Testing Usage-Based Approaches to Assessing EFL Learners' Development of English Argument Structure Constructions

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Usage-based approaches to language acquisition explain language development as a gradual process of generalizing constructions through language experience. This study investigated second language learners' development of constructional knowledge from the perspective of usage-based language development. A total of 169 Korean EFL students at five grade levels completed a sentence-sorting and a translation task. Results of the sorting task showed stronger constructional sorting as the learners' grade level increased. Additionally, the sorting of intermediate-level learners was influenced by verb semantics such that the sentences including light verbs were more strongly clustered according to constructions than the sentences with heavy verbs, suggesting learners' reliance on light verbs in the early stages of constructional development. Results of the translation task demonstrated a higher translation accuracy with increasing proficiency, but with a significant amount of variation across individual constructions contingent on the constructions' syntactic and semantic complexity. Overall, our findings confirm the usage-based development of L2 learning.

Key words: constructional knowledge, Korean EFL learners, developmental process, sorting task, translation

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1. INTRODUCTION

Argument structure constructions have received a fair amount of attention as one of important linguistic cues that subserve sentence comprehension, especially within the framework of construction-based linguistic theories (Barlow & Kemmer, 2000; Bybee, 2008; Croft, 2001; Ellis, 2008; Goldberg, 1995, 2006; Langacker, 2000; Tomasello, 2003). Previous research has attested the ontological status of constructions and their pivotal role in first language (L1) development. The increased interest in argument structure constructions has offered numerous opportunities for researchers to investigate whether and to what extent second language (L2) learners can access and utilize constructional information during sentence comprehension. Since Bencini and Goldberg's (2000) seminal sentence-sorting study that demonstrated English speakers' reliance on constructional information, several studies have adopted the sentence-sorting paradigm to test adult L2 learners' reliance on constructional cues (e.g., Gries & Wulff, 2005; Lee & Kim, 2016; Liang, 2002; Shin, 2010; Valenzuela & Rojo, 2008). Despite variability in learners' L1 background, these studies provide consistent findings that late L2 learners can employ constructional information as efficiently as native speakers of English, and that their use of constructional cues is modulated by L2 proficiency such that proficient learners are more likely to rely on constructional information in a sorting task.

While most studies investigating language user's constructional knowledge have targeted L1 speakers (e.g., Childers & Tomasello, 2001; Dodson & Tomasello, 1998; Sethuraman & Goodman, 2004), adult L2 learners (e.g., Ellis & Larsen-Freeman, 2009; Gries & Wulff, 2005; Kim & Rah, 2016, 2019; Lee & Kim, 2016; Valenzuela & Rojo, 2008), or young L2 learners (e.g., Kim, Hwang, & Rah, 2017), few studies have examined the developmental process of acquiring English argument structure constructions by including L2 learners across different developmental stages. Building on results from previous studies, this paper aims to provide a more comprehensive picture of the L2 use of constructional information by including learners at various proficiency levels and ages. We particularly compared their patterns of construction usage with construction development in monolingual contexts. This study follows the usage-based perspective that L2 development of constructions is guided by their language experience, just as in L1 development. As will be reviewed in the next section, studies show that a child gradually accumulates constructional knowledge through repeated language experience over an extended period of time (Goldberg & Casenhiser, 2008; Sethuraman & Goodman, 2004; Tomasello, 2003). In the early stages, children mostly learn individual words or chunks that are highly frequent in the input. In particular, some verbs play an important role in early construction development, providing cues for a constructional framework. For example, young children are reported to rely on a small number of light verbs (i.e., verbs

that are highly frequent and have semantically scant content) to recognize the form and meaning of a construction (e.g., *go* for the intransitive-motion construction, *get* for the transitive construction, and *give* for the ditransitive construction) (Akhtar, 1999; Akhtar & Tomasello, 1997; Bates & MacWhinney, 1987; Pinker, 1989; Tomasello, 1992). Once language users move beyond item-based learning and establish abstract representations of constructions generalized over numerous tokens of sentences, they take advantage of constructional knowledge to comprehend and produce various types of sentences including those whose meaning cannot be easily derived from verb semantics alone (Ahrens, 1995; Bencini & Goldberg, 2000; Goldberg, 1995, 2013).

Based on the usage-based approach, this study predicts a step-by-step language learning process in L2 learners. Beginner-level L2 learners will exhibit a strong reliance on individual verbs and can only understand some highly frequent argument structure patterns, as their constructional representations have yet to be constructed. In contrast, reliance on constructional information will increase with L2 experience, and more advanced learners will more likely use constructional information and acquire complex and less frequent constructions. Also, given the significant role of light verbs in early L1 acquisition, we predict that verb semantics will modulate sensitivity to constructional cues for learners, particularly those at early or intermediate stages of constructional development.

To test these predictions, the present study implemented a sentence-sorting task (e.g., Bencini & Goldberg, 2000) and a translation task (e.g., Lee & Kim, 2016) with Korean speakers learning English as a foreign language (EFL) aligned at five grade levels (young students in grade 5, 7 and 10, and college students in English and non-English majors). Investigating the use of constructional information by EFL students at different stages of language development may afford more precise and comprehensive assessment of the L2 development of constructional knowledge from the usage-based principle, as well as allowing us to test whether L2 constructional development proceeds along the same lines as in L1 contexts. At the same time, close inspection of constructional usage patterns in L2 learners will offer useful information to language teachers dedicated to teaching English constructions in the EFL context.

2. DEVELOPMENT OF ENGLISH CONSTRUCTIONS IN L1

Construction Grammar (Goldberg, 1995, 2006) defines a construction as an independent unit of form-meaning correspondence, as shown in the following definition.

