Korean-Chinese Bilingual Children's Comprehension of Korean Relative Clauses: Rethinking of the Structural Distance Hypothesis*

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This paper investigates the asymmetrical development of subject relative clauses and object relative clauses in the acquisition of Korean by Korean-Chinese bilingual children. The results of a picture-aided comprehension task with 96 Korean-Chinese bilinguals show that subject relative clauses are easier to understand than object relative clauses, supporting the structural distance hypothesis (O'Grady et al. 2003), but not the linear distance hypothesis (Hsiao & Gibson, 2003). At the same time, however, an analysis of children's errors leads us to ask a question on the structural distance hypothesis. Children's strategies for understanding the relative clauses such as the canonical sentence strategy and language-specific factors of Korean such as subject-drop and case markers are discussed as an alternative explanation for the subject/object asymmetry found in this study. We propose that language-specific factors should be taken into consideration in the study of acquisition of Korean relative clauses before uncritically ascribing the subject/ object asymmetry to the structural distance hypothesis.

Key words: Korean-Chinese bilingual children, Korean relative clauses, Structural distance hypothesis, Linear distance hypothesis, Canonical sentence strategy

1. Introduction

This paper investigates an asymmetrical development between subject relative clauses and object relative clauses in the acquisition of Korean by

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Korean-Chinese bilingual children. It has been one of the robust findings in the acquisition of relative clauses that subject relative clauses such as (1a) are easier to process (i.e., comprehend and produce) than object relative clauses such as (1b) by L2 learners of English (Gass, 1979, 1980, 1982; Eckman et al., 1988; Doughty, 1991; Wolfe-Quintero, 1992).

(1) Relative clauses in English
a. the cat that [_____ pushes a monkey] (Subject Relative Clause)
b. the cat that [a monkey pushes _____] (Object Relative Clause)

The developmental order of different types of relative clauses has often been found to conform to Keenan and Comrie's (1977) relativization hierarchy (Subject > Direct Object > Indirect Object >···). They propose the hierarchy as a psychologically valid entity, which enables them to predict that the subject is easier to relativize than the object. Similar tendencies were found with different L2 (Hyltenstam, 1984: Swedish; Hawkins, 1989: French; Ortega, 2000: Spanish) and in different situations (Pavesi, 1986: uninstructed/instructed learning; Doughty, 1991: meaning-oriented/rule-oriented learning).

Several theories have been proposed to explain the validity of the acquisition order from a processing point of view. The construction of relative clauses contains a gap in the subordinate clause and its filler (i.e., a head noun). According to different syntactic theories this is created by movement or feature passing. The dependency of the gap and the head noun (i.e., the filler) should be resolved to process relative clauses, which reduces the cost of the working memory. In other words, the dependency of the gap and the head noun (the filler) must be resolved as soon as possible to reduce the demands on the processor (e.g., De Vincenzi, 1992; Hawkins, 1999).

It has been assumed that different amounts of working memory are required depending on the distance between the gap (e.g., the subject or object) and its filler (i.e., the head noun) (Caplan & Waters, 2001; Carpenter, Miyake & Just, 1994). The distance can be measured in various ways according to different hypotheses.

There have been two major hypotheses for measuring the distance between the gap and the head noun; the structural distance hypothesis (e.g., Hamilton, 1995; Hawkins, 1999; O'Grady, 1999; Wolfe-Quintero, 1992) and the linear distance hypothesis (Tarallo & Myhill, 1983; Hawkins, 1989; Hsiao and

Gibson, 2003). The structural distance hypothesis argues that the distance relates to the depth of embedding of the gap in the syntactic structure of the sentence. On the other hand, the linear distance hypothesis argues that the distance is calculated in terms of the number of words or the number of different phrases intervening between the head noun and the gap.

