

# A Usage-based Analysis of L2 Production of English Resultative Constructions

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## ABSTRACT

This study investigates whether the usage patterns of resultative constructions (e.g., *The lake froze solid*; *Tom painted the wall white*) in argumentative essays written by Korean-speaking learners of English follow the usage-based principles influencing first language acquisition. Specific research questions addressed in this study are: a) whether resultative constructions with high complexity and low frequency are more difficult to learn for Korean-speaking learners of English than other types of argument structure constructions, and b) whether learners expand their choice of verbs in the resultative constructions as their proficiency increases. Multiple regression analyses showed that the occurrence of resultative constructions explains the variability of learner proficiency better than that of other constructions. In addition, learners employed less frequent and more varied types of verbs in the resultative constructions as their proficiency was higher. Our findings suggest that usage-based theories of language development hold true in the context of foreign language learning.

**Keywords:** English resultatives, usage-based models, construction grammar, L2 proficiency

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## 1. Introduction

The usage-based account explains language development as an input-driven process whereby language items that are more frequent and/or more noticeable in input are acquired more easily and at earlier stages of language development (Barlow and Kemmer 2000; Bybee 2008; Croft 2001; Ellis 2008; Goldberg 1995, 2006; Kay and Fillmore 1999; Langacker 2000; Tomasello 2003). It is well-known that children start off with item-based learning of prefabricated verbal chunks, e.g., *look here* and *gimme that*, and then advance toward formulating abstract representations of argument structure constructions, e.g., NP-V-NP-NP (Cameron-Faulkner, Lieven and Tomasello 2003; Campbell and Tomasello 2001; Childers and Tomasello 2001; Farrar 1990,

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1992; MacWhinney 2008; Redington, Chater and Finch 1998; Theakston, Lieven, Pine and Rowland 2001; Tomasello 2003). For example, an initial stage of learning argument structure constructions is characterized by an item-based process. The repertoire of constructions that children use at this stage is mostly restricted to individual tokens, including simple lexical words, chunks, and some highly frequent argument structure patterns, such as intransitive (e.g., *Tom cried*), transitive (e.g., *Jane ate pizza*), and ditransitive constructions (e.g., *Give me some cookies*). In contrast, the acquisition of the complex and infrequent constructions, such as the transitive resultative construction (e.g., *Tom painted the wall red*) is shown to set in considerably later (e.g., Snyder 2001).

The usage-based acquisition of progressing from acquiring frequent and salient items to building abstract knowledge of complex and less frequent constructions also manifests itself in the use of verbs. In the early stages of item-based learning, the verbs children use are mostly restricted to highly frequent words that are closely associated in meaning with the constructions that they appear in, e.g., *want* in [V-NP], *give* in [V-NP-NP], and *put* in [V-NP-PP] (Goldberg, Casenhiser and Sethuraman 2004; Ninio 1999). As children accumulate a larger repertoire of constructions through statistical learning based on their language experience, however, they become less constrained by the paradigmatic connections between verbs and constructions and start to integrate a wide selection of verbs, including those that are non-prototypical in a target construction (Goldberg 1995; Goldberg et al. 2004; Tomasello 2003), as in *Paul wiped the table clean* and *Sally sneezed the tissue off the table*.

The observations of the first language (L1) development in light of usage principles bring up the question of whether the same acquisition process applies to second language (L2) learners. So far, few studies have focused on the role of language experience in the L2 development of argument structure constructions. Assuming that L2 proficiency can be a good indication of estimated language experience (e.g., Luk and Bialystok 2013), particularly in the context where English is learned as a foreign language (EFL) and its input is restricted to classroom exposure, examining usage patterns of learners at different proficiency levels will allow us to capture the relation between language experience and the ability to use target constructions. Against this backdrop, the present study examines the production of the English resultative construction by Korean EFL learners from the perspective of usage-based language development. The English resultative construction, as shown in (1), denotes the change of state (1a-b) or location (1c-d) experienced by the subject or the object

(Goldberg 1995; Goldberg and Jackendoff 2004).

- (1) a. Mike got angry (change of state in the subject)
- b. Mike wiped the table clean. (change of state in the object)
- c. Mike ran into the house. (change of location in the subject)
- d. Mike pushed Paul along the trail. (change of location in the object)

The English resultative construction has received a critical attention from a wide array of L2 studies, which report persistent difficulties with this construction in L2 comprehension and production (e.g., HW Kim and YO Rah 2016; S Kim 2016; J-H Lee and HM Kim 2011; K-S Park and Lakshmanan 2007; YO Rah 2014; M-C Sung and H-K Yang 2016; Whong-Barr 2005). Despite the widely attested problems associated with the acquisition of resultatives in L2 learners, however, less is known about specific processes underlying the L2 acquisition and development of resultatives. Moreover, previous research has relied largely on receptive measures to assess L2 learners' linguistic knowledge of resultatives, such as acceptability judgment, sentence-sorting, and translation tasks, and little evidence is proffered on the way that L2 learners develop an ability to *produce* the target construction across various proficiency levels. To address these gaps, this study adopts the usage-based linguistic framework and examines L2 learners' production patterns of English resultative constructions to determine whether L2 learners follow similar acquisitional processes as L1 children.

This paper presents two corpus-based analyses that examined occurrences of four types of resultatives (intransitive and transitive resultatives denoting a change of state and path, respectively) in argumentative essays produced by Korean college students aligned at three proficiency levels (beginner, intermediate, and advanced). Motivated by the usage-based language learning, the analyses employed in this study explore the relationship between learners' ability to produce each resultative type and their writing proficiency, as well as investigate the types of verbs that the learners used in the target constructions. Specific questions we ask in this study are 1) whether the frequency and complexity of resultatives in EFL learners' essays can account for a significant amount of variation among different proficiency levels, and 2) whether learners expand their choice of verbs in the use of resultatives as their proficiency increases. Answering these questions will help to better characterize the process of EFL learners' development of English resultatives within the framework of usage-based theories as well as provide EFL teachers with detailed guidelines

about how to teach target constructions to learners.

## 2. The English Resultative Construction

The resultative construction is structurally represented as containing a resultative phrase headed by an adjective or a particle. This construction denotes either an intransitive or transitive meaning. The intransitive meaning denotes a theme undergoing a change in its state or location, or “X becomes Y”; the transitive meaning denotes that an agent causes a theme to change its state or location, or “X causes Y to become Z” (Bencini and Godberg 2000; Goldberg 1995; Goldberg and Jackendoff 2004). The syntactic and semantic characteristics of the resultative construction distinguish it from other constructions that contain ostensibly similar structures. Consider the sentences in (2), for example.

- (2) a. Jim washed the jacket clean.
- b. Jim wore the jacket wet.
- c. Jim considered Mary stupid.

