

Derivational Complexity in EFL Learners' Development of Bi-clausal *Wh*-questions

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Abstract—This paper aims to investigate Korean learners' interlanguage with respect to the production of English bi-clausal *wh*-questions. One hundred seven adult Korean-speaking learners of English in three proficiency groups took part in a production task designed to elicit English bi-clausal *wh*-questions. The study specifically asked what interlanguage structures Korean EFL learners would produce and whether the structures would change as learners' English proficiency advances. The results revealed that Korean EFL learners produced a range of alternative bi-clausal structures, including *wh*-scope marking, silent scope marking, *wh*-scope marking with embedded *wh-in-situ*, L1 clause order, and *wh-about-wh* type constructions. Comparison of three proficiency groups showed that as the learners' English proficiency increases, they tend to produce an increasing number of derivationally more complex alternatives. It is argued that derivational complexity plays a role in the developmental process of Korean EFL learners' interlanguage for bi-clausal *wh*-questions.

Index Terms—interlanguage, bi-clausal *wh*-question, derivational complexity, *wh*-movement, *wh*-scope marking

I. INTRODUCTION

In English, complex *wh*-questions have been analyzed as involving long-distance movement of the *wh*-phrase, as illustrated in (1).

(1) a. [_{CP} Who_i do you think [_{CP} *t_i* Tom loves *t_i*]?]

In (1), the *wh*-phrase that originated in the object position in embedded clause goes through successive cyclic movement before rising to Spec-CP of the main clause. This long-distance movement has been known to pose considerable difficulty for child L1 acquisition and causes children to resort to some alternative options such as (2a) and (2b) below.

(2) a.* What do you think who Bert kissed?

b.* Who do you think who Gumby threw in the water?

(McDaniel et al., 1995, p.720)

The sentence in (2a) is a '*wh*-scope marking' construction in which the sentence initial position is marked by an expletive *wh*-word 'what' and (2b) is a '*wh*-copying' construction in which the same *wh*-word appears both in the matrix and embedded clauses. These types of structures are also known to appear in the L1 acquisition of French (Jakubowicz, 2004, 2011; Jakubowicz & Strik, 2008; Strik, 2006) and Spanish (Gutierrez, 2004).

Similar alternative constructions for complex *wh*-questions have also been observed in L2 acquisition of English (e.g., Gutierrez, 2005; Gutierrez & Mayo, 2008; Wakabayashi & Okawara, 2003; Yamane, 2003). For example, Gutierrez (2005) and Gutierrez & Mayo (2008) report that L1 Spanish-Basque bilingual speakers produced the following sentences for the target sentence '*who do you think lived in the house?*'

(3) a. *What do you think who lived in that house? (Gutierrez & Mayo, 2008, p. 277)

b. *Who do you think who lives in the house? (Gutierrez, 2005, p.174)

The sentence in (3a) is a *wh*-scope marking construction and (3b) is a *wh*-copying construction. These constructions are not the results of L1 influence because learners' L1s do not allow these constructions. The L1s of the speakers who produced constructions as in (3) include Japanese (Schulz, 2006; Wakabayashi & Okawara, 2003; Yamane, 2003) and bilingual Spanish/Basque (Gutierrez, 2005; Gutierrez & Mayo, 2008) which do not license constructions such as in (3). The fact that these constructions appear in the acquisition of both L1 and L2 even though such constructions are not available in language input nor the learners' L1 has raised an important question about what causes the production of the non-target-like structures in the process of language acquisition.

A number of studies in L1 and L2 acquisition have proposed that learners' use of those non-target-like structures is a developmental phenomenon that occurs when learners try to overcome the high derivational complexity of long-distance *wh*-movement. As long-distance *wh*-movement requires movement of *wh*-element across clausal boundary, learners will need the capacity to deal with the complex long-distance processing. When they do not have this capacity, they develop constructions that are derivationally less complex. Jakubowicz and Strik (2008), for example, claimed that child language acquisition is sensitive to computational complexity of the syntactic derivation, so that children first attempt to avoid long-distance movement of the *wh*-phrase and often resort to target-deviant productions,

such as *wh*-scope marking and *wh*-copying constructions in (2). Slavkov (2015) suggested that L2 learners also create derivationally simpler alternative forms to compensate for their lack of competence to carry out long-distance *wh*-movement during the developmental process.

The present study aims to investigate Korean EFL learners' interlanguage in the development of English long-distance *wh*-movement. It will examine the bi-clausal *wh*-question interlanguage forms produced by Korean EFL learners and see how those forms change as the learner's English proficiency increases. Specifically, this study will ask if the change can be explained by the 'derivational theory of complexity' which claims that degree of derivational complexity is related to the language developmental process. The concrete research questions of this study will be presented after a brief introduction to the derivational theory of complexity and a review of previous work related to the theory.

