter through the Canterbury Japanese Supplementary School and my acquaintances. The number of participants in different age groups, and range, average and median of the participants' ages in each group are shown in Table 12. The children were divided into six age groups based on age.

Age groups	Number (boys, girls)	Range	Average	Median
1	6 (2, 4)	4;11 - 5;11	5;4	5;4
2	5 (3, 2)	6;5 - 6;11	6;8	6;9
3	5 (2, 3)	7;0 - 7;11	7;5	7;7
4	5 (2, 3)	8;1 - 8;9	8;5	8;4
5	8 (3, 5)	9;0 - 9;9	9;5	9;5
6	5 (1, 4)	10;0 - 11;10	10;9	10;5
Total	34 (13, 21)			

Table 12: The survey participants

The children shared three attributes: (i) their mothers were native speakers of Japanese and their fathers were native speakers of New Zealand (NZ) -English, (ii) the children were born and were residing in NZ, and (iii) the children were being raised in a one-person one-language environment; that is, each parent addressed their child in their native language from birth.

Originally, 43 children from 30 families offered to participate. Nine children from five families were not included in the study, because the children's background did not meet the selection criteria set out above: Two of the mothers reported that they mixed English and Japanese when they addressed their children at home, and six children from three families were born outside of New Zealand. All the other children fitted the selection criteria and completed both of the tasks.

The data collection was carried out at the participants' homes. Before participation, the child and the mother were given an information sheet and oral instructions. Then,

the mother completed a consent form and the child completed an assent form. The mothers also participated in a structured interview on the same day. The interview took about 15 minutes and was carried out immediately after data collection using a questionnaire prepared beforehand. The mothers were asked about who spoke to the child and in what language, how frequently they travelled to Japan, whether the child went to the Japanese Supplementary School, if the child likes Japanese DVDs, books, video-games and so forth. The interview questionnaire is given in Appendix A. Both the data collection and the interview were conducted by the author.

Each child was tested individually in the living/family room. Siblings were not in the same room at the time of data collection. A warm-up time to get to know each other was held before the tasks. All the conversation between the examiner and the child was in Japanese. The whole elicitation took about twenty minutes per child. The procedure was recorded using two devices, a voice-recorder, Sony ICD-PX820 for audio recording and a camcorder, Canon A495 for audio and visual recording.

4.3. Part 1 – Picture selection

4.3.1. Methodology

The purpose of Part 1 of the study was to explore how children interpret the agent-patient relationship in the six clause types (A) - (F) in Table 13 (N1: the agent, N2: the patient).

Type A (SOV)	Canonical transitive	[N1-*ga*	N2-*o*	V]
Type B (SV)	Object ellipsis	[N1-*ga*		V]
Type C (OV)	Subject ellipsis	[	N2-*o*	V]
Type D (OSV)	Scrambling	[N2-*o*	N1-*ga*	V]
Type E (*wa*-*ga*)	Object topicalization	[N2-*wa*	N1-*ga*	V]
Type F (*ga*-*wa*)	Contrastive reading	[N1-*ga*	N2-*wa*	V]

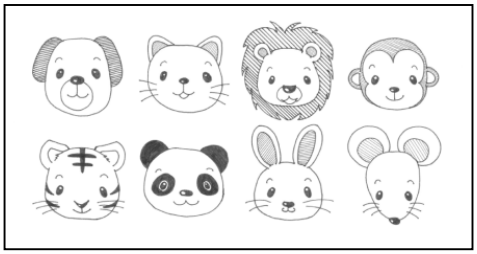
Table 13: The 6 types of stimulus sentence used in Part 1 of the data collection

The child was presented with two pictures where two animals were involved in the same actions but with the reversed roles in the second picture. The child was asked to select the picture out of the two that matched the clause the examiner read in Japanese.

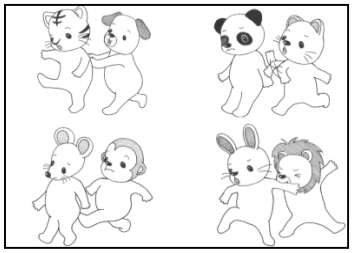
In the current study, the participants were not given any discourse context. There are two reasons for this. The first is that the children in this study were aged five and older. The studies introduced in Chapter 3 suggested that Japanese monolingual children aged five and older show over 90% accuracy in the comprehension tasks without the discourse context. The second is that the absence of a discourse context allows us to see more clearly whether or not the children use the case marking cue to interpret the agent-patient relationship. The noun followed by the nominative marker *-ga* is the agent; the noun followed by the accusative marker *-o* is the patient. In sentence types A, B and F, the first noun is the agent, but in sentence types C, D and E, the first noun is the patient. This means that word order is not always a reliable cue. Without the discourse context, the case particle is the only cue to tie target interpretation of sentence types C, D and E. The procedure following in the picture selection task is explained in more detail below.

Phase 1 – Familiarization

Prior to the experimental phase, the examiner made sure the child knew the Japanese terms for all the animals and actions that were used in the picture selection task. The eight animals shown in Figure 3-a – a dog, a cat, a lion, a monkey, a tiger, a panda, a rabbit and a mouse – were presented in a picture together, as were the four actions in Figure 3-b – *os* ‘push’, *tatak* ‘hit’, *ker* ‘kick’ and *kam* ‘bite’. These transitive verbs can take animate subjects and objects, and thus allow an exchange of roles. The protocol for familiarization is given in (45)-(48).



a. Eight animals



b. Four actions

Figure 3: The eight animals and four actions used in the picture selection task

(45) To confirm productive knowledge of the Japanese terms for the animals

Examiner: Kore-wa nan-desu-ka? (pointing at the dog in Figure 3-a)
this-TOP what-POL-Q
'What is this?'

Child: Inu.
dog
'A dog.'

Examiner: So desu-ne.
right POL-SFP
'That is right.'

(46) To confirm receptive knowledge of the Japanese terms for the animals

Examiner: Neko-wa dore-desu-ka?
cat-TOP which-POL-Q
'Which is the cat?'

Child: Kore. (pointing at the cat in Figure 3-a)
this
'This (is the cat).'

Examiner: So desu-ne.
right POL-SFP
'That is right.'

(47) To confirm productive knowledge of the Japanese terms for the actions

Examiner: Nani shi-teru-no? (pointing at 'pushing' in Figure 3-b)
what do-ASP-Q
'What is (this) doing?'

Child: (Inu-ga) (neko-o) osh-iteru.
dog-NOM cat-ACC push-ASP
'(The dog) is pushing (the cat).'

Examiner: So desu-ne.
right POL-SFP
'That is right.'

(48) To confirm receptive knowledge of the Japanese terms for the actions

Examiner: Ke-tteiru e-wa dore-desu-ka?
kick-ASP picture-TOP which-POL-Q
'Which is the picture of kicking?'

Child: Kore. (pointing at 'kicking' in Figure 3-b)
this
'This (is the picture of kicking).'

Examiner: So desu-ne.
right POL-SFP
'That is right.'

To ensure that the child had both receptive and productive knowledge of the Japanese terms for the animals and actions, (45) and (46) were repeated for each of the 8 animals, and (47) and (48) were repeated for each of the 4 verbs. All 34 children understood the animals and verbs. The examiner then introduced the picture selection task to the child as a guessing game.

Phase 2 – Practice

After the familiarization phase, the child was given the opportunity to practice the picture selection task. The examiner explained what the child was expected to do using the verbal instructions given in (49).

(49) Instruction

Examiner: *E-o ni-mai misemasu. Soshite totemo mijikai ohanashi-o shimasu.*
Yoku kiite, docchi-no e-no ohanashi ka kangaete kudasai.
Siiru-o totte, eranda e-no ue-ni hatte kudasai ne.

'I will show you two pictures and tell you a very short story.
Listen carefully and guess which picture the story is about.
Pick up the sticky note, and put it on the picture you choose.'

Next, the child was shown the two pictures given in Figure 4. In the left picture, a dog is running in a park, while in the right picture a dog is sleeping in a park. Then the examiner said the practice sentence shown in the protocol in (50). An intransitive verb

was used for practice so as not to bias the child's responses in the actual data collection phase. It was also to ensure the child could easily understand the task.

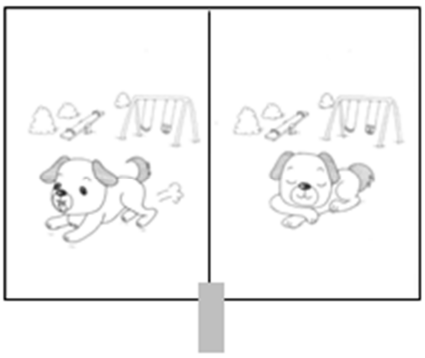


Figure 4: Pictures used for practice in the picture selection task

(50) Protocol for the practice sentence (intransitive)

Examiner:	Inu-ga	kooen-de	hashi-ttei-ru-yo.	Docchi kana?
	dog-NOM	park-in	run-ASP-PRES-SFP	which Q
	'A dog is running in a park. Which (picture is it)?'			
Child:	(the child puts a sticky note on the left picture.)			
Examiner:	yoku	deki-mashi-ta		
	Well	do-POL-PAST		
	'Well done!'			

The child was not given the correct answer even if s/he made a mistake. The examiner responded 'well done' no matter what the child's answer was. All the 34 children understood the instruction and succeeded in the practice without hesitation.

Phase 3 – Data collection

After the practice, the data collection was carried out. The procedure was recorded using audio and visual equipment. Each of the six types of transitive sentence in Table 14 was tested with each of the four verbs, *os* 'push', *tatak* 'hit', *ker* 'kick' and *kam* 'bite', and with different animal combinations. The order of the stimuli was always 'push' (A > B > C > D > E > F) > 'kick' (A > B > C > D > E > F) > 'hit' (A > B > C > D > E > F) >

'bite' (A > B > C > D > E > F) so that the conditions would be the same for all the children.

Types	Examples		
Type A (SOV) canonical	Raion-*ga*	usagi-*o*	os-itei-ru-yo
	lion-NOM	rabbit-ACC	push-ASP-PRES-SFP
	A lion is pushing a rabbit.		
Type B (SV) null object	Neko-*ga*	(nezumi)	os-itei-ru-yo
	cat-NOM	mouse	push-ASP-PRES-SFP
	A cat is pushing (a mouse).		
Type C (OV) null subject	(usagi)	inu-*o*	os-itei-ru-yo
	rabbit	dog-ACC	push-ASP-PRES-SFP
	(A rabbit) is pushing a dog.		
Type D (OSV) scrambling	Neko-*o*	saru-*ga*	os-itei-ru-yo
	cat-ACC	monkey-NOM	push-ASP-PRES-SFP
	A cat, a monkey is pushing.		
Type E (*wa-ga*) object topicalization	Inu-*wa*	tora-*ga*	os-itei-ru-yo
	dog-TOP	tiger-NOM	push-ASP-PRES-SFP
	As for a dog, a tiger is pushing.		
Type F (*ga-wa*) contrastive	Panda-*ga*	neko-*wa*	os-itei-ru-yo
	panda-NOM	cat-TOP	push-ASP-PRES-SFP
	A panda is pushing a cat.		

Table 14: Sentence types and examples using 'push' in the picture selection task

An example of the pictures used in the tasks is shown in Figure 5. The position of the target picture (right or left) was randomized for each stimulus sentence prior to the data collection, and then presented in the same position to all of the children. The combination of animals was also selected so that all of the animals appeared sometimes as agents and sometimes as patients. The pictures were put in the plastic pockets in a clear binder in the same order as the stimuli. The binder was put on the table in front of the child so that the child could easily put the sticky note on the picture that they selected. The examiner turned the pages.

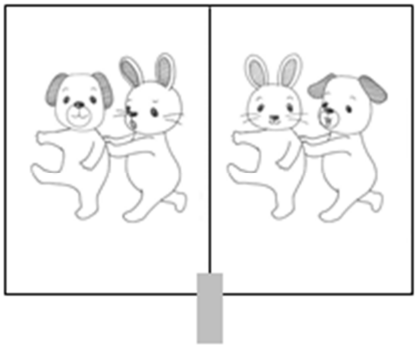


Figure 5: Example pictures used in the picture selection task

The examiner presented the stimulus sentences following the protocol exemplified in (51). After reading the stimulus, the examiner waited for the child's response by looking at the child until the child put the sticky note on one of the pictures. If the child did not respond for a while or looked bewildered, the examiner asked the child if s/he wanted to hear it again. The examiner repeated the sentence up to three times if the child asked. After the child selected one picture using the sticky note, the examiner responded with *yoku deki-mashi-ta* 'well done', regardless of whether the child had picked the appropriate picture or not. The examiner then turned the page and repeated the protocol. All the children responded to all stimuli and completed the picture selection tasks.

(51) Protocol for the test of Type C (OV) with the picture in Figure 5

Examiner:	Inu-o	oshi-tei-ru-yo.	Docchi kana?
	dog-ACC	push-ASP-PRES-SFP	which Q
	'(Someone) is pushing a dog.'		'Which (picture is it)?'
Child:	(the child puts a pink sticky note on the right picture.)		
Examiner:	yoku	deki-mashi-ta	
	well	do-POL-PAST	
	'Well done!'		

4.3.2. Predictions

In part 1 of the data collection, five predictions were made. Firstly, if the child interprets the agent and patient relationships on the basis of the word order, then, we would expect the child to misinterpret the first noun phrase in the object-initial

sentences (Type C, D, and E) as an agent but the child would correctly identify the agent in the subject-initial sentences (Type A, B, and F).

Secondly, if the child has acquired the knowledge of the *ga-o* contrast and makes use of the case marking cue, then, we would expect the child to interpret the first noun phrase in Type C (null subjects) correctly as a patient.

Thirdly, if the pre-requisite for the correct interpretation of Type D (scrambling) is not only the knowledge of the *ga-o* contrast but also the knowledge of the syntactic property of scrambling, then, we would expect that the child may misinterpret the first noun phrase in Type D (scrambling) as an agent even if the child correctly interpreted the Type C sentence.

Fourthly, if the pre-requisite for the correct interpretation of Type E (object topicalization) is not only the knowledge of the *ga-o* contrast but also the knowledge of the syntactic property of object topicalization including the *wa-ga* contrast, then, we would expect that the child may misinterpret Type E (object topicalization) even if the child correctly interpreted the Type C and Type D sentences.

Lastly, if the child has the same knowledge of the *ga-o* and *wa-ga* contrasts as adults, then, the child may still misinterpret Type F (contrastive) because, without the wider discourse context, full knowledge of additional functions of *-ga* may perplex the child.

4.3.3. Results

4.3.3.1. Overall results

The overall results are shown in Table 15. The order of average scores by decreasing accuracy is: A (SOV) 99.2% > B (SV) 96.8% > F (*ga-wa*) 93.5% > C (OV) 63.1% > D (OSV) 41.0% > E (*wa-ga*) 21.1%.

Age group (age range)	N	Type A (SOV)	Type B (SV)	Type C (OV)	Type D (OSV)	Type E (*wa-ga*)	Type F (*ga-wa*)
1 (4;11-5;11)	6	100.0 %	95.8%	58.3%	29.2%	8.3%	91.7%
2 (6;5-6;11)	5	95.0%	100.0 %	50.0%	45.0%	15.0%	90.0%
3 (7;0-7;11)	5	100.0 %	100.0 %	55.0%	30.0%	20.0%	95.0%
4 (8;1-8;9)	5	100.0 %	100.0 %	75.0%	50.0%	25.0%	100.0 %
5 (9;0-9;9)	8	100.0 %	100.0 %	75.0%	46.9%	28.1%	84.4%
6 (10;0-11;10)	5	100.0 %	85.0%	65.0%	45.0%	30.0%	100.0 %
total average	34	99.2%	96.8%	63.1%	41.0%	21.1%	93.5%

Table 15: The average score of each age group in picture selection

The results in Table 15 were converted into the six graphs in Figure 6. The graphs show the percentages of target interpretation in each sentence type for each age group. The horizontal axis of the graphs is age group. The vertical axis is percentage of the target response.

There is a sharp contrast between the upper three graphs and the lower three graphs in Figure 6. The first noun in the upper three graphs was the agent. Almost all the children show a very high proportion of target responses regardless of age. The average success rate for each age group was near 100% in Type A (SOV) and Type B (SV). Group 6, the oldest group, has an average of 85% in Type B, which is the lowest average among all the age groups. The total average is relatively lower for Type F (*ga-wa*) than Types A and B.

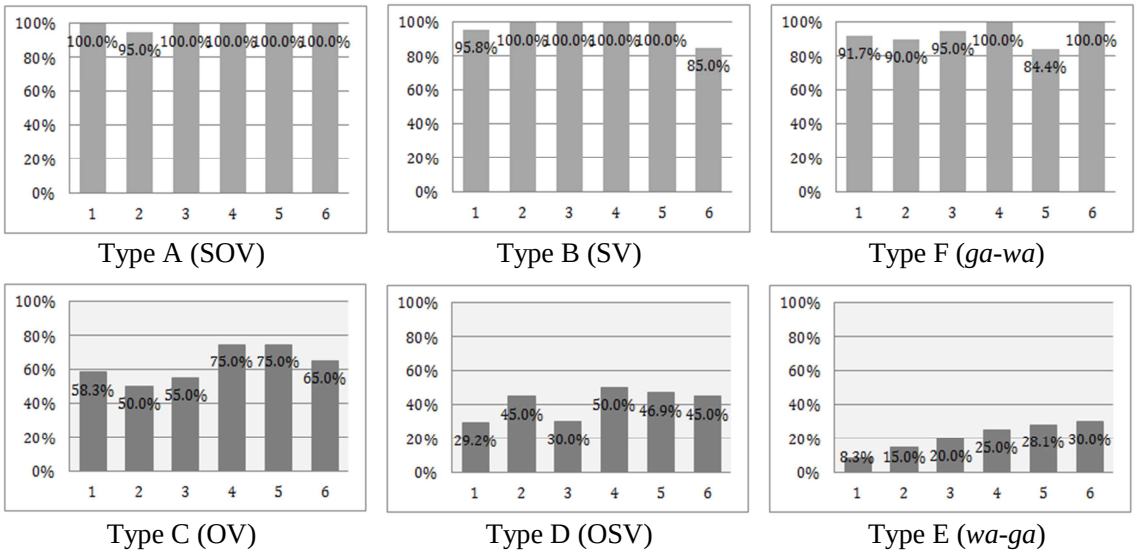


Figure 6: The graphs of the results for each sentence type in picture selection

In contrast with the upper three sentence types, the first noun in the sentence types in the lower three graphs was not the agent. The children's performance was worse, which suggests that children who failed in the object-initial sentence types (the lower three) relied on the word order cue rather than the case marker when interpreting the agent-patient relationship. We also see differences between the lower three graphs. The total averages were 63.1% for Type C, 41.0% for Type D, and 21.1% for Type E. It thus seems plausible to assume that children need to have acquired not only the knowledge of the nominative and accusative contrast but also some additional pre-requisites to correctly interpret scrambling (Type D) and object topicalization (Type E). Scrambling (Type D) seems more demanding than subject ellipsis (Type C), and object topicalization (Type E) seems more demanding than scrambling (Type D).

4.3.3.2. Effect of age

A logistic regression analysis was conducted to see the effect of age and gender on the probability of achieving the target interpretation. The model used was a generalized linear mixed-effects model in R, with gender and age as fixed effects, the verb as a random effect, and accuracy (1=target, 0=non-target) as the response variable for each sentence type. The results are shown in Figure 7 and Table 16. The figure shows

probability curves for each sentence type and the table shows the estimates and P-values. The analysis suggests a slightly significant effect of age on Type E (*wa-ga*), with older children more likely to interpret the sentence correctly. There was no significant effect of gender.