Although the sentences in (2) share the same surface word order configuration, Subj-Verb-Object-Adjective, only (2a) is considered as an instance of the resultative construction since this meets the semantic constraint of resultatives, namely the object’s change of state or location induced by the subject’s action (i.e., Jim washed the jacket, and as a result, the jacket became clean). In contrast to (2a), the other two sentences do not involve a resultative meaning: The status of *the jacket* being wet in (2b) is not caused by Jim’s action of wearing it, and the state of *Mary* in (2c) has little to do with the consequence of Jim’s action of considering. The semantic asymmetry among the sentences in (2), in spite of their structural proximity, points to the need for considering both syntactic and semantic properties in characterizing resultatives.

Goldberg and Jackendoff (2004) provide a fine-grained analysis of the resultative construction by elaborating it in terms of two subevents: the verbal subevent contributed by the verb and the constructional subevent contributed by the construction. According to their account, these two subevents interact with each other to deliver a single event in such a way that “the verb subevent is the means by which the constructional subevent takes place” (p. 538). For example, the sentence *Tom drunk*

*himself stupid* denotes a resultative meaning by integrating the constructional meaning of “Tom caused himself to be stupid” and the verbal meaning of “by drinking.”

Depending on the structural and semantic properties of the constructional subevent, Goldberg and Jackendoff (2004) classify resultatives into four types aligned in two dimensions, as illustrated in (3).

- |                                    |                                      |
|------------------------------------|--------------------------------------|
| (3) a. Tom painted the wall white. | (Transitive; property resultative)   |
| b. Jim hit the ball into the hole. | (Transitive; spatial resultative)    |
| c. The water froze solid.          | (Intransitive; property resultative) |
| d. The stone sled down the hill.   | (Intransitive; spatial resultative)  |

First, resultatives are split into ‘property’ and ‘spatial’ resultatives depending on whether a resultative phrase depicts a change of state or a change of location. For example, the transitive property resultative in (3a) denotes that the state of *the wall* becomes *white* as a result of Tom’s *painting*, and the intransitive property resultative in (3c) depicts the state of *the water* becoming *solid* through the event of *freezing*. On the other hand, the resultative phrase in the spatial resultative expresses the change of location of a theme resulting from an agent’s action or an event. For instance, in (3b) and (3d), *the ball* and *the stone* undergo a change of location as a result of the agent *Jim*’s action and the *sliding* event, respectively.

The resultative constructions are also divided into intransitive and transitive resultatives depending on whether the construction involves a causing event. For example, the sentences (3a) and (3b) are categorized as transitive resultatives because they involve an agent instigating an action to cause the theme to change state or location. The sentences (3c) and (3d), on the other hand, are examples of intransitive resultatives since there is no explicit agent that gives rise to the change of state or location of the theme.

In sum, the four types of resultatives are distinguished from one another in terms of both semantic and syntactic properties. The resultatives denoting a change in the state, as in (3a) and (3c), involve an adjective or a figurative particle (e.g., *down* meaning *disappointed*, as in *Tom let me down*) in the resultative phrase, whereas the resultatives denoting a change of location, as in (3b) and (3d), project a prepositional phrase or a spatial particle (e.g., *down* meaning *downward movement*, as in *Jane went down*) as a resultative phrase. On the other hand, transitive (3a-b) and intransitive resultatives (3c-d) include different argument structure configurations, involving two nominal arguments and one nominal argument, respectively.

### 3. Usage-based Acquisition of Resultatives

The L1 acquisition of resultatives has been captured within the usage-based linguistic framework (Barlow and Kemmer 2000; Bybee 2008; Croft 2001; Ellis 2008; Goldberg 1995, 2006; Kay and Fillmore 1999; Langacker 2000; Tomasello 2003). Usage-based linguistic theories describe language development as gradual generalizations from accumulating repertoires of pattern-based formulaic expressions through language use. Learning of formulaic expressions and formal generalizations are primarily determined by the quantity and quality of target language input. For example, during an early stage of L1 acquisition, a child starts to pick up information of individual linguistic items in their memory, mostly confined to highly frequent and structurally simple expressions (Braine 1976; Cameron-Faulkner Lieven and Tomasello 2003; Childers and Tomasello 2001; Tomasello 1992). For example, Childers and Tomasello (2001) demonstrated that English-speaking children aged 2 and half years learned to use simple transitive constructions such as *He's [verb]-ing it*. In particular, children at this stage preferred to use basic verbs such as *do*, *have* and *want* in their production of transitive constructions, suggesting that English-speaking children “use verb consistency to facilitate acquisition of the transitive” (p. 64).

The usage-based model predicts that the acquisition of complex constructions is protracted in the developmental process, due to its low input frequency, inconsistent lexical entries, and collocational restrictions (Boas 2003). The best illustration of such cases is the acquisition of the resultative construction. In English, resultatives are less frequent than other constructions such as simple transitives and ditransitives (Snyder 2001). This construction also can integrate with various types of lexical verbs, including those that do not inherently denote a resultative meaning, such as *drink* (e.g., *Tom drank the pub dry*), *wipe* (e.g., *John wiped the table clean*), and *hammer* (e.g., *Mike hammered the wall down*). At the same time, the resultative construction requires that certain verbs be paired with only a certain type of resultative phrase, imposing collocational restrictions on the use of the target construction. In the analyses of the BNC corpus, for example, Boas (2003) found that the resultative use of the verb *wipe* almost always included the resultative phrase meaning ‘removal of an unwanted substance.’

The difficulty of acquiring the resultative constructions, particularly the transitive ones, has been attested by two studies on L1 acquisition. First, Snyder (2001) analyzed the spontaneous speech from twelve children aged of 1;4 and 2;6 in the CHILDES database and found that the occurrence of the transitive resultative

constructions was severely restricted, presumably due to their “extremely low frequency” in input (p. 327). Similarly, Sethuraman (2002) investigated young children’s (mean age of 2;4) production of English resultative constructions in the Bates Corpus and found that the children produced fewer number of transitive resultatives than other constructions.

The usage-based model also explains the expansion of verbs employed in target constructions as children progress from item-based learning to acquiring complex constructions. Under this model, a child’s early use of constructions is characterized by the use of a limited set of highly frequent verbs with general and less specific semantic features (Akhtar 1999; Akhtar and Tomasello 1997; Bates and MacWhinney 1987; Goldberg et al. 2004; Ninio 1999; Pinker 1989; Tomasello 1992). At this stage, the use of high-frequency verbs closely associates with the range of constructions that the verbs appear in (e.g., *want* in the transitive, *go* in the intransitive, and *give* in the ditransitive construction). This item-based or verb-centered language learning in early stages is followed by the rule-based stage where L1 speakers have established abstract knowledge of constructions from language experiences. It is at this stage that language users begin to integrate a wide range of verbs with semantically compatible constructions (Ellis 2008; MacWhinney 2008; Tomasello 2003), often producing creative verb-construction pairing as in *Frank sneezed the tissue off the table* and *Mary urged Bill into the house* (Goldberg 1995).