II. BACKGROUND

A. *Wh*-questions and Derivational Complexity

The hypothesis that language develops from derivationally simpler structures (i.e. structures involving less syntactic operations) to more complex ones (i.e., structures involving more syntactic operations) has existed since the 1960s. Often called the 'derivational theory of complexity', this idea has been tested by a growing number of studies in L1 language acquisition (e.g., Hamann et al., 2007; Jakubowicz, 2011; Jakubowicz and Nash, 2001). These studies generally suggest that constructions involving less complex syntactic derivation appear prior to those involving more complex derivation in the language acquisition process. The most commonly studied forms in those studies are *wh*-constructions in different languages. For example, French allows four types of mono-clause *wh*-questions with varying degrees of derivational complexity.

(4) French mono-clause *Wh*-questions

- | | |
|---|--|
| a. Tu as vu qui? | (<i>wh-in-situ</i>) |
| 'You saw who?' | |
| b. Qui _i tu as vu t _i ? | (<i>wh</i> -fronting without S-V inversion) |
| 'Who you saw?' | |
| c. C'est qui _i [que tu as vu t _i] | (clefted- <i>wh</i>) |
| 'Who is it that you saw?' | |
| d. Qui _i as _k tu t _k vu t _i | (<i>wh</i> -fronting with S-V inversion) |
| 'Who did you see?' | |

(from Jakubowicz, 2011, p. 341)

Among the above French *wh*-questions, the *wh-in-situ* construction (1a) adopts no overt movement of the *wh*-word while (1b), (1c) and (1d) involve movement of the *wh*-word from the base-generated position. In terms of derivational complexity, therefore, (1a) is the least complex structure among the four constructions. Several studies in child L1 French acquisition have found that children's early *wh*-question production is characterized by the high rate of the *wh-in-situ* constructions like (1a) and almost complete absence of the construction like (1d) which requires subject-verb inversion operation as well as overt *wh*-movement (Hamann 2000, 2006; Jakubowicz, 2011; Plunkett, 1999).

With regard to the early L1 production of mono-clausal *wh*-questions, however, target language properties constrain the available options for children's production. Although *wh-in-situ* construction is derivationally the least complex form, it has been reported that children learning L1 English rarely produce constructions with *wh-in-situ*, and produced *wh*-questions with a sentence-initial *wh*-phrase from the very early stage (Guasti, 2002; Strik, 2008). This rare production of *wh-in-situ* construction has also been documented L1 acquisition of Dutch (Jakubowicz and Strik, 2008; Van Kampen, 1997) and Portuguese (Soares, 2006). Unlike French, these languages do not license *wh-in-situ* for normal *wh*-questions. These findings suggest that although early child L1 acquisition is affected by derivational complexity, it is also constrained by the input to which children are exposed. That is, children prefer derivationally less complex structures, but only when those structures are a legitimate part of adult grammar.

Nonetheless, the subsequent development of more complex *wh*-questions allows alternative forms that are not licensed in child's L1. As presented earlier in (2), *wh*-scope-marking constructions and *wh*-copying constructions, which do not exist in language input available to L1 English learning child, have often been observed in children's production. Interestingly, although prohibited in English, *wh*-scope marking and *wh*-copying are cross-linguistically attested options to derive complex *wh*-questions. The *wh*-scope marking construction is a legitimate option in Romani (McDaniel, 1989), Hungarian (Horvath, 1997), and German (Felser, 2004). The *wh*-copying construction is acceptable in Frisian (Hiemstra, 1986), some dialects of Dutch (van Kampen, 1997), and some varieties of colloquial German and Romani (Fanselow & Mahajan, 2000; McDaniel, 1986). Although *wh*-scope marking and *wh*-copying constructions are not allowed in adult English grammar, they are admissible syntactic options in human language which are derivationally less complex than English bi-clausal *wh*-questions.

It has also been suggested that derivational complexity plays a role in the L2 acquisition process (Prévost, 2006; Prévost et al., 2010; Prévost, Strik, & Tuller, 2014, Slavkov, 2015). Studies in child L2 French (Prévost, 2006; Prévost et al. 2010, Prévost et al. 2014) found that the French *wh*-question forms involving fewer movement operations are generally acquired earlier than those involving more movement operations. These studies raised the possibility that

child L2 learning process is influenced by derivational complexity without discounting the possibility of an interaction between L1 properties and derivational complexity.

Comparatively fewer studies have examined *wh*-questions in adult L2 acquisition of English. Slavkov (2015) examined English complex *wh*-questions produced by lower-intermediate level English learners whose L1s are French and Bulgarian. In this study, Slavkov found that both French and Bulgarian learners resorted to a variety of non-target-like constructions with less derivational complexity. Some of these constructions cannot be explained by either L1 influence or L2 input, and Slavkov proposed that adoption of alternative forms is part of the avoidance strategies used as an escape-hatch from the high complexity of English complex *wh*-questions. The study, however, did not allow us to see how learners in different developmental stages produce different alternative forms, because the proficiency levels of Bulgarian and French learners in the study were all in the low-intermediate range. Kim (2017) compared Korean college and high school EFL learners' productions of English *wh*-questions. He found that Korean college EFL learners produced greater number of derivationally more complex alternatives to long-distance *wh*-questions than high school EFL learners did. While this finding is suggestive of the role of derivational complexity in L2 developmental process of long-distance *wh*-questions, the study did not check on whether the college EFL learners' English proficiencies were indeed higher than those of the high school learners. The present study is the subsequent to Kim (2017), with the aim to find out whether EFL learners with differing English proficiency show different interlanguage productions for complex *wh*-questions.

