

L1 Influence and Interface Effects in L2 English Unaccusatives*

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The Interface Hypothesis (Sorace, 2011; Sorace & Filiaci, 2006; Sorace & Serratrice, 2009; Tsimpli & Sorace, 2006, among others) states that the grammar external interface is more vulnerable for advanced L2ers or bilinguals than the grammar internal interface, and L1 discourse influence is one factor responsible for their residual difficulty (Sorace, 2005; Sorace, Serratrice, Filiaci & Baldo, 2009). Their study, however, did not disentangle interface effects from L1 influence and it is unclear whether the residual difficulty of advanced L2ers is due to interface effects or L1 influence. The results of the present study which teases the two factors apart show that L1 influence is stronger than interface effects. The results without L1 influence show that the syntax-discourse interface is more vulnerable than the syntax-morphology interface, supporting the Interface Hypothesis. This study examines two sets of data, cross-sectional and longitudinal, on overpassivization of L2 English unaccusative verbs by Chinese and Korean speakers.

Key words: Interface Hypothesis, grammar internal/external interface, L2 English unaccusative verbs, L1 influence, interface effects, discourse, verb alternation

1. INTRODUCTION

In recent years many researchers of second language acquisition (SLA) and bilingualism have put focus on incomplete or variable acquisition and claim that the grammar external interface is more vulnerable or problematic than the grammar internal interface (or narrow syntax) is, or not all interfaces pose the same level of difficulty in acquisition (Montrul,

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2011; Sorace, 2005; Sorace & Filiaci, 2006; Sorace & Serratrice, 2009; Tsimpli & Sorace, 2006). For example, Sorace and Filiaci (2006) claim that the syntax-semantic interface, the grammar internal interface, is not problematic for very advanced or near-native L2 speakers but the syntax-discourse interface, the grammar external interface, causes delayed development or difficulty in L2 or bilingual situations. This position is called the Interface Hypothesis (IH, hereafter).¹

The present study examines L2 English unaccusative verbs and investigates the interface effects and L1 influence in the acquisition of the construction by Korean and Chinese subjects. Two types of intransitive verbs were observed early by Perlmutter (1978): unaccusatives and unergatives. The single argument of an unaccusative verb is Theme (internal argument) while that of an unergative verb is Agent (external argument), but they both surface in subject position (Burzio, 1986; Perlmutter, 1978). And unaccusative but not unergative verbs allow resultative constructions (Levin & Rappaport-Hovav, 1995). It has been reported that L2 learners often overpassivize English unaccusative verbs regardless of their L1 backgrounds and several factors were proposed for causes for the overpassivization: NP movement (Zobl, 1989), L1 morphology (Hirakawa, 1995; Chung, 2014; Montrul, 1999), animacy (Chung, 2014; Pae et al., 2014), and a discourse factor (Chung, 2014; Ju, 2000). The current study will examine two factors, L1 morphology and a syntax-discourse interface factor, causing overpassivization.

The major goal of the present study is to find out which one of interface effects and L1 influence is stronger, which has not been examined yet in the literature. We will examine the two factors at the syntax-discourse and syntax-morphology interfaces, where L1 and L2 are different in the relevant morphology but not different in the discourse. We examine two types of data of overpassivization of L2 English unaccusative verbs by Korean and Chinese speakers. The cross-sectional study examines two L1 groups, Chinese (N = 99) and Korean (N = 117) speakers of L2 English, and the longitudinal study examines eight advanced Korean speakers of L2 English over a period of five years.

This paper is organized as follows. Section 2 introduces the IH and L2 English unaccusatives. Section 3 presents the research method and results of the cross-sectional study, and Section 4, those of the longitudinal study. Section 5 discusses the findings of the current study and Section 6 concludes the study.

¹ This hypothesis is also known as the Interface Vulnerability Hypothesis (Sorace, 2005; Sorace & Serratrice, 2009; Tsimpli & Sorace, 2006).

2. THE INTERFACE HYPOTHESIS AND L2 ENGLISH UNACCUSATIVES

2.1. The Interface Hypothesis

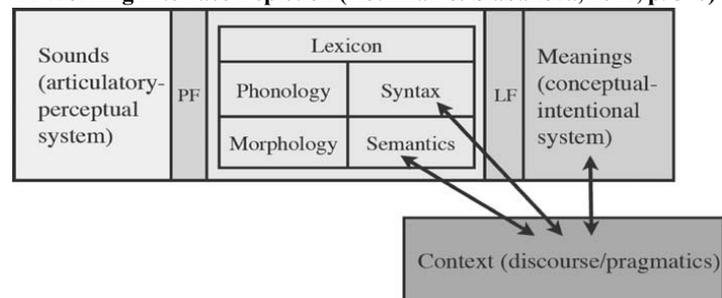
2.1.1. Interfaces in grammar and the Interface Hypothesis

The grammar consists of a lexicon and a computational system that has independent modules such as syntax, phonology, morphology and semantics, and the modules of the grammar interface since language is a relation between form and meaning (Chomsky, 1995; Jackendoff, 2002). The interfaces are shown in Figure 1, which is from Rothman and Slabakova (2011) who modified White (2009).

The interfaces between the modules such as the syntax-lexicon and the syntax-semantics are grammar internal, but the grammar must also interface with grammar external domains like the articulatory-perceptual system at phonetic form (PF) and the conceptual-intentional system (LF); the grammar external interfaces such as the syntax-discourse and semantics-discourse interfaces are indicated by arrows in Figure 1. Our perception and understanding of linguistic utterances is possible through the interface between the grammar and PF, and our contextual understanding of linguistic utterances is through the interface between the grammar and LF or contexts (discourse and pragmatics).

FIGURE 1

A Working Interface Depiction (Rothman & Slabakova, 2011, p. 570)



Recently SLA and bilingualism look into interface phenomena to account for L2ers' vulnerability or difficulties. Researchers (Sorace, 2005; Sorace, 2011; Sorace & Filiaci, 2006; Sorace & Serratrice, 2009) proposed the IH for the L2 difficulty. They assume that interfaces are problematic for L2 learners, but all interfaces are not alike; some interfaces cause a problem but others do not, or some are more difficult than others. Their main assumption is that the grammar external interface is more vulnerable than the grammar internal interface. Specifically, Sorace (2005) stated that "features that are internal to the

computational system of syntax proper are acquired successfully by adult L2 learners", while "features that belong to the interface between syntax and other domains such as the lexicon, discourse, or pragmatics, may never be completely acquired by L2 learners" (pp. 69-70).^{2,3}

Sorace, Serratrice, Filiaci and Baldo (2009) investigated English-Italian and Spanish-Italian bilingual children's acceptability of uses of null subject pronouns and determiners in Italian. Overt or null subject pronouns in Italian and Spanish involve the syntax-discourse interface. The use of a null subject pronoun is governed by a discourse constraint; a null pronoun is used when it is the same topic while an overt subject pronoun is used when the topic is shifted or the entity referred to by the overt subject is new as shown in (1); ϕ marks a null pronoun. But English uses overt subject pronouns regardless of the discourse factor, as shown in (2):

(1) Italian/Spanish

- | | | |
|------------------------------------------------|--------------------|-----------------|
| a. Mentre Gianni mangia, ϕ (Gianni) parla | al telefono | SAME TOPIC |
| While Gianni eats, | talks on the phone | |
| b. Mentre Gianni mangia, lui (Paolo) parla | al telefono | DIFFERENT TOPIC |
| While Gianni eats, he | talks on the phone | |

(2) English

- | | | |
|-----------------------------------------------|---------------|-----------------|
| a. While John is eating, he (John) is talking | on the phone. | SAME TOPIC |
| b. While John is eating, he (Paul) is talking | on the phone. | DIFFERENT TOPIC |

(Sorace & Serratrice, 2009, p. 204)

On the other hand, presence or absence of the definite articles in Italian and Spanish involves the syntax-semantics interface. The languages differ from English in the distribution of definite articles with plural noun phrases in subject position and their semantics, as shown in (3) and (4):

² As a reviewer pointed out, the syntax-lexicon interface is grammar internal in Figure 1, but Sorace (2005) states that it is one of the very difficult interfaces for L2 learners to acquire. It seems that the lexicon referred to by Sorace indicates some irregular properties of lexical words, whereas the lexicon in Figure 1 refers to some regular lexical properties related to syntax. It needs to be made clear in the future research.