> C is a construction iff$_{def}$ C is a form-meaning pair <F_i, S_i> such that some aspect of F_i or some aspect of S_i is not strictly predictable from C's

component parts or from other previously established constructions.

(Goldberg, 1995, p. 4)

Table 1 shows examples of English argument structure constructions.

TABLE 1
Argument Structure Constructions in English

Construction	Form	Meaning	Example
Intransitive-Motion	Subj V Obl$_{path/loc}$	X moves Y$_{path/loc}$	*The fly buzzed into the room.*
Transitive	Subj V Obj	X acts on Y	*Jim pushed Paul.*
Caused-Motion	Subj V Obj Obl$_{path/loc}$	X causes Y to move Z$_{path/loc}$	*Bill sneezed the foam of the cappuccino.*
Ditransitive	Subj V Obj Obj2	X causes Y to receive Z	*Tom faxed me a letter.*
Resultative	Subj V Obj RP	X causes Y to become Z$_{state}$	*Sam painted the wall red.*

Note. Obj = object; Obl = oblique; RP = resultative phrase; Subj = subject; V = verb

Argument structure constructions express basic human experience in a consistent linguistic frame (Fillmore & Kay, 1999; Goldberg, 1995). For example, the constructions listed in Table 1 are associated with common daily experiences, such as "someone causing something, something moving, something being in a state, someone possessing something, something causing a change of state or location, something undergoing a change of state or location, and something having an effect on someone" (Goldberg, 1995, p. 39). In L1 acquisition, two features are known to play an instrumental role in constructional development: language experience and prototypicality of language input. First, usage-based constructional approaches characterize the acquisition of the constructions as a gradual process of formulating abstract representations through *language experience* (Barlow & Kemmer, 2000; Bybee, 2008; Croft, 2001; Ellis, 2008; Goldberg, 1995, 2006; Langacker, 2000; Tomasello, 2003). In an early acquisition, children accumulate information of individual linguistic input, characterized as concrete and highly frequent item-based constructions (Cameron-Faulkner, Lieven, & Tomasello, 2003; Farrar, 1990, 1992; Redington, Chater, & Finch, 1998; Theakston, Lieven, Pine, & Rowland, 2001). Drawing statistical regularities from the input through a repeated exposure, children gradually move beyond the acquisition of discrete lexical items into internalizing abstract constructional representations generalized over individual language exemplars (Ellis, 2003; Goldberg, 1995; Langacker, 2008; MacWhinney, 2005; Tomasello, 2003). These constructional representations are assumed to provide consistent syntactic and semantic frames, helping children integrate additional language input into the frame of previously established constructions (Childers & Tomasello, 2001; Dodson & Tomasello, 1998;

Goldberg, Casenhiser, & Sethuraman, 2004).

Another feature that characterizes the acquisition and development of argument structure constructions is the role of prototypicality encoded in verbs. Researchers found that children strongly rely on so-called light verbs, or highly frequent, prototypical verbs with general purposes and less semantic content, in their early stages of constructional development (Akhtar, 1999; Akhtar & Tomasello, 1997; Bates & MacWhinney, 1987; Pinker, 1989; Tomasello, 1992). Children's high facility of light verbs may stem from the verbs' high frequency and semantic compatibility with constructional meanings. For example, Clark (1987) noted that children prefer to use light verbs, mostly attributable to their frequent occurrence in the input they receive from their caregivers. Goldberg and her colleagues (Goldberg et al., 2004) supported this argument in a corpus analysis of mother talk and children's speech by showing a direct effect of highly frequent light verbs on children's speech. In particular, they found a strong correlation between the meanings of the most frequent light verbs and their corresponding constructions in the speech of children and their mothers (e.g., *go* in the intransitive-motion, *give* in the ditransitive, *put* in the caused-motion construction). Similarly, Ninio (1999) observed that light verbs such as *do*, *make*, *take*, *give*, and *get* were preferentially adopted by young children long before they used semantically heavy verbs in the same constructions. These results suggest that the nature of light verbs that allows for a biunique correspondence with constructional meanings makes it possible for children to detect regular patterns among individual instances and develop abstract knowledge of constructions.

In sum, previous research shows that monolingual children develop constructional knowledge by advancing from item-based usage to establishing abstract constructional representations through language experience, and light verbs help boost learners' generalization and entrenchment of argument structure constructions (Casenhiser & Goldberg, 2005; Goldberg et al., 2004; Tomasello, 2003).

3. DEVELOPMENT OF ENGLISH CONSTRUCTIONS IN L2

The acquisition and development of argument structure constructions in the L1 context can lead to the question of how L2 learners develop constructional knowledge. Numerous studies have reported that late L2 learners can utilize construction information as efficiently as, sometimes even more strongly than L1 speakers (e.g., Gries & Wulff, 2005; Lee & Kim, 2016; Liang, 2002; Shin, 2010; Valenzuela & Rojo, 2008). For example, Gries and Wulff (2005) conducted a sentence-sorting task with highly proficient German-speaking adult learners of English. In their study, participants were presented with 16 English sentences that crossed four verbs (*take*, *get*, *throw*, *cut*) with four constructions

(transitive, ditransitive, caused-motion and resultative) and asked to sort them according to their overall meaning. Results showed learners' stronger tendency to cluster the sentences according to construction than according to verb, suggesting that these advanced learners had successfully established abstract knowledge of target constructions. In another sentence-sorting study, Valenzuela and Rojo (2008) found a strong tendency toward a construction-based sorting with advanced Spanish-speaking adult learners of English. In particular, the learners in their study efficiently drew upon constructional information, although their L1, Spanish, does not instantiate two of the four constructions employed in the task (caused-motion and resultative constructions). These findings suggest that the Spanish learners of English could successfully derive constructional information without recourse to their L1 knowledge.