B. Syntax of Alternatives for English Bi-clausal Wh-questions

The degree of derivational complexity is related to the number of grammatical operations involved in the derivation of a sentence. The present study adopts Chomsky's (2001) model of sentence generation in which derivation occurs through the process of External Merge and Internal Merge (or movement) operations. In English *wh*-question derivation, the *wh*-word is first externally merged to establish the base structure (*wh-in-situ* construction) and then undergoes Internal Merge to the left periphery of the clause. Therefore, *wh*-questions without Internal Merge of the *wh*-word (i.e., *wh-in-situ* construction; e.g., 'Do you eat what?') is derivationally less complex than the ones with Internal Merge (*wh*-construction with overt *wh*-movement; e.g., 'What do you eat?').

When it comes to the bi-clausal *wh*-questions, several potential alternative forms could be predicted to be produced by L2 learners.

Wh-copying construction: The use of the *wh*-copying (examples were given in (2b) and (3b)) has been reported in L1 acquisition of a variety of languages and in some of the L2 acquisition studies (Bruening, 2006; Jakubowicz, 2011). It is generally accepted that long-distance cyclic *wh*-movement (or Internal Merge) has been instantiated in this construction, but without deleting the *wh*-copy located in the Spec-CP of the second clause (Fanselow and Mahjan, 2000; Felser, 2004). (5) illustrates the simplified structure of *wh*-copying construction in (2b).

(5) * [_{CP} Who_i do you think [_{CP} who_i Gumby threw *t_i* in the water]]?

Production of the *wh*-copying construction indicates that the learner fails to delete the phonological feature of the *wh*-copy in the embedded Spec-CP once the *wh*-phrase has moved to Spec-CP of the main clause¹. In this sense, the degree of derivational complexity of the *wh*-copying construction is a little lower than the grammatical bi-clausal *wh*-construction which has employed 'deletion' operation along with the Internal Merge operations.

Wh-scope marking construction: For *wh*-scope marking constructions (such as *What do you think who Bert kissed?), two different analyses have been suggested. In the first analysis, which is often called the direct dependency approach, the *wh*-word moves partially to Spec-CP of the embedded clause from its base position, and the scope-marker 'what' is added to the sentence initial position. This scope marker could be a vacuous expletive (among others, see McDaniel, 1989; Sabel, 2000) or a separated and raised *wh*-feature pronounced as default *wh*-word 'what' (Cheng, 2000, Hiemstra, 1986). Regardless of whether it is an expletive or a raised *wh*-feature, there is a direct dependency between the scope marker and the sentence medial *wh*-word. In the second analysis, which is called the indirect dependency approach, the construction is analyzed as having two independent and separate local *wh*-movements. For example, the sentence *what do you think who Bert kissed? is the result of two short *wh*-movements as illustrated in (6).

(6) *What_i do you think *t_i*? who_j Bert kissed *t_j*?

In this analysis, two questions are connected, but no chain relation is established between the two *wh*-phrases in the construction. (see Dayal, 2000; Horvath, 2000).

According to the direct dependency approach, the derivational complexity of *wh*-scope marking is difficult to judge as it employed one short *wh*-movement (one Internal Merge) and an addition of *wh*-word 'what' to the structure. While it is obvious that short *wh*-movement is derivationally less complex than the long-distance *wh*-movement, previous literature has not weighed the cost of externally merging an expletive to the structure in comparison to the cost of Internal Merge. When the indirect approach is assumed, *wh*-scope marking is derivationally simpler than cyclic long-distance *wh*-movement as it adopts only a short movement for each independent clause (thus, two unconnected short movements). The same view on the complexity of *wh*-scope marking construction was taken in Slavkov (2015).

¹ According to Chomsky (2005), the minimization of computation requires deletion of all but one copy at the PF.

Silent scope marking construction: Constructions like (7), which is called the silent scope marking construction, were reported to appear in previous research on L2 acquisition of English complex *wh*-movement (Slavkov, 2015).

(7) *Do you think who Mary sent to buy eggs? (for “*Who do you think Mary sent to buy eggs?*”)

(Slavkov, 2015, p.199)

In this construction, the *wh*-phrase has risen to Spec-CP of embedded clause, but, is stranded there, failing to move further to Spec-CP of the main clause (thus, one short *wh*-movement). Therefore, this construction is believed to be derivationally less complex than long-distance *wh*-movement, *wh*-copying, and *wh*-scope marking constructions (also see Slavkov, 2015).

Wh-Scope marking with wh-in-situ construction: Another potential alternative to the long-distance *wh*-movement construction is a construction in which the *wh*-phrase remains *in-situ*, but the sentence initial position is scope-marked by a *wh*-word *what*, as shown in (8).

(8) What do you think Jane ate the cookies where?

Although no specific syntactic analysis has been proposed for this structure in literature, it is reasonable to assume that it has the lower derivational complexity than the normal *wh*-scope marking construction as no *wh*-movement has been made even within the embedded clause in this construction.