This usage-based account of verb usage has been validated in the L1 acquisition of the resultative construction. Sethuraman (2002) found that young children relied strongly on high frequency verbs with semantically light contents, such as *get*, *come*, *make*, *have*, and *put*, in their production of resultatives. Beyond this early item-based phase, usually sometime after the third birthday (Tomasello 2003), children make generalizations and abstractions about the form-meaning pairing of the resultative construction, as evidenced by the novel and productive use of the construction, e.g., *Are you washing me blind?* and *You’re combing me baldheaded* (Bowerman 1982). Children’s novel and creative use of the verbs in the resultative construction indicates that they have reorganized their knowledge of independently learned items and established abstract constructional schema through generalizations over numerous instances of tokens. With a substantial exposure to resultatives, children at this stage are able to recalibrate their linguistic knowledge for specific semantic and syntactic constraints on the use of the construction (Boas 2003; Richter and van Hout 2013).

Taken together, the basic principles and predictions of usage-based approaches can provide a reasonable account for the L1 acquisition of the resultative construction.

The usage-based model predicts that the low frequency and high variability of the resultative construction make it more difficult to learn and use the target construction compared to other constructions. In addition, it predicts step-wise phases for the use of verbs in the resultative construction, which progresses from using prototypical, high-frequency verbs to using non-prototypical verbs. These usage-based approaches to the learning of resultative constructions, however, have not been tested in the context of L2 acquisition, which involves various usage-related characteristics such as limited L2 exposure, proficiency, and learning channel (e.g., immersive learning vs. classroom exposure).

#### 4. The Present Study

The usage-based acquisition of English resultatives leads to a question as to whether L2 developmental process follows a similar trajectory as L1 acquisition. To address this question, the present study explores usage patterns of resultatives in argumentative essays written by Korean EFL learners at different proficiency levels. Specific research questions are summarized as follows:

- (A) Do the frequency and complexity of resultatives in EFL learners' essays account for a significant amount of variation among different proficiency levels?
- (B) Do EFL learners expand their choice of verbs in the use of resultative construction as their proficiency increases?

The first research question rests on the observation that the resultative constructions are highly infrequent in both L1 (e.g., Snyder 2001) and L2 input (e.g., Whong-Barr 2005) and are structurally complex. To the extent that input frequency and complexity determine the relative difficulty of acquiring target constructions (e.g., Ellis 2012), this study predicts that the resultative construction significantly contributes to distinguishing learner proficiency compared to other constructions. Among the four types of resultatives (i.e., transitive and intransitive resultatives denoting a change of property or a change of location), we predict that the more complex and less frequent transitive resultatives will explain more variance of proficiency. Testing this prediction will help establish whether EFL learners also follow the step-by-step process like L1 children, moving from acquiring simple, highly frequent constructions to establishing representations of complex, less frequent constructions.



The second question focuses on the learners’ ability to integrate a verb with a target construction. Based on the usage-based perspective that extensive experience with a target construction allows one to build an abstract representation beyond item-level acquisition (e.g., Bencini and Goldberg 2000; Goldberg et al. 2004), we predict that proficient learners are more likely than less proficient learners to employ a wide variety of verbs including those that do not typically appear in the target constructions.

4.1. Data

The study involved 156 written essay samples produced by native and nonnative English speakers. We collected 117 L2 data from Yonsei English Learner Corpus (YELC, S-C Rhee and CK Jung 2012), which consisted of argumentative essays produced by college-level Korean-speaking EFL learners. The L2 essays were rated by trained native English speakers in terms of vocabulary, grammar, organization and coherence of a text, and then classified into different proficiency levels according to the Common European Framework of Reference for Languages (see Verhelst et al. 2009 for the reference guideline). For the current analysis, 39 essays were selected from each level of beginner (L2-B), intermediate (L2-I) and advanced (L2-A). In addition to the L2 samples, 39 argumentative essays produced by native speakers were selected from the Louvain Corpus of Native English Essays (Granger, Sanders and Connor 2007) and served as a control group (NS). Table 1 summarizes the corpus information for L2 learners at each proficiency level as well as for native speakers.

**Table 1.** Information of learner and native corpus

	Beginner (L2-B)	Intermediate (L2-I)	Advanced (L2-A)	Native speaker (NS)
Number of samples	39	39	39	39
Number of words	8,539	10,115	11,651	16,584
Number of clauses	698	682	724	1,556

4.2. Analysis 1: Frequency and complexity of resultatives as a predictor of L2 proficiency

The first analysis focused on the first research question and investigated how the

frequency of resultatives contributes to the prediction of L2 learners' proficiency. Based on the observations in L1 acquisition that the English resultative constructions are complex and highly infrequent in input and thus acquired later compared to other constructions (e.g., Snyder 2001), we predicted that L2 learners at low proficiency will have difficulty producing these constructions, whereas L2 learners with higher proficiency will show an increased number of resultatives. As a consequence, the frequency and complexity of the resultative constructions will significantly contribute to the prediction of L2 proficiency compared to other constructions. Moreover, it is probable that the predictive power among the different types of resultative constructions will be contingent on their relative complexity and frequency in such a way that the more complex and less frequent *transitive* resultatives will have a stronger predictive power than the less complex and more frequent *intransitive* resultatives. To test these predictions, a multiple regression analysis was carried out, with occurrences of four resultative and four non-resultative constructions as predictors and proficiency levels (beginner, intermediate, advanced, and native speaker) as a dependent variable. We examined the extent to which the relative coefficients of the variables predict the proficiency levels in written production.

#### 4.2.1. Variable selection and coding procedure

We inspected each sentence in the essay samples and identified a total of eight major types of English argument structure constructions as specified in Construction Grammar (Goldberg 1995, 2006). These constructions include transitive resultatives denoting a change in object's state (TR-S, e.g., *Tom painted the wall white*) or location (TR-L, e.g., *Jim hit the ball into the hole*), intransitive resultatives denoting a change in subject's state (IR-S, e.g., *The water froze solid*) or location (IR-L, e.g., *The stone sled down the hill*), intransitive construction (INT, e.g., *The sun rose*), simple transitive construction (ST, e.g., *Jane saw the dog*), ditransitive construction (DI, e.g., *Nancy gave Joe some money*), and periphrastic causative construction (CT e.g., *Mary made John wash the dishes*). While Construction Grammar characterizes each of these constructions as an individual unit distinct from one another in terms of form and meaning (Goldberg 1995), the four resultative types are closely associated with one another, as reviewed earlier. We thus analyzed the eight constructions as individual variables, while paying particular attention to the four resultative-type constructions, to address our research questions. Across the three proficiency groups, the occurrences of these eight constructions were counted in the written samples. To ensure that

the analysis included only the cases that reflect participants' knowledge of these constructions, we discounted errors irrelevant to the constructional knowledge, such as misspelling, incorrect use of tense and agreement morphemes in a verb, omission or incorrect use of articles, and omission of the plural morpheme for a plural noun phrase. Table 2 shows the frequency count for each construction.

