Beneficial effect of multilingualism in resolving L3 structural complexity: Attention shift from familiar cue to critical cue*

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Park, Mihi and Jeeyoung Peck. 2022. Beneficial effect of multilingualism in resolving L3 structural complexity: Attention shift from familiar cue to critical cue. *Linguistic Research* 39(Special Edition): 1-27. Multilingualism is known to be influential in subsequent language learning due to linguistic transfer (Flynn et al. 2004; Bardel and Falk 2007; Rothman 2011; Westergaard et al. 2017) or enhanced metalinguistic awareness achieved from L2 learning experience (Thomas 1988; Klein 1995; Sanz 2000; Jaensch 2009; Park and Starr 2015). This study examines the complexity of word order scrambling in L3 Korean from cross-linguistic perspective, and investigates the influence of L2 learning experience in L3 acquisition by novice early bilingual learners (English-Chinese/Malay) in Singapore (n=148). An untimed grammaticality judgement task (GJT), which manipulates Case-assigning cues (e.g. word order, animacy and case-marking morphemes) for competition, was employed to investigate an impact of word order scrambling and item grammaticality. Given different cue hierarchy among involved languages, learners experience a challenge in unlearning L1 reliance on word order and animacy cues in Case assignment and adjusting to the novel cue hierarchy of L3 Korean. Conflicting information between animacy cue and word order cue triggers negative judgment on the GJT regardless of the sentences' true grammaticality. Irrespective of typological proximity of L2, L2 learning experience is found to be facilitative in the acquisition of scrambled structure of L3, conditionally on ungrammatical sentences. We argue that these findings imply that general L2 learning experience benefits learners with control ability to effectively conform to a new cue hierarchy based on L3 exposure, and that such enhanced metalinguistic awareness is more visible when learners are handling tasks that require explicit knowledge. **(National University of Singapore · Hanyang University)**

Keywords L3, Korean, structural complexity, multilingualism, enhanced metalinguistic awareness

1. Introduction

In third or subsequent language learning, all other previous language(s) and learning experience in a formal context were shown to be influential, due to language transfer (Bardel and Falk 2007; Rothman and Cabrelli Amaro 2010; Rothman 2011, 2015; Jaensch 2012; Westergaard et al. 2017; Park and Starr 2019) or enhanced metalinguistic awareness (Thomas 1988; Klein 1995; Sanz 2000; Jessner 2006; Jaensch 2009; Park and Starr 2015, 2019). Yet, compared to studies on transfer of linguistic knowledge, there have been limited works which explores how L2 learning experience itself could affect subsequent language learning.

To address this gap, the current study aims to investigate if formal L2 learning experience would facilitate the resolving of structural complexity in the acquisition of L3 Korean. While word order (WO) scrambling is a common phenomenon in Korean, it is shown infrequently in languages lacking rich case-marking morphology, such as English, Chinese, Malay or Indonesian, the L1s of the early bilinguals in Singapore. Therefore, WO scrambling would add a complexity for Singaporean learners in comprehending Case of L3 Korean, because these learners must unlearn their L1 tendency to primarily rely on WO and acquire explicit morphological case-markers (CM) in L3. During this process, cue hierarchy adjustment is anticipated, and formal L2 learning experience is expected to facilitate this adjustment, that would eventually support the acquisition of WO scrambling in L3, given that previous works provided empirical support of facilitative impact of L2 learning experience in L3 acquisition (Thomas 1988; Klein 1995; Sanz 2000; Jaensch 2009; Park and Starr 2015).

In addition, typological proximity is known to be another facilitative factor in L3 acquisition (Bardel and Falk 2007; Rothman and Cabrelli Amaro 2010; Rothman 2011, 2015). Even though L1s of the participants in the study are typologically distant from L3 Korean, Japanese, one of L2s among early bilinguals who learned L2 before, is typologically close to L3. The current study investigates whether L2 typological proximity adds any beneficial effect in resolving complexity from WO scrambling in the acquisition of L3 Korean.

2. Background

2.1 Transfer in language learning

Odlin (1989) reviews previous studies of linguistic transfer, and notes that the proposal that learners might transfer their L1 WO feature to L2 has been subject to criticism and counter-evidence (e.g., Nagara 1972 versus Muysken 1984 in Japanese learners of L2 English). For example, Muysken (1984) argues that a phenomenon resembling WO transfer occurs as an artifact of discourse manipulation in relation to topic continuity, and Zobl (1986) argues that basic WO transfer is blocked by UG.

In contrast to the controversy over transferability of canonical WO, WO rigidity has been consistently reported as transferable, as stated in Odlin (1989). This notion of WO rigidity refers to speakers' tendency to rely on WO as a mean to express Case marking instead of other Case marking cues such as CMs. Languages can be classified as whether their canonical WO is rigid or not, and the degree of WO rigidity also varies among languages (Thompson 1978). For example, English and Russian are both classified as SVO in terms of their canonical order, but Russian allows much more flexible WO, such as SVO, SOV, VSO, VOS, OSV, and OVS, owing to its case-marking morphemes. Empirical evidence supporting the transfer of WO rigidity has been produced in studies of both production and comprehension (Odlin 1989). However, the transfer of WO rigidity should be considered differently from the linguistic transfer of morphosyntactic feature. To explain such influence from previous languages other than linguistic transfer, Kellerman (1995: 141) proposed the *transfer to nowhere* principle, an assumption that "the way we talk or write about experience is not something that is subject to between-language variation". The *transfer to nowhere* predicts that when adult learners who already have established particular perspectives on events available within their L1, express events in L2, they may seek linguistic tools that will allow them to continuously use their L1 perspectives, rather than other linguistic tools associated with the L2 perspective. This principle is an application of Slobin (1993)'s *thinking for speaking* to the study of second language acquisition: it claims that those categories of thinking for speaking, such as tense-aspect as a grammatical category, are difficult to "restructure". Notably, the *transfer to nowhere* assumes that the speakers may not be aware of the perspective of describing events particular to their L1, as well as the perspective permitted in their L2. In other words, those categories of thinking for speaking are

"inaccessible to meta-awareness", namely, "unanalyzed" in Bialystok (1994)'s terms (Kellerman 1995).