In addition to the compelling evidence of adult learners' facility with constructional information, it is also shown that the degree of sensitivity to construction cues can be constrained by L2 proficiency. For instance, Liang (2002) carried out a sentence-sorting task with Chinese-speaking college students at three levels of English proficiency (beginner, intermediate, and advanced learners). She found that the students were more likely to produce construction-based sorts as their proficiency level was higher. From these findings, she concluded that increased proficiency allows L2 learners to utilize constructional information more efficiently.

Similarly, in a sentence-sorting study with Korean-speaking college students at lower and higher proficiency levels, Lee and Kim (2016) found an interaction of proficiency and learners' sorting tendency. In their study, students with higher proficiency produced construction-oriented sorting, whereas lower-level students created verb-centered sorting. Results of a subsequent translation task further revealed that L2 learners had varying degrees of difficulty with individual constructions. Participants had the highest translation accuracy for the transitive construction and the lowest accuracy for the resultative construction, with the translation accuracies of the caused-motion and ditransitive constructions remaining in the middle of the scale.

Findings from Liang (2002) and Lee and Kim (2016) reflect the usage-based constructional development in two aspects. First, the distinct sorting patterns across proficiency groups suggest that more language experience indicated by L2 proficiency may lead to stronger reliance on constructional information, consistent with the L1 constructional development where children accumulate constructional representations through constant language experience. Second, the findings from the translation task in Lee and Kim (2016) demonstrate that individual constructions are acquired at different stages of language development according to their prototypicality and frequency. It is shown that the transitive construction is acquired from early on due to its syntactically and semantically generic properties and high contingency in language input (Dodson &

Tomasello, 1998). By contrast, the resultative construction is difficult to acquire for learners because it is not only one of the least frequent constructions but also contains less paradigmatic structure and meaning (Snyder, 2001). Lee and Kim's findings that construction's prototypicality and frequency affected the learners' translation performance suggest that constructional development in L2 learners is closely associated with language usage.

Despite prolific evidence of L2 learners' use of constructions, the overall pattern of L2 constructional development has not been sufficiently explored since most studies have focused on adult learners. In order to assess usage-based constructional learning in L2 in depth, it is necessary to compare patterns across various age and proficiency groups including both young and adult learners. We set out to address this issue by including Korean-speaking EFL learners at five grade levels in a sentence sorting and a translation task.

4. PRESENT STUDY

The purpose of this study is to investigate L2 learners' developmental process of English argument structure constructions from the perspectives of usage-based theories of language development. Specific questions we address in this study are as follows:

1. Do Korean EFL learners show increased sensitivity to constructional information in a sorting task as their target language experience accumulates?
2. Does verb semantics interact with L2 proficiency to influence learners' sorting tendency?
3. Do learners have different degrees of translation difficulties with individual constructions in a translation task?

The first research question addresses the issue of whether the general pattern of construction development in the monolingual context also manifests in L2 development. Based on the usage-based theories of language development, we predicted that the degree of relying on construction information is contingent on the amount of learners' language experience. In this cross-sectional study, we relied on participants' school grades as a proxy for their language experience, assuming that the regular school curricular that these participants received roughly correspond to their English language experience. Indeed, participants' grades strongly correlated with their scores from an independent proficiency test ($r > .7$, see 4.1. Participants), suggesting that the participants' grade is closely aligned with their proficiency and/or language experience. We thus predicted that upper-level

learners would be more biased toward constructions than verbs when they sort sentences.

The second research question concerns whether the role of verb semantics in L1 children's early constructional development is also found among L2 learners. We predicted that verb semantics would have a strong influence in sorting tendency of learners, particularly at beginner and intermediate levels. That is, less proficient learners will demonstrate construction-based sorting more strongly when target sentences include light verbs, because the verb's high frequency and less semantic content are expected to help learners raise awareness of the constructional similarities in target sentences. In contrast, verb semantics will have little impact on the sorting patterns of more proficient learners who are assumed to have developed constructional knowledge enough to apply to any sentences regardless of verb profiles.

The third research question focuses on learners' difficulties with individual constructions in a translation task. We predicted that learners' translation accuracies for individual constructions would vary depending on prototypicality and frequency of each construction. Specifically, learners will show the highest accuracy for the transitive construction, the most frequent and simplest one, while having the greatest difficulty with the resultative construction as it is non-prototypical and one of the least frequent constructions.

4.1. Participants

The current study involved 169 Korean-speaking EFL learners of English, consisting of 35 elementary school students in grade 5 (labeled as G1), 36 middle school students in grade 7 (G2), 35 high school students in grade 10 (G3), 31 non-English major college students (G4) and 32 English major college students (G5). Results from a language background questionnaire revealed that except for the G5 group, none of the learners had any experience of staying in English-speaking countries at the time of testing, providing some support that learner grade may be associated with their estimated amount of English learning experience. Between G4 and G5, there is no age difference, but their language experience is assumed to differ substantially because of their major in college and the different length of staying in English-speaking countries (see Table 2).

To assess participants' L2 proficiency, we administered an English C-test (i.e., a fill-in-the-blank task in which the first letter of an answer is shown in each blank, Keijzer, 2007) as an independent proficiency measure. A one-way ANOVA indicated significant differences among the five groups in their mean scores ($F(4, 168) = 128.116$, $p < .001$, $\eta^2 = .76$). Post-hoc comparisons confirmed that all learner groups differed significantly from one another (all ps $< .05$), indicating that the groups are aligned in terms of both grade and English proficiency. The alignment of grade and proficiency measures ensures

that each group had different language experience, offering a good testing ground for investigating the effect of language experience on the learners' use of constructional information. Table 2 summarizes information of each learner group including a sample size, years of staying in English-speaking countries, age, and C-test scores.