³ Sorace and researchers espousing the IH (Hopp, 2007; Sorace, 2011; Sorace & Filiaci, 2006; Sorace & Serratrice, 2009) suggest that the main source of the difficulty of the grammar external interface is processing complexity with it. The external interface requires more processing costs than the one at the internal interface since it needs to coordinate the internal or syntactic module with the external module (Sorace & Serratrice, 2009) and L2 learners or bilingual speakers do not have optimal strategies to process the interface, though they have the corresponding grammar, or knowledge representation of the grammar properties (Sorace & Filiaci, 2006).

(3) Italian (Spanish)

- | | |
|----------------------------------------------------|----------|
| a. Gli squali sono animali pericolosi. | GENERIC |
| The sharks are animals dangerous | |
| b. Gli squali all'acquario sono piuttosto piccoli. | SPECIFIC |
| The sharks at the aquarium are rather small | |

(4) English

- | | |
|-------------------------------------------------|----------|
| a. ϕ Sharks are dangerous animals. | GENERIC |
| b. The sharks at the aquarium are rather small. | SPECIFIC |

(Sorace & Serratrice, 2009, p. 204)

The results of the study showed that both groups of the bilingual children have difficulty with the syntax-discourse interface regardless of the structural overlap of the languages they speak, and that both groups of the bilingual children have no great difficulty with the syntax-semantics interface. Sorace and Filiaci (2006) presented a similar finding from the data of adult near native speakers of L2 Italian. Dekydtspotter, Sprouse and Swanson (2001) also showed that the syntax-semantics interface was not problematic for L2 French speakers, and Tsimpli and Sorace (2006) presented findings that L2 learners of Greek acquired the syntax-semantics interface structures (e.g. focus) without difficulty but had prolonged difficulty with the syntax-discourse interface structures (e.g. the distribution of subject pronouns).

2.1.2. Some issues in the Interface Hypothesis

Following the IH, the syntax-morphology interface is considered less vulnerable than the syntax-discourse interface. However, L2 learners' acquisition of the syntax-morphology interface is known to be difficult. For example, the subject of Lardiere's (1998) study showed serious difficulty with inflectional morphology in English though she was a very fluent speaker of L2 English in general. Slobavokova (2008) proposed that inflectional morphology is a bottle neck for L2 speakers. The IH researchers do not explain the difficulty of inflectional morphology for L2ers specifically, focusing on the syntax-discourse interface.⁴ The present study is concerned with the syntax-morphology interface when L2 differs from L1 in the morphology and it is compared with the syntax-discourse interface which is known as the most difficult interface.

⁴ Lardiere (1998, 2000) and other researchers suggested that L2 learners have knowledge of inflectional morphology at the underlying level but inflectional morphology is missing only at the surface level. That is, morphological errors do not suggest total absence of relevant morphology and it is a mapping problem between syntax and lexicon, which is called the Missing Surface Inflection Hypothesis (Prévost & White, 2000).

Researchers who proposed and supported the IH assumed that the hypothesis is restricted to three domains: simultaneous bilingual development (Serratrice, Sorace, & Paoli, 2004), first language attrition (Tsimplici, Sorace, Heycock, & Filiaci, 2004), and near native L2 ultimate attainment by L2 speakers (Sorace & Filaci, 2006). And Sorace (2011) states that "it [the IH] is not about intermediate stages of L2 development" (p. 26).⁵ White (2011b), however, pointed out that this exclusion of L2 development is unnecessarily restrictive, saying that "there is no a priori reason why learners still in the process of L2 acquisition should not experience similar interface problems to those experienced by bilingual children in the course of their language development" (p. 109). Thus, the present study examines data from L2 learners at the intermediate stages as well as the advanced stage, which we expect to show a bigger picture of L2 grammar.

The IH assumes that L1 plays an important role in L2 grammar, especially when L1 differs from L2 with respect to a relevant property. Sorace (2005) stated that "residual L1 influence leading to optionality in L2 grammars is only when the L1 instantiates the most 'economical' option, but not in all cases" (p. 70). That is, "cross-linguistic influence may take place unidirectionally, from less complex to more complex grammars, whenever two coexisting grammars are in conflict with respect to syntactic complexity." In the case of L1 English and L2 Italian speakers, the speakers are likely to have difficulty with the two uses (overt and null) of pronoun subjects in Italian since their L1, English, has a simpler use of pronoun subjects, only overt pronoun subjects. And Sorace (2005) said that L1 discourse influence is one factor responsible for the difficulty of L2 grammar.⁶ This means that the residual difficulty of L2 grammar is caused by the two factors, the grammar-external interface and L1 influence. One question to be asked is which factor of the two, L1 and interface effects, is more responsible for L2 speakers' difficulty. This question is the major concern of the present study and an answer to the question is suggested in this paper.

2.2. L2 English Unaccusatives

2.2.1. L2 English unaccusative verbs and overpassivization

Unaccusatives have been known to be problematic for L2 learners to acquire (Balcom, 1997; Chung, 2014, 2015; Hirakawa, 1995; Ju, 2000; Kondo, 2005; Montrul, 1999, 2000; Oshita, 1997; Yip, 1994; Zobl, 1989). The unaccusative verb construction differs from the unergative construction (Burzio, 1986; Perlmutter, 1978), though they are both

⁵ Sorace (2011) warned of extensions of the IH, stating that "criticisms of the IH sometimes ignore the fact that it [the IH] is not about the intermediate stages of L2 development" (p. 26).

⁶ Sorace (2005) also stated that "... the endstate grammar exhibits residual optionality due to subtle and persistent L1 influence" (p. 58).

intransitives, as shown below:

- (5) a. Joe laughed loudly.
 b. He ran for an hour.
 (6) a. The letter arrived yesterday.
 b. The snow melted today.

The verbs *laughed* and *ran* in (5) are unergatives and the verbs *arrived* and *melted* in (6) are unaccusatives. The subjects *Joe* and *He* in (5) bear the thematic role Agent, an initiator who intentionally performs the event described, while those in (6) bear Theme, an entity that undergoes the event described. It is reported that the unergative verbs are not difficult for L2 learners to acquire, but the unaccusative verbs are, causing overpassivization errors as in (7):

- (7) a. *The letter was arrived yesterday.
 b. *The snow was melted today.

L2 learners often produce or accept the passive unaccusatives in (7) where the corresponding sentences in (6) are appropriate. It is also reported that L2 learners are more likely to overpassivize the unaccusative in (7b) than the one in (7a); the verbs like *arrive* are known as non-alternating or non-paired unaccusatives, and the verbs like *melt* as alternating or paired ones (Levin & Rappaport-Hovav, 1995; Montrul, 2000; Yip, 1995).⁷

One major reason for overpassivization of unaccusative verbs is related to the universal linking principles between the thematic structure and the syntactic structure. The principles state that Agent is linked to subject and Theme to object; there have been several versions of the universal linking principles known as the Universal Alignment Hypothesis (Rosen, 1984), the Universal Thematic Alignment Hypothesis (Baker, 1988, p. 46) and the Argument Selection Principle (Dowty, 1991, p. 576). The linking principles are universal, applying to all languages. In English the unergative verbs follow the principles, but the unaccusative verbs do not; the surface subject bears Theme, not following the linking principles. Semantically an unaccusative verb sentence is interpreted like a passive where the surface subject undergoes the event described, as seen in (6). Due to this interpretation, L2 learners are likely to overpassivize the unaccusative verbs.

