

Variation among heritage speakers: Sequential vs. simultaneous bilinguals

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Abstract

This study examines the differences in the grammatical knowledge of two types of heritage speakers of Korean. Early simultaneous bilinguals are exposed to both English and the heritage language from birth, whereas early sequential bilinguals are exposed to the heritage language first and then to English upon schooling. A listening comprehension task involving relative clauses was conducted with 51 beginning-level Korean heritage speakers. The results showed that the early sequential bilinguals exhibited much more accurate knowledge than the early simultaneous bilinguals, who lacked rudimentary knowledge of Korean relative clauses. Drawing on the findings of adult and child Korean L1 data on the acquisition of relative clauses, the performance of each group is discussed with respect to attrition and incomplete acquisition of the heritage language.

Introduction

A heritage speaker refers to a bilingual who grew up listening to and/or speaking a minority language in the US (Valdés, 2000; Montrul, 2011). The use of the heritage (or home) language is normally limited to home settings, as opposed to the use of English, a socially dominant (majority) language in the US. Even with a child who was dominant in the heritage language in early childhood, his/her language use gradually shifts from the heritage language to the majority language of the wider society once schooling begins (Montrul, 2008). As the child begins to use the majority language more than the heritage language, the majority language takes dominance over the heritage language in proficiency and use. As a result, some features of the heritage language may not be fully acquired or be lost by the time adolescence is reached.

One of the characteristics of heritage speakers is that a considerable amount of individual variation is found in their linguistic competence (Polinsky & Kagan, 2007; Kondo-Brown, 2005; to just

name a few), which might be attributed to the fact that the amount of input, opportunities to use the heritage language, and the manner/setting in which heritage speakers received input during childhood vary considerably (Montrul, 2008; Rothman, 2007). Despite this variation, common characteristics and patterns of linguistic knowledge within the subgroups of heritage speakers have been identified (Kondo-Brown, 2005; Lee, 2011; Montrul, 2005; Polinsky, 2008), which provides useful insight into the nature of their heritage grammars.

Several studies have reported that late bilinguals (exposed to English after age six or seven) have an advantage over early bilinguals (Kim, Montrul, & Yoon, 2010; Montrul, 2002, 2004; Yeni-Komshian, Flege, & Liu, 2000). For example, those who were born in their home country (e.g. Korea) and came to the United States after preschool would exhibit more competent knowledge of the heritage language than those who were born in the US and learned it mainly in the home. A similar trend is found with early (simultaneous vs. sequential) bilinguals. Early sequential bilinguals are likely to have an advantage over early simultaneous bilinguals, exhibiting more competent linguistic knowledge (Montrul, 2008). The latter group is exposed to two languages (e.g. English and Korean) from birth or before age three, while the former is predominantly exposed to the heritage language (e.g. Korean) until schooling begins. In other words, it is likely that early simultaneous bilinguals receive reduced input in their heritage language, compared to early sequential bilinguals (Montrul, 2008; Polinsky, 2011).

The distinction between these two types of early bilinguals is useful in discussing incomplete acquisition and attrition in heritage grammars, as Montrul (2008) points out. These two groups mainly differ from each other with respect to the amount of input received during childhood, which would likely have a lingering effect on their linguistic knowledge of the heritage grammar later in life. Incomplete acquisition occurs if features of a given grammatical system were not fully acquired and fossilized in a simplified or reduced form (Montrul, 2008). On the other hand, attrition occurs if a given grammatical system was acquired at an age-appropriate developmental stage and then was lost. A general tendency is that early simultaneous bilinguals are likely to exhibit a more severe degree of deviation from the heritage

language than early sequential bilinguals, whether both groups manifest incomplete acquisition or attrition (Montrul, 2005; Silva-Corvalán, 2003; Tsimpli, Sorace, Heycock, & Filiaci, 2004).

The present study aims to contribute to a better understanding of the differences in the grammatical knowledge of these two types of early Korean-English bilinguals. In doing so, their comprehension of Korean relative clauses is examined and their knowledge is discussed with respect to incomplete acquisition and attrition of the heritage language.

Previous studies

Accuracy rates

In the literature on the acquisition of relative clauses, much of the discussion revolves around the Noun Phrase Accessibility Hierarchy proposed by Keenan and Comrie (1977). The hierarchy was formulated, based on a crosslinguistic observation that subjects are the easiest to be relativized, compared to direct objects, indirect objects, obliques, genitives, and objects of comparison. This typological finding has implications for the acquisition of relative clauses in that it captures the difference in the processing load of different syntactic positions when relativized. As noted by Keenan and Comrie (1977) and reiterated by Polinsky (2011), processing ease is closely tied with saliency, and subjects are more salient than other syntactic positions. Hence, it would be easier to associate the subject with a modifying relative clause, and therefore it follows that subject relatives should be easier to comprehend than other types of relative clauses.¹