**Table 2.** Mean number of target constructions (standard deviations) in the essays of each group

Construction	Count by group			
	L2-B (n = 39)	L2-I (n = 39)	L2-A (n = 39)	NS (n = 39)
TR-S	0.2 (0.7)	0.5 (0.9)	1.3 (1.3)	0.8 (0.9)
TR-L	0.2 (0.5)	0.4 (0.8)	1.2 (1.3)	2.1 (1.7)
IR-S	0.5 (0.9)	1.1 (1.4)	1.0 (1.3)	0.8 (1.0)
IR-L	0.6 (1.7)	0.4 (0.9)	0.8 (1.1)	0.7 (0.7)
CT	0.4 (0.7)	0.7 (0.9)	1.1 (1.2)	0.9 (0.9)
DI	0.3 (0.6)	0.3 (0.5)	0.4 (0.7)	0.9 (1.2)
INT	4.3 (2.8)	4.5 (3.1)	5.9 (3.9)	6.0 (2.2)
ST	18.5 (6.5)	19.4 (5.8)	23.4 (4.9)	25.5 (5.5)

#### 4.2.2. Results

We conducted a multiple regression analysis, with frequencies of the eight target constructions as predictors and proficiency groups as a dependent variable. Prior to data analysis, the occurrences of the eight construction types across groups were normalized through arcsine transformation. This was done because frequency-based data often fail to meet the normal distribution requirement, and transforming raw frequencies to arcsine-square-root proportions makes the data more suitable for a regression analysis (e.g., Sokal and Rohlf 1995). The arcsine-transformed values were then submitted to a multiple regression analysis as variables predicting the proficiency levels.

Before running the analysis, multicollinearity was checked across the selected variables. As diagnostics of multicollinearity, a correlation and a variance inflation factor (VIF) were inspected for each pair of the variables. A sign of multicollinearity is generally indicated by high pairwise correlations ( $|r|>.65$ ) (Wolfe-Quintero,

Inagaki and H-W Kim 1998) and/or by a VIF of 5 or above (O'Brien 2007). For our eight constructional variables, Pearson correlation tests revealed that none of the variables highly correlated with each other (all  $|r/s| < .40$ ), and the VIFs for all pairs of the variables were less than 2, suggesting that these variables are free from any multicollinearity problem. As a result, all eight variables were used as predictors in the regression analyses.

Outcomes of the regression model indicated that the model was statistically significant at the alpha level of .05,  $F(8, 155) = 21.606$ ,  $p < .001$ , with the total variance ( $R^2$ ) of .540. These results suggest that the regression model including all eight variables predicted the group differences quite reliably. While the overall model was found to be significant, however, coefficients for the individual constructions demonstrated different results, with varied degrees of contributions among the variables. As shown in Table 3, statistical significance was found for the coefficients of three resultative constructions, TR-L ( $t(155) = 6.661$ ,  $p < .001$ ), TR-S ( $t(155) = 3.599$ ,  $p < .001$ ), and IR-L ( $t(155) = 2.392$ ,  $p = .018$ ). Among the non-resultative type constructions, ST ( $t(155) = 5.534$ ,  $p < .001$ ) and DI ( $t(155) = 2.064$ ,  $p = .041$ ) showed significant coefficients. Marginal significance was found for CT ( $t(155) = 1.920$ ,  $p = .057$ ) and for INT ( $t(155) = 1.828$ ,  $p = .070$ ), and there was no statistical difference among proficiency groups for IR-S ( $t(155) = 0.761$ ,  $p = .448$ ).

When the relative predictive power indicated by each standard coefficient was compared across the eight constructions, the two transitive resultative constructions,

**Table 3.** Summary of regression analysis

Predictors	Unstandardized coefficients		Standardized coefficients	<i>t</i>	Sig.
	Beta	Std. Error	Beta		
(Constant)	-1.110	.438		-2.534	.012
TR-L	.600	.090	.395	6.661	< .001
ST	.505	.091	.324	5.534	< .001
TR-S	.355	.099	.208	3.599	< .001
IR-L	.239	.100	.138	2.392	.018
DI	.239	.116	.121	2.064	.041
CT	.190	.099	.110	1.920	.057
INT	.164	.090	.107	1.828	.070
IR-S	.071	.094	.044	0.761	.448

TR-L and TR-S, and the simple transitive construction contributed the most to the model (standardized coefficient of .395, .208, and .324 respectively). The other predictors were found to be less contributive: IR-L (standardized coefficient of .138), DI (standardized coefficient = .121), CT (standardized coefficient = .110), INT (standardized coefficient = .107) and IR-S (standardized coefficient = .044).

In order to establish that the strong predictive power of the resultative constructions stems from variations in learner proficiency, not attributable entirely to significant gaps between the learners and the native speakers, we further conducted a regression analysis including only the three L2 groups. As in the previous model, the eight constructional variables were entered into a regression model as predictors of proficiency. The learner model turned out to be statistically significant,  $F(8, 116) = 12.054$ ,  $p < .001$ , explaining the total variance ( $R^2$ ) of .472. As shown in Table 4, the model demonstrates variability in coefficients for the individual constructions. Statistical significance was found for coefficients of three resultative constructions, TR-S ( $t(116) = 5.100$ ,  $p < .001$ ), TR-L ( $t(116) = 3.586$ ,  $p = .001$ ), and IR-L ( $t(116) = 2.348$ ,  $p = .021$ ). Among the non-resultative type constructions, only ST showed a significant coefficient ( $t(116) = 4.012$ ,  $p < .001$ ). Marginal significance was found for IR-S ( $t(116) = 1.946$ ,  $p = .070$ ) and for CT ( $t(116) = 1.830$ ,  $p = .070$ ), and there was no statistical difference among proficiency groups for DI ( $t(116) = 0.822$ ,  $p = .413$ ) and INT ( $t(116) = 1.069$ ,  $p = .288$ ).

When relative predictive power indicated by each standard coefficient was compared across the target constructions, TR-S and ST contributed the most to the

**Table 4.** Summary of regression analysis including L2 groups only

Predictors	Unstandardized coefficients		Standardized coefficients		<i>t</i>	Sig.
	B	Std. Error	Beta			
(Constant)	-.328	.389			-0.844	.401
TR-S	.457	.090	.371		5.100	< .001
ST	.330	.082	.291		4.012	< .001
TR-L	.335	.093	.261		3.586	.001
IR-L	.211	.090	.171		2.348	.021
IR-S	.165	.085	.141		1.946	.054
CT	.167	.091	.133		1.830	.070
INT	.081	.076	.077		1.069	.288
DI	.100	.122	.060		.822	.413

learner model (standardized coefficient of .371 and .291, respectively), followed by TR-L (standardized coefficient of .261) and then by IR-L (standardized coefficient of .171) and IR-S (standardized coefficient = .141). The other predictors were found to be less contributive: CT (standardized coefficient = .133), INT (standardized coefficient = .077), and DI (standardized coefficient = .060).

