SYNTACTIC PERSISTENCE WITHIN AND ACROSS LANGUAGES
IN ENGLISH AND KOREAN L1 AND L2 SPEAKERS

By

Boon-Joo Park

Copyright © Boon-Joo Park

A Dissertation Submitted to the Faculty of the
GRADUATE INTERDISCIPLINARY DOCTORAL PROGRAM IN
SECOND LANGUAGE ACQUISITION AND TEACHING

In Partial Fulfillment of the Requirements
For the Degree of

DOCTOR OF PHILOSOPHY

In the Graduate College
THE UNIVERSITY OF ARIZONA

2007
As members of the Dissertation Committee, we certify that we have read the dissertation prepared by Boon-Joo Park entitled Syntactic Persistence Within and Across Languages in English and Korean L1 and L2 Speakers and recommend that it be accepted as fulfilling the dissertation requirement for the Degree of Doctor of Philosophy.

Date: 11/5/07

Dr. Janet L. Nicol

Date: 11/5/07

Dr. Merrill F. Garrett

Date: 11/5/07

Dr. Andrew Barss

Date: 11/5/07

Dr. Peter M. Ecke

Final approval and acceptance of this dissertation is contingent upon the candidate's submission of the final copies of the dissertation to the Graduate College. I hereby certify that I have read this dissertation prepared under my direction and recommend that it be accepted as fulfilling the dissertation requirement.

Date: 11/5/07

Dissertation Director: Dr. Janet L. Nicol
STATEMENT BY AUTHOR

This dissertation has been submitted in partial fulfillment of requirements for an advanced degree at the University of Arizona and is deposited in the University Library to be made available to borrowers under rules of the Library.

Brief quotations from this dissertation are allowable without special permission, provided that accurate acknowledgement of source is made. Requests for permission for extended quotation form or reproduction of this manuscript in whole or in part may be granted by the copyright holder.

SIGNED: BOON-JOO PARK
ACKNOWLEDGEMENTS

This dissertation would not have been possible without the support of my committees, participants, family, friends, and colleagues. I realize that my words cannot express all of my gratefulness to all of the people that contributed to the project. I know, value, and appreciate every one.

Especially, I want to thank my Dissertation Chair, Dr. Janet Nicol who has been a constant mentor, support, and guide throughout my dissertation process. Her lectures inspired me to decide on this field of language processing for the dissertation. Dr. Nicol’s words continuously encouraged me to walk through problems and, sometimes, to look beyond the obvious. Moreover, I have appreciated her since the day we met. I feel privileged to have been one of her students. Dr. Nicol’s support, kindness, and helpful suggestions have been invaluable.

I thank my Dissertation Committee Members, Dr. Merrill F. Garrett, Dr. Andy Barss, and Dr. Peter Ecke for their constant encouragement, their insightful comments, and sharing of knowledge through the dissertation process. It would have been impossible without their extensive input.

I am also greatly indebted to Professor Sunae Lee at the University of California, Santa Barbara (UCSB) who helped me to collect data from her students. I am also grateful to Hyobin Kang and Jaeun Jung for their assistance with experiments and helping with transcriptions. I want to thank all the participants at the University of Arizona, the Critical Language Program at the U of A, and at the University of California, Santa Barbara. I am also grateful to Social Behavior Science Research Institute (SBSRI), from which I received financial support for subject payments and travel to UCSB for my dissertation.

Many thanks to my good friends and peer mentors at the University of Arizona, especially Kamolthip Phonlabutra, Hyunok Ahn, Brittany Lindsey, Karen Barto-Sisamout, and Timothy Murphy. Their comments, advice, and positive encouragement helped me throughout my experience in the SLAT program.

I am blessed with a great family in Korea and a family in Tucson that supported my education with patience. Especially, I am extremely grateful to my husband, Weonhak Jung, and my parents, sisters, and a brother, who have been the driving force all along from afar, Korea. Here in Tucson, I appreciate my son, Hyunchae, for his patience. Also, I am also thankful to Mr. Kevin White and his family for all the support and encouragement.
DEDICATION

I wish to dedicate this dissertation to my husband, Weonhak Jung, who provided with much support and encouragement from Korea. And to my son, Hyunchae Jung, who stayed with me in Tucson and showed much patience and understanding.
# TABLE OF CONTENTS

**LIST OF TABLES** .........................................................................................................................................................................................10

**LIST OF FIGURES** ..........................................................................................................................................................................................11

**ABSTRACT** .................................................................................................................................................................................................12

**CHAPTER 1: INTRODUCTION** ........................................................................................................................................................................14

1.1 Theoretical background .............................................................................................................................................................................14

1.1.1 The studies of syntactic persistence in experimental setting ........................................................................................................15

1.1.2 Potential influence on syntactic priming effects ..........................................................................................................................28

1.1.3 The studies of syntactic persistence across languages ..............................................................................................................31

1.1.4 The studies of syntactic persistence in L2 production ..................................................................................................................36

1.2 The current study ....................................................................................................................................................................................38

**CHAPTER 2: SYNTACTIC PERSISTENCE IN L1 AND L2 PRODUCTION OF ENGLISH** ..............................................................................40

2.1 Experiment 1A .......................................................................................................................................................................................41

2.1.1 Method .............................................................................................................................................................................................41

  **Participants** ................................................................................................................................................................................................41

  **Materials** ................................................................................................................................................................................................42

  **Design** ................................................................................................................................................................................................44

  **Procedure** ................................................................................................................................................................................................45

  **Scoring** ................................................................................................................................................................................................48

2.1.2 Results and Discussion ...........................................................................................................................................................................49

  **Transitive utterances** ..............................................................................................................................................................................49

  **Dative utterances** ....................................................................................................................................................................................51
TABLE OF CONTENTS – continued

Discussion .................................................................................................................. 53

2.2 Experiment 1B .................................................................................................... 54

2.2.1 Method ......................................................................................................... 54

Participants ............................................................................................................ 54

Materials .................................................................................................................. 55

Procedure ................................................................................................................ 56

Scoring ..................................................................................................................... 56

2.2.2 Results and discussion ................................................................................ 57

Transitive utterances ............................................................................................. 57

Dative utterances ................................................................................................... 59

Discussion .............................................................................................................. 60

CHAPTER 3 SYNTACTIC PERSISTENCE IN L1 AND L2 PRODUCTION OF KOREAN
.................................................................................................................................. 61

3.1 Experiment 2 .................................................................................................... 68

3.1.1 Method .......................................................................................................... 68

Participants ............................................................................................................ 68

Materials and design ............................................................................................ 69

Procedure ................................................................................................................ 71

Scoring ..................................................................................................................... 71

3.1.2 Results and Discussion ................................................................................ 74

Transitive utterances ............................................................................................. 74

Dative utterances ................................................................................................... 77
### TABLE OF CONTENTS - continued

Discussion ..................................................................................................78

CHAPTER 4 SYNTACTIC PERSISTENCE WITH CROSS-LANGUAGE PRIMING IN KOREAN AND ENGLISH ...............................................................................................81

4.1 Experiment 3 .............................................................................................85

4.1.1 Method ....................................................................................................85

Participants .................................................................................................85

Materials and design ..................................................................................86

Procedure ...................................................................................................87

Scoring .......................................................................................................88

4.1.2 Results and Discussion ...........................................................................88

Transitive utterances ..................................................................................89

Dative utterances ........................................................................................92

Discussion .................................................................................................95

CHAPTER 5 GENERAL DISCUSSION ..................................................................99

5.1 Summary of findings ................................................................................99

5.2 Syntactic persistence within languages ..................................................102

5.3 Syntactic persistence across languages ...............................................107

5.4 Syntactic priming as an implicit learning in language acquisition ..........113

5.5 Limitations and suggestions for further study ..........................................116

APPENDIX A: Items for Experiment 1A ......................................................118

APPENDIX B: Items for Experiment 1B ......................................................120

APPENDIX C: Items for Experiment 2 ........................................................122
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPENDIX D: Questionnaire on Language History and Proficiency</td>
<td>124</td>
</tr>
<tr>
<td>APPENDIX E: Human Subjects Approval</td>
<td>125</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>126</td>
</tr>
</tbody>
</table>
LIST OF TABLES

Table 2.1: Examples of Priming Sentence from Experiment 1A.................................43

Table 2.2: Proportions of Dative Utterance Forms Produced in the Two Dative Syntactic
Priming Conditions in English as L1 and L2 in Experiment 1A.................................50

Table 2.3: Proportions of Dative Utterance Forms Produced in the Two Dative Syntactic
Priming Conditions in English as L1 and L2 in Experiment 1A.................................52

Table 2.4: Proportions of Active and Passive Utterances Produced in the Two Transitive
Priming Conditions in L1 and L2 English for Experiment 1B .................................57

Table 2.5: Proportions of Dative Utterances Produced in the Two Dative Priming
Conditions in L1 and L2 English for Experiment 1B..................................................59

Table 3.1: Examples of Priming Sentence Sets from Experiment 2............................70

Table 3.2: Proportions of Active and Passive Utterances Produced by L1 and L2 Korean
Speakers in the Two Prime Conditions (active, passive) for Experiment 2 ...............75

Table 3.3: Proportions of ACC-DAT Dative and DAT-ACC Dative Utterances Produced
by L1 and L2 Korean Speakers for Experiment 2 .....................................................77

Table 4.1: Proportions of Transitive Utterances Produced in the two Cross-linguistic
Transitive Priming Conditions by Korean-as-L2 speakers in Experiment 3 .............90

Table 4.2: Proportions of Transitive Utterances Produced in the Two Cross-linguistic
Transitive Priming Conditions by English-as-L2 speakers in Experiment 3 .............91

Table 4.3: Proportions of Dative Utterances Produced in the Two Cross-linguistic Dative
Priming Conditions by Korean-as-L2 speakers in Experiment 3 ..............................93

Table 4.4: Proportions of Dative Utterances Produced in the Two Cross-linguistic Dative
Priming Conditions in English-as-L2 speakers in Experiment 3 .............................94

Table 4.5: Frequency of ‘Success’ or ‘Fail’ in the L2 Prime Trials of Korean-as-L2 and
English-as-L2 Speakers in Experiment 3 .................................................................96

Table 5.1: Summary of Results of Experiments for the Within-language Priming
Condition (both L2-English and L2-Korean speakers) .................................................100

Table 5.2: Summary of Results of Experiments for Cross-language Priming Condition
both L1 and L2 Korean and English Speakers .........................................................102
LISTS OF FIGURES

Figure 2.1 Examples of Target Pictures from Experiment 1A .................................................43

Figure 2.2: Procedures for Language Production with Syntactic Priming from Experiment 1A.......................................................................................................................................47

Figure 5.1: An overview of the language production process (adapted from Bock & Levelt, 1994; Garrett, 1982)..............................................................................................................................106

Figure 5.2: Example of lexical entries for “to chase” and “to hit” in an integrated account (shared lexicon, shared syntax) account of bilingual language representation, adapted from Hartsuiker et al.(2004)..................................................................................................................111

Figure 5.3: Asymmetry activation between L1 and L2, from Schoonbaert et al.’s adapted model Hartsuiker et al. (2004) ..................................................................................................................112
ABSTRACT

During the production of language, speakers tend to use the same structural patterns from one utterance to the next if it is possible to do so. For example, if a speaker uses a passive or dative construction, he/she is relatively more likely to use the same construction again in the next utterance (e.g., Bock, 1986; Bock & Loebell, 1990; Hartsuiker & Kolk, 1998): the sentence structure “persists”.

The current study investigates syntactic persistence in first and second language speakers of English and Korean using within-language primes (Experiments 1A, 1B, and 2) and across-language primes (Experiment 3). The target structures were transitive alternate structures (active and passive) and dative alternate structures (double object dative/DAT-ACC dative and prepositional dative/ACC-DAT dative). The experimental paradigm involved repetition of an auditory stimulus, followed by picture description.

Overall, syntactic priming effects were found, although various magnitudes were observed as a function of structure; strong effects were found for “shared” syntactic constructions across languages (e.g., active vs. passive) and weak priming effects were found for syntactic constructions not shared (e.g., double object dative vs. prepositional dative) between English and Korean. Other asymmetrical priming effects were observed, reflecting differences between Korean and English such that reliable priming effects were found from L1 to L2, but not from L2 to L1 for Korean-as-L2 speakers (English-as-L1). These patterns of asymmetrical priming imply that cross-linguistic differences might interfere with syntactic persistence in production process unless speakers are highly advanced proficient bilinguals. Also, the present study showed that syntactic priming
appears to be sensitive to the order of case-marked phrases in the cross-language priming condition. This finding indicates that the order of case-marked arguments is involved in syntactic repetition. It sheds light on further universal accounts of syntactic priming.
CHAPTER 1
INTRODUCTION

1.1 Theoretical background

During the production of language, speakers tend to use the same structural patterns from one utterance to the next. *Syntactic persistence*¹ is a phenomenon in which a form is carried over across utterances when speakers produce sentences in natural conversation, or when they read aloud or repeat just–heard sentences. For example, if a speaker uses a passive or dative construction, he/she is more likely to use the same construction again in the next utterance. Evidence of syntactic persistence has been found in spontaneous speech production, as shown in reports of speech errors, sociolinguistic data, and corpora (Schenkein, 1980; Levelt & Kelter, 1982), but it has also been observed in experimentally elicited language production (Bock, 1986; Bock & Griffin, 2000; Branigan, Pickering, Liversedge, Stewart, & Urbach, 1995; Pickering, Branigan, & McLean, 2002; Hartsuiker & Kolk, 1998a, 1998b).

As an instance of spontaneously occurring syntactic persistence, Levelt and Kelter’s (1982) sociolinguistic data from telephone surveys show that the forms in the questions are carried over in the answers, such as “Q: *At* what time does your shop close? – A: *At* five o’clock,” and “What time does your shop close? - A: Five o’clock.”(Levelt & Kelter, 1982). Another example comes from corpus data of normal conversation between two bank robbers: “... *the noise downstairs, you’ve got to hear and witness it to realize*...”

¹ In this paper, the terms ‘syntactic persistence’, ‘syntactic priming’, ‘structure priming’, or ‘structure repetition’ are used interchangeably.
how bad it is” and “You have got to experience exactly the same position as me, mate, to understand how I feel” (Schenkein, 1980). This phenomenon has been documented in other work as well, where the structure is carried over to the other utterance during conversational exchanges (Estival, 1985; Schenkein, 1980; Weiner & Labov, 1983).

