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Second Language Acquisition of Complex Structures: The Case of English Oblique Relative Clauses*

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ABSTRACT

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Previous works on English relative clauses (RCs) have tested subject and direct object RCs to find an asymmetrical pattern in L2 syntactic development. Studies on English native speakers and L2 learners of English have shown that both groups were better at subject RCs than any other types of RCs. However, these test items potentially involve compounding factors such as animacy effect and word order canonicity. To resolve this issue, the present study used an elicited production task to see how Korean-speaking adult learners of English perform two types of English oblique RCs. Forty Korean college students (18 high proficiency group; 22 low proficiency group) showed better performance at oblique RCs with a short filler-gap dependency (FGD) than oblique RCs with a long FGD. Both proficiency groups showed better accuracy rates when oblique RCs with a short FGD were elicited. In addition, patterns of non-targeted responses can explain how L2 learners differently process two oblique RCs with dissimilar distance between the filler and the gap. Overall, the test results demonstrated a clear linear distance effect between the filler and the gap in producing oblique RCs.

I. INTRODUCTION

In languages, a relative clause (RC) is considered as one of the complex structures because of its structural difficulty. English RCs can be indicated as shown in (1). As in (1a), the head noun (*girl*), which is modified by the following clause, takes the subject role in the clause; whereas direct object (*apple*) in the clause is relativized in (1b).

(1a) Subject RC: the girl [that _ is eating an apple]
(1b) Direct object RC: the apple [that the girl is eating _]

Due to the structural (complex) difficulty, RCs have been concentrated in syntax, psycholinguistics and acquisition of first language and second language. Interestingly, different languages indicating typological contrasts manifested similar-looking process of learning and acquiring RCs of English. In addition, regardless of fields and methodologies, most of studies indicated a strong subject preference (L1 English: McKee, McDaniel, & Snedeker, 1998; Zukowski, 2009; L1 Cantonese: Hsu, Natalie, & Zukowski, 2009; L1 Korean: C.-E. Kim, 2015).

In particular, various language acquisition studies on English RCs have shown the easiness of both comprehending and producing subject RCs as in (1a) compared to direct object RCs as in (1b) (McKee et al., 1998; Zukowski, 2009). Researchers in language development field mostly obtained the initial data from a natural linguistic method, an elicited production task, and a picture selection

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task among others. Despite varied methodologies used in experiments, all findings were quite straightforward: English-speaking adults and children showed better performance for subject RCs compared to direct object RCs. Likewise, L2 learners of English presented greater accuracy when subject RCs were targeted (K.-S. Jeon & H.-Y. Kim, 2007; C.-E. Kim, 2017b).

Numerous researchers adopted Keenan and Comrie's (1977) proposition to describe this asymmetrical pattern. Keenan and Comrie reported that subject is typologically easier to access than direct object or any other phrases located in lower levels as indicated in (2). According to their opinion, a subject RC is easier to access than any other types of RC located on the right side, which are in lower levels of the hierarchy. Therefore, previous works on RCs adopted the Noun Phrase Accessibility Hierarchy (NPAH) to interpret the results of the empirical studies.

(2) NPAH: subject > direct object > indirect object > oblique

However, findings of earlier works are problematic because they failed to control factors (e.g., word-order, animacy); therefore, it is crucial to examine the real effect on accuracy rate in production of English RCs. The purpose of the present study is to contribute to the literature by seeking the clear effect on the difficulty of RCs. The two English oblique RCs are to be adopted to resolve the uncontrolled issues and tested in a production task.

The paper is structured as follows. Section 2 introduces two hypotheses used in the L2 acquisition literatures and how differently they expect the difficulty of producing English RCs. In addition, several factors that can affect the producing of English RCs are discussed. Section 3 explains the methods, test items, and procedure of the empirical study. Section 4 discusses the findings of the study, and section 5 provides the conclusion.

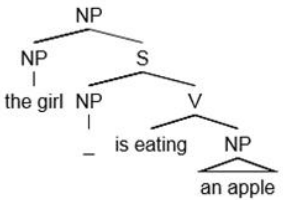
II. L2 ACQUISITION OF ENGLISH RCS

Various approaches have been proposed to detect the cause of the asymmetrical patterns in production of English RCs. How can we explain the difficulty of the direct object RCs as described in the NPAH? It is essential to know how previous works analyze experimental outcomes using English as a first language and a second language. There are two widely used perspectives, 'the structural distance hypothesis' and 'the linear distance hypothesis', to be chosen for data analysis.