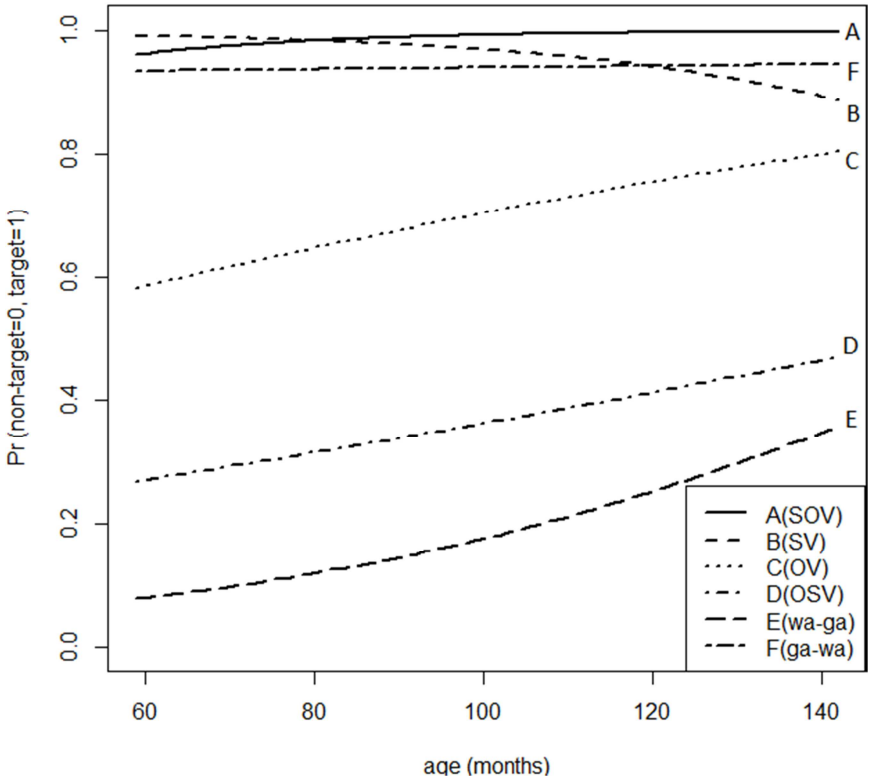


Figure 7: Age effect on the target interpretation in picture selection

	Age			Gender M	
	Estimate	Pr (>|z|)		Estimate	Pr (>|z|)
Type A (SOV)	0.043	0.40		17.030	1.00
Type B (SV)	-0.034	0.22		0.593	0.62
Type C (OV)	0.013	0.13		-0.567	0.13
Type D (OSV)	0.011	0.20		0.615	0.09
Type E (*wa-ga*)	0.023	0.03	*	0.601	0.17
Type F (*ga-wa*)	0.002	0.88		-0.515	0.43

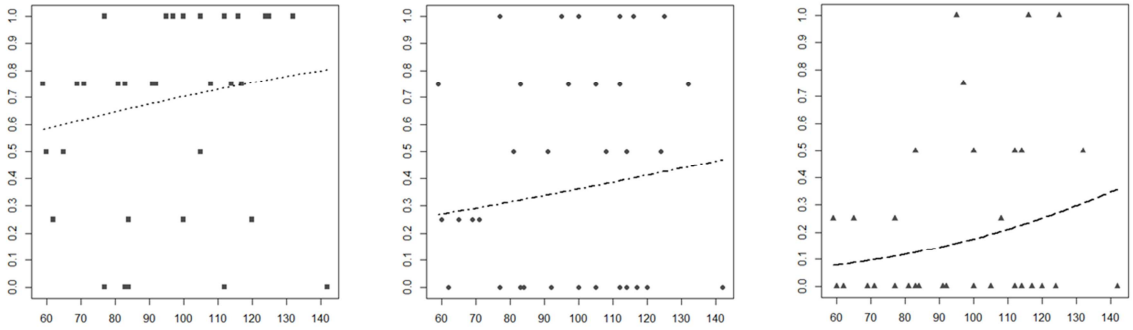
(Significance codes: *** p<0.001, ** p<0.01, * p<0.05)

Table 16: Effect estimates and P-values for the target interpretation

In Figure 7, we can see that the probabilities of achieving the target response in Types C, D and E increase with age, but it is not possible to predict whether or not the children in this study will attain adult-like knowledge of the case marking system in the future.

4.3.3.3. Individual variation

It is also important to note that there is considerable individual variation between the children. Some of the children selected the target picture 100% of the time for Types C, D and/or E, but some did not select the target picture at all. The three graphs in Figure 8 show individual success rates along with the probability curve for each sentence type. The horizontal axis of the graphs is age in months. The vertical axis is p-value and success rate for target response (1=target, 0=non-target). The markers plotted in the three figures indicate individual responses. Since each sentence type was tested four times with 4 different verbs, the success rates vary between 0 (no success), 0.25 (one success out of four), 0.5 (two out of four), 0.75 (three out of four), and 1 (all successful).



Type C (OV) Type D (OSV) Type E (*wa-ga*)

Figure 8: Probability and individual variation in sentence Types C, D, and E

We see a great deal of variation among individuals. Ten children selected the target pictures 100% of the time for Type C, six for Type D, and three for Type E. These children succeeded in selecting the agent in all the sentences with non-canonical word order, suggesting that they used the case marking cue in comprehension. In contrast, five children did not select the target pictures at all for Type C, 12 for Type D, and 18 for Type E. They consistently interpreted the first noun phrase as the agent, suggesting that they used the word order cue in comprehension.

Among the 34 children, there was only one child (a girl, 10;5) whose responses were all on target. A boy (7;11) misinterpreted only one Type F stimulus but got all target responses for the other sentence types. A girl (9;8) misinterpreted just three sentences that were all of Type F. All the responses from the individual children are given in Appendix B.

4.3.4. Discussion

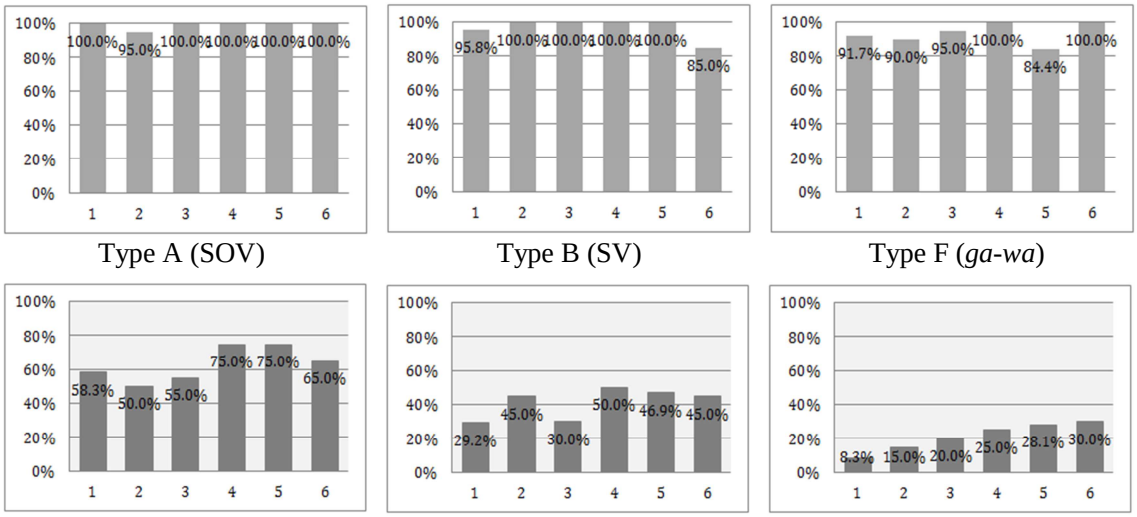
To compare the behaviour of the bilingually raised children in the current study with that of monolingual children, the results of relevant prior studies of monolingual acquisition are summarised in Table 17. All of the results presented here, except those for T. Ito's (1990) study, are based on a comprehension task involving transitive sentences where both the agent and patient were animate and no discourse context was provided. The data from T. Ito (1990) includes the results of a comprehension task with an inanimate argument.

Type	Ages	Success rate	Study	Method	Section
SOV	5 (mean 5;5)	96.4%	Sano 2004	act-out	3.2.4
	6 (mean 6;3)	94.3%	Sano 2004	act-out	3.2.4
	5;9-6;7	85.2%	Suzuki 2012	speeded picture selection	3.3.2
SV	5;6-6;5	94.2%	Suzuki 2007	picture selection	3.2.1
OV	5;6-6;5	90.0%	Suzuki 2007	picture selection	3.2.1
OSV	5 (mean 5;5)	74.1%	Sano 2004	act-out	3.2.4
	6 (mean 6;3)	75.0%	Sano 2004	act-out	3.2.4
	5;9-6;7	70.5%	Suzuki 2012	speeded picture selection	3.3.2
wa-ga	5 (mean 5;5)	57.2%	Sano 2004	act-out	3.2.4
	6 (mean 6;3)	61.1%	Sano 2004	act-out	3.2.4
	6 (mean 6;9)	*60.0%	T. Ito 1990	act-out	3.2.6
ga-wa	6 (mean 6;9)	*55.0%	T. Ito 1990	act-out	3.2.6

* data including [animate × inanimate] and vice versa

Table 17: Success rates of monolinguals extracted from previous studies

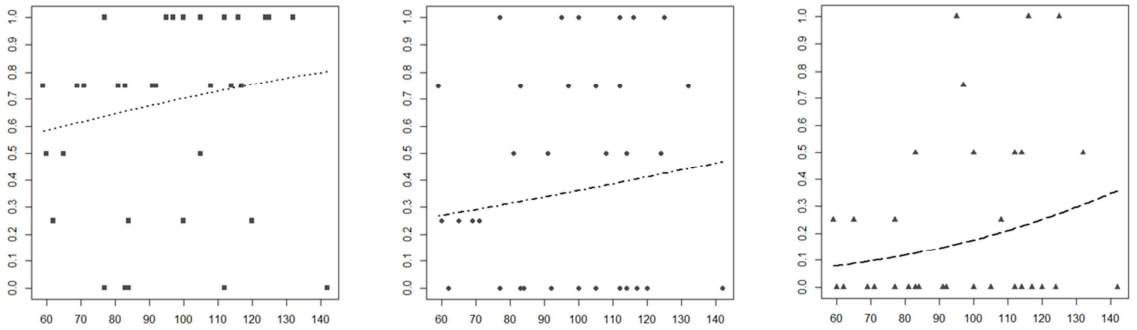
The results of the picture selection task in the current study (Figure 6 and Figure 8) are repeated on the next page as Figure 9 and Figure 10. In Figure 9, the horizontal axis is age group [1 (4;11-5;11), 2 (6;5-6;11), 3 (7;0-7;11), 4 (8;1-8;9), 5 (9;0-9;9), 6 (10;0-11;10)], and the vertical axis is percentage of the target response. In Figure 10, the horizontal axis is age in months. The vertical axis is p-value and success rate for target response [1=target, 0=non-target]. The age range in the previous studies in Table 17 is comparable with age group 1 and 2 in the current study. The differences between monolingual children in the previous studies and the bilingually raised children in the current studies are follows.



Type A (SOV) Type B (SV) Type F (*ga-wa*)

Type C (OV) Type D (OSV) Type E (*wa-ga*)

Figure 9: The graphs of the results for each sentence type (Figure 6)



Type C (OV) Type D (OSV) Type E (*wa-ga*)

Figure 10: Probability and individual variation in Types C, D, and E (Figure 8)

4.3.4.1. Type A (canonical SOV) and B (null objects SV)

Age groups 1 and 2 in the current study succeeded nearly 100% of the time for both Type A (canonical transitive SOV) and Type B (null objects SV), which is the same level as (and even slightly higher than) that exhibited by the monolinguals in the previous studies.

4.3.4.2. Type C (null subjects OV)

The success rates for Type C (null subjects OV) in age groups 1 and 2 in the current study were 58.3% and 50.0% respectively, whereas that reported for monolinguals was 90%. This indicates that monolinguals at five years and older were able to make use of the case marking cue like adult speakers of Japanese when they identified the agent in Type C (null subjects OV). In contrast, some of the children in the current study interpreted the agent and patient relationship based on the word order like monolingual children aged four years or younger. This suggests that some of the bilingually raised children in the current study were still at the transitional stage where they must change priority form the word order cue to the case marking cue (cf. Müller and Hulk, 2001).

However, as is shown in Figure 10, six children of age groups 1 and 2 achieve a success rate of 75% (3 out of 4) and higher for OV sentences, suggesting that these children behaved like Japanese monolingual children of the same age. In total, 11 children achieved 100% accuracy for this sentence type, whereas five children including one of the oldest age group interpreted the first noun phrase as the agent. There are big differences among individuals in the current study.

4.3.4.3. Type D (scrambled OSV)

The success rates for Type D (scrambled OSV) in age groups 1 and 2 in the current study, which were 29.2% and 45% respectively, were much lower than those for monolinguals of the same age, which was over 70%. We also notice that the differences between Type D (scrambled OSV) and Type C (null subjects OV) were much bigger for the children in the current study than for the monolingual children in previous studies. Type D (scrambled OSV) seems more difficult to process than Type C (null subjects OV) for monolinguals as well but even more so for the bilingually raised children in the current study. Recall Kang's (2005) study of the comprehension of OV and OSV in Korean monolingual children (section 3.2.3). The results shown in Table 2 are repeated here as Table 18.

		OSV (Scrambling)	
		pass	fail
OV (null subject)	pass	15	1
	fail	0	9

Table 18: The results of Kang (2005) (Table 2)

Fifteen Korean monolingual children who passed the OV tests also passed the scrambling tests. The nine children who failed in the OV tests also failed in scrambling. There was only one child who passed in OV but failed in OSV (the grey cell in Table 18), and there was none who passed the OSV tests but failed the OV tests.

The corresponding matrix for the children in the current study is shown in Table 19. When the child's interpretation was on target 75% and more of the time in the same sentence type tests, the child was counted as gaining a 'pass' in the tests, with a success rate of 50% or less counted as a 'fail'.

		OSV	
		pass	fail
OV	pass	11	11
	fail	1	11

Table 19: OV versus OSV matrix for the children in the current study

There were 22 children whose response was on target 75% and more of the time in the Type C (OV) tests. Of those who were counted as achieving a 'pass' in the OV tests, 11 children also correctly interpreted the first noun phrase as the patient in the Type D (OSV) tests 75% and more of the time, while 11 children's response was on target only 50% or less of the time (the grey cell in Table 19). This number is extremely high compared to the results reported by Kang (2005). In contrast to Kang's (2005) study, the results in Table 19 provide evidence to support the idea that scrambling is more demanding to process than null subjects when a child seems to have knowledge of the contrast between subject and object case markers.

As discussed in 3.3.1 and 3.3.2, there are arguably structural differences between null subject sentences and scrambling. In the construction of null subject sentences, the empty element in the subject position is considered to be a pronoun, with no gap and no

movement, according to Rizzi (1986). That means that, although the subject of the OV sentence is not pronounced, the linear order of the constituents does not change. Therefore, the knowledge of the case marker is the only requisite for the target interpretation. In the construction of clause-internal OSV scrambling, on the other hand, the object either undergoes A-movement or A'-movement (Mahajan, 1990; Miyagawa, 2003). There is a gap in the object position, which can be argued to take longer to process (filler-gap dependency, Suzuki, 2012). Monolingual children parse the gap in the scrambled sentence, and then retrieve the filler that is the first noun in the sentence to interpret the gap (Suzuki, 2012). The interpretation process of scrambling is thus more complex than the interpretation of the OV sentence. These differences appear to affect bilingually raised children in the current study more markedly than monolinguals.

However, again, there is a great deal of variation between individuals, as can be seen in Figure 10 – Type D. On the one hand, six children (the youngest of whom was six years and five months old) showed 100% accuracy for OSV. On the other hand, 13 children did not succeed in selecting the target picture at all for this sentence type.

4.3.4.4. Type E (object topicalization wa-ga)

For the Type E (object topicalization) tasks, groups 1 and 2 in the current study responded on target only 8.3% and 15% of the time respectively, which was quite considerably lower than monolinguals of the same age, who achieved about 60% accuracy. The results of the current study and Sano (2004) also indicate that not only bilingually raised children but also monolingual children have greater difficulties with the comprehension of Type E (object topicalization) than Type D (scrambling).

As discussed in 3.3.3, object topicalization arguably involves the same kind of movement as scrambling (Neeleman et al., 2009; Vermeulen, 2008). However, in the Type D scrambled sentence, both arguments are clearly case marked, whereas, in object topicalization, the accusative particle on the topicalized noun phrase is replaced by the topic marker. The topic marker itself does not indicate the grammatical relation of the noun phrase. The child therefore cannot identify the role of the first noun phrase until

s/he comes across the nominative particle following the second noun phrase. After that, s/he also finds a gap and then the filler is reactivated. In view of the complexity of this process, it is not surprizing that object topicalization seemed to be more difficult to process than a scrambled sentence even for children who have acquired the *ga-o* contrast and are able to identify the roles of the argument(s) in Type C (OV) and Type D (OSV) using the case marking cue.

Again however, it is important to note the individual variation. As shown in Figure 10 – Type E, 21 children could not identify the agent in the *wa-ga* object topicalization sentences at all, while three children aged 7;11, 9;8, and 10;5 showed 100% accuracy. These three children behaved like adult native speakers of Japanese for this task.

4.3.4.5. Type F (contrastive ga-wa)

Almost all the bilingually raised children in the current study showed 100% accuracy in interpreting the contrastive *ga-wa* sentences. There were only six children who misinterpreted the first noun in Type F as the patient. These six children's performance is shown in Table 20.

Age	Type A	Type B	Type C	Type D	Type E	Type F
5;5	100%	100%	50%	25%	25%	75%
6;5	75%	100%	100%	0%	0%	75%
6;11	100%	100%	75%	75%	50%	75%
7;11	100%	100%	100%	100%	100%	75%
9;6	100%	100%	75%	50%	50%	50%
9;8	100%	100%	100%	100%	100%	25%

Table 20: Performance of the six children who made errors in Type F

Two children aged 7;11 and 9;8 achieved 100% accuracy for Types A – E, suggesting that even though they were able to apply the knowledge of the case marking system in interpreting various types of transitive sentence, they still misinterpreted the Type F sentence. The child aged 7;11 made one error, and the child aged 9;8 made three errors. They were two of the only three children who scored 100% for all the

object-initial sentence tasks: another child aged 10;5 scored 100% for all six types. Even considering that the picture selection task is a binary choice and 50% of chance must be taken into account, it is hard to think that these two children's errors in Type F would be accidental. These two children actually asked me to repeat the stimulus sentence.

Although there is no comparable data from monolingual children for Type F, The results in T. Ito (1990) and Hatano (1979) discussed in 3.2.6 and 3.2.7 are suggestive. The adults in T. Ito (1990) showed inconsistent behaviour in the comprehension task for the contrastive sentence (cf. Table 4). They appeared not to rely on the case cue in all instances. However, we have to take into account the fact that the tested sentences in T. Ito included inanimate arguments. Monolingual children in the oldest age group (age 6 and 7) in Hatano (1979) misused *-ga* and *-wa* more frequently than the younger age groups (cf. Table 8 and Table 10). When *-wa* and *-ga* are both presented in a sentence, the case marking cue alone does not seem very useful for adult speakers of Japanese without other cues such as the discourse context in spite of the fact that the nominative *-ga* always marks the agent in Type F. This appears to be because adult speakers have full knowledge of additional functions of- *ga*, such as exhaustive listing. In this sense, it might be possible to say that the two children aged 7;11 and 9;8 in Table 20 have the same knowledge as adult in terms of the *ga-o* and the *ga-wa* contrast.

4.3.5. Summary of part 1- picture selection

In 4.3.2, five predictions were made. The first prediction was that if the child interprets the agent and patient relationships on the basis of the word order, the child would misinterpret the first noun phrase in the object-initial sentences (Type C, D, and E) as an agent but the child would be able to identify the agent in the subject-initial sentences (Type A, B, and F). The results indeed showed a sharp contrast between the subject-initial sentences (Type A, B, and F) and the object-initial sentences (Type C, D, and E), suggesting that the children who could not correctly identify the agent in the object-initial sentences used word order rather than case marking as a cue for agent-patient relationship. Thus, even when a child shows high accuracy in the

comprehension of subject-initial sentences, this cannot be seen as evidence that they have acquired knowledge of the nominative case particle *-ga*. We cannot actually tell whether they interpret the sentences by the case marker or the word order.