This prediction has been supported by many studies on several different languages, including East Asian languages (Diessel & Tomasello, 2005; Doughty, 1991; Gass, 1979; Jeon & Kim, 2007; Kanno, 2007; O'Grady, Lee, & Choo, 2001, 2003, Polinsky, 2011; Slobin, 1986; among others).² Several studies on first language (L1) and second language (L2) acquisition of Korean also found similar results, using different methodologies (Cho, 1999; Jeon & Kim, 2007; Kim, 1987; Kwon, Lee, Gordon, Kluender, & Polinsky, 2010; Lee, 1991; O'Grady *et al.*, 2003). In their oral production study on L2 Korean, Jeon and Kim (2007) reported that subject relative clauses were correctly produced more often than direct object relative clauses. Comprehension studies by Cho (1999) and by O'Grady *et al.* (2003)

also found that subject relatives were correctly understood more often than their direct object counterparts. Also, Kwon *et al.*'s (2010) processing (reading-time measures) study with adult native speakers of Korean showed that subject relatives were read faster than direct object relatives.

In heritage language acquisition, many studies have used adult L1 data as the baseline for their studies (Lee, 2011; Montrul, 2002, 2004; Polinsky, 2008). In the acquisition of relative clauses, an L2 Korean study by O'Grady *et al.* (2003) reported that adult native speakers of Korean correctly understood both subject and direct object relative clauses almost 100% of the time. Similar results were also reported by Kanno's (2007) L2 Japanese study. Child L1 data can also be useful in discussing incomplete acquisition and attrition of the heritage language (Polinsky, 2011). Unlike adult L1 data, which obscure the asymmetry between subject and direct object relatives,³ child L1 data provide insight into accuracy and error rates of each type of relative clauses, which helps understand the linguistic development of heritage speakers.

In this regard, the findings of Cho's (1999) comprehension study with four- to seven-year-old Korean monolinguals provide clues about the knowledge of child monolingual speakers.⁴ In Cho's study, the four-year olds correctly understood both subject (73%) and direct object relatives (56%) more than half of the time. It should be pointed out that the children's comprehension of subject relatives was at ceiling (98%) by age seven, which suggests that adult-like competence in comprehension of subject relatives is likely acquired by that age. On the other hand, the mean scores for direct object relatives suggest that more time is required to obtain a similar rate (ceiling) of accuracy. Six- and seven-year olds correctly understood direct object relatives approximately 82% of the time. Yet, it might be reasonable to hypothesize that children would reach accuracy at ceiling by age eight or nine, considering the increase rate in accuracy each year.

Error types and rates

Before discussing error types and rates, a remark on the differences between relative clauses in Korean and English is in order. Korean relative clauses are different from their English counterparts in two

major aspects. First, the branching direction is opposite. In English, the relative clause follows the head noun, but the relative clause precedes the head noun in Korean. Second, case markers are crucial to correct interpretation of relative clauses in Korean, unlike in English. As shown in (1), subject relatives are identical with direct object relatives in Korean, except case marking on the noun (an argument of the verb) that appears inside the relative clause.

- (1) a. Subject relative
 [*namca-**lul** salangha-nun*] *yeca*
 Man-ACC love-PRES woman
 ‘the woman who loves the man’
- b. Direct object relative
 [*namca-**ka** salangha-nun*] *yeca*
 Man-NOM love-PRES woman
 ‘the woman whom the man loves’

(ACC: accusative, NOM: nominative, PRES: present tense)

Turning now to error types, both case marking and the branching direction seem to have bearing on the particular types of errors that are found in the acquisition of relative clauses in Korean (and Japanese). Several L2 studies have identified two types of common errors: reversal and head errors (Kanno, 2007; Lee-Ellis, 2011; O’Grady *et al.*, 2003). Reversal errors occur when subject relatives are misinterpreted as direct object relatives or vice versa. On the other hand, a head error occurs when the first noun in a relative clause is selected as the head noun. The difference between these two types of errors is illustrated by the examples in (2).

- (2) [_{RC} *yeca-ka po-nun*] *namca*
 Woman-NOM see-PRES man
- a. Correct interpretation: ‘the man whom the woman sees’
 (object relative)
- b. Reversal error interpretation: ‘the man who sees the
 woman’ (subject relative)
- c. Head error interpretation: ‘the woman who sees the man’
 (erroneous)

These two types of errors have different implications for the linguistic knowledge of the learner. As noted earlier, the head noun comes after the relative clause in Korean. If the learner erroneously selected the first noun that s/he heard in the relative clause as the

head noun, it would indicate that s/he had trouble correctly locating the head noun. However, reversal errors would be indicative of the fact that the learner had trouble figuring out the grammatical relation of the gap (i.e. the element that is relativized) to a relative clause, misinterpreting case marking information on the noun that appears inside the relative clause. Also, instances of reversal errors would presuppose that the learner already knows which element serves as the head noun.