1.1.1 The studies of syntactic persistence in experimental setting

With regard to experimental work, it has the advantage that the environment is more controlled to reduce the potential for confounds that appear within normal conversation, and therefore alternative explanations in the production process can be ruled out (Bock & Levelt, 1994). Also, experimental studies can examine features of language production that spontaneous speech errors do not demonstrate clearly. In the experimental domain, various techniques have been used to investigate speakers’ unconscious language production while the speakers were engaged in the tasks. Methods have included primed sentence production tasks disguised as memory tasks (Bock, 1986; Bock & Loebell, 1990; Bock & Griffin, 2000; Hartsuiker & Kolk, 1998b), written sentence completion tasks (Branigan, Pickering, Liversedge, Stewart, & Urbach, 1995; Pickering & Branigan, 1998; Pickering, Branigan, & McLean, 2002), internet-based tasks (Corley & Scheepers, 2002), sentence recall tasks (Fox Tree & Meijer, 1999; Meijer & Fox Tree, 2003), and a dialogue game (Branigan, Pickering, & Cleland, 2000; Hartsuiker, Pickering, & Veltkamp, 2004; Schoonbaert, Hartsuiker, & Pickering, 2007). Also, particular syntactic structures are used for target structures in the experimental settings. The essential requirement for target structures is that roughly the same message should be
“mappable” onto an alternative structure. These have included active vs. passive, double object dative vs. prepositional dative, and noun phrase vs. relative clause. Most of the research to date has focused on active vs. passive, and dative alternative forms such as double object dative vs. prepositional dative (Bock, 1986; Bock, 1989; Bock & Griffin, 2000; Bock & Loebell, 1990; Branigan, Pickering, & Cleland, 1999, 2000; Corley & Sheepers, 2002; Hartsuiker & Kolk, 1998a, 1998b; Hartsuiker, Pickering, & Veltkamp, 2004, Pickering, Branigan, & McLean, 2002; Potter & Lombardi, 1998; Schoonbaert, Hartsuiker, & Pickering, 2007).

As mentioned above, a variety of tasks have been used in the study of syntactic persistence. Bock (1986) used a picture description task coupled with a memory task, asking the subjects whether they recognized the sentences and pictures that were presented in the study phase. The purpose of this method is to minimize the subjects’ attention to their speech production. Therefore, the process requires participants to not only repeat sentences aloud and to describe pictures, but also to indicate whether the sentences or pictures had occurred previously. This methodology is considered effective for measuring unconscious language processing by distracting the subjects from consciousness of their speech, and also from their attention to the target structures. This methodology has been replicated in a number of studies. In Bock’s (1986) study, active and passive transitive and dative alternative forms were investigated. Significant main effects were observed in both transitive and dative utterances, and dative utterance forms showed a more salient priming effect than transitive utterance forms did.
Subsequent studies showed syntactic persistence effects in different modalities. For example, Pickering and Branigan (1998) and Pickering, et al. (2002) used written sentence completion tasks in their experiments. In this task, the participants were asked to complete sentences in booklets which contained sentence fragments. Examples of prime and target fragments are presented below in (1).

(1) Prime and target fragments (Pickering & Branigan, 1998)

A. Prime fragments
   a. The racing driver showed the torn overall…
   b. The racing driver showed the helpful mechanic…
   c. The racing driver gave the torn overall…
   d. The racing driver gave the helpful mechanic…

B. Target fragment
   The patient showed…

Pickering and Branigan (1998) found dative structures in prime fragments facilitated corresponding dative target sentence completion. Also, they found priming effects in various other conditions, in which verbs were manipulated in different ways (such as same vs. different verbs, tense, aspect, and number). Using repeated verbs between the prime and target fragments completion task increased the priming effect. However, varying the features (e.g., tense, aspect, and number) did not appear to affect priming. Pickering, Branigan, and McLean (2002) used two different methods in their
study: the written sentence completion task (which was used in their Experiment 3) and the spoken sentence completion task in Experiment 4 (in which subjects read aloud the fragments and completed the sentences). These yielded similar patterns of priming for dative structures to each other.

Following Pickering and Branigan (1998), Corley and Scheepers (2002) used a similar method to conduct syntactic priming experiments on the internet (using WebExp experimental software, Keller, Corley, Corley, Konieczny, & Todirascu, 1998). Having found a similar pattern to the results from Pickering and Branigan (1998), they observed priming effects for dative completion forms, and more significant effects in the condition where same verbs were repeated. However, the magnitude of the priming effect was lower than that of Pickering and Branigan’s (1998) study. Corley and Scheepers (2002) suggest that using the internet allowed them to get the effect of a well-controlled laboratory setting with a variety of participants, rather than a homogeneous set of college students.

Other research has used a sentence recall task (Potter & Lombardi, 1998; Lombardi & Potter, 1992; Fox Tree & Meijer, 1999; Meijer & Fox Tree, 2003). In this task, although there were some variations across experiments, a target sentence was presented to participants. Participants were told to read and memorize it. Then, a priming sentence was presented, and then, as a distraction task, participants were asked whether a certain word was presented in the previous prime sentence. Following the distraction task, participants were asked to recall the target sentence orally (Fox Tree & Meijer, 1999). For the distraction task, participants were presented a list of five words followed by a test
word, called “lure” word. The “lure” word can be a substitute for one of the alternative target sentences and induce selection of a certain syntactic structure. For instance, Lombardi and Potter (1992) manipulated the ‘lure’ verb (i.e. donate) which can substitute the target dative structure only in one alternation of the target sentences, as shown in (2) and (3).

(2) The rich widow is going to give a million dollars to the university.
(3) The rich widow is going to give the university a million dollars.

The “lure” verb donate can be substituted for the verb in sentence (3) but not in sentence (2). This lure-word method has been used in a series of sentence-recall experiments (Potter & Lombardi, 1990; Lombardi & Potter, 1992; Potter & Lombardi, 1998). The main purpose of this lure-word method is to see whether subjects tend to choose the syntactic rule first and keep the surface structure of the target without choosing the ‘lure’ word, or whether they tend to regenerate the sentence without being drawn to the concept or frequency of the distracter verb. Lombardi and Potter (1992) hypothesized that the surface structure of the to-be-remembered target sentence is not directly represented in memory, but rather it tends to be regenerated following “normal mechanisms of sentence production” (p. 713). The data in Lombardi and Potter (1992) provided evidence of syntactic priming. They observed that the subject tended to keep the surface structure of the target structure. If required a change, they tend to substitute a verb without making many spontaneous changes of the structures in a sentence recall trial.
This finding indicated that a syntactic-generation module plays a role in syntactic priming effects rather than a memory for a particular sentence. They found that the structure in the target sentence persisted reliably regardless of the conceptual representation or different frequency of the distracter verb. In a similar way, Potter and Lombardi (1998) also investigated syntactic priming effects in immediate recall of a sentence in two paradigms: recalling a single sentence (Experiment 1) and recalling two-clause sentences (target clause first in Experiment 2 and target clause second in Experiment 3). In their study, a subject read a visually presented target sentence and recalled the target sentence after an intervening priming trial. Three types of prime sentences were provided: A (a mismatching dative), B (a mismatching surface structure similar to a dative, such as double NP or to-locative), or C (a control sentence), as presented in (4).

(4) A. Dative target (double object dative / prepositional dative)

The prompt secretary wrote her boss a message every week./ The prompt secretary wrote a message to her boss every week.

B. Primes

a. A mismatching dative

The tycoon willed that mansion to his young nephew very grudgingly./ The tycoon willed his young nephew that mansion very grudgingly.

b. A mismatching surface structure similar to a dative (Locative/Double-NP nondative)
Lenore drove her new convertible to the beach early this afternoon./A terrible accident almost cost the driver his life today.

c. Control

My favorite shirt glowed when the room was completely dark.

The target sentence was preceded by one of three types of primes. Potter and Lombardi (1998) investigated spontaneous changes following each prime type in a sentence recall task. They predicted that if more spontaneous changes are triggered by prime type A (a mismatching dative) than prime type C (control), a syntactic module in the surface syntax influenced the immediate recall of the sentence. On the other hand, if a higher number of regeneration occurs following prime type B than following prime type C, the priming effect would be expected to be equal between dative primes and similar surface structures, as seen in Bock and Loebell’s (1990) study. They found a strong priming effect for the prime type A and an intermediate priming effect for the prime type B. Potter and Lombardi (1998) also examined two-clause sentence recalls, manipulating either the target clause first (Experiment 2) or the prime clause first (Experiment 3). In the condition of target clause first in Experiment 2, as seen in examples in (5), when subjects recall the two-clause sentence after reading the two clauses (target clause-prime clause), they recall the target clause before the prime clause is recalled, but the prime clause was perceived implicitly already when it was read. On the contrary, in Experiment 3, the prime clause precedes the target clause so that the prime was perceived and recalled before the target is recalled.
(5) Target clause first condition (Experiment 2)

Joe fed the baby pudding….. (double-object dative target)

A. and sold some diapers to the neighbors. (prepositional dative prime)

B. and then dragged a highchair to the kitchen. (locative prime)

C. and wondered when his wife would return.(control)

In the two-clause sentences, one clause was the target and the other was the prime clause. In a target-first condition, the second clause served as a syntactic prime for a to-be-recalled target sentence. The target-second condition was also examined in Experiment 3. Significant priming effects were obtained from the experiments of recalling two-clause sentences. Given the fact that a priming effect occurred in the condition where subjects perceived the prime but had not yet produced an utterance (in the form of the recall) while recalling the two-clause sentences, this finding indicates that syntactic priming can occur implicitly.

Other research has focused on interlocutor interactions (Branigan et al., 2000; Cleland & Pickering, 2003; Hartsuiker et al., 2004; McDonough, 2006; McDonough & Mackey, 2006; Schoonbaert et al., 2007). Branigan et al. (2000) looked at syntactic priming effects in a dialogue paradigm using a confederate. A confederate pretends to be another participant who interacts with a participant, but actually the confederate is provided with a script. A confederate and a participant take turns describing pictures on index cards and the participant selects the picture which matches the description and put the selected cards into the box for selected cards. Actually, the confederate reads a script
specifying the description for each prime card. A divider is set up between the confederate and a subject so that the participant cannot see the confederate and her cards. The target structure in this experiment was dative alternations (prepositional and double object dative). They found a very robust syntactic priming effect in the confederate-scripting technique and suggest that syntactic representation is shared between comprehension and production, and it is also shared during spontaneous dialogue. This task has also been used by Cleland and Pickering (2003) to investigate the priming effects of pre-nominal adjectives (e.g., “the red sheep”) and relative clauses (e.g., “the sheep that is red”).

Several studies have investigated syntactic priming in various syntactic structures. Hartsuiker and Kolk (1998b) expanded the target structures into three types of transitive structures (active, passive 1, and passive 2-verb-final passive), and three dative structures (double object, prepositional, and medial dative) in Dutch. The examples are shown in (6) and (7).

(6) Transitive sentences (Hartsuiker & Kolk, 1986b, p.151)

a. Active

_De modder bevuilt de wandelaar._

the mud dirties the walker

‘The mud dirties the walker.’

b. Passive (P1)

_De wandelaar wordt bevuild door de modder._

the walker is dirtied by the mud.

‘The walker is dirtied by the mud.’
(7) Dative structures in Dutch

a. Double-Object (DO)

De zeeman schrift zijn vriendin een large brief aan.

the sailor writes his girlfriend a long letter to

The sailor writes his girlfriend a long letter.

b. Prepositional Dative (PP)

De zeeman schrift een large brief aan zijn vriendin.

the sailor writes a long letter to his girlfriend

The sailor writes a long letter to his girlfriend.

c. Medial Dative (MM)

De zeeman schrift aan zijn vriendin een large brief.

the sailor writes to his girlfriend a long letter

The sailor writes his girlfriend a long letter.

Note that Dutch allows more flexible word order than English. The main effects of prime type were obtained for transitive and dative structures. The results are similar to those of other studies in English (Bock, 1986, 1989; Bock & Loebell, 1990). However, Hartsuiker & Kolk (1989b) did not obtain a priming effect for transitive pictures (i.e. no increase in the rate of production of passives). Hartsuiker and Kolk (1998b) proposed two hypotheses to these results: 1) pragmatic impact and 2) cross-linguistic effects. In terms of pragmatic impact, passivization, compared to dative alternation, might be more influenced by pragmatic factors. As for cross-linguistic effects, passive structures in
Dutch are different from English in that attracting the patient to the subject position is stronger in English than in Dutch. In speaking of the influence of cross-linguistic differences, Hartsuiker & Kolk (1998b) suggest that, compared to English, Dutch has a weaker correlation between the appearance of a patient in subject position and the presence of passive morphology and word order. Regarding these differences, Hartsuiker and Kolk (1998b) cited Cornelis’ (1997) explanations on differences in passivization between English and Dutch. First of all, a subjectless passive is possible in Dutch (e.g., *Er werd gelachen*, literally ‘There was laughed’). Next, the word order in passive in Dutch is freer. For example, it is possible to begin with a by-phrase in Dutch passives (cited in Hartsuiker and Kolk, 1998b). Also, a passive can be replaced by different constructions, such as sentences with the verb *krijgen* (similar to ‘get’ in English), as in (8).

(8) *Het huis krijgt een lawine over zich heen*

the house gets an avalanche over it

‘The house is being struck by an avalanche.’

The verb “*krijgen*” allows the patient to remain subjects. The possibility of this passivization is greater than the verb “*get*” in English. As seen in these cross-linguistic analyses, in general, the relation of having the patient as subject in passivization in Dutch seems to be looser than in English. Hartsuiker and Kolk (1998b) attributed the results of no priming effects for passives. In particular, it was informative that they obtained
reliable priming effects for the verb-final passive and medial dative, which had not been
tested before.

Pickering et al. (2002) included shifted dative priming as a priming fragment in
their sentence completion task in English (e.g., *The racing driver showed to the mechanic
the extremely dirty and badly torn overall*), which is a fairly uncommon construction in
English. They did not observe any priming effects on shifted dative completion. Instead,
the shifted dative prime showed a similar pattern as in a baseline prime. They found that
participants rarely produced shifted dative target responses; there were only ten instances
over all three experiments (2, 3, and 4). Interestingly, although the numbers were not
large enough for statistical analysis, six responses were produced followed by a shifted
dative prime, three responses were followed by double object dative prime conditions,
and one response followed ‘other’ prime responses. No shifted dative target responses
were produced in the prepositional dative prime condition.

