

English Wh-Question Formation by Korean Elementary and Middle School EFL Students*

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Cho, Yuhyeon & Kim, Ji-Hye. (2023). English wh-question formation by Korean elementary and middle school EFL students. *The Linguistic Association of Korea Journal*, 31(3), 157-173. The present study investigated the sentence production of English wh-questions among early Korean EFL learners through a sentence-forming writing task, with a specific focus on the influence of distinct types of wh-pronouns based on their argument structure and grammatical relations. The participants were 64 5th-grade elementary school students and 58 1st-grade middle school students in Seoul. The study utilized English wh-question sentences containing different forms of wh-pronouns (*who* and *what* for argument vs. *why* for adjunct), which varied in their grammatical relations (subject vs. object). The main task was an elicited sentence-forming task aimed at generating wh-question sentences, in which the participants were required to arrange provided words into a coherent question. The key findings are as follows: i) Korean EFL learners did not demonstrate statistically significant asymmetrical response patterns with respect to argument structure of wh-words. ii) As for grammatical relations of wh-words, subject interrogatives displayed higher accuracy compared to object interrogatives. The implications of these findings will be discussed in detail.

Key Words: wh-question, argument structure, grammatical relation, Korean EFL learners

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1. Introduction

English interrogative sentences are divided into two primary categories: yes-no questions and wh-questions. Wh-questions involve different types of wh-words based on the elements they substitute for within a sentence: wh-elements such as *what*, *who*, and *where* function as interrogative pronouns by replacing essential sentence components (i.e., arguments). On the other hand, wh-elements like *why*, *how*, *when*, and *where*, which replace additional information elements (i.e., adjunct); those like *whose* and *which* take on adjectival roles to specify characteristics of the constituent (Bloom et al., 1982; Rowland, 2000). Wh-elements like *where* can act as an adjunct, and *how* can function as an argument in certain sentence types (Rowland, 2000; Stromswold, 1990).

In Transformational Generative Grammar framework, wh-questions, typically formed from declarative sentences, are thought to be shaped through two primary movement rules: Subject-Auxiliary Inversion (SAI) and wh-movement.¹⁾ The structure is often divided into Deep Structure (DS) and Surface Structure (SS), which can be illustrated in (1).

- (1) a. DS: *Lucy should buy a book.*
 b. Substitution of Interrogative Pronoun: *Lucy should buy what.*
 c. SS after Movements (SAI+Wh-fronting): *What should Lucy buy ____?*

Wh-questions, due to their syntactic complexity, often culminate in the later stages of acquisition in comparison to the SAI rule exclusively applicable to yes-no questions. According to Lightbown and Spada (2021), the development of wh-interrogative sentences can be outlined as shown in Table 1.

Table 1. Developmental Stages of Wh-Questions (Lightbown and Spada, 2021)

Stage	Explanation	Examples
1	Single words or simple 2~3 word sentences with rising intonation and chunks	“Cookie?” “Mommy book?” “Where’s Mommy?”

1) While other scholars propose that interrogative pronouns or auxiliary verbs emerge directly in their original positions (O’Grady, 1997), the focus in this paper is on explaining their emergence through movement rules (Chomsky, 1993; Stromswold, 1995).

Stage	Explanation	Examples
2	Declarative sentences with rising intonation and chunk-learned forms	“You like this?” “I have some?” “What’s that?”
3	Fronting	“Can I go?” “*Is the teddy is tired?” “*Why you don’t have?”
4	Yes/no questions with Aux inversion	“Is he crying?” “*Why he is crying?”
5	Wh-and yes/no questions with inversion Negative questions with no inversion	“Are these their books?” “Why does she do that?” “*Why the teddy bear can’t go outside?”
6	Correct all question types	“Why can’t teddy bear go outside?” “Ask him why can’t she go out.”