An L2 Korean comprehension study by O'Grady *et al.* (2001) reported interesting results regarding the rates of these two types of errors. Focusing on error rates on direct object relatives, the beginning learners made more head errors (52%) than reversal errors (38%). However, the intermediate learners made more reversal errors (31%) than head errors (23%). In other words, the learners who received less input produced more head errors, assuming that beginning (second-semester) L2 learners would normally have less exposure to the target language than intermediate (fourth-semester) L2 learners.

A similar trend can be observed even with groups, all of whom made more head errors than reversal errors. In Kim's (2008) comprehension study of Korean relative clauses with heritage speakers, the Korean dominant group received the most input in the heritage language, followed by the Korean-English group and the English dominant group in that order. The English dominant group made head errors three times as often as they made reversal errors, and the Korean-English group produced head errors one-sixth time (16%) more than reversal errors. The Korean dominant group produced a similar rate of errors. These results suggest that those with less input in the heritage language would likely produce more head errors than reversal errors, exhibiting a more severe lack of rudimentary knowledge of Korean relative clauses.

In the next section, I will formulate predictions about two groups of adult early Korean-English bilinguals and describe the methodology of an experimental study.

The present study Predictions about the nature of linguistic knowledge of the two heritage groups

The goal of the present study is to examine the differences in the grammatical knowledge of early simultaneous and sequential bilinguals. Early simultaneous bilinguals are exposed to English and Korean from birth, whereas early sequential bilinguals are predominantly exposed to Korean before schooling begins. Given this difference, early simultaneous bilinguals would likely have received reduced input, compared to early sequential bilinguals, and the former group tends to exhibit a more severe degree of deviation from the heritage language than the latter group (Kim, Montrul, & Yoon, 2010; Montrul, 2002, 2004). Based on this observational tendency, the following two predictions are formulated with respect to their knowledge of relative clauses in Korean. If the amount of input received in the heritage language early in childhood plays a role, (1) early sequential bilinguals will understand Korean relative clauses more accurately than early simultaneous bilinguals, and (2) early simultaneous bilinguals are likely to produce errors (i.e. head errors) that exhibit their lack of rudimentary knowledge of Korean relative clauses more often than early sequential bilinguals do.

Participants

Two types of English-dominant heritage speakers of Korean participated in the experiment: 13 early simultaneous and 38 early sequential bilinguals. All of them were enrolled in a beginning (second-semester) Korean language class at a four-year university in the US.⁵ The heritage speakers were in their late teens or early twenties. The study also included five native speakers of Korean (control; in their late twenties or early thirties), who were graduate students at the same institution. All of the controls had completed college education in Korea and most of them had resided in the US for about two to three years at the time of testing.

All early simultaneous bilinguals in the present study were born in the US, except three of them who were born in Korea and came to the US before or at age one. According to the biographical survey, all of them had one parent speaking Korean and the other speaking English, being exposed to both Korean and English. The

majority of the early sequential bilinguals were also born in the US, except five of the thirty-eight participants came to the US before age two and one who came at the age of two and a half years. Unlike the early simultaneous bilinguals, all early sequential bilinguals had both Korean-speaking parents, and they were predominantly exposed to Korean during early childhood. Despite this difference, it should be noted that all participants in both heritage groups started schooling at a similar age (four or five years old), which means that the noticeable difference between these two heritage groups was mainly in the amount of parental linguistic input they had received early in childhood.

Regarding heritage language use since the start of formal schooling, the majority of the heritage speakers in both groups reported that they had conversed with their parents in English more often than in Korean. In many cases, parents would speak in Korean more often than in English, but more than half of the heritage speakers would speak back mostly in English. It should also be noted that the majority of the early sequential bilinguals' parents had increased their use of English after formal schooling began, further limiting their heritage language use. Most heritage speakers in both groups would converse with their siblings and friends mostly in English. Some of the heritage speakers in both groups showed more interest in and had more exposure to Korean culture including Korean drama and popular music than others, but nobody indicated that s/he watched Korean drama or TV on a regular basis. Based on this, heritage language exposure through media did not appear to be a factor that had an impact on their overall proficiency in Korean.

In addition, some of the participants (both simultaneous and sequential) indicated that they had previously visited Korea, but mostly for a couple of weeks during the summer, which suggests that heritage language exposure through these visits was sporadic and not consistent. Some participants from both groups also attended Saturday Korean schools from a week to several months when they were young (mostly during their elementary school years), but instruction at those schools was limited to the alphabet, basic reading skills, numbers, and some basic writing skills in some cases. Also, many of the participants who had attended these Saturday Korean schools reported that they forgot most or all of what they had learned. In

other words, the main input the participants in the present study received in the heritage language was from their parents in the home.

Experimental method and test materials

The experiment employed a picture-selection comprehension task, a similar type used by earlier studies such as O'Grady *et al.* (2001, 2003) and Kanno (2007). There were a total of 14 test items included in the analysis: seven tokens of subject and direct object relatives, respectively.⁶ Test items included both reversible and non-reversible relatives to see whether animacy plays a role in comprehension of relative clauses (Gennari & MacDonald, 2009). Non-reversible relatives are different from reversible relatives in terms of the number of animate nouns (referents) involved in the relative clause. The former type involves one animate and one inanimate noun whereas the latter involves two animate nouns. Examples of these two types are given in (3) and (4).