⁷ Alternating unaccusative verbs have corresponding transitives; verbs like *change*, *open*, and *sink* belong to this group. The non-alternating unaccusative verbs are the ones without corresponding transitives; verbs like *arrive*, *appear*, and *happen* belong to this group.

2.2.2. Morphology for unaccusativity and the syntax-morphology interface

Morphology for unaccusativity differs from language to language. Languages like English or Chinese do not encode unaccusativity morphologically, as shown below.⁸

- (8) a. He changed his first plan.
 b. His first plan changed.
- (9) a. ta gai le na tian de richeng.
 He change ASP DET day 's schedule
 'He changed the schedule of that day.'
 b. na tian de richeng gai le.
 that day 's schedule change ASP
 'The schedule of that day changed.' (Chung, 2014, p. 65)

The English unaccusative verb *change* in (8b) takes the same form as its transitive counterpart in (8a) and this is the case in Chinese; the same form *gai* 'change' is used in (9a) and (9b). These languages have null morphology for unaccusativity. On the other hand, Spanish and Korean have overt morphology for the verb alternation between transitives and intransitives (unaccusatives or passives):⁹

- (10) a. El cocinero derritió la manteca.
 The cook melt-PAST the butter
 'The cook melted the butter.'
 b. La mantec se derritio.
 The butter REFL melt-PAST
 'The butter melted.' (Montrul, 1999, p.194)
- (11) a. Ku-nun ku nal-uy kyehoyk-ul bakku-ess-ta
 He-TOP the day-GEN plan-ACC change-PAST-DEC
 'He changed the day's plan.'
 b. ku nal-uy kyehoyk-i bakku-i-ess-ta
 The day-GEN plan-NOM change-PASS-PAST-DEC
 'The day's plan changed/was changed.'

⁸ Abbreviations; ASP: aspect marker, DET: determiner, PAST: past marker, REFL: reflexive marker.

⁹ Abbreviations; PAST: past tense marker, REFL: reflexive, TOP: topic marker, GEN: genitive marker, ACC: accusative marker, DEC: declarative marker, NOM: nominative marker, PASS: passive marker.

Examples in (10) show that Spanish has a reflexive marker *se* for unaccusativity. Those in (11) exhibit that Korean has an overt marker for the verb alternation; the transitive verb *bakku-* 'change' is expressed by a bare form in (11a) and its intransitive meaning is expressed by the passive form *bakku-i-* 'change-PASS' in (11b).

The morphological differences for unaccusativity between languages are known to cause difficulty for L2 learners, especially for those whose L1s have overt morphology but L2s do not. This is the case for Korean learners of L2 English. L2 English learners are reported to have more difficulty with alternating unaccusative verbs than non-alternating ones (Hirakawa, 1995; Hwang, 2006; No & Chung, 2006). English verbs like *change* alternate between transitives and intransitives, while verbs like *appear* do not. The Korean verbs corresponding to the English non-alternating unaccusative verbs do not alternate; they are used only intransitively, as shown below:

- (12) a. John-i hakkyo-ey dochakha-ess-ta
 John-NOM school-at arrive-PAST-DEC
 'John arrived at the school.'
- b. *Kutul-i John-ul hakkyo-ey dochakha-ess-ta.
 they-NOM John-ACC school-at arrive-PAST-DEC
 (intended: 'They caused John to arrive at the school')

The verb *dochakha-* 'arrive' does not alternate between transitive and intransitive; the verb does not have any morphological marker for its transitive use other than the periphrastic causative construction, *-key ha-* 'have/cause someone (to) do'. This is the case for other Korean non-alternating unaccusative verbs such as *natana-* 'appear' and *saraci-* 'disappear'. If L1 plays a role in L2 acquisition, Korean learners of L2 English will have more difficulty with alternating unaccusative verbs (eg. *change*) than non-alternating ones (eg. *appear*). Chinese learners of L2 English, however, will not, since their L1 and L2 have zero morphology for the verb alternation.

Here we assume that the morphology for verb alternation/unaccusativity is inflectional; English has null morphology, and that Korean and Chinese speakers' acquisition of L2 English unaccusative verbs involves the syntax-morphology interface.¹⁰ Inflectional morphemes are related to syntax; they have formal features like number, tense, agreement, and case, causing syntactic operations like movement. The morphemes for unaccusativity

¹⁰ Note that whether the morphology for the verb alternation is inflectional or derivational does not affect the main issue of the present study. If we assume that the morphology for the verb alternation in the languages is derivational, not inflectional, Korean and Chinese learners' acquisition of L2 English unaccusatives involves the syntax-lexicon interface, which is another grammar internal interface (See Figure 1).

or verb alternation, whether they are null (in English and Chinese) or overt (in Korean), change the argument structure of the verbs they are attached to and delete the accusative case feature of the verbs; unaccusative verbs cannot assign/check case and thus the object of an accusative verb not assigned a case feature needs to move to the subject position to get case.

2.2.3. The syntax-discourse interface in L2 English unaccusatives

Ju (2000) showed that L2 English unaccusatives are also affected by a discourse factor and the factor plays a significant role for overpassivization of L2 English unaccusatives by Chinese EFL learners. Ju compared the two unaccusatives in different contexts in (13) and (14) below:

- (13) A fighter jet shot at the ship.
The ship sank slowly.
- (14) The rusty old ship started breaking up.
The ship sank slowly.
- (Ju, 2000, p. 92)

The event of 'the ship's sinking slowly' in (13) is externally-caused (by a fighter jet) while the one in (14) is not, meaning 'it sank by itself'. Though the same unaccusative sentence *The ship sank slowly* is used in the two cases, their discourses are different: the one in (13) has an external causer and the one in (14) does not. If L2 English learners are influenced by the discourse factor, they are predicted to be more likely to overpassivize the one with an external causer than the one without. Ju's (2000) findings supported the prediction.¹¹

L2ers are very likely to consider the factor, external causation, as cause, one of properties of the Agent proto-role (Dowty, 1991). When an event is externally caused in a given context, the event is likely to be considered or viewed as a causative event, though the causer is not present in the same sentence. This is similar to a passive where Agent or causer is not present; *The ship was sunk slowly*.¹² Most L2 English learners who have learned the passives are likely to apply the passive rule to the unaccusatives or they are reluctant to accept unaccusative (non-passive) sentences with a Theme subject. If L2 learners of English unaccusatives are affected by the external cause, the finding will indicate that the L2 acquisition of the construction is affected by the syntax-discourse

¹¹ Note that Ju (2000) did not take the interface approach to the phenomenon but put focus on the role of the discourse factor or the cognitive Agent.

¹² Note that a cause or Agent in a passive is given by a predicate (verb), whereas external cause is given by a context.

interface.