Comparing the subject relative clauses and the object relative clauses in the English examples in (1), however, the structural distance hypothesis and the linear distance hypothesis will predict the same acquisition order, (subject > object). The object is not only more deeply embedded (structurally) than the subject in the structure (i.e., the object is contained in the VP within the IP, whereas the subject is contained in the IP outside the VP), but also more linearly distant from the head noun than the subject is (i.e., the number of intervening words between the object and the head noun is greater than that between the subject and the head noun). This is well illustrated in the following examples:

(2) Comparison of the depth of embedding and the number of intervening words between the head noun and the gap

	Depth of embedding	*Number of words*
a. the cat that [$_{IP}$ _____ [$_{VP}$ pushes a monkey]]	1 (IP)	1 (*that*)
b. the cat that [$_{IP}$ a monkey [$_{VP}$ pushes _____]]	2 (IP, VP)	4 (*that, a, monkey, pushes*)

Therefore, both hypotheses can explain learners' preference for subject relative clauses over object relative clauses in English, confounding each other.

However, Korean relative clauses can tease apart the two hypotheses, providing us with an opportunity to evaluate them because opposite results are predicted by the two hypotheses (O'Grady et al., 2003). In Korean, a head final language, relative clauses precede their head noun, as shown in the following examples:

(3) Relative clauses in Korean

a. Subject RC

[_____	kay-lul	po]-nun	thokki	'the rabbit that sees a dog'
[_____	dog-ACC	see]-ADN	rabbit	
S	O	V	NP	

b. Object RC

[kay-ka	_____	po]-nun	thokki	'the rabbit that a dog sees'
[dog-NOM	_____	see]-ADN	rabbit	
S	O	V	NP	

Therefore, the linear distance between the head and the gap is larger in subject relative clauses than in object relative clauses. Accordingly, the linear distance hypothesis will predict that subject relative clauses will be harder to process than object relative clauses in Korean unlike in English (i.e., object > subject). In contrast, the structural distance hypothesis will predict the same order in Korean as in English (i.e., subject > object) because the depth of embedding between subject and object is the same regardless of the word order difference (i.e., the object is more deeply embedded than the subject). Accordingly, the structural distance hypothesis will predict that subject relative clauses will be easier to process than object relative clauses in Korean.

The studies of the acquisition of Korean relative clauses by Korean children showed somewhat contradictory findings. Kim (1987) and Lee (1991) studied spontaneous speech data from Korean children and found that subject relative clauses were produced earlier than object relative clauses. Cho's (1999) experimental data on Korean children's performance in an elicited production task and picture comprehension task also showed that subject relative clauses were acquired earlier than object relative clauses. However, Lee (1998) obtained different results from her experimental study involving an elicited imitation task and a picture comprehension task with Korean children. She found that indirect object relative clauses were easier to acquire than subject relative clauses, which does not conform to the accessibility hierarchy. A picture-aided comprehension study by Lee et al. (2004) with Korean children also showed Korean children's preference for object relative clauses over subject relative clauses.

Very few studies have been done so far on KFL (Korean as a foreign language) learners' acquisition of relative clause. O'Grady et al. (2003), addressing the opposite predictions by the two hypotheses, studied KSL (Korean as a Second Language) learners' comprehension of Korean relative clauses. They found that adult English-speaking learners of Korean comprehended subject relative clauses far better than object relative clauses in their picture-aided comprehension test, providing supporting evidence for the structural distance hypothesis. Lee (2000) studied KFL learners' writing

data and found that subject relative clauses were more frequent than object relative clauses in free composition by L2 learners of Korean. In contrast, the opposite order was found in Jun's (2001) study with Korean-English bilingual children and the study by Lee et al. (2004) with Korean-Chinese bilingual children.

Lee et al. (2004) found that Korean-Chinese bilingual children's comprehension of Korean relative clauses was more accurate with object relative clauses than with subject relative clauses. They explained the results with children's word order strategy, arguing that children are likely to assign the agent role to the first noun of the sentence (Lee et al., 2004). Children tend to correctly choose the pictures with object relative clauses containing the order, [[S+V] NP] where the first noun is the agent of the sentence as in a canonical sentence of Korean. However, they tend to make mistakes with subject relative clauses containing the order [[O+V] NP], where the first noun is not the agent, unlike in a canonical sentence.