Studies of linguistic transfer in the acquisition of an L2 have evolved into investigating the source of transfer in third language acquisition over the last decades. Various theoretical models from a generative perspective were put forward, and it is worthwhile to present an overview of some representative models. Flynn et al. (2004) proposed the Cumulative Enhancement Model (CEM), which predicts language learning is cumulative and posits that any previously learned language can be transferred in the acquisition of an L3. In other words, transfer from either L1 or L2 or a combination of both L1 & L2 is possible, if such knowledge is beneficial; on the other hand, transfer from any previously learned languages might remain neutral, if a given transfer is not beneficial. Bardel and Falk (2007) argued that the L2 status factor (L2SF) is stronger to select a source for transfer in the acquisition of L3 morphosyntax. It claims that even if L1 and L3 share typological proximity, a typologically less similar L2 can override L1 transfer due to the declarative/procedural distinction between L1 and L2 syntactic knowledge (Paradis 2009; Bardel and Falk 2012). The Typological Primacy Model (TPM), proposed by Rothman (2010), extended the CEM by identifying a specific language that is "perceived" as (psycho)typologically close (Kellerman 1983). In other words, syntactic properties of the closest (psycho)typological language, either the L1 or L2, constitute the initial state hypotheses in multilingualism, whether or not such transfer constitutes the most economical option (Rothman 2010). Recently, Westergaard et al. (2017) proposed a new model, namely, the Linguistic Proximity Model (LPM), and argued for cross-linguistic influence through perceiving a particular linguistic property in the Ln that shares abstract structural similarity with linguistic properties of the previously learned languages. As a result, the LPM predicts property-by-property transfer in the acquisition of L3, when the source language shares a similar linguistic property of the target language, regardless of their holistic typological distance.

However, there are limited works regarding non-linguistic transfer in the acquisition of non-linguistic transfer.

2.2 Beneficial effect of formal L2 learning experience

Empirical studies have shown that there is a general benefit from L2 learning

experience. Thomas (1988) is one of the early works on the effect of bilingualism, which found English-Spanish bilinguals outperformed English monolinguals significantly in a formal test of L3 French syntactic and lexical knowledge after a semester of learning. This beneficial effect was particularly strong when L2 learning experience was formal rather than informal. Thomas argues that such results are due to the speakers' enhanced metalinguistic awareness, achieved from formal L2 learning experience and typological proximity between Spanish and French.

In addition, Klein (1995) argues that multilinguals demonstrate faster and more facilitative acquisition than monolinguals in the acquisition of an L3, even though both groups are in similar stages of the learning process. Multilinguals outperformed the monolinguals (various L1s) in learning lexical information and syntactic information of L3 English. Because none of the participants' L1s and L2s shared the target syntactic feature of L3 English, Klein (1995) argues that what supported multilinguals learning the syntactic structure of L3 was the combination of enhanced metalinguistic awareness (Thomas 1988), enhanced lexical knowledge (Thomas 1988), and a less conservative learning procedure that resulted in "wider grammars" (Zobl 1992: 190), rather than the direct linguistic transfer from L1 and L2. Park and Starr (2015, 2019) recently provided empirical evidence supporting that additional language learning experience, regardless of typological proximity, is beneficial in acquiring a morphosyntactic feature and sociolinguistic variation patterns of L3 due to enhanced metalinguistic awareness.

From psychological perspective, Bialystok (2001) proposes that all metalinguistic tasks involve two cognitive processes, while the degrees of involvement of each process may vary. One of these processes, *analysis of representational structures*, "is children's ability to construct mental representations with more detail and structure than was part of their initially implicit knowledge" (Bialystok 2001: 177). The other process, *control of attention*, plays a role in "directing attention to specific aspects of either a stimulus field or a mental representation as problems are solved in real time" (Bialystok 2001: 178). By manipulating a task to involve greater degrees of conflict which demands participants to attend to one of two plausible representations and inhibits them from attending to the other, a researcher can increase levels of control of attention that can be tested (Bialystok 2001: 177-178).[1] Bialystok (2001) argues that bilingual children outperform monolingual children in tasks that make high demands on *control of attention*,

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1   Similarly, Jessner (2006) also explains that metalinguistic awareness consists of both the ability to attend to language as an object in itself and the resultant ability to play with or manipulate language.

though not necessarily in metalinguistic tasks that involve high demands on *analysis of representational structures*.

To sum up, the metalinguistic advantage achieved from bilingualism helps learners consciously pay attention to grammatical structures during subsequent language learning. And such identified grammatical information becomes the focus of learners' attention.

2.3 Cross-linguistic information

Within the Competition Model, MacWhinney (1987: 318) explains that the parser is able to deal with a combination of multiple cues in comprehending Case across languages, such as semantic features of nouns (e.g., animacy of NPs), morphological cues (e.g., CMs, agreement markers), WO cues (e.g., canonical WO of a specific language), and intonational cues (e.g., contrastive stress). For example, English speakers might use any of or all of the above-mentioned multiple cues to understand that *he* is doing the action to *pencils* rather than *pencils* doing the action to *he* in the sentence with the nonsense word *mibs* in *He mibs pencils* (Dittmar et al. 2008). Learners decode WO (e.g., the preceding NP before V is subject), case marking morphemes (*he* instead of *him*), number agreement between subject and verb (inflected *mibs* instead of *mib*), and NP animacy (animate roles like *he* act on inanimate roles like *pencil*).