To summarize, in long-distance (LD) *wh*-movement, cyclic *wh*-movement and a deletion operation are both employed, whereas in the *wh*-copying construction, cyclic long-distance *wh*-movement is employed without the deletion operation. In the *wh*-scope marking construction, either one short *wh*-movement and an external merge of *what* are employed (according to the direct dependency approach) or two independent short movements are employed (according to the indirect dependency approach). In the silent scope marking construction, only one short local *wh*-movement is employed. Finally, in the *wh*-scope marking with *wh-in-situ* construction, only an external merge of the scope marking is made, without *wh*-movement of any sort.

C. Korean Wh-questions

Unlike English and French, Korean language does not employ overt *wh*-movement (Bach, 1971; Huang, 1982). Consider the Korean sentences in (9).

(9) a. Sunhi-ka *cha-eyse* *khephi* -lul masi-ess-eyo.

Sunhi-Nom car-in coffee-Acc drink-Pst-End
‘Sunhi drank coffee in the car’

b. Sunhi-ka *edise* *khephi*-lul masi-ess-eyo ?

Sunhi-Nom where coffee-Acc drink-Pst-End
‘Where did Sunhi drink coffee?’

c. [[Sunhi-ka *edise* *khephi* -lul masi-ess -tago] sayngkakha-yyo]]?

Sunhi-Nom where coffee-Acc drink-Pst-Comp think-End
‘Where do (you) think Sunhi drank coffee?’

Note: Nom-nominative Case marker, Acc-accusative Case marker, Pst-past tense morpheme, End-ending morpheme, Comp-complementizer

Sentence (9a) shows the typical word order in Korean in which the adjunct *cha-eyse* (in the car) and object *khephi-lul* (coffee) come before the verb. When a part of sentence is unknown and needs to be asked, the unknown part is replaced by a *wh*-word in Korean. In (9b), the unknown part is the adjunct indicating a place and the *wh*-word *edise* (where) has been base-generated in the adjunct position, and stayed *in-situ*. Example (9c) is a Korean bi-clausal *wh*-question equivalent to ‘Where do you think Sunhi drank coffee?’ Because Korean is a head final language, the main verb comes after the embedded object clause. In (9c), the main verb *sayngkakha* ‘think’ comes after the embedded clause while main subject *ne* ‘you’ is dropped (as Korean is a pro-drop language). With respect to the formation of *wh*-questions, Korean contrasts with English in two respects. First, there is no overt *wh*-movement in Korean, and second, Korean clause order is the opposite to English.

Considering that the Korean *wh*-word stays *in-situ*, the *wh*-Scope marking with *wh-in-situ* construction shown in (8) is a possible interlanguage structure if Korean learners transfer their L1 syntax, while still implementing *wh*-scope marking. The sentence in (8), therefore, may be interpreted in two different ways: 1) learners’ use of a derivationally less complex alternative form or 2) learners’ transfer of the L1 syntactic feature responsible for (non) *wh*-movement.

III. THE STUDY

A. Research Questions

The present study specifically asks the following two questions. First, what are the alternatives to English bi-clausal *wh*-questions produced in the interlanguage of adult Korean EFL learners? Second, does derivational complexity play a role in the development of those alternative forms? That is, can the change in interlanguage forms be accounted for by the hierarchy of derivational complexity?

B. Methods

1. Participants

Participants in this study were 107 adult Korean speakers learning English in Korea. They were either undergraduate students (N=103) or graduate students (N=4) in various areas of study including English language and literature, business administration, engineering, and natural science at a university in South Korea. Participants ages ranged from 18 to 40. Because official English education in South Korea begins in the 3rd grade, all of the participants studied English at least 10 years in elementary and secondary schools before entering college. In addition, participants were either taking or had completed the university's general English courses, which are required for all students as part of general education requirements.

Participants were divided into three proficiency groups based on their TOEIC (Test of English for International Communication) scores: a HIGH group (N=38), an INTERMEDIATE Group (N=34), and a LOW Group (N=35). All students at the university are required to take the TOEIC as a requirement for graduation, and the participants in this study were chosen from those who had already taken the exam.² Students who had resided in an English-speaking country for more than one year were excluded from participation.

2. Materials and Procedure

In order to elicit complex *wh*-questions from the L2 learners, a written-elicitation task was used. A total of 12 test items were employed in the task, with each item containing a description providing a context and a task instruction. For example, for the target *wh*-question “Where do you think Brian met Jane yesterday?,” the test item included the context description and task instruction as follows: Context Description, *You know that Brian met Jane yesterday, but you don't know where they met. Now you want to know where your friend **thinks** Brian met Jane yesterday;* Task, *Write a question in English to ask your friend where he/she **thinks** Brian met Jane yesterday. (think, Brian, meet, where).*

The context description and task instruction were given in Korean, and students were asked to include all the words given in parentheses in their questions with possible verb conjugations. The structure of the target *wh*-questions used in the present study was same as the ones used in Slavkov (2015)'s study: six questions with *wh*-words moved from the object position (e.g., *who do you think James is kissing?*) and six from the adjunct position (e.g., *Where do you think David is sleeping?*). The verbs used in the embedded clause include *meet, be, sleep, have, put, choose, send, ask, call, kiss, and talk*. The main verb for all target questions was *think*.