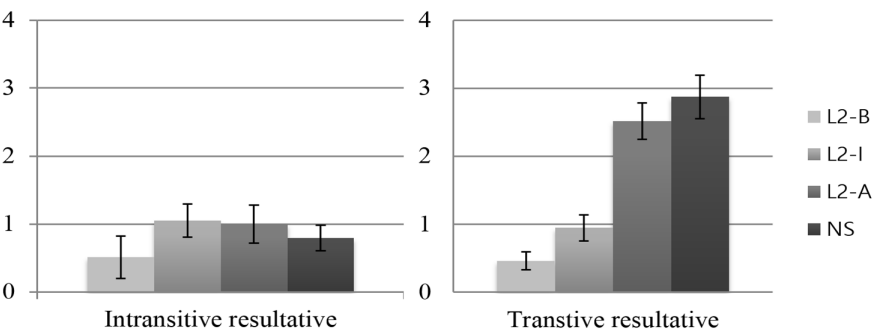
Overall, the results of the regression analyses demonstrated that among the eight constructions investigated, the transitive resultative constructions – TR-S and TR-L – significantly contributed to the prediction model with the strongest predictive power, both in the model including all four groups and in the model including only L2 learners. These results indicate that learners were more likely to produce the transitive resultative constructions as their proficiency was higher. Among the different types of resultative constructions, the transitive ones had greater predictive powers than the intransitive ones, confirming our prediction that the transitive resultative constructions will explain more variance of proficiency than the intransitive resultative constructions. Unexpectedly, ST also showed a strong predictive power. Considering that ST is one of the highly frequent, simple constructions, this result appears inconsistent with our prediction that constructions with more frequency and less complexity will be less likely produced as learner proficiency rises. Other than this unexpected finding, the results of the regression analyses support our prediction that the transitive resultative constructions give rise to a better prediction of the proficiency levels than other constructions by virtue of their complexity and low frequency in input.

To see how much variation exists in the production of resultatives among the proficiency groups, we compared the number of the two resultative types – transitive and intransitive – across the groups. Table 5 presents mean occurrences of the two types of constructions across the four groups, followed by a graphical illustration in Figure 1. For statistical analyses, the numbers of intransitive and transitive resultatives obtained from the sample essays were transformed into arcsine values in the same manner as in the previous regression analyses. The arcsine-transformed proportions were analyzed in a 2×4 mixed ANOVA, with *Construction type* (intransitive, transitive resultatives) as a within-group variable and *Group* as a between-group variable.

The results of the ANOVA revealed a main effect of *Group*,  $F(3, 152) = 24.147$ ,  $p < .001$ ,  $\eta_p^2 = .323$ , with more instances of target constructions with increasing proficiency. No main effect of *Construction type* was found,  $F(3, 152) = 1.311$ ,  $p = .254$ ,  $\eta_p^2 = .009$ . Crucially, there was a significant interaction between *Group* and *Construction type*,  $F(3, 152) = 6.020$ ,  $p = .001$ ,  $\eta_p^2 = .106$ , indicating that the differences

**Table 5.** Mean numbers and SDs for intransitive and transitive resultatives across groups

Group	Intransitive 4tive				Transitive resultative			
	L2-B	L2-I	L2-A	NS	L2-B	L2-I	L2-A	NS
Mean	1.1	1.4	1.8	1.5	0.5	0.9	2.5	2.9
Std. deviation	1.9	1.5	1.7	1.2	0.8	1.2	1.7	2.0



**Figure 1.** Mean numbers of intransitive and transitive resultatives produced by the four groups; error bars denote 95% confidence intervals

in the number of target constructions across the four groups varied along the two types of resultatives. To unpack this interaction, we conducted post-hoc comparisons by each construction type. Due to multiple comparisons, the alpha level was adjusted to .025 (0.5/2). Results of the by-construction analyses showed that there was a significant between-group difference in the transitive resultative construction,  $F(3, 152) = 30.680, p < .001, \eta_p^2 = .377$ , but not in the intransitive resultative construction,  $F(3, 152) = 2.878, p = .038, \eta_p^2 = .054$ , at the adjusted alpha level. These results suggest that while all groups produced intransitive resultatives in similar proportions, the number of transitive resultatives significantly differed across the groups. Tukey HSD post-hoc comparisons further revealed that the number of transitive resultatives was significantly higher in the NS group than in the L2-B ( $p < .001$ ) and L2-I groups ( $p < .001$ ), yet the number was not significantly different between the NS and L2-A groups ( $p = .864$ ). Among the L2 groups, the L2-A group differed significantly from the L2-B ( $p < .001$ ) and L2-I groups ( $p < .001$ ), but there was no significant difference between the L2-B and L2-I groups ( $p = .170$ ). These results indicate that the advanced learners and the native speakers produced significantly more numbers of

transitive resultatives than the beginner and intermediate learners.

In sum, the participants' production of the transitive and intransitive resultative constructions demonstrated a distinct pattern in terms of input frequency and structural complexity of the constructions. The learner groups produced less complex, more frequent intransitive resultatives in the same manner as the native speakers, indicating that this construction is acquired relatively early in the course of constructional development. In contrast, the number of transitive resultatives was noticeably different across groups: The L2-B and L2-I groups produced this construction less frequently compared to the L2-A and NS groups. It appears that the transitive resultative construction posed particular difficulties for the beginner and intermediate learners, but not for the advanced learners who were deemed to have established sufficient constructional knowledge to produce as many of target constructions as the native speakers. These results are consistent with the outcomes of the regression analyses that the transitive resultative construction contributed the most to the group variance. Overall, our findings support the predictions that the resultative construction will demonstrate stronger predictive power than other constructions and that L2 learners will produce more instances of complex constructions, such as transitive resultatives, as their proficiency level increases. This indicates that input frequency and constructional complexity may be an important indicator of L2 proficiency, suggesting that L2 acquisition of resultatives follows a similar process as that in L1 speakers, consistent with the usage-based account of language learning.