The second prediction was that if the child has acquired the *ga-o* contrast and makes use of the case marking cue, then, we would expect the child to interpret the first noun in Type C (null subjects) correctly as a patient. The results showed a total average score of 63% for target interpretation of this sentence type. The children who successfully interpreted Type C appear to have acquired the *ga-o* contrast because the accusative marker following the first noun phrase was the only available cue. The average scores were lower than for five and six year-old monolingual children (90%). Considering that monolingual children aged four and younger also interpret the agent and patient relationship based on the word order (Sano, 2004; Suzuki, 2007), it seems that some of the bilingually raised children in the current study have remained at the transitional stage longer than monolinguals (cf. Müller and Hulk, 2001).

The third prediction was that if the pre-requisite for the correct interpretation of Type D (scrambling) is not only the knowledge of the *ga-o* contrast but also the knowledge of the syntactic properties of scrambling, then, we would expect that a child may misinterpret Type D (scrambling) even after the child has acquired the *ga-o* contrast. The results showed a total average score of 41% for target interpretation of OSV scrambling, which was lower than 63% for OV null subject sentences. The score was also much lower than that for monolinguals (approximately 70%). The current study yielded more compelling evidence than Kang's (2005) study of Korean monolingual, that OSV scrambling is more demanding to process than OV null subject sentences.

The fourth prediction was that if the pre-requisite for the correct interpretation of Type E (object topicalization) is not only the knowledge of the *ga-o* contrast but also the knowledge of the syntactic properties of object topicalization including the *wa-ga* contrast, then, we would expect that a child may misinterpret Type E (object topicalization) even after the child has acquired the *ga-o* contrast and scrambling. The

results showed 21% total average scores for target interpretation of object topicalization, which was lower than the 41% total average score for Type D (scrambling). The score was also considerably lower than that reported for monolinguals (who scored around 60%). This indicates that object topicalization is more demanding to process than scrambling especially for the children in the current study.

The fifth prediction was that if a child had the same knowledge of the *ga-o* and the *wa-ga* contrast as adults, then the child may still misinterpret Type F (contrastive) sentence. In keeping with this prediction, two children who seemed to have acquired both the *ga-o* and the *ga-wa* contrast and could apply the knowledge in the interpretation of both the subject-initial and object-initial sentences, nevertheless made errors in the Type F tasks.

The statistical analysis did not show a significant effect of age on the probability of the target interpretation for any of the sentence types except Type E. However, there was a great deal of individual variation in the responses to the object-initial sentences. On the one hand, some children correctly identified the agent like monolingual children of the same age. They appeared to have acquired the target grammar. On the other hand, there were children in all age groups who consistently failed to select the target pictures for the object-initial sentence types. Some of these children seemed considerably delayed. The question is what causes such individual variation between individuals. We will come back to this point in Chapter 5.

4.4. Part 2 – Elicited imitation

4.4.1. Methodology

The purpose of the second part of the study was to explore the children's knowledge of the use of the topic marker *-wa* and the nominative marker *-ga* in the different sentence types listed in Table 21.

Type G	The topic-comment construction	[topic-*wa* subject-*ga* PRED]
Type H	Non-canonical object case	[subject-*wa* object-*ga suki* 'like']
Type J	New information	[subject-*ga* PRED]
Type K	Anaphoric or generic use	[subject-*wa* PRED]

Table 21: The 4 types of stimulus sentences used in Part 2 of the data collection

As mentioned in sections 3.1 and 3.2.7, the nominative marker -*ga* is linked to exhaustive listing, new information, and thetic judgment, and the topic marker -*wa* is associated with topic, contrastive reading, old information, and categorical judgment. Type G tests the knowledge of -*wa* and -*ga* used in the topic-comment construction. Type H tests the knowledge of the non-canonical transitive case frame. Type J tests the use of -*ga* that marks a noun phrase describing new information, and Type K tests the knowledge of -*wa* that marks an anaphoric or generic noun phrase in contexts other than the topic-comment construction.

The 34 children who participated in Part 1 of this study participated in Part 2 of this study as well. Part 2 took place immediately after Part 1, and all the children completed all the tasks. In contrast to part 1, the methodology used in this second part of the study was elicited imitation.

Elicited imitation is used as a means of assessing the child's syntactic knowledge. It allows us to examine whether or not the child has grammatical knowledge of a certain structure on the assumption that a child will not be able to imitate a structure that is not part of his/her grammatical competence. The imitation task requires the child to reconstruct the stimulus, and thus reveals the child's analysis of the structure (Lust, Flynn, & Foley, 1996).

The protocol used for the current study is an adaptation of Hatano's (1979) immediate imitation of the topic-comment construction and other stimuli testing the understanding of the pragmatics of -*wa* and -*ga*. In Hatano's study, the children were asked to repeat the recorded sentence immediately after hearing the voice recording, and were asked to fill in any particles obscured by a noise when repeating the sentence.

Pilot study 1

In preparation for Part 2 of the data collection, a pilot study was conducted to explore the best method of eliciting children's grammatical knowledge of the *wa-ga* contrast. In Hatano (1979), the child was informed that the target particle was masked with a distinct noise. Hatano masked the particle based on the assumption that, even if the child had not acquired the *wa-ga* contrast, s/he would have no problem in imitating a particle overtly realized in the stimulus if s/he already had -*wa* and -*ga* in her/his grammar. The tasks were to listen to the stimulus, find a gap, decide what should be in the gap, then repeat the stimulus sentence with the appropriate particles filled in where they heard a noise. The experimental design seemed very complicated and demanding for children to process.

However, there might be another possible way to assess a child's grammatical knowledge without informing the child about the gap, if the target particle in the sound stimulus could be replaced with natural and obscure sound. This method may make it possible to elicit the child's implicit knowledge without placing a load on the child.

The pilot study was conducted to test whether this latter method was superior to the Hatano's method. Eight children whose parents were both Japanese participated in the pilot study. The pilot study was consisted of two parts. In the first part of the study, the target particles in the sound stimuli were clipped and the gap was refilled with a natural but obscure [ə] sound. The children were not informed about the gap, but were simply asked to repeat the sentence. In the second part of the study, the target particles in the sound stimuli were masked with brown noise generated with the help of the audio software Audacity. The children were informed about the gap and were asked to repeat the sentence and fill the gap with the particle of their choice.

The results suggested that Hatano's method was a better way to access children's grammatical knowledge. When the children were not informed about the gap, they repeated the stimulus sentence precisely as they heard it. That is, they did not fill the place where the particle was replaced with an obscure sound. However, once the

children were informed about the gap, some children changed their response by filling in the particles based on their grammatical knowledge. All the response patterns are given in Appendix C. After the data collection, some children told me that they had noticed the obscure sound and deliberately left the gap unfilled in the first part of the study because the instruction was just to repeat the sentence. In view of the results of the pilot study, Hatano's method was adopted for part 2 of the current study.

Pilot study 2

When I started the data collection, the elicited imitation task yielded some rather unexpected results. Some of the children's response patterns did not match any of the responses reported by Hatano (1979). To see whether the results reported by Hatano (1979) were supported by another group of young monolingual children, comparative data were collected from six monolingual children in Japan, following exactly the same method and procedure as used with the bilingually raised children in the current study. The results of this second pilot study are reported in 4.4.4.2.

In what follows, the procedure of the elicited imitation tasks is explained in detail.

Phase 1 – Practice

At the beginning of part 2 of the study, the examiner explained what the child was expected to do. The initial instruction was given in Japanese as shown in (52).

(52) Initial instruction

Examiner: *Imakara e-o misemasu. Konpuuta-kara onnanohito-no koe-ga kikoemasu. Sono koe-wa sono e-no ohanashi-o shimasu. Totemo mijikai ohanashi desu.Kikiowattara koe-no toori-ni mane-o shite kudasai. Tochuude kono oto-ga kikoetara* (the brown noise was played) *nani-ga kakurete iruka kangaete, tadashiku naruyooni kotoba-o umete mane-o shite kudasai ne.*

'I will show you a picture. You will hear a woman's voice from the computer. It will tell you a very short story about the picture. Please tell me the story back exactly the way the recording says it. Where you hear a noise like this (the brown noise was played), guess what is missing and fill the gap to make the sentence complete.'

The sentences used for practice are shown in (53). The two particles *-wa* and *-ga* were not used for practice in order not to bias the child's responses in the actual data collection phase. The sound stimulus was presented along with the picture in Figure 11.

(53) Practice

a. Isu(-ni) suwaru
chair(-DAT) sit
'(A woman) sit(s) on a chair.'

b. Jitensha(-o) kogu
bicycle(-ACC) ride
'(A man) ride(s) on a bicycle.'

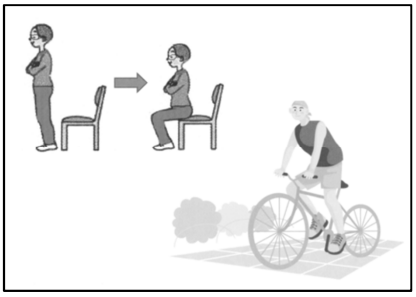


Figure 11: The picture used for practice in part 2 – elicited imitation

The stimulus sentences were pre-recorded with brown noise over the particles in parentheses. The sentences were read clearly and deliberately by an adult female native Japanese speaker. The brown noise was generated with the help of the audio software Audacity to be the same length and amplitude as the particle read by the native Japanese speaker. Audacity was also used for mixing the noise and the pre-recorded narration. The computer software Praat fetched and stored the sound stimuli in a notebook computer, and those stimuli were played with the notebook computer in the data collection.

The examiner presented the picture and played the stimulus sentence following the protocol in (54).

(54) Protocol for the practice and the whole of the second part of the study

Examiner: (while pointing to the picture of the woman)
Kono e-o mite, koe-ga kikoe-tara mane shite-ne.
This picture-ACC look voice-NOM hear-when imitate do-SFP
'Please look at this picture and repeat the sentence after you hear it.'

(The examiner then played the sound stimulus in (53)-a.)

Sound stimulus: Isu (NOISE) suwaru
chair (NOISE) sit
'(A woman) sit(s) on a chair.

Child: Isu-ni suwaru
chair-DAT sit
'(A woman) sit(s) on a chair.

Examiner: yoku deki-mashi-ta
Well do-POL-PAST
'Well done!'

The sound stimulus was played once. After playing the stimulus, the examiner waited for the child's response by looking at the child until the child repeated the sentence. If the child did not respond, the examiner asked, 'Do you want me to play it again?' The recording was repeated up to three times. When the child finished, the examiner said 'Very good' or 'Well done' regardless of the response. Then, the practice was repeated using the sentence (53)-b. All the children completed the practices for both sentences.

Phase 2 – Data collection

Immediately after the practice phase, the data collection was carried out following the protocol in (54). The stimuli and the pictures used in this part of the experiment are shown in Table 22. The procedure was recorded using audio and visual equipment.

There were three stimuli to each picture. The pictures were put in plastic pockets in a clear binder in the same order as the stimuli. The binder was put on the table in front of the child. The examiner then pointed to the elephant in the first picture, for example, and asked the child to look at it before playing stimulus G-a. After G-a, the

examiner pointed to the giraffe and asked the child to look at it before playing stimulus G-b. The examiner turned the pages after G-c was finished.

The order of the stimuli was as shown in Table 22 for all the children. Stimuli a, b, c, g, h and j were adopted from Hatano (1979). Stimuli d, e and f were generated for the current study. All the children responded to all the stimuli in the tasks.

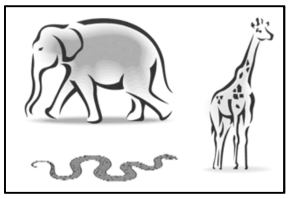
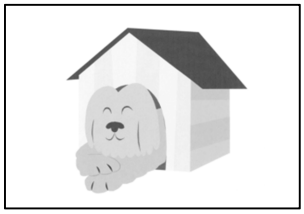
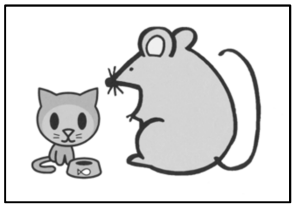
Type	Stimulus sentence	Picture
G a	Zo(-wa) hana-ga nagai elephant-TOP nose-NOM long 'As for an elephant, the trunk is long.'	
G b	Kirin-wa kubi(-ga) nagai giraffe-TOP neck-NOM long 'As for a giraffe, the neck is long.'	
G c	Hebi(-wa) karada(-ga) nagai snake-TOP body-NOM long 'As for a snake, the body is long.'	
J d	Inu(-ga) ouchi-de ne-tei-masu dog-NOM house-at lie-ASP-POL 'A dog is lying in a house.'	
K e	Inu-no namae(-wa) Koro desu dog-GEN name-TOP koro POL The dog's name is Koro.	
K f H	Koro(-wa) neruno(-ga) dai-suki desu koro-TOP lying-NOM very-like POL 'Koro likes lying very much.'	
K g	Kono e-wa sukoshi hen desu-ne this picture-TOP a.bit strange POL-SFP This picture looks a bit strange.	
J h	Neko yori ookii nezumi(-ga) i-masu cat than big mouse-NOM exist-POL 'There is a mouse that is bigger than a cat.'	
K j	Hutuu neko yori ookii nezumi(-wa) i-mas-en generally cat than big mouse-TOP exist-POL-NEG 'Generally, there is no mouse that is bigger than a cat.'	

Table 22: Stimulus sentences and pictures for part 2 – elicited imitation

4.4.2. Predictions

In Part 2 of the current study, the following predictions were made. Firstly, if the child has no knowledge of the nominative *-ga* and the topic *-wa*, then we would expect him/her to reproduce the sentence without the particle for both the masked and unmasked stimulus. This expectation comes both from the assumption that the child will not imitate a particular structure that they do not use spontaneously (Bloom, Hood, & Lightbown, 1974), and from the results in Hatano's (1979) study. Many young monolingual children in Hatano's study dropped a particle for both the masked and unmasked stimulus. The children in the current study might use a different particle in the case of the masked stimulus, since they would be explicitly asked to fill in the gap when they hear a noise. However, young monolinguals tended to leave the gap unfilled rather than using a different particle.

Secondly, if the child occasionally uses the nominative and the topic particles in his/her speech but has not acquired the target knowledge in terms of the *wa-ga* contrast, then we would expect him/her to use *-wa* and *-ga* inconsistently when repeating the masked stimulus but to succeed when repeating the unmasked stimulus. Some monolingual children in Hatano's study misused *-wa* and *-ga* for the masked stimulus, while they succeeded in reproducing a complete sentence for the unmasked stimulus.

Thirdly, if the child has acquired the *wa-ga* contrast, we would expect him/her to reproduce the stimulus sentence correctly with both the masked and unmasked stimulus.

4.4.3. Results

4.4.3.1. Overall results

The overall results for the elicited imitation task and the total average success rates for each stimulus are shown in Table 23 and Table 24 respectively.

Age Group (Age range)	N	G [*wa*]			G [*ga*]			H [*ga*]	J [*ga*]		K [*wa*]			
		(a1)	b1	(c1)	a2	(b2)	(c2)	(f2)	(d)	(h)	(e)	(f1)	g	(j)
1 (4;11-5;11)	6	33.3%	50.0%	16.7%	100%	33.3%	50.0%	16.7%	0.0%	16.7%	33.3%	33.3%	83.3%	66.7%
2 (6;5-6;11)	5	40.0%	60.0%	20.0%	100%	80.0%	40.0%	40.0%	0.0%	60.0%	100%	60.0%	80.0%	40.0%
3 (7;0-7;11)	5	60.0%	60.0%	40.0%	100%	80.0%	60.0%	60.0%	60.0%	80.0%	80.0%	100%	100%	80.0%
4 (8;1-8;9)	5	20.0%	80.0%	20.0%	100%	60.0%	60.0%	60.0%	60.0%	60.0%	100%	100%	100%	40.0%
5 (9;0-9;9)	8	12.5%	62.5%	37.5%	100%	87.5%	100%	75.0%	50.0%	100%	87.5%	87.5%	100%	75.0%
6 (10;0-11;10)	5	40.0%	60.0%	40.0%	100%	80.0%	60.0%	80.0%	40.0%	60.0%	80.0%	100%	80.0%	60.0%
Total average	34	34.3%	62.1%	29.0%	100%	70.1%	61.7%	55.3%	35.0%	62.8%	80.1%	80.1%	90.6%	60.3%

Table 23: The average score of each age group in elicited imitation

The percentages in Tables 23 and 24 indicate the proportion of the target response for each particle in each of the sentence types. The parentheses in the column headings indicate particles that were masked.

For the purpose of the analysis, the particles were divided into the four types of uses outlined in Table 24. The particle is numbered when there are two particles in one stimulus, for example, the first particle in G-a -*wa* is a1 and the second particle in G-a -*ga* is a2 as shown in Table 24. The particles in parentheses were masked: the other particles were unmasked.

Type G	The used of *-wa* and *-ga* in the topic-comment construction	Total average
a1: (*-wa*)	Zo(-wa) hana-ga nagai elephant-TOP nose-NOM long 'As for an elephant, the trunk is long.'	34.3%
b1: *-wa*	Kirin-wa kubi(-ga) nagai giaff-TOP neck-NOM long 'As for a giraffe, the neck is long.'	62.1%
c1: (*-wa*)	Hebi(-wa) karada(-ga) nagai snake-TOP body-NOM long 'As for a snake, the body is long.'	29.0%
a2: *-ga*	Zo(-wa) hana-ga nagai	100%
b2: (*-ga*)	Kirin-wa kubi(-ga) nagai	70.1%
c2: (*-ga*)	Hebi(-wa) karada(-ga) nagai	61.7%
Type H	The use of *-ga* as a non-canonical object marker	
f2: (*-ga*)	Koro(-wa) neruno(-ga) dai-suki desu koro-TOP lying-NOM very-like POL 'Koro likes lying very much.'	55.3%
Type J	The use of *-ga* in contexts other than the topic-comment construction	
d: (*-ga*)	[new information in contexts other than the existential frame] Inu(-ga) ouchi-de ne-tei-masu dog-NOM house-at lie-ASP-POL 'A dog is lying in a house.'	35.0%
h: (*-ga*)	[new information in the existential frame] Neko yori ookii nezumi(-ga) i-masu cat than big mouse-NOM exist-POL 'There is a mouse that is bigger than a cat.'	62.8%
Type K	The use of *-wa* in contexts other than the topic-comment construction	
e: (*-wa*)	[anaphoric] Inu-no namae(-wa) Koro desu dog-GEN name-TOP koro POL The dog's name is Koro	80.1%
f1: (*-wa*)	[a non-canonical subject marker] Koro(-wa) neruno(-ga) dai-suki desu	80.1%
g: *-wa*	[anaphoric] Kono e-wa sukoshi hen desu-ne this picture-TOP a.bit strange POL-SFP This picture looks a bit strange.	90.6%
j: (*-wa*)	[generic] Hutuu neko yori ookii nezumi(-wa) i-mas-en generally cat than big mouse-TOP exist-POL-NEG 'Generally, there is no mouse that is bigger than a cat.'	60.3%

Table 24: The total average success rates for each stimulus

The relative order of the average score is G-a2 (100%) > K-g (90.6%) > K-e, f1 (80.1%) > G-b2 (70.1%) > J-h (62.8%) > G-b1 (62.1%) > G-c2 (61.7%) > K-j (60.3%) > H-f2 (55.3%) > J-d (35%) > G-a1 (34.3%) > G-c1 (29%).

We notice a big difference between the highest (G-a2, 100%) and the lowest (G-c1, 29%). There were three particles that were not masked; G-b1, G-a2, and K-g. However, the average score for G-b1 (62.1%) was not very high compared to G-a2 (100%) and K-g (90.6%).