With these contradictory previous findings, this paper investigates the issue of subject/object asymmetry. It looks at the area of O'Grady et al. (2003) but with different types of subjects: Korean-Chinese bilingual children. The reason for choosing Korean-Chinese bilingual children is to compare our data with previous studies such as O'Grady et al. (2003) and Lee et al. (2004). The subjects of O'Grady et al. were KSL learners using Korean and English, which are different in terms of the direction of head. On the other hand, our subjects (Korean-Chinese bilingual children) are learning two languages which are similar in terms of the direction of head (i.e., Chinese is a head final language with SVO word order). The comparison of the two groups will show us any influence of the second language on the acquisition of Korean relative clauses as well as testing the validity of the structural distance hypothesis. For example, O'Grady et al. (2003) found a big proportion of a typical type of errors in L2 learners' responses which they called 'head errors' arguing that the learners mistook the first NP as the head of the relative clause because of L1 transfer (i.e., a head noun precedes relative clauses in English). In contrast, Korean-Chinese bilingual children will not make such errors because both Korean and Chinese are head final languages, where a head noun follows relative clauses. In other words, head errors caused by L1 transfer (according to O'Grady et al., 2003) will not be made by our subjects, Korean-Chinese bilinguals. However, they still may show errors such as reversal errors, whereby learners mistake object relative clauses for subject relative clauses.

In addition, Korean-Chinese bilingual children in the study of Lee et al. (2004) comprehended object relative clauses better than subject relative clauses, which is different from the pattern of subjects in the study by O'Grady et al. (2003). English-speaking learners of Korean. It seems that the difference resulted from the different experimental methods, which will be discussed in detail in 2.5. Therefore, we still need to confirm their conclusions using a different method. This brings us to the following research questions:

(4) Research questions

a-(i). Is there asymmetry between subject relative clauses and object relative clauses in Korean-Chinese bilingual children's acquisition of relative clauses in Korean?

a-(ii). Which hypothesis provides a better explanation for Korean-Chinese bilingual children's acquisition of relative clauses in Korean, the structural distance hypothesis or the linear distance hypothesis?

b. What type of errors are made in Korean-Chinese bilingual children's acquisition of relative clauses in Korean, compared with English-speaking learners' of Korean? For example, do they make errors similar to so-called head errors (L1 transfer errors) like English-speaking learners?

2. The Study

2.1. Subjects

A total of 96 Korean-Chinese bilingual children and adults participated in this study. The subjects were recruited from a Korean (i.e., Chosunjok) kindergarten, a Korean elementary school, and a Korean education college in Shenyang, China. Total numbers and mean ages of the subjects in each age group are summarized in the following table:

Shenyang, like Yanji, is one of the areas in China where the immigrants from Korea and their descendants comprise a peculiar Korean community preserving Korean culture and language. The people in this area grow up as bilinguals because of this unique situation. They are exposed to Korean and Chinese in public and private life through education, the mass media, etc.

Table 1. Total numbers and mean ages of subjects in each age group

Group	Age range	Mean age	Number of subjects
6 year olds	5;5-6;5	5;11	29
8 year olds	7;5-8;5	8;0	20
10 year olds	9;5-10;5	10;0	20
Adults	18;1-20;5	19;4	27
Total			96

Both parents of all the subjects are Koreans who speak both Korean and Chinese. The teachers at the schools speak Korean and Chinese but the official language in the educational setting is Korean. Even though the students are taught in Korean, most of them feel more comfortable with Chinese when among friends at playtime.

2.2. Method

A picture-aided comprehension task based on the one used by O'Grady, Lee and Choo (2003) was conducted. The relative clauses with head nouns were presented without matrix clauses. There were three sets of pictures of animals for one target item and the subjects were instructed to select the animal indicated by the target relative clause. For example, for the target item '[koyangi-ka cha]-nun wenswungi (= the monkey that the cat is kicking'), one of the three pictures described the situation of a monkey kicking a cat, the second picture described the opposite (i.e., a cat kicking a monkey), and the third described the same situation with other animals. The subjects were instructed to select one animal (not one picture) by putting a check mark on the animal described by the target item. Therefore, the correct answer to this particular target item, [koyangi-ka cha]-nun wenswungi, presented with the corresponding pictures shown in Appendix III-(i), should be the monkey in the left-hand one of the two upper pictures (see Appendix III-(i)).

Five tokens for each type of relative clause (i.e., subject relative clauses and object relative clauses) were prepared with three warm-up relative clauses and ten distracters (a total of 23). All sentences were randomized and recorded by a female native speaker of Korean. There were eight seconds between each item in order to give the subjects time to think and check the answer.