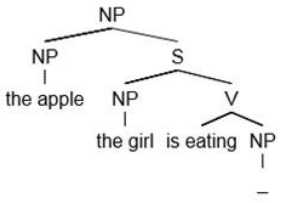
1. Structural Distance Hypothesis

As one of the important perspectives, the difficulty of direct object RCs was explained with 'the structural distance hypothesis' (SDH hereafter) (O'Grady, 1997), which was adopted by many researchers (S. Huh, 2015; S. Lee-Ellis, 2011; O'Grady, M.-S. Lee, & M.-H. Choo, 2003).

(3a) Subject RCs



(3b) Direct object RCs



According to the SDH, the difficulty of direct object RCs in English can be interpreted quite simply. As shown in (3a-b), the direct object gap is structurally lower than subject gap in English. In (3b), there are two maximal projections (V, S) between the filler (*the apple*) and the gap; however, only one node exists between the filler (*the girl*) and the gap as in (3a). Data from L1 English-speaking children and adults and L1 Korean-speaking children and adults supported his explanations of difficulty in acquiring direct object RCs (C.-E. Kim, 2015; O'Grady et al., 2003). Also, works in SLA have supported the SDH indicating that subject RCs have a strong advantage over direct object RCs (Eckman, Bell, & Nelson, 1988; Gass, 1979; Hamilton, 1994; C.-E. Kim, 2013; Wolfe-Quintero, 1992).

2. Linear Distance Hypothesis

'The linear distance hypothesis' suggested by many researchers such as Gibson (1998, 2000), Hawkins (2004), and O'Grady (2015) can explain the asymmetrical pattern. They claimed that the length between the filler and the gap takes an important role when parsers process the English RCs. Their 'length' (i.e., distance) refers to the discourse component such as N and V. According to this hypothesis, the difficulty of direct object RCs in English can be construed as meaning that the number of the discourse referent between the filler and the gap matters. In particular, C.-E. Kim and O'Grady (2016) and O'Grady (2015) posited the effect of the distance between the filler and the gap in processing of RCs as follows:

(4) Distance Hypothesis
(C.-E. Kim & O'Grady, 2016, p. 1062)
The length of the filler-gap dependency is relevant to the difficulty of relative clauses

(5a) Subject RC: the girl [that _ is eating an apple]
|___0__|

(5b) Direct object RC: the apple [that the girl is eating _]
|_____1_____2___|

As in (5b), the direct object RCs have two intervening materials (*girl, eat*) between the filler and the gap; whereas the subject RCs have no intervening elements as in (5a). Therefore, the distance hypothesis (DH hereafter) can anticipate the difficulty of direct object RCs compared to subject RCs. For subject RCs, the parsers need minimal

working memory because of 'zero intervening material', however, they are required to consume a large amount of working memory to possess and resolve two intervening materials for direct object RCs (MacWhinney, 2005). MacWhinney and O'Grady asserted that holding intervening materials until the filler-gap dependency is resolved imposes an arduous task on the parser. Some studies in L1 acquisition follow this explanation for difficulty in processing direct object RCs (Hawkins, 2004; C.-E. Kim, 2016, 2020). Also, C.-E. Kim (2017b) tested L2 learners of English to examine whether they prefer to use subject RCs over the direct object RCs in a picture-elicited production task. The results supported the DH indicating the difficulty of direct object RCs over subject RCs.

3. Compounding Factors

In the face of two explanations, the difficulty of direct object RCs can be described with ease. We have been intrigued by the fact because it is unclear whether the difficulty of the direct object RCs comes from the syntactic distance or the linear distance. In addition, comparison between subject and direct object is fundamentally problematic because subject-direct object contrast implies complex compounding factors such as animacy (Mak, Vonk, & Schriefers, 2006; Reali & Christiansen, 2007), canonical word order (Slobin & Bever, 1982) and frequency effect (C.-E. Kim & O'Grady, 2016).

Kidd, Brandt, Lieven, and Tomasello (2007) and Traxler, Morris, and Seely (2002) pointed the animacy of the head noun in relative can be crucial in processing of RCs. Many studies tested direct object RCs with an animate head noun as in (6b), however, Mak et al. (2006) reported that direct object RCs in English corpus data mostly took an inanimate noun as a head noun as shown in (6a). To explain human performance in psycholinguistics, studies need to include empirically validated test items (Mandera, Keuleers, & Brysbaert, 2017). Therefore, it is crucial to prepare more transparent test items by controlling animacy effect to investigate the true cause of parser's difficulty of direct object RCs.