Now we point out that external causation does not play a grammatical role in Korean, which is the case in English; the unaccusative sentence, not the passive one, in (13) and (14) is acceptable for native speakers of English, regardless of whether the event is either externally-caused or not. Consider Korean sentences (15) and (16) below, which are assumed to have the same readings as those in (13) and (14):

- (15) Jentwuki-ga bay-lul kongkyekha-ess-ta.
 fighter jet-NOM ship-ACC shot at-PAST-DEC
 ku bay-nun karaanc-ess-ta.
 the ship-TOP sink-PAST-DEC
- (16) ku nalkun bay-un buseciki sijakha-ess-ta.
 the old ship-TOP get broken start-PAST-DEC
 ku bay-nun karaanc-ess-ta.
 the ship-TOP sink-PAST-DEC

The Korean verb *karaanc-* 'sink' used in (15) and (16) is an intransitive form; its derived causative form is *karaanc-hi-* 'sink-CAUS'. The causative form cannot be used in either of the situations, (15) or (16).¹³ That fact that only a bare intransitive or passive verb form is used in an externally-caused or non-externally-caused event indicates that Korean as an L1 does not differ from L2 English; that is, the discourse factor, external causation, does not play a grammatical role in Korean.¹⁴

We have examined two factors, morphology for verb alternation and a pragmatic Agent in English. The first morphology factor is about whether an unaccusative verb in L2 English is alternating or non-alternating, and L2 learners' acquisition of the factor involves the syntax-morphology interface. We predict that L1 Korean learners of L2 English would have more difficulty with alternating verbs than non-alternating verbs, while L1 Chinese speakers would not. The pragmatic factor is about whether the discourse has a pragmatic, not lexically given, Agent or not. We predict that the two L1 groups would not show big differences since the factor is influenced by a universal principle. Our major concern is which one of the two factors is stronger.

¹³ The other type of verb alternation is that a transitive verb form is bare and its intransitive (passive or unaccusative) is derived. The verb *bakwu-* 'change' belongs to this type: *bakwu-* 'change' is transitive and *bakwu-i-* 'change-PASS' is intransitive (passive). Regardless of the different discourse contexts (externally-caused or internally-caused) in (15) and (16), the intransitive/passive form only is used.

¹⁴ Note that the discourse factor does not play a grammatical role in Korean or English does not indicate that it does not play a role in L2 grammar. As Ju (2000) assumed and showed, it would play a role in learner grammar.

2.3. Research Questions

The first and main research question of the present study is which one, the syntax-discourse interface or the syntax-morphology interface, is more vulnerable for L2 speakers of English. The next research questions are how the two factors change with proficiency and over time. The questions are summarized as follows:

- RQ1: Is the syntax-discourse interface more difficult than the syntax-morphology interface?
- RQ2: How do the two factors at the two interfaces change as proficiency changes?
- RQ3: How persistent are the two factors at the two interfaces over time?

It is predicted that both Chinese and Korean speakers of L2 English will be affected in a similar pattern by the syntax-discourse interface factor since the pragmatic factor is one of the universal semantic properties of the Proto Agent role (Dowty, 1991) and their L2 grammar will be governed by the universal property. Since the discourse factor is not affected by L1, it is assumed that its acquisition is affected only by the interface effect, the syntax-discourse interface. On the other hand, the syntax-morphology interface factor is predicted to affect Korean speakers of L2 English more than Chinese speakers of English since Korean morphology for verb alternation differs from English morphology, while Chinese morphology does not. RQ1 is to see which interface factor affects Korean speakers of English more. Since the subjects of the present study consist of different L1 groups in terms of morphology for verb alternation, we expect the results will reveal which one, the syntax-morphology interface or the syntax-discourse interface, is more responsible for difficulty of L2 English unaccusatives. The findings will also show whether L1 influence is stronger than interface effects or interface effects are stronger than L1. If Korean learners of English have more difficulty with the morphological factor than with the discourse factor but Chinese learners of English do not, then it indicates that L1 influence is stronger than interface effects.

RQ2 is to see how the morphology and discourse factors in RQ1 change as learners' proficiencies change. According to the IH, the syntax-discourse interface factor afflicts near-native L2 speakers. We predict that it will also affect speakers of L2 English at intermediate and advanced stages. Specifically, we predict that the syntax-morphology interface effect is very strong at the early stages of development because of L1 influence but the effect will decrease as proficiency increases. RQ3 is to see how the two factors change over time or how persistent they are. It is interesting to see how persistent both factors are, and to see which one is the most persistent.

3. STUDY ONE: CROSS-SECTIONAL STUDY

We performed two types of experiments, cross-sectional and longitudinal. The method and results of the cross-sectional study are presented in this section and those of the longitudinal study in the next section.¹⁵

3.1. Method

The number of participants in the experiment was 249, but 33 of them were excluded from the final data analysis. Thirty subjects did not meet the requirement on the passive test embedded in the main test; they made 4 errors or more out of 20 passive test items, and three subjects did not belong to any of the proficiency groups. The 216 subjects for the final data analysis consisted of two L1 groups, Chinese (N = 99) and Korean (N = 117) L2 English learners, who were recruited and tested in Seoul, Korea. The Chinese were high school graduates and college students who came to Seoul to study at a university (mean age 22.37). All of them had little knowledge of Korean since they stayed in Seoul only for several months. The Koreans were students at a high school and at a university in Seoul (mean age 19.8). All the participants took the *Quick Placement Test* (QPT) and were divided into four groups by their proficiency, as shown in Table 1. Table 1 shows the number of participants at each proficiency level (QPT) (levels in parentheses indicate those of the Association of Language Testers in Europe (ALTE)). The Chinese' and Koreans' mean scores on the QPT were 39.91 and 37.26 (out of 60), respectively. There were also eleven native speakers of English as a control group.

TABLE 1
Number of Participants by Proficiency Level (Chung, 2014, p. 68)

| QPT scores | QPT level (ALTE level) | Chinese | Koreans | Total |
|------------|------------------------------|---------|---------|-------|
| 0–17 | Level 0 (Beginner) | | | |
| 18–29 | Level 1 (Elementary) | 15 | 15 | 30 |
| 30–39 | Level 2 (Lower intermediate) | 30 | 58 | 88 |
| 40–47 | Level 3 (Upper intermediate) | 42 | 31 | 73 |
| 48–54 | Level 4 (Advanced) | 12 | 13 | 25 |
| 55–60 | Level 5 (Very advanced) | | | |
| Total | | 99 | 117 | 216 |

Two types of test were used in the experiment: an unaccusative verb test and a

¹⁵ Results of the two studies were reported in Chung (2014) and Chung (2015), respectively. But the theoretical approach and research questions of the present study are different from those of the previous ones, though the methods of the present study are the same as those of the earlier ones.

proficiency test. The proficiency test is the *Quick Placement Test* that contains 60 questions on grammar, reading and vocabulary. The unaccusative test consists of 68 items; 48 unaccusative verb items and 20 fillers. The filler items were used to test the subjects' knowledge of English passives. Twelve unaccusative verbs were chosen; six of them in (15a) are alternating and the other six in (15b), non-alternating verbs. The unaccusative verbs were chosen based on their frequency level in the *Collins COBUILD English Dictionary for Advanced Learners* (2001), which is marked by the number of diamonds on verbs in (15); the highest frequency level by five diamonds and the lowest level by no diamond.

- (15) a. *change*^{♦♦♦♦♦}, *drop*^{♦♦♦♦}, *dry*^{♦♦♦}, *roll*^{♦♦♦}, *sink*^{♦♦}, *bounce*^{♦♦}
 b. *appear*^{♦♦♦♦♦}, *die*^{♦♦♦♦}, *arrive*^{♦♦♦}, *emerge*^{♦♦♦}, *disappear*^{♦♦}, *vanish*^{♦♦}

The main test was originally designed to test three variables, verb alternation, animacy of the surface subject,¹⁶ and external causation, as shown in Table 2. Each of the twelve verbs was used in four different conditions: [+caused, +animate], [-caused, +animate], [+caused, -animate], and [-caused, -animate]. The condition [+caused, +animate] indicates an externally-caused event with an animate subject. Since each verb is either alternating ([+VA]) or non-alternating ([-VA]), there are eight conditions in which the verbs appear, numbered from [1] to [8] in Table 2. Each condition differs from another with respect to the three factors and their values: verb alternation [\pm VA], external causation [\pm EC], and subject animacy [\pm SA].