(3) Reversible relative

a. Subject relative

[_____ *yeca-lul* *po-nun*] *namca* *eti* *iss-e-yo?*
 woman-ACC see-PRES man where is

'Where is the man who sees the woman?'

b. Direct object relative

[*yeca-ka* _____ *po-nun*] *namca* *eti* *iss-e-yo?*
 woman-NOM see-PRES man where is

'Where is the man whom the woman sees?'

(4) Non-reversible relative

a. Subject relative

[_____ *chayk-ulilk-nun*] *namca* *eti* *iss-e-yo?*
 book-ACC read-PRES man where is

'Where is the man who reads the book?'

b. Direct object relative

[*yeca-ka* _____ *ilk-nun*] *chayk* *eti* *iss-e-yo?*
 woman-NOM read-PRES book where is

'Where is the book that the woman reads?'

b. Direct object relative

[*yeca-ka* _____ *ilk-nun*] *chayk* *eti* *iss-e-yo?*
 woman-NOM read-PRES book where is

'Where is the book that the woman reads?'

All test sentences were embedded in a full sentence that denotes ‘Where is...?’ as seen in (3) and (4). The vocabulary items used in the task were familiar to the participants. Test sentences were tape-recorded and read once with an eight second interval between each test item. Test items were presented in randomized order, along with instructions written in English. Instructions read as follows:

Each page of this booklet contains a series of three pictures. As you go to each page, you will hear a recorded voice describing a person, or an item in one of the three pictures. Your job is simply to put a circle around the person or item described in the sentences (Do NOT put the circle around the entire box).

A set of three pictures were given for each relative clause. In each set, one picture would correctly depict an action denoted by the verb in a relative clause, one would depict a reversible interpretation, and one would be a distractor. For example, the third picture frame in Figure 1 would be the correct one to choose for the test item ‘the man whom the woman thinks of’, and the participant would circle the right-hand figure if s/he understood the sentence correctly. On the other hand, the participant would circle the left-hand figure in the second frame if s/he understood the given relative clause with a reversible interpretation ‘the man who thinks of the woman.’

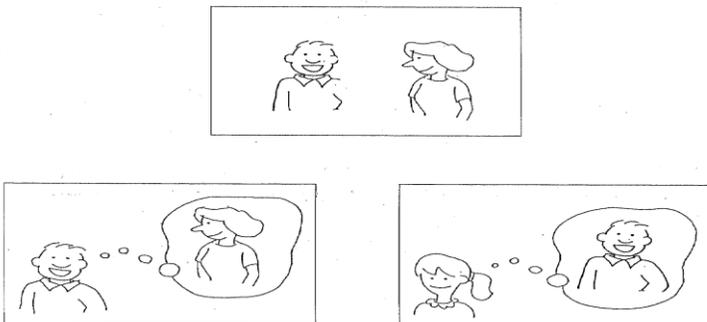


Figure 1. Sample test item used in the experiment.

Lastly, it should be mentioned that participants were introduced to relative clauses in class at the outset of their second-semester beginning-level class. The experiment was conducted within several days after this instruction. During classroom instruction, an effort was made to provide the equal number of subject and direct object relatives.

Results

Group results

All of the controls (ages ranged from 25 to 39 years old) correctly understood all types of relative clauses, except one participant who circled both items (e.g. the man and the book) in the correct picture frame of a relative clause on two occasions.

Turning now to the experimental groups, recall that there were seven tokens of subject relatives and seven tokens of direct object relatives included in the analysis. A two-way repeated-measures ANOVA was performed to see if there was a significant effect for gap position (subject vs. direct object) and animacy (reversible vs. non-reversible). The results showed that there was a significant main effect for animacy, which suggests that both heritage groups found non-reversible relatives easier to comprehend than their reversible counterparts ($F(1, 12)=16.54, p=0.0016$ for the early simultaneous bilinguals; $F(1, 37)=30.48, p=0.0001$ for the early sequential bilinguals).

However, mixed results were obtained regarding gap position. A main effect was found for the early simultaneous bilinguals, but not for the early sequential bilinguals. The difference in the mean scores of the latter group was not statistically significant ($F(1, 37)=0.74, p=0.395$), although their overall mean scores suggested a subject advantage. However, the difference in the mean scores of the early simultaneous bilinguals was significant

($F(1, 12) = 10.42, p=0.0072$), exhibiting a subject advantage. Also, there was an interaction effect between the two variables for the early sequential bilinguals ($F(1, 37) = 5.02, p=0.0312$), but not for the early simultaneous bilinguals ($F(1, 12) = 0.81, p=0.2305$).

Let us now take a look at the overall mean scores of each group. Due to the unequal number of tokens in reversible and non-reversible relatives, both overall mean scores and comprehension

percentages are presented here. Table 1 summarizes the mean scores for reversible relatives.