Furthermore, word order variations involving locative phrases were investigated
in several experiments (Hartsuiker et al., 1999; Hartsuiker & Westenberg, 2000;
Pickering et al., 2002). Hartsuiker et al. (1999) tested two sentence variants in Dutch (*Een
bal light op de tafel*; ‘A ball is on the table’ / *Op de tafel light een bal*; ‘On the table is a
ball’), which differ in word order, though they have the same functional and hierarchical
relations between constituents. They found that word order was persistent: the
participants tend to use the same word order as in the prime sentence. Similarly,
Hartsuiker and Westenberg (2000) also found persistence effects with auxiliary-main
verb and main verb-auxiliary order (*Ik kon er niet door omdat de weg was geblokend /
In contrast, Pickering et al. (2002) did not find a priming effect for structures that have the same constituent categories but different word order for prepositional dative and shifted prepositional dative (e.g., *The girl gave the encyclopedia to the man*, and *The girl gave to the man the encyclopedia*). This empirical evidence supports the existence of the linearization process, in which word order is computed after grammatical functions have been assigned to the constituents.

Further research has examined priming in other types of structures. Cleland and Pickering (2003) investigated priming effects for noun phrases with alternative forms of simple noun phrases (e.g., ‘the red square’) and complex noun phrases containing a relative clause (e.g., ‘the square that’s red’) using the confederate priming technique, a paradigm similar to that of Branigan et al. (2000). They manipulated the semantic relatedness (e.g., related: *the red sheep vs. the red goat*, unrelated: *the red goat vs. the red knife*) in Experiment 2. They found that participants tended to repeat the same syntactic construction as the prime when they produce target responses regardless of whether the repeated nouns were semantically or phonologically related, although enhanced priming effects were observed when the same head noun was repeated in the target and when prime and target nouns were semantically related.
1.1.2 Potential influences on syntactic priming effects

So far, persistence effects have been characterized as “syntactic”, the implication being that they are not due to other factors. In this section, some alternatives are considered, including lexical, semantic, or phonological information.

In some studies, the same words were repeated from the priming sentences to elicited target description. Lexical repetition of open-class words produces stronger effects, particularly when a HEAD (i.e. the noun in noun phrases and the verb in verb phrase) is repeated (Pickering & Branigan, 1998; Cleland & Pickering, 2003). For example, Pickering and Branigan (1998) found that verb repetition increased syntactic priming effects. However, note that syntactic priming effects occurred independently of lexical repetition. In addition, as reviewed earlier, Cleland and Pickering (2003) found similar effects for noun phrases: head noun repetition boosted the priming effects. However, an important fact is that reliable priming effects have been observed even without those lexical repetitions, which means that structural repetition and lexical repetition are independent.

The increased effect of word repetition appears to be restricted to open-class words. When the repetition of function words in the closed-class words (i.e. tense, aspect, number of verbs, and prepositions) was manipulated, this did not increase the effect. For example, Pickering and Branigan (1998) conducted a sentence completion task and they found stronger effects when the same verb was carried over from prime to target fragments (Experiment 1 and 2). However, the closed-class words did not affect the magnitude of syntactic priming. Significant priming effects were shown in dative
alternations (double object dative, prepositional dative) whether the tense in the verb was the same or different (Experiment 3), whether verb aspect was the same or different (Experiment 4), and whether verb number was the same or different (Experiment 5). Bock (1989) investigated the effect of closed-class words on syntactic priming by manipulating lexical repetition in the prepositional dative (to-, for-). She found similar syntactic priming effects whether the prepositions were the same or different (Experiments 1 and 2). For instance, the ‘for-’ prepositional dative structure (e.g., ‘The secretary baked a cake for her boss’) and the ‘to-’ prepositional dative structure (e.g., ‘The secretary took a cake to her boss’) both effectively elicit a prepositional phrase dative like ‘The girl handed the paintbrush to the man’.

Semantic effects have been examined by manipulating thematic roles. In Bock and Loebell’s (1990) study, for example, thematic roles were manipulated in priming sentences. They found that participants produced dative prepositional phrase sentences to the same extent following sentences containing a locative prepositional phrase (e.g., ‘The wealthy widow drove her Mercedes to the church’) and those containing a prepositional dative (e.g., ‘The wealthy widow gave her Mercedes to the church’). Equivalent priming effects were also observed when a prime contained a locative by-phrase (e.g., ‘The construction worker was digging by the bulldozer’) or a passive by-phrase (e.g., ‘The construction worker was hit by the bulldozer’). The results of this study indicated that the syntactic structure (NP VP NP PP[to the NP]) or (NP VP PP[ by NP ]) was carried over to the next utterance regardless of the different thematic roles.
Also, phonological information does not appear to influence syntactic priming (Bock & Loebell, 1990; Cleland & Pickering, 2003). Bock and Loebell (1990) found that the constituent structures are persistent, but not other superficial information such as prosody or phonological information. Furthermore, Cleland and Pickering (2003) manipulated phonological relatedness in Experiment 3. For a target picture of a pink sheep, in addition to two different prime types (simple noun phrase vs. relative clause), three more different conditions were manipulated in the experiment: 1) whether the same noun was shared between the prime and target (e.g., ‘the pink sheep / the sheep that’s pink’), 2) whether a phonologically related noun was shared between the prime and target (e.g., ‘the pink sheep / the ship that’s pink’), and 3) whether the phonologically unrelated noun was included (e.g., ‘the pink sheep vs. the pink ball’). Overall, they found an effect of prime type on target structure, which means that the subjects tend to use the same structure in their target utterances as that of the confederate’s prime utterance. Also, sharing the same nouns between the prime and target boosted the priming effect; however, phonological relatedness did not appear to affect priming. Cleland and Pickering (2003) found that ‘a ship that’s red’ did not reliably prime the phonologically related structure (i.e. ‘a sheep that’s blue’) more than the phonologically unrelated structure (i.e. ‘a ball that’s blue’).

Thus, it appears that syntactic forms are carried over in sentence production and that this effect is independent of other factors such as lexical, conceptual, thematic, or prosodic information.
1.1.3 The studies of syntactic persistence across languages

Recently, syntactic persistence has been used to explore whether syntactic representations are shared or not in bilinguals. A few studies have shown some evidence of syntactic priming effects across languages, including: English-German (Loebell & Bock, 2003), English-Spanish (Meijer & Fox Tree, 2003; Hartsuiker et al., 2004), and English-Dutch (Desmet & Declercq, 2006; Schoonbaert et al., 2007). Hartsuiker et al. (2004) conducted a syntactic priming study with English-Spanish bilinguals (who were highly proficient English-as-L2 speakers living in the United Kingdom for 22 months average). This experiment was conducted in a dialogue framework: native Spanish-speaking bilingual subjects interacted with a confederate. In this task, the participant describes the pictures to the confederate in English, and the confederate reads aloud scripted sentences in Spanish while pretending to describe the pictures. The prime sentences consisted of Spanish active and passive transitive sentences and Spanish intransitive sentences (active sentences without direct objects) and active sentences with object-verb-subject word order (different from English). The examples are shown in (9), with English translation-equivalents following.

(9) a. El taxi persigue el camión (Active)
   “The taxi chases the truck”

   b. El camión es perseguido por el taxi (Passive)
   “The truck is chased by the taxi.”
c. *El taxi acelera.* (Intransitive)

“The taxi accelerates”

d. *El camión persigue un taxi.* (OVS)

“The truck [chasee] it chases a taxi [chaser]” (Hartsuiker et al., 2004, p.411)

The results of this study showed reliable cross-language syntactic priming effects: Spanish-English bilinguals tended to produce English passive sentences more often following a Spanish passive sentence than following a Spanish intransitive or active sentence. This result indicates that people who speak two languages in which the elicited structure is similar (e.g., English-Spanish passives) are more likely to use the same syntactic processes or structures.

Loebell and Bock (2003) investigated syntactic persistence in German and English (with subjects who were native speakers of German with English as an L2 and had lived a minimum of 2 years in the United States. They investigated syntactic priming for dative and transitive structures with both German primes with English picture descriptions and vice versa. There was significant priming for the datives (stronger in double-object dative than in prepositional dative), but not passives. Within-language priming effects were tested only in German, not in English. Although this within-language priming did not reach significance as a main effect, the results showed a trend in the right direction. This is similar to the pattern that Bock (1986) showed in English. Although this within-language priming did not reach significance as a main effect, the results showed a tendency. Thereby, Loebell and Bock (2003) proposed that non-
significant effect for passives can be attributed to the structural difference between English and German regarding passives. The main verb in passives in German goes to the end of the sentence (e.g., Die Böden warden täglich von dem Hausmeister gereinigt, literally “The floors are daily by the janitor cleaned”) which is different from the passive construction in English.

Meijer and Fox Tree (2003) investigated cross-language priming effects with Spanish-English bilinguals in a sentence recall paradigm. In the critical condition, the English double-object dative target structure of a NP-NP construction was followed by a prepositional dative (an NP-PP Spanish prime sentence as shown below in (10)). In the control condition, an English double-object dative target structure (NP-NP) was followed by a Spanish prime sentence of a non-NP-PP construction as seen in (11).

(10) Critical Condition

Target: The car salesman sold [the young woman] [a red Sports car].
Prime: La mujer le trajo [el niño que dormía] [a su mama preocupada]
“The woman brought the child that slept to her worried mother”

(11) Control Condition

Target: The antiques dealer sold the couple the 18th-century mahogany bed.
Prime: El cocinero y su compañero quieren abrir un restaurante nuevo.
“The cook and his partner want to open a new restaurant.”
Meijer and Fox Tree (2003) predicted that if syntactic priming occurs across languages, the spontaneous change in order of objects should happen more often in the critical condition than in the control condition. They observed that the participants changed English double object dative sentences with NP-NP construction into a NP-PP construction followed by Spanish prime sentences with a NP-PP construction more frequently in the critical condition than in the control condition. This finding suggests that syntactic priming effects with bilinguals undergo similar mechanisms as those of monolinguals.

Recently, Schoonbaert et al. (2007) adapted Branigan et al.’s (2000) picture matching technique and Hartsuiker et al.’s (2004) dialogue game in bilingualism for their syntactic-priming experiments. However, instead of using index cards, they used a computer to display the priming sentences and target pictures, so that a confederate and a participant sat facing each other, while being separated by two computer screens. They conducted a cross language syntactic priming experiment with Dutch-English bilinguals, who speak Dutch as L1 and English as L2. They used dative alternations for prime sentences and presented verbs on target pictures with manipulation of verb types (identical vs. unrelated) within L2 (Experiment 1) and within L1 (Experiment 3) to determine whether there was a lexical boost effect, in which identical verbs would boost the syntactic priming effect. They also explored whether there was an added effect of translation-equivalents between languages: L1 to L2 (Experiment 2) and L2 to L1 (Experiment 4). In cross-language paradigms, the manipulations of verb types (identical
vs. unrelated) were changed into translation equivalent and unrelated verbs, as given in examples in (12).

(12) Priming sentence in English and Dutch and verb type on target pictures
A. Priming sentence
   a. The cook shows a hat to the boxer (Prepositional dative)
   b. De kok toont een hoed aan de bokser. (Prepositional dative)
   c. The cook shows the boxer a hat. (Double-object dative)
   d. De kok toont de bokser een hoed. (Double-object dative)
B. Verb type on target pictures
   a. identical/translation-equivalent verb type condition – show in English, toten in Dutch
   b. unrelated verb type condition- throw in English, toten in Dutch

They found reliable priming effects within languages, in L2 production as well as L1 production. Also they found that identical verbs boosted the syntactic priming effects. Further, they found that priming effects from L1 to L2 were stronger with translation equivalent verbs than with unrelated verbs. As for priming from L2 to L1, syntactic priming effects were also observed, though they did not appear to receive a “boost” from translation-equivalents.

Using different target structures, Desmet and Declercq (2006) investigated relative clauses (e.g., Someone shot the servant of the actress who was on the balcony)
with alternative attachments in the phrasal structure (High-attachment “the servant” was on the balcony, Low-attachment “the actress” was on the balcony) with Dutch-English bilinguals (native speakers of Dutch and highly proficient English-as-L2 speakers). In this experiment, a hand-written sentence completion task was used and cross-linguistic syntactic priming effects for the attachment of relative clauses to noun phrases were found. So far, the empirical evidence from cross-linguistic priming studies has shown that syntactic representations may be shared by both languages in the bilingual.

1.1.4 The studies of syntactic persistence in L2 production

Several recent studies have focused on syntactic priming effects in second language learners (McDonough, 2006; McDonough & Mackey, 2006). McDonough (2006) claims interaction with native speakers plays a role in L2 development. The presentation of syntactic primes is considered to be one of several facilitators (others include negative feedback, enhancing the salience of positive evidence and raising learners’ awareness). McDonough adopted the confederate scripting technique used by Branigan and colleagues (Branigan, Pickering, & Cleland, 2000; Hartsuiker et al., 2004), in which the participants listen to the confederate’s description (provided with a script) and pick out the card (matching the confederate’s description) from the table, and then describe the cards in the box to the confederate. The participants in her study were second language speakers of English with various language backgrounds. She divided them into two experimental groups: a comprehension priming group, which did not repeat the primes aloud before doing a picture matching task, and a production priming
group, which repeated the confederates’ priming sentences aloud while they were looking for the picture which matched the confederate’s description. The target structure was a dative construction, and prime sentences were either double object datives or prepositional datives. A significant persistence effect was found (but only when the data from both groups were put together). A robust priming effect was found for the prepositional dative, but only a weak effect was found for the double object datives. Concerning the lack of a robust priming effect for double object dative structures, the author suggests that the English L2 speakers may have incomplete linguistic knowledge of dative alternation. Also, their dative alternations may be associated with limited usage of the dative, such as ‘specific lexical items or specific discourse contexts’ (McDonough, 2006, p.197). The shortcoming of this study was that the participants had various first languages (e.g., Korean, Chinese, Thai, etc.). If the participants of English L2 speakers are a homogenous ethnic group, such a finding may not be attributed to cross linguistic differences (because their first language background would not be different). The present thesis uses homogeneous groups of L2 speakers, such as Korean native speakers of English as L2 speakers and English native speakers of Korean as L2.
1.2 The current study

The purpose of the present study is to investigate whether syntactic persistence would occur in Korean as well as in English within-language priming for L1 speakers and L2 speakers. Also, L2 production will be investigated in the cross-language priming condition. There are two major significant aspects for my proposed research. Firstly, syntactic priming effects in Korean L1 and L2 speakers have not been investigated so far. Secondly, unlike the previous cross-language priming research, this study explores cross-linguistic syntactic priming effects in languages with very dissimilar structures. English and Korean differ with respect to the alphabetical system, head-direction (word order), the case-marking system, and some syntactic constructions. These differences render this research distinct from previous work on syntactic persistence, where the languages shared similar syntactic features (e.g., English-Spanish, English-German, and English-Dutch).

Chapter 2 describes two experiments (Experiments 1A and 1B) which were intended to replicate syntactic priming studies in English with native speakers and to extend these studies to second language learners (with Korean as L1). Different from McDonough's (2006) study of L2 production in English (which had a heterogeneous L2 English subject group), a homogenous L2 group, composed of Korean native speakers with English as a second language, participated in the two experiments. Two types of structures (transitive alternations and dative alternations) were investigated.