As shown above, the first stage of interrogative development involves the single words or short phrases with raised intonation. The second stage involves raising intonation in semantically complete declarative sentences to create questions or modifying sentence forms learned through language chunks. By the third stage, children begin to understand the distinct structure of question sentences, by placing question words or auxiliary verbs at the beginning. In the fourth stage, SAI and fronting of wh-words start to emerge, although applying both rules simultaneously becomes challenging. As a result, SAI occurs in declarative questions, while non-inverted sentences (no SAI) co-exist in interrogative word questions. The fifth stage witnesses the accurate production of both declarative and wh-word questions. In the final stage, acquisition extends to all types of question sentences, including negative and embedded questions.

De Villiers (1991) proposed that during certain periods of children’s early grammar development, they view wh-questions as being positioned at the sentence-initial topic position, like topicalization (e.g., *These dogs, I am afraid of.*). While topicalization displays similarities to wh-movement, TP (Tense Phrase) lacks elements that trigger inversion, which results in non-inversion (no SAI) phenomena when children perceive wh-questions as topicalized sentences. After children become capable of recognizing subcategories of wh-questions, they subsequently reanalyze wh-questions as being located in the complementizer position (CP). Following this reanalysis, the [+Q] feature of CP stimulates the application of the SAI rule.

Factors influencing the further acquisition of wh-questions are multi-faceted, but the error patterns occurring in wh-questions are predominantly associated with no SAI, with such errors reported not only in studies targeting native-speaking children (Ambridge et al., 2006; De Villiers, 1991; Rowland & Pine, 2000, 2003; Rowland et al., 2005; Stromswold, 1990; Van Valin, 2002) but also in research focused on ESL/EFL learners (Kang, 2013; S-Lee, 2008; J-Lee, 2008; Spada & Lightbown, 1999, 2021).

The present study aims at investigating how structural factors such as the argument structure and the grammatical relations of wh-element influence the acquisition of wh-questions by using a sentence forming task with Korean early EFL learners in elementary and middle school students.

2. Factors Influencing the L₁ Acquisition of Wh-Questions

2.1. Argument Structure of Wh-words

De Villiers (1991) observed that children tend to apply the SAI rule differently depending on whether the wh-question is an argument or adjunct. The distinction between argument and adjunct wh-questions arises from argument structure of lexical verbs. For example, the sentence *'The table hit the ball'* is grammatical with an agent subject, direct object as theme, based on the argument structure of the verb *'hit'*. However, the sentence *'*The table hit yesterday'* is ungrammatical, since the direct object as one of the argument is missing.

When wh-words move, the remnants they leave behind are also subjected to this constraints. As argument wh-words are essential constituents within a sentence, children can perceive them as having moved from the predicate position to the front during the early stages of acquisition. The process of forming argument wh-questions is illustrated in Figure 1.

In other words, if children perceive argument wh-words as moving to the sentence-initial position without leaving traces (i.e., t_j in Figure 1) in the VP position, the wh-words would not bind to the positions that assign thematic roles. Then, the traces of the wh-words would fail to assign thematic roles, leading to the generation of ungrammatical sentences that violate rules. As a result, argument wh-questions would not exhibit non-inversion (no SAI) errors.