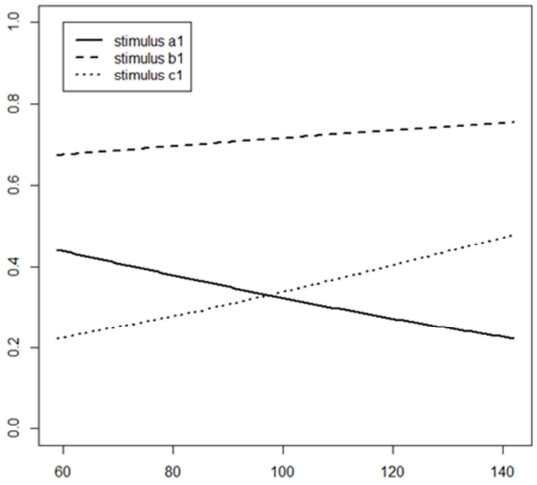
When we look closely at the results for Type G (the topic – comment construction) in (55), which was extracted from Table 24, we see that many children's responses were not on target for the first particle in these sentences. When the second particle was masked, some children also responded with non-target patterns.

(55) The average scores for Type G stimuli

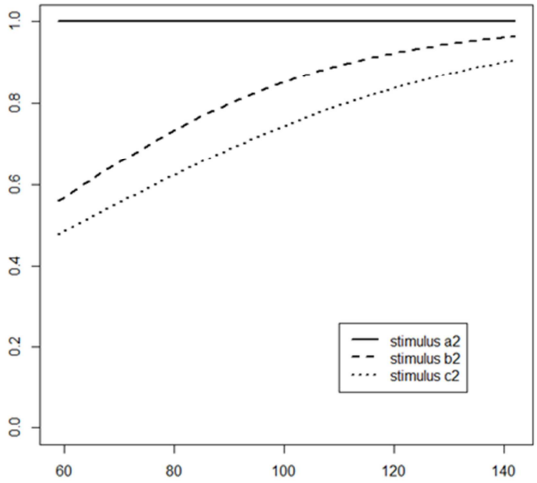
a.	G-(a1)	34.3%,	G-a2	100%	stimulus; Zo(-wa) hana-ga nagai.
b.	G-b1	62.1%,	G-(b2)	70.1%	stimulus; Kirin-wa kubi(-ga) nagai.
c.	G-(c1)	29.0%,	G-(c2)	61.7%	stimulus; Hebi(-wa) karada(-ga) nagai.

4.4.3.2. Effect of age

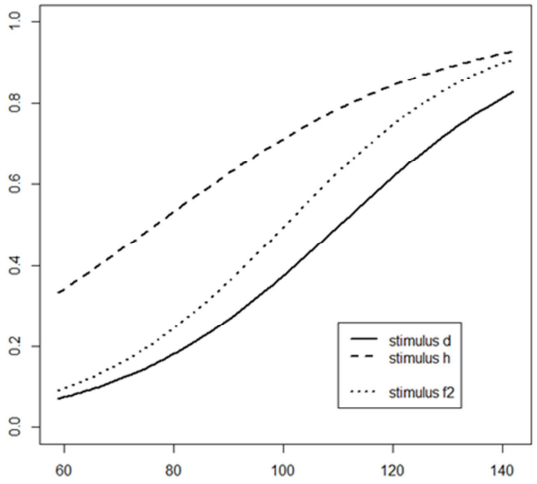
A logistic regression analysis was conducted to see the effect of age and gender on the probability of the target production. The model used was a generalised linear model in R, with accuracy (1=target, 0=non-target) as the response variable for each stimulus, and gender and age as explanatory variables. The results are shown in the four graphs in Figure 12, and Table 25. The figure shows probability curves for each particle in each sentence type and the table shows the estimates and P-values.



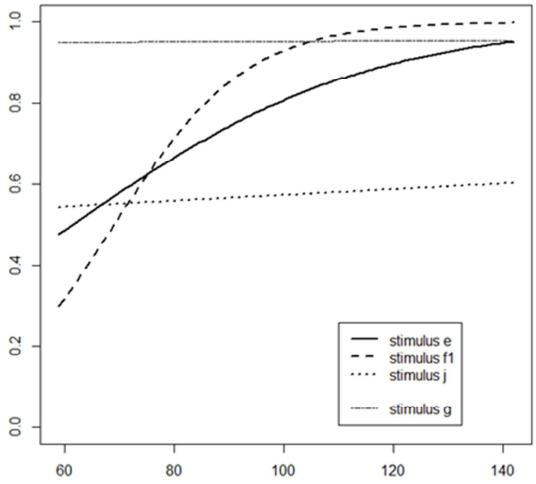
Type G [*wa*]
[the topic-comment construction]



Type G [*ga*]
[the topic-comment construction]



Type H [*ga* for non-canonical object case]
Type J [*ga* for new information]



Type K [*wa* for generic and anaphoric use]

Figure 12: Age effect on the target response in elicited imitation

Type	Age			Gender M	
	Estimate	Pr (>|z|)		Estimate	Pr (>|z|)
G-a1 [*wa*]	-0.012	0.478		-0.140	0.855
G-b1 [*wa*]	0.005	0.779		-1.065	0.149
G-c1 [*wa*]	0.014	0.432		-0.491	0.545
G-a2 [*ga*]	-4.18E-09	1.000		-2.46E-08	1.000
G-b2 [*ga*]	0.037	0.078		-1.393	0.099
G-c2 [*ga*]	0.028	0.123		-0.772	0.314
H-f2 [*ga*]	0.055	0.014	*	1.312	0.135
J-d [*ga*]	0.050	0.022	*	-0.230	0.782
J-h [*ga*]	0.039	0.044	*	-0.182	0.817
K-e [*wa*]	0.037	0.096		0.620	0.519
K-f1 [*wa*]	0.084	0.013	*	-0.374	0.719
K-g [*wa*]	0.001	0.963		-1.289	0.315
K-j [*wa*]	0.003	0.858		0.529	0.479

(Significance codes: *** p<0.001, ** p<0.01, * p<0.05)

Table 25: Effect estimates and P-values on the target production

There was no effect of gender. Age appears to have a significant effect on the likelihood of a target response to Type H-f2 [*ga*] (p<0.05), Type J-d [*ga*] (p<0.05), Type J-h [*ga*] (p<0.05), and Type K-f1 [*wa*] (p<0.05). The particle combination of Type H-f2 [*ga*] and Type K-f1 [*wa*] builds the non-canonical transitive case frame [S-*wa* O-*ga suki* 'like']. Type J-d [*ga*] and Type J-h [*ga*] are used to mark a noun phrase describing new information in contexts other than the topic-comment construction. There was no age effect on Type G, the topic comment construction, and the use of *wa* in contexts other than the topic-comment construction.

4.4.3.3. Response patterns for -*wa* in G-a1, G-b1, and G-c1

In this and following sections, I will report the results of a response pattern analysis. Whereas the picture selection task only offered a binary choice of responses, the children's response patterns for the elicited imitation task were manifold. An analysis of the responses to the elicited imitation task therefore allows us to find out more about the child's grammar. Since number of participants and the size of the data pool are small, and also there was considerable variation in the responses, the 34 participants were divided into three groups based on age as in Table 26 for the purpose of the response pattern analysis.

Age group	Number (boy, girl)	Age range (months)	Average	Median
Y: young	11 (5, 6)	4;11 - 6;11 (59-83)	6;0	5;11
M: middle	10 (4, 6)	7;0 - 8;9 (84-105)	7;11	8;0
O: old	13 (4, 9)	9;0 - 11;10 (108-142)	9;11	9;8

Table 26: Three groups of the participants for response pattern analysis

The children's response patterns for the initial particle -*wa* in Type G (the topic-comment construction) are shown in Table 27. The results elicited by these stimuli were unexpected. For all three stimuli, the topic marker -*wa* was the target. However, many children responded with the genitive particle -*no*. When the initial particle was not masked, many children's response was on target. However, all the age groups have a tendency to choose the genitive marker when it was masked. Additionally, the children of the youngest age group tended to leave the particle out.

Type-particle	Type G - a1[ø-*ga*]			Type G - b1[*wa*-ø]			Type G - c1[ø-ø]		
Age group	Y	M	O	Y	M	O	Y	M	O
ga	0	0	0	0	0	0	0	0	0
wa (Target)	4	4	3	6	7	8	2	3	5
no	4	6	10	4	2	5	6	6	8
ellipsis	3	0	0	1	0	0	3	0	0
other	0	0	0	0	1	0	0	1	0
uninterpretable	0	0	0	0	0	0	0	0	0
% of the target	36.4%	40.0%	23.1%	54.5%	70.0%	61.5%	18.2%	30.0%	38.5%
% of *no*	36.4%	60.0%	76.9%	36.4%	20.0%	38.5%	54.5%	60.0%	61.5%
% of ellipsis	27.2%	0.0%	0.0%	9.1%	0.0%	0.0%	27.3%	0.0%	0.0%

Table 27: The response patterns for the initial particle -*wa* in Type G

Note that [ø] in the table indicates that the particle was masked with brown noise. For example, the initial particle *wa* in G-a (Zo(-wa) hana-ga nagai) was masked, so I henceforth refer to this pattern as [ø-*ga*]; in G-b (Kirin-wa kubi(-ga) nagai), the first particle was not masked but the second particle was masked, henceforth [*wa*-ø], and in G-c (Hebi(-wa) karada(-ga) nagai) both particles were masked, henceforth [ø-ø]. The table shows the number of children who produced a particular response. For example, for Type G-a1, four children in the age group Y responded on target, four responded with the particle -*no*, and three elided the particle.

4.4.3.4. Response patterns for *-ga* in G-a2, G-b2, and G-c2

The children's responses to the second particle *-ga* in Type G (the topic – comment construction) are shown in Table 28. The second particle *ga* in G-a2 (Zo(-wa) hana-ga nagai) was not masked but other particles G-b2 (Kirin-wa kubi(-ga) nagai) and G-c2 (Hebi(-wa) karada(-ga) nagai) were masked with brown noise.

Type-particle	Type G - a2[ø-*ga*]			Type G - b2[*wa*-ø]			Type G - c2[ø-ø]		
Age group	Y	M	O	Y	M	O	Y	M	O
ga (Target)	11	10	13	6	7	11	5	6	11
wa	0	0	0	3	1	1	1	4	2
no	0	0	0	0	0	0	0	0	0
ellipsis	0	0	0	2	1	0	3	0	0
other	0	0	0	0	1	0	1	0	0
uninterpretable	0	0	0	0	0	1	1	0	0
% of the target	100%	100%	100%	54.6%	70.0%	84.6%	45.5%	60.0%	84.6%
% of ellipsis	0.0%	0.0%	0.0%	18.2%	10.0%	0.0%	27.3%	0.0%	0.0%

Table 28: The response patterns for the second particle *-ga* in Type G

For all three stimuli, the nominative *ga* was the target. All the children responded on target when it was realized (G-a2). When it was masked, however, three children in the youngest group responded with the topic marker *-wa* for G-b2, and some children from all the groups responded with the topic marker *-wa* for G-c2. Again, we see particle ellipsis in the youngest group and one child of the middle group when the particle was masked in the stimulus.

4.4.3.5. Response patterns for *-ga* in H-f2, J-d and J-h

The children's responses to the nominative *-ga* in sentences of Type H and J are shown in Table 29. The particle *-ga* was masked with brown noise in all Type H and J stimuli.

Type-particle	Type H-f2			Type J - d			Type J - h		
Age group	Y	M	O	Y	M	O	Y	M	O
ga (Target)	3	6	10	0	6	6	4	7	11
wa	0	0	0	6	4	6	0	2	0
no	0	0	0	0	0	1	0	0	0
ellipsis	8	3	1	4	0	0	6	1	0
other	0	0	1	1	0	0	0	0	0
uninterpretable	0	1	1	0	0	0	1	0	2
% of the target	27.3%	60.0%	76.9%	0.0%	60.0%	46.2%	36.4%	70.0%	84.6%
% of *wa*	0.0%	0.0%	0.0%	54.5%	40.0%	46.2%	0.0%	20.0%	0.0%
% of ellipsis	72.7%	30.0%	7.7%	36.4%	0.0%	0.0%	54.5%	10.0%	0.0%

Table 29: The response patterns to *-ga* in Type H and J

The Type H stimulus was a non-canonical transitive object case (Koro(-wa) neruno(-ga) dai-suki desu). No children chose topic *wa* or other particles such as accusative case in this context, but eight children of the youngest group left the gap unfilled.

The Type J stimuli were designed to test the knowledge of the nominative *-ga* that is used to mark a noun phrase describing 'new information'. Six children of the youngest group responded with the topic marker *-wa* in this context, and four left the particle out. Four children of the middle age group and six in the oldest age group responded with the topic marker *-wa*. The response pattern for Type J-d (Inu(-ga) ouchi-de ne-tei-masu) among the oldest group was almost fifty-fifty between the nominative *-ga* and the topic marker *-wa*.

In contrast, seven children in the middle age group and eleven in the oldest group responded on target for Type J-h (Neko yori ookii nezumi(-ga) i-masu). Again, six children in the youngest group did not fill the gap.

4.4.3.6. Response patterns for *-wa* in K-e, K-f2, K-g and K-j

The children's responses to the topic *-wa* in Type K are given in Table 30. The Type K stimuli were designed to test the knowledge of the topic *-wa* that is used to mark a noun phrase describing 'old information (anaphoric or generic)'. The particles K-e, K-f1, and K-j were masked with brown noise. The particle K-g was not masked.

Type-particle	Type K - e			Type K - f1			Type K - g			Type K - j		
Age group	Y	M	O	Y	M	O	Y	M	O	Y	M	O
ga	0	0	2	0	0	0	0	0	1	1	1	0
wa (Target)	7	9	11	5	10	12	9	10	12	6	6	9
no	0	0	0	0	0	1	0	0	0	0	0	0
ellipsis	4	0	0	4	0	0	1	0	0	3	2	0
other	0	0	0	1	0	0	0	0	0	0	0	1
uninterpretable	0	1	0	1	0	0	1	0	0	1	1	3
% of the target	63.6%	90.0%	84.6%	45.5%	100%	92.3%	81.8%	100%	92.3%	54.6%	60.0%	69.2%
% of *ga*	0.0%	0.0%	15.4%	0.0%	0.0%	0.0%	0.0%	0.0%	7.7%	9.1%	10.0%	0.0%
% of ellipsis	36.4%	0.0%	0.0%	36.4%	0.0%	0.0%	9.1%	0.0%	0.0%	27.3%	20.0%	0.0%

Table 30: The response patterns to *-wa* in Type K

For Type K-e (Inu-no namae(-wa) Koro desu), four children of the youngest group left the gap unfilled but the other seven children in this age group responded on target. Nine children in the middle age group also responded with the target *-wa*. Two children in the oldest group chose the nominative *-ga*.

For Type K-f1 (Koro(-wa) neruno(-ga) dai-suki desu), all the children in the middle age group and the oldest group (except for one of the oldest group) responded with the target *-wa*, whereas four children in the youngest group dropped the particle.

For Type K-g (Kono e-wa sukoshi hen desu-ne), which was not masked, all except three children responded with the target *-wa*.

For Type K-j (Hutuu neko yori ookii nezumi(-wa) i-mas-en), one child each in the youngest group and the middle age group responded with the nominative *-ga*. Three children in the youngest group and two in the middle age group left the gap unfilled.

4.4.4. Discussion

4.4.4.1. The topic-comment construction

To compare the behaviour of the bilingually raised children in the current study with that of monolingual children, the results of Hatano (1979) introduced in 3.2.7 are repeated here as comparative data. Information about the participants in Hatano's study is shown in Table 31. As can be seen from Table 32, Group C in Hatano is similar in age range to age group Y in the current study.

Group	Number	Age range	Median
A	10	3;0-4;4	4;1
B	10	4;5-5;5	5;1
C	10	5;6-6;3	6;1
D	10	6;6-7;5	7;2

Table 31: The participants in Hatano (1979)

Age group	Number	Age range	Median	Average
Y	11	4;11 - 6;11	5;11	6;0
M	10	7;0 - 8;9	8;0	7;11
O	13	9;0 - 11;10	9;8	9;11

Table 32: The participants in the current study

The stimulus sentences used to test children's knowledge of the use of *-wa* and *-ga* in the topic-comment construction in the current study were exactly the same as those in Hatano's study except that the second particle in G-c2 was not masked in Hatano. The stimuli are repeated below in (56).

(56) G-a Zo(-wa) hana-ga nagai
elephant-TOP trunk-NOM long
'As for an elephant, the trunk is long.'

G-b Kirin-wa kubi(-ga) nagai
giraffe-TOP neck-NOM long
'As for a giraffe, the neck is long.'

G-c Hebi(-wa) karada(-ga) nagai
snake-TOP body-NOM long
'As for a snake, the body is long.'

The response patterns reported by Hatano are shown in Table 33.

Type	*wa* in Topic-Comment				*ga* in Topic-Comment				Type
Age group	A	B	C	D	A	B	C	D	Age group
ga	3.2%	1.9%	1.9%	1.7%	43.2%	53.3%	68.3%	81.6%	*ga* (Target)
wa (Target)	1.7%	15.0%	33.5%	75.0%	0.0%	1.7%	0.0%	1.7%	*wa*
other particle	1.7%	0.0%	0.0%	0.0%	1.7%	5.0%	1.7%	0.0%	other particle
particle ellipsis	67.0%	75.0%	55.0%	18.3%	31.7%	23.3%	18.3%	13.3%	particle ellipsis
constituent ellipsis	18.0%	8.1%	8.3%	5.0%	1.7%	5.0%	5.0%	0.0%	constituent ellipsis
other	8.4%	0.0%	1.3%	0.0%	21.7%	11.7%	6.7%	3.4%	other
Total	100%	100%	100%	100%	100%	100%	100%	100%	Total

Table 33: The response patterns for the topic-comment construction in Hatano

For the initial particle *-wa* in the Topic-comment construction, only a few children in age groups A and B responded with the target *-wa* in Hatano's study. Instead, the majority of the young monolingual children of age groups A, B and C left the gap unfilled. A few children responded with the nominative *-ga*. The response with the other particles than *-wa* and *-ga* was only 1.7% from the youngest group. Hatano did not provide further information on what kind of particles the children used. The success rate for producing the target particle rose sharply in age group D.

For the second particle *-ga*, the children rarely used *-wa* or other particles for *-ga*. Instead there was a comparatively high proportion of particle ellipsis. In view of the monolingual response patterns shown in Table 33, it is conceivable that the particle combination in the topic-comment construction produced by young children is [0-0] at the early stage of learning, then [0-*ga*] at the next stage, and [*wa*-*ga*] at around seven years old ('0' represents particle ellipsis).

The bilingually raised children in the current study behaved quite differently from the monolingual children in Hatano. Table 34 shows the particle combinations that were produced in response to the three stimuli of Type G.

Type	Type G – a [ø-*ga*]			Type G - b[*wa*-ø]			Type G - c[ø-ø]		
Age group	Y	M	O	Y	M	O	Y	M	O
wa-ga (Target)	4	4	3	5	6	8	1	3	5
no-wa	0	0	0	3	1	2	1	3	2
no-ga	4	6	10	1	1	3	2	3	6
ellipsis & other responses	3	0	0	2	2	0	7	1	0
% of topic-comment (Target)	36.4%	40.0%	23.1%	45.5%	60.0%	61.5%	9.1%	30.0%	38.5%
% of possessive	36.4%	60.0%	76.9%	36.4%	20.0%	38.5%	27.3%	60.0%	61.5%

Table 34: Bilingually raised children's particle combinations for Type G

As reported in section 4.4.3 and shown in Table 34, many of the bilingually raised children responded with a [*no-wa*] or [*no-ga*] pattern. These patterns were not reported by Hatano. For Type G-a, 11 children responded on target, whereas 20 children, especially ten from the oldest group, responded with the [*no-ga*] pattern. Eleven children responded with the particle *-no* for the initial particle in Type G-b, even though the initial particle *-wa* was unmasked in the recording. For Type G-c, six children responded with the [*no-wa*] pattern, and 11 children, especially six from the oldest group, responded with the [*no-ga*] pattern. Seven children in the youngest age group left either one or both the gaps unfilled.