Chapter 3 presents Experiment 2 which was intended to test syntactic priming effects in the within-language priming condition in Korean as L1 and as L2 with English native speakers who learned Korean as a second language.
Chapter 4 describes Experiment 3 which was designed to test syntactic priming effects in a cross-language priming paradigm with Korean-English bilinguals (Korean L2 speakers and English L2 speakers). Experiment 3 investigates whether priming effects can occur between two languages that differ in word order, case-marking system, and other grammatical constructions. A finding of a persistence effect could suggest that aspects of sentence structure may be shared across languages in the bilingual.

Finally, Chapter 5 summarizes the results from the four experiments and discusses the general findings in the context of language production models.
Inspired by Bock’s (1986) study, as introduced in chapter 1, several researchers have explored syntactic persistence in the experimental setting mainly in English as a first language (L1). Recent research has expanded investigation of the effect to the language production of second language (L2) English speakers (McDonough, 2006; McDonough & MacKay, 2006). Contrary to the robust effect found in Bock’s (1986) study, some of the data for L2 English speakers showed only a weak priming effect. The reasons for this weak priming effect for double object datives with L2 speakers were not yet made clear in the previous research. Because the first language background of the L2 English speakers in McDonough’s (2006) study was not homogeneous, the weak priming effect for double object dative utterances could not be attributed to language-specific syntactic features or preference of the subjects’ first languages. As an attempt to fill this gap, this study recruited Korean-as-L2 speakers with English-as-L1. If priming effects would not be shown in a certain utterance form, closer investigations of cross-linguistic differences or proficiency can be undertaken.

In this chapter, two experiments (Experiments 1A and 1B) are reported that seek to shed light on the apparent discrepancy between the priming effects found for L1 and those found for L2. Both experiments are designed to replicate previous syntactic priming studies done for L1 and L2 English with the aim of answering two questions: 1) whether the syntactic priming effect will appear in L1 as well as L2 English speakers, and 2)
whether the pattern of the effect in L2 will be different from that of L1. Experiment 1B replicates Experiment 1A with modified materials and an increased number of subjects and items.

2.1. Experiment 1A

Experiment 1A adopted the design of Bock’s (1986) study and made use of the technique of picture description coupled with a recognition task.

2.1.1. Method

Participants

Twenty undergraduates (male = 8, female = 12) at the University of Arizona participated as English L1 control subjects (N=20). They received course credit for taking part in the experimental session which took 20-30 minutes. Ages ranged from 18 to 21 years, with an average of 19.15 years. All of the participants were native speakers of English.

The L2 English group consisted of twenty University of Arizona students, undergraduates as well as graduates (male = 9, female=11). Except for several volunteers, all of the subjects in this group were paid $5 for their participation in the 20-30 minute experimental session. The participants in this group were between 19 and 36 years of age and the mean age was 22.7 years. All of the participants were native speakers of Korean and second language speakers of English. In order to reduce possible interference from other languages, the target group was limited to Korean native speakers who had studied
only English as a second language. The subjects were recruited from either the Korean
Students Association at University of Arizona or the Critical Languages Program at the
University of Arizona. Most subjects had studied English in a formal setting for at least 8
years and demonstrated proficiency in English at either a high intermediate level or at an
advanced level. The majority of participants were enrolled as international students at the
University of Arizona; thus, each participant demonstrated the minimal English language
proficiency required for admission: a TOEFL score of 500 (PBT), 173 (CBT), 61 (IBT)
or satisfactory completion (at or above level 80) of the English program provided at the
Center for English as a Second Language (CESL). In the questionnaire survey, the
average length of residence in the US was 4.8 years with a range of 2 to 6 years. The
subjects’ self-reported proficiency ranged from 3 to 6 on a scale of 1-7 (1 means ‘very
poor’ and 7 means ‘perfect’) with a mean self-reported proficiency score of 3.80.

Materials

The primary materials for the experiment consisted of practice items, two
counterbalanced lists of priming sentences, target pictures, and filler sentences and
pictures. The practice items were comprised of 7 sentences and 7 pictures and did not
contain any of the experimental priming sentences or target pictures. The priming
sentences consisted of two counterbalanced test lists of 10 transitive sentences (5 active
and 5 passive sentences) and 10 dative sentences (5 double object dative and 5
prepositional dative sentences). Example sentences are shown in Table 2.1. Appendix A
contains a complete list of the priming sentences.
TABLE 2.1 Examples of Priming Sentence from Experiment 1A

<table>
<thead>
<tr>
<th>Prime type</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transitive Structure</strong></td>
<td></td>
</tr>
<tr>
<td>Active</td>
<td>A policeman chased the burglar.</td>
</tr>
<tr>
<td>Passive</td>
<td>The burglar was chased by a policeman.</td>
</tr>
<tr>
<td><strong>Dative Structure</strong></td>
<td></td>
</tr>
<tr>
<td>Double Object Dative</td>
<td>The students baked their teacher cookies.</td>
</tr>
<tr>
<td>Prepositional Dative</td>
<td>The students baked cookies for their teacher.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transitive Structure</th>
<th>Dative Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elicitation</td>
<td>Elicitation</td>
</tr>
<tr>
<td>1. A ball hit a boy (Active)</td>
<td>1. A boy gives a girl a gift (Double object dative)</td>
</tr>
<tr>
<td>2. A boy was hit by a ball (Passive)</td>
<td>2. A girl gives a gift to a boy (Prepositional dative)</td>
</tr>
</tbody>
</table>

Figure 2.1 Examples of Target Pictures from Experiment 1A

The target pictures were comprised of 10 transitive-eliciting pictures and 10 dative-eliciting pictures. The 10 transitive target pictures depicted events that could be described with either an active or a passive sentence. Every event involved an agent, an
action, and a patient. The 10 dative target pictures depicted an action containing an agent, an object undergoing the action, and a beneficiary of the action, which could be described with either a prepositional or a double-object dative sentence (see FIGURE 2.1).

An additional 20 sentences and 20 pictures served as fillers in the presentation lists. The filler sentences contained various structures, such as intransitive sentences, questions, and negative sentences. In addition, 14 items (7 sentences and 7 pictures) which were used for practice items were repeated as fillers in the experiment and they contributed to ‘YES’ response items in the recognition task.

All of the sentences were digitally recorded by a native speaker of English and were edited using “Praat” software for acoustic analysis (designed by Paul Boersma at the University of Amsterdam http://www.fon.hum.uva.nl/praat/). The recordings were checked for fluency, naturalness of intonation and pronunciation. Recordings of sentences and digital pictures were inserted into PowerPoint slides and were presented either on a desktop computer or on a Dell laptop computer. The target and filler pictures used in this experiment were clip art downloaded from web-sites.

**Design**

Two counterbalanced test lists were constructed. Only one of the two alternative priming sentence constructions was presented on each priming trial, followed by a target picture. For example, the active structure of a sentence appeared in Test 1 and the passive structure of the sentence appeared in Test 2. Also, if the double object dative structure of a sentence appeared in Test 1, the prepositional dative structure of the sentence appeared
in Test 2. Participants were randomly assigned to each test. The order of presentation of structures was scrambled randomly so as not to reveal the repetition of the target sentences.

Procedure

Each subject was run individually in a sound-resistant computer booth and the entire session was recorded on audio tape using a cassette tape recorder with a built-in recording system. All of the stimuli were displayed on a computer screen using Microsoft PowerPoint software. The priming sentences were presented auditorily and the target pictures were presented in picture slides. Item presentation was self-paced to accommodate the different language proficiencies of the two groups, L1 and L2 respectively. Participants moved to the next slide after finishing the required task by clicking the mouse button.

The details of the procedure are as follows: before the experiment started, the participants received a brief introduction to the experiment from the experimenter or a research assistant. Participants were told that the experiment was a recognition task involving language and that they would see a mixed list of sentences and pictures on the computer monitor. They were instructed that when the sound icon was presented, they should click the icon to hear a sentence and repeat the sentence aloud. If they failed to listen and repeat the sentence aloud, they were allowed to hear the sentence again by clicking the sound icon; however, they were asked to repeat the entire sentence only once. They were instructed to move on after the third repetition even if they failed to
repeat the stimulus. After repeating the sentence aloud, they were to indicate whether or not the sentence that they just repeated aloud had been presented before in the experiment by saying “YES” or “NO”. When a picture was presented on the computer monitor by clicking a mouse button or arrow on the keyboard, participants were told to describe the event shown in the picture using one complete grammatical sentence and to avoid sentences containing “there is…” as well as sentence fragments. They were encouraged to try to describe the pictures using action verbs as much as possible. Again, the recognition task followed picture description. Visual examples of the procedure are shown in Figure 2.2.

After the instructions were given, each participant was seated in a test booth, and the experiment began. At the beginning of each experimental session, the experimenter was present to go through the practice items with the participants. The participants were permitted to ask questions during this practice session. When the experimenter was sure that the subject understood the procedure clearly and that they were completing the task correctly, the participant was left alone to complete the experiment.

All sessions were recorded on audio tape. The tapes were transcribed later by both two research assistants and the experimenter to obtain a written record of the participants’ repetitions of the priming sentences and their descriptions of the target pictures for further analysis. The transcriptions done by the research assistants were reviewed by the experimenter.
<table>
<thead>
<tr>
<th>PRIME SENTENCE TRIAL - Auditory presentation by clicking the sound icon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Click the sound icon to listen to the sentence, and repeat the sentence aloud.</td>
</tr>
<tr>
<td>1. Subjects hear the prime sentence</td>
</tr>
<tr>
<td>“The students baked the cookies for their teacher.”</td>
</tr>
<tr>
<td>2. Subjects repeat the prime sentence.</td>
</tr>
<tr>
<td>“The students baked the cookies for their teacher.”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RECOGNITION DECISION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has this sentence been presented before in this experiment?</td>
</tr>
<tr>
<td>Say “YES” or “NO”</td>
</tr>
<tr>
<td>3. Subjects respond out loud either “yes” or “no”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PICTURE TRIAL (SENTENCE ELICITATION)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe following picture with a full sentence.</td>
</tr>
<tr>
<td>4. Subjects describe the target picture.</td>
</tr>
<tr>
<td>a. “A boy gives a gift to a girl”</td>
</tr>
<tr>
<td>or,</td>
</tr>
<tr>
<td>b. “A boy gives a girl a gift.”</td>
</tr>
</tbody>
</table>

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Has this picture been presented before in this experiment?</td>
</tr>
<tr>
<td>Say “YES” or “NO”</td>
</tr>
<tr>
<td>5. Again, subjects indicate whether this picture has been presented before in the experiment.</td>
</tr>
</tbody>
</table>

Figure 2.2 Procedures for Language Production with Syntactic Priming from Experiment 1A
Scoring

The audio-taped picture descriptions were transcribed and scored with respect to:
1) whether the priming sentence was correctly repeated and 2) which structure was used for describing the target pictures.

Descriptions of the target pictures were scored according to the structures used such as Active (AC), Passive (PA), Double-Object Dative (DOD), Prepositional Dative (PD), and Other (OT). In terms of the transitive picture descriptions, a sentence was classified as Active if it contained an agent in subject position, a verb, and a patient in object position (e.g., ‘A man cuts a tree’). A sentence was considered a passive structure if it contained a patient in subject position and a verb phrase consisting of be + past participle and by-phrase (e.g., ‘A tree is cut by a man’). However, lenient scoring was applied to second language speakers of English in that truncated passives were allowed. For example, sentences without a by-phrase (e.g., ‘A tree was cut’.) were scored as passive structures. As long as the patient appeared in subject position and the verb phrase contained be + past participle, the sentence was coded as passive (PA).

Dative picture description was scored as a prepositional dative (PD) if the sentence contained a dative verb followed by the direct object and by the beneficiary as the object of the preposition (e.g., A boy gives a cup of tea to a nurse). A picture description was coded as a double object dative (DOD) if it contained a dative verb followed by the beneficiary as the first object and by the theme as the second object (e.g., A boy gives a nurse a cup of tea). If the description was missing either the prepositional phrase of the prepositional dative (PD) or one object in the double object dative (DOD),
the description was coded as “other” (OT). Sentences with only one complement (patient or recipient/beneficiary) as illustrated in (13) were also coded as “other” (OT). Missing morphological features, such as determiners, were allowed if the sentence was not syntactically ambiguous.

(13) a. An old man is reading a book (Patient only).
   b. Grandpa is reading for his granddaughter (Recipient only).

2.1.2. Results and Discussion

A proportion was calculated for each subject as well as for each item based on number and type of utterance produced. First, the resulting proportions for transitive structures were analyzed using a two-factor mixed ANOVA with Test Type (Test 1, and Test 2, which are counterbalanced lists) as the between-subjects factor and Prime Type (AC, PA) as the within-subjects factor. For all dative structures, all calculated proportions were analyzed using a two-factor mixed ANOVA with Test Type (Test 1, Test 2) as the between-subjects factor and Prime Type (DOD, PP) as the within-subjects factor. All proportions per participant and per item were subjected to a repeated-measures analyses of variance, by subjects and by items (F1 and F2, respectively).

Transitive utterances (Active and Passive)

The tendency for the production of the transitive alternate construction following transitive prime sentences by English L1 and L2 speakers is shown below in Table 2.2.
Table 2.2 Proportion of Active and Passive Utterances Produced in the Two Transitive Syntactic Priming Conditions in English as L1 and L2 in Experiment 1A

<table>
<thead>
<tr>
<th>Priming condition</th>
<th>Utterance Form in Picture Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Active (AC)</td>
</tr>
<tr>
<td>L1 Active (AC)</td>
<td>.96</td>
</tr>
<tr>
<td>Passive (PA)</td>
<td>.65</td>
</tr>
<tr>
<td>Difference</td>
<td>+.31*</td>
</tr>
<tr>
<td>L2 Active (AC)</td>
<td>.97</td>
</tr>
<tr>
<td>Passive (PA)</td>
<td>.65</td>
</tr>
<tr>
<td>Difference</td>
<td>+.32*</td>
</tr>
</tbody>
</table>

*Note* * significant at p < .05 level.

**L1 speakers:** The results showed that active sentences were produced significantly more often than passive sentences. Active utterances decreased in frequency by 31% following passive primes. Repeated measures ANOVAs showed a significant main effect of prime type on the proportion of active picture-descriptions in both the by-subjects (F1) analysis and in the by-item (F2) analysis, $F_1 (1, 18) = 34.735, p < .001$; $F_2 (1, 8) = 17.315, p < .05$.