(6a) Direct object RCs with inanimate head noun:
the apple [that the girl is eating _]
[-animate]
(6b) Direct object RCs with animate head noun:
the man [that the girl is seeing _]
[+animate]

To resolve this issue, C.-E. Kim & O'Grady (2016) compared subject and indirect object RCs, both of which take animate heads (as agent or goal) as in (7). Both English-speaking adults and children produced subject RCs with higher accuracy in an elicited production task.

(7a) Subject RC:
the boy [that is throwing a bag to the girl]
[+animate][agent]

(7b) Indirect object RC:
the girl [that the boy is throwing a bag to _]
[+animate] [goal]

As a result, English-speaking group manifested a strong preference for subject RCs with more purified test items in L1 acquisition field. However, C.-E. Kim and O'Grady pointed out this subject-indirect object comparison has an unsolved problem because of canonical word-order. See examples in (8) below.

(8a) Subject RC:
the boy [that _ is throwing a bag to the girl]
S V DO IO
(8b) Indirect object RC:
the girl [that the boy is throwing a bag to _]
IO S V DO

As in (8a), subject RCs follow English canonical word order frame SVX, whereas indirect object RCs indicate IO-S-V-DO patterns, which are dissimilar to SVX. Slobin & Bever (1982) suggested that subject RCs have an advantage over direct object RCs is quite reasonable because of canonical word order frame. Subject RCs resemble word order of a standard sentence; however, direct object RCs follow DO-S-V patterns (see C.-E. Kim, 2015).

In the present study, therefore, two oblique RCs located in a very low position of the NPAH are targeted for the production task to remove possibilities of animacy and canonical sentence effects, both of which were problematic in previous literatures. Comparison of two oblique RCs with different length between the filler and the gap has two different advantages as follows. First, two oblique RCs have a typically inanimate head noun such as '*island*' and '*dock*' as in (9a) and (9b). Since the locative NPs are typically inanimate, taking the same (semantic) selection restriction gains access to eliminate an animacy issue, which was dubious regarding a subject advantage.

(9a) Oblique RCs with a shorter FGD
a dock [that the boy is swimming from_
toward an island]
[-animate]

(9b) Oblique RCs with a longer FGD
an island [that the boy is swimming from a beach
toward_]
[-animate]

Second, two oblique RCs with dissimilar distance between the filler and the gap match with a non-canonical sequence. As in (10a-b), two oblique RCs are following OBL-S-V-OBL patterns. Because only subject RCs produce significant profits with regard to word order, not having subject RCs in the study should facilitate more obvious findings about acquiring English RCs.

(10a) Oblique RCs with a shorter FGD
the dock
[that the boy is swimming from_ toward the island]
[-animate]
OBL S V OBL

(10b) Oblique RCs with a longer FGD
the island
[that the boy is swimming from the beach toward_]
[-animate]
OBL S V OBL

The study aims to investigate how differently L2 learners manifest processing difficulty of two oblique RCs with different distance between the filler and the gap. To my limited knowledge, C.-E. Kim's (2017a) research is the first L2 study on English oblique RCs which tests the difficulty of English oblique RCs by using a comprehension task. She tested high-proficiency and intermediate-proficiency L2 groups to examine to test length effect between the filler and the gap of two English oblique RCs. The results showed that both groups spend much longer reading times in comprehending oblique RCs with a long FGD than oblique RCs with a short FGD. In particular, the high proficiency showed faster total reading times with oblique RCs with a short FGD than with oblique RCs with a long FGD just L1 group did.

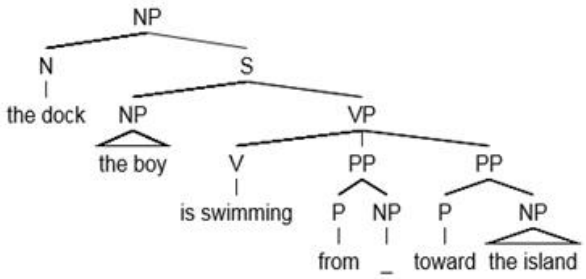
4. Research Questions

The study addresses three research questions as follows:

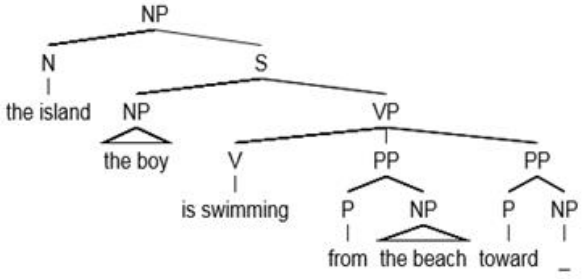
1) How differently do Korean L2 learners produce two English oblique RCs? Does the learner's foreign language proficiency have an effect on producing English oblique RCs?
2) What kinds of processing strategies do they use when oblique RCs are targeted?
3) Which hypothesis is better in explaining the difficulty of English oblique RCs?