TABLE 2
Participant Information

Group	*n*	Mean Years Staying in English Speaking Countries	Mean Age	C-test Score (*max* = 40)	
				M	*SD*
G1 (5th grade)	35	0	10.9	0.83	2.04
G2 (7th grade)	36	0	12.3	6.36	3.69
G3 (10th grade)	35	0	15.6	10.31	4.63
G4 (non-English major)	31	0	21.4	17.68	6.69
G5 (English major)	32	1;1	22.7	26.44	10.22

4.2. Materials

For the sentence-sorting and translation tasks, 16 English sentences were adopted from previous sentence-sorting tasks (Gries & Wulff, 2005; Lee & Kim, 2016; Valenzuela & Rojo, 2008), with a modification on the characters' names by replacing them with more frequent ones. In the sentences, four lexical verbs (*take*, *get*, *cut*, *throw*) were crossed with four types of constructions (transitives, ditransitives, caused-motions, and resultatives). Among the four verbs, *take* and *get* are categorized as light verbs since they have less semantic content and more general purposes than the other two semantically heavy verbs, *cut* and *throw*. The whole experimental items are presented in Table 3.

TABLE 3
Experimental Sentences in the Sorting Task

Verb	Construction			
	Transitive	Ditransitive	Caused-Motion	Resultative
TAKE	Amy took the watch.	Paul took Sam a message.	Robert took the flower into the house.	Rachel took the wall down.
GET	Mike got the book.	Sarah got Kim a book.	Tony got the ball into the net.	David got the balloon flat.
CUT	Tom cut the bread.	Julie cut Daniel an apple.	Kevin cut the ham onto the plate.	Jim cut the watermelon open.
THROW	Mary threw the ball.	James threw Linda the pencil.	Lee threw the key onto the roof.	John threw the box apart.

4.3. Procedure

Both sentence-sorting and translation tasks were completed during a single session. During the sentence-sorting task, participants were presented with 16 English sentences on a test sheet and asked to classify them into four groups based on their overall meanings and forms. Prior to the task, they were instructed that each sorting cluster should contain exactly four sentences. Participants supplied their sorting by writing sentence numbers in a sorting box presented on the bottom of the test sheet. After a sorting task, participants were asked to translate each sentence into Korean as closely as possible. Following both tasks, participants completed a language background questionnaire and the English C-test. The overall procedure took approximately 50-70 minutes.

5. RESULTS AND DISCUSSION

5.1. Analysis of Sorting Scores

We first inspected participants' sorting in terms of whether the sentences were classified into groups with the same verbs or with the same constructions. As shown in Table 4, about half of the learners in G1 (54%) and G2 (53%) produced entirely verb-based sorts (i.e., sentences sorted entirely by verb similarities), whereas the proportion of completely verb-based sorting decreased consistently as the grade level increased (20% in G3, 13% in G4 and 0% in G5). The converse pattern was obtained for the number of entirely construction-based sorting (i.e., sentences sorted entirely by constructional similarities) in each group. While no one produced entirely construction-based sorting in G1, the proportion steadily grew with the grade (28% in G2, 32% in G3, 45% in G4, and 81% in G5). These findings demonstrate a close association between learners' experience and their ability to use constructional information, indicating that language experience can account for the learners' constructional knowledge.

TABLE 4
Number of Students Who Produced Entirely Verb-Based and Construction-Based Sorts

Group	n	Entirely Verb-Based Sorting	Entirely Construction-Based Sorting
G1 (5th grade)	35	19 (54 %)	0 (0 %)
G2 (7th grade)	36	19 (53 %)	10 (28 %)
G3 (10th grade)	35	8 (20 %)	13 (32%)
G4 (non-English major)	31	4 (13 %)	14 (45%)
G5 (English major)	32	0 (0 %)	26 (81%)

To assess learners' sorting behaviors in detail, we calculated deviation scores for verb- and construction-based sorting across groups. Following the protocol from Bencini and Goldberg (2000), the deviation score from verb-based sorting (labeled as Vdev) was computed by counting the number of changes to be made in individual's sorting for a completely verb-based sort. For example, when sorting piles include four groups with the same verbs, no sentence in each group needs to move across the piles to make the sorting verb-based, thus yielding a Vdev score of 0. In contrast, when each sorting pile includes sentences with different verbs, three sentences in each of the four groups should move to other groups in order to make completely verb-based sorting. In this case, the Vdev score is 12. Likewise, the deviation score from a construction-based sorting (Cdev) indicated the number of changes to be made for a fully construction-based sorting. On a scale of 0 to 12, a lower Vdev/Cdev score indicates a stronger verb-/construction-based sorting, whereas a higher Vdev/Cdev score indexes a weaker verb/construction-based sorting (Bencini & Goldberg, 2000).

As summarized in Table 5, participants' reliance on constructional information was accentuated with increasing grade levels. For example, the lower-level learners in G1 and G2 produced verb-based sorts in general, as indicated by their low Vdev scores (mean Vdev scores of 2.74 and 4.89, respectively), whereas the three higher-level groups sorted the sentences in a more construction-oriented way (mean Cdev scores of 5.60 in G3, 4.28 in G4, and 1.19 in G5).