The written-elicitation task was given to participants in groups, and no time limit was set for the completion of the task. Participants' background information (including age, years of English study, and TOEIC score) was gathered through a background questionnaire distributed after the written-elicitation task was completed.

IV. RESULTS AND DISCUSSION

Our participants produced a total of 1284 questions. The questions were classified into the following structure types: LD *wh*-movement, *wh*-copying, *wh*-scope marking, silent scope marking, scope marking with *wh-in-situ*, L1 clause order, and *wh*-about-*wh* types. Among those, LD *wh*-movement, *wh*-scope marking, and silent scope marking types were the three most common production types. Together, these three types account for approximately 75% of all productions. Table 1 presents the types and production rates of *wh*-questions produced by the Korean learners.

TABLE 1
STRUCTURE TYPES OF ELICITED-WRITTEN *WH*-QUESTIONS BY KOREAN LEARNERS

Structure Type	% Production (No. of sentences)
LD <i>wh</i> -movement Type	29.4% (378)
<i>Wh</i> -copying Type	0.2% (2)
<i>Wh</i> -Scope marking Type	29.7% (382)
Silent scope marking Type	15.7% (201)
<i>Wh</i> -Scope marking with <i>wh-in-situ</i> Type	1.7% (22)
<i>Wh</i> -about- <i>wh</i> Type	8.4% (108)
L1 clause order Type	7.4% (95)
Others	7.5% (96)
Total	100% (1284)

Korean learners produced a fairly large number of constructions containing long-distance (LD) *wh*-movement (29.4 % of all productions). Examples are given in (10).

(10) LD *wh*-movement Type

- | | | |
|--|----------------|--------|
| a. Where do you think David is sleeping? | (Targeted) | (H-16) |
| b. Who do you think Jane is talking to? | (Targeted) | (H-18) |
| c. Where do you think Brian met Jane? | (Targeted) | (I-3) |
| d. Who do you think John talk to? | (Non-targeted) | (I-13) |

² Students were assigned to the HIGH group if their TOEIC score is 870 or above, the INTERMEDIATE group if between 650-869, and LOW group if below 649. These TOEIC scores were set arbitrarily to assign an approximately balanced number of subjects across groups, and thus, the terms 'HIGH', 'INTERMEDIATE' and 'LOW' in this article do not represent the standardized proficiency levels.

H: HIGH group learner, I: INTERMEDIATE group learner, L: LOW group learner

Some non-targeted productions such as (10d) were not grammatically correct, but these sentences were still considered to have the same degree of complexity as the targeted LD *wh*-questions in terms of *wh*-derivation.

As for the *wh*-copying type constructions, our participants produced only two sentences of this type, suggesting that Korean learners rarely use *wh*-copying strategy as an alternative to long-distance *wh*-movement. The two sentences produced are given below.

(11) *Wh*-copying Type

- a. Who do you think who was sent by Jessica for buying milk? (H-18)
- b. Who do you think who Mary is calling? (I-1)

A considerable number of *wh*-scope marking constructions were produced. A total of 382 sentences (29.7% of all productions) were of this type. (12) shows some example sentences.

(12) *Wh*-scope marking construction Type

- a. What do you think where Tom put the book? (H-20)
- b. What do you think where is Elisa? (H-21)
- c. What do you think whom Ben chose as a partner? (H-19)
- d. What do you think where David sleep? (I-19)
- e. What do you think who did Jessica send to buy? (I-5)
- f. What do you think who Jane talk to? (L-21)
- g. What do you think where is David sleeping? (L-4)

Although all *wh*-scope marking constructions in our data were identical in the use of scope marker ‘what’ followed by the ‘do you think’ clause, the structure of the embedded clause exhibited two distinctive patterns: ones without subject-auxiliary (Sub-Aux) inversion and ones with such inversion. In (12a), (12c), (12d), and (12f), no Sub-Aux inversion was employed in the embedded clause whereas (12b), (12e), and (12g) show Sub-Aux inversion. In total, our data showed 198 (15.4% of total production) scope marking constructions without Sub-Aux inversion and 184 (14.3% of total production) constructions with Sub-Aux inversion. This distinction may be meaningful in that the constructions with Sub-Aux inversion could be seen as employing two separate short movements as shown in (13), which might correspond to the analysis of *wh*-scope marking construction made in the indirect dependency approach.

(13) What_i do you think t_i ... where_j is David sleeping t_j? (Analysis of (12g))

The possibility of this analysis for *wh*-scope marking constructions with Sub-Aux inversion was also suggested in Slavkov (2015). While further studies are needed to decide whether *wh*-scope marking constructions without Sub-Aux inversion (such as (12a), (12c), (12d), and (12f)) are better explained by the direct dependency approach, it seems relatively reasonable to assume that scope marking constructions with Sub-Aux inversion (such as (12b), (12e), and (12g)) fit better with the analysis provided by the indirect dependency approach. This is because the two *wh*-movements in the construction are independent and no chain relation exists between the two *wh*-words. Following this assumption, the subsequent analysis of results by proficiency group will pay particular attention to how the production rates of *wh*-scope marking constructions with Sub-Aux inversion change as learners’ proficiencies increase.