Table 1. Mean scores for reversible relative clauses (four tokens each).

	Subject RC		Object RC		Total mean average
	Mean	SD	Mean	SD	
E. simultaneous (N=13)	1.54	(1.51)	1.00	(0.91)	1.27 (1.25)-32%
E. sequential (N=38)	2.89	(1.25)	2.42	(1.24)	2.26 (0.83)-66%
RC type mean average	2.54	(1.43)	2.06	(1.31)	

The mean scores show that both heritage groups gave correct responses to subject relatives more often than to direct object relatives. The early simultaneous bilinguals correctly responded to subject relatives 38% of the time and direct object relatives 25% of the time. The accuracy rates of the early sequential bilinguals were 72% for subject relatives and 61% for direct object relatives.

In terms of a comparison between the two groups, the early sequential bilinguals were twice accurate as often as the early simultaneous bilinguals. The early sequential bilinguals correctly understood reversible relatives two-thirds (66%) of the time whereas the early simultaneous bilinguals did so just one-third (32%) of the time. *T*-tests showed that the early sequential bilinguals differed from the early simultaneous bilinguals, performing better on both subject and direct object relatives ($t=-3.21$, $p=0.0024$ for reversible subject; $t=-3.77$, $p=0.004$ for reversible direct object). The overall mean scores of non-reversible relatives also show that the early sequential bilinguals gave correct responses more often than the early simultaneous bilinguals, as seen in Table 2.

Table 2. Mean scores for non-reversible relative clauses (three tokens each).

	Subject RC		Object RC		Total mean average
	Mean	SD	Mean	SD	
E. simultaneous (N=13)	2.62	(0.65)	1.31	(1.32)	1.96 (1.22)-65%
E. sequential (N=38)	2.55	(0.69)	2.76	(0.43)	2.66 (0.58)-89%
RC type mean average	2.57	(0.67)	2.39	(0.98)	

The early sequential bilinguals correctly understood non-reversible relative clauses almost 90% of the time while the early simultaneous bilinguals did so only 65% of the time. *T*-tests revealed that the early sequential bilinguals differed from the early simultaneous bilinguals in terms of non-reversible direct object relatives ($t=-3.92$, $p=0.0018$). However, the two groups did not differ from each other when non-reversible subject relatives were considered. Although the early simultaneous bilinguals performed better than the early sequential bilinguals, the difference in their mean scores was not statistically significant ($t=0.29$, $p=0.7743$).

In addition to accuracy rates, error rates also help reveal the linguistic knowledge of learners. Two types of errors are discussed here. As mentioned earlier, reversal errors occur when subject relatives are misinterpreted as direct object relatives or vice versa. On the other hand, head errors occur when the learner selects the first noun in a relative clause as the head noun. For example, correct interpretation of a direct object relative *yeca-ka* (NOM) *po-nun namca* ‘the man whom the woman sees’ would enable the learner to select the man in the picture frame where the woman’s head is turned toward the man. However, a head error would force the learner to circle the woman in the same picture frame, and the (erroneous) interpretation would be ‘the woman who sees the man’, in which the woman is the head noun of the relative clause. If the phrase was interpreted as a subject relative *yeca-lul* (ACC) *po-nun namca* ‘the man who sees the woman’, it would be an example of reversal error and this interpretation would

go with the selection of the man whose head is turned toward the woman in another picture frame.

Before discussing the error rates of the two bilingual groups, it should be noted that neither group made reversal errors on non-reversible relative clauses. This might have to do with the fact that reversible relative clauses allow two possible interpretations (correct and reversal) whereas non-reversible relative clauses allow only one sensible interpretation. The percentages of each type of error are presented in Figure 2.

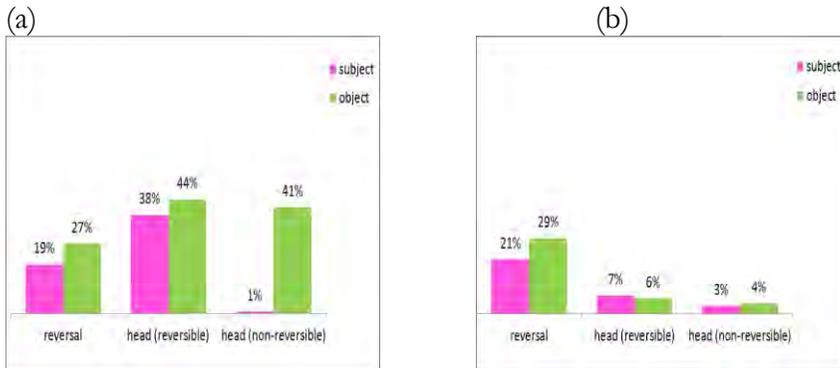


Figure 2. Percentages of each error type by (a) simultaneous bilinguals ($n=13$) and (b) sequential bilinguals ($n=38$).