Another set of tests was prepared for this study. As the two kinds of relative clauses (subject/object) differ only in terms of the case marker *(-ka, -lul)* used within the relative clause in Korean (see (1) for examples), it is important to confirm that the subjects know the case marker. If the children show any difference in their comprehension of the two case markers, it is difficult to ascribe any difference between subject relative clauses and object relative clauses to their structural differences (O'Grady et al., 2003). Therefore, another set of test items was prepared to test the children's comprehension of the case markers. Five tokens for each case marker (i.e., *-ka* and *-lul*) were prepared with appropriate pictures of animals which also appeared as the pictures for the test of relative clauses. There were also two warm-ups. The subjects were instructed to put an 'o' mark under the picture of each item if the picture described the test item appropriately, but to put an 'x' mark if it did not.

For example, when a target item 'cha-yo, koyangi-**ka** cha-yo' ('the cat is kicking somebody') is presented with a picture of a cat kicking some other animal, the subject is expected to put an 'o' mark under the picture. However, if the target item is presented with a picture of a cat being kicked by some other animal (i.e., cha-yo, koyangi-**lul** cha-yo, 'somebody is kicking a cat'), the subject is expected to put an 'x' mark under the picture. See the sample picture for this item in Appendix III-(ii).

All the test items and warm-ups were tape-recorded by the same female native speaker to control variability. There were also eight seconds between the items in order to give the subjects time to mark the answers. See Appendices I and II for all the test items for relative clauses and case markers.

2.3. Procedure

The kindergarteners took the test individually in a quiet classroom at the kindergarten. The elementary students took the test in groups of five in a separate classroom. The college students took the test as a group in their own classroom. Each subject was provided with a test booklet and a pen. The experimenter explained the procedure and went over the warm-ups one by one with the subjects for practice. Relative clauses were tested before case markers. It took about 25 minutes for the whole session.

2.4. Results and discussion

Regarding our research question (4a-i), the results of our experiment involving the comprehension of relative clauses are presented in Table 2.

Table 2. Mean scores of Korean-Chinese bilingual children's comprehension of relative clauses (maximum: 5)

Group	Subject RC	Object RC
6 year olds	1.34	0.72
8 year olds*	4.45	2.85
10 year olds*	4.65	3.30
Adults	4.93	4.93

* $p < .05$

Table 2 shows subject/object asymmetry in the acquisition of Korean by Korean-Chinese bilingual children. The scores for the subject relative clauses were higher than those for the object relative clauses except for the adults. A statistical analysis with repeated measures was conducted to show that there was an effect caused by relative clause type ($p < 0.05$, $F(1, 94) = 18.474$). There was also an interaction between relative clause type and age ($p < 0.05$, $F(3, 92) = 3.070$).

A paired-sample T-test showed that the mean difference between subject relative clauses and object relative clauses was statistically significant at age 8 ($t(19) = 2.886$, $p < .05$) and age 10 ($t(19) = 2.599$, $p < .05$), but non-significant at age 6 ($t(28) = 1.460$, $p > .05$). The bilingual children's comprehension of subject relative clauses in our experiment was about 90% (i.e., 4.45 out of 5) at age 8, whereas their comprehension of object relative clauses did not reach even 60% at the same age (i.e., 2.85 out of 5).

Unlike understanding subject relative clauses, understanding of object relative clauses seems to develop gradually. There is clearly an asymmetrical development between subject relative clauses and object relative clauses in Korean-Chinese bilingual children. This is depicted in Figure 1.

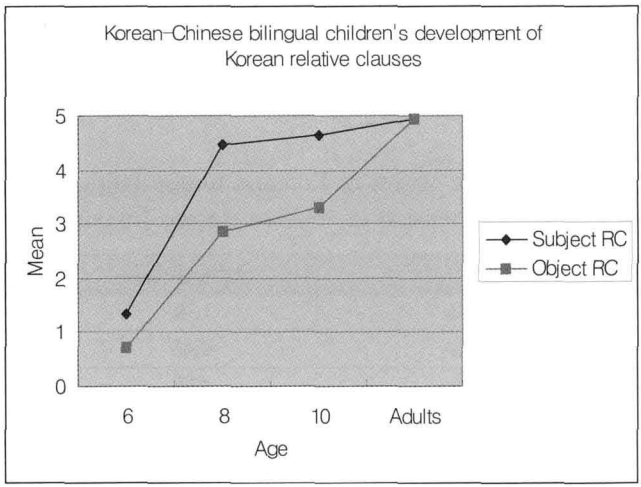


Figure 1. Korean-Chinese bilingual children's development of Korean relative clauses

Table 3 presents the results of our experiments on the case markers.