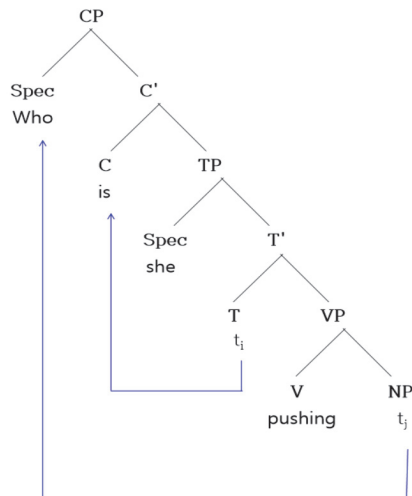


Figure 1. Movement of Argument Wh-word

On the other hand, adjunct wh-words initially follow a process analogous to argument wh-words, originating within TP and moving to CP (e.g., from *She is smiling [because she won the game]* to replacing the bracketed clause with *why*). De Villiers (1991) posits that since adjuncts are not essential constituents of a sentence, children might perceive adjunct wh-words as not originating within TP and directly merging at the sentence beginning, rather than moving to CP. This could lead to a stage where adjunct wh-questions are mistakenly interpreted as declarative sentences, causing non-inversion (no SAI) errors. Even if adjunct wh-words are perceived as immediately merged to the sentence beginning without forming thematic relations with the verb or leaving traces, they might still produce non-inversion sentences in adjunct wh-questions, as in Figure 2.

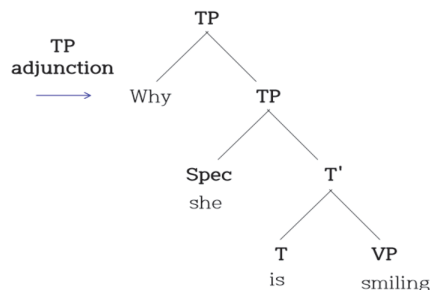


Figure 2. No SAI Structure in Early Childhood Adjunct Wh-Questions (S. Lee, 2008)

2.2. Grammatical Relations of Wh-words

Types of wh-elements can also be classified from a perspective of grammatical relations. There are different positions taken in terms of the acquisition order of wh-questions: O'Grady (1997) took the position that subject wh-questions are acquired earlier than object wh-questions due to the complexity of sentence structure. With his Structural Distance Hypothesis, O'Grady (1997) explained that the complexity of sentence structure increases with the number of XPs between the trace (t) and the moved wh-word, making acquisition more difficult as the sentence structure becomes more complex.

On the contrary, Stromswold (1995) proposed that the acquisition of object wh-questions precedes that of subject wh-questions, attributing this difference to the Empty Category Principle (ECP) based on Government and Binding Theory. In this framework, the object wh-word receives a thematic role from the verb and is directly governed by it, while the subject wh-word is governed by its antecedent NP. While governing by the antecedent NP is less local and more indirect, the thematic role-based government is more direct. This distinction leads to the argument that the acquisition of object wh-questions is earlier, which is a stance known as the Antecedent Government Hypothesis (Stromswold, 1995).

2.3. Previous Studies of Wh-Questions with Korean EFL Learners

Previous studies focusing on the acquisition of wh-questions among Korean EFL learners reported argument-adjunct asymmetry in terms of the structural property of wh-elements (S. Lee, 2008; J. Lee, 2008; Kang, 2013). S. Lee (2008) conducted a study involving 41 Korean EFL college students to investigate the presence of asymmetric patterns in the acquisition of argument and adjunct wh-questions. The participants were presented with pairs of sentences, one with correct SAI and the other with incorrect placement. The wh-words included *what* and *who* for argument, and *why* and *how* for adjunct. They were asked to judge the grammaticality of each sentence using a 4-point scale (-2 = very incorrect, -1 = incorrect, 1 = correct, 2 = very correct) while listening to recorded sentences (e.g., *who are you meeting in the cafeteria?* vs. **who you are meeting in the cafeteria?*). The results demonstrated that Korean college EFL learners did not show significant differences between argument and adjunct interrogatives with the sentences with SAI. However, a statistically significant difference was made with non-inverted

sentences (i.e., sentences without SAI) where the learners showed higher accuracy with argument wh-questions.