Noticeable from Figure 2 is that the difference in the percentages of head errors made by each group is striking. The head error rate of the early sequential bilinguals is minimal (5%) whereas the early simultaneous bilinguals made head errors one-third (31%) of the time. This suggests that unlike the early sequential bilinguals, the early simultaneous bilinguals had difficulty correctly identifying the relative position of the head noun and the relative clause.

Individual Results

An examination of individual scores would also provide insight into the linguistic knowledge of the participants. The discussion of this subsection will be on reversible relatives (eight tokens total) mainly because both types of errors were found with them. A first point has to do with the proportion of participants who were accurate on at least seven of the eight tokens. Approximately one-fourth ($n=9$) of the early sequential bilinguals did so, and four (H15, H22, H30, H33)

of those nine gave correct responses to all eight tokens. However, none of the early simultaneous bilinguals exhibited this type of accurate performance, although it is possible that inclusion of more participants might yield different results.

Another point has to do with the ratio of error types found in each group. Recall that nine of the thirty-eight early sequential bilinguals correctly responded to at least seven of the eight tokens, which kept their error rates minimal. Among those ($n=29$) who failed to do so, eleven participants made at least two reversal errors on subject relatives, respectively, and fourteen of the remaining participants did the opposite at least twice, respectively. The two (H9, H26) remaining early sequential bilinguals made at least two reversal errors on both types. However, of a total of nineteen head errors, there were only four instances that happened more than twice individually. In other words, the early sequential bilinguals predominantly produced reversal errors (a total of 80 errors).

However, of the thirteen early simultaneous bilinguals, three participants made reversal errors on subject relatives at least twice individually, and another three did the opposite at least twice, respectively. Yet, eight of the thirteen early simultaneous bilinguals made head errors on one or the other type at least on two occasions, respectively, and four (HL1, HL4, HL9, HL12) of those eight did so on both types at least twice, respectively. Table 3 lists individual error rates of the early simultaneous group in each category (reversal vs. head errors).

Table 3. Individual error rates of the early simultaneous group

	SR		OR			SR		OR	
	Rev.	head	Rev.	head		Rev.	head	Rev.	head
HL1	0	4	0	3	HL8	3	0	1	0
HL2	1	1	1	2	HL9	2	0	0	4
HL3	0	0	4	0	HL10	0	2	1	1
HL4	0	3	0	4	HL11	0	0	1	1
HL5	0	1	3	1	HL12	0	4	0	4
HL6	1	2	1	1	HL13	0	0	2	0
HL7	3	1	0	2	Total	10	20	14	23

In other words, the early simultaneous bilinguals produced more head errors than reversal errors, which suggests that the majority of

the early simultaneous bilinguals had trouble correctly locating the head noun and the relative clause, compared to the early sequential bilinguals, who had a good understanding of that aspect of Korean relative clauses.

Discussion

The present study set out to examine the differences in the grammatical knowledge of early simultaneous and sequential bilinguals, who mainly differed from one another with respect to the amount of input they had received in the heritage language during early childhood. Two predictions were tested. Regarding the first prediction (early sequential bilinguals will understand Korean relative clauses more accurately than early simultaneous bilinguals), both group and individual data showed that the comprehension of the early sequential bilinguals was more accurate than that of the early simultaneous bilinguals. The accuracy rates of reversible relatives were 32% for the early simultaneous bilinguals and 66% for the early sequential bilinguals. A similar contrast was also found with non-reversible relatives (65% for the early simultaneous bilinguals and 89% for the early sequential bilinguals).

Turning to the second prediction (early simultaneous bilinguals will produce errors (i.e. head errors) more often than early sequential bilinguals), the early simultaneous bilinguals produced more head errors than reversal errors whereas the opposite was true for the early sequential bilinguals. Unlike the early sequential bilinguals (5%), the early simultaneous bilinguals produced head errors approximately one-third (31%) of the time. Head errors would occur if the learner failed to attend to the fact that the head noun follows the relative clause in Korean. Given this, the error rates suggest that the early simultaneous bilinguals had trouble identifying the head noun and its relative position to the relative clause in Korean, compared to the early sequential bilinguals.

As noted earlier, head errors are made when the first noun in the relative clause is erroneously selected as the head noun. Recall that the early simultaneous bilinguals produced head errors 31% of the time. This head error rate is interesting in that the head noun precedes the relative clause in English, unlike Korean, which leads us to speculation that the early simultaneous bilinguals in the present study

might have relied on the English word order, as similar observations were made by Kim (2008) and by Lee-Ellis (2011). In other words, the sizable proportion of head errors produced by the early simultaneous bilinguals seems to suggest that they were more prone to utilizing the head-initial order of English relative clauses, compared to the early sequential bilinguals. Both bilingual groups in this study were English-dominant, but the percentage of head errors made by each group suggests that the early simultaneous bilinguals were more susceptible to dominant language influence than the early sequential bilinguals.