Passive utterances were not produced at all following active priming sentences; however, they were produced 33% of the time following passive primes. Repeated measures ANOVAs revealed a main effect of prime type on the proportion of passive utterances, again significant by subjects, $(F_1 (1, 18) = 32.75, p < .001)$, and by items $(F_2 (1, 8) = 24.75, p = .001)$. 
L2 speakers: L2 speakers of English showed the same pattern as the L1 speakers. English L2 speakers produced 32% more active structures in the primed condition (active structure primes) than in the unprimed condition (passive structure primes). The effect of prime type on the proportion of active picture-descriptions was significant by subjects and by items ($F1 (1, 18) = 27.972, p < .001; F2 (1,8) = 22.474, p = .001$).

Regarding passive utterances with L2 speakers of English, interestingly, the difference in frequency of passive structures between the primed and unprimed conditions was identical to that of the L1 speakers. Repeated measures ANOVAs showed a significant main effect of a prime type by subjects, and by items ($F1 (1, 18) = 26.698, p < .001; F2 (1, 8) = 36.841, p < .001$).

Dative utterances (Double object datives and Prepositional datives)

With respect to dative structures, Table 2.3 shows proportions of the alternative dative structures following transitive priming sentences by English L1 and L2 participants. Overall, the results show that no priming effect was observed for the double-object dative structure for either L1 or L2 speakers of English. However, a robust priming effect was shown for prepositional dative.

L1 speakers: L1 speakers of English produced more prepositional datives (28% more) following prepositional dative primes than following the double object dative primes. Repeated measures ANOVAs revealed a main effect of prime type on the proportions of
prepositional datives significant in both the by-subjects analysis and in the by-item analysis, $F1 (1, 18) = 27.138, p < .001$; $F2 (1, 8) = 12.564, p = .008$.

Table 2.3 Proportions of Dative Utterance Forms Produced in the Two Dative Syntactic Priming Conditions in English as L1 and L2 in Experiment 1A

<table>
<thead>
<tr>
<th>Prime Types</th>
<th>Utterance Forms in Picture Description</th>
<th>Double object Dative</th>
<th>Prepositional Dative</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1 DOD</td>
<td></td>
<td>.23</td>
<td>.08</td>
<td>.69</td>
</tr>
<tr>
<td>L1 PD</td>
<td></td>
<td>.28</td>
<td>.36</td>
<td>.36</td>
</tr>
<tr>
<td>Difference</td>
<td></td>
<td>-.05</td>
<td>+.28*</td>
<td></td>
</tr>
<tr>
<td>L2 DOD</td>
<td></td>
<td>.05</td>
<td>.24</td>
<td>.71</td>
</tr>
<tr>
<td>L2 PD</td>
<td></td>
<td>.04</td>
<td>.62</td>
<td>.34</td>
</tr>
<tr>
<td>Difference</td>
<td></td>
<td>+.01</td>
<td>+.38*</td>
<td></td>
</tr>
</tbody>
</table>

*Note* * significant at $p < .05$ level

L2 speakers: The L2 speakers of English demonstrated a pattern of production of dative structures similar to that shown for the L1 speakers of English. More prepositional dative utterances were produced following prepositional dative primes by 38%. Repeated measures ANOVAs revealed a main effect of prime type on proportions of prepositional dative picture-descriptions for both comparisons, by-subject (F1) and by-item (F2) analyses ($F1 (1, 18) = 44.674, p < .001$, $F2 (1, 8) = 5.548, p = .046$). L1 speakers of English produced more double object dative forms than did L2 speakers of English, and
both preferred prepositional dative utterances. Surprisingly, many ‘other’ sentences were produced by participants in both groups, especially following the double object dative priming sentences.

Discussion

Consistent with Bock’s (1986) study, robust effects of syntactic persistence were observed in the active and passive utterance forms as prime types not only in L1 production but also in L2 production. Interestingly, the significant difference in the passive utterances increased from 0% in the active prime condition to remarkably higher percentages, 33% in L1 and 32 % respectively in L2 in passive primed condition. Although the robust priming effect was impressive, the pictures of animate themes seemed to have led to the prevalent production of active sentences.

For the dative structures, contrary to the fact that identical numbers were observed in comparisons between the two dative priming conditions in Bock’s (1986) study, no priming effects were shown in double-object dative structures in either the L1 or L2 groups. Both the L1 and L2 speakers of English preferred to produce the prepositional dative rather than double object datives. However, it is interesting to notice that a very small amount of the double object datives was produced by the L2 speakers of English compared to the L1 speakers of English. Considering the high percentage of picture description ‘Other’ forms, the pictures might have been unclear. In fact, in most of the utterances, the beneficiary/recipient elements were omitted in the double object prime conditions. This part will be tested again in Experiment 1B with modified materials.
2.2. Experiment 1B

The results of Experiment 1A were inconsistent with Bock's (1986) study which showed a robust priming effect for dative structures. In Experiment 1A, it was shown that the frequency of passive utterances in the description of transitive pictures was relatively low and the frequency of ‘other’ utterances in dative picture description was very high. As pointed out in Experiment 1A, the non-significant priming effects may be attributed to the unclear target pictures, so this study replicated Experiment 1A with modified pictures. To raise statistical power, more items and more participants were implemented in Experiment 1B.

2.2.1. Method

Participants

Thirty undergraduates (male = 13, female = 17) at the University of Arizona participated as the English L1 control group. Participants received course credit for completing the experimental session which took 20-30 minutes. The ages of the participants ranged from 18 to 25 years with an average of 19.46 years. The mean of subjects’ self-rated first language proficiency was 6.34 out of a scale of 1-7 (1 means ‘very poor’ and 7 means ‘perfect’). All of the participants were native speakers of English.

Additionally, a group of thirty undergraduate and graduate (male = 16, female = 14) students at the University of Arizona participated in the English L2 group for monetary compensation of five dollars. The age of the participants ranged from eighteen
to thirty six years. All of the participants were native speakers of Korean and second language speakers of English who had been studying in the US an average of 4.79 years, ranging from one to eight years. In order to reduce interference from other languages, the target group was limited to Korean native speakers who were studying only English as a second language. Subjects were recruited from either the Korean Students Association or the Critical Languages Program at the University of Arizona. None of the participants from Experiment 1A participated in Experiment 1B. The self-reported proficiency ranged from 3 to 6 on a scale of 1-7 (1 means ‘very poor’ and 7 means ‘perfect’) with a mean self-reported proficiency score of 4.24. The scores ranged from 5-7. Their proficiency level of English is the same as described in Experiment 1A.

Materials

The primary materials for Experiment 1B consisted of the same kind of materials as Experiment 1A, except for some modifications made to improve the clarity of the picture stimuli. The practice items from Experiment 1A were repeated in Experiment 1B and were comprised of 7 sentences and 7 pictures. The prime sentences from Experiment 1A were also used in Experiment 1B with the addition of three sets of prime sentences. The prime sentences were arranged to form two counterbalanced lists of 16 transitive sentences (8 actives and 8 passives) and 16 dative sentences (8 double object datives and 8 prepositional datives). Appendix B contains a complete list of the priming sentences.

As discussed above, few passive utterances were produced and numerous ‘Other’ dative utterances were produced in Experiment 1A. Since it is possible that these results
were affected by the pictures presented, some modifications were made to the target pictures for Experiment 1B. The items resulting in a high percentage (over 50%) of ‘Other’ productions were removed and new pictures were created. To avoid the unclear events depicted with simplified clip art, line drawings were used. To match up with the remaining clip art pictures, the black and white line drawings were scanned and colored using PhotoShop software. During the modification process, care was taken to make the relevant sentence elements clear without including unnecessary elements. For example, the target pictures for the transitive structures contained the agent, object, and patient undergoing the action. In addition, the target pictures for dative structures contained the agent, object, and beneficiary undergoing the dative event. The number was increased by 6 transitive eliciting pictures and 6 dative eliciting pictures for a total of 16 pictures for each structure (16 transitive and 16 dative structures).

An additional 12 filler sentences and pictures were also added to those of Experiment 1A for a total of 32 sets of sentences and pictures. As in Experiment 1A, the filler sentences contained various structures, such as intransitive sentences, questions, and negative sentences. Also, as in Experiment 1A, 14 items (7 sentences and 7 pictures) were included in the fillers to elicit ‘YES’ responses in the recognition task.

**Procedure**

The procedure was the same as in Experiment 1A.

**Scoring**

The scoring was the same as in Experiment 1A.
2.2.2. Results and discussion

The same statistical analysis was conducted in Experiment 1B with that of Experiment 1A. Again, the independent variables are participants and priming conditions (active and passive for transitive structure, and double object dative and prepositional dative for dative structure). The dependent variables are the corresponding utterance forms in picture description.

Transitive utterances (Actives and Passives)

The results for syntactic priming of the transitive structures in Experiment 1B are presented in Table 2.4.

Table 2.4 Proportions of Active and Passive Utterances Produced in the Two Transitive Priming Conditions in L1 and L2 English for Experiment 1B.

<table>
<thead>
<tr>
<th>Prime Type</th>
<th>Utterance Form in picture description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Active</td>
</tr>
<tr>
<td>L1 Active</td>
<td>.62</td>
</tr>
<tr>
<td>Passive</td>
<td>.45</td>
</tr>
<tr>
<td>(Difference)</td>
<td>+.17*</td>
</tr>
<tr>
<td>L2 Active</td>
<td>.66</td>
</tr>
<tr>
<td>Passive</td>
<td>.63</td>
</tr>
<tr>
<td>(Difference)</td>
<td>+.03</td>
</tr>
</tbody>
</table>

*Note* *significant at* $p = 0.05$ *level*
L1 speakers: For the L1 speakers of English, consistent with the previous experiment, repeated measures ANOVAs produced main effects of active and passive primes. The active utterances produced by English-as-L1 speakers increased by 17% following active primes. This increase was shown to be significant on the by-subjects analysis ($F_1 (1, 28) = 36.344, p < .001$), but was not significant on the by-items analysis ($F_2 (1, 14) = 2.578, p = .131$). For the production of passives, more passive utterances were produced following an active prime and more passive utterances were produced following a passive prime by 19%. This effect was shown to be significant by subjects ($F_1 (1, 28) = 36.344, p < .001$), but only approached significance in the by-items analysis ($F_2 (1, 14) = 3.124, p = .099$).

L2 speakers: In contrast to the previous experiment and to the results of the L1 group in Experiment 1A, the L2 English speakers showed a weak priming effect on the transitive picture descriptions with both active and passive prime types. The 3% difference found between the primed and unprimed conditions for active picture-description was not significant, $F_1 (1, 28) = .458, p = .504$; $F_2 (1, 14) = .909, p = .357$. Also, for passives, two-factor repeated measure ANOVAs did not show a main effect of prime type (active vs. passive) on the production of passives in either the by-subjects or the by-items analysis, $F_1 (1, 28) = 6.221, p = .279$; $F_2 (1, 14) = .858, p = .370$. 
Dative utterances (Double object datives and prepositional datives)

The results of priming on the dative structures in Experiment 1B are presented in Table 2.5. Overall, a priming effect was shown resulting in an increased production of the primed structure.

Table 2.5 Proportions of Dative Utterances Produced in the Two Dative Priming Conditions in L1 and L2 English for Experiment 1B.

<table>
<thead>
<tr>
<th>Prime Type</th>
<th>Utterance Form in picture description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DOD</td>
</tr>
<tr>
<td>L1 DOD</td>
<td>.52</td>
</tr>
<tr>
<td>PD</td>
<td>.37</td>
</tr>
<tr>
<td>(Difference)</td>
<td>+.15*</td>
</tr>
<tr>
<td>L2 DOD</td>
<td>.16</td>
</tr>
<tr>
<td>PD</td>
<td>.12</td>
</tr>
<tr>
<td>(Difference)</td>
<td>+.04</td>
</tr>
</tbody>
</table>

Note * significant at p < 0.05 level

L1 speakers: The L1 speakers of English showed stronger effects than the L2 speakers of English. Repeated measures ANOVAs revealed a significant main effect of prime type for the double object dative by subjects ($F1 (1, 28) = 7.182, p = .012$), but not by items ($F2 (1, 14) = 2.276, p = .154$). As for the prepositional dative structures, the prepositional dative prime facilitated production of prepositional datives. The 23% difference found between the primed and unprimed conditions was significant on both the by-subjects
analysis \( F1 (1, 28) = 13.575, p = .001 \) and the by-items analysis \( F2 (1, 14) = 12.853, p = .003 \).

**L2 speakers:** The L2 group, contrary to the results in Experiment 1A, showed weak priming of the dative structure. Repeated measures ANOVAs failed to yield a main effect of either the double object dative \( F1 (1, 28) = 1.894, p = .180; F2 (1, 14) = 1.881, p = .192 \) or the prepositional dative \( F1 (1, 28) = 1.631, p = .212; F2 (1, 14) = .686, p = .421 \) as prime types.

**Discussion**

With an increased number of subjects and modified materials, Experiment 1B showed robust effects of the transitive and dative structures for the L1 group, consistent with Experiment 1A. However, the L2 speakers did not show a main effect on either utterance forms (transitive or dative utterances).

The different magnitudes of priming effects observed for the L2 English group between Experiment 1A and Experiment 1B can be attributed to different proficiency levels between the two groups of L2 speakers of English. In Experiment 1A, the average self-reported proficiency score was 4.14, ranging from 2 to 6 on a scale of 1-7, whereas Experiment 1B reported the mean score as 3.80. As McDonough (2006) proposed, incomplete knowledge of dative alternations, especially double object dative for less proficient L2 English speakers, may explain the weak priming effect for double object datives in L2 production.
CHAPTER 3
SYNTACTIC PERSISTENCE IN L1 AND L2 PRODUCTION OF KOREAN

As reviewed in Chapter 1, Hartsuiker and Kolk (1998b) investigated syntactic priming in Dutch and obtained, in general, syntactic priming effects for dative structures and the passive structure; however, contrary to Bock (1986) there was no priming found for active structures. Hartsuiker and Kolk (1998b) attributed the difference between Dutch and English (with respect to priming patterns of the transitive) to cross-linguistic differences between English and Dutch. Citing Cornelis (1996, 1997), they point to several differences between English and Dutch passives. For example, English is more likely to have the patient in subject position than Dutch, and Dutch allows “dummy” subjects for passives (e.g., Er werd gelachen, ‘There was laughed’) and to begin with the by-phrase. Also, passives in Dutch can be replaced more easily by different constructions using the verb krijgen, which is similar to the verb ‘to get’ in English. These features provide evidence that the relation between having the patient as subject and having a passive sentence in Dutch is looser than in English (Cornelis, 1996, 1997, cited in Hartsuiker & Kolk, 1998b).