The particle *-no* is a genitive marker. The [*no-wa*] pattern is entirely grammatical and possible especially in G-c [ø-ø], where both particles were masked with brown noise. In this construction, as is illustrated in (57)-a, the genitive marker *no* marks the possessor in a noun phrase which is the *wa*-marked subject of the sentence, yielding [*Hebi-no karada*]-*wa nagai* 'The snake's body is long'.

(57) a.[*no-wa*] Hebi-no karada-wa nagai
snake-GEN body-TOP long
'The snake's body is long.'

b.[*no-ga*] Q: Which animal's body is long?
A: Hebi-no karada-ga nagai
snake-GEN body-NOM long
'(No other but only) the snake's body is long.'

The [*no-ga*] combination in (57)-b, which was used most by the children in the current study, also has the possible reading of an exhaustive listing. It can be the answer to the question 'which animal's body is long?' Recall the picture used for this task that

is shown in Table 22, the three animals were drawn in a single picture. It is, therefore, possible to use the [*no-ga*] pattern to describe that none other but the snake's body is long.

Another possible construction is the [*ga-ga*] pattern shown in (58). While both (57)-a and (57)-b involve a possessive construction in the subject noun phrase, (58) is not. The first *-ga* in this [*ga-ga*] pattern is used to indicate exhaustive listing and it does not function as a subject marker. It can be the answer to the question 'which animal is it whose body is long?' The difference of the reading between [*no-ga*] and [*ga-ga*] is the entities that are listed: body parts in the case of [*no-ga*] and animals in the case of [*ga-ga*]. Although no children in the current study responded with this pattern, a few monolingual children in Hatano's study seemed to respond with this [*ga-ga*] pattern.

(58) [*ga-ga*] Q: Which animal is it whose body is long?
A: Hebi-ga karada-ga nagai
snake-NOM body-NOM long
'(It is) the snake, the/whose body is long.'

4.4.4.2. Pilot study 2

Many of the children tested in the current study analysed the topic-comment construction as possessive regardless of age. Even though [*no-wa*] was not the target response, it sounds natural in adult grammar. And [*no-ga*] is also possible with the exhaustive-listing reading.

Previous studies have demonstrated that monolingual children learn the genitive marker at an early stage of language development at MLU (m) stage I or II (Clancy 1985, Fujimoto 2008). The topic marker, on the other hand, is acquired late (Hatano 1979, Ito 1990, Fujimoto 2008). It would, therefore, seem possible that young monolingual children in Japan might respond in the same way as the children in the current study, which raises the question why this pattern was not reported in Hatano's (1979) study.

As mentioned earlier in 4.4.1, a second pilot study was conducted to explore whether the responses of other monolingual children support the results reported by Hatano (1979). Data for this pilot study were collected in Osaka, Japan, and six monolingual children participated in the study. The method and procedure were exactly the same as used for the bilingually raised children in Christchurch. All the responses produced by the monolingual children are shown in Table 35. 0 in the table indicates particle drop.

Participant	age (gender)	Type G-a[ø-*ga*]	Type G-b[*wa*-ø]	Type G - c[ø-ø]
A	4;4 (boy)	*wa* - *ga*	*wa* - *ga*	0 - *ga*
B	4;8 (girl)	*wa* - *ga*	0 - 0	(no response)
C	4;9 (girl)	*wa* - *ga*	*wa* - 0	0 - 0
D	5;1 (boy)	0 - *ga*	0 - *ga*	0 - 0
E	5;8 (girl)	*wa* - *ga*	*wa* - *ga*	*wa* - *ga*
F	6;2 (girl)	*no* - *ga*	*wa* - *ga*	*no* - *ga*

Table 35: Monolingual children's response to Type G

As can be seen, the most common response among four and five year-old children was the [*wa-ga*] pattern as reported in Hatano's study. The children did not respond with other particles, but rather left the gap unfilled, especially when both particles were masked, as in Type G-c. Very interestingly, only the oldest girl responded with the [*no-ga*] pattern in Type G-a and G-c, like the bilingually raised children in the current study, even though she responded with the [*wa-ga*] pattern for Type G-b. The current study does not have an explanation for the behaviour of the oldest monolingual child in the pilot. However, overall, the data collected in Japan clearly supported the results of Hatano's (1979) study. Thus it seems possible to say that the topic-comment construction appears to be a part of young monolingual children's grammatical competence. In contrast, the bilingually raised children in the current study tended to use the possessive construction. What kind of factors might be responsible for the difference between the behaviour of the monolingual children and the bilingually raised children in the current study? We will come back to this point in Chapter 5.

4.4.4.3. The use of *-ga* in contexts other than the topic-comment construction

The current study tested other uses of the particle *-ga*. The stimuli are repeated below in (59) and (60). Type H is a non-canonical transitive case frame, and the particle *-ga* is used to mark the object. (The first particle *-wa* was also tested as Type K-f1. See section 4.4.4.4) The function of *-ga* in (60) is to mark a subject that is newly introduced. The difference between J-d and J-h is that J-d is an active sentence, whereas J-h is an existential sentence that has the [there is X] structure. Type J-h was exactly the same as the stimulus tested in Hatano's study, but two stimuli H-f2 (K-f1) and J-d were generated for the current study.

(59) H-f2 Koro(-wa) neruno(-ga) dai-suki-desu
K-f1 koro-TOP lying-NOM very.much-like-POL
'Koro likes lying very much.'

(60) J-d Inu(-ga) ouchi-de ne-tei-masu
dog-NOM house-in lie-ASP-POL
'A dog is lying in a house.'

J-h Neko-yori ookii nezumi(-ga) i-masu
cat-than big mouse-NOM exist-POL
'There is a mouse that is bigger than a cat.'

The results of Hatano (1979) introduced in section 3.2.7 are repeated in Table 36 as comparative data. It is important to note two points though. The first is that Hatano did not test the non-canonical object case (Type H-f2 in the current study). The second is that the two stimuli used by Hatano shared the same existential sentence pattern [X-*ga i-masu*] as J-h (see (28)-b and (29)-b in section 3.2.7). Hatano did not test the use of new information *-ga* in non-existential sentences like stimulus J-d in (60) that is used in the current study. This means that Hatano's study does not provide any response pattern of monolingual children for Type J-d, and we can therefore compare the two studies only in terms of the use of *-ga* in the [X-*ga i-masu*] structure, namely, stimulus J-h in (60).

Type / Age group	New information *ga* (used in a Type J-h structure) A	B	C	D
ga (Target)	29.0%	55.0%	65.0%	80.0%
wa	0.0%	2.5%	2.5%	5.0%
other particle	0.0%	0.0%	0.0%	0.0%
particle ellipsis	23.0%	22.5%	32.5%	7.5%
constituent ellipsis	15.0%	12.5%	0.0%	0.0%
other	33.0%	7.5%	0.0%	7.5%
Total	100%	100%	100%	100%

Table 36: Response pattern for the use of new information -*ga* in Hatano

The response patterns produced by the bilingually raised children are repeated in Table 37 below.

Type-particle	Type H-f2			Type J - d			Type J - h		
Age group	Y	M	O	Y	M	O	Y	M	O
ga (Target)	3	6	10	0	6	6	4	7	11
wa	0	0	0	6	4	6	0	2	0
no	0	0	0	0	0	1	0	0	0
ellipsis	8	3	1	4	0	0	6	1	0
other	0	0	1	1	0	0	0	0	0
uninterpretable	0	1	1	0	0	0	1	0	2
% of the target	27.3%	60.0%	76.9%	0.0%	60.0%	46.2%	36.4%	70.0%	84.6%
% of *wa*	0.0%	0.0%	0.0%	54.5%	40.0%	46.2%	0.0%	20.0%	0.0%
% of ellipsis	72.7%	30.0%	7.7%	36.4%	0.0%	0.0%	54.5%	10.0%	0.0%

Table 37: The response patterns to -*ga* in Type H and J (Table 29)

Comparing the results from Hatano in Table 36 with the response patterns for Type J-h in Table 37, we notice three things. First, the monolinguals have reached 80% of the target response at around seven years of age (Group D), while the children in the middle age group (average 7;11) reached 70% of the target response. Second, in both studies, very few children responded with the particle -*wa*. Third, in both studies, younger children tend to leave out the particle. The response patterns for Type J-h in the two studies therefore look quite similar, except that the children in the current study seem slightly delayed.

Although no comparative data is available, we notice interesting response patterns for Type J-d. The nominative -*ga* is used to mark a noun phrase describing 'new information' in both Type J-d and J-h. However, the response patterns are quite different

between J-d and J-h. Only two children responded with the particle *-wa* for J-h, whereas 16 children responded with *-wa* for J-d.

While this pattern is not on target, it is possible with a contrastive reading in wider context. However, the picture that was used for this stimulus depicted only one dog lying in a kennel. In this sense, *-ga* is the only choice in adult grammar. It may also be a non-contrastive topic, although when this is the case, the definite marker *sono* 'the' in the first noun phrase would be preferable. Why does the response pattern for J-d differ from that for J-h? It is known that the particle -ga generally appears as [*X-ga iru/aru* 'there is/are X(s)'] in child directed speech (CDS) (Fujimoto, 2008). There are two verbs that express existence: *iru* takes an animate subject and *aru* takes an inanimate subject. Therefore, it might be possible that the children have acquired [X-*ga iru/aru* 'there is/are X(s)'] as a chunk at an early stage of learning and automatically use *-ga* when they encounter the predicate *i-masu* that is the polite form of *iru* 'exist'.

Finally, for Type H-f2 (the non-canonical object case), the studies of maternal input to young monolingual children suggest that object case markers in child directed speech tend to be omitted (Clancy, 1985; Miyata, 2008; Tanaka & Shirai, in press). This explains the high rate of ellipsis in the youngest group. However, many children in the current study seem to have succeeded in learning non-canonical object case with age. The issue of maternal input will be further discussed in section 5.2.

4.4.4.4. The use of *-wa* in contexts other than the topic-comment construction

To test the use of *-wa* in other constructions, four stimuli were used, which are repeated below as (61). Stimulus K-g and K-j were exactly the same as those tested in Hatano's study. Stimulus K-e and K-f1 were generated for the current study.

(61) K-e Inu-no namae(-wa) Koro desu
dog-GEN name-TOP Koro POL
'The dog's name is Koro.'

K-f1 Koro(-wa) neruno(-ga) dai-suki-desu
koro-TOP lying-NOM very.much-like-POL
'Koro likes lying very much.'

K-g Kono e-wa sukoshi hen desu-ne
this picture-TOP a.bit strange POL-SFP
'This picture looks a bit strange.'

K-j Hutuu neko yori ookii nezumi(-wa) i-masen
generally cat than big mouse-TOP exist-POL.NEG
'Generally, there is no mouse that is bigger than a cat.'

The function of the particle *-wa* in (61) is basically 'thematic' in Kuno's (1972) use of the term and 'non-contrastive topic' in Vermeulen's (2008) approach. According to Kuno, the noun phrase followed by *-wa* is anaphoric or generic. Stimulus K-e, K-f1, and K-g illustrate anaphoric uses of *-wa*, whereas stimulus K-j represents a generic use of *-wa* in the sense that the speaker is talking about mice in general.

The results of Hatano (1979) introduced in 3.2.7 are repeated in Table 38 as comparative data. Hatano (1979) used four sentences to test the use of the particle *-wa* in contexts other than the topic-comment construction (see (28)-c, (29)-c, (30)-a, and (30)-b in section 3.2.7). Stimulus (28)-c is exactly the same as K-j in (61). All the noun phrases followed by *-wa* in the four stimuli in Hatano were generic noun phrases as in K-j. Thus, again, we can compare the results from Hatano's study only with the responses to K-j in the current study.

Type / Age group	-*wa* following a generic noun phrase A	B	C	D
ga	7.7%	5.0%	3.7%	12.0%
wa (Target)	19.0%	33.8%	37.3%	72.0%
other particle	5.0%	5.0%	0.0%	0.0%
particle ellipsis	39.0%	48.7%	50.0%	15.0%
constituent ellipsis	12.7%	5.0%	4.5%	0.0%
other	16.6%	2.5%	4.5%	1.0%
Total	100%	100%	100%	100%

Table 38: The response patterns for generic -*wa* in Hatano

The response patterns produced by the bilingually raised children are repeated in Table 39 below.

Type-particle	Type K - e			Type K - f1			Type K – g			Type K - j		
Age group	Y	M	O	Y	M	O	Y	M	O	Y	M	O
ga	0	0	2	0	0	0	0	0	1	1	1	0
wa (Target)	7	9	11	5	10	12	9	10	12	6	6	9
no	0	0	0	0	0	1	0	0	0	0	0	0
ellipsis	4	0	0	4	0	0	1	0	0	3	2	0
other	0	0	0	1	0	0	0	0	0	0	0	1
uninterpretable	0	1	0	1	0	0	1	0	0	1	1	3
% of the target	63.6%	90.0%	84.6%	45.5%	100%	92.3%	81.8%	100%	92.3%	54.6%	60.0%	69.2%
% of *ga*	0.0%	0.0%	15.4%	0.0%	0.0%	0.0%	0.0%	0.0%	7.7%	9.1%	10.0%	0.0%
% of ellipsis	36.4%	0.0%	0.0%	36.4%	0.0%	0.0%	9.1%	0.0%	0.0%	27.3%	20.0%	0.0%

Table 39: The response patterns for -*wa* in Type K (Table 30)

When comparing Hatano's results in Table 38 with the response patterns for Type K-j in Table 39, we notice three things. Firstly, the bilingually raised children in the youngest group (4;11-6;11) responded on target more than the monolinguals of age group C (5;6-6;3). However, the rate of response with the target particle sharply rose in the monolingual children in age group D (6;6-7;5), whereas there is only a gradual increase in the rate of the target response between age groups in the current study as 60% in the youngest group (7;0-8;9) and 69% in the oldest group (9;0-11;10). It appears that bilingually raised children take more time to attain adult grammar than monolinguals. Secondly, many of the monolingual children of age groups A, B and C left the particle out including 15% of the oldest age group. In contrast, the rate of particle ellipsis is not very high among the children in the current study. Thirdly, some monolinguals, especially in the oldest group, responded with *-ga* rather than *-wa*, whereas only two children in the current study responded with *-ga*.

The use of *-wa* with an anaphoric noun phrase, as in K-e, K-f1 and K-g, appears to be acquired earlier by the bilingually raised children than the use of *-wa* with a generic noun phrase, as in K-j. For both K-e and K-f1, many children in the current study responded on target, while some children of the youngest group left the particle out. For K-g, where the particle was not masked with brown noise, all the children except three responded on target.

Why does the proportion of responses with the target particle differ between K-j and the three stimuli K-e, f1, g? The current study does not have an answer to this question. However, there might be two possible explanations. The first explanation could be that K-j was the longest stimulus of all and also the only stimulus that started with the adverb *hutuu* 'generally'. These facts might have confused some children. The second explanation might be that children acquire the concept of a generic statement and generic uses of noun phrases later than non-generic statements where the noun phrase followed by *-wa* is used anaphorically.

4.4.4.5. Individual differences

There were seven children in the current study who consistently responded on target for Type H, J and K as shown in Table 40. Three of these children (aged 7;11, 8;1, and 11;0) responded on target with the [*wa-ga*] pattern for Type G (the topic comment construction) as well. This indicates that these three children appeared to have acquired the *ga-wa* contrast like monolingual children of the same age. The other four children responded with the [*no-ga*] or [*no-wa*] pattern for Type G (the topic-comment construction). These patterns are grammatical but not on target. Two children (aged 7;7 and 9;8) responded with the [*wa-ga*] pattern only when the first particle was unmasked in G-b, and one child (aged 9;6) analysed all Type G stimuli as possessive. Therefore, even though the four children consistently used *-wa* and *-ga* appropriately in contexts other than the topic-comment construction, this cannot be evidence that they have acquired the *wa-ga* contrast in the topic comment construction.

Age	G-a	G-b	G-c	J-d	K-e	J-f1	H-f2	K-g	J-h	K-j
7;7	*-no -ga*	*-wa -ga*	*-no -wa*	*-ga*	*-wa*	*-wa*	*-ga*	*-wa*	*-ga*	*-wa*
7;11	*-wa -ga*	*-wa -ga*	*-wa -ga*	*-ga*	*-wa*	*-wa*	*-ga*	*-wa*	*-ga*	*-wa*
8;1	*-wa -ga*	*-wa -ga*	*-wa -ga*	*-ga*	*-wa*	*-wa*	*-ga*	*-wa*	*-ga*	*-wa*
9;4	*-no -ga*	*-wa -ga*	*-wa -ga*	*-ga*	*-wa*	*-wa*	*-ga*	*-wa*	*-ga*	*-wa*
9;6	*-no -ga*	*-no -ga*	*-no -ga*	*-ga*	*-wa*	*-wa*	*-ga*	*-wa*	*-ga*	*-wa*
9;8	*-no -ga*	*-wa -ga*	*-no -ga*	*-ga*	*-wa*	*-wa*	*-ga*	*-wa*	*-ga*	*-wa*
11;0	*-wa -ga*	*-wa -ga*	*-wa -ga*	*-ga*	*-wa*	*-wa*	*-ga*	*-wa*	*-ga*	*-wa*

Table 40: Response patterns from the seven children

The four youngest children, in contrast, showed a high rate of particle ellipsis as shown in Table 41. In the table, 0 indicates particle ellipsis, # indicates that the child rephrased the stimulus, and ? suggests that the response was uninterpretable.

Age	G-a	G-b	G-c	J-d	K-e	J-f1	H-f2	K-g	J-h	K-j
4;11	0 *-ga*	*-wa -ga*	0 *-ga*	0	0	0	0	*-wa*	0	*-wa#*
5;0	0 *-ga*	0 0	0 *-ga*	0	0	0	0	*-wa*	0	0
5;2	0 *-ga*	*-wa* 0	0 0	0	0	0	0	?	0	0
5;5	*-wa -ga*	*-no -wa*	*-no* 0	0	0	*-wa*	0	*-wa*	0	*-wa#*

Table 41: Response patterns from young children

Two young children aged 4;11 and 5;5 responded on target to K-j, even though the sentences they produced were rephrased as shown in (62) and (63).

(62) 4;11
Hutuu-ni ookii nezumi-wa imasen
generally-DAT big mouse-TOP exist-NEG.POL
'Generally, there is not a big mouse.'

(63) 5;5
Neko to ookii nezumi-wa imasen
cat and big mouse- TOP exist-NEG.POL
'There is not a cat and a big mouse.'

It is worth noting that (62) still matches the K-j sentence type in being a generic negative existential, whereas (63) appears more like a basic negative existential, where the particle *wa* is normally expected in that context.

Although the other children responded in an inconsistent way, statistical analyses (cf. section 4.4.3.2) have shown that the effect of age on probability of the target response is slightly significant in Type H-f2 ($p<0.05$), Type J-d ($p<0.05$), and Type J-h

(p=<0.05), and Type K-f1 (p<0.05). The bilingually raised children seem to be on course for acquiring the target grammar in terms of the *ga*-*wa* contrast. However, the rate of acquisition seemed to be delayed compared to the monolingual children in the previous study with regard to the use of -*ga* marking a noun phrase that describes new information in contexts other than the existential [X-*ga iru/aru* 'there is X'] frame and the use of -*wa* following the generic noun phrase. All the individual response patterns are shown in Appendix D.

4.4.5. Summary of part 2 – elicited imitation

In section 4.4.2, three predictions were made. The first prediction was that if the child has no knowledge of the nominative -*ga* and the topic -*wa*, then, we would expect him/her to reproduce the sentence without the particle for both masked and unmasked stimuli.