TABLE 2
Conditions for Unaccusative Verbs Used in the Test (Chung, 2014, p. 69)

| | | Verb Alternation (L1 morphology) | | | |
|--------------------------------------|-----------|----------------------------------|------------|----------------|------------|
| | | [+alternating] | | [-alternating] | |
| External Causation (discourse) | [+caused] | +VA | +VA | -VA | -VA |
| | | +EC | +EC | +EC | +EC |
| | | +SA | -SA | +SA | -SA |
| | | [1] | [2] | [5] | [6] |
| | [-caused] | +VA | +VA | -VA | -VA |
| | | -EC | -EC | -EC | -EC |
| | | +SA | -SA | +SA | -SA |
| | | [3] | [4] | [7] | [8] |
| | | [+animate] | [-animate] | [+animate] | [-animate] |
| Subject Animacy | | | | | |

¹⁶ Animacy is a variable of Chung (2014), where half of the target items (N=24) have animate subjects and the other half, non-animate subjects. Since this factor is not our present concern, its results and discussion are excluded in this study.

Each test item has a value for each variable, verb alternation, subject animacy and external causation. The examples in (16) show how each item is constructed with respect to the three factors. Each item consists of two sentences and the subjects were asked to choose one of the two forms, active or passive, in the second sentence.

- (16) a. I pushed the man. He (rolled / was rolled) all the way down the hill.
 b. The man fell down. He (rolled/ was rolled) all the way down the hill.
 c. The rock became loose. It (rolled/ was rolled) all the way down the hill.
 d. I kicked the ball lightly. It (rolled/ was rolled) all the way down the hill.

Example (16a) contains an animate subject [+SA] *He* and the event *His rolling all the way down the hill* is externally caused [+EC], and the verb *roll* is alternating [+VA]. Thus, this item is in the condition [+VA, +EC, +SA], corresponding to [1] in Table 2. Item (16b) corresponds to [3], item (16c) to [4], and item (16d) to [2].¹⁷

Each of the four items in (16) appeared on different pages and all the sentences appeared in past tense. For some possibly difficult words, corresponding L1 translations (Korean or Chinese) were provided. To avoid ambiguity between middles and unaccusatives and to get the eventive interpretation of unaccusatives, some adverbial like *all the way down the hill* or *slowly* was always used, as shown in the examples.^{18,19} The subjects were not allowed to refer back to a sentence with the same verb, though they could ask the administrator (an L1 native speaker) meanings of some expressions other than the target verbs. The fillers were mixed with the unaccusative verb items. The verbs used for the fillers were transitive and the target forms of the fillers were passive (eg. *Mary bought an umbrella. It (used/ was used) right away*). The filler verbs were also chosen based on the frequencies.

The subjects spent about 25 minutes for the main test and about 30 minutes for the proficiency test. The control group (N = 11) also took the main test in 20 minutes or less. The results were reported in terms of correct answer rate; if a subject gave correct responses to all the questions, s/he got a score of 1. So, if a subject received a score of 0.5, s/he gave correct answers to half of the questions.

¹⁷ The following illustrate four items of the non-alternating verb *appear* (Chung, 2014, p. 70):

- a. It was a very foggy morning. Some people (appeared/were appeared) slowly in the distance.
 b. It was a very foggy morning. Some houses (appeared/were appeared) slowly as we drove along.
 c. The boy pulled the toy car out of the sand. The car (appeared/was appeared) slowly.
 d. The boy lifted the dog out of the blanket. The dog (appeared/was appeared) slowly.

¹⁸ Refer to Hale and Keyser (1987) and Fagan (1988) for differences between middles and unaccusatives.

¹⁹ The test appears in the Appendix of Chung (2014).

3.2. Results

The control group agreed with the target choices. The mean number of errors of the passive test taken by the subjects was 0.91 (out of 20), which means the subjects (N = 216) have the knowledge of the English passive. The mean correct response rate of the main test was 0.78; 0.82 for the Chinese and 0.75 for the Koreans. Table 3 and Table 4 show correct response rates of the two groups.²⁰ The tables show that the correct response rates increase as their proficiency increases. Two L1 groups show similar patterns with the EC factor; they both have more difficulty with [+EC] events than [-EC] ones. The two groups show big differences with the VA factor; Chinese subjects show little differences between alternating [+VA] and non-alternating [-VA] verbs but Korean subjects show big differences at all proficiency levels.

TABLE 3
Correct Response Rates by the Chinese Subjects

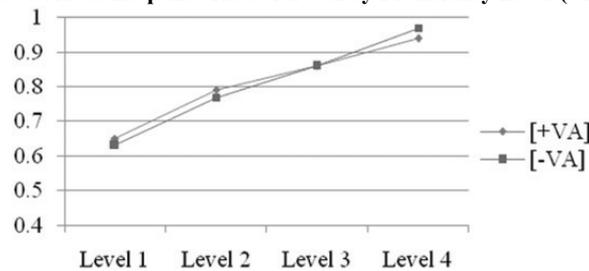
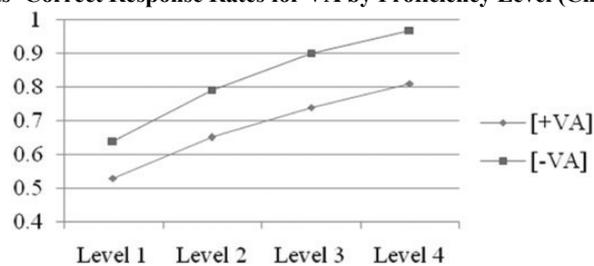
| | VA | | EC | |
|---------|-----|-----|-----|-----|
| | + | - | + | - |
| Level 1 | .65 | .63 | .55 | .73 |
| Level 2 | .79 | .77 | .72 | .84 |
| Level 3 | .86 | .86 | .81 | .90 |
| Level 4 | .94 | .97 | .94 | .97 |

TABLE 4
Correct Response Rates by the Korean Subjects

| | VA | | EC | |
|---------|-----|-----|-----|-----|
| | + | - | + | - |
| Level 1 | .53 | .64 | .49 | .68 |
| Level 2 | .65 | .79 | .66 | .79 |
| Level 3 | .74 | .90 | .79 | .85 |
| Level 4 | .81 | .97 | .89 | .90 |

Now let us examine the results of each factor by each L1 group. Figure 2 and Figure 3 show the correct response rates with the VA factor by Chinese and Korean subjects, respectively. In the figures the blue line represents the response rate of the alternating verbs [+VA] and the red one, that of the non-alternating verbs [-VA]. The Chinese subjects show little difference between the two types of verbs, while the Korean subjects show a large difference and the gap between the two types of verbs does not narrow as the proficiency increases. The results indicate that the Koreans had much more difficulty with the alternating verbs than with the non-alternating ones, while the Chinese did not.

²⁰ Note that the results of the animacy factor are excluded from Table 3 and Table 4.

FIGURE 2**Chinese Subjects' Correct Response Rates for VA by Proficiency Level (Chung, 2014, p. 74)****FIGURE 3****Korean Subjects' Correct Response Rates for VA by Proficiency Level (Chung, 2014, p. 74)**

The differences in the correct response rates by the two L1 groups between [+EC] and [-EC] events are shown in Figure 4 and Figure 5. Both L1 groups had more difficulty with the externally-caused events than with the non-externally-caused events, and the two groups' correct response rates increase as their proficiency goes up in a similar pattern. The gap in the rates of the two groups between the two events gets narrower as proficiency increases and it is very small at Level 4.