Another important type of alternative forms produced by our participants is the silent scope marking constructions that contain only one local *wh*-movement. A total of 201 sentences (15.7% of total production) were of this type. Examples were given in (14).

(14) Silent scope marking Type

- a. Do you think where Mary have dinner yesterday? (I-5)
- b. Do you think who Jessica sends to buy? (I-23)
- c. Do you think where Tom put book? (L-3)
- d. Do you think who is kiss with James? (L-17)
- e. You think where is Jane’s car? (L-28)

These sentences were all bi-clausal sentences with a sentence medial *wh*-word, which were also common in Slavkov’s (2015) and Wakabayashi & Okawara’s (2003) L2 English studies. Sentences like (14e), which is bi-clausal, but with declarative formation, were also included in this type.

Wh-scope marking with *wh-in-situ* type sentences were also produced, but their numbers were very small (22 sentences, 1.7% of all production). The following sentences are some of the *Wh*-scope marking constructions with *wh-in-situ* in our L2 data.

(15) *Wh*-scope marking with *wh-in-situ* Type

- a. What do you think Jane is talking to whom? (H-27)
- b. What do you think Sofia ask who bring the apple? (I-25)
- c. What do you think Ben chose who as a partner? (I-2)
- d. What are you think Jessica send who buy the milk? (L-16)

In addition to the alternative types presented so far, our participants unexpectedly produced a considerable number of sentences that include *about* that connects the two *wh*-clauses, which I will name *Wh-about-wh* Type (a total of 108 sentences, 8.4% of total production).

(16) *Wh*-about-*wh* Type

- a. What do you think about where Brian met a person? (H-28)
 b. How you think about where Tom is put book? (I-1)
 c. What do you think about whom Mary call? (I-33)
 d. What do you think about where is David sleep? (L-5)
 e. What do you think about who is she? (L-19)

Sentences in (16) are different from normal *wh*-scope marking constructions in that the second *wh*-clause (e.g., *where Brian met a person* in (16a)) is the complement of the preposition ‘*about*,’ and that the overall structure of this type is well-formed. This type of sentences employs two short *wh*-movements (i.e., *What_i do you think t_i about where_j Brian met a person t_j?*), and thus, its degree of derivational complexity is considered lower than long-distance *wh*-movement Type.

Another unexpected type of production that occurred was the L1 Korean clause order type in which the main subject and verb “you think” are located after the embedded clause.

(17) L1 clause order Type

- a. Who does James kiss do you think? (I-17)
 b. Who Ben chose as a partner do you think? (I-25)
 c. Who ask Sofia bring apple do you think? (L-13)
 d. Where David sleep do you think? (L-20)
 e. Where is Jane’s car you think? (L-5)
 f. Where is Mary have dinner think? (L-33)

A total of 95 sentences (7.4%) were in this type. Obviously this construction follows the Korean clause order in which the main clause verb follows the embedded clause. While there is a short local *wh*-movement in the embedded clause, the learners added the main clause (*do you think, you think, think*) after the embedded clause. With regard to this construction, I propose that the learners’ strategy of adopting the L1 clause order would enable them to avoid the difficult task of making complex *wh*-movement. That is, by resorting to the Korean macro-structure which puts the embedded clause before the main clause, the learners tried to express what they wanted with the employment of only one local *wh*-movement, as illustrated in the analysis in (18).

(18) Analysis of L1 clause order Type

[[*Who_i does James kiss t_i*] do you think]? (Analysis of (17a))

The ‘others’ category includes productions that are not bi-clausal, that are clearly isolated and idiosyncratic, or that are difficult to understand meaning due to global errors. For example, sentences such as ‘*Who James kiss?*’ and ‘*What’s think buy?*’ were classified into this category.

One of our research aims was to examine how alternative structures vary across the three proficiency groups and whether this variation can be explained in terms of complexity hierarchy. If derivational complexity is a factor constraining the production of bi-clausal *wh*-questions, L2 interlanguage would exhibit an increasing number of derivationally more complex alternatives as learners’ proficiencies increase. Figure 1 shows production rates of different alternative types by the three proficiency groups in our study. *Wh*-copying type was excluded in the group analysis because only two sentences in type were produced (one by the HIGH and the other by INTERMEDIATE group) and, thus, it could not be considered as a genuine interlanguage form used by Korean learners of English.