The proportion of ellipsis was high in the youngest group (4;11-6;11) in the current study. For the use of -*wa*, 27% of the children in the youngest group left the gap unfilled in the topic-comment construction, 36% in the anaphoric noun phrase, and 27% in the generic noun phrase. For the use of -*ga*, 27% of the children in the youngest group left the gap unfilled in the topic-comment construction, 72% in the non-canonical transitive case frame, 36% in a noun phrase that describes new information in contexts other than the existential [X-*ga iru/aru* 'there is X'] frame, 54% in the existential [X-*ga iru/aru* 'there is X'] frame. In contrast, the rates of particle ellipsis declined sharply for all types among the children in the middle age and older groups. These results indicate that the young children who could not fill the gap in the current study have not gained productive competence of the use of the particles -*wa* or -*ga* yet.

The second prediction was that if the child occasionally uses the nominative and the topic particles in his/her speech but has not acquired the target knowledge in terms of the *wa*-*ga* contrast, then, we would expect him/her to use -*wa* and -*ga* inconsistently when repeating a masked stimulus but to succeed when repeating an unmasked stimulus.

When the particle was presented in the stimulus, the bilingually raised children in the current study responded on target almost 100% of the time, suggesting that the particles *-wa* and *-ga* are in their grammar. When the particle in the recording was masked with brown noise, however, the children showed inconsistent behaviour. In terms of the use of *-ga*, when it was used in the existential [X-*ga iru/aru* 'there is X'] frame, 70% of the children in the middle age group (7;0-8;9) and 85% of the children in the oldest group (9;0-11;10) responded on target. In contrast, when it was used to mark a noun phrase that describes new information in contexts other than the existential [X-*ga iru/aru* 'there is X'] frame, 60% of the children in the middle age group and 46% of the children in the oldest group responded on target and the other children responded with the particle *-wa*. In terms of the use of *-wa*, nearly 90% of the children in the middle age groups and the oldest group responded on target when it was used with an anaphoric noun phrase. In contrast, when it was used with a generic noun phrase, 65% of the children in the middle age groups and the oldest group responded on target and the other children left the particle out or could not repeat the stimulus. The results suggest that some children in the current study are still on the way to acquiring the use of *-ga* marking a noun phrase that describes new information in contexts other than the existential [X-*ga iru/aru* 'there is X'] frame and *-wa* used with a generic noun phrase.

With regard to the unmasked particle, however, there was one exception. Even when the initial particle *-wa* in the topic comment construction was presented in the recording, 11 children responded with the genitive particle.

Strikingly, many of the bilingually raised children in the current study re-analysed the topic-comment construction as a genitive possessive regardless of age. This pattern was not observed in the monolingual children in the previous study and was also absent in the monolingual data collected in the current study, with one notable exception: the oldest girl (6;2) in the monolingual data collected in the current study responded with a [*no-ga*] pattern.

The third prediction was that if the child has acquired the *wa*-*ga* contrast, we would expect him/her to reproduce the stimulus sentence correctly with both the masked and unmasked stimulus.

There were three children who responded consistently on target for all the stimuli. These children seemed to have acquired the *ga*-*wa* contrast. Age also has a statistically significant effect ($p<0.05$) on the uses of each particle in the non-canonical [S-*wa* O-*ga* *suki* 'like'] case frame and the use of -*ga* marking a noun phrase that describes new information in contexts other than the topic-comment construction. The bilingually raised children in the current study, however, seem to take a longer time to reach the same level of knowledge as monolinguals.

5. General discussion

In Chapter 4, we found that the bilingually raised children in the current study exhibited different behaviour from monolingual children in previous studies. In Part 1 of the study, the bilingually raised children exhibited difficulties in interpreting the agent-patient relationship in the object-initial sentence types. Some of the children consistently interpreted the first noun phrase as the agent, which suggests that these children relied on the word order cue rather than the case marking cue in interpreting the agent and patient relationship. However, this is not a phenomenon unique to the bilingually raised children in this study. Monolingual children in similar studies also exhibited a stage of interpreting the agent and patient relationship based on word order. Nevertheless, case marking seems to replace word order as the most influential cue in the monolingual children at around five years of age, whereas, some of the bilingually raised children seemed to retain word order as a stronger cue than case marking.

In Part 2 of the study, many of the bilingually raised children re-analysed the topic-comment construction as a genitive possessive. This appears to be a response confined to bilingually raised children. This pattern was not observed in monolingual children in the previous study (Hatano, 1979) or the monolingual data collected in the current study (with one exception).

We also discovered that there was a great deal of variation between individuals in the current study. Some of the bilingually raised children seem to have acquired the *ga-o* and/or *ga-wa* contrast almost at the same rate as the monolingual children in the prior studies, whereas, others seem to be lagging behind in acquiring these contrasts.

This chapter will look at possible explanations for the differences between monolingual children and the bilingually raised children in this study, and I will also consider what factors may have given rise to the individual variation among the bilingually raised children.

5.1. Cross-linguistic influence

One possible explanation for the difference between monolingual children and bilingually raised children in the way they responded to stimuli involving case and topic particles is cross-linguistic influence. As discussed in Chapter 2, many studies have observed cross-linguistic influence in the development of grammatical systems between two languages that children learn simultaneously from birth. Some researchers say that cross-linguistic influence is a child internal process and grammar-based (Hauser-Grüdl *et al*., 2010).

Hulk and Müller (2000) and Müller & Hulk (2001) propose that two conditions have to be met for cross-linguistic influence to take place in bilingual acquisition. The first condition is that cross-linguistic influence occurs in the C-domain (between CP and TP in Figure 13) where syntax and pragmatics interface. The second condition is that there has to be a certain overlap of the two grammatical systems at the surface level.

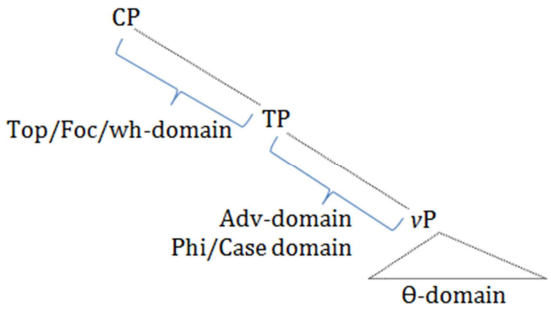


Figure 13: C-domain (Chomsky, 2000, diagrammed by Laenzlinger, 2010: 2)

In the following sections, the structures of the object-initial sentences and the topic-comment construction will be analysed in turn, to examine if these structures meet the two conditions for cross-linguistic influence.

5.1.1. Structures of the object-initial sentences

When we compare the basic word order of English and Japanese, there is an overlap between the two grammatical systems in the way the agent-patient relationship is expressed at the surface level. With regard to the linear order of agent and patient in a

sentence, the agent precedes the patient in a canonical transitive sentence in both Japanese (64)-a and English (64)-b.

(64) Canonical transitive word order in Japanese and English
a. Usagi-ga inu-o oshi-ta
rabbit-NOM dog-ACC push-PAST
b. A rabbit pushed a dog.

In Japanese (64)-a, the agent can be identified in two possible ways: the first noun phrase is the agent or the noun phrase followed by the particle *-ga* is the agent. At the same time, English (64)-b provides support for one of the analyses: the first noun phrase is the agent. There is thus a certain overlap between the two systems at the surface level, so one condition for cross-linguistic influence is satisfied.

However, Japanese has more flexible word order than English, and the linear order of the agent and the patient changes on the basis of discourse-pragmatics factors. This is the domain where syntax and pragmatics interface. Consider examples (65)-(67).

(65) Null subjects (OV) (cf. Murasugi & Sugisaki, 2008)
pro inu-o oshi-ta
dog-ACC push-PAST
'(The rabbit) pushed a dog.'

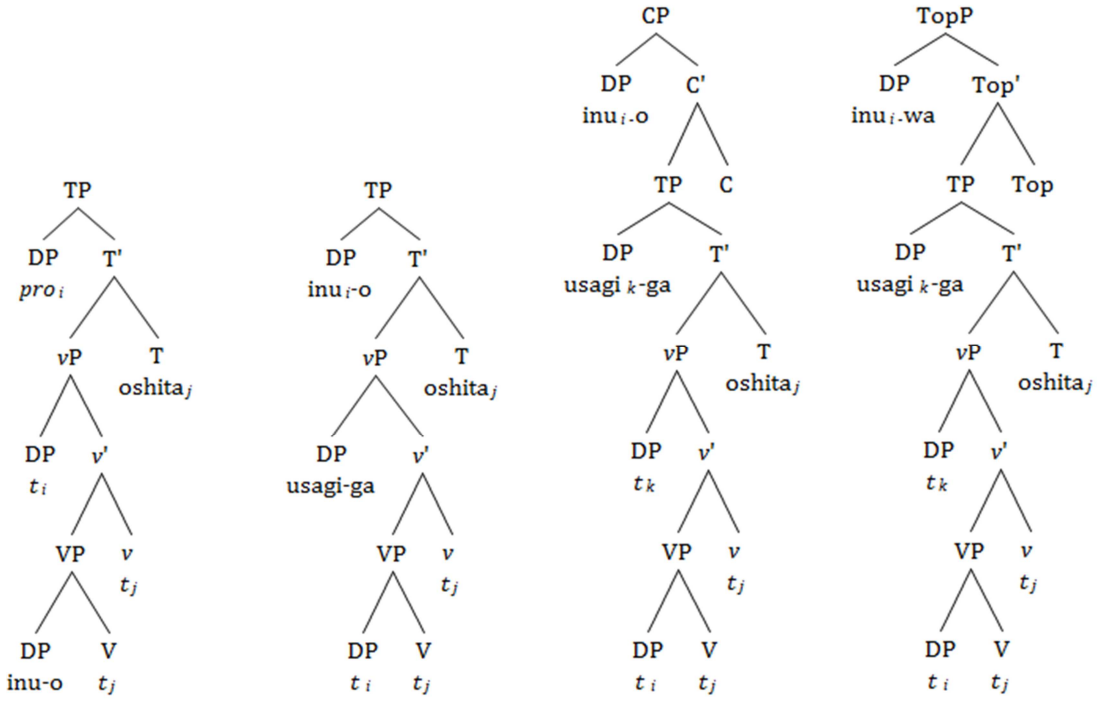
(66) Scrambling (OSV) (cf. Miyagawa, 2003)
Inu$_i$-o usagi-ga t_i oshi-ta
dog-ACC rabbit-NOM push-PAST
'The rabbit pushed the dog.'

(67) Object topicalization (*wa-ga*) (cf. Nakamura, 2011)
a. Inu$_i$-wa usagi-ga t_i oshi-ta
dog-TOP rabbit-NOM push-PAST
'The rabbit pushed the dog.'

Example (65) is a null-subject sentence. In Japanese, like in English, the Extended Projection Principle (EPP) triggers movement of the subject to Spec TP. However, unlike English, Japanese allows null subjects (*pro*) as in Figure 14-(65), so children acquiring Japanese need to learn that even null subjects satisfy the EPP.

Example (66) is scrambling, which readily occurs in Japanese but not in English. Miyagawa (2003) proposes that scrambling may involve either A- or A'-movement. In A-movement, the subject stays in situ and the object moves to Spec TP as shown in Figure 14-(66)-a. In A'-movement, the object moves up higher than the TP as shown in Figure 14-(66)-b. In both analyses, the object leaves its base position and goes up to the TP or higher into the C-domain.

Example (67) is object topicalization. As shown in Figure 14-(67), the object moves up into the C-domain, and the topic marker replaces the accusative marker. Null subject (65), scrambling (66), and object topicalization (67) are all optional. The speaker's choice of these three structures depends on the discourse context.



(65) Null subjects | (66)-a Scrambling A-movement | (66)-b Scrambling A'-movement | (67) Object topicalization

Figure 14: Structures of object-initial sentences

Based on the analyses of the three object-initial constructions given above, we could argue that all these structures involve the interface between syntax and pragmatics in the left periphery of the sentence, and thus satisfy the other condition for cross-linguistic influence.

Difficulties with interpreting object-initial sentences are not unique to the bilingually raised children in the current study. Previous studies suggest that monolinguals also undergo a phase of interpreting the agent and patient relationship based solely on word order. However, the monolingual children seem to have shifted from the word order analysis to the case marking analysis earlier than some of the bilingually raised children, and some of the children in the current study seem to remain in this phase even when they're quite a bit older.

It seems possible to conclude that the different behaviour between monolinguals and the bilingually raised children in terms of interpreting the agent and patient relationship in the object-initial sentences is due to cross-linguistic influence, which appears to have caused delay in shifting the priority of cues from the word order analysis to the case marking analysis.

5.1.2. Structure of the topic-comment construction

One of the stimulus sentences used for elicited imitation of the topic-comment construction is given in (68)-a. Japanese allows two analyses when the particle following the first noun is masked. If the child's analysis was that the first noun is the topic of the sentence, then the result will be in (69). If the child's analysis was that the first noun is the possessor of the second noun, then the result will be in (70)-a or (70)-b. Since, English does not have a topic-comment construction like Japanese, the English input only offers support for one of the two analyses: the first noun is the possessor of the second noun as in (68)-e.

(68) Stimulus G-a in the elicited imitation task and possible analyses

a. Zo-( ) hana-ga nagai
   elephant-( ) nose-NOM long

b. topic -*wa* (Japanese)
c. possessor -*no* (Japanese) entity possessed
d. possessor -'*s* (English) entity possessed

e. The elephant's trunk is long.

(69) Topic-comment construction

Zo-wa	hana-ga	nagai
elephant-TOP	nose-NOM	long

'As for an elephant, the trunk is long.'

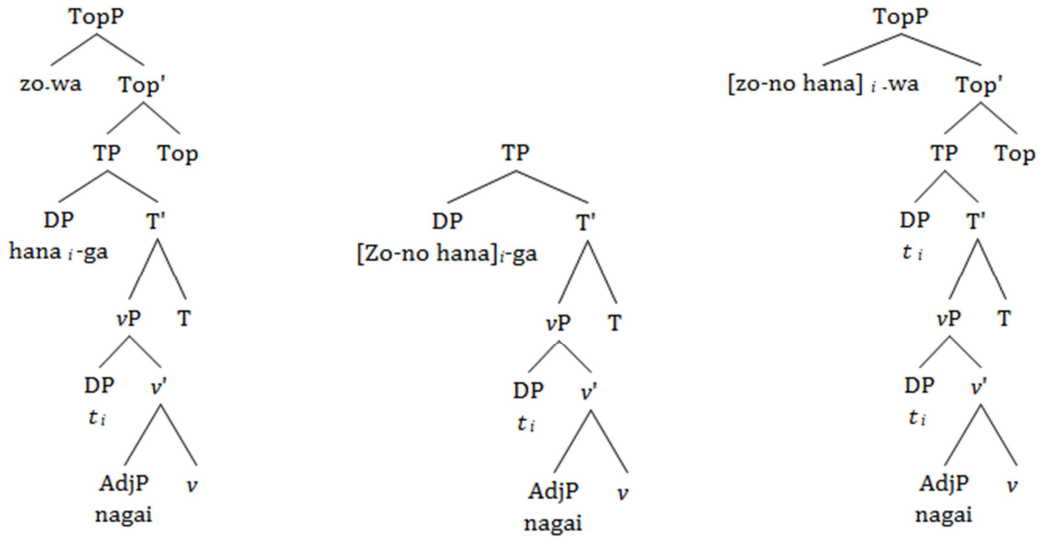
(70) Two types of genitive possessive construction

a. Zo-no hana-ga nagai [Possessive + exhaustive listing *-ga*]
elephant-GEN nose-NOM long
'(No other but only) the elephant's trunk is long.'

b. Zo-no hana-wa nagai [Possessive + topic *-wa*]
elephant-GEN nose-TOP long
'The elephant's trunk is long.'

There is an overlap between Japanese and English when it comes to expressing the possessor-possession relationship at the surface level. It seems that when confronted with stimuli such as (68)-a, the children in the current study are opting for the possessor-possession analysis, which has an English equivalent, rather than the topic-comment construction, which doesn't. Thus, one condition for cross-linguistic influence is met.

Now let us consider the structures of the topic-comment construction in (69), and the sentences with the possessive constructions in (70).



(69) Topic-comment (70)-a Possessive + *ga* (70)-b Possessive + *wa*

Figure 15: The sentences with the possessive and the topic-comment constructions

Example (69) is the topic-comment construction. In this construction, the topic phrase *zo-wa* is not involved in movement at all, but is base generated in the Spec of the Topic Phrase, as in Figure 15-(69).

Example (70)-a is the combination of genitive possessive and the exhaustive listing *-ga*. As shown in Figure 15-(70)-a, the genitive marker *-no* marks the possessor of the subject DP, which is merged in the Spec of the small *v*P and moves up to Spec TP. The subject containing the possessive undergoes the same movement in English 'the elephant's trunk is long' in (68)-e. This combination was the most frequent response pattern in task G-a. It is worth noting that the Japanese example (70)-a bears an exhaustive listing interpretation, which is not implied in English (68)-e. It may thus be possible to assume that the subject noun phrase *Zo-no hana-ga* might involve movement from the subject position in Spec TP to Spec XP in the C-domain in order to receive the exhaustive listing interpretation (cf. Yoshimoto, 2012).

Example (70)-b is the combination of genitive possessive and the topic *-wa*. In this structure, the subject moves further up to the C-domain and the topic marker replaces the nominative marker as in Figure 15-(70)-b. This combination was used by the children in the current study only when the second particle or both the particles were masked with brown noise in task G-b and G-c.

Two of the structures in Figure 15 involve the interface between syntax and pragmatics in the left periphery of the sentence: the topic-comment construction in (69) and the possessive with the topic *-wa* in (70)-b. So we could argue that the bilingually raised children's re-analysis took place in the C-domain, and that the other condition for cross-linguistic influence is thus met as well. This phenomenon appears to be more or less unique to the bilingually raised children, because we have only one instance where a monolingual child responded with the same possessive pattern as the children in the current study.

Based on the analyses above, it seems possible to conclude that cross-linguistic influence in the domain of the topic-comment construction and possessive structures

may have caused the bilingually raised children in this study to respond differently to the topic-comment construction than monolinguals.

5.2. Characteristics of maternal input

In the previous section, I considered the possibility of cross-linguistic influence of English on Japanese in the bilingually raised children in the current study from the perspective of the two conditions proposed by Hulk and Müller (2000) and Müller and Hulk (2001), that is, (a) it occurs in the interface between pragmatics and syntax and (b) there has to be a certain overlap of the two grammatical systems at the surface level.

This approach offers a plausible explanation for the difference between the behaviour of the monolingual children in the previous studies and that of the bilingually raised children in the current study. However, it cannot explain the individual variation among the bilingually raised children. There was a great degree of variation among individuals in the results for the picture selection task (see section 4.3.3.3). Some children selected the target picture 100% of the time, whereas other children consistently interpreted the first noun phrase as the agent in the object-initial sentences. If it is indeed cross-linguistic influence of English over Japanese, why did some children not seem to be affected at all while other children seemed to be strongly affected?

When we consider possible explanations for individual variation, we have to consider the characteristics of maternal input, because some researchers claim that there is a relation between either quality or quantity of input and simultaneous bilingual development (Austin, 2009; Cornips & Hulk, 2008; De Houwer, 2007; Francis, 2011; La Morgia, 2011; Mykhaylyk, 2009; Schlyter, 1993; Unsworth et al., 2012). In this section, we will review two studies that focused on aspects of the maternal input that are relevant to the current study, Rispoli (1991) and Tanaka and Shirai (in press).

Previous studies on first language acquisition of Japanese have pointed out the frequent omission of argument noun phrases and case particles in child directed speech (CDS) (Clancy, 1985; Rispoli, 1991; Tanaka & Shirai, in press). Rispoli (1991) studied

450 action sentences produced by 9 parents and caregivers addressing their 7 children aged between 22 and 30 months and found a considerable amount of constituent ellipsis and case particle drop. There were 226 transitive sentences among the 450 action sentences as shown in Table 42. Surprisingly, 32% of the 226 transitive sentences had neither subjects nor objects. 13% had subject NPs only (SV) and 44% had object NPs only (OV). 9% of the transitive sentences were null object (SV) sentences where the subject appeared without a case particle, and 36% of the transitive sentences were null subject (OV) sentences where the object appeared without a case particle. Only 11% of the transitive sentences exhibited both explicit subjects and explicit objects (SOV), and only 1% of the transitive sentences contained both an explicit subject with overt case marking and an explicit object with overt case marking. In Table 42, *–ga* means that the case particle *ga* was dropped, whereas *+ga* means that the case particle was pronounced.