Before discussing the nature of the linguistic knowledge of the heritage speakers in this study, a remark on their performance on different types of relative clauses (subject vs. direct object and reversible vs. non-reversible) is in order. As for the animacy effect (reversible vs. non-reversible), both heritage groups performed better on non-reversible relative clauses (those with one animate argument) than on reversible relative clauses (those with two animate arguments), which adds support to the observation that the number of animate arguments in the relative clause has an effect on the comprehension of relative clauses (Gennari & MacDonald, 2009). Yet, the two heritage groups differed when the gap effect (subject vs. direct object relative) was concerned. The early simultaneous bilinguals performed significantly better on subject relatives than on direct object relatives while the early sequential bilinguals did not show a statistically significant subject advantage.

At first glance, the results of the early sequential group do not seem to be consistent with the implications of the Noun Phrase Accessibility Hierarchy (Keenan & Comrie, 1977) whereas those of the early simultaneous bilinguals are. However, it should be noted that the early sequential bilinguals overall did score higher on subject relatives (72%) than on direct object relatives (61%). Another point might have to do with the fact that twenty-five percent ($n=9$) of the early sequential bilinguals were accurate on at least seven of the eight reversible relative clauses, performing well on both subject and direct object relatives, which might have obscured the difference in the mean scores.⁷

Let us turn now to the nature of the linguistic knowledge of the two heritage groups. Without the longitudinal data of the partici-

pants in the present study, any conclusive remarks must be cautiously made. Yet, it should be noted that there was not much difference between the two heritage groups in terms of their use of the heritage language since the start of formal schooling, according to the biographical survey. All participants indicated that English was their dominant language and they would normally converse with their parents, siblings, and friends mostly in English. Also, the majority of the early sequential bilinguals' parents had increased their use of English after formal schooling began, further limiting their heritage language exposure. In other words, the main difference between the two heritage groups would be in the amount of input they received during early childhood.

Given this, it might be useful to compare the performance of the two heritage groups in the present study with that of four-year monolingual Korean children as well as that of adult Korean L1 speakers, which would provide meaningful insights into the nature of each bilingual group's knowledge of the heritage language. According to Cho's (1999) L1 study, four-year old monolingual children correctly understood (reversible) relatives about 66% of the time and then improved to 71% by age five. The accuracy rate of the early simultaneous bilinguals in the present study was about 32% and that of the sequential bilinguals was 66%. In other words, the early sequential bilinguals' accuracy rate matches that of four-year old L1 children whereas the early simultaneous bilinguals' rate is far below. As Cho's study showed, the accuracy rate would improve as children grow older. In addition, five adult L1 controls in this study correctly understood all test items, which indicated their accuracy rate at ceiling. Based on this, both the early simultaneous and the early sequential bilinguals appear to exhibit incomplete acquisition of Korean relative clauses rather than attrition of them.

However, each group seems to exhibit a different degree of incomplete acquisition. First, the early sequential bilinguals' head error rate (5%) showed that they had a firm understanding of the relative position of the head noun and the relative clause in Korean, unlike the early simultaneous bilinguals. Second, their accuracy rate (66%) was the same as that of L1 four-year olds in Cho's study whereas the early simultaneous bilinguals' accuracy rate was half that (32%). Based on this, it might be possible to speculate that the early

sequential bilinguals' knowledge of Korean relative clauses was already in place by the time they started to be exposed to English. This speculation seems to be supported by the fact that four of the thirty-eight early sequential bilinguals gave correct responses to all eight reversible relatives.

Compared to the early sequential bilinguals, the early simultaneous bilinguals might not have acquired age-matched knowledge of relative clauses by age four, which might have persisted into their adolescent years. Recall that the early simultaneous bilinguals were accurate about one-third (32%) of the time and made more head errors (41%) than reversal errors (23%). In other words, it appears that the early simultaneous bilinguals did not have a chance to obtain age-appropriate knowledge of Korean relative clauses.

The findings of the present study help better understand the differences of the two heritage groups and the effect of input received in early childhood. Yet, it should be noted that caution must be exercised in interpreting the findings of the present study due to its limitations. In particular, a larger sample size and more tokens of test stimuli would help verify the tentative conclusions drawn in this paper.

Lastly, the findings of the present study also have pedagogical implications for foreign language instruction. In recent years, there has been an increasing trend in many foreign language classrooms including those involving less commonly taught languages that heritage speakers are placed alongside L2 learners (Brinton, Kagan, & Bauckus, 2008). This aspect presents challenges to the instructor in that these two groups of learners bring to class different language backgrounds and experiences, and different sets of language skills, among other things. In turn, the differences in these aspects affect the instructor's decision-making process in terms of course objectives, designing class activities, and the way in which classroom activities are executed to benefit both learner groups. Along with a mixture of L2 learners and heritage speakers in the same class, the heterogeneous nature of heritage speakers also presents challenges to the instructor in the sense that it adds more variables to consider in his or her instructional decision-making process. As Montrul and Ionin (2012) pointed out, figuring out which linguistic areas the various types of learners (e.g., L2 learners vs. heritage speakers and simulta-

neous vs. sequential heritage speakers) may or may not differ would be a prerequisite to achieving more effective instruction. In this sense, the findings of the present study provide a useful reference point.