To see the statistical effects of the variables, a five-way mixed ANOVA was conducted on the results. The independent variables were VA, EC, SA, proficiency levels (4 levels) and L1 (Chinese and Korean), and the correct response rate was the dependent variable. The three factors (VA, EC, SA) had main effects, and L1 and proficiency level had significant effects; VA ($F(1, 214) = 25.31, p = .000$), EC ($F(1, 214) = 80.94, p = .000$), SA ($F(1, 214) = 33.72, p = .000$), proficiency ($F(3, 212) = 32.21, p = .000$) and L1 ($F(1, 214) = 6.64, p = .011$), and there were some significant interactions; EC*Level ($F(3, 212) = 7.58, p = .000$), SA*Level ($F(3, 212) = 13.97, p = .000$), VA*L1 ($F(1, 214) = 27.25, p = .000$), VA*SA ($F(1, 212) = 44.25, p = .000$). All the independent factors had significant effects.²¹

²¹ The data were also analyzed in three-way repeated ANOVAs to see the effects of the three factors (EC, SA, VA) in each L1 group. VA had a significant effect on the Korean group ($F=60.579, p=.000$), but not on the Chinese group ($F=0.25, p=.876$). EC and SA showed

FIGURE 4

Correct Response Rates for External Causation by the Chinese Subjects

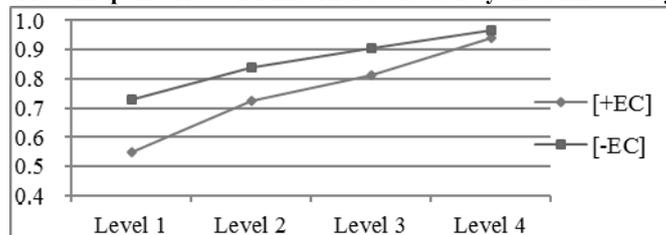
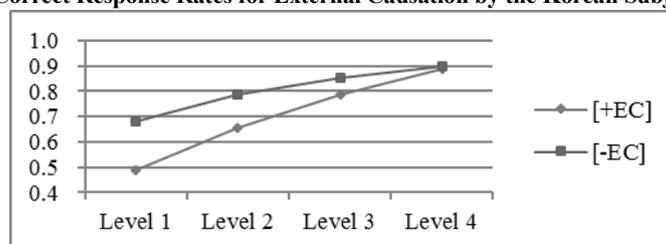


FIGURE 5

Correct Response Rates for External Causation by the Korean Subjects



To compare the strengths of the factors we measured their effect sizes with the Pearson's correlational coefficient r .²² Table 5 shows the effects sizes of the factors.^{23,24} For the Chinese L1 speakers, the syntax-discourse interface (EC) factor ($r = .61$) is stronger than the verb alternation (VA) factor ($r = .02$), which is predicted since Chinese and English both have no morphology for unaccusativity. For the Korean L1 speakers, on the other hand, verb alternation factor ($r = .59$) was almost as strong as the syntax-discourse interface factor ($r = .57$). Note also that the influence of the syntax-discourse factor gets weaker as the proficiency increases with both L1 groups, while the verb alternation factor shows a striking difference between the two groups; with Korean subjects its effect gets stronger (from $r = .53$ to $r = .79$) as their proficiency increases and with Chinese subjects its effect gets weaker (from $r = .27$ to $r = .08$) and then slightly stronger ($r = .30$) as their proficiency increases.

significant effects with the two groups; for EC, $F=58.728$, $p=.000$ with the Chinese, and $F=55.140$, $p=.000$ with the Koreans, and for SA, $F=7.320$, $p=.008$ with the Chinese and $F=28.930$, $p=.000$ with the Koreans. There were also significant interactions: VA and SA with the Koreans ($F=40.658$, $p=.000$); VA and SA ($F=28.334$, $p=.000$), and VA and SA and EC with the Chinese ($F=6.898$, $p=.01$).

²² The Pearson's correlational coefficient r is used since the data are paired quantitative.

²³ An effect size is small when $r=.10$, medium when $r=.30$, and large when $r=.50$ (Cohen, 1988).

²⁴ The effect sizes of all factors including animacy are presented in Chung (2014).

TABLE 5
Effect Sizes (*r*) of Factors by L1 and Proficiency Level

| | EC | VA |
|---------------------|-----|-----|
| Chinese and Koreans | .53 | .33 |
| Chinese (all) | .61 | .02 |
| Level 1 | .78 | .27 |
| Level 2 | .65 | .11 |
| Level 3 | .59 | .08 |
| Level 4 | .35 | .30 |
| Koreans (all) | .57 | .59 |
| Level 1 | .86 | .53 |
| Level 2 | .61 | .55 |
| Level 3 | .44 | .63 |
| Level 4 | .12 | .79 |

4. STUDY TWO: LONGITUDINAL STUDY

The second study investigated eight Korean college students' acquisition of L2 English unaccusative verbs over a period of five years. It examined the same factors examined in STUDY ONE during that time; which factor is more persistent and how each factor's difficulty changes over the period. Three tasks were performed over 61 months: the first one in September 2009, the second in December 2012 and the third in September 2014.²⁵

4.1. Method

The subjects of STUDY TWO also participated in STUDY ONE. They majored in English language education at a university in Seoul, Korea, at the time of the first task in 2009. Six of the subjects were sophomores and two were freshmen, aged 19 to 21, and they had learned English for eleven or twelve years in classroom settings. Table 6 shows each subject's information. All the subjects except one (S5) scored at Level 4 or 5, which correspond to the advanced or very advanced. Subjects S2 and S8 had TOEFL (iBT) scores of 99 and 97. Most of the students at the department were strongly motivated to learn English since their aim was to be English teachers after graduation.

Table 7 describes the subjects in 2012 and 2014. Their English proficiency improved during the period as shown in their scores of the standardized English tests. Six subjects resided in English speaking countries (the United States or Canada) as exchange students for six months or a year. In December 2012, four subjects (S1, S2, S4, and S7) were English teachers at secondary schools, three subjects (S3, S5, S6) were seniors, and one

²⁵ Note that the main test of STUDY TWO is the same as the one in Chung (2015).

subject (S8) was attending a graduate school in Korea, majoring in Chinese language. In 2014 all subjects other than S5 and S8 were English teachers; S5 was studying for the teachers test after graduation and subject S8 was studying as a graduate student but was exposed to English rarely.²⁶ All the subjects were considered advanced L2 English users when their TOEFL or TOEIC scores in 2012 were taken into consideration.

TABLE 6

Description of the Subjects (2009) (Chung, 2015, p. 13)

| Subjects | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 |
|----------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| College year | 2 nd | 2 nd | 1 st | 2 nd | 2 nd | 1 st | 2 nd | 2 nd |
| Years of studying English (year) | 12 | 12 | 11 | 12 | 12 | 11 | 12 | 12 |
| QPT level | 4 | 5 | 4 | 4 | 3 | 4 | 5 | 5 |
| TOEFL scores | NA | 99 | NA | NA | NA | NA | 97 | NA |

TABLE 7

Description of Individual Subjects in Oct. 2012 and Sept. 2014 (Chung, 2015, p. 14)

| Subjects | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 |
|--------------------------------|--------|--------|-------|--------|--------|--------|--------|--------|
| English level (2012) | tc 975 | tc 950 | tf 92 | tf 102 | tc 935 | tc 955 | tc 960 | tc 950 |
| Years in L2 environment (2012) | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0.5 |
| Status (2012) | T | T | U | T | U | U | T | G |
| Status (2014) | T | T | T | T | | T | T | G |

Note. tc = TOEIC; tf = TOEFL; U = undergraduate student; T = teacher; G = graduate student

The test used for the first and second tasks was the same as that of STUDY ONE.²⁷ But the fillers used in the third test were different from those in the first and second; they were passives of psychological verbs (e.g., *Jenny bored/ was bored*) where the correct form was always the passive and the items were given in different orders.²⁸

4.2. Results

Table 8 shows the subjects' overpassivization errors by factor and year. The difference in errors between alternating and non-alternating verbs got larger as time went by, and the gap between externally-caused and non-externally-caused events did not get smaller as time went by. The syntax-morphology interface factor (VA) was very strong over the five year

²⁶ There were some subjects who participated in the first and second tasks but were excluded from the final analysis since they did not take the third task in 2014.