The two different approaches, the structural distance hypothesis and the linear distance hypothesis, predict the followings. First, according to the SDH, both oblique RCs with a short FGD as in (11a) and oblique RCs with a long FGD as in (11b) will be expected to be processed by L2 readers with a same amount of difficulty because two conditions have equally three intervening nodes between the filler and the gap. Oblique RCs with shorter FGD as in (11a) have maximal projections (PP, VP, S) between the filler (*dock*) and the gap. Also, oblique RCs with a long FGD have maximal projections (PP, VP, S) between the filler (*island*) and the gap as in (11b).

(11a) Oblique RCs with a short FGD



(11b) Oblique RCs with a long FGD



Because the number of maximal projections between the filler and the gap is equal as in (11a-b), no differences will be detected in L2 learners' responses of the experimental task. Therefore, the SDH hypothesizes that L2 learners will be expected to show similar performances when two oblique RCs are targeted in the task.

Second, following the distance hypothesis, it is anticipated that L2 learners will indicate much more difficulty when oblique RCs with a long FGD are targeted. Oblique RCs with a short FGD as in (12a) take two intervening materials (*boy, swim*); however, oblique RCs with a long FGD as in (12b) have three intervening materials (*boy, swim, beach*).

(12a) Oblique RCs with a short FGD
the dock [that the boy is swimming from_ toward the island]
|_____1_____2_____|

(12b) Oblique RCs with a long FGD
the island [that the boy is swimming from the beach toward_]
|_____1_____2_____3_____|

L2 learners' language proficiency is an important factor to consider regarding learners' performance on two oblique RCs in the task. The results will reveal a significant effect of language proficiency indicating that the high proficiency group will show better performance than the intermediate group when two oblique RCs are elicited in the task.

III. THE EXPERIMENT

1. Participants

Forty Korean learners of English as a foreign language participated in the study. They are all university students who were born and raised in Seoul, Korea, with a mean age of 22.8. They voluntarily agreed to participate in the experiment. An English C-test designed by Schulz (2006) was used after the main experiment to measure L2 learners' English proficiency. They were asked to complete C-test and the scores were calculated by the researcher to measure their English proficiency level. Two passages including 40 blanks were given to the participants and they were required to fill out the blanks. As a cut off value for two proficiency group, the mean score (26.52) became a datum point. Forty students were divided into low proficiency group (LPG) (22 participants; mean score = 18.45) and high proficiency group (HPG) (18 participants; mean score = 36.38).

2. Procedure

As a research method, elicitation production task (Goodluck & Stojanovic, 1997; Hsu et al., 2009) was used. A production task can provide an opportunity to peek at process of building the relative clauses and a chance to examine what types of utterances are chosen by speakers (C.-E. Kim, 2017b). The peculiarity of the production task (MacDonald, 2013) can provide various responses because the speakers are unrestricted when the setting makes them choose an utterance. To indicate a certain meaning, the speakers can choose to use a wide variety of expressions. Participants sat in front of the computer screen to participate in the experiment. All audio-recorded test items came with the pencil-drawing pictures to describe the situation denoted by the stimuli. Before starting the critical items, all participants were exposed to 3 warm-up test items (such as simple RCs) to get accustomed to performing the task. It took about ten minutes to complete the main experiment. The participants heard the script and saw the pictures describing the stories; shortly afterward, the beep sounds were given with an arrow mark on the computer screen. Usually, the elicited product task contains the questions which provoke proper responses from the participants. However, repeatedly used *wh*-questions (e.g., which one has an arrow mark?) may have priming effect on the participant's response because they are all subject *wh*-questions (Hsu et al., 2009; C.-E. Kim & O'Grady, 2016; C.-E. Kim, 2020). Therefore, only *wh*- questions are given to the participants in warm-up tests, but not in critical items.

3. Test Items

Sixteen sets of test items were prepared to test the research questions. Sample picture and the recorded script were shown in Figures 1 and 2. All test items are listed in Appendix.