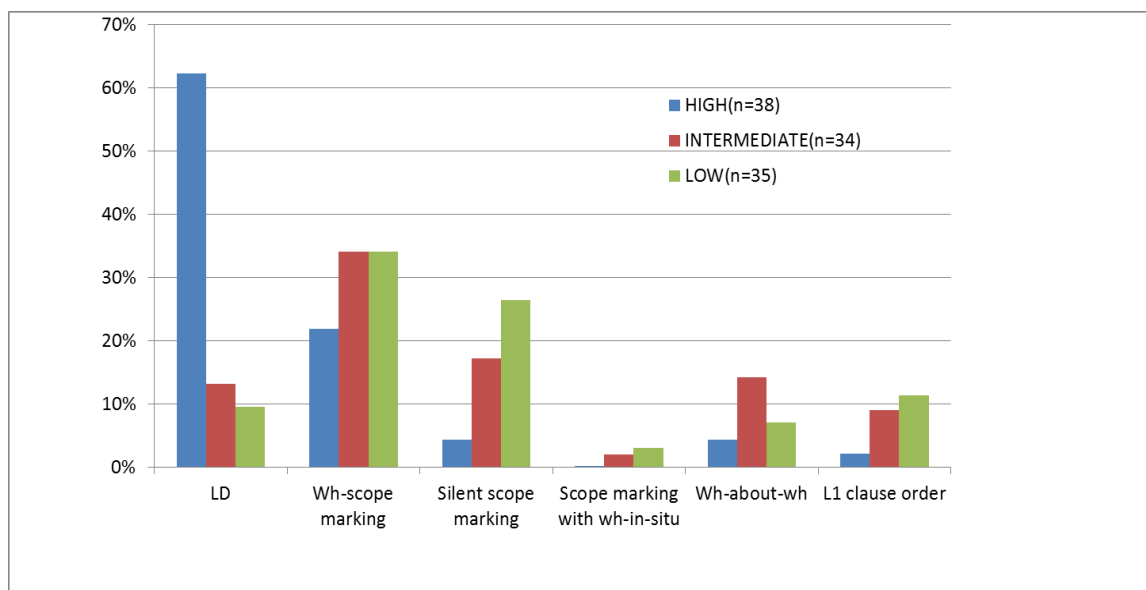


Figure 1. Production rates of alternative types by proficiency group

For the LD type, the HIGH group produced this type at a distinctively higher rate (62.3% of the group's total production) compared to the two other groups (INTERMEDIATE group, 13.2% of the group's total production; LOW group, 9.5% of the group's total production). For the silent scope marking type, on the other hand, the LOW group showed highest production rate (26.4%), followed by the INTERMEDIATE group (17.2%) and the HIGH group (4.4.%). For the scope making with *wh-in-situ* type, the LOW group showed a higher (3.1 %) rate than the INTERMEDIATE group (2.0%) and the HIGH group (0.2%), although the low production rate of this type (1.7% of total production) made the validity of this type's distinction somewhat weak. Overall, these results generally conform to the prediction made by the derivational theory of complexity in that less proficient L2 learners relied more on derivationally less complex alternative forms when facing the task of constructing complex *wh*-questions.

A large number of *wh*-scope marking constructions were produced by all three groups. In total, the HIGH group learners produced 100 sentences (21.9%), the INTERMEDIATE learners produced 139 sentences (34.1%), and the LOW learners produced 143 sentences of this type (34.1%). This was the second most common production type in the HIGH group (following the LD type), and the most common production type in the INTERMEDIATE and LOW groups. The fact that the HIGH group learners' production rate of this type is placed between the LD type (62.3%) and the silent scope marking type (4.4.%) suggests that the interlanguage stage characterized by the *wh*-scope marking production is an intermediate stage that occurs between the LD *wh*-movement stage and the one short *wh*-movement stage. Both the INTERMEDIATE and LOW group learners, then, mainly belong to this intermediate stage in that the *wh*-scope marking construction is the most common type of their production. These results are also consistent with the prediction made by the derivational theory of complexity, as the order of the interlanguage stages conforms to the order of derivational complexity.

When *wh*-scope marking sentences were further divided into subtypes according to whether or not Sub-Aux inversion is employed in the embedded clause, the three groups showed notable differences. Figure 2 shows the rates of two subtypes of *wh*-scope marking constructions by the proficiency groups.