²⁷ Note that the second task was performed 39 months after the first task and the third task, 24 months after the second task.

²⁸ The researcher of the current study taught English grammar in the department to which all the subjects belonged, and six subjects other than S7 and S8 took an English grammar course taught by the researcher during the period; in the course simple instruction on English unaccusatives was given. Refer to Chung (2015) for the detailed method of STUDY TWO.

period and the syntax-discourse interface (EC) factor was also a strong factor.²⁹ Most of the overpassivized errors were made with alternating verbs; nearly all the errors (N = 18) occurred with the verb type in the final task. And errors with externally-caused events (N = 14) were almost three times those with non-externally-caused events (N = 5).

TABLE 8
Number of Overpassivization Errors by Factor and Year

| | VA | | EC | | Sum per year |
|------|-----|-----|-----|-----|-----------------|
| | (+) | (-) | (+) | (-) | |
| 2009 | 26 | 13 | 25 | 14 | 39 |
| 2012 | 24 | 11 | 22 | 13 | 35 |
| 2014 | 18 | 1 | 14 | 5 | 19 |

Table 9 shows the numbers of errors with the VA factor made by each subject in the three tasks. The syntax-morphology factor was persistent for some subjects (S5, S6, S7, and S8) during the period, and its strength got stronger for subjects S7 and S8 who did not get any instruction on English unaccusatives; their errors increased as time went by. On the other hand, the errors by subjects, S4, S5 and S6 reduced greatly as time went by.

TABLE 9
Number of Errors with VA by Subject and Year (Chung, 2015, p. 18)

| Subject | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | Sum | |
|---------|-------|----|----|----|----|----|----|----|-----|----|
| 2009 | [+VA] | 1 | 3 | 1 | 7 | 7 | 6 | 1 | 0 | 26 |
| | [-VA] | 1 | 0 | 2 | 0 | 9 | 0 | 1 | 0 | 13 |
| 2012 | [+VA] | 0 | 0 | 3 | 2 | 4 | 10 | 4 | 1 | 24 |
| | [-VA] | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 11 |
| 2014 | [+VA] | 0 | 0 | 0 | 0 | 5 | 1 | 7 | 5 | 18 |
| | [-VA] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |

TABLE 10
Number of Errors with EC by Subject and Year (Chung, 2015, p. 19)

| Subject | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 | Sum | |
|---------|-------|----|----|----|----|----|----|----|-----|----|
| 2009 | [+EC] | 0 | 1 | 1 | 4 | 15 | 3 | 1 | 0 | 25 |
| | [-EC] | 2 | 2 | 2 | 3 | 1 | 3 | 1 | 0 | 14 |
| 2012 | [+EC] | 0 | 0 | 2 | 2 | 9 | 5 | 4 | 0 | 22 |
| | [-EC] | 0 | 0 | 1 | 0 | 6 | 5 | 0 | 1 | 13 |
| 2014 | [+EC] | 0 | 0 | 0 | 0 | 4 | 1 | 5 | 4 | 14 |
| | [-EC] | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 2 | 5 |

Table 10 shows the numbers of errors with the EC factor made by each subject in the

²⁹ See Chung (2015) for the details of the results including those of the animacy factor.

three tasks. This syntax-discourse interface factor was also strong and persistent, especially for the subjects (S7 and S8) who did not get any instruction. They made more errors in the final task than in the earlier tasks.

5. DISCUSSION

5.1. The Syntax-Discourse Interface and the Syntax-Morphology Interface

Researchers on the IH point out that "problems in syntax-discourse phenomena ... are due to L1-L2 interference at this 'higher' level of language use" (Tsimpli & Sorace, 2006, p. 653) and that the L1 discourse influence is most vulnerable for near-native or advanced L2 speakers (Sorace, 2005). These statements suggest that the major difficulty for near-native L2 speakers is the combinatory effects of interface and L1. We already pointed out that studies on the IH did not disentangle L1 influence from interface effects. So, we teased L1 influence apart from the syntax-discourse interface effects. The syntax-discourse interface factor, external causation, examined in this study is a universal property that is taken to affect the English unaccusative or its overpassivization by L2 English speakers. Cause is a universal property which plays a role in many languages, not just in English, and thus L2 learners of English are predicted to be affected by the property, regardless of their L1 backgrounds. So, the syntax-discourse factor in the present study is independent of L2 speakers' L1. On the other hand, the syntax-morphology interface factor, verb alternation, in English is a property that is influenced by the subjects' L1; Korean has overt morphology for verb alternation, while English does not. Korean speakers of L2 English are predicted to use some overt morphology like passive morphemes for English unaccusatives, making overpassivization errors, if there is L1 influence. Chinese speakers of L2 English, however, are predicted to show different patterns from Koreans since Chinese, like English, has no morphology for verb alternation.

The results showed that both factors at the syntax-discourse interface and the syntax-morphology interface affected L2 English speakers but in different ways. The cross-sectional data showed that the syntax-discourse interface factor (EC) had very similar effects for both L1 groups. Its effect sizes of the two groups were similar ($r = .61$ for the Chinese and $r = .57$ for the Koreans) and its effect sizes got smaller as proficiency increased in both groups (See Table 5). One interesting finding in the cross-sectional study was that the interface factor was more difficult for the beginning and intermediate L2 English learners than for the advanced speakers, and the difficulty seemed to have been almost overcome by the advanced learners, which also differs from those of Sorace (2005) where the discourse property afflicted near-native L2 speakers.

The longitudinal data also showed that some advanced L2 English speakers suffered from the syntax-discourse interface factor, though more than half subjects ($N = 5$) seemed to have little difficulty with it (See Table 8 and Table 10); three subjects (S5, S7 and S8) made more errors with externally-caused events than non-externally-caused ones. We suggest that this is due to the fact that this interface factor is one of the universal Agent properties and thus governed by the linking principles.³⁰ The finding also reveals that the discourse factor can be overcome by Korean advanced speakers of L2 English. An implication of this finding we suggest is that one cannot make a generalization that all properties at the syntax-discourse interface or at a certain interface are always vulnerable for advanced or near-native L2 speakers; the levels of vulnerability may vary depending on the nature of the property or L1 influence.

The effects of the syntax-morphology interface factor, verb alternation, were very clear in the results. As predicted, Korean speakers of L2 English made many more overpassivization errors with alternating verbs than non-alternating verbs, while Chinese speakers of L2 English showed little difference between them. The difference in difficulty between the two L1 groups was indicated by a large difference in the effect sizes of the factor: $r = .02$ for the Chinese and $r = .59$ for the Koreans. This finding is a clear indication of the strong role of L1 morphology. It is also important to point out that the effect of L1 morphology for the L1 Korean subjects did not decrease as proficiency increased; the gap in overpassivization errors between the two types of verbs did not get narrower with the increase of proficiency, though the number of total errors decreased (See Figure 3). The influence of L1 morphology in the L2 acquisition of L2 unaccusatives is pointed to by several studies (Chung, 2014; Hirakawa, 1995; Hwang, 2006; Montrul, 1999, 2000), but they did not investigate it in terms of interface. For example, Montrul (2000) stated that L1 influence plays a prominent role in the L2 acquisition of English, Spanish and Turkish, which differ in encoding the causative/inchoative alternation morphologically.

As for our first research question, which of the two factors at the syntax-discourse interface and the syntax-morphology interface, is stronger, the results revealed that the syntax-morphology interface factor is stronger and more persistent than the syntax-discourse interface factor for Korean speakers of L2 English. But for Chinese speakers of L2 English, the syntax-discourse interface was more problematic than the syntax-morphology interface; in fact, the syntax-morphology interface posed little difficulty.