Prompt: In the first picture, the boy is strolling from a school to park. In the second picture, the boy is strolling from a church to a park. (Which one has an arrow mark?)
Target: the school [that the boy is strolling from _ to the park]

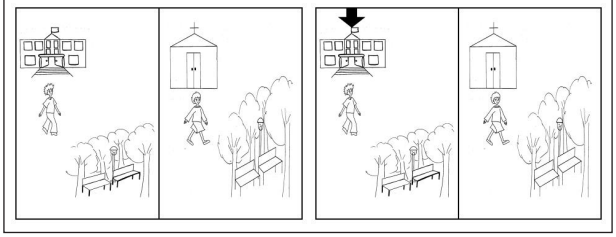


FIGURE 1 A Sample Set of Oblique RCs With a Short FGD

Prompt: In the first picture, the boy is strolling from a school to park. In the second picture, the boy is strolling from a church to a park. (Which one has an arrow mark?)
Target: the park [that the boy is strolling from the church to _]

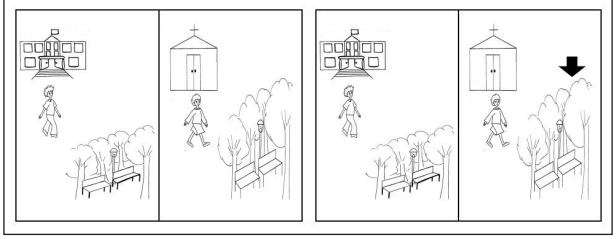


FIGURE 2 A Sample Set of Oblique RCs With a Long FGD

4. Data Analysis

All responses were recorded in the Audacity program to analyze the data. The data recorded were carefully transcribed by the author and one native English speaker to obtain the reliable data, and input into an excel file. Only the first response is analyzed in the results because more than one response tends to be primed by the very first response (Hue et al., 2009, C.-E. Kim, 2013). When an elicited production task is used, there is a huge potential of semantically appropriate responses which are were non-targeted. For that reason, analyzing non-targeted responses is a point to be considered along with accuracy rate. All utterances were categorized into three categories: targeted responses, semantically appropriate response, and non-targeted responses.

IV. RESULTS

1. Accuracy

The HPG indicated higher targeted responses in OBL RCs with a short FGD than in OBL RCs with a long FGD (88.8% vs. 3.3%) as described in Figure 3.

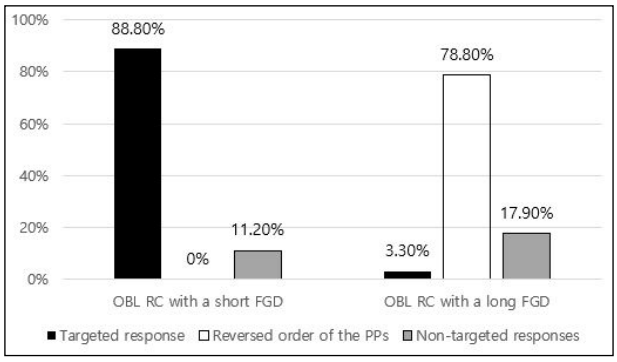


FIGURE 3 Accuracy of Two Oblique RCs for HPG

As in Figure 4, the LPG similarly indicated a much lower rate of targeted responses in OBL RCs with a long FGD (6.4%) compared to OBL RC with a short FGD (60%). All in all, both groups strikingly performed better for OBL RC with a short FGD than for OBL RCs with a long FGD. There are (i) main effect of condition ($F(1, 38) = 451.211$, $p < 0$ .001); (ii) main effect of proficiency ($F(1, 38) = 16.104$, $p < 0$ .001); and significant interaction between proficiency and condition ($F(1, 38) = 23.728$, $p < 0.001$), confirming that the difference between OBL RCs with a short FGD condition and OBL RCs with a long FGD condition was larger for the HPG than for the LPG. The fact that the LPG showed higher accuracy than the HPG in OBL RCs with a long FGD does not mean the LPG showed better performance because the reversed order pattern are semantically appropriate responses like targeted responses.

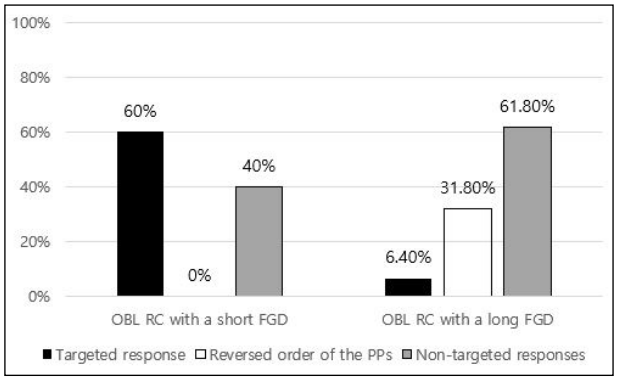


FIGURE 4 Accuracy of Two Oblique RCs for LPG

Next, it should be noted what types of other responses the L2 learners produced in the task because understanding their motivations to create non-targeted responses instead of targeted responses can offer the process of planning the outcomes to avoid the target structure. When OBL RCs with a long FGD were elicited, both proficiency groups used reversed order of the PPs (HPG: 78.8%; LPG: 31.8%, respectively) as in Figures 3 and 4. This represents that both groups generated oblique RCs with a short FGD when oblique RCs with a long FGD were targeted.