Also, regarding discrepant results of priming effects between transitive structures and dative structures, Hartsuiker and Kolk (1998b) argued that pragmatic factors play a greater role in the choice of active vs. passive than in the choice of dative alternative forms in language production.
As a further contribution to the cross-linguistic study of syntactic priming, this chapter investigates syntactic persistence in Korean. Before moving on to the experiment, it is necessary to discuss the relevant typological differences between English and Korean. First, Korean is a head-final language with SOV (Subject-Object-Verb) word order, whereas English is a head-initial language with SVO (Subject-Verb-Object) word order. Secondly, the grammatical functions of noun phrases (NPs) in a sentence are defined through case markers. The case markers are attached as suffixes in Korean, and differentiate between Nominative (marked by –i/ga), accusative (marked by -ul/lul), and dative (marked by -ey/-eykey/-hante)\(^2\) cases. In addition, –ess- is used for the past tense (PAST), and –ta marks declarative sentences (DECL). Since the suffix of a word indicates its role in the sentence, the word order of arguments is somewhat flexible, certainly more flexible than English.

Based on these linguistic features of Korean, when we look at transitive constructions, Korean allows alternative forms of the transitive as illustrated in (14) and (15). Furthermore, there are two alternative passive forms: the morphological passive (i-, hi-, li-, and ki-) and the analytic passive(-ci-) as shown in example (15) (Yoen, 2003). The passive construction formed with an auxiliary verb such as in English and other Indo-European languages is defined as an analytic passive construction as shown in (15a), whereas the morphological passive is constructed with the addition of morphemes as in (15b). The analytic passive construction is more productive than is the morphological construction (Yoen, 2003).

\(^2\) The case markers of –eykey and –hante can be used interchangeably. However, Moon (2003) found –hante was used more frequently by young children of Korean native speakers (12-48 months).
(14) The Active

Mary-ka John-ul chop-ess-ta.

Mary-NOM John-ACC catch-PAST-DECL.

‘Mary caught John’

(15) a. The Analytic passive (-ci-)

Kyohoe-ga pokpung-ey busu-ci-ess-ta.

Church-NOM storm-by break-be(PASSIVE)-PAST-DECL.

‘The church was destroyed by storm.’

b. The Morphological Passive

John- i Mary- eykey chop -hi -ess -ta.

John –NOM Mary- by catch-be(PASSIVE)-PAST-DECL.

‘John was caught by Mary’

With respect to dative structures in Korean, considering SOV word order, the two objects, direct object (DO) and indirect object (IO) appear between the subject NP and the verb. Similar to Japanese dative structures (Miyagawa & Tsujioka, 2004), dative alternations in Korean have variance in the word order of the two case-marked arguments: ACC-DAT vs. DAT-ACC as shown in example (16). As for the terminology, ACC-DAT dative and DAT-ACC dative will be used for these two Korean dative structures hereafter.
(16) a. ACC-DAT dative
Mary-ka kurim -ul Inho-eykey cwu -ess -ta.
Mary-NOM picture –ACC Inho-to/DAT give-PAST-DECL.
‘Mary gave the picture to Inho’
b. DAT-ACC dative
Mary-ka Inho-eykey kurim -ul cwu -ess -ta.
Mary-NOM Inho-to/DAT picture –ACC give-PAST-DECL.
‘Mary gave the picture to Inho’

In addition, two other variances of Korean equivalent double-object datives (ACC (DO)-ACC (IO) vs. ACC (IO)-ACC (DO)) are possible. However, these structures are exclusively used in benefactive datives (for-datives). Also, the English counterpart of the latter variance of ACC (IO)-ACC (DO) would be ungrammatical as shown below in (17) (Wong-Barr & Schwartz, 2002; Moon, 2003).

Mary- NOM Inho- ACC picture-ACC draw- BEN-PAST-DECL.
‘Mary drew Inho a picture.’
b. Mary-ka kulim-ul Inho-rul kul y-e cwu-ess-ta.
Mary- NOM Yong-for/ Dat picture- Acc draw- Ben-Past-Decl
‘*Mary drew a picture Inho.’
Among four variances for datives in Korean, ACC-DAT dative has been considered the naturally used unmarked form and the canonical order (Cho et al. 2002; Moon, 2003). Some studies of language acquisition and language development observed that young children acquire unmarked ACC-DAT datives before the marked ACC-ACC datives. As ACC-DAT dative and DAT-ACC dative are natural alternative forms in Korean, these two structures will be used as target structures for datives in the present study.

To help understand the Korean structures at issue, tree diagrams for the dative structures and transitive structures are presented below in (18).

(18) a. Active

```
TP
  \   /\          \   /
 T'  T           v' -ess
 |   |           |   |
vP  T           v  -ess
 |   |
DP  v
   |    
John VP           v
   |       
DP  V
   |    
Mary-rul VNP cap-

John-i Mary-rul cap-ess-ta
John-NOM Mary-ACC catch-PAST-DECL
‘John catches Mary’
```
b. Passive

```
TP
  
DP  T
  Mary PassiveP T
      Passive P T
           -ess

  VP  Passive
      -hi

John –eykae  DP  V
  ‘by John’  |  cap
```

Mary-ga John-eykey cap-hi-ess-ta
Mary-NOM John-by catch-Pass-PAST-DECL
‘Mary was caught by John’