Table 3. Mean scores of Korean-Chinese bilingual children's comprehension of Korean case markers (Maximum: 5)

Group	Subject case marker *-ka*	Object case marker *lul*
6 year olds	4.00	3.14
8 year olds	4.85	4.90
10 year olds	4.35	4.90
Adults	4.89	5.00

Table 3 shows that the scores for subject case marker are similar to those for object case marker. A statistical analysis with repeated measure was conducted to show that the mean difference between the subject case marker and object case marker was statistically non-significant ($p > 0.05$, F (1, 94) = 0.197). There was only an interaction between age and case marker type ($p < 0.05$, F (3, 92) = 13.324).

The finding that there is no difference between subject case marker and object case marker in the bilingual children's comprehension of case markers seems to reveal that the asymmetry between subject relative clauses and object relative clauses found in this experiment cannot be directly explained

by their knowledge of case markers in Korean.

To summarize, the results of our experiment clearly revealed subject/object asymmetry in the acquisition of Korean by Korean-Chinese bilingual children. As with the English-speaking KSL learners in O'Grady et al. (2003), subject relative clauses were easier to understand than object relative clauses for the bilingual children, which conforms to the structural distance hypothesis, not the linear distance hypothesis.

Consequently, regarding our research question (4a-ii), the structural distance hypothesis, not the linear distance hypothesis provides a better explanation for the Korean-Chinese bilingual children's acquisition of relative clauses in Korean.

Regarding our research question (4b), children's error analysis was conducted, to identify the specific strategies that the bilingual children employed to solve the problem of relative clauses (i.e., to understand the relative clause they hear and select the right animal in the picture). Table 4 shows an error analysis for children's comprehension of relative clauses.

Table 4. Mean scores of different types of errors in Korean-Chinese bilingual children's comprehension of Korean relative clauses (Maximum: 5)

Group	Correct answers		Reversal errors		Head errors	
	Subject	Object	Subject	Object	Subject	Object
6 year olds	1.34	0.72	0.50	0.17	1.83	3.69
8 year olds	4.45	2.85	0.35	0.10	0.05	2.05
10 year olds	4.65	3.30	0.10	0.20	0.05	1.40
Adults	4.93	4.93	0.04	0.00	0.00	0.07

First of all, reversal errors were not very frequent in Korean-Chinese bilingual children, which differs from the results for KSL (with English L1) learners in O'Grady et al. (2003), who made a large proportion of reversal errors (i.e., 9.8% of subject relative clauses and 43.4% of object relative clauses).

Second, so-called head errors which were found in the KSL (with English L1) subjects in the study by O'Grady et al. were also found in our subjects. This is surprising because we did not expect that the Korean-Chinese bilingual children would make this type of error. That is, Korean and Chinese are head final languages, so any transfer errors regarding the direction of the head such as the one in the study by O'Grady et al. (2003)

are not expected to happen. In addition, the same type of errors which were analyzed as 'head errors' in O'Grady et al. (2003) are very frequent at age 6 (i.e., 36% of the subject questions or a mean of 1.83 out of 5 and 74% of the object questions or a mean 3.69 out of 5). Even at age 8, 41% of the children's answers to the object questions (a mean of 2.05 out of 5) contain to this type of error. It does not seem that these errors are 'head errors' caused by L1 transfer. Therefore, we need to reanalyze the data from a different point of view.