#### 4.3. Analysis 2: Verb types in resultatives

Our second research question is concerned with changes in the verb types as learners progress from item-based or verb-centered acquisition to formulation of abstract constructional knowledge. Previous research on L1 acquisition proffered evidence that young children tend to rely heavily on a limited set of high frequency verbs (e.g., Goldberg et al. 2004; Ninio 1999). In contrast, adults are found to have an ability to apply abstract constructional knowledge in sentence processing, regardless of specific verbs involved in a sentence (e.g., Bencini and Goldberg 2000; Robenalt and Goldberg 2015). We explored whether a similar developmental process is found in the EFL learners' production of the resultative constructions by examining the verb types employed in the target constructions by each proficiency group. Our specific prediction follows that less proficient learners will show dominant reliance on a small number of high frequency verbs, just as L1 children do, whereas advanced



learners will utilize a broad range of verbs to produce resultatives, indicating that they have established abstract knowledge of the target constructions.

4.3.1. Variable selection and coding procedure

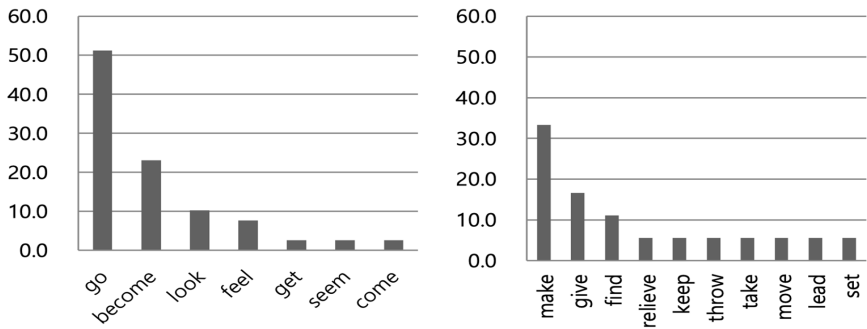
As in the previous analysis, resultatives in participants’ essays were divided into two types by complexity – intransitive and transitive resultatives. Tokens of verbs that appeared in each construction type were counted across the learner groups (L2-B, L2-I, L2-A) as well as for the native speaker group. We also calculated frequency of each verb based on the corpus from Centre for Lexical information (CELEX).

4.3.2. Results

Table 6 displays information of the verbs employed by each group. Results showed that the advanced learners and native speakers tended to use less frequent verbs than the beginner and intermediate learners. We compared verb usage patterns across the groups by focusing on verb types and frequency.

**Table 6.** Information of verbs for intransitive and transitive resultatives across groups

Group	Intransitive resultative				Transitive resultative			
	L2-B	L2-I	L2-A	NS	L2-B	L2-I	L2-A	NS
Mean CELEX word frequency	2.92	2.58	2.22	2.38	2.44	2.57	2.13	2.08
Number of verb types	7	14	23	20	10	12	35	63



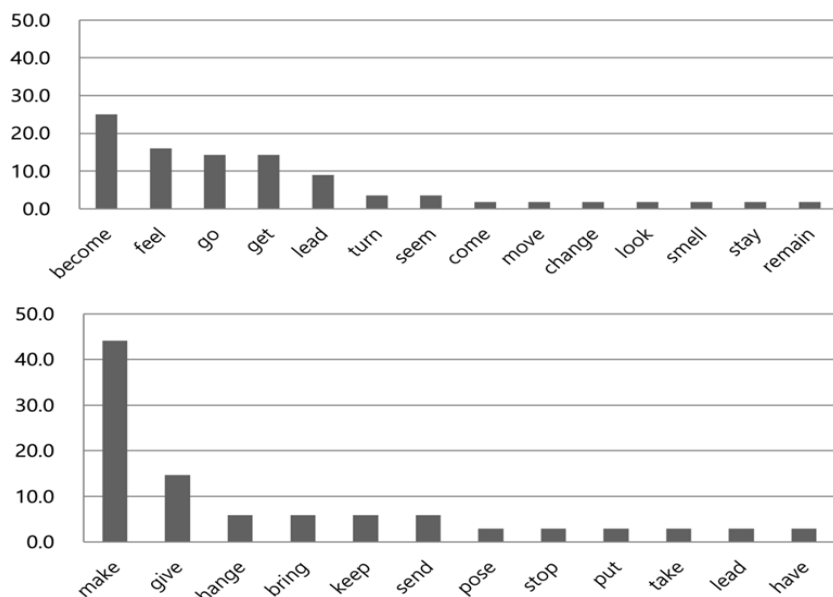
**Figure 2.** Percentage (%) of verbs used in the intransitive (left) and transitive (right) resultatives for the L2-B group

Let us first focus on the L2-B group. This group used only seven verbs for intransitive and ten verbs for transitive resultatives (see Figure 2). In particular, the learners in this group showed dominant reliance on high frequency verbs such as *go* (e.g., *We might **go** to the jail because of our misunderstood-advice for him*) and *make* (e.g., *Physical punishment and other punishment could **make** things better if they collaborated*). These results are consistent with the verb usage patterns observed in L1 speaking children who overextend a small set of high frequency verbs in diverse constructions (e.g., Ninio 1999). As shown in Table 6, the mean CELEX frequency in this group (2.92 for the intransitive; 2.44 for the transitive resultatives) was relatively higher compared to that in any other group.

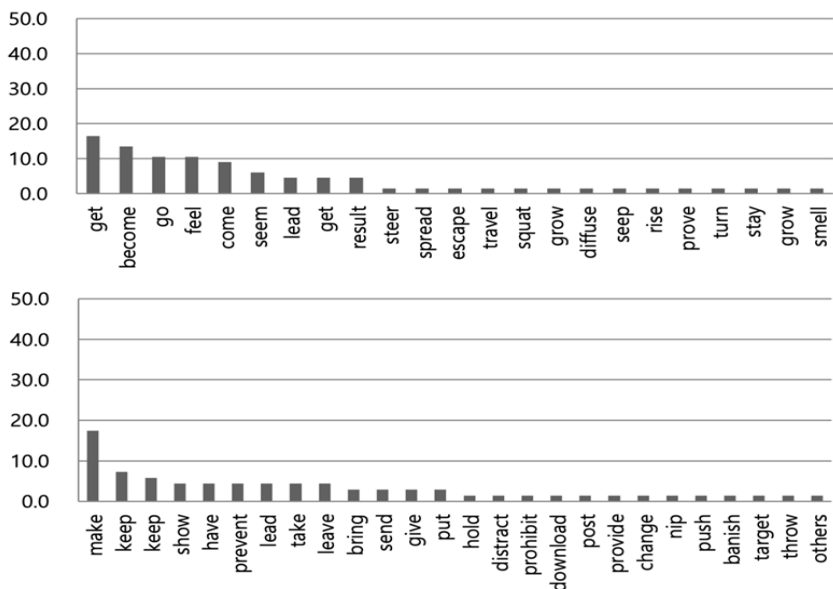
A similar tendency was found for the L2-I group, who was largely dependent upon a limited number of verbs in their production of resultatives: They used 14 verbs for intransitive and 12 verbs for transitive resultatives (see Figure 3). This group most dominantly used *become* (e.g., *Bad children **become** worse when they received physical punishments*) for intransitive and *make* (e.g., *Physical punishment only **makes** situation worse*) for transitive resultatives. The mean CELEX verb frequency for intransitive resultatives (2.58) was lower than that of the beginner group, but the mean of the verbs for transitive resultatives (2.57) was similar to that of the beginner group (see Table 5).