J. Lee (2008) also conducted a study with 60 first-year middle school EFL learners to investigate the influence of different types of wh-questions and auxiliary verbs on the acquisition of inversion rules. The study employed an elicited sentence-forming task to assess the impact of argument structure of wh-words and auxiliary verbs. The research included argument wh-words *what* and *who*, adjunct wh-words *why* and *how*, and three auxiliary verbs (*be*, *do*, *can*) categorized into 3rd person singular and plural. The results were analyzed with a division of sentences with SAI and those without SAI. In case of the sentences with SAI (i.e., [Wh-Aux-S-V]), the accuracy of was higher for adjunct compared to argument wh-interrogatives, though the difference was not statistically significant. When including incomplete inversion of responses with inversion (i.e., [Wh-Aux-V-S]), the accuracy for argument wh-interrogatives was higher. In contrast, with non-inverted sentences, adjunct wh-interrogatives showed higher accuracy. These findings align with S. Lee (2008), in that asymmetry is more pronounced in non-inverted sentences for both argument and adjunct interrogatives.

Kang (2013) conducted a study with sixth 6th-grade elementary EFL learners to investigate the extent of their acquisition of SAI rules in interrogative sentences based on different types of interrogative pronouns (*what*, *why*) and auxiliary verbs (*do*, *will*, *be*). In an elicited sentence-forming task, contexts were provided in Korean, and learners were instructed to convert provided declarative sentences into questions by changing specific parts (e.g., transforming *I will go to the bookstore because...* into *Why will I go to the bookstore?*) to prompt the correct question form. The results indicated that the accuracy of applying SAI was generally higher for argument than for adjunct interrogative sentences. However, it was observed that applying inversion in adjunct interrogatives could be significantly higher in certain cases depending on the type of auxiliary verb used.

The studies related to the argument structure of wh-words have provided different patterns of results - with distinct age and proficiency groups. Also, the differences in the construction of research tools and design across previous studies might have yielded variations in performance among the participants. This makes it challenging to determine whether the observed asymmetry based on argument structure is a transient or can be sufficiently generalized to EFL learners, thus highlighting a limitation.

On the other hand, research focusing on the grammatical relations (subject vs. object) of wh-words is limited to investigations restricted to Japanese EFL learners (Hasebe &

Maki, 2014; Muroya, 2019) and mostly with specific auxiliary verbs (Muroya, 2019). If Korean EFL learners exhibit similar structural influences and asymmetrical learning patterns between subject and object interrogatives as native-speaking English children, it would enable the anticipation of difficulties the learners might encounter during the acquisition of *wh*-questions. Therefore, the present study aims to address these limitations of previous studies, by employing a modification of task and broadening the learner groups, to examine how the argument structure and grammatical relations of *wh*-elements influence the formation of *wh*-questions in Korean early EFL learners in high grade-level of elementary school students, together with low grade-level middle school students.

3. Method

3.1. Research Questions

The research questions that motivated this study are as follows:

- 1) Do early Korean EFL learners exhibit asymmetry in the acquisition of *wh*-questions with respect to argument structure (i.e., argument vs. adjunct) of *wh*-words?
- 2) Do early Korean EFL learners exhibit asymmetry in the acquisition of *wh*-questions with respect to the grammatical relations (i.e., subject vs. object) of *wh*-words?

3.2. Participants

The participants in the study were chosen to represent early Korean EFL learners - the 5th-grade elementary school students, who could understand and use written English for instructional focus, and the 1st-grade middle school students in distinct school district, whose English proficiency was not significantly different from the chosen elementary group.²⁾ The study recruited a total of 78 students from three 5th-grade classes at J Elementary School in Seoul and 77 students from three 1st-grade classes at G Middle School. Among them, 13 students who participated in only one of the two tests, 16 students who produced irregular sentences, and 3 students who were unable to recognize

2) The equivalent-level TOSEL exam demonstrated no significant difference between the elementary group and the middle school group ($t = -1.80, p > .05$).

characters or create a single interrogative sentence were excluded due to their potential impact on the research outcomes. As a result, the final data set for analysis comprised 64 5th-grade elementary school students and 58 1st-grade middle school students.