In order to understand the relative clause, children must know that the word order of relative clauses is different from that of canonical sentences. Especially in this type of experiment, children need to find the head of the relative clause, which is located at the end in Korean (i.e., [(S)(O)V] NP). However, considering the large proportion of 'head errors' at age 6 (i.e., in pointing to the first NP as the head in Korean relative clauses in this experiment), it is unclear whether the children noticed the construction of relative clauses at this age. Consequently, it is likely that the children misunderstood this type of sentence as a simple sentence and marked the agent of the sentence, because they had to mark something on the test. In other words, the first NP was analyzed as an agent and the verb was analyzed as the one that described the action of the agent (i.e., canonical sentence strategy: Slobin and Bever, 1982; or agent-first strategy, O'Grady et al., 1996; Jun 2001; Lee et al., 2003).

(5) Children's misinterpretation of relative clauses

a. Subject relative clauses

agent

[_____koyangi-lul cha-nun] wenswungi

_____ cat-ACC kick-ADN monkey

'the monkey that is kicking a cat'

(Misinterpretation: 'The cat is kicking a monkey'; select 'the cat that is kicking a monkey,' not 'the monkey that is kicking a cat')

b. Object relative clauses

agent

[koyangi-ka _____ cha-nun] wenswungi

[cat-NOM _____ kick-ADN] monkey

'the monkey that a cat is kicking'

(Misinterpretation: 'The cat is kicking a monkey'; select 'the cat that is kicking a monkey,' not 'the monkey that is kicked by a cat')

(This type of error results in exactly the same interpretation as that of the head errors analysis by O'Grady et al.'s (2003) (i.e., selecting the first NP as head)).

If our analysis is right, it seems a universal tendency for children to resort to canonical sentence strategy in the first stage of acquisition of relative clauses when they are not aware of the structure of the relative clauses (Slobin & Bever 1982).

Then, why is this type of error caused by canonical sentence strategy more frequent in object relative clauses than in subject relative clauses in Korean as shown in Table 4? The reason seems to relate to the case marker *-ka* used in object relative clauses. Because of the case marker, children are likely to comprehend the sentence as a simple sentence without considering the following adnominal marker *-nun* and the head (the canonical sentence strategy). That is, the case marker *-ka* in object relative clauses is likely to accelerate the canonical sentence strategy, causing misinterpretation of the object relative clauses. In contrast, the case marker *-lul* in subject relative clauses is likely to reduce the canonical sentence interpretation, decreasing the misinterpretation of the subject relative clauses. Consequently, this seems to have influenced the results of our experiment, that is, a better score for subject relative clauses than for object relative clauses.

There are other factors to take into consideration in children's comprehension of relative clauses in korean: (i) subject-drop and (ii) deletion of object case marker in Korean. Korean is one of the subject- drop languages, where the subject of a sentence can be dropped without violating its grammar. Cho, Lee and O'Grady (1998) found that Korean adults dropped the subject about 57% of the time in their picture-aided elicited production task. Oh (1999) found that 46% of the sentences with a transitive verb were missing a subject in Korean adults' narratives. These findings indicate that

children are frequently exposed to the structure of [Obj + transitive verb], which is the structure used in subject relative clauses. The frequency of this structure seems to linked to children's preference for subject relative clauses over object relative clauses.

In addition, the accusative case markers, *-lul* or *-ul*, are deleted more frequently than the nominative case markers, *-ka* and *-i*, in colloquial speech in Korean in cases where the NP is immediately followed by the predicate of the clause (i.e., NP + V]. For example, Hong, Park, Chung and Kim (1998) analyzed ongoing dialogue on radio talk shows. They found that about 46% of the subjects without case markers were immediately followed by the predicate of the clause, whereas about 68% of the objects without case markers were adjacent to their predicate. This means that when a bare NP is directly followed by a predicate, it is more likely that the NP is the object of the predicate, than its subject. Consequently, when the children miss the case markers, which are very small particles composed of one syllable, the relative clauses are likely to be interpreted as subject relative clauses not only because of the frequent structure, [Obj + transitive Verb] but also because of the frequent deletion of the object case marker. For example, without a case marker, [[koyangi( ) cha-nun] wenswungi] is likely to be interpreted as [[koyangi-**lul** cha-nun] wenswungi], rather than [[koyangi-**ka** cha-nun] wenswungi]. (One Korean adult took the same test without case markers and she showed this tendency in 100% of cases). When the children become aware of the particular word order of the relative clause, they might not focus on the case marker, which is a very small particle, but on another type of frequent word order [Object + Verb], which is a bigger chunk.