In Chinese, WO cues (e.g., canonical SVO), animacy cues and semi-morphological cues for partial Object-marking (e.g., *ba*) are available for comprehending NP Case. The canonical SVO order with a prototypical transitive verb indicates that the preverbal NP is subject/agent and the post-verbal NP is object/patient, as in (1).

(1) 他们吃面条了。
     tamen chi miantiao le
     3pl   eat noodle   prt
     'They have eaten noodles.'

While the canonical WO is fairly rigid in Chinese, non-canonical orders are allowed to a limited extent with pragmatic cue.[2] For example, in OSV order (2) or SOV order

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2   The canonical SVO has a very high cue availability in Case assignment in Chinese. It has been observed that the canonical VO pattern occurs in 94% and 92% of the written and the spoken data respectively, whereas the OV pattern (including both OSV and SOV) occurs in only 6-8% of cases (Sun and Givón 1985).

(3), the preposed O is associated with a particular information structure, such as topicality (Tsao 1987; Liu 2007) or emphasis/contrast (Sun and Givón 1985).

(2) 面条他们吃了。

    miantiao tamen chi le

    noodles 3pl   eat pfv

    'The noodles, they ate.'

(3) 他们(把)面条吃了。

    tamen   (ba) miantiao chi le

    3pl   (om) noodle   eat pfv

    'They ate the noodles.'

In these non-canonical NN'Vs, although WO cue indicates that the preverbal N' is subject/agent,[3] Chinese speakers also rely on the animacy contrast between the two nouns and comprehend that the animate noun *tamen*, rather than the inanimate noun *miantiao*, is subject/agent. Thus, the semi-morphological object marker *ba* which is only in SOV pattern (Huang 1982) can be omitted when the animacy cue is available as shown in (3).

In Korean and Japanese, the canonical SOV signals that the first NP is subject/agent and the second NP is object/patient. At the same time, explicit CM cues are available, signaling the grammatical relations of NP arguments. For Korean, the nominative CM, ka marks subject/agent and accusative marker *lul* marks object/patient in a prototypical active transitive sentence as in (4). See the similar Japanese example in (5). In (4) and (5), multiple cues, including canonical WO, CM and animacy, are simultaneously indicating Case roles in a coalition.

(4) Korean

    Minsu-ka   kimchi-lul   meok-eyo

    Minsu-NOM kimchi-ACC   eat-ENDING

    'Minsu eats Kimchi.'

(5) Japanese

    Minsu-ga   kimchi-o   tabe-masu.

    Minsu-NOM kimchi-ACC   eat-ENDING

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3   Empirical findings in Li, Bates and MacWhinney (1993) indicate that Chinese speakers tend to comprehend the non-canonical NN'V as OSV rather than SOV.

Meanwhile, explicit CMs allow Korean or Japanese speakers to correctly understand the grammatical relations of NPs even when canonical WO is violated. For example, in (6) and (7), the CM cue indicates that the first NP is object/patient and the second NP is subject/agent. The information interpreted from the CM cue conflicts with the canonical WO cue which signals the reverse information on the case roles, that is, the first NP is subject/agent, and the second NP is object/patient. Yet, Korean or Japanese adult speakers would not mistake *Kimchi* as agent in (6) and (7), implying that the CM cue is higher in cue reliability than the WO cue in the competition.

(6) kimchi-lul   Minsu-ka   meok-eyo
     kimchi-ACC Minsu-NOM   eat-ENDING
     'Minsu eats Kimchi.'

(7) kimchi-o   Minsu-ga   tabe-masu
     kimchi-ACC Minsu-NOM   eat-ENDING
     'Minsu eats Kimchi.'

Cue strength and weighting of cues vary cross-linguistically. For example, in English the WO cue is the most reliable cue to speakers to identify the subject of a sentence, followed by the case-marking cue on pronominal forms (MacWhinney 1987; Li, Bates and MacWhinney 1993). In Chinese as well, the WO cue is high in cue strength. CM cue has lower cue strength, as reflected in the observation that the object marker *ba* is used obligatory only for a low frequency non-canonical order SOV that lacks animacy cue (Yang and van Bergen 2007) (e.g., (3)). WO rigidity is greater in English and Chinese, compared to Korean and Japanese, where CM cues have consistently higher cue strength than WO cue in the sentences with non-canonical WO (Dittmar et al. 2008).

In this work, we use the term, scrambling to refer to a phenomenon where the ordering of arguments of transitive verbs in a simple sentence is non-canonical. Scrambling is freely allowed in Korean or Japanese, as in examples (6) and (7), due to the high cue strength of CMs. On the other hand, scrambling in Chinese or English is allowed only to a limited extent that satisfies pragmatic constraint. Recall Chinese examples (2) and (3). In English scrambling is more constrained and available only in the topicalization of object, as in *This book I like*.

2.4 Complexity of scrambled sentences

Several empirical studies have shown that the processing of scrambled sentences places more cognitive burden than canonical sentences in rigid WO languages (e.g., English in Gibson 1998, 2000) as well as in flexible WO languages (e.g., Japanese in Hagiwara et al. 2007). Based on these results, this study focuses on examining the complexity that the Singaporean early bilingual learners of L3 Korean might experience during their acquisition of scrambled sentences.