The HPG and the LPG produced syntactically and semantically non-targeted responses when two OBL RCs were targeted in Table 1 and 2.

TABLE 1
Accuracy of Non-Targeted Response for HPG

	OBL with a short FGD	OBL with a long FGD
Reversal error	2.2%	4.5%
Preposition 'to' deletion	0%	8.9%
Preposition 'from' deletion	5.6%	0%
Non-RC	3.4%	4.5%
Total	11.2%	17.9%

As indicated in Table 1, when OBL RCs with a short FGD were targeted, the HPG made (i) reversal errors (2.2%), (ii) preposition '*from*' deletion (5.6%); and (iii) non-RCs (3.4%). They produced errors such as (i) reversal errors (4.5%), (ii) preposition '*to*' deletion (8.9%); and (iii) non-RCs (4.5%) when OBL RCs with a long FGD were elicited.

TABLE 2
Accuracy of Non-Targeted Response for LPG

	OBL with a short FGD	OBL with a long FGD
Reversal error	2.8%	9.1%
Resumptive NP	2.8%	14.5%
Preposition 'to' deletion	0%	30%
Preposition 'from' deletion	28.1%	0%
Non-RC	6.3%	8.2%
Total	40%	61.8%

Similarly, when OBL RCs with a short FGD were targeted, the LPG made (i) reversal errors (2.8%), (ii) resumptive NP (2.8%); (iii) preposition '*from*' deletion (28.1%); and (iv) non-RCs (6.3%). They produced errors such as (i) reversal errors (9.1%), (ii) resumptive NP (14.5%); (iii) preposition '*to*' deletion (30%); and (iv) non-RCs (8.2%) when OBL RCs with a long FGD were elicited. Actual responses by L2 learners were exemplified in (13) below.

(13) Non-targeted response when OBL RCs with a short FGD were targeted
(Target: the school [that the boy is strolling from _ to the park]
a. Reversible error: the school [that the boy is strolling from the park to_]
b. Preposition deletion: the school [that the boy is strolling _ to the park]
c. Resumptive error: the school [that the boy is strolling from *the school to the park]
d. Non-RC: that the boy is strolling from the school to the park

When OBL RCs with long FGD were targeted, the HPG and the LPG produced non-targeted responses as indicated in (14).

(14) Non-targeted response when OBL RCs with a long FGD were targeted
(Target: the park
[that the boy is strolling from the church to _])
a. Reversible error: the park
[that the boy is strolling from _ to the church]
b. Resumptive error: the park
[that the boy is strolling from the church to *the park]
c. Preposition deletion: the park
[that the boy is strolling from the church]
d. Non-RC: the boy is strolling from the church to the park

2. Processing Strategies

After analyzing all data in Section IV.1, it is detected that the participants used three prominent processing strategies. First, when OBL RCs with a long FGD were targeted, both proficiency groups (HPG: 78.8%; LPG: 31.8) produced forms of the changed prepositional phrases (PPs) as shown in (15).

(15) PP order change
the park [that the boy is strolling to _ from the church]
(Target: the park
[that the boy is strolling from the church to _])

Example (15) is a very well-formed and semantically appropriate RC type. This denotes that changing the order of two PPs (destination-source order) does not form meaningful disparity between two structures. However, we can discern the linear difference from two patterns. By taking the reversed order of PPs, the distance between the filler and the gap becomes shorter than the targeted form as indicated in (16b). The targeted form possesses the source-destination order; therefore, there exists three discourse elements as in (16a). After all, L2 groups prefer to have the OBL RCs with a shorter length between the filler and the gap.

(16a) Oblique RCs with a long FGD
the park [that the boy is strolling from the church to _]
|_____1_____2_____3_____|

(16b) Oblique RCs with a short FGD
the park [that the boy is strolling to _ from the church]
|_____1____2_____|

Interestingly, our participants changed the order of PPs to shorten the distance between the filler and the gap in OBL RCs with a long FGD condition with eagerness. They never tried to increase the distance between the filler and the gap; OBL RCs with a long FGD were not detected when OBL RCs with a short FGD were elicited. Second, both groups tend to delete prepositions (*from, to*) in their responses when OBL RCs with a long FGD were elicited. This made ungrammatical responses as in (17). Without preposition inside of the clause, the gap position cannot exist. Presumably, this type of errors occurs because the L2 learners fail to connect the filler and the trace (gap) position. It is said that understanding the relation between the filler and the gap is quite troublesome to L1 children and L2 speakers (C.-E. Kim, 2013; C.-E. Kim & O'Grady, 2016; C.-E. Kim, 2017b, 2020).