TABLE 5
Vdev and Cdev Scores for Each Group

Group	*n*	Vdev (0–12)	Cdev (0–12)
G1 (5th grade)	35	2.74	10.69
G2 (7th grade)	36	4.89	7.33
G3 (10th grade)	35	7.20	5.60
G4 (non-English major)	31	8.13	4.28
G5 (English major)	32	11.00	1.19

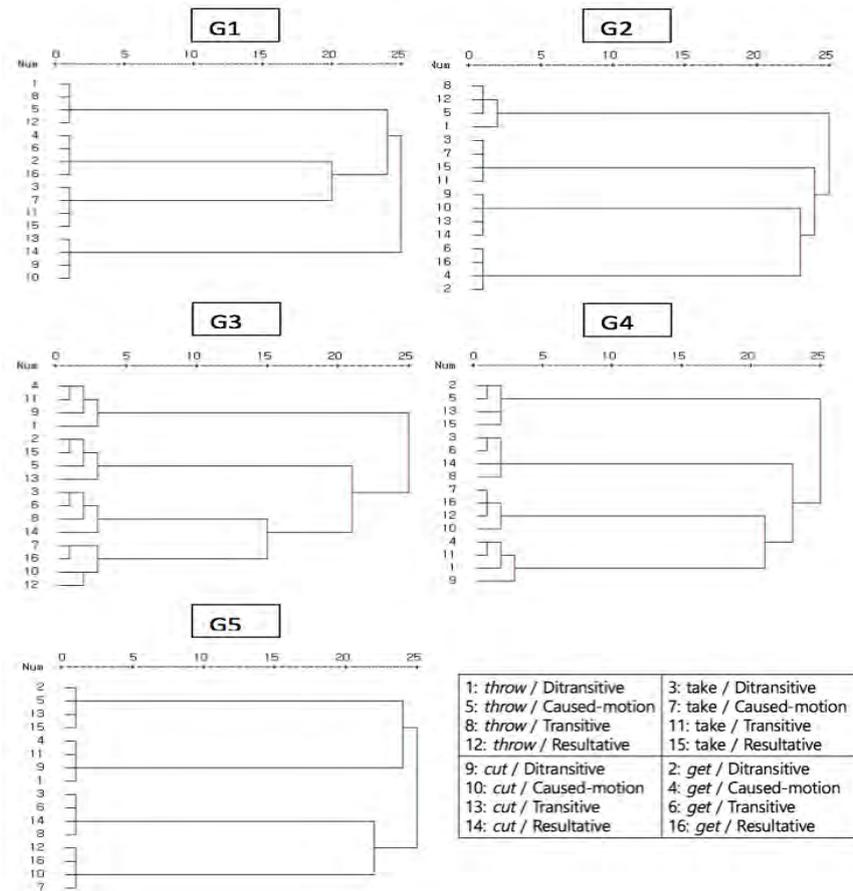*Note.* Vdev = deviation score from verb-based sorting; Cdev = deviation score from construction-based sorting

One-way ANOVA revealed significant group differences both for Vdev ($F(4, 165) = 17.597$, $p < .001$, $\eta^2 = 0.30$) and Cdev scores ($F(4, 165) = 17.730$, $p < .001$, $\eta^2 = 0.37$). Tukey HSD post-hoc comparisons revealed that a significant difference was found in every pair of groups, except between the pairs of G1–G2, G2–G3, G3–G4, and G4–G5 in Vdev, and between G2 and G3 and between G3 and G4 in Cdev. These results indicate distinct sorting patterns among the groups, which can be characterized as strong verb-based sorting for the beginner-level learners in G1 and G2 and strong construction-based sorting for the learners in G5, with the G3 and G4 groups positioned in the middle of the two ends. The

findings suggest a close association between language experience and L2 development of constructional knowledge, consistent with the prediction of usage-based approaches.

5.2. Cluster Analysis

To analyze learners' sorting tendencies by each verb, we conducted a cluster analysis following previous studies (e.g., Gries & Wulff, 2005; Valenzuela & Rojo, 2008). As a first step toward the analysis, we created a symmetric similarity matrix based on the frequency of co-occurrence of each sentence with other sentences. A hierarchical cluster analysis was then performed with the matrix using Euclidean distance as a measure and Ward's method as a clustering algorithm. The dendrogram output of the cluster analysis is illustrated in Figure 1.

FIGURE 1
Dendrogram for the Cluster Analysis

1: *throw* / Ditransitive	3: take / Ditransitive
5: *throw* / Caused-motion	7: take / Caused-motion
8: *throw* / Transitive	11: take / Transitive
12: *throw* / Resultative	15: take / Resultative
9: *cut* / Ditransitive	2: *get* / Ditransitive
10: *cut* / Caused-motion	4: *get* / Caused-motion
13: *cut* / Transitive	6: *get* / Transitive
14: *cut* / Resultative	16: *get* / Resultative

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Consistent with the analysis of Vdev and Cdev scores, results of the cluster analysis exhibited dominant verb-based clusters in the two lower-level groups and construction-based clusters in the three higher-level groups. In the G1 group, sentences were clustered based on the same lexical verbs (sentences 1-5-8-12 for *throw*, 2-4-6-16 for *get*, 3-7-11-15 for *take*, and 9-10-13-14 for *cut*). The same tendency was obtained for G2, who produced verb-based clusters, except for the first cluster, which was produced incompletely with only three sentences of 5-8-12. By contrast, clusters in G3, albeit incomplete, were constructed around the same constructions (sentences 4-11 for ditransitive, 2-15 for caused-motion, 3-6 for transitive, and 7-16 for resultative constructions). G4 demonstrated clearer construction-oriented sorting (sentences 4-11 for ditransitive, 2-15 for caused-motion, 3-6 for transitive, and 7-12-16 for resultative constructions). Finally, the clusters of G5 showed a complete construction-based sorting tendency (sentences 2-5-13-15 for caused-motion, 1-4-9-11 for ditransitive, 3-6-8-14 for transitive, and 7-10-12-16 for resultative).