Besides the inherent complexity in comprehension of scrambled sentences as introduced above, the cue strength adjustment might impose complexity on the learning of L3 Korean. Learners adjust the strength of a cue to be in accordance with the cue *reliability* rather than understanding the cue strength as merely reflected in the cue *availability* during the learning process; in other words, the cue strength is a moving value in the acquisition process (MacWhinney 1992: 4). In this sense, we assume that cue strength adjustment in subsequent language learning could add a complexity for learners in processing Case, especially when learners have to acquire a new cue that differs in reliability from their L1 cue. For example, L1 Chinese and/or English speakers not only have to learn a new cue, Korean CMs, but also have to learn a new hierarchy of cue strength in comprehending Case in L3 Korean. As CMs in Korean have higher cue reliability and cue strength consistently over canonical WO cues, the learners have to unlearn their L1 habit of primarily relying on the canonical WO cue. Thus, adjusting cue strengths between WO and CM, i.e., learning scrambled structure in Korean, can increase complexity for learners of L1 English or Chinese.

Furthermore, the universal influence of the animacy cue would contribute to a complexity in learning additional languages if learners have to adjust the cue strength acquired from L1. Gass (1987) proposes that the animacy cue may have a universal prepotency in L2 learning as well as L1 acquisition, based on the finding regarding the difference between English learners of Italian and Italian learners of English. English speakers learning Italian L2 were quicker in dropping their strong English L1 habit to rely on WO cue for determining subject and acquiring the Italian monolingual's tendency to rely on the animacy cue; in contrast, Italian speakers learning English L2 were slower in transitioning from their L1 perspective to rely on the animacy cue to the English monolingual speaker's tendency to use the WO cue. The cue strength of animacy has

been found relatively high in Mandarin (Miao 1981; Li et al. 1993; Su 2001) and English (MacWhinney 1977; Bates and MacWhinney 1982). However, to our knowledge, there are no studies that investigated the acquisition of scrambled sentences in L3 so far.

For instance, when comprehending scrambled sentences that present a non-canonical word order and a non-canonical animacy order in Korean, then Chinese or English learners would have to apply newly learned cue hierarchy of L3 Korean that differs from their L1s. Thus, we postulate that scrambled sentences increase complexity in identifying Case of L3 for the early bilingual learners. It has been argued that the types of linguistic patterns yielding complexity and the degrees of difficulty that language users experience during the process of comprehension and production of a particular language may vary depending on *language user types*, i.e., whether they are speakers or hearers, or the learners of L1 or L2 (Miestamo 2008: 24-29). Based on this assumption, we further postulate that the comprehension of Case of arguments in scrambled sentences of L3 Korean provides different degrees of cognitive burden to the participants who have different types of L2 learning experience. To test this assumption, we will compare performance in scrambled sentences of L3 Korean between early bilinguals without any L2 learning experience before L3 Korean and early bilinguals with L2 learning experience, and between early bilinguals with L2 Japanese learning experience and bilinguals who have learned L2s other than Japanese.

2.5 Grammaticality judgement task

In language acquisition, there are two types of knowledge that are in charge of different activities, namely, implicit knowledge and explicit knowledge. According to Ellis (2005), implicit knowledge is intuitive and procedural, variable but systematic, usually accessed by means of automatic processing and during fluent performance, and not verbalizable; there also seem to be age-related constraints regarding learners' ability to acquire it. Conversely, explicit knowledge is conscious and declarative, often anomalous and inconsistent, and is accessed through controlled processing; it is a tool to achieve control in linguistic problem solving, is potentially verbalizable, and can be learned at any age. Therefore, implicit and explicit knowledge should be measured through different methodology.

An untimed GJT, a traditional methodology to examine explicit metalinguistic

knowledge (Ellis 2005, 2009), was adopted in the current study. Yet, it is worth noting that there have been inconclusive results reported from various studies investigating the effect of task stimulus and time pressure in results. Gutiérrez (2013) extensively reviewed a body of work regarding this aspect: some previous work reported that L2 learners performed better in grammatical items over ungrammatical items (Marten 1988; Ellis 1991), whereas some found opposite trends (Bley-Vroman et al. 1988). Additionally, other studies indicated that L2 proficiency (Gass 1983) or time pressure (Loewen 2009) would induce incongruity (see Gutiérrez (2013) for details) in investigating task effect. Gutiérrez (2013) reported that grammaticality of GJT stimulus affects the L2 learner's performance significantly, and this difference was attributed to the type of knowledge that learners resort to; implicit knowledge for grammatical items and explicit knowledge for ungrammatical items in untimed GJT. Therefore, it was suggested to consider task effect in reading results.

2.6 Hypothesis

Based on the discussion on complexity of scrambled sentences, language transfer and beneficial effect of formal L2 learning experience, we have two research questions to address in this study.

(8) i. Does word order scrambling increase complexity on the acquisition of L3
Korean by Singaporean early bilinguals?
ii. If word order scrambling causes complexity for L3 learners, do formal L2
learning experience or L2 typological proximity facilitate learning the
scrambled structure in L3 Korean?

3. The study

3.1 Participants

148 adult early bilinguals whose L1s are English and heritage language (e.g., Chinese, Malay, or Indonesian) participated in the study. Among those, 121 participants studied no other non-L1s before Korean (EBLs) while 27 participants studied other L2(s) prior

to Korean (EBLs+L2) after the age of six. Those L2s include Japanese, French, German, Thai, Indonesian, Arabic, Chinese and Malay. To examine potential facilitative linguistic transfer from typologically close languages to L3 Korean, regarding scrambling, 14 participants were categorized as early bilinguals with L2 Japanese that shares case-marking system and scrambling feature (EBLs+Jp), and 13 participants were categorized as early bilinguals with L2s that do not share case-marking systems (EBLs+nonJp). The current study follows Hammarberg's (2001) terminology in using the term L3 to refer to the current target language, i.e., Korean, in order to maintain terminological consistency across participant sub-groups. L1 refers to any languages learned before the age of eight, while L2 refers to any other languages studied in a formal setting before the target language (Park and Starr 2015). The information of learner groups is shown in Table 1.