3.3. Task and Materials

In order to examine the knowledge patterns of wh-questions among Korean elementary EFL learners, an elicited sentence-forming task was employed. This task involved providing contexts in their mother tongue (Korean) and prompting the participants to write the wh-questions in English. The use of writing task was chosen due to the difficulty in eliciting immediate speech from EFL learners.

The main task comprised 24 items, involving arranging given English words in the appropriate word order to create English wh-questions based on the argument structure and the grammatical relations. While previous studies prompted participants to select specific auxiliary verbs or enforced a single choice of auxiliaries (J. Lee, 2008; Kang, 2013), this study provided guidance that allowed participants to deliberately choose or not choose auxiliary verbs, thereby enabling a clearer identification of auxiliary verb-related errors. The basic format of the elicited sentence-forming task can be illustrated with an example below.

(2) *A short story in Korean for a context eliciting a question*

꼭 사용하세요 (You must use them.)			선택하세요 (You can choose among them.)		
what	they	eat	are	do	선택 안함 (Not choose)

Question: _____

While previous studies might have indicated a potential advantage for the acquisition of *what* over *why* by setting *you* as the subject and potentially exposing students to more familiar school textbook input, this study controlled for such factors by limiting the subject to *they*, a subject with minimal exposure in textbooks, and by standardizing the main verb, thus reducing the likelihood of other confounding factors on the accuracy.

Furthermore, addressing a limitation observed in some previous studies (J. Lee, 2008) where a single test item representing each distinct sentence type posed challenges in

generalizing results, this study aimed to enhance the approach. For this purpose, representative test items in each sentence type were constructed in sets of 3 tokens, in order to facilitate the identification of patterns within learners' responses. The auxiliary verbs were chosen to be the extent of *be* and *do*, so as not to exceed the elementary school level English vocabulary. Within the object wh-words, a division was further made based on the animacy of wh-objects to explore potential differences within the argument structure.³⁾ The compiled wh-question and auxiliary verb types in the test instrument are summarized in Table 2.

Table 2. Construction of Target Sentences

Type of Wh-word		Type of Auxiliary Verbs	# of Token	
Argument	Subject (who)	be	3	
		do	3	
	Object (who, what)	be	animate	3
			inanimate	3
		do	animate	3
			inanimate	3
Adjunct (why)	be	3		
	do	3		
Total			24	

3.4. Procedures and Data Analysis

Prior to the main task, a preliminary English test was conducted to gauge the proficiency levels of the participants. The proficiency test consisted of 30 multiple-choice questions using the TOSEL (Test of Skills in the English Language) format.⁴⁾ Subsequently,

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- 3) However, examining the distinction based on animacy within the argument wh-question type, the average difference in the correct response rates between what and who within the argument type did not show statistical significance ($p > .05$), indicating that animacy did not influence the accuracy rates.
- 4) The proficiency test aimed not only to compare the proficiency levels of the participating groups (5th-grade elementary schoolers and 1st-grade middle schoolers) but also to explore whether the learners' ability to generate English wh-questions correlated with their English proficiency level. Pearson correlation analysis revealed a significant correlation between proficiency scores and the accuracy rates of interrogative sentences in both elementary group ($r = .53$, $p < .01$) and middle

the main task of sentence-forming was administered. The data obtained from this examination were analyzed using SPSS Statistics 12.0 at a significance level of 0.05. To investigate the impact of the argument structure or grammatical relations of wh-words on acquisition, a one-way analysis of variance (ANOVA) was conducted for each group.⁵⁾

4. Results and Discussion

4.1. The Results with Argument Structure of Wh-Words

In order to investigate the first research question related to argument structure of wh-words, the rates of the participants' correct responses for forming wh-questions were computed independently for each group. As shown in Figure 3 below, distinct patterns emerged in each group. Within the elementary school group, the argument wh-question yielded higher correct response rates (rates of correct responses) (35.02%), compared to adjunct wh-question (26.04%), whereas in middle school group, adjunct wh-question exhibited higher rates of correct responses (31.9%), compared to argument wh-question (30.02%).