Importantly, the results of the cluster analysis revealed an interaction of verb type and grade levels in the participants' sorting patterns. We found a significant role of the light verbs (*take* and *get*) in the sorting performance of the intermediate groups (G3 and G4), who clustered sentences together with the same construction only when they included the light verbs. For example, the first and second clusters in G3, comprised of the sentences with the light verbs, indexed construction-based sorting (1-4-9-11 for ditransitive, and 2-5-13-15 for caused-motion), whereas the remaining two clusters contained a mixture of sentences with different verbs and constructions. Similarly, the first and second clusters in G4, which contained sentences with the light verbs, were created based on constructions (2-5-13-15 for caused-motion, and 3-6-8-14 for ditransitive), yet the other clusters consisted of sentences with different verbs and constructions. These findings suggest that the intermediate-level learners in G3 and G4 were able to produce construction-oriented clusters when they encountered sentences including light verbs. Unlike for G3 and G4, the light verbs did not influence the sorting tendencies of G1 and G2, who produced strong verb-based sorting, and G5, who created completely construction-oriented sorting. These results shed light on the role of verb semantics in the process of developing constructional knowledge, particularly for intermediate-level L2 learners.

Taken together, the outcomes of the sorting score and cluster analyses are summarized as follows. First, the learners were more capable of relying on constructional information as their grade level increased, suggesting an important role of language experience in formulating constructional knowledge in L2 development. These results permit us to establish a continuum for constructional development of the EFL learners, which sets G1 and G2 at one end of a developmental spectrum (strongly verb-centered) and G5 at the other (strongly construction-centered) while placing G3 and G4 in the middle of the

continuum. Furthermore, the verb semantics modulated the degree to which the intermediate-level learners drew upon constructional information during the task. Unlike the beginner-level learners in G1 and G2 and the advanced-level group in G5 who were impervious to the semantic properties of the verbs, the intermediate-level learners in G3 and G4 paid more attention to constructions when they encountered the sentences with the light verbs. The significant role of verb semantics in learners' sorting pattern is reminiscent of the strong reliance on light verbs by L1 children. These results will be discussed in more detail in the Discussion section, in light of the usage-based theories of language development.

5.3. Analysis of the Translation Task

To investigate learners' difficulties with individual constructions, we analyzed their translation performance of the target sentences. Of the five groups, G4 was excluded from data analysis due to a large loss of data. Translation data for the remaining four groups were evaluated based on whether the translated sentences included the core meaning of target constructions. For example, participants' translations were coded as correct when they contained the meaning of 'X causes Y to become Z' for resultatives, 'X causes Y to receive Z' for ditransitives, and so on (see Table 1 for the meaning of each target construction). Errors such as misspelling and incorrect tense morphemes were discounted since they have little to do with the constructional knowledge.

Analyses of translation accuracy (see Table 6) showed that for the ditransitive and caused-motion constructions, accuracy scores for each construction increased in concomitance with the learners' grade levels. Unlike these constructions, the learners scored the highest accuracy in the transitive construction while receiving the lowest scores in the resultative construction in general. The fact that even the beginner-level students in G1 received scores as high as the other groups in the transitive construction indicates that this construction is acquired relatively early in the learning process. On the other hand, the relatively low scores on the resultative construction in G5 suggest that even learners at a later stage have difficulties with this construction.

TABLE 6

Mean Translation Accuracy (Standard Deviations) for Each Construction per Group

Group	n	Total ($max = 16$)	Transitive ($max = 4$)	Ditransitive ($max = 4$)	Caused-Motion ($max = 4$)	Resultative ($max = 4$)
G1	35	8.2 (1.11)	3.5 (1.01)	1.0 (1.00)	2.3 (1.13)	1.4 (1.00)
G2	36	11.0 (0.89)	3.9 (0.32)	2.1 (1.40)	3.1 (0.92)	2.0 (1.10)
G3	35	11.8 (0.87)	3.9 (0.23)	2.9 (1.12)	3.3 (0.66)	1.9 (0.86)
G5	32	13.9 (0.50)	3.9 (0.60)	3.4 (0.80)	3.8 (1.00)	2.8 (1.12)

To break down the analysis of the interaction between group and construction type, we conducted pair-wise group comparisons for each construction. The analysis of the transitive construction revealed no difference among groups (all $ps > .1$), indicating that all groups performed similarly in this construction. For the ditransitive, caused-motion, and resultative constructions, however, significant group differences were found. In the ditransitive construction, except for between G3 and G5 ($p = .340$), every pair of groups differs significantly from each other (all $ps < .05$), indicating the distinct translation performance between the beginner and the advanced groups. Similarly, in the caused-motion construction, a significant difference was found in all pairs of group comparisons (all $ps < .05$), except for between G2 and G3 ($p = .797$), and between G3 and G5 ($p = .069$), again pointing to the distinguished translation scores between the beginner and the advanced groups. These results suggest that the ditransitive and caused-motion constructions caused difficulties for the learners at beginner and intermediate levels, but not for the advanced learners in G5. In the resultative construction, a significant difference was found only between G5 and the other groups, with the scores among G1, G2 and G3 remaining the same (all $ps > .1$). Although G5 obtained significantly higher scores for this construction than the other groups, their low scores (mean scores of 2.8) relative to the scores in the other constructions indicate that they also had difficulties with this construction.