Table 1. Language background information of learner groups

L1s	EBL	EBL+L2		Total
		L2 Japanese	Others L2s	
English – Chinese	111	13	10	134
English – Indonesian	3	1		4
English – Malay	5		3	8
English – Tamil	1			1
English – Vietnamese	1			1
Sub-total		14	13	
Total	121	27		148

Proficiency level of L2s varies from lower novice to advanced, but the current study does not evaluate the impact of L2 proficiency due to smaller group size.

The participants studied Korean at the university level in a formal setting for 10 weeks in a credited course. CMs in Korean were introduced to the participants at the second week of the course, as they are the crucial part of sentence construction.

3.2 Methodology

A language background survey and an untimed GJT were used to collect data. The language background survey gathered the students' primary and secondary home-languages, any L2s, age of acquisition of L2s, mode of learning (formal or

informal), and L2 proficiency. Subsequently, participants completed an untimed GJT in Korean.

The GJT in the current study consisted of four different sentence structures with transitive verbs to examine structural complexity such as WO scrambling (i.e., the violation of a canonical WO of nouns, e.g. (6)) in the acquisition of an L3. Design of test items was based on manipulating the places of conflicts among three case-marking cues from lexical entry (i.e., animacy cue) and syntactic perspectives (i.e., explicit CMs and WO cue). These cues in Korean may or may not support each other in a canonical way - that is where cue competition occurs. As explained earlier, the CM cue has a higher cue strength than the WO cue in Korean (6), and the animacy cue has a universal prepotency cross-linguistically (MacWhinney 1977; Gass 1987). For instance, a mismatch between canonical WO cue and the CM cue in Korean leads to WO scrambling but not grammatical violation, as long as CM cue is aligned with animacy cue, as suggested in Grammatical/Scrambled in Table 2. However, a mismatch between the CM cue and the animacy cue leads to ungrammaticality, as in Ungrammatical/Scrambled in Table 2. Therefore, we created an ungrammatical sentence by replacing the CMs of the arguments in the grammatical sentences with mismatching CMs.

Table 2. Exemplified test items

Grammaticality	Category	Sentence		
Grammatical	Non-Scrambled	sensayngnim-i teacher-NOM	kkoch-ul flower-ACC	sayo. buy
	Scrambled	theynisu-lul tennis-ACC	enni-ka sister-NOM	payweyo. learn
Ungrammatical	Non-Scrambled	*oppa-lul brother-ACC	senmwul-i gift-NOM	mantuleyo. make
	Scrambled	*kicha-ka train-NOM	emeni-lul mother-ACC	thayo. ride

* NOM=nominative CM, ACC=accusative CM

Among grammatical sentences, in 'teacher-NOM flower-ACC buy' (Grammatical/Non-scrambled), all three cues are suggesting that NP1 is subject/agent, and NP2 is object/patient; on the other hand, in 'tennis-ACC sister-NOM learn' (Grammatical/Scrambled), the WO cue conflicts with the CM cue, yet the animacy cue and CM cue support each other. Among ungrammatical sentences, in 'train-NOM mother-ACC ride' (Ungrammatical/Scrambled), WO and CM cues indicate that NP1 is

subject/agent, and NP2 is object/patient, but the animacy cue conflicts with the CM cue; and in 'brother-ACC gift-NOM make' (Ungrammatical/Non-scrambled), WO and animacy cues suggest that NP1 is subject/agent and NP2 is object/patient, but the CM cue is in conflict with the animacy cue[4].

The 2 by 2 structure of the GJT, as a result, was formed with scrambling factor and grammaticality factor to investigate potential effect of those two factors. Two-argument transitive verbs were selected from the course textbook to form test items. Four test items for each structure (16 test items altogether) were presented with 54 filler items. The participants were asked to rate each test item on a four-value scale: Correct, Probably Correct, Probably Wrong, and Wrong. Coding for analysis was done in a continuous manner. A correct response to the test item was coded as 4 and a wrong response was coded as 1. For instance, choice of 'Correct' to a grammatical sentence was coded as 4, whereas the same choice to an ungrammatical sentence was coded as 1.

4. Results

4.1 The effect of scrambling

As predicted, scrambling was found to be significantly impactful both in grammatical sentences ($t(147)= 12.3892$, $p<.0001$) and ungrammatical sentence ($t(147)= 3.0284$, $p=.0029$), meaning that WO scrambling imposes a statistically reliable complexity in L3 Korean.

Table 3. GJT mean score (out of 4)

Grammaticality	Sentence type	Mean score
Grammatical	Non-Scramble	3.75
	Scramble	2.67
Ungrammatical	Non-Scramble	3.79
	Scramble	3.65

4　We are aware that there can be conflict between WO/CM cues and animacy cue (i.e., Typhoon-NOM Toby-ACC blew away) in some grammatical sentences in Korean. However, the current study only uses sentences with highly transitive verbs that require animate nouns for subject/agent and inanimate nouns for object/patient.