2.5. General discussion

We began this study with the aim of testing the structural distance hypothesis against the linear distance hypothesis. It was found that Korean-Chinese bilingual children comprehended subject relative clauses better than object relative clauses in Korean. This provides supporting evidence for the structural distance hypothesis. However, before we conclude our study, the fact that a great proportion of so-called head errors (caused by L1 transfer according to O'Grady et al. 2003) were also found in Korean-Chinese bilingual children suggests a question about the structural distance hypothesis. It is true that Korean relative clauses provide a

chance to test the structural distance hypothesis against the linear distance hypothesis as mentioned earlier. However, by choosing Korean, which is different from English in various aspects of syntax, it is possible to identify other typological or idiosyncratic factors of Korean that might influence the acquisition of relative clauses, such as subject-drop and case markers discussed.

Even though the results of our experiment conform to the predictions of the structural distance hypothesis, the analysis of the errors that children make in this experiment gives us an opportunity to investigate the strategies that children apply to understand the relative clauses such as the canonical sentence strategy and/or the agent-first strategy.

Lee et al. (2004) also account for children's comprehension of relative clauses with canonical word order strategy. They argue that the first NP is interpreted as the subject and the agent of the sentence in their experiment on the comprehension of Korean relative clauses by Korean monolingual children and Korean-Chinese bilingual children. However, the results of their experiment which is also a picture-aided comprehension task were opposite to ours. The test score of object relative clauses was higher than that of subject relative clauses, which does not conform to the results of other studies including those of Clancy et al. (1986), Kim (1987), Lee (1990), Cho (1999) or our own study. The reason for this seems to relate to the methodology of the experiment as Lee et al. (2004) also mentioned. The task in their experiment is to choose one of the pictures that describes the relative clauses correctly. There are two sets of pictures to choose from for each question. Let's consider the following examples:

(6) a. [Koyangi-lul cha-nun] wenswungi 'the monkey that is kicking a cat'
b. [Koyangi-ka cha-nun] wenswungi 'the monkey that a cat is kicking'

One picture shows a monkey kicking a cat whereas the other picture shows a monkey being kicked by a cat. The children are supposed to pick one of the pictures. In this case, it seems hard to measure children's actual knowledge of relative clauses (i.e., of the structure of relative clauses as opposed to that of canonical sentences). Children can answer the questions by understanding only the first two words (i.e., [koyangi-lul cha-nun] or [koyangi-ka cha-nun]) without considering the final head. This can be done without knowledge of the structure of the relative clauses (e.g.,

through knowing the position of the head noun). In this case, the child is likely to select the correct picture with object relative clauses because the word order [SV] matches the canonical word order [SV] and to follow agent first strategy, as the authors interpreted the data.

On the other hand, in the present experiment, the children have to select the animal corresponding to the head of the relative clauses, which is not possible without knowing the structure of relative clauses including the position of the head. They are supposed to select either of the animals in the picture. For example, in the test item, [[koyangi-lul cha-nun] wenswungi], there are three pictures, two of which describe opposite situations as in Lee et al. (2004), but the children's task involves not only selecting the picture that describes the situation correctly but also choosing one animal from the picture that corresponds to the head of the relative clauses they hear.

Therefore, the correct answers the children gave to the present test reflect their knowledge of relative clauses. Consequently, the results of our experiment (i.e., higher scores in subject relative clauses than in object relative clauses) reveal that children's knowledge of relative clauses develops earlier with subject relative clauses than with object relative clauses. It is possible that the development of subject relative clauses takes place relatively early because of the frequent appearance of similar types of structure [OV] due to the subject drop. The object relative clauses develop later because mistakes that are easily caused by the canonical sentence strategy are accelerated by the case marker *-ka* in object relative clauses.

3. Conclusion

The present study found that Korean-Chinese bilingual children acquired subject relative clauses earlier than object relative clauses. This finding is similar to previous findings on acquisition of relative clauses (Keenan & Comrie, 1977; Gass, 1979, 1980; O'Grady et al., 2003; Cho, 1999). The results of our experiment provide evidence for the structural distance hypothesis. At the same time, however, the analysis of children's errors found in this experiment leads us to a question about the structural distance hypothesis. It is necessary to consider language-specific factors in Korean such as subject-drop and case markers that the might influence children's acquisition of relative clauses. It is possible that the subject/object asymmetry found in

the acquisition of Korean relative clauses might be accounted for by those factors as well as the canonical sentence strategy, rather than by the structural distance hypothesis.