In sum, the results of the translation task reflect the developmental sequence for the L2 learners, suggesting that the acquisition of the four English constructions takes place at different stages. Specifically, the transitive construction was acquired at the earliest stage, followed by the ditransitive and caused-motion constructions, which seem to pose difficulties for the low and intermediate-level learners. In contrast, it appears that the acquisition of the resultative construction was not completed even at the advanced level, as all groups had generally low scores in this construction, albeit with significantly higher scores in the G5 than in the other groups.

6. GENERAL DISCUSSION

Motivated by the usage-based theories of constructional development, the current study investigated L2 learners' development of construction knowledge by conducting sentence-sorting and translation tasks with Korean EFL learners across different grade levels. The primary objectives of this study were: (a) to examine the developmental tendency of EFL learners' use of constructional information according to their language experience, (b) to test modulating effects of verb semantics in learners' sorting, and (c) to establish a

developmental sequence of acquiring individual constructions. In this section, we discuss the current findings within the theoretical framework of usage principles.

First, we found a close association between learners' language experience (as indicated by their grade levels and proficiency scores) and their ability to utilize constructional cues in the sorting task. While the beginner-level learners in G1 and G2 demonstrated a dominant reliance on verbs, the higher-level learners showed a strong preference for construction-based sorts, as indicated by the decreasing Cdev scores in direct proportion to grade levels. We assumed that participants' grade levels and proficiency could serve as a reliable index of the presumable amount of their exposure to English, since all participants, except for G5, learned English in a classroom setting without any substantial natural exposure to the target language. To the extent that the learners in each group are aligned in terms of their language experience, the distinct sorting patterns among the groups reflect the general developmental sequence of Korean EFL learners, that is, advancing from item-based learning (i.e., verb-centered) to the establishment of abstract constructional representations (i.e., construction-centered). The greater ability to use constructional information with increased target language experience indicates that these EFL learners follow the same developmental trajectories as monolingual children, consistent with the main tenet of usage-based theories of language learning that language experience is a major driving force for constructional learning.

Although we argue that the results of the sorting task are well-captured by usage-based theories, some caveats may be raised. For instance, one might attribute the group differences largely to age-specific factors. Because of the nature of the sorting task, which queries language users' constructional usage through sentence categorization, it is conceivable that older learners who have greater cognitive abilities are more capable of recognizing constructional similarities among target sentences in the task, regardless of their target language experience. However, we remain skeptical about identifying age as the sole explanation of the current results for the following reasons. First, when the age factor was ignored, we still found a firm connection between the learners' proficiency and their performance in the sorting and translation tasks. Across all participants, the C-test scores moderately correlated both with Cdev ($r = .60$, $p < .001$) and with translation scores ($r = .52$, $p < .001$), indicating that the participants' performance in the sorting and translation tasks is closely aligned with their English proficiency. Second, G4 and G5 showed a significant difference in their Cdev scores. Since the learners in these groups were comparable in their age, it appears less plausible that cognitive abilities associated with their age led to the different sorting results. We thus dismiss the possibility that an age factor alone contributed to the current results. Instead, it is feasible that several factors, including age, L2 proficiency, and language experience, which are known to play a crucial role in overall language development, may have interacted with each other to influence participants'

sorting behaviors. Further research needs to tease apart these potential factors and examine how strongly L2 sorting performance is affected by each of the contributors.

Another crucial finding we obtained from the sorting task was the influence of verb semantics in the sorting patterns of the intermediate-level learners in G3 and G4: They showed a strong bias toward constructional sorting when the sentences included light verbs (*get* and *take*), but not in the presence of semantically heavy verbs (*cut* and *throw*). The role of light verbs in intermediate-level learners' sorting patterns mirrors the dominant reliance of light verbs by L1 children in their early development of constructional knowledge (e.g., Ninio, 1999). It appears that these light verbs' prototypical meanings, high frequency, and compatibility with constructional meanings may have alleviated cognitive loads required for integrating the verbs with the constructional meanings during sentence comprehension, leading to an increased awareness of constructional information. The semantically heavy verbs, by contrast, may have imposed greater cognitive demands on the learners. Note that the verbs, *cut* and *throw*, preferentially appear in the simple transitive configuration. Their appearance in the ditransitive, caused-motion, and resultative constructions may thus have required the learners to make additional efforts to associate the verbs' semantic information with the constructional meanings when they sorted the sentences. Because the intermediate learners in this study are assumed to have underspecified constructional representations, the heavy verbs may have overshadowed constructional similarities for these learners during the task, militating against their construction-based sorting. Unlike for the intermediate-level learners, the beginner (G1 and G2) and the advanced (G5) groups produced either completely verb- or construction-centered sorting irrespective of the verb type. The verb semantics had little impact on the sorting performance of these groups for different reasons. It seems that the beginner-level learners had not yet established sufficient constructional knowledge to apply to either light or heavy verbs, whereas the advanced learners may have developed fully specified constructional representations that can integrate with both light and heavy verbs.

In addition to the sorting task, the results from the translation task suggest that individual constructions are acquired at different stages of language learning according to their frequency and complexity. In this task, learners at each grade level demonstrated variability in the degrees of difficulties with individual constructions. In general, the transitive construction was unproblematic for all learner groups, suggesting that this construction is acquired quite earlier than other constructions by virtue of its high frequency and simple syntactic and semantic structure. In contrast, the ditransitive and caused-motion constructions, which are more complex than the simple transitive construction, appear to present a particular difficulty for the learners at the beginner and intermediate-levels, but not for the advanced learners. The acquisition of the resultative construction, on the other hand, seemed to pose the greatest challenge to learners at all

grade levels, presumably due to its low frequency in the input (Snyder, 2001) and/or complex structure in form and meaning (Sethuraman, 2002). These results suggest that input frequency and complexity of constructions are important factors contributing to constructional development.