Conclusion

The present study examined the differences in the grammatical knowledge of early simultaneous and sequential bilinguals. Its findings have revealed that many of the early simultaneous bilinguals had trouble correctly identifying the head noun and the relative clause, unlike the early sequential bilinguals. In addition, the latter group performed at a level similar to four-year old L1 children whereas the early simultaneous bilinguals performed far below. This finding, along with the fact that adult-like comprehension was observed with some of the early sequential bilinguals, seems to indicate that the early simultaneous bilinguals exhibited a lesser degree of grammatical competence, compared to the early sequential bilinguals. In other words, a more severe degree of incomplete acquisition was observed with the early simultaneous bilinguals, although both heritage groups appear to have experienced incomplete acquisition of the heritage language.

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Notes

1. Other explanations were also proposed. Some accounts (O'Grady, 1997) are based on the structural distance between the head noun and the gap (the number of nodes or maximal projections such as CP (complementizer phrase), IP (inflectional phrase), and VP (verb phrase)). Others rely on the linear distance (e.g. the number of intervening words) between the gap and the head noun (Tarallo & Myhill, 1983). According to structural distance accounts, subject relatives should be easier to comprehend, regardless of branching directions (pre-nominal vs. post-nominal), in that less syntactic embedding is

involved in a subject relative (*the man* [_{CP} *who* [_{IP} ___ *looks at the woman*]]) than in a direct object relative (*the man* [_{CP} *whom* [_{IP} *the woman* [_{VP} *looks at* ___]]])). However, linear distance accounts predict that subject relatives should be easier to comprehend in languages with post-nominal relative clauses (e.g., English) whereas direct object relatives should be easier in languages with pre-nominal relative clauses (e.g., Korean). There are also accounts that invoke the semantic prominence associated with the subject of the relative clause in explaining the relative ease of subject relatives over direct object relatives (O'Grady, 2011).

2. Many studies in first language (L1) and second language (L2) acquisition of Korean and Japanese relative clauses found an advantage for subject relatives, but studies on Chinese relative clauses have yielded conflicting results. For example, Hsiao and Gibson (2003) found that L1 Chinese speakers read direct object relatives faster than subject relatives while a reading time measures study by Lin and Bever (2006) reported opposite results. See O'Grady (2011) for further discussion of processing effects on relative clauses in these three East Asian languages.

3. This is not to say that subject advantage or the implications of the Noun Phrase Accessibility Hierarchy (Keenan & Comrie, 1977) do not hold for adult L1 Korean speakers. Rather, adult L1 Korean speakers' comprehension of relative clauses is so competent that their comprehension scores would obscure the subject-object asymmetry. Hence, different methodologies such as those involving reading-time measures and eye-tracking movement might be more appropriate in probing into the knowledge of adult L1 speakers. In fact, processing studies by Kwon, Polinsky and Kluender (2006) and by Kwon, Lee, Gordon, Kluender and Polinsky (2010) reported that adult L1 Korean speakers read subject relatives faster than direct object relatives, consistent with the Noun Phrase Accessibility Hierarchy.

4. Some variation is found in the test materials used in comprehension studies. Cho's (1999) study only included a set of two pictures whereas studies by O'Grady *et al.* (2003) and by Kim (2008) employed a set of three pictures including a distractor, which did not depict a relative clause. Yet, Cho's (1999) study found support for subject advantage, as O'Grady *et al.* (2003) and Kim (2008) did. Based on these results, it is unlikely that the variation found in test materials would affect the experimental results. Thus, inferences may still be

drawn from the findings of these studies, although direct comparisons might not be desirable.

5. The majority of the participants in the present study were placed into a first-semester beginning-level course through a placement test, which consisted of a written test and an oral interview.

6. Originally there were a total of sixteen tokens in the experiment, but two of them were excluded from the analysis due to an error in those two test items. It would be desirable to have more tokens in general, but the number (four or five tokens for each type) gets small if the comparison between subject and direct object relatives is focused, as seen in some of the previous L1 and L2 studies (Cho, 1999; Diessel & Tomasello, 2005; O'Grady *et al.*, 2001, 2003; to just name a few).

7. In O'Grady *et al.*'s (2001) study with both heritage and L2 learners of Korean, the difference in the mean scores of subject and direct object relatives was much smaller for the four-semester (intermediate) L2 learners (36%) than for the second-semester (beginning) L2 learners (58.4%). Interestingly, the mean difference of the second-semester heritage speakers (23.7%) was much smaller than that of both L2 groups. The matching four-semester heritage group was not included in their study, but it might be speculated that the mean difference of the four-semester heritage speakers would have likely been much smaller, possibly obscuring the difference in the mean scores of subject and direct object relatives, unlike that of the three groups included in O'Grady *et al.*'s (2001) study.

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