Appendix I: Target items for comprehension of Korean relative clauses

i) Subject relative clauses

S1. thokki-lul po-nun kay 'the dog that is looking at a rabbit'
S2. toyci-lul cohaha-nun thokki 'the rabbit that likes a pig'
S3. say-lul silheha-nun wenswungi 'the monkey that dislikes a bird'
S4. wenswungi-lul cha-nun koyangi 'the cat that is kicking a monkey'
S5. thokki-lul mi-nun koyangi 'the cat that is pushing a rabbit'

ii) Object relative clauses

O1. thokki-ka po-nun kay 'the dog that a rabbit is looking at'
O2. toyci-ka cohaha-nun thokki 'the rabbit that a pig likes'
O3. say-ka silheha-nun wenswungi 'the monkey that a bird dislikes'
O4. wenswungi-ka cha-nun koyangi 'the cat that a monkey is kicking'
O5. thokki-ka mi-nun koyangi 'the cat that a rabbit is pushing'

Appendix II: Target items for comprehension of case markers

i) Subject case markers

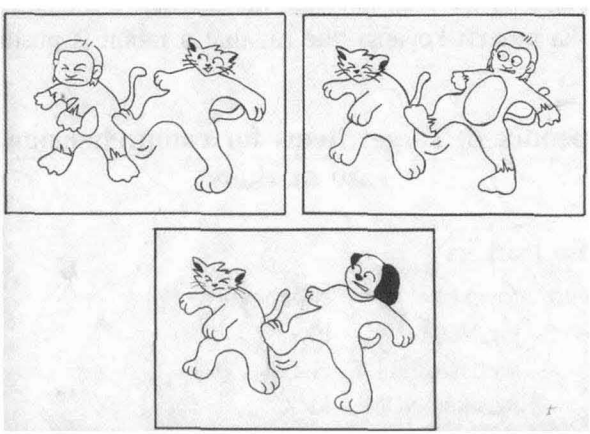
1. cohaha-eyo.	toyci-ka	cohahay-eyo (Y)
like	pig-NOM	like
2. cha-ayo.	wenswungi-ka	cha-ayo. (N)
kick	monkey-NOM	kick
3. po-ayo.	thokki-ka	po-ayo. (Y)
see	rabbit-NOM	see
4. mil-eyo.	thokki-ka	mil-eyo. (N)
push	rabbit-NOM	push
5. sileha-eyo.	say-ka	silheha-eyo. (Y)
dislike	bird-NOM	dislike

ii) Object case markers

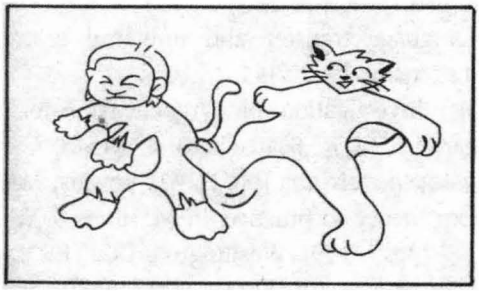
1. po-ayo.	kay-lul	po-ayo. (Y)
see	dog-ACC	see
2. mil-eyo.	thokki-lul	mil-eyo. (N)
push	rabbit-ACC	push
3. sileha-eyo.	say-lul	silheha-eyo. (Y)
dislike	bird-ACC	dislike
4. cha-ayo.	wenswungi-lul	cha-ayo. (N)
kick	monkey-ACC	kick
5. cohaha-eyo.	toyci-lul	cohahay-eyo (N)
like	pig-ACC	like

Appendix III: Sample pictures and target items for the experiment

i) A sample of a target item and its corresponding picture for the test of comprehension of relative clauses ([koyangi-ka cha]-nun wenswungi, 'the monkey that a cat is kicking')



ii) A sample of a target item and its corresponding picture for the test of comprehension of case markers (cha-yo, koyangi-ka cha-yo, 'A cat is kicking somebody')



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