Compared to the small number of verbs employed by the beginner and the intermediate learners, the L2-A group utilized a much wider range of verbs: 23 verbs for intransitive and 35 verbs for transitive resultatives (see Figure 4). In particular, this group used verbs that do not typically appear in the resultative construction, such as *steer* (e.g., *having to **steer** abruptly out of the way*) and *hold* (e.g., *one arm must be **held** stiff*), indicating their ability to creatively use various verbs in the resultative constructions. Not only the selection of the verbs was widely distributed, their frequency was also lower compared to that in the beginner and intermediate groups. The mean CELEX word frequency for the verbs in the L2-A group was very low, with 2.22 for intransitive and 2.13 for transitive resultatives.

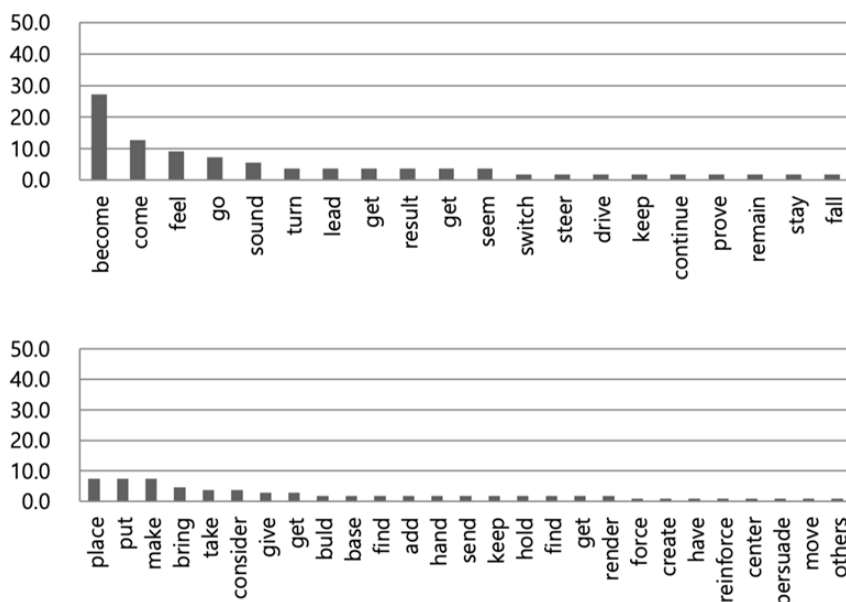
Finally, the native speaker group also showed a wide distribution of verb usage, employing 20 types of verbs for intransitive and 63 types of verbs for transitive resultatives (see Figure 5). Compared with the L2-A group, the CELEX frequency of the verbs used for intransitive resultatives (2.38) was slightly higher, but the CELEX frequency of the verbs for transitive resultatives (2.08) was lower, suggesting that the native speakers, like the L2-A group, used many low-frequency verbs in their production of resultatives.



**Figure 3.** Percentage (%) of verbs used in the intransitive (up) and transitive (down) resultatives for the L2-I group



**Figure 4.** Percentage (%) of verbs used in the intransitive (up) and transitive (down) resultatives for the L2-A group



**Figure 5.** Percentage (%) of verbs used in the intransitive (up) and transitive (down) resultatives for the NS group

In summary, the analyses of the verb types demonstrated distinct patterns across the groups. The L2-B and L2-I groups showed a heavy dependency on a small number of high frequency verbs, whereas the L2-A and NS groups employed a wide range of verbs, including those with low frequency. These findings clearly reflect the transitional aspects of the development of English resultatives in the EFL learners, showing item-based acquisition with strong reliance on high frequency verbs among the lower-proficiency groups, as well as establishment of abstract constructional knowledge as evidenced by the integration of a variety of verbs among the advanced group.

## 5. Discussion and Conclusion

The primary goal of this study was to characterize the general process of the EFL learners' acquisition and use of the English resultative constructions on the basis of the usage-based principles by examining their production patterns in argumentative essays aligned at different proficiency levels. In light of the usage-based theoretical

framework, this study addressed two key questions that apply to the L2 acquisition of English resultatives: a) gradual development of resultative constructions and b) transition in verb usage from item-based to construction-based stages. In the corpus-based analyses, we found that the frequency count of the resultative constructions — in particular, the transitive resultative constructions — predicted proficiency differences among the EFL learners more strongly than non-resultative constructions, and the range and frequency of the verbs used in the resultative constructions differed across the proficiency levels. In this section, we discuss how these results are aligned with the usage-based theories of language development.

First, the outcomes of the regression analyses showing that the two transitive resultative constructions – TR-S and TR-L – demonstrated a stronger prediction of L2 proficiency compared to other constructions (except for ST) suggest that the transitive resultative constructions may serve as a good index of language development. The distinct tendency across the groups, namely that less proficient learners produced fewer number of transitive resultatives and the number grew with increasing proficiency, clearly mirrors the usage-based production pattern by L1 speaking children, who seldom produce the target constructions in early stages of language learning (e.g., Snyder 2001). It appears that the ability to produce the transitive resultatives requires a certain level of proficiency or language experience, as indicated by the advanced learners in this study who supplied a significantly greater number of the target constructions than the beginner and intermediate learners. To the extent that the EFL learners' proficiency reflects their amount of language experience (e.g., Luk and Bialystok 2013), our findings suggest that it is accumulated language usage that facilitated the production of the target constructions for the advanced learners, a finding compatible with the main tenet of usage-based approaches (e.g., Ellis 2008).

It is noteworthy that group differences in the production of resultatives were more prominent in the transitive than intransitive resultatives. In the regression analyses, the two transitive resultatives – TR-S and TR-L – exhibited stronger prediction powers than the intransitive ones. In the ANOVA analysis, a significant group difference was found only in the transitive resultative constructions, but not in the intransitive resultative constructions. These production patterns are reminiscent of the lack of an ability to produce less frequent, complex constructions in L1 children, who prefer simple item-based expressions to conceptually and structurally more complex constructions. It seems that the beginner and intermediate learners in our study had less difficulty at least in producing the intransitive resultatives (but see below for a discussion of their difficulties with the use of various types of verbs

in this construction). When producing these constructions, learners are assumed to have few cognitive demands as the production of these constructions requires a simple argument structure (i.e., a subject and a subject oblique) and a single meaning concerning the movement or state of the theme. Such simple semantic and syntactic structure may be easily learned as chunks and used repeatedly without cognitive difficulties (e.g., Tomasello 2003).