(17a) oblique RCs with a long FGD
*the park [that the boy is strolling from the church ~~to~~ _]
(17b) oblique RCs with a short FGD
*the school [that the boy is strolling ~~from~~ _ to the park]

Third, the LPG often utilize the resumptive NP strategies when oblique RCs with long FGD were targeted. Including the resumptive NPs in the responses is grammatically problematic as in (18), which leads to the ungrammaticality. This never happened to the HPG, but to the LPG.

(18a) oblique RCs with a long FGD
the park
[that the boy is strolling from the church to *the park]
(18b) oblique RCs with a short FGD
the school
[that the boy is strolling from *the school to the park]

A great deal of previous works has examined the use of the resumptive NP in production of relative clause (Hsu et al., 2009; C.-E. Kim & O'Grady, 2016; McKee et al., 1998; Zukowski, 2009). This error is caused by processing burden because the L2 learners were unsuccessful in evacuating the gap position. Similar to preposition deletion, this strategy also reflects L2 learners' troubles while producing OBL RCs with a long FGD.

V. CONCLUSION AND IMPLICATIONS

In an attempt to search for the asymmetrical patterns among various types of RCs, this study examined forty Korean college students' responses on two oblique RCs in an elicited production task. All answers to the critical items in the experiment were calculated and categorized by pattern of RC and its frequency. Among various perspectives, two positions: (i) the SDH and (ii) the DH were adopted to explain the difficulty of English oblique RCs.

The followings are the findings of three research questions.

First, L2 learners of English indicate difference in producing two oblique RCs with dissimilar lengths between the filler and the gap. The accuracy rate showed striking difference between the two oblique RCs (for HPG: 88.8% vs. 3.3%; for LPG: 60% vs. 6.4%). Both proficiency

groups revealed similar patterns in their responses. They showed better performance in OBL RCs with a short FGD condition than in OBL RCs with a long FGD condition. Also, English proficiency takes an importance role in producing the two types of oblique RCs. The HPG showed significantly better performance than the LPG when two English OBL RCs were targeted overall.

Second, the L2 learners adopted diverse strategies in the experiments to weaken the processing burden. When the OBL RCs with long FGD were targeted, L2 learners employed various strategies: (1) reordering PP; (2) preposition deletion; and (3) resumptive NP errors. Both groups produced the OBL RCs with short FGD instead by reordering PPs when the OBL RCs with long FGD were targeted. Trying hard to make a shorter distance between the filler and the gap is a prominent way to have less burden on processing RCs. C.-E. Kim (2017b) showed L2 learners of English produced lots of passivized form when the direct object RCs were targeted in an elicited production task by employing an '*avoidance strategy.*' As simplified in (19b), producing passive subject RCs means that the parser does not need to hold intervening materials between the filler and the gap. However, to produce the direct object RCs as in (19a), the parser should hold two intervening materials (*girl, push*) until reaching the gap position.

(19a) Targeted RCs
the boy [that the girl is pushing _]
|_____1_____2_____|
(19b) Passive subject RCs when the direct object RCs are targeted the boy [that _ is pushed by the girl]
|____0___|

The fact that L2 learners (regardless of proficiency level) prefer to produce OBL RCs with a short FGD when OBL RCs with a long FGD are elicited presents that they rarely produce oblique RCs with a long FGD. Therefore, it can be concluded the speakers intend to '*avoid*' difficult types of RC. According to Hsu et al. (2009), C.-E. Kim (2017b), and MacDonald (2013), language learners show a tendency of choosing (producing) easier pattern over complex structures when production tasks were applied in the experiment. This finding was possible because the production task gives the speakers the freedom to choose their answers compared to the comprehension task. In addition, both proficiency groups deleted prepositions often; when they did not make targeted RCs, they produced preposition deletion (HPG: 4.5%; LPG: 28.1%). Although they do understand ungrammaticality of the responses without preposition, holding the filler in the mind while conducting a production task may be tough obligations to the L2 learners. In particular, finding and maintaining right position for preposition, which is a particle, should be planned ahead before starting the utterance in the task. Because of this complicated process, they often fail to consider the existence of preposition. Psychological tiredness does damage successful utterance. Furthermore, only the LPG produced the resumptive NP errors; they produced more resumptive NP in OBL RCs with a long FGD (14.5%) than in OBL RCs with a short FGD (2.8%). L2 learners know the resumptive NP error is ungrammatical. Then why do they make this error? Hsu et al. (2009) mentioned that producing resumptive NPs in gap positions is strongly related to having the unresolved filler in working memory. The reason the resumptive NP exists in the gap position is the parser fails to hold the filler and mistakenly reactivates it in the gap position. More usages of the resumptive NP in OBL RCs with long FGD can also be explained by the distance hypothesis. As indicated in (16), OBL RCs with a long FGD have three intervening materials (*boy, stroll, church*) between the filler and the gap; however, OBL RCs with short FGD take two referents (*boy, stroll*). This suggests that having one more referent in (16a) strongly push the speaker to utter the resumptive NP in the gap position of OBL RCs with a long FGD.