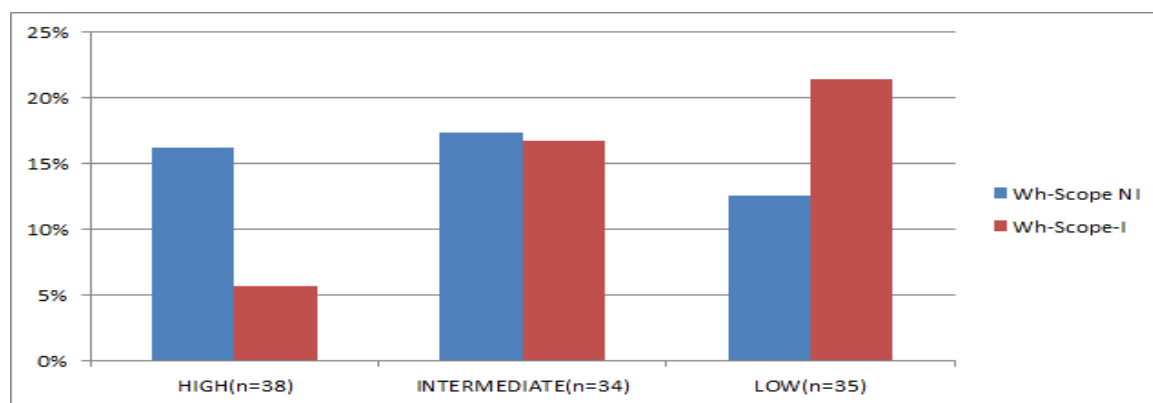


Figure 2. Rates of the subtypes of *wh*-scope marking by proficiency group

Between the two subtypes, the High group produced the *Wh*-Scope marking-Non Inversion subtype (*Wh*-scope-NI) much more frequently than the *wh*-Scope marking-Inversion subtype (*Wh*-scope-I) (16.2% vs. 5.7%). Conversely, the LOW group produced the *wh*-scope-NI type considerably less than the *wh*-scope-I type (12.6% vs. 21.4%). In fact, the production rate of the *Wh*-scope-I type dropped as the learners' proficiency increases (21.4% (LOW) vs. 16.7% (INTERMEDIATE) vs. 5.7% (HIGH)). As discussed earlier in this section, the *wh*-scope marking with Sub-Aux inversion subtype may be better accounted for by the indirect dependency approach which assumes two separate employments of short *wh*-movement. The present result suggests that the *wh*-scope-NI type (which might assume the direct dependency between the scope marker and the sentence medial *wh*-word) is more difficult to produce than the *Wh*-scope-I type (which may assume two independent short *wh*-movements). This finding, in turn, tells us that, although both the INTERMEDIATE and LOW groups produced *wh*-scope marking construction at the same rate (34.1%), the LOW group learners depended more on the easier subtype (*Wh*-scope-I type) of this construction.

As for the *Wh*-about-*wh* type, an interesting result was found. As this type of sentences utilize two short *wh*-movements, it must be considered to have a lower degree of derivational complexity than the LD type construction, but a higher complexity than the silent scope marking type construction. Our data showed that the INTERMEDIATE group produced this type more frequently than any other groups (58 sentences, 14.2%), followed by LOW Group (30 sentences, 7.1%) and HIGH Group (20 sentences, 4.4.%). This result was different from that of the LD type constructions (whose number consistently increased as the learners' proficiency increased) and from the silent scope marking type constructions (whose number consistently decreased as the learners' proficiency increased). While I do not intend to provide a definitive answer as to what caused the INTERMEDIATE learners to produce this type more than the other groups, I tentatively propose that the *Wh*-about-*wh* type constructions work as one of the intermediate constructions bridging the gap between the one short *wh*-movement stage and the LD *wh*-movement stage. Given that the *Wh*-about-*wh* type construction is derivationally less complex, but grammatically still legitimate alternative to the

LD movement type, this type could be a good option for the learners who have reached the proficiency level well enough to know the ungrammaticality of silent scope marking construction, but have not reached the proficiency level to carry out complex *wh*-movement. Further investigation of this particular type of construction will be needed, of course, especially regarding its hierarchical relationship with the *wh*-scope marking construction in terms of derivational complexity. I will leave this for future research.

The L1 clause order type was produced by all three groups. The LOW group produced them at highest rate (48 sentences, 11.4%), followed by the INTERMEDIATE group (37 sentences, 9.1%) and the HIGH group (10 sentences, 2.2%). Although this result was consistent with the general expectation that the lower level L2 learners are more likely to be influenced by the L1 structure than higher level learners, it also showed that the transfer effect remained strong even for some INTERMEDIATE and HIGH proficiency learners. This result seems to suggest that processing complex *wh*-questions is a difficult task even for some higher-level learners, leading them to resort to their L1 clause order, which allowed them to utilize just one short *wh*-movement.

V. CONCLUSION

Korean EFL learners produced a variety of alternative structures to English bi-clausal *wh*-questions, including *wh*-scope marking, silent scope marking, and *wh*-scope marking with *wh-in-situ*, L1 clause order transfer, and *Wh-about-wh* types. The appearance of these alternatives indicates that Korean learners have relied on derivationally less complex interlanguage forms in order to compensate for their lack of L2 competence to execute the highly complex derivational process needed to form bi-clausal *wh*-questions.

This study generally supported the derivational theory of complexity, although further work is needed to examine the validity of some of the assumptions made in this study. In general, more proficient L2 learners produced greater number of LD *wh*-movement structures while less proficient learners produced larger number of structures that are derivationally less complex, such as silent scope marking construction and scope marking with *wh-in-situ* construction. The general interlanguage order of the three most common production types in our data (silent scope marking type → *wh*-scope marking type → LD *wh*-movement type) is consistent with the order of degree of derivational complexity.

The current study also found two somewhat unexpected interlanguage constructions: the *wh-about-wh* type and the L1 clause order type. The *wh-about-wh* type, which employs two short *wh*-movements, is considered to occur in the period between one short *wh*-movement stage and LD *wh*-movement stage. The L1 clause order type may be seen as the learners' resort to their L1 macro-structure in an attempt to avoid LD *wh*-movement. In terms of the derivational complexity hierarchy, the L1 clause order type, which takes one short *wh*-movement, may be placed lower than the *wh-about-wh* type. In this sense, the fact that the L1 clause order type is produced largely by the LOW group while the *wh-about-wh* type is produced largely by the INTERMEDIATE group is also consistent with the derivational theory of complexity.

The empirical data obtained in the present study suggest that derivational complexity plays a role in developmental process of Korean EFL learners' acquisition of bi-clausal *wh*-questions. While the present study focused on the *wh*-questions produced by Korean EFL learners, it would be worthwhile for future studies to test the role of derivational complexity with other target structures, L1s, and learning contexts.

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