Taken all together, the current findings demonstrate that EFL learners' development of argument structure constructions is influenced by learners' language experience, semantic aspects of verbs, and frequency/complexity of target constructions, reflecting the usage-based language learning. The learners' sentence-sorting and translation results can be summarized as a continuum of constructional development, as schematized in Figure 2.

FIGURE 2
Developmental Process of the L2 Learners in the Present Study
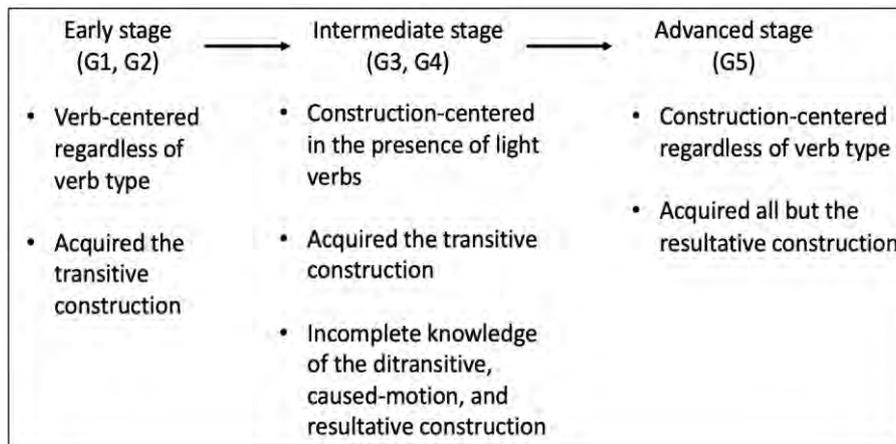
After all, the current results lend strong support to the central idea of the usage-based accounts, which posit that language usage shapes the process of building constructional knowledge. We found that language experience and frequencies of exemplars in the target language allow for EFL learners' learning and entrenchment of target constructions, which closely mirrors the process of constructional learning by L1 children (e.g., Ellis, O'Donnell, & Römer, 2013). Our findings suggest that the L2 learning of constructions relies on the same kind of learning mechanisms operative in the L1 acquisition, as far as constructional learning is concerned, even in the EFL context where target language input is regarded as being impoverished (Yang, 2010). This implication is in line with the consideration that the L2 learning process is indistinguishable from the L1 counterpart, and the L2 learning mechanism is considered as a subset of the L1 learning mechanism (e.g., MacWhinney, 2005). We thus conclude that L2 learning systematically follows usage-based models of language acquisition that emphasize the role of language experience in the

process of schematizing and generalizing linguistic patterns. In this regard, the findings from this study hold the promise of providing a basic foundation for detailed characteristics of L2 constructional development. Future research needs to work toward extending the current findings to uncover additional aspects of L2 constructional learning mechanisms.

The significant role of language use in constructional development found in this study also sheds light on English instruction in the EFL setting. It is well-attested that a lack of language input constitutes a major source of difficulties for acquiring English constructions in the EFL setting (e.g., Xu, 2016; Year & Gordon, 2009). While substantial exposure to the target constructions may help learners overcome such difficulties, providing an abundant amount of meaningful input is severely restricted in the EFL classroom due to constraints of time and available resources (Yang, 2010). Given such restrictions, EFL teachers need to explore possible ways of presenting target constructions in an efficient way. One promising avenue in such attempts is to give explicit explanations on the form and meaning of constructions. As Holme (2012) noted, an explicit instruction may subserve learners' acquisition of abstract constructional knowledge, circumventing the need to "build this from repeated exposure to different tokens" (p. 21). Indeed, several studies have proffered empirical evidence of beneficial effects of instructional treatment on EFL learners' acquisition of constructions (e.g., Rah & Kim, 2018; Sung & Yang, 2016).

In addition, the significant role of light verbs in the sorting performance of the intermediate learners in our study offers several productive directions for EFL teachers. To our best knowledge, verb semantics have received little attention in the English teaching curriculum and textbooks in the Korean EFL context. Instead, much focus has been placed on the provision of discrete grammatical rules to students. Recently, grammar instruction has been extended to a broader domain such as sentence reading, promoting learners' knowledge of form and meaning of sentences in texts (e.g., Lee, Schallert & Kim, 2015). Considering that verbs make significant contributions to the form and meaning of a sentence, we believe that a careful selection of verbs, particularly providing light verbs for beginner- and intermediate-level learners, may help learners strengthen the connection between a verb and a construction, ultimately engendering a development of necessary constructional knowledge to understand various types of sentences. Future research investigating the effect of verb semantics in grammar and reading instruction in the EFL setting should advance our understanding of this issue.

Finally, the translation patterns of the L2 learners for individual constructions in this study call for more attention to teaching constructions that present particular difficulties to learners. For example, the English resultative construction posed difficulties for even the most advanced learners in our study. This is not surprising given that this construction is highly infrequent in the input (Snyder, 2001), and its form and meaning diverge greatly from the Korean correspondent (Shim & Den Dikken, 2007), presumably creating more

potential difficulties associated with cross-language interference. In contrast, learners across all proficiency levels found the transitive construction the least challenging among the target constructions, as this construction is extremely frequent and contains simple semantic and syntactic structures. Therefore, EFL teachers should take into consideration the asymmetries in the degree to which learners have difficulty with individual constructions and allocate more time and resources to teaching more difficult constructions. In this regard, our findings may furnish EFL teachers with useful directions regarding the constructions they should pay more attention to, which may be an important piece of information that can be used to guide them in the selection of texts and curriculum design.

Applicable levels: Elementary, secondary, tertiary

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