Third, the outcomes from both accuracy rate and processing strategies demonstrated the DH is a better explanation to interpret the difficulty of OBL RCs with a long FGD. The SDH anticipated the same difficulty from both conditions; however, the L2 learners clearly indicated distinctions between the two conditions. Therefore, the distance factor can describe the difficulty of oblique RCs with different distance between the filler and the gap.

Altogether the distance factor between the filler and the gap has an effect on producing English OBL RCs in the production task. From the accuracy rate and the L2 learner's response strategies such as avoidance, PP deletion, and resumptive NP, the results strongly supported the DH as described in previous session. As a result, OBL RCs with a long FGD are more difficult to produce by L2 learners. At my limited knowledge, this is the first study to test L2 learners with English oblique RCs with different distances in the production task. It can be concluded that L2 learners had much more difficulty in producing OBL RCs with a long FGD.

These findings can be parallel with some studies on RCs. C.-E. Kim and O'Grady (2016) manifested the distance effect in other types of RCs (subject, indirect object, direct object, oblique). On top of their findings, this work showed the striking effect of the length between the filler and the gap by adopting two oblique RCs. Therefore, various studies including the present work examined that the L2 learners are very sensitive to the distance between the filler and the gap in RCs and they show a clear preference of OBL RCs with a short FGD by taking varied strategies which help the L2 learners plan a structure with less difficulty.

The pedagogical implications which arise from the findings are discussed as follows: (i) Various English RC types including oblique RCs need to be introduced in EFL settings. EFL teachers are required to report the structure and give learners chances to comprehend each function of RCs and produce them. (ii) Understanding a mechanism of language processing is being essential to successful learning a target language. With regard to this point, learners can find out that language use can be connected to hu-

man mind.

This work investigated the accuracy rate and their non-targeted responses from production task to detect what processing strategies the L2 learners use when two oblique RCs were elicited. However, future studies are needed to investigate L2 learners' comprehensive knowledge since the production task gives the participants much more burden compared to comprehension task. Also, English OBL RCs are very infrequent in natural conversation setting. Due to its infrequency, it should be tested whether all L2 participants comprehend the targeted form well in advance. When we have a similar result from the comprehension task, it can clearly be reported that L2 learners have processing difficulty of the OBL RCs with a long FGD in productive and comprehensive ways. Therefore, connection between the comprehension and the production should be discussed in detail in future study.

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APPENDIX

Survey Questionnaire

1. In the first picture, a boy is walking from a car to a church.
   In the second picture, a boy is walking from a tree to a church.
2. In the first picture, a boy is strolling from a school to a park.
   In the second picture, a boy is strolling from a church to a park.
3. In the first picture, a boy is paddling from a beach to an island.
   In the second picture, a boy is paddling from a dock to an island.
4. In the first picture, a boy is leaping from a table toward a skateboard.
   In the second picture, a boy is leaping from a chair toward a skateboard.
5. In the first picture, a boy is rowing from a buoy toward an island.
   In the second picture, a boy is rowing from a beach toward an island.
6. In the first picture, a boy is jogging from a school to a forest.
   In the second picture, a boy is jogging from a bus to a forest.
7. In the first picture, a boy is swimming from a dock to an island.
   In the second picture, a boy is swimming from a beach to an island.
8. In the first picture, a boy is jumping from a table toward a bicycle.
   In the second picture, a boy is jumping from a rock toward a bicycle.
9. In the first picture, a boy is sailing from an island toward a buoy.
   In the second picture, a boy is sailing from beach toward a buoy.
10. In the first picture, a boy is traveling from a farm toward a city.
    In the second picture, a boy is traveling from a park toward a city.