Transitive sentence type	Frequency	%
–causer, –theme/patient (V)	73	32%
+causer, –theme/patient (SV)	29	13%
–ga	21	9%
+ga	8	4%
–causer, +theme/patient (OV)	99	44%
–o	82	36%
+o	15	7%
+ga (non-canonical case frame)	2	1%
+causer, +theme/patient (SOV)	25	11%
–ga, –o	18	8%
+ga, –o	3	1%
–ga, +o	2	1%
+ga, +o	2	1%
Total	226	100%

Table 42: Frequency of explicit causer, theme/patient NPs, and case-marking in 450 action sentences of Japanese caregivers in CDS (Rispoli, 1991: 45)

Tanaka and Shirai (in press) investigated how Japanese monolingual children interpret transitive sentences by looking at the available cues in the framework of the Competition Model (Bates & MacWhinney, 1989). The Competition Model considers multiple potential cues indicating agent-patient relations and posits that the frequency and consistency of the cues in the input have an effect on form-function mapping in the syntactic development. Tanaka and Shirai focused on cue validity because in the model, children are argued to rely on the cue that has most validity. Cue validity is further

decomposed into availability and reliability. Availability is the percentage of the time that a cue is present when needed. Reliability is the percentage of the time that the cue leads to correct interpretation when it is present.

Tanaka and Shirai chose data from the CHILDES corpus (MacWhinney, 2000) by 2 monolingual children and their mothers when the children were 3;0, 4;0, and 5;0. They analysed all the transitive verbs used in interactions between the two children and their mothers, where the two children produced 736 utterances containing transitive verbs, and the mothers produced 1,011. The word order cue was counted as 'available' when two overt nouns were present, and as 'reliable' when the arguments were in canonical order. The animacy contrast cue was considered 'available' when one of the arguments was animate and the other inanimate. Tanaka and Shirai evaluated the animacy contrast based on the context even when the argument was not overtly expressed in the sentence. For the animacy contrast cue to be 'reliable', the subject had to be animate and the object had to be inanimate. The case marking cue was counted as 'available' when at least one of two arguments was case marked, and as 'reliable' when the particle marked what it was expected to mark. The results are shown in Table 43.

		Mothers		Children	
		frequency	%	frequency	%
word order cue	availability	62	6.1%	73	8.6%
	reliability	53	85.5%	62	84.9%
animacy contrast cue	availability	945	93.5%	697	94.7%
	reliability	943	99.8%	697	100.0%
case marking cue	availability	11	17.5%	11	17.7%
	reliability	11	100.0%	11	100.0%

Table 43: Availability and reliability of the cues (Tanaka & Shirai, in press: 288f)

The results show that animacy is highest in cue validity, followed by case marking and then word order. The availability of the case marking cue in mothers' speech was only 17.5% but the reliability was 100% when it was present.

Tanaka and Shirai next looked at how these cues interacted with each other. Table 44 shows frequency and percentage of cues in combination and alone.

	mother		child	
Cues	frequency	%	frequency	%
WO+AC+CM	6	9.5%	6	9.7%
WO+AC	44	69.8%	45	72.6%
AC+CM	5	7.9%	3	4.8%
WO+CM	1	1.6%	0	0.0%
WO	3	4.8%	1	1.6%
AC	5	7.9%	6	9.7%
CM	0	0.0%	0	0.0%

Table 44: Cues in combination and alone (Tanaka & Shirai, 2013)
(WO: word order, AC: animacy contrast, CM: case marking)

The cue combination of word order and animacy contrast was most frequent: 69.8% in the mothers' speech and 72.6% in the children's speech. This suggests that when there are two overt arguments, the first noun will generally be an animate agent and the second noun will usually be an inanimate theme. Although the case marking cue scored highest in reliability, it always appeared in conjunction with other cues, suggesting that children are not usually put in a situation where they have to rely on case marking alone to determine the target interpretation. Tanaka and Shirai claim that the results shed some light on why it is hard for Japanese children to acquire case marking, and they propose that the order of cue strength for Japanese monolingual children's sentence comprehension and production is Animacy > Word order > Case, whereas the order of cue strength for adults seem to be Case > Animacy > Word order (Bates & MacWhinney, 1989).

The studies by Rispoli (1991) and Tanaka and Shirai (in press) drew attention to important characteristics of maternal input. Rispoli found a great degree of constituent ellipsis and case marker drop in the maternal input. Tanaka and Shirai demonstrated that there were transitive sentences in the maternal input that provided only the word order cue to the agent-patient relationship and sentences that provided only the animacy contrast cue, but the case marking cue never appeared alone. Thus, in spite of its high cue reliability, the case marking cue is the weakest cue compared to the word order cue and the animacy contrast cue.

Although the current study did not collect maternal speech data, we might expect that the children in the current study have been exposed to similar maternal input in

terms of Japanese transitive sentences and case marking as the monolingual children in Rispoli (1991) and Tanaka and Shirai (in press). If this assumption is right, then a question arises as to whether the children have sufficient Japanese input and how they manage to succeed in learning the use of the particles without clear evidence in the input. Thus it seems possible that in the absence of sufficient Japanese input that tells the children how Japanese case markers work, the bilingually raised children in this study have no choice but to transfer the strategy for identifying the agent from English to Japanese. Since the amount and quality of input that the children are exposed to may vary, the rate of acquisition of morphological case marking knowledge will inevitably vary too (cf. Austin, 2009).

As Meisel (2011) suggests that if exposure to one language is drastically reduced, the LAD (language acquisition device) may reach its limit, we cannot rule out the possibility of incomplete acquisition of the *ga-o* contrast in some of the bilingually raised children based on the data collected in Part 1 of the current study. A few children of the oldest age group appeared considerably delayed.

5.3. Linguistic background

Although the current study did not collect any data on input and fluency, some light can be shed on the issue from the parent interview that was conducted after the tasks were completed. To determine whether there was relation between individual performance in the tasks and their language environments, the individual information reported by the mothers was coded as either 1 or 0, with 1 for the response that can be considered to represent greater exposure to Japanese for a logistic regression analysis. The children's responses to the tasks were also coded as either 1 or 0, with a coding of 1 given when the child responded on target 75% or more of the time to each sentence type. The converted information and the results of a generalized linear model are shown in Table 45 and Table 46 respectively.

FB	Firstborn/singleton Second/third-child	1 for the first child or singleton 0 for the second or third child
JPG	Japanese Play Group	1 for attendance 0 if not
JSS	Japanese Supplementary School	1 for attendance 0 if not
T2J	Frequency of travel to Japan	1 if the average days in Japan per year are 12 and more 0 if not
SIJ	Schooling in Japan	1 for attendance 0 if not
OA	Other advantage	1 if the mother was a JSOL teacher 1 if there was a native Japanese speaker other than the mother living in the same house 0 if not

Table 45: Individual information coding

	Part 1			Part 2			Total	
	Estimate	Pr(>|z|)		Estimate	Pr(>|z|)		Estimate	Pr(>|z|)
GenderM	0.7234	0.4713		-0.2720	0.7801		-0.2044	0.8238
Age	0.0484	0.0680		-0.0055	0.8181		0.02963	0.2022
FB	-0.1175	0.9077		-0.7057	0.5777		-0.3119	0.7475
JPG	-0.4602	0.6187		1.8530	0.0799		-0.6348	0.4632
JSS	-0.8499	0.5535		20.5600	0.9951		0.9830	0.5039
T2J	-0.2201	0.8188		-0.5211	0.6025		-0.6915	0.4347
SIJ	2.1336	0.0474	*	2.2290	0.0490	*	1.3952	0.1450
OA	1.4224	0.2248		-0.4205	0.7338		0.5965	0.5718

(Significance codes: *** p<0.001, ** p<0.01, * p<0.05)

Table 46: Effect estimates and P-values for individual performance

Experience of schooling in Japan (SIJ) had a statistically significant effect on individual performance in Part 1 – picture selection ($p<0.05$) and Part 2 – elicited imitation ($p<0.05$), but not overall ($p=0.1450$). Although many mothers reported that the first child had a better command of Japanese than the second and third child, this effect (FB) was not statistically significant in the current study ($p=0.9077$ in Part 1, $p=0.5777$ in Part 2, $p=0.7475$ in Total).

The results indicate that the children who had experienced schooling in Japan (either a kindergarten or a primary school) performed better in the tasks than the other children. Considering that experience of schooling in Japan (SIJ) is substantially different from other factors such as attendance to Japanese play group and Japanese supplementary school that are within a English dominant environment, as opposed to a

Japanese dominant environment, the analysis of the mother's responses to the linguistic background survey seem to support the hypothesis that input plays an important role in the acquisition of case and topic marking in Japanese.

The current study argues that there is cross-linguistic influence from English in terms of the acquisition of Japanese case and topic marking of in the object-initial sentence types and the topic-comment construction, which satisfy the two conditions for cross-linguistic influence proposed by Hulk and Müller (2000) and Müller and Hulk (2001). Those structures involve the interface between syntax and pragmatics in the C-domain, and English and Japanese overlap at the surface level in terms of the agent position in a canonical sentence, and in the possessive structure that the bilingually raised children produced in response to the topic-comment stimuli (see 5.1). Studies of L1 acquisition revealed the frequent omission of argument noun phrases and case particles, and a weakness of the case marking cue in the maternal input, which raises a question as to whether the bilingually raised children in the current study have sufficient Japanese input (see 5.2). Although the current study did not collect any input data, the analysis of linguistic background that the mothers reported for each child in the parent interview did seem to support the idea that input may have a significant effect on the child's performance in the tasks (schooling in Japan $p<0.05$).

5.4. Limitations

It must be noted that this study has several limitations. Firstly, the number of participants was small and the participants are not evenly distributed across age and gender. Secondly, the number of tasks was small. There were only four tokens per participant for each sentence type in Part 1 of the study – picture selection, and only one to three tokens per participant for each sentence type in Part 2 of the study – elicited imitation. Thirdly, as the range of possible responses for the picture selection tasks is binominal (right or left), the possibility of chance cannot be denied. Lastly, the current study did not collect any data on the children's fluency in Japanese, or on the amount and quality of the Japanese input that might explain the variation among individuals observed in the current study.

6. Conclusions

The current study addresses the question whether children raised bilingually in Japanese and English from birth behave like monolingual learners of Japanese with respect to the case and topic marking system, by examining the children's knowledge of the use of the nominative particle *-ga,* the accusative particle *-o,* and the topic particle *-wa*. The study employed an experimental method that involved two different types of tasks: picture selection and elicited imitation.

The results for the picture selection task revealed that some of the children in the current study had difficulties in interpreting the agent-patient relationships in transitive sentences with non-canonical word order. Some children tended to rely on the word order cue rather than the case marking cue in identifying the agent.

However this is not a phenomenon unique to the bilingually raised children in this study. Comparative data from studies of monolingual acquisition suggest that monolingual children also go through a stage of interpreting the agent and patient relationship based on the word order cue. The monolingual children, however, seemed to switch from relying on the word order cue to using the case marking cue at around five years of age. In contrast, there was a great degree of variation among the bilingually raised children. Some children responded on target using the case marking cue like monolingual children of the same age, whereas other children consistently interpreted the first noun phrase as the agent in the object-initial sentences based on the word order cue, even in the oldest age group.

The results of the picture selection tasks also shed light on the fact that the structural differences between null subjects, scrambling and topicalization affect children's interpretation. Even after a child has acquired the *ga-o* contrast, the child may not be able to apply the knowledge in interpreting either the scrambled or object-topicalized sentences or both. Although this phenomenon can be observed in monolinguals as well, the differences between the constructions were more noticeable in the current study.

The results for the elicited imitation task revealed that many of the bilingually raised children re-analysed the topic-comment construction as a genitive possessive. This appears to be a phenomenon unique to the bilingually raised children. This pattern was not observed in monolingual children in the previous study or the monolingual data collected in the current study, the only exception being the oldest girl (6;2) who responded with a genitive possessive pattern.

The difference between monolingual children's behaviour and that of the bilingually raised children can be plausibly attributed to cross-linguistic influence from English. It was the object-initial sentence types such as null subjects, scrambling, and object-topicalization, and the topic-comment construction that were problematic for some of the children in the current study. Those structures involve the interface between syntax, pragmatics, and case and topic marking morphology in the C-domain, and English and Japanese overlap at the surface level in terms of the agent position in a canonical sentence, and in the possessive structure that the bilingually raised children produced in response to the topic-comment stimuli. These phenomena, thus, satisfy the two conditions for cross-linguistic influence proposed by Hulk and Müller (2000) and Müller and Hulk (2001).

In view of studies of L1 acquisition that revealed the frequent omission of argument noun phrases and case particles and a weakness of the case marking cue in the maternal input, the question arises as to whether the bilingually raised children in the current study have sufficient Japanese input. Since the current study did not collect any input data, we cannot tell whether input is a factor in a great degree of individual variation between children in this study. However, the analysis of the linguistic background information that the mothers reported for each child in the parent interview seems to support the idea that input plays an important role in the acquisition of case and topic marking in Japanese, since the effect of schooling in Japan was statistically significant ($p<0.05$). Further research will be necessary to identify whether factors such as language fluency and the amount and quality of the input might be responsible for variation among individuals in the current study.

Appendices

Appendix A: Parental interview sheet

質問票 The structured interview question sheet

◆お子さんのお名前 Child's name
◆生年月日 Date of birth
◆出生地 Birthplace

◆お子さんとの会話 language used when addressing your child
お父さんとお子さん language between the father and the child
お母さんとお子さん language between the mother and the child
ご夫婦の会話 language between parents
兄弟姉妹の会話 language between siblings

◆通学状況 Education, Activities, Lessons (In what language? How frequent?)

◆日本帰国歴 Travel to Japan
(When, how long, who with, language while in Japan)
(Has your child ever entered a school or kindergarten in Japan?)

◆ご家族以外の方(例えば、ご親戚・ご両親のご友人・お子さんのご友人等)との会話
Language between the child and people other than the family member
(Who speaks which language to the child? How frequent is the opportunity?)

◆その他お子さんの使用言語について特記事項
Is there anything else you would like to tell about your child's language use or development? Does your child like Japanese books, comics, TV programs, DVDs, or games? What is your biggest concern about your child's language development?

◆ご両親の学歴とご職業(差支えなければ)
If you don't mind, please provide parents' educational background and occupation.

Appendix B: All the responses for Part 1 – Picture selection

age		sex	push						kick						hit						bite					
y	m		sov	sv	ov	osv	wg	gw	sov	sv	ov	osv	wg	gw	sov	sv	ov	osv	wg	gw	sov	sv	ov	osv	wg	gw
4	11	G	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	0
5	0	G	1	1	0	0	0	1	1	1	1	1	0	1	1	1	1	0	0	1	1	1	0	0	0	1
5	2	G	1	1	0	0	0	1	1	1	0	0	0	1	1	1	1	0	0	1	1	1	0	0	0	1
5	5	B	1	1	1	0	0	0	1	1	0	0	1	1	1	1	1	0	0	1	1	1	0	1	0	1
5	9	G	1	1	0	0	0	1	1	1	1	0	0	1	1	1	1	0	0	1	1	1	1	1	0	1
5	11	B	1	0	1	1	0	1	1	1	1	0	0	1	1	1	1	0	0	1	1	1	0	0	0	1
6	5	G	0	1	1	0	0	1	1	1	1	0	0	1	1	1	1	0	0	0	1	1	1	0	0	1
6	5	B	1	1	0	1	1	1	1	1	0	1	0	1	1	1	0	1	0	1	1	1	0	1	0	1
6	9	G	1	1	0	0	0	1	1	1	1	1	0	1	1	1	1	0	0	1	1	1	1	1	0	1
6	11	B	1	1	0	0	0	1	1	1	0	0	0	1	1	1	0	0	0	1	1	1	0	0	0	1
6	11	B	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	0	1	0	1
7	0	B	1	1	0	0	0	1	1	1	0	0	0	1	1	1	0	0	0	1	1	1	0	0	0	1
7	0	G	1	1	0	0	0	1	1	1	0	0	0	1	1	1	0	0	0	1	1	1	1	0	0	1
7	7	G	1	1	1	0	0	1	1	1	1	0	0	1	1	1	1	1	0	1	1	1	0	1	0	1
7	8	G	1	1	1	0	0	1	1	1	1	0	0	1	1	1	1	0	0	1	1	1	0	0	0	1
7	11	B	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8	1	G	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8	4	G	1	1	0	0	0	1	1	1	1	0	0	1	1	1	0	0	0	1	1	1	0	0	0	1
8	4	B	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
8	9	G	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	0	0	1	1	1	1	1	0	1
8	9	B	1	1	0	0	0	1	1	1	0	0	0	1	1	1	1	0	0	1	1	1	1	0	0	1
9	0	G	1	1	0	0	0	1	1	1	1	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1
9	4	B	1	1	1	0	0	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	0	1
9	4	B	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1
9	4	G	1	1	0	0	0	1	1	1	0	0	0	1	1	1	0	0	0	1	1	1	0	0	0	1
9	6	G	1	1	0	0	0	1	1	1	1	0	0	1	1	1	1	0	0	1	1	1	1	0	0	1
9	6	B	1	1	0	1	1	0	1	1	1	1	1	0	1	1	1	0	0	1	1	1	1	0	0	1
9	8	G	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	0
9	9	G	1	1	0	0	0	1	1	1	1	0	0	1	1	1	1	0	0	1	1	1	1	0	0	1
10	0	G	1	0	1	0	0	1	1	0	0	0	0	1	1	1	0	0	0	1	1	1	0	0	0	1
10	4	G	1	1	1	0	0	1	1	1	1	1	0	1	1	1	1	0	0	1	1	1	1	1	0	1
10	5	G	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11	0	G	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	0	1	1	1	1	1	0	1
11	10	B	1	1	0	0	0	1	1	1	0	0	0	1	1	1	0	0	0	1	1	1	0	0	0	1

- 1: target, 0: non-target
- The grey indicates where the child misinterpreted the first noun as an agent in spite of the fact that the particle following the first noun was not the nominative marker, suggesting that the child determined the agent based on word order.
- The pale grey indicates where the child misinterpreted the first noun as a patient in spite of the nominative marker. This may have been an accident because it cannot be explained by word order.
- The dark grey indicates where the child interpreted the first noun as a patient in spite of the nominative marker in the Type F sentence.

Appendix C: All the response patterns for Pilot study 2 – Elicited imitation

Age Y	Age M	Sex	Type of stimuli	G a1, a2	G b1, b2	G c1, c2	J d	K e	K f1	H f2	K g	J h	K j
5	1	B	part 1	0 -ga	-wa 0	0 -ga	0	0	0	0	#	#	#
			part2	-	-	-	-	-	-	-	-	-	-
5	10	G	part 1	0 -ga	-wa 0	0, 0	0	0	0	0	-wa	0	0
			part2	-wa -ga	-wa 0	-wa ?	-wa	-wa	-wa	-ga	-wa	-ga	-wa
6	8	G	part 1	0 -ga	-no ?	0 0	0	0	0	0	-wa	0	#
			part2	0 -ga	-no -ga	0 0	0	-wa	0	0	-wa	0	#
8	0	G	part 1	-no -ga	-no 0	-no 0	0	0	0	0	-wa	0	0
			part2	0 -ga	-no 0	-no 0	0	0	0	0	-wa	0	0
10	2	G	part 1	0 -ga	-wa -ga	0 0	0	0	0	0	-wa	-ga	-wa
			part2	-wa -ga	-wa -ga	-wa -ga	-wa	-wa	0	-ga	-wa	-ga	-wa
11	11	G	part 1	-wa -ga	-wa -ga	-wa -ga	-wa	-wa	-wa	-ga	-wa	-ga	-wa
			part2	-wa -ga	-wa -ga	-wa -ga	-wa	-wa	-wa	-ga	-wa	-ga	-wa
12	4	B	part 1	-wa -ga	-wa -ga	-wa -ga	-ga	-wa	-wa	-ga	-wa	-ga	-wa
			part2	-wa -ga	-wa -ga	-wa -ga	-ga	-wa	-wa	-ga	-wa	-ga	-wa
14	9	G	part 1	0 -ga	-wa -ga	-wa -ga	-ga	-wa	-wa	-ga	-wa	-ga	-wa
			part2	-wa -ga	-wa -ga	-wa -ga	-wa	-wa	-wa	-ga	-wa	-ga	-wa

- Part 1: the target particles in the sound stimuli were clipped and the gap was refilled with a natural but obscure sound.
- Part 2: the target particles in the sound stimuli were masked with brown noise.
- 0: particle ellipsis, ?: uninterpretable
- #: the stimulus was rephrased or no response.
- The pale grey indicates that the response pattern was not on target but grammatical and possible with different reading.
- The grey indicates that the response pattern was not on target because of particle ellipsis, inappropriate particle use, and uninterpretable response, or because the stimulus was rephrased without an appropriate particle.