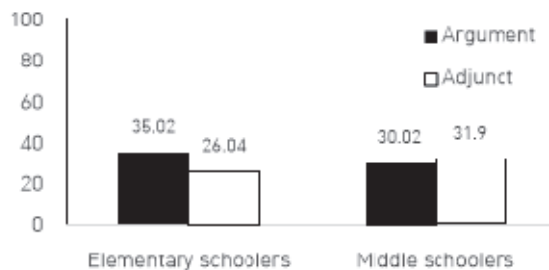


Figure 3. Rates of Correct Responses Based on Argument Structure of Wh-Questions

school group ($r = .48, p < .01$).

- 5) As one of the reviewers kindly pointed out, group differences together with the linguistic factors (e.g., two-way ANOVAs) could have been examined. However, since the proficiency between the two groups were not significantly different ($t = -1.80, p > .05$), the analysis in this study will focus on independent within-group differences in each group, rather than between-group differences.

Further investigation across different wh-words indicated that the case of argument wh-word *who* showed higher correct responses rate than that of adjunct wh-word *why* (*What*: Mean = 1.16, SD = 1.33; *Who*: Mean = 0.95, SD = 1.31; *Why*: Mean = 0.77, SD = 1.22). In order to examine the influence of the argument structure on the sentences with specific wh-words, a one-way ANOVA⁶⁾ was conducted using three types of wh-words (*who*, *what*, *why*) as variables. The results for the elementary group revealed that the assumption of homogeneity of variances was violated according to Levene's test ($F(2, 381) = 2.82, p > .05$). Therefore, Welch's one-way ANOVA was used, which indicated marginally significant effect ($p = .56$). That is, while the elementary group did not exhibit significant asymmetry between argument and adjunct structures, it approached the significance level.⁷⁾

As for the middle school group, the patterns observed based on the wh-word type were different: the correct response rate for the wh-question *who* was the lowest, while the rates for *what* and *why* were almost identical (*What*: Mean = 0.97, SD = 1.28, *Who*: Mean = 0.83, SD = 1.24, *Why*: Mean = 0.96, SD = 1.31). The homogeneity of variance was met with a Levene's test and the one-way ANOVA indicated no significant difference ($F(1, 346) = 0.149, p > .05$). The pattern of results with the middle school group indicated that there was no evidence of asymmetry between argument and adjunct wh-questions.

4.2. The Results with Grammatical Relations of Wh-elements

To investigate the second research question, the distribution of correct response rates in terms of grammatical relations of wh-words was analyzed. Both groups reported higher rates of correct responses with subject wh-words, compared to object wh-words (Elementary group: Subject = 50.26%, Object = 35.02%; Middle school group: Subject = 53.73%, Object = 30.02%). This pattern of the results are shown in Figure 4.

6) Since Kolmogorov-Smirnov test indicated non-normality ($p < .05$), a further examination of skewness and kurtosis was carried out. Since the absolute value of skewness is less than 3 and the absolute value of kurtosis is less than 8, the assumption of normal distribution can be made (Kline, 2011), which enable us to assume normal distribution with the current data set.

7) An additional post hoc analysis with Dunnett's T3 revealed that particularly for the argument wh-question type (i.e., *what*), the correct response rate was significantly higher compared to the adjunct wh-question type (i.e., *why*) although not statistically significant ($p > .05$).