c. ACC-DAT dative

```
TP
  
T
  
  V
  
  T

DP  -ess
  John

  VP  v
      
  PP  V
      ‘picture’

Mary-eykey cwu-
  ‘to Mary’  ‘give’

John-i  kurim -ul  Mary-eykey cwu-ess-ta
John-NOM picture-ACC Mary-DAT  give-PAST-DECL
‘John gave a picture to Mary’
In the current study, active and passive structures, along with the ACC-DAT dative and DAT-ACC dative structures are used as primes. In Experiment 2 the participants are Korean-as-L2 speakers whose native language is English. Experiment 2 was designed to investigate the following two research questions:

1) Will a syntactic priming effect be shown in the Korean transitive and dative structures as demonstrated for English?

2) Will Korean L2 speakers show a similar priming tendency as Korean L1 speakers?
3.1 Experiment 2

The purpose of this study is to investigate syntactic priming in Korean for L1 Korean speakers and L2 Korean speakers whose native language is English.

3.1.1 Method

Participants

Korean as L1: A group of thirty undergraduate and graduate students (male = 16, female = 14) at the University of Arizona participated as the L1 Korean control group (N = 30). Participants were paid $5 for taking part in the experimental session, which lasted 20-30 minutes. All of the participants were native speakers of Korean who were studying at the University of Arizona as international students. Twenty two of the participants who took part in Experiment 1B as Korean native speakers with English L2 participated in Experiment 2 as part of the Korean L1 group. Those who participated in both experiments completed either Experiment 1B first or Experiment 2 first based on random assignment. The materials for English and Korean were different. The subjects who participated had been in the US for less than 6 years, with an average length of residence of 4.79 years according to the questionnaire survey (see APPENDIX D). The subjects ranged in age from 18 to 36 years with an average age of 23.16 years.

Korean as L2: Thirty one undergraduate students who either spoke Korean as a second language or had learned Korean as a foreign language in a classroom setting participated in the L2 Korean target group. Subjects were recruited from the Critical Languages
Program at the University of Arizona and intermediate Korean classes at the University of California in Santa Barbara (UCSB). Each participant received $5 as compensation for taking part in the 20-30 minute session. The fifteen males and sixteen females who participated ranged in age from 18 to 26 with an average age of 20.33. All of the participants in the target group were native speakers of English and second language speakers of Korean who either learned Korean in a university setting as a foreign language, or from their parents at home.

Materials and design

Similar to Experiments 1A and 1B for English, the primary materials for the experiment consisted of practice items, prime sentences, target pictures, and filler sentences and pictures. The practice items included seven sentences and seven pictures. The prime sentences consisted of two counterbalanced test lists of sixteen transitive sentences (eight actives and eight passives), and sixteen dative sentences (eight double object datives and eight prepositional datives). Example sentences are shown below in Table 3.1, and Appendix C contains a complete list of the priming sentences.

The target pictures were comprised of sixteen transitive-eliciting pictures, sixteen causative-eliciting pictures, and sixteen dative-eliciting pictures. The sixteen transitive target pictures depicted events that could be described with either an active or a passive sentence. Every event involved an agent, an action and a patient. (see Table 3.1).
Table 3.1 Examples of Priming Sentence Sets from Experiment 2

<table>
<thead>
<tr>
<th>Prime type</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transitive Structure</td>
<td></td>
</tr>
<tr>
<td>Active</td>
<td><em>Kyungchal-i doduk-ul chap-ess-ta</em></td>
</tr>
<tr>
<td></td>
<td>(‘A policeman chased the burglar’).</td>
</tr>
<tr>
<td>Passive</td>
<td></td>
</tr>
<tr>
<td>Morphological Passive</td>
<td><em>Doduk-i Kyungchal-eykey chap-hi-ess-ta</em></td>
</tr>
<tr>
<td>Analytical Passive</td>
<td>(‘The burglar was chased by a policeman.’)</td>
</tr>
<tr>
<td></td>
<td><em>Doduk-i Kyungchal-eykey chap-hi-ce-ess-ta</em></td>
</tr>
<tr>
<td></td>
<td>(‘The burglar was chased by a policeman.’)</td>
</tr>
<tr>
<td>Dative Structure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(‘The students baked their teacher cookies.)</td>
</tr>
<tr>
<td>DAT-ACC Dative</td>
<td><em>Haksangtul-i sunsangnim-eykey phang-ul kwucwu-ess-ta.</em></td>
</tr>
<tr>
<td></td>
<td>(‘The students baked cookies for their teacher.’)</td>
</tr>
</tbody>
</table>

An additional fifty four sentences and fifty four pictures served as fillers in the counterbalanced lists. The filler sentences contained various structures such as intransitive sentences, questions, and negative sentences. Also, fourteen items (seven sentences and seven pictures) which were used for practice items were repeated as fillers in the experiment and were intended to elicit ‘YES’ responses in the recognition task.
The remaining details regarding materials and design were identical to those in Experiment 1A and 1B with the exception that the language in the prime sentences and instructions was Korean.

Procedure

The procedure was the same as in Experiment 1A and Experiment 1B except for the fact that the instructions were given in Korean and the target language in the experimental session was also Korean. In addition, the experimenter was present during the task for data collected from Korean L2 speakers at the UCSB. Since a computer booth was not available at the UCSB, the experimenter sat next to the participant and ran each experiment individually. The experimenter tried not to get involved in the experiment, unless participants asked about the meaning of a word or the Korean translation. The experimenter did not provide any help other than with vocabulary.

Scoring

The audio-taped picture descriptions were transcribed and subsequently coded according to: 1) whether or not the participant correctly repeated the prime sentence and 2) which structure the participant used for describing the target pictures.

Descriptions of the target pictures were also scored for syntactic structure, specifically whether the subject used an Active (AC), Passive (PA), DAT-ACC Dative (DAT-ACC), ACC-DAT Dative (ACC-DAT) or Other (OT), any utterance that could not be classified in one of the above-mentioned categories. Transitive responses were
classified as either ‘Active’ (AC), ‘Passive’ (PA), or ‘Other’ (OT). In order for an utterance to be coded as an ‘Active’ sentence it had to contain an agent in subject position, a patient in object position, and a verb. A sentence coded as a passive structure contained a patient in subject position and a verb phrase consisting of a passive verb including the corresponding passive morpheme. However, lenient scoring was applied to utterances produced such that truncated passives were coded as passives for both L1 Korean speakers and L2 Korean speakers, because Korean allows the truncated passives grammatically. For example, sentences without a by-phrase were scored as passive structures (e.g., kot-i kkuck-y-ess-cta. ‘the flower was cut.’). Providing that the patient appeared in subject position and the verb phrase contained the appropriate passive morpheme, the sentence was coded as a passive (PA) from either analytic passives or morphological passives as shown in (19).

(19) a. Analytic passive (-ci-) (APA)

Kyohoe-ga (pokpung-ey) busu-ci -ess -ta.
Church-NOM (storm-by) break-be(Passive)-PAST-DECL
‘The church was destroyed (by storm).’

b. Morphological Passive (MPA)

John- i (Mary- eykey) chop-hi -ess-cta.
John–NOM (Mary- by) catch-be(Passive)-PAST-DECL
‘John was caught (by Mary)’
As for dative picture descriptions, the dative trials were classified as ‘ACC-DAT’ dative, ‘DAT-ACC’ dative, and ‘Other’ (OT). A sentence was considered an ACC-DAT dative if the case-marked arguments appear with the direct object (Accusative) first, followed by the recipient/beneficiary (Dative) in the order Accusative-Dative, followed by a dative verb. The 'DAT-ACC Dative' is coded if the case-marked arguments appear in the order of recipient/beneficiary (Dative), then direct object (Accusative), followed by a dative verb as shown in (20).

(20) a. ACC-DAT Dative
Kanhosa-ka yak-ul hwanca-eykey cwu-ess-ta.
Nurse-NOM medicine-ACC patient-DAT give-PAST-DECL
‘The nurse gave the medicine to the patient’

b. DAT-ACC Dative
Kanhosa-ka hwanca-eykey yak-ul cwu-ess-ta.
Nurse-NOM patient-DAT medicine-ACC give-PAST-DECL
‘The nurse gave to the patient the medicine’

If the subject’s description lacked either a direct object marked by –ul/lul (ACC) or an indirect object marked by –eykey (DAT), the sentence was coded as ‘Other’ (OT) along with any other deviated structure that included only one of the obligatory complements such as patient or recipient/beneficiary as illustrated in (21). Missing morphological features, such as case markers, were allowed if the resulting sentence was not syntactically ambiguous.
(21) Other (OT): Incomplete Dative

a. *ganhosa-ga  yak-ul   cwu-ess-da. (Direct object only)
   Nurse-NOM  medicine-ACC  give-PAST-DECL
   ‘*The nurse gave the medicine.’

b. *ganhosa-ga   hwanja-eykey   cwu-ess-da. (Recipient only)
   Nurse-NOM   patient-DAT   give-PAST-DECL
   ‘*The nurse gave to the patient’

3.1.2. Results and Discussion

The same statistical analysis (a repeated measures analysis of variance) was performed separately for the two participant groups (L1 and L2) and for the two structure frames (transitive and dative). Test type was a between-subjects variable and prime type (AC and PA for transitive, and DAT-ACC and ACC-DAT for dative) was a within-subjects variable. The proportions per participant and per item were subjected to repeated measures analyses of variance, F1 and F2, respectively as a random factor with prime as a two-level within-participants and within-items factor.

Transitive utterances

The overall proportions of active or passive utterances out of transitive utterances are presented in Table 3.2 below for both the L1 and L2 groups.
Table 3.2 Proportions of Active and Passive Utterances Produced by L1 and L2 Korean Speakers in the Two Prime Conditions (active, passive) for Experiment 2

<table>
<thead>
<tr>
<th>Prime Type</th>
<th>Utterance Form in picture description</th>
<th>Active</th>
<th>Passive</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1 Active</td>
<td></td>
<td>.69</td>
<td>.31</td>
<td>.00</td>
</tr>
<tr>
<td>Passive</td>
<td></td>
<td>.57</td>
<td>.43</td>
<td>.00</td>
</tr>
<tr>
<td>(Difference)</td>
<td></td>
<td>+.12*</td>
<td>+.12*</td>
<td></td>
</tr>
<tr>
<td>L2 Active</td>
<td></td>
<td>.69</td>
<td>.29</td>
<td>.02</td>
</tr>
<tr>
<td>Passive</td>
<td></td>
<td>.56</td>
<td>.42</td>
<td>.02</td>
</tr>
<tr>
<td>(Difference)</td>
<td></td>
<td>+13*</td>
<td>+.13*</td>
<td></td>
</tr>
</tbody>
</table>

* Note: * significant at p < .05 level

The results showed a priming effect for transitive structures in Korean both for Korean native speakers and second language speakers.

**L1 speakers:** For the L1 group, the active prime sentence increased the frequency of active utterances by 12 % relative to their frequency in the unprimed condition. A two-factor repeated measures ANOVA revealed a main effect of prime type (active, passive) on the number of active picture-descriptions produced, significant on the by-subject (F1) analysis, $F1 (1, 28) = 6.85, p = .014$, but not significant on the by-item (F2) analysis, $F2 (1, 15) = 1.816, p = .198$. For passive picture-descriptions, the passive priming condition was shown to increase the frequency of passive utterances following a passive prime sentence by 23 % relative to their frequency following active primes. A repeated
measures ANOVA showed a main effect of prime type (active, passive) on the percentage of passive utterances produced, again significant by subjects ($F_1 (1, 28) = 6.85, p = .014$), but not significant by items ($F_2 (1, 15) = 1.816, p = .198$).

**L2 speakers**: The L2 group showed a similar priming pattern as the L1 group, though the L2 group produced fewer passive structures overall. The active prime condition increased the frequency of active utterances by 13% relative to the unprimed condition. Repeated measures ANOVAs showed significant effects for all comparisons: the effect of prime type on the proportion of active picture descriptions was significant by subjects and by items ($F_1 (1, 28) = 11.513, p = .002; F_2 (1, 14) = 15.631, p = .001$). For passive utterances, the passive prime increased the incidence of passive utterances by 13% relative to the frequency of passives produced following active primes. Repeated measures ANOVAs showed a significant main effect by subjects and by items ($F_1 (1, 28) = 12.582, p = .001; F_2 (1, 14) = 17.218, p = .001$).
Dative utterances

The results for the dative structures are shown in Table 3.3 below.

Table 3.3 Proportions of ACC-DAT Dative and DAT-ACC Dative Utterances Produced by L1 and L2 Korean Speakers for Experiment 2

<table>
<thead>
<tr>
<th>Prime Type</th>
<th>ACC-DAT</th>
<th>DAT-ACC</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1 ACC-DAT</td>
<td>.23</td>
<td>.58</td>
<td>.19</td>
</tr>
<tr>
<td>DAT-ACC</td>
<td>.13</td>
<td>.68</td>
<td>.19</td>
</tr>
<tr>
<td>Difference</td>
<td>+.10*</td>
<td>+.10*</td>
<td></td>
</tr>
<tr>
<td>L2 ACC-DAT</td>
<td>.69</td>
<td>.29</td>
<td>.02</td>
</tr>
<tr>
<td>DAT-ACC</td>
<td>.56</td>
<td>.42</td>
<td>.02</td>
</tr>
<tr>
<td>Difference</td>
<td>+13*</td>
<td>+.13*</td>
<td></td>
</tr>
</tbody>
</table>

* Note: * significant at p=0.05 level

**L1 speakers:** ACC-DAT dative primes increased the incidence of ACC-DAT dative utterance by 10% relative to their frequency following DAT-ACC dative primes. Also, DAT-ACC dative utterances increased in frequency with the same rate (10%) as ACC-DAT datives following their corresponding prime types. Repeated measures ANOVAs yielded a main effect of prime type (ACC-DAT, DAT-ACC) on the proportion of ACC-DAT dative picture-descriptions produced, significant by subjects (F1) and by items (F2) ($F1(1, 28) = 10.946$, $p = .003$; $F2 (1, 14) = 6.935$, $p = .02$). The effect of prime type on the mean proportion of DAT-ACC datives was significant on the by-subject analysis, $F1$
$F_1 (1, 28) = 6.781, p = .015$, but was marginally significant on the by-item analysis, $F_2 (1, 14) = 4.037, p = .064$.

L2 speakers: A pattern of syntactic persistence similar to the L1 group was observed. Unlike the L1 speakers of Korean, the L2 speakers produced more ACC-DAT datives than DAT-ACC datives. With ACC-DAT primes, there was a 13% increase in the number of ACC-DAT dative picture descriptions. Also, there was a 13% increase in the production of DAT-ACC dative utterances following the corresponding prime type. Repeated measures ANOVAs revealed that the difference between proportions of ACC-DAT datives in the primed versus unprimed conditions was significant both by subjects and by items ($F_1 (1, 28) = 12.319, p = .01, F_2 (1, 14) = 9.996, p = .007$). The effect of prime type on the mean proportion of DAT-ACC datives showed a marginal effect on the by-subject analysis ($F_1 (1, 28) = 3.353, p = .077$), and a significant effect in the by-item analysis ($F_2 (1, 14) = 8.089, p = .013$).

Discussion

To summarize the priming effects found for the two main structures (transitive and dative) thus far, consistent with previous results for English, robust syntactic-persistence effects were observed in transitive alternative structures and dative alternative structures in Korean. Also, L2 speakers of Korean showed patterns of syntactic priming similar to L1 speakers although the difference in proportions of use of the different dative structures suggests that L1 speakers preferred the DAT-ACC dative while L2 speakers
preferred the ACC-DAT datives. This difference in preferences for datives could indicate a cross-language influence from L1 for the L2 speakers. Moon (2003) suggested DAT-ACC dative is the unmarked dative structure for Korean, which indicates that DAT-ACC dative is the preferred dative form in Korean dative by the native speakers. However, several studies showed that ACC-DAT is preferred in language development and language acquisition (Moon, 2003; Cho et al. 2002).

The purpose of this study was to answer two research questions regarding priming effects in Korean. The first research question addressed priming effects in Korean for transitive alternative structures and dative alternative structures as explored in the previous study. The answer to this question was clear: robust effects were found for transitive structures (active and passive). With respect to dative alternative utterance forms, greater priming was found for ACC-DAT dative than DAT-ACC dative, found to be marginally significant. These results were consistent with studies in English (Bock, 1986; Bock & Loebell, 1990), in which significant priming effects were found for dative structures. However, the results for the dative were inconsistent with the findings of Hartsuiker and Kolk (1998), who found significant priming effects for dative structures but not for active transitive structures in Dutch.

With respect to the question about priming effects in second language production, we tested a relatively homogenous group of second language learners of Korean whose L1 is English. Significant priming effects were obtained for both transitive and dative alternative forms. Looking at the production of dative utterances, it is interesting to notice that the preference for dative alternative structures between L1 and L2 group was
reversed. Korean-as-L1 speakers showed a strong preference for the DAT-ACC dative structure. On the other hand, Korean-as-L2 speakers showed a strong preference for the ACC-DAT dative structure. Note that the English equivalent DAT-ACC dative is ungrammatical (e.g., *Mary gave to Inho (DAT) the picture (ACC)). Given this fact, it is not surprising that Korean-as-L2 speakers produced the ACC-DAT dative structure more frequently than the DAT-ACC dative structure.

These results support the possible influence of language-specific preference on syntactic persistence. To investigate further the possible influence of cross-linguistic differences, the next chapter will explore how languages differentially affect syntactic priming when a cross-language priming paradigm is involved.
CHAPTER 4
SYNTACTIC PERSISTENCE WITH CROSS-LANGUAGE PRIMING
IN KOREAN AND ENGLISH

This chapter investigates syntactic priming effects across Korean and English. As reviewed in Chapter 1, cross language priming effects have been investigated in a few studies, such as German-English (Loebell & Bock, 2003), Spanish-English (Hartsuiker et al., 2004), and Dutch-English (Schoonbaert et al., 2007). Priming effects were observed overall, but there were some variations of the effect as a function of the different structures and languages involved. Loebell and Bock (2003) investigated priming effects of both transitive and dative structures. They found significant priming effects for dative structures, but only a small effect for passive utterance forms. In contrast, Hartsuiker et al. (2004), in a study of English and Spanish bilinguals, found significant syntactic persistence for passive structures.

Variations also have been observed in the previous experiments reported in this thesis for second language production in English and Korean in the within-language priming paradigm. For example, in Experiment 1B, second language speakers of English did not show results consistent with those found with first language speakers of English for dative structures. Also, second language speakers of Korean differed from the native speakers of Korean with respect to overall proportions of the different dative structures used in Experiment 2.
What influences contribute to such variation shown between the two language groups? It has been assumed, based on the results of previous experiments in this thesis, that cross-linguistic differences might have an effect on second language production. Experiment 3 seeks to investigate cross-language priming effects between two language groups (Korean L2 speakers and English L2 speakers) and to determine whether cross-linguistic differences account for the variation in priming patterns.

Will speakers show cross-language priming? It has been proposed that “shared” syntactic constructions between two languages (e.g., transitive structures in English and Spanish) tend to facilitate syntactic repetition (Hartsuiker et al., 2004, p.412). On the other hand, if the two languages do not share similar syntactic forms, the priming effects tend to be interfered with (Loebell & Bock, 2003). It is important to note the structural variations between Korean and English before introducing the specific research questions. First of all, with regard to transitive structures (actives vs. passives), admitting the fact that Korean and English differ with respect to head directionality and case marking, both languages exhibit active and passive alternation in the expression of transitive actions, as in the examples in (23) below.