A 2 by 2 factorial ANOVA was conducted to compare the main effects of grammaticality and sentence type and the interaction effect between grammaticality and sentence type on the GJT performance. The results showed a significant interaction between two factors ($F(1, 147)=88.0976$, $p<.0001$). Post-hoc tests on scrambling showed that participants experienced significant difficulties in judging grammaticality of the correct sentences ($t(147)=12.3892$, $p<.0001$), and of the incorrect sentences ($t(147)=3.0284$, $p=0.0029$). However, the significance is larger in grammatically correct sentences compared to incorrect sentences due to exceptionally poor performance in Grammatical/Scrambled sentences ($M=2.67$). On the other hand, post-hoc tests on task effect in each structure revealed that grammaticality-judging is significantly difficult in scrambled sentences ($t(147)=9.5826$, $p<.0001$), but grammaticality is not a significant factor in non-scrambled structures. It is because scrambling elicited a negative response for both grammatical and ungrammatical sentences, regardless of their true grammaticality, which resulted in good performance on ungrammatical sentences ($M=3.65$) and poor performance on grammatical sentences ($M=2.67$).

4.2 The impact of L2 learning experience

To investigate the impact of L2 learning experience in resolving complexity in learning scrambled structures, two-factor ANOVA with repeated measures on structures analysis was conducted.
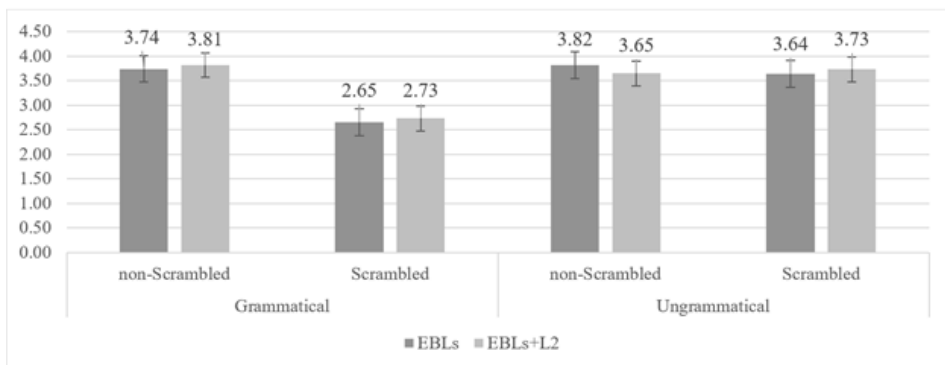

Figure 1. GJT accuracy of EBLs and EBLs+L2 by Grammaticality and Sentence type

A factorial ANOVA was conducted to find the interaction effect between sentence type and L2 learning experience on the GJT performance. For ungrammatical sentences, a significant interaction between L2 learning experience and scrambling was found (F(1, 146)=5.43, p=.021163). Yet, no significant difference was found in grammatical sentences. Post-hoc tests found a significant impact from L2 learning experience in Ungrammatical/Scrambled (t(146)=1.9990, p=.0475). The in-depth discussion is reported in chapter 5.

4.3 The impact of L2 typological proximity

L2 typological proximity regarding the use of CM cue and WO cue for comprehending Case was found to be not significant in the GJT, similar to result shown in Park and Starr (2015).
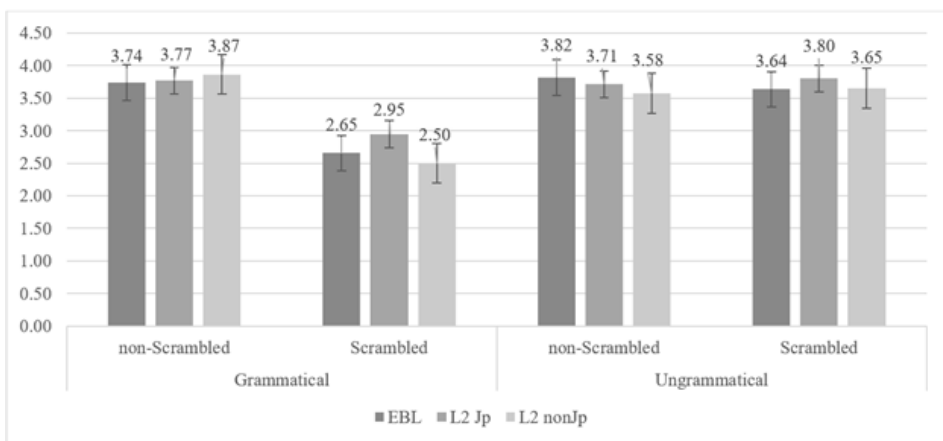

Figure 2. GJT accuracy of EBLs, EBLs+Jp, and EBLs+nonJp by Grammaticality and Sentence Type

A factorial ANOVA to compare the main effects of sentence type and typological proximity was conducted, and the interaction effect between sentence type and typological proximity on the GJT performance found not significance between groups both in grammatical and ungrammatical sentences.

Further, scrambling effect in four difference participant groups was investigated and the results are shown in Table 4.

Table 4. Impact of scrambling in grammatical and ungrammatical sentences by participant group

Group	Grammatical	Ungrammatical
EBLs	$t(120)= 11.0489$**	$t(120)=3.8125$**
EBLs+L2	$t(26)= 5.5497$**	$t(26)=0.8130$
EBLs+Jp	$t(13)=3.1919$*	$t(13)=0.5556$
EBLs+nonJp	$t(12)=4.7850$**	$t(12)=0.5876$

* *p<.05*
** *p<.001*

In grammatical sentences, four participant groups were all significantly influenced by scrambling, yet a greater significance was found from EBLs, compared to other groups. However, in ungrammatical sentences, a reliable effect of scrambling was found only from EBLs, meaning that only EBLs were significantly influenced by scrambling in their performance, while other participant groups were not.