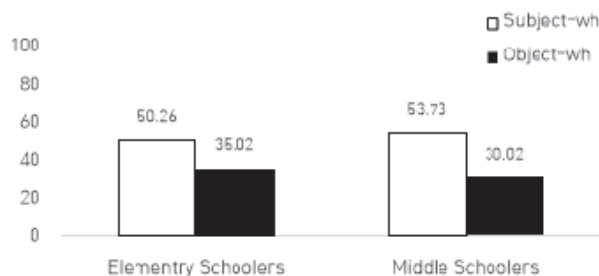


Figure 4. Accuracy Rates Based on Grammatical Relations of Wh-Questions

While we found the asymmetry in the correct responses rates between subject and object wh-questions, a question entails as to whether this phenomenon applies only within the argument wh-questions, or can be extended to adjunct wh-questions like adverbials. Therefore, a one-way ANOVA⁸⁾ was conducted using three types of wh-questions (subject, object, adverbials) to explore the influence of extended grammatical relations of wh-elements on correct response rates. Levene's homogeneity of variance tests indicated that homogeneity was not met in either group ($F(3, 508) = 7.35, p < .05$, $F(3, 460) = 8.48, p < .05$). As a result, a Welch's ANOVA was conducted to reveal statistical significance in accuracy rates by grammatical relations of wh-elements for both both elementary ($F(3, 508) = 7.35, p < .01$) and middle school students ($F(3, 460) = 7.9, p < .01$). Therefore, it appears that the grammatical relations of wh-questions (i.e., subject, object, adverbials) have an impact on the correct response rates of both groups of participants in this study.

5. Discussion and Conclusion

This study investigated the impact of various types of wh-questions, focusing on their argument structure and grammatical relationships, on the performance of forming wh-questions among early Korean EFL learners. The study also enhanced experimental designs of previous studies, by modifying aspects of an elicited sentence-forming task and constructing target sentences.

As for argument-adjunct asymmetry on the acquisition of wh-questions, previous studies suggested that EFL learners, like native speakers, tend to have higher acquisition

8) Likewise, Kolmogorov-Smirnov test indicated non-normality ($p < .05$), a further examination of skewness and kurtosis was carried out, which resulted in normality assumption.

rates in sentences with argument wh-words. The findings of the present study demonstrated that there were varying degrees of asymmetry in the acquisition patterns across different participant groups. For elementary learners, higher rates of correct responses were observed when wh-words functioned as arguments compared to adjuncts. However, for secondary learners, the rates between argument and adjunct wh-words showed minimal difference. This contradicts the claims made by some previous studies such as Kang (2013), S. Lee (2008), J. Lee (2008) and De Villiers (1991), who argued that EFL learners face greater difficulty in acquiring adjunct wh-questions. The results of the present study that Korean EFL learners showed statistically insignificant asymmetry in acquisition based on the argument structure of wh-words seem to be in line with the claims by Ambridge et al. (2006) and Van Valin (2002).

As for the results on the grammatical relations of wh-words (subject vs. object), the current study revealed significant asymmetrical response patterns in subject and object interrogatives for both groups of learners. The results seem to support O'Grady's (1997) structural distance hypothesis, which suggests that subject wh-questions are acquired earlier due to their simpler syntactic structure, compared to object wh-questions. However, other factors involving auxiliary verbs and the effect of the mother tongue should also be considered to explain the full picture of the acquisition related to wh-interrogatives.

There are several limitations for the study. First, though this study limited the adjunct wh-words to *why* due to the level of elementary learners, future investigation with *how* as adjunct wh-word would be necessary. In addition, although the research results did not reveal asymmetrical response patterns based on the argument structure of wh-words, it is important to note that errors without *do-support* occurred more frequently in both groups for adjunct wh-questions. Therefore, the focus of future research should not solely be on predicting higher accuracy rates in one group based on argument structure, but rather on studying the perspective of error occurrence, considering that specific errors might manifest more frequently in one group based on argument structure.

Moreover, since both subject and object wh-questions were mixed in the same test, some participants might have incorrectly applied the structure of subject wh-questions to object wh-questions due to the lack of exposure in textbooks. To address this, future studies could separate subject and object wh-questions into different test forms and administer them with a time gap between the two. These directions for further research would contribute to a more comprehensive understanding of the acquisition of wh-questions, addressing the limitations of the current study and enhancing the validity of the findings.

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