Appendix D: All the response patterns for Part 2 – Elicited imitation

Age		Sex	G	G	G	J	K	K	H	K	J	K
Y	M		a1, a2	b1, b2	c1, c2	d	e	f1	f2	g	h	j
4	11	G	0 -ga	-wa -ga	0 -ga	0	0	0	0	-wa	0	-wa #9
5	0	G	0 -ga	0 0	0 -ga	0	0	0	0	-wa	0	0
5	2	G	0 -ga	-wa 0	0 0	0	0	0	0	?	0	0
5	5	B	-wa -ga	-no -wa	-no 0	0	0	-wa	0	-wa	0 #2	-wa #10
5	9	G	-wa -ga	-wa -ga	-wa -ga	-wa	-wa	-wa	-ga	-wa	-ga	-wa #11
5	11	B	-no -ga	-no -wa	-no 0	-wa	-wa	?	0	-wa	0	-wa
6	5	G	-no -ga	-no -ga	-no -ga	-wa	-wa	0	0	-wa	-ga	-ga
6	5	B	-no -ga	-wa -ga	-no -wa	-wa	-wa	-wa	-ga	-wa	-ga	-wa
6	9	G	-wa -ga	-wa -ga	-wa 0	-wa	-wa	-wa	0	-wa	0	0
6	11	B	-no -ga	-no -wa	-no -o	-o	-wa	-o	0	0	#3	#12
6	11	B	-wa -ga	-wa -ga	-no -ga	-wa	-wa	-wa	-ga	-wa	-ga	-wa
7	0	B	-wa -ga	-wa -ga	-wa -ga	-wa	-wa	-wa	-ga	-wa	-ga	-wa #13
7	0	G	-wa -ga	-o 0	-o -wa	-wa	?	-wa	-o	-wa	-wa #4	#14
7	7	G	-no -ga	-wa -ga	-no -wa	-ga	-wa	-wa	-ga	-wa	-ga	-wa
7	8	G	-no -ga	-no -ga	-no -ga	-ga	-wa	-wa	0	-wa	-ga	-wa
7	11	B	-wa -ga	-wa -ga	-wa -ga	-ga	-wa	-wa	-ga	-wa	-ga	-wa
8	1	G	-wa -ga	-wa -ga	-wa -ga	-ga	-wa	-wa	-ga	-wa	-ga	-wa
8	4	G	-no -ga	-wa -ga	-no -ga	-ga	-wa	-wa	0	-wa	0	0
8	4	B	-no -ga	-no -wa	-no -wa	-wa	-wa	-wa	-ga	-wa	-ga	-wa
8	9	G	-no -ga	-wa -ga	-no -ga	-ga	-wa	-wa	0	-wa	-ga	-ga
8	9	B	-no -ga	-wa 0	-no -wa	-wa	-wa	-wa	-ga	-wa	-wa	0
9	0	G	-wa -ga	-wa -ga	-wa -ga	-wa	-wa	-wa	-ga	-wa	-ga	-wa
9	4	B	-no -ga	-no -wa	-no -ga	-no	-wa	-no	-o	-wa	-ga #5	#15
9	4	B	-no -ga	-wa -ga	-wa -ga	-ga	-wa	-wa	-ga	-wa	-ga	-wa
9	4	G	-no -ga	-wa -ga	-wa -ga	-wa	-wa	-wa	-ga	-wa	-ga	-wa
9	6	G	-no -ga	-wa -ga	-no -ga	-wa	-wa	-wa	-ga	-wa	-ga	-wa
9	6	B	-no -ga	-no -ga	-no -ga	-ga	-wa	-wa	-ga	-wa	-ga	-wa
9	8	G	-no -ga	-wa -ga	-no -ga	-ga	-wa	-wa	-ga	-wa	-ga	-wa
9	9	G	-no -ga	-no -ga	-no -ga	-ga	-ga	-wa	0	-wa	-ga #6	#16
10	0	G	-no -ga	-no -wa	-no -wa	-wa	-wa	-wa	#1	-wa	#7	-tte #17
10	4	G	-wa -ga	-wa -ga	-wa -ga	-wa	-wa	-wa	-ga	-wa	-ga	-wa
10	5	G	-no -ga	-wa -ga	-no -wa	-wa	-wa	-wa	-ga	-wa	-ga	-wa
11	0	G	-wa -ga	-wa -ga	-wa -ga	-ga	-wa	-wa	-ga	-wa	-ga	-wa
11	10	B	-no -ga	-no -ga	-no -ga	-ga	-ga	-wa	-ga	-ga	#8	#18

- 0: particle ellipsis, ?: uninterpretable
- #: the stimulus was rephrased.
- The pale grey indicates that the response pattern was not on target but grammatical and possible with different reading.
- The grey indicates that the response pattern was not on target because of particle ellipsis, inappropriate particle use, and uninterpretable response, or because the stimulus was rephrased without an appropriate particle.

References

Austin, J. (2009). Delay, interference and bilingual development: The acquisition of verbal morphology in children learning Basque and Spanish. *International Journal of Bilingualism, 13*(4), 447-479.

Bates, E., & MacWhinney, B. (1989). Functionalism and the competition model. In E. Bates & B. MacWhinney (Eds.), *The crosslinguistic study of sentence processing* (pp. 3-73). New York: Cambridge university press.

Bernardini, P., & Schlyter, S. (2004). Growing syntactic structure and code-mixing in the weaker language: The Ivy Hypothesis. *Bilingualism Language and Cognition, 7*(1), 49-70.

Bloom, L., Hood, L., & Lightbown, P. (1974). Imitation in language development: If, when, and why. *Cognitive Psychology, 6*(3), 380-420.

Bošković, Ž. (2004). Topicalization, focalization, lexical insertion and scrambling. *Linguistic Inquiry, vol.35*(4), 613-638.

Chafe, W. L. (1974). Language and Consciousness. *Language, 50*(1), 111-133. doi: 10.2307/412014

Chomsky, N. (1981). *Lectures on government and binding*. Dordrecht, Holland: Foris Publications.

Chomsky, N. (2000). Minimalist inquiries: The framework. In R. Martin, D. Michaels & J. Uriagereka (Eds.), *Step by step: Essays on minimalist syntax in honor of Howard Lasnik* (pp. 89–155). Cambridge, MA: MIT Press.

Chomsky, N. (2002). *On nature and language*. New York: Cambridge university press.

Chomsky, N. (2006). *Language and mind third edition*. New York: Cambridge university press.

Cinque, G. (1993). A null theory of phrase and compound stress. *Linguistic Inquiry, 24*(2), 239-297.

Clancy, P. M. (1985). The acquisition of Japanese. In D. I. Slobin (Ed.), *The crosslinguistic study of language acquisition. Volume 1: The data* (pp. 373-524). Hillsdale, New Jersey: Lawrence Erlbaum Associates Inc Publishers.

Cornips, L., & Hulk, A. (2008). Factors of success and failure in the acquisition of grammatical gender in Dutch. *Second Language Research, 24*(3), 267-295.

De Houwer, A. (1990). *The acquisition of two languages from birth: A case rtudy*. Cambridge: Cambridge university press.

De Houwer, A. (2006). Bilingual language development: Early years. In K. Brown (Ed.), Encyclopedia of language & linguistics (Second edition) (pp. 780-786). Oxford: Elsevier. Retrieved from http://www.sciencedirect.com/science/article/pii/B0080448542008427. doi: http://dx.doi.org/10.1016/B0-08-044854-2/00842-7

De Houwer, A. (2007). Parental language input patterns and children's bilingual use. *Applied Psycholinguistics, 28*, 411-424.

Francis, N. (2011). Imbalances in bilingual development: A key to understanding the faculty of language. *Language Sciences, 33*(1), 76-89.

Fujimoto, M. (2008). *L1 acquisition of Japanese particles: A corpusbased study.* Doctoral dissertation, The City University of New York.
Gawlitzek-Maiwald, I., & Tracy, R. (1996). Bilingual bootstrapping. *Linguistics, 34*(5), 901-926.
Hakuta, K. (1982). Interaction between particles and word order in the comprehension and production of simple sentences in Japanese children. *Developmental Psychology, vol.18*(1), 62-76.
Halliday, M. A. K. (1967). Notes on Transitivity and Theme in English: Part 2. *Journal of Linguistics, 3*(2), 199-244. doi: 10.2307/4174965
Hatano, E. (1979). A study of children's acquisition of particles wa and ga in Japanese. *The Japanese Journal of Educational Psychology, vol. 27*(3), 160-168.
Hauser-Grüdl, N., Arencibia Guerra, L., Witzmann, F., Leray, E., & Müller, N. (2010). Cross-linguistic influence in bilingual children: Can input frequency account for it? *Lingua, 120*(11), 2638-2650.
Hayashibe, H. (1975). Word order and particles: A developmental study in Japanese. *Descriptive and Applied Linguistics, 8*, 1-18.
Hoji, H. (1998). Null object and sloppy identity in Japanese. *Linguistic Inquiry, 29*(1), 127-152.
Hulk, A., & Müller, N. (2000). Bilingual first language acquisition at the interface between syntax and pragmatics. *Bilingualism: Language and Cognition, 3*(3), 227-244.
Ishihara, S. (2001). Stress, focus, and scrambling in Japanese. *MIT working papers in linguistics, 39*, 151-185.
Ito, K. (1990). *Kodomo no kotoba: Syutoku to sozo*. Tokyo, Japan: Keiso Syubo.
Ito, T. (1990). *Nihongo ni okeru joshi no kakutoku: ha ga o no hattatsu shinrigaku teki kenkyu.* Doctoral dissertation, Tohoku university, Sendai, Japan.
Kang, B. (2005). *Acquisition of language particular properties under impoverished input.* Doctoral dissertation, University of Connecticut.
Kuno, S. (1972). *The structure of the Japanese language*. Cambridge, MA.: MIT press.
Kuno, S. (1973). *Nihon bunpo kenkyu*. Tokyo Japan: Taishukan.
Kuroda, S.-Y. (2005). Focusing on the matter of topic: a study of wa and ga in Japanese. *Journal of East Asian Linguistics, 14*(1), 1-58.
La Morgia, F. (2011). *Bilingual first language acquisition: the nature of the weak language and the role of the input.* Doctoral dissertation, Dublin City university.
Laenzlinger, C. (2010). *Elements of comparative generative syntax: A cartographic approach*. Padova: Unipress.
Lust, B., Flynn, S., & Foley, C. (1996). What children know about what they say: Elicited imitation as a research method for assessing children's syntax. In D. McDaniel, C. McKee & H. S. Cairns (Eds.), *Methods for assessing children's syntax* (pp. 55-76): The MIT Press.
MacWhinney, B. (2000). The CHILDES project: Tools for analyzing talk. Mahwah, N.J: Lawrence Erlbaum Associates.
Mahajan, A. K. (1990). *The A/A-bar distinction and movement theory.* Doctoral dissertation, Massachusetts Institute of Technology.

Masunaga, K. (1983). Bridging. In S. Hattori & K. Inoue (Eds.), *Proceedings of the XIIIth international congress of linguistics* (pp. 455-460). Tokyo: Proceedings publishing committee.
Matsuoka, K. (1998). *The acquisition of Japanese case particles and the theory of Case checking.* Doctoral dissertation, The university of Connecticut.
Mazuka, R., Itoh, K., & Kondo, T. (2002). Cost of scrambling in Japanese sentence processing. In M. Nakayama (Ed.), *Sentence processing in east Asian languages* (pp. 131-166). Stanford: CSLI Publications.
Meisel, J. M. (1989). Early differentiation of languages in bilingual children. In K. Hyltenstam & L. K. Obler (Eds.), *Bilingualism across the lifespan: aspects of acquisition, maturity and loss* (pp. 13-40). Cambridge: Cambridge university press.
Meisel, J. M. (2007). The weaker language in early child bilingualism: Acquiring a first language as a second language? *Applied Psycholinguistics, 28*(3), 495-514.
Meisel, J. M. (2011). *First and second language acquisition: Parallels and differences*. New York: Cambridge university press.
Mikami, A. (1976). *Zo wa hana ga nagai*. Tokyo: Kuroshio Shuppan.
Miyagawa, S. (2003). A-movement scrambling and options without optionality. In S. Karimi (Ed.), *Word order and scrambling* (pp. 177-200). Oxford, UK: Blackwell publishing Ltd.
Miyagawa, S. (2005). EPP and semantically vacuouc scrambling. In J. Sabel & M. Saito (Eds.), *The free word order phenomenon: Its syntactic sources and diversity* (pp. 181-220). Berlin: De Gruyter Mouton.
Miyamoto, E. T., & Nakamura, M. (2003). Subject/object asymmetries in the processing of relative clauses in Japanese. In G. Garding & N. Tsujimura (Eds.), *Proceedings of the 22nd West Coast conference on formal linguiatics* (pp. 342-355). Somerville, MA: Cascadilla Press.
Miyata, S. (2008). Input frequency and case aquisition in Japanese. *Journal of Medical Welfare, 4*, 108-117.
Müller, N. (2008). Builingual first language acquisition at the interface between syntax and pragmatics. *EUROSLA Yearbook, 8*, 52-78.
Müller, N., & Hulk, A. (2001). Crosslinguistic influence in bilingual language acquisition: Italian and French as recipient languages. *Language and Cognition, 4*(1), 1-21.
Murasugi, K., & Sugisaki, K. (2008). The acquisition of Japanese syntax. In S. Miyagawa & M. Saito (Eds.), *The Oxford handbook of Japanese linguistics* (pp. 250-286). New York: Oxford university press Inc.
Mykhaylyk, R. (2009). Developmental patterns in flexible word order acquisition. In J. Crawford, K. Otaki & M. Takahashi (Eds.), *Proceedings of the 3rd conference on generative approaches to language acquisition North America (GALANA 2008)* (pp. 165-174). Somerville, MA: Cascadilla proceedings project. www.lingref.com, document #2317.

Nakamura, K. (2011). Three kinds of wa-marked phrases and topic-focus articulation in Japanese. *GG@G (Generative Grammar in Geneva), Vol. 7*, (pp. 33-47) retrieved from http://www.unige.ch/lettres/linge/syntaxe/journal/Volume37/Nakamura_GGG11.pdf.

Neeleman, A., Titov, E., van de Koot, H., & Vermeulen, R. (2009). A syntactic typology of topic, focus and contrast. *Alternatives to Cartography. Berlin: Mouton de Gruyter*, 15-51.

Otsu, Y. (1994a). Case-marking particles and phrase structure in early Japanese acquisitlon. In B. Lust, M. Suňer & J. Whitman (Eds.), *Syntactic theory and first language acquisition: Cross-lingulstic perspectives. Volume 1, heads, projections and learnability* (pp. 159-169). Hillsdale, New Jersey: Lawrence Erlbaum Associates Inc Publishers.

Otsu, Y. (1994b). Early acquisition of scrambling in Japanese. In T. Hoekstra & B. D. Schwartz (Eds.), *Language acquisition studies in generative grammar* (Vol. 8, pp. 253-264). Amsterdam: John Benjamines publishing company.

Paradis, J., & Genesee, F. (1996). Syntactic acquisition in bilingual children: Autonomous or interdependent? *Studies in Second Language Acquisition, 18*(1), 1-25.

Paradis, J., & Navarro, S. (2003). Subject realization and crosslinguistic interference in the bilingual acquisition of Spanish and English: what is the role of the input? *Journal of Child Language, 30*(2), 371-393.

Reinhart, T. (1995). Interface strategies. *OTS working papers in linguistics*.

Rispoli, M. (1991). The acquisition of verb subcategorization in a functionalist framework. *First Language, 11*, 41-63.

Rizzi, L. (1986). Null objects in Italian and the theory of pro. *Linguistic Inquiry, 17*(3), 501-557.

Saito, M. (2003). A derivational approach to the interpretation of scrambling chains. *Lingua, 113*(4), 481-518.

Saito, M. (2005). Further notes on the interpretation of scrambling chains. In J. Sabel & M. Saito (Eds.), *The free word order phenomenon: Its syntactic sources and diversity* (Vol. 69, pp. 335-376): De Gruyter Mouton.

Sakamoto, T. (2002). Processing filler-gap constructions in Japanese: The case of empty subject sentences. In M. Nakayama (Ed.), *Sentence processing in East Asian languages* (pp. 189-221). Stanford: CSLI publications.

Sano, T. (2004). *The aquisition of Japanese topicalization and the role of discourse context*. Paper presented at the The 28th Boston university conference on language development, Boston, MA. USA.

Schlyter, S. (1993). The weaker language in bilingual Swedish-French children. In K. Hyltenstam & A. Viberg (Eds.), *Progression and regression in language: Sociocultural, neuropsychological & linguistic perspectives*: Cambridge university press.

Shirakawa, M. (2013). Simultaneous bilingual first language acquisition: A case study of English-Japanese bilingual children in Christchurch. *Working papers from NWAV Asia-Pacific 2*. Retrieved from http://www.ninjal.ac.jp/socioling/nwavap02/Shirakawa-NWAVAP2-2013.pdf

Snyder, W. (2007). *Child language: The parametric approach*. New York: Oxford university press.
Suzuki, T. (1999). *Two aspects of Japanese Case in acquisition.* Doctoral dissertation, The university of Hawaii.
Suzuki, T. (2007). The development of Japanese case-markers observed through children's comprehension of single-argument sentences. *Gengo Kenkyu, 132*, 55-76.
Suzuki, T. (2012). Children's on-line processing of scrambling in Japanese. *Journal of Psycholinguistic Research, April 2012, 42*(2), 119-137.
Takahashi, D. (2008). Quantificational null objects and argument ellipsis. *Linguistic Inquiry, 39*(2), 307-326.
Takano, Y. (2010). Scrambling and control. *Linguistic Inquiry, 41*(1), 83-110.
Tanaka, N., & Shirai, Y. (in press). L1 acquisition of Japanese transitive verbs: How do children acquire grammar in the absence of clear evidence? In S. Nam, H. Ko & J. Jun (Eds.), *Japanese/Korean Linguistics* (Vol. 21). Stanford, CA: CSLI.
Unsworth, S., Argyri, F., Cornips, L., Hulk, A., Sorace, A., & Tsimpli, I. (2012). The role of age of onset and input in early child bilingualism in Greek and Dutch. *Applied Psycholinguistics, First View Articles*, 1-41. doi: 10.1017/S0142716412000574
Vermeulen, R. (2008). Topics in Japanese: A unified analysis of contrastive and non-contrastive topics. Retrieved from http://www.phon.ucl.ac.uk/home/reiko/Topics_in_Japanese-Sept08.pdf
Yip, V., & Matthews, S. (2007). *The bilingual child: Early development and language contact*. New York: Cambridge university press.
Yoshimoto, K. (2012). The left periphery of CP phases in Japanese. *Acta Linguistica Hungarica, 59*(3), 339-384.
Zushi, M. (2003). Null arguments: The case of Japanese and Romance. *Lingua, 113*(4), 559-604.