The situation is different, however, in the production of the transitive resultative constructions. Not only should learners manage a greater number of arguments including a subject, an object, and an object oblique, they also need to consider causal relations between a subject and an object and integrate this information with additional meanings regarding object's change of state or location. Due to such complex structures and meanings, the transitive resultatives are known to constitute a great challenge to L2 learners with low or intermediate proficiency in sentence comprehension (e.g., J-H Lee and HM Kim 2011; YO Rah 2014; YO Rah and HW Kim 2018; Whong-Barr 2005). Similarly, the beginner and intermediate learners in our study demonstrated persistent difficulties with transitive resultatives, indexing their lack of sufficient knowledge to produce the constructions.

In contrast to the beginner and intermediate learners, the advanced learners produced the transitive resultative constructions as often as the native speakers, suggesting that these learners had sufficient knowledge of the target constructions through extensive language experience. According to usage-based language learning, increased language experience enables learners to become more aware of different levels of complexity and abstraction of constructions, leading to the development of cognitive abilities to utilize competence based on their accumulated language experiences of "language use and the frequency-biased abstraction of regularities" (Ellis and Ferreira-Junior 2009: 188). If we assume that language experience drives development of constructional knowledge, we may expect that the beginner and intermediate learners who had difficulties with the transitive resultatives will eventually advance toward producing more instances of these constructions, as indicated by the advanced group.

The important role of proficiency or language experience was also evinced in the way that learners employed specific verb types in the resultative constructions. We found that the beginner and intermediate learners restricted their selection of verb to a small number of high frequency verbs, whereas the advanced learners and the native speakers adopted diverse types of verbs with lower frequency. The limited use of verbs by the beginner and intermediate learners resembles the usage patterns

of L1 children who resort to a small set of high frequency verbs in their speech, and this tendency clearly reflects the item-based or verb-centered learning process. In contrast, the wide range of verbs used by the advanced learners indicates their ability to incorporate diverse verb types into their constructional knowledge. Indeed, many of the verbs produced by the advanced learners do not typically appear in the resultative constructions. For example, in the expression *one arm must be held stiff, and the head must be crooked sideways* (extracted from an essay in the advanced group), the verb *hold* does not carry a causative meaning by itself, yet nevertheless it is integrated with the transitive resultative construction and delivers the meaning of causation resulting from the action of the agent. This example shows that the advanced learner had the ability to extend a verb beyond its usual complement patterns and to integrate it with a resultative construction. The advanced learners' ability to supplement the semantic constraints of the verbs with constructional meanings may indicate their rich constructional knowledge. In other words, these advanced learners had established abstract constructional knowledge to incorporate diverse types of verbs including those whose meanings do not entirely overlap with the constructional meaning. These results support our prediction that EFL learners' production patterns of the resultative constructions reflect a usage-based developmental tendency similar to that of L1 children in which the verb-centered constructional acquisition in early stages develops into the establishment of abstract constructional knowledge with more language experience.

The overall results obtained from the current study shed light on teaching English resultatives to EFL learners. The fact that the number of the resultative constructions predicted proficiency levels across groups indicates that resultatives are difficult to acquire for the beginner and intermediate learners in this study. We attribute the scarcity of these constructions in the essays of beginner and intermediate learners primarily to a lack of input in the instructional setting (YO Rah 2014; YO Rah and HW Kim 2018). In light of this problem, teachers need to place an additional emphasis on the target constructions, especially on the transitive resultatives. For example, teachers may consider presenting plentiful examples of the target constructions in meaningful contexts, using images and visual scenes that denote resultative situations, or provide explicit instructions on the form and meaning of the resultative construction (e.g., YO Rah and HW Kim 2018; M-C Sung and H-K Yang 2016), so that they can help learners quickly go through the item-based learning process and move into formulating abstract knowledge of the target constructions.

In addition, the finding that the beginner and intermediate learners in our study

showed a restricted use of verbs points to the need for teaching the relationship between the resultative constructions and the verbs that can integrate with these constructions. It appears that these lower-level learners had little problem using the verbs denoting a resultative meaning on their own such as *make* and *become* in resultatives, since these verbs not only coincide with the resultative constructions in terms of their meanings but also appear most frequently in the target constructions. However, these learners did not seem to notice that some verbs, which do not inherently signal a resultative meaning, can still be used in resultatives. For example, verbs such as *sneeze* and *drink* do not contain a resultative meaning but can be used in resultative sentences as in *John sneezed the tissue off the table* and *Mike drank the pub dry*. Given that such sentences are produced and comprehended through both constructional and verbal information, learners need to be directed to consider both verbal and constructional meaning, not simply relying on the verbal cue alone. In this regard, EFL teachers may need to focus on constructional cues when they present target constructions and emphasize that verbs with no resultative meaning can still be used in resultatives when the verbal meaning is supplemented by the constructional information. Such efforts are expected to raise students' awareness of constructional information and help them produce the resultative constructions without excessive reliance on verbs.

While we conclude that the current results lend support for the usage-based theories of language learning, we acknowledge some limitations of this study. First, our findings may also be explained by general L2 developmental patterns, not necessarily by the usage-based approach, whereby learners gradually progress from acquiring simple to complex components in several domains including lexis, morphology, syntax and pragmatics. Thus, one may interpret our findings in line of previous research showing general L2 learning processes. Nevertheless, we highlight implications of this study as advancing our knowledge of how particular constructions such as resultatives present production problems to EFL learners and how such problems are alleviated by increasing proficiency, a research question less well-understood in previous studies. Considering that English resultatives have received less attention compared to other grammatical points in the EFL setting, we expect our findings to raise awareness of teachers and students with regard to the importance of this complex construction. More importantly, we showed a close association between language proficiency and learners' ability to employ verbs with the resultative construction. While an integration of verb and construction has been widely investigated in L1 acquisition settings (e.g., Goldberg et al. 2004; MacWhinney



2008; Ninio 1999; Tomasello 2003), only few studies have looked at this issue in the EFL context (cf. Ellis 2008). In this study, therefore, we address the issue of verb-construction association in a more comprehensive way by involving specific types of constructions that have not been closely examined. Although our findings are by no means novel in terms of the usage-based approach and general perspectives of L2 development, we expect that our focus on the resultative construction and its association with a verb in L2 production will lead to various constructive and creative inquiries that can illuminate domains of L2 acquisition and development as well as studies applying the usage-based theories to L2 learning.

Another limitation of the study is that we only examined L2 learners' knowledge and use of resultatives in the domain of written production. While corpus-based investigations on written production allow for less intrusive examinations of learners' language use, the production-only data fall short of revealing learners' overall knowledge of the relevant constructions, making it difficult to draw generalizable conclusions from our findings. This problem may be solved by including various experimental tools that assess learners' knowledge in production as well as in comprehension, such as acceptability judgment tasks, elicited picture description tasks, and online processing tasks. We leave such attempts as future research.

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