5. Discussion

In the discussion, we present the analysis of the results to address research questions. First, we will identify relevant factors contributing to the structural complexity found in the acquisition of WO scrambling in L3. Second, we will further discuss the beneficial effect from formal L2 learning experience as holistic support rather than linguistic transfer.

5.1 Structural complexity

The results from GJT support that manipulation of WO increases complexity in the performance of L3 Korean. We propose that such complexity of scrambled structure is due to L1 transfer from a tendency of strong reliance on canonical WO and animacy order in English and Chinese, instead of a newly learned cue, i.e., explicit CM.

In GJT, explicit morphological CMs in scrambled sentence were not interpreted accordingly, probably because learners relied on a canonical animacy order, i.e., animate NP1 and inanimate NP2, due to the higher association between WO cue and animacy cue in L1s. Scrambled structures follow non-canonical animacy order, inanimate noun

preceding animate noun for both of grammatical and ungrammatical structures. Participants judged the sentences with inanimate NP1 as "Wrong" without attending to CMs. Unlike performance in scrambled structures, participants were able to judge non-scrambled structures as correct or wrong respectively by paying attention to whether CMs correctly supported an animacy cue or not. Both Grammatical/non-scrambled and Ungrammatical/non-scrambled structures follow the canonical animacy order, yet differ in grammaticality due to CM displacement as shown in Table 5.

Table 5. Type of WO scrambling in test items

Category		Structure	
Grammatical	non-Scrambled	Agent/+animacy-NOM	Patient/-animacy-ACC
	Scrambled	Patient/-animacy-ACC	Agent/+animacy-NOM
ungrammatical	non-Scrambled	Agent/+animacy-ACC	Patient/-animacy-NOM
	Scrambled	Patient/-animacy-NOM	Agent/+animacy-ACC

A possibility of simple CM displacement or imperfect acquisition of CM to be responsible for complexity was rejected due to the outperformance in Ungrammatical/non-scrambled sentences (M=3.79). In this structure, an accusative marker that preceded a nominative marker was not perceived as a trigger of grammatical violation in judging the grammaticality of sentences. Instead, participants were able to judge the sentences with animate NP1 with an accusative marker "Wrong," as a result of decoding CMs correctly. Consequently, for transitive sentences with animated nouns followed by inanimate nouns, learners judged grammaticality of the sentences with an equivalent level of accuracy both for grammatical and ungrammatical sentences (see Table 3).

We also speculated if learners formed a strong association between animate NPs and nominative CM, and between inanimate NPs and accusative CM. However, this possibility was rejected based on the significant poor performance in Grammatical/Scrambled (M=2.67) that presented inanimate NPs with an accusative CM.

Based on the results from GJT and analysis presented above, it is logical to identify the rigidity of canonical word order and animacy order as a major L1 influence, on which a parser continues to heavily relies in the acquisition of L3 Korean's case-assignment strategy. And this argument supports the transfer of WO rigidity from their L1s (Odlin 1989), universal prepotency effect of animacy (Gass 1987), and a consequent cue strength

adjustment during L2 learning process (MacWhinney 1992), which seem to be the major cause of complexity in the acquisition of L3. A series of previous findings suggest that animacy not only influences the online computation of thematic relationships between a verb and its arguments (Kuperberg et al. 2007)[5], but also may have a universal prepotency effect in the acquisition of L1 and L2, in comparison to the WO cue (MacWhinney 1977; Gass 1987).

Thus, explicit case-marking morphemes were more likely to be correctly decoded when animate NP1 was followed by inanimate NP2. Conversely, non-canonical animacy order imposed difficulties in decoding case-marking morphemes. Even though learners learnt the new cue, CM, at declarative level, their perceived cue strength of CM might have not over-ride the cue strength of canonical WO and animacy order yet, due to their L1 influence of WO rigidity.

5.2 The beneficial effect from formal L2 learning experience

The examination on the effect of late bilingualism and L2 typological proximity in the acquisition of scrambled structures revealed that formal L2 learning experience conditionally facilitates learners shift their attention from familiar cues to a newly learned morphological case-marking cue to resolve complexity of L3 structure, regardless L2 typological proximity.

We put forward that L2 learning experience enhances ability to perceive and interpret CM cue correctly despite additional complexity from the violation of canonical WO and canonical animacy order. As reviewed in Bialystok (2011), the specific advantages in cognitive development of bilinguals are control of attention and executive procedures for monitoring information and resolving conflict. The beneficial effect of late bilingualism in the acquisition of complex L3 structures that is found from the current study supports Bialystok's enhanced control ability. After the participants were exposed to L3 input that

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5   It is argued that in English the animacy of NPs is closely related to thematic role assignment by a verb (Jackendoff 1972): for example, the verb eat assigns the role of agent to an animate NP, and is more likely to assign the role of theme to an inanimate NP. Supporting evidence for this semantic correlation between English verbs and the animacy of their argument NPs has been found in Kuperberg et al. (2007), where in neurolinguistic experiments, P600 effect was evoked by verbs whose thematic structures were violated by their preceding inanimate NP arguments (regardless of the existence of semantically (un)related context), as in At breakfast the eggs would eat or At breakfast the eggs would plant…. This finding suggests that the animacy of thematic roles assigned by individual verbs impact the online processing of verbs in active English sentences.

proposes a higher cue strength of CMs, EBLs+L2 can adjust cue hierarchy and shift attention from familiar cues to a critical cue in GJT more effectively. In other words, EBLs+L2's outperformance of EBLs is attributed to the enhanced control ability which helps learners to shift their attention from a canonical WO and animacy order to a critical explicit morphological cue.