To examine the question of which one of interface effects and L1 influence is stronger, we can compare the effect sizes of the two factors for the Korean subjects. Here we consider that the syntax-discourse interface is a typical interface to cause interface effects since it is known to be the most difficult. The syntax-morphology interface factor

³⁰ Chung (2015) suggests that instruction also plays a role for their overcoming the difficulty.

examined in this study is influenced by the subjects' L1 and thus its effect size reflects L1 influence. Table 11 below (a part of Table 5) shows the effect sizes of the two factors EC (the syntax-discourse interface factor) and VA (the syntax-morphology interface factor). It reveals how strongly Korean speakers of L2 English were affected by the factors. Though the average effect sizes of the two factors are similar (EC $r = .57$ and VA $r = .59$), that of VA becomes larger and larger; it is .53 at Level 1 but .73 at Level 4. On the other hand, the effect size of EC becomes smaller and smaller, as proficiency increases; it is .86 at Level 1 but .12 at Level 4. It indicates that the effect of the syntax-morphology interface or L1 influence gets stronger for more advanced L2 English speakers. Note that the syntax-morphology interface posed little difficulty for the Chinese speakers of L2 English; the average effect size of the factor was .02 (See Table 5). These findings indicate that L1 influence is stronger than interface effects.

TABLE 11
Effects Sizes of EC and VA (Koreans)

| | EC | VA |
|---------------|-----|-----|
| Koreans (all) | .57 | .59 |
| Level 1 | .86 | .53 |
| Level 2 | .61 | .55 |
| Level 3 | .44 | .63 |
| Level 4 | .12 | .79 |

The longitudinal data also showed that the syntax-morphology (L1 influence) is more persistent than the syntax-discourse interface factor (interface effects) (See Table 8). The difference ($N = 17$) in errors between alternating and non-alternating verbs is larger than that ($N = 9$) between externally-caused and non-externally-caused events. This difference is also reflected in individual subjects' error numbers in Table 9 and Table 10. The two subjects S7 and S8 has little difficulty in the first task but had difficulty in the third task.³¹

On the other hand, for the Chinese subjects the syntax-discourse interface factor was more difficult than the syntax-morphology interface ($r = .61$ with EC, $r = .02$ with VA), as the IH predicted; the grammar external interface is more vulnerable than the grammar internal interface. But note that the Chinese subjects' results were not influenced by L1.

³¹ We acknowledge that there can be some combinatory effects of an interface effect and L1 influence with the Korean subjects in this research. The subjects can be affected by the syntax-morphology interface in some way as well as L1 influence. But we assume that it will be very small; note that the effect size of the syntax-morphology interface factor with the Chinese subject is $r = .02$. If the Korean subjects were affected by the interface effect (the syntax-discourse interface) more than the syntax-morphology interface (L1 influence), then we could argue that interface effect is stronger than L1 influence, which is not the case in the results of this study.

5.2. Other Issues in the Interface Hypothesis

Sorace (2011) excluded the intermediate stages of L2 grammar for the IH, but White (2011b) pointed out that there is no logical reason to disregard those stages since beginner or intermediate learners will experience similar interface problems to those experienced by near-native L2 speakers or bilinguals. The present study examined how the L2 learners' difficulty with interfaces changes with proficiency levels and time, which are replies to our second and third research questions. The findings from the cross-sectional data in this study showed that the syntax-discourse interface plays a much stronger role for the beginning and intermediate L2 speakers than the advanced speakers and it didn't seem to be very difficult for the advanced (Level 4) L2 speakers (See Figure 4 and Figure 5). The longitudinal study showed that the interface factor is problematic for some subjects, though not for more than half of the subjects; especially it was vulnerable for those who were rarely exposed to L2 input, indicating that they were affected by input and instruction.³²

The finding that the syntax-discourse interface is not very difficult for advanced L2 English speakers in the present study suggests that the difficulty of a certain property depends on various factors; the interface effects are constrained by L1 or universal principles. We want to point out that properties at one interface do not pose the same level of difficulty; some property may not easily be overcome but some may. We agree with White (2011a) who pointed out, after carefully examining the findings in the previous studies, that it is not the case that "all phenomena at a particular interface are necessarily problematic" (p. 587). Valenzuela (2006) and Tsimpli and Sorace (2006) showed that the doubling of a topic by a clitic in Spanish, Greek and Bulgarian, a linguistic phenomenon at the syntax-discourse interface, was problematic, but Ivanov (2009) showed that it was not.³³ Yuan (2010) also showed that the semantic-syntax interface was not equally acquirable for L2 learners of Chinese and there were differential successes in the same construction, by investigating *wh*-expressions used as existential polarity words that occurred in a limited number of non-factive syntactic environments, and argued that the syntax-semantics interface should not be treated in the same manner.³⁴

³² Refer to footnote 28 in this paper.

³³ Valenzuela (2006) and Tsimpli and Sorace (2006) both reported that the syntax-discourse interface is problematic but their findings were different. Valenzuela reported the overuse of clitic doubling by near native speakers of Spanish, while Tsimpli and Sorace found its underuse by Russian speaking learners of Greek even at advanced levels. On the other hand, Ivanov (2009) showed that advanced English-speaking learners of Bulgarian acquired the discourse constraint on clitics.

³⁴ Some studies (Oh, 2015; Park, 2013) examined the IH with data from Korean speakers of L2 English. Oh examined Korean speakers' knowledge of English view point aspect and showed that L1 influence was stronger than the interface effects. Park investigated Korean speakers' uses of (in)definite articles and generic uses of English articles and her findings do not support the IH.

It is also pointed out by White (2011a) that grammatical phenomena at interfaces are not monolithic as assumed by many IH researchers. Sorace and Serratrice (2009) argued that the use or acquisition of article semantics at the syntax-semantics interface was less difficult than the use of overt/null pronoun subjects at the syntax-discourse interface. But, as Montrul (2011) pointed out, the acquisition of English articles or DPs involves the syntax-semantics-discourse interface (possibly, more interfaces) as well as the syntax-semantics interface; uses of articles require discourse knowledge since the meaning or definition of definiteness is based on the state of knowledge of both the speaker and hearer (Ionin et. al. 2004). Hopp (2007) examined scrambling in German, which involves multiple interfaces. In German the basic word order is SOV in an embedded clause, but the language allows a relatively free word order by scrambling. Scrambling is restricted by several constraints and thus involves multiple interfaces: syntax-morphology (word order and case), syntax-semantics (interpretive constraints on the scrambling indefinite NPs), syntax-discourse (information structural conditions on scrambling). Hopp's findings exhibit how a grammatical property involves multiple interfaces. All the findings in the previous studies and the findings of the present study from the L2 English unaccusative verbs reveal some limitations of the IH.

6. CONCLUSION

The IH proposes that the grammar external interface is more vulnerable than the grammar internal interface and the grammar external interface is very problematic for L2ers when their L1 differs from L1 with respect to a property in under consideration. They specifically claimed that "L1 discourse influence" is one factor responsible for the difficulty of L2 grammar (Sorace, 2005). The researchers of the IH, however, did not disentangle the discourse interface from L1 influence. The current study's findings from cross-sectional and longitudinal experiments reveal that L1 influence is stronger than interface effects (the syntax-discourse interface), and that the results without L1 influence supported the hypothesis that the grammar external interface is more difficult than the grammar internal interface.

This study also showed that a discourse interface factor affects L2 learners at the beginning and intermediate stages as well as at the advanced stage, and its strengths became weakened as their proficiency increased. We further found that L1 plays an important role for L2 learners at various developmental stages when an interface factor involves L1 as in the syntax-morphology interface for Korean speakers of L2 English; its strength (effect size) did not decrease as the L2 speakers' proficiency increased. Longitudinal data also showed that the L1 effect in the syntax-morphology interface was

persistent for advanced L2 English speakers over a period of five years.

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Applicable levels: Tertiary

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