Furthermore, the result showed that grammaticality of the test items plays a role in the beneficial effect. Why is a significant impact of L2 learning experience only found in ungrammatical sentences? In fact, sentence grammaticality is based on a different pairing between two cues as shown in Table 2 in this paper. A mismatch between the CM cue and the animacy cue, not only leads to grammatical violation, but also leads to an extra novel construction such as an animate noun marked with an accusative marker and an inanimate noun marked with a nominative marker. This finding supports a previous finding from Park and Starr (2015). They found that EBLs+L2 acquired ungrammatical scrambled sentences significantly better than EBLs, and the authors argued it was due to the enhanced sensitivity to new structures from formal L2 learning experience.

On the other hand, the results provided no strong evidence for direct linguistic transfer from typologically close L2 on L3. The findings from this study do not support the CEM, the L2SF, the TPM, and the LPM in resolving structural complexity of an L3, due to a lack of statistical evidence for linguistic transfer. In sum, among the attested factors, a reliable interaction with WO scrambling was found only from late bilingualism, regardless of typological proximity between L2 and L3. We would like to put forward potential explanation for this result.

First, typological proximity between languages needs to be explicitly recognized (Bardel and Falk 2012; Rothman 2015) for learners to exercise transfer. In other words, beneficial effect of typological proximity is genuinely coming from perceived proximity (Rothman 2015) and there will be no beneficial effect or even negative effect if proximity is not recognized. The fact that L2 typological proximity was not found from the current study implies that learners have not yet reached the stage of recognizing typological proximity. In addition, L2 proficiency level matters similarly in experiencing typological proximity effect. Jaensch (2009) reported that advanced L2 proficiency level is positively correlated with successful learning of a morphosyntactic feature in L3. Yet, in the current study, the proficiency level of L2 Japanese among 14 participants varies from lower Novice to Advanced. Due to the limited number at each proficiency level, we could not

investigate statistically the role of L2 proficiency further.

Second, the findings support previous works claiming enhanced metalinguistic awareness (Sanz 2000; Park and Starr 2015) and enhanced feature sensitivity (Jaensch 2009) in subsequent language learning as well as control ability development from bilingualism (Bialystok 2011). These factors of influence are different from linguistic transfer from L1 or L2 to L3. In the current result, attention shift seems to be attributed to an outperformance of EBLs+L2 in line with Bialystok (2011).

Lastly, the main benefit of late bilingualism particularly is known to lie in the acquisition of unfamiliar structures (Jaensch 2012; Park and Starr 2015). Given WO scrambling is relatively newer phenomena, the results of reliable interaction between WO scrambling and late bilingualism is in line with the previous findings. Thus, we argue that late bilingualism is significantly influential in the acquisition of the novel complex scrambled structure in learning L3 Korean.

Consequently, the current result supports the hypothesis that cognitive impact of L2 learning experience, rather than linguistic transfer, occurs in the acquisition of complex structure of L3. Based on the analysis, we argue that general L2 learning experience benefits learners with ability to suppress dominant L1 influence in decoding Case, such as relying on L1 cue hierarchy, and with ability to accommodate a new cue hierarchy conformed to L3 exposure. And this whole mechanism is more vivid when learners are handling tasks with ungrammatical test items that require explicit knowledge.

6. Conclusion

The current study investigated the structural complexity from WO scrambling in L3 Korean, a novel feature from L1s, and the learning mechanism of such complex structure. Further, a possibility of formal L2 learning aiding learners to resolve the structural complexity, as well as L2 typological proximity was examined.

The results suggested that scrambling caused a complexity for Singaporean early bilingual learners of L3 Korean due to the L1 (English/Chinese-Malay) influence of WO rigidity ('transfer to nowhere' Kellerman 1995) and the L1 tendency to depend on the strong association between canonical WO and animacy cue. Learners learned better explicit CMs, the novel feature in L3 Korean, as long as the L1 cue hierarchy was not violated, whereas the non-canonical WO and animacy order triggered incorrect judgment

on GJT. This result points to the prepotency of animacy among case-assigning cues (Gass 1987; MacWhinney 1987; Kuperberg et al. 2007), transferability of WO rigidity (Odlin 1989), and the dominant role of L1 in decoding Case in L3 (Sanz et al 2015).

This study further found that the formal L2 learning experience rather than a direct L2 transfer facilitated the resolving of structural complexity in L3 by enhancing the metalinguistic awareness and control ability which enables learners to shift attention to the target information. Notably, a significant impact of L2 learning experience only found in ungrammatical sentences indicated that such enhanced metalinguistic awareness has a greater impact when learners utilize explicit knowledge to perform a task. Therefore, the current result does not support the L3 models arguing linguistic transfer (e.g. the CEM, the L2SF, or the TPM), yet suggests that general L2 learning experience enhances metalinguistic awareness to adjust cue hierarchy of L3 with limited L3 exposure.

Our study sheds light on the previous studies of L3 acquisition incorporating the competition model (Riestenberg et al. 2015; Sanz et al. 2015) by further providing evidence from the acquisition of L3 Korean by Singaporean early bilingual learners. In addition, an examination of a process of resolving structural complexity rather than learning a morphosyntactic feature is a new way to view the acquisition of an L3.

However, we must admit that there is still room to improve in the further studies. Having a control group with typologically close L1 to an L3 would provide a chance to compare the performance with the current participant group regarding an exact role of L1s. Or a study with mirror design in L1-L2 dynamic would provide a stronger support for the beneficial effect of L2 learning without direct linguistic transfer. Also, mixed methods could be adopted to investigate the explicit awareness of typological proximity among languages by learners in addition to empirical inference.

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