(23) a. The Active in English

Mary caught John.

Mary-NOM John-ACC
b. The Active in Korean

Mary-ka John-ul chop-ess-ta

Mary-NOM John-ACC catch-PAST-DECL

‘Mary caught John.’

c. The Passive in English

John was caught by Mary.

NOM oblique case

d. The Passive in Korean

Kyohoe-ka pokpung-ey busu -ci -ess -ta.

Church-NOM storm-by break-be(Passive)-PAST-DECL

‘The church was destroyed by storm.’

Both languages also allow variations in the expression of datives. As explained previously in Chapter 3, double object datives in Korean with two accusative case marked phrases (ACC-ACC) are uncommon in usage. Instead, Korean has a DAT-ACC dative as the canonical order. The thematic role sequence for this structure corresponds to the double object dative (Goal-Theme) in English, see (24) below for examples of all dative structures.

(24) a. Prepositional dative in English (ACC-DAT order)

Mary gave a picture to Inho.

Theme Goal
b. ACC-DAT Dative in Korean

Mary-ka  kulim-ul  Inho-eykey  cwu-ess-ta

Mary-NOM  picture_–ACC  Inho-DAT  give-PAST-DECL
Theme  Goal
‘Mary gave a picture to Inho.’

c. Double-object Dative in English (ACC-ACC order)

Mary gave Inho a picture.
Goal  Theme


d. DAT-ACC Dative in Korean

Mary-ka  Inho-eykey  kulrim-ul  cwu-ess-ta.

Mary-NOM  Inho-DAT  picture_–ACC  give-PAST-DECL
Goal  Theme
‘Mary gave to Inho a picture ’

e. ACC-ACC Dative in Korean

Mary-ka  Inho-rul  kulrim-ul  cwu-ess-ta.

Mary-NOM  Inho-ACC  picture_–ACC  give-PAST-DECL
Theme  Theme
‘Mary gave Inho a picture ’

Among these different linguistic features between English and Korean as presented in (24), the main structural dissimilarity between Korean and English is word order due to different head-direction. Some studies have found word order priming
effects (Hartsuiker et al., 1999; Hartsuiker & Westenberg, 2000). If word order priming is strongly involved in cross-language priming between two dissimilar languages, then clearly we cannot expect cross-language carry-over of the entire sentence structure. Otherwise, we might expect some facilitation based on the surface order of arguments (case-marked arguments in Korean), where the English prepositional dative and the ACC-DAT in Korean share argument order and the double object dative in English shares word order with the DAT-ACC dative in Korean.

4.1 Experiment 3

Experiment 3 seeks to determine: 1) whether transitive alternate structures persist between English primes and Korean picture descriptions, and between Korean primes and English picture descriptions, 2) whether dative alternative structures also show priming.

4.1.1 Method

Participants

Two groups of second language speakers participated in this study. The first group consisted of L1 English speakers whose L2 was Korean (this group will be referred to as ‘Korean-as-L2’ hereafter), and the second group contained L1 Korean speakers whose L2 was English (this group will be referred to as 'English-as-L2' hereafter). Twenty undergraduate students (10 male and 10 female) either at the University of Arizona or at the University of California in Santa Barbara took part in this experiment forming the Korean-as-L2 group. The speakers in this group were determined to be at an
intermediate level of proficiency based on the fact that they were taking intermediate level courses (Korean 201 or Korean 202) offered by either the University of California at Santa Barbara or the Critical Languages Program at the University of Arizona. Also they learned Korean either from their parents or as a foreign language in a university setting. Their ages ranged from 18 to 25, with a mean age of 20.85 years.

Twenty subjects, all undergraduate or graduate students at the University of Arizona, participated in the second group of English-as-L2 speakers. These participants had been in the US for less than 6 years, with 4.34 years being the average length of stay (according to the questionnaire data). There were eleven males and nine females, ranging in age from 18 to 35 years, with 23.6 years as the average age. None of the participants who took part in the previous experiments (Experiments 1A, 1B, or 2) participated in this experiment.

Except for several volunteers, the subjects were paid $5 for taking part in the experimental session which lasted 20-30 minutes, or $10 for taking part in two sessions which took less than an hour.

Materials and design

The English materials were identical to those used in Experiment 1B. The Korean materials were the same as those used in Experiment 2. The experiment consisted of two sessions. One session was designed to elicit picture descriptions in Korean with English prime sentences. The other session was designed to elicit picture descriptions in English with Korean prime sentences. The order of the two sessions was randomly assigned, but
care was taken to counterbalance of the order of the two sessions. The lists were different, so that the list presented in the later session was not the translation-equivalent of the list from the previous session. The remaining details regarding design were identical to those implemented in Experiment 1A and 1B for English priming and Experiment 2 for Korean priming.

**Procedure**

The procedure for Experiment 3 was the same as for the previous experiments, Experiment 1A and Experiment 2, except for the alternation between language of the prime and language of the target description as indicated in the cross language priming paradigm. The subjects were instructed to listen and repeat aloud a sentence in the same language of the presented stimulus, and then to describe the presented picture in the other language (either Korean or English) in one session, and vice versa in the other session. Within a session, picture-description was always in one language. Regarding the language for a recognition task, participants were told that it would not matter if they spoke in Korean or English. They were free to answer ‘YES’ or ‘NO’ in English or the equivalent response in Korean. Again, the test consisted of two sessions, which included a Korean priming session and an English priming session. The order of sessions was randomly assigned to each subject. The participants took a five minute break between the sessions. The remaining details regarding procedure were identical to those implemented in the previous experiments.
Scoring

All the picture descriptions were transcribed and scored. For the picture descriptions in English, the criteria used in Experiment 1A were applied here. Therefore, English prime sentences were coded as four types: ‘Active’ (AC), ‘Passive’ (PA), ‘Double object dative’ (DOD), and ‘Prepositional dative’ (PD). Picture descriptions in English were scored as follows: ‘Active’ (AC), ‘Passive’ (PA), ‘Double object dative’ (DOD), ‘Prepositional dative’ (PD), and ‘Other’ (OT).

For the picture descriptions in Korean, the scoring rules from Experiment 2 were applied. Therefore, Korean prime sentences were coded as four types: ‘Active’ (AC), ‘Passive’ (PA), ‘DAT-ACC dative’, and ‘ACC-DAT dative’. Korean utterance forms were scored as five types, ‘Active’ (AC), ‘Passive’ (PA), ‘DAT-ACC dative’, ‘ACC-DAT dative’, and ‘Other’ (OT).

4.1.2. Results and discussion

Among the data from the two groups, data from twenty participants in the Korean-as-L2 speakers were analyzable. However, among the twenty participants in the group of English-as-L2, data from six participants were excluded for not complying with the task. The language these six participants used for the picture descriptions was the same as the language in the primes, instead of the cross language response intended by the experimenter. Ultimately, we could use 19 subjects’ data from English (L2) priming (L2 to L1 direction) and 15 subjects’ data from Korean (L1) priming (L1 to L2 direction).
All analyses were conducted with the proportions of target utterance forms. Test types (two counterbalanced test types) were a between-subject variable and the prime type (AC and PA for transitives, and DOD/DAT-ACC and PP/ACC-DAT for datives) was a within-subject variable. We subjected the proportions per participant and per item to repeated measures analyses of variance (F1 and F2, respectively) as a random factor with prime as a two-level within-subjects and within-items factor. Repeated measures ANOVAs were performed separately for the two target structures (transitive and dative), and for the two participant groups, the one group with Korean-as-L2 speakers, and the other group with English-as-L2 speakers.

Transitive utterances

For the Korean-as-L2, the overall syntactic priming effect was observed in the transitive alternate construction following L1 priming in English, but not shown following L2 priming in Korean. Table 4.1 shows the proportion of the active and passive utterances produced in the two transitive priming conditions across language.
Table 4.1 Proportions of Transitive Utterances Produced in the two Cross-linguistic Transitive Priming Conditions by Korean-as-L2 speakers in Experiment 3

<table>
<thead>
<tr>
<th>Priming Language and Type</th>
<th>Picture Description in Korean (L2)</th>
<th>Picture Description in English (L1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Active</td>
<td>Passive</td>
</tr>
<tr>
<td>English (L1) Actve</td>
<td>.78</td>
<td>.16</td>
</tr>
<tr>
<td>Passive</td>
<td>.58</td>
<td>.33</td>
</tr>
<tr>
<td>Difference</td>
<td>+.20**</td>
<td>+.17*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Priming</th>
<th>Picture Description in English (L1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Active</td>
</tr>
<tr>
<td>Korean (L2) Active</td>
<td>.58</td>
</tr>
<tr>
<td>Passive</td>
<td>.58</td>
</tr>
<tr>
<td>Difference</td>
<td>0</td>
</tr>
</tbody>
</table>

*Note* * significant at p < .05 level, ** significant p ≤ .001

With regards to the L2 picture description in Korean with L1 priming in English, the English (L1) active priming sentences facilitated the production of Korean (L2) active utterance forms in frequency by 20% relative to the frequency in the passive utterance forms for picture descriptions in Korean (L2). A repeated measures ANOVA yielded a significant effect of prime type both by subjects ($F1 (1, 18) = 21.077, p = .001$) and by items ($F2 (1, 14) = 8.517, p = .011$). The English (L1) passive priming sentences also increased the frequency of Korean (L2) passive utterance forms by 17%, which is significantly different from the proportion of Korean active utterance forms both by subjects ($F1 (1, 18) = 15.927, p = .001$) and by items ($F2 (1, 14) = 5.200, p = .039$). On
the other hand, as for the picture descriptions in English (L2) with Korean (L1) priming sentences, no significant main effects were observed in any comparisons of the transitive structures (Fs < 1).

Contrary to the results from the previous group (Korean-as-L2), the group of English-as-L2 showed symmetric priming effects as illustrated below in Table 4.2.

Table 4.2 Proportions of Transitive Utterances Produced in the Two Cross-linguistic Transitive Priming Conditions by English-as-L2 speakers in Experiment 3

<table>
<thead>
<tr>
<th>Prime Type</th>
<th>Picture description in English (L2)</th>
<th>Picture Description in Korean (L1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Active</td>
<td>Passive</td>
</tr>
<tr>
<td>Korean(L1)</td>
<td>.58</td>
<td>.36</td>
</tr>
<tr>
<td>(n=15)</td>
<td>.48</td>
<td>.43</td>
</tr>
<tr>
<td>Difference</td>
<td>+10*</td>
<td>+07*</td>
</tr>
<tr>
<td>English(L2)</td>
<td>.66</td>
<td>.34</td>
</tr>
<tr>
<td>(n=19)</td>
<td>.49</td>
<td>.50</td>
</tr>
<tr>
<td>Difference</td>
<td>+17*</td>
<td>+16*</td>
</tr>
</tbody>
</table>

Note: * significant at p=0.05 level, ** significant at p=.001, and ‘n’ means participants’ number whose data were analyzable.

For the L2 picture descriptions in English with L1 priming sentences in Korean, a similar pattern was observed in the active priming condition to that of the previous group. A repeated measures ANOVA showed a significant main effect of prime type on the proportions of active utterance forms in the by-subjects analysis ($F1 (1, 13) = 11.732, p = .005$) and a marginally significant effect in the by-items analysis ($F2 (1, 14) = 3.820, p = .071$). Similarly, for the passive structure, a repeated measures ANOVA showed a
significant main effect of prime type on the proportions of passive utterances by subjects
\( (F1 (1, 13) = 10.348, p = .007) \), and a main effect approaching significance by items, \( (F2 (1, 14) = 3.545, p = .081) \).

As for the other condition with L1 picture descriptions in Korean and L2 priming in English, a repeated measures ANOVA revealed a significant main effect on the active utterance forms both by subjects and by items \( (F1 (1, 17) = 12.139, p = .003; F2 (1, 14) = 5.604, p = .033) \). For the passive structure, ANOVAs yielded a significant main effect of prime type on the passive utterance form only by subjects \( (F1 (1, 17) = 12.214, p = .003; F2 (1, 14) = 2.409, p = .143) \).

**Dative utterances**

With regards to the dative structures, overall, Korean-as-L2 speakers showed weak priming effects on dative utterance forms as illustrated in Table 4.3. In L2 production of Korean with L1 priming in English, the ‘DAT-ACC’ dative and prepositional dative utterances were produced slightly more frequently following the corresponding priming structures. However, ANOVAs did not show any significant main effects on the differences on any comparisons \( (Fs < 1) \). Similarly, in L1 production in English with L2 priming in Korean, there was no priming effect in the double object dative utterance. Prepositional dative utterances, on the other hand, were slightly more frequent following the prepositional dative priming sentences than following double object dative utterances by 4%. However, the difference was not significant by subjects \( (F1 (1, 18) = 1.164, p = .292) \), or by items \( (F2 < 1) \).
Table 4.3 Proportions of Dative Utterances Produced in the Two Cross-linguistic Dative Priming Conditions by Korean-as-L2 speakers in Experiment 3

<table>
<thead>
<tr>
<th>Prime Language and Type</th>
<th>Picture description in Korean (L2)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DAT-ACC</td>
<td>ACC-DAT</td>
<td>Other</td>
</tr>
<tr>
<td>English (L1) DOD (n=20)</td>
<td>.79</td>
<td>.08</td>
<td>.13</td>
</tr>
<tr>
<td>(n=20) PD</td>
<td>.77</td>
<td>.11</td>
<td>.12</td>
</tr>
<tr>
<td></td>
<td>+.02</td>
<td>+.03</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prime Language and Type</th>
<th>Picture description in English (L1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DOD</td>
</tr>
<tr>
<td>Korean (L2) DAT-ACC (n=20)</td>
<td>.40</td>
</tr>
<tr>
<td>ACC-DAT</td>
<td>.40</td>
</tr>
<tr>
<td></td>
<td>.0</td>
</tr>
</tbody>
</table>

*Note. * significant at p <.05 level, n means participants’ number whose data were analyzable.

In L2 production in Korean with L1 priming in English, DAT-ACC dative utterance and ACC-DAT dative were produced slightly more frequently following the corresponding priming structures. However, ANOVAs did not show any significant main effects on the differences in any of the comparisons (Fs <1). Similarly, in L1 production in English with L2 priming in Korean, there was no priming effect in the double object dative utterance. Prepositional dative utterances were slightly more frequent following the prepositional dative priming sentences than following double object dative utterances by 4%. However, the difference was not significant by subjects ($F_1$ (1, 18) = 1.164, p=.292), nor by items ($F_2$<1).
For the English-as-L2 group, the overall results with the proportions of dative utterances are shown below in Table 4.4.

Table 4.4 Proportions of Dative Utterances Produced in the Two Cross-linguistic Dative Priming Conditions in English-as-L2 speakers in Experiment 3

<table>
<thead>
<tr>
<th>Prime Language and Type</th>
<th>Picture description in English (L2)</th>
<th>Picture description in Korean (L1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DOD</td>
<td>PP</td>
</tr>
<tr>
<td>Korean (L1) (n=15)</td>
<td>.20</td>
<td>48</td>
</tr>
<tr>
<td>Difference</td>
<td>-.03</td>
<td>+.12*</td>
</tr>
<tr>
<td>English (L2) (n=19)</td>
<td>.74</td>
<td>.04</td>
</tr>
<tr>
<td>Difference</td>
<td>-.04</td>
<td>.0</td>
</tr>
</tbody>
</table>

*Note: * significant at p <.05 level.

As for L2 production (English) with L1 priming (Korean), syntactic priming was shown only in prepositional dative utterances. ANOVAs revealed a significant main effect of prime type on the prepositional dative by subjects (F1(1,13)=5.629, p=.034), but not by items (F2 (1,14)=1.112, p=.311). No priming effect was observed in the double object dative utterance following the DAT-ACC dative priming in Korean. On the other hand,
for L1 production (Korean) with L2 priming (English), no priming effects were found on the DAT-ACC dative and ACC-DAT dative (Fs<1).

Discussion

Let us briefly summarize the results. (1) Korean-as-L2 speakers showed asymmetric priming effects for transitive alternate constructions between the L1 priming and L2 priming conditions. Specifically, L1 primes were effective in facilitating the corresponding L2 target utterance forms in picture descriptions, but L2 primes were not equally effective for the L1 picture descriptions. However, no significant priming effects were found for the dative alternate constructions by this group, meaning that there were no reliable priming effects in either condition for the dative (L1 and L2 priming conditions). (2) The English-as-L2 group showed symmetrical priming effects in transitive structures, but not on the dative utterance forms. As for the dative structures, significant priming effects were found only on the prepositional dative structures, not on the double object dative in English or DAT-ACC dative in Korean.

This discrepancy between asymmetric and symmetric priming effects might be due to the differences in proficiency between the two groups of L2 speakers (English-as-L2, Korean-as-L2). To investigate this possibility, the error rates in the priming trials and the answers to the proficiency-related questions in the questionnaire survey were analyzed. First of all, the analysis of the error rate in the priming trial of the two groups was conducted to compare the fluency of the two groups. The error rate was calculated based on the performance on prime trials in their L2 priming condition. If the subject
repeated the prime sentence correctly the first time, the sentence was scored as “Successful” (S). If the subject listened more than twice or failed to repeat the prime sentence correctly, the item was scored as “Failed” (F). To determine error rates, the fail rate out of total prime trials was analyzed. The error rate in both groups, Korean-as-L2 and English-as-L2, is provided in Table 4.5.

Table 4.5 Frequency of ‘Success’ or ‘Fail’ in the L2 Prime Trials of Korean-as-L2 and English-as-L2 Speakers in Experiment 3

<table>
<thead>
<tr>
<th></th>
<th>‘Success’</th>
<th>‘Fail’</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>English-as-L2 (n=16)</td>
<td>393 (76%)</td>
<td>119 (23%)</td>
<td>512 (100%)</td>
</tr>
<tr>
<td>Korean-as-L2 (n=20)</td>
<td>368 (59%)</td>
<td>253 (41%)</td>
<td>621 (100%)</td>
</tr>
</tbody>
</table>

As shown in Table 4.5 above, there is an appreciable difference in error rate. The English-as-L2 group showed a smaller error rate than the Korean-as-L2 group, which means that the English-as-L2 speakers performed better in prime trials and indicates that they have better fluency than Korean-as-L2 speakers.

Next, among the questionnaire items (see Appendix D), several items related to proficiency were analyzed, such as the self-rated proficiency for L2 (on a scale from 1 (very poor) to 7 (perfect)), frequency of their language usage, and context of the language usage. First, with respect to ratings of proficiency, Korean-as-L2 (native English) speakers reported an average of 3.65. On the other hand, the English-as-L2 (native Korean) speakers gave an average rating of 4.15. Next, a 5-point scale was used to rate
frequency of language usage, with the scale ranging from 1 (not at all) to 5 (very frequently). The Korean-as-L2 speakers reported an average of 3.6. However, the English-as-L2 group reported an average of 4.15. Lastly, regarding the context of L2 usage, the Korean-as-L2 group reported mainly ‘class’, ‘classmates’, and ‘family or parents’. The English-as-L2 group reported a broader range for their L2 usage contexts, such as ‘friends’, ‘party’, ‘academia’, and ‘everywhere’. These differences suggest that the group of English-as-L2 speakers were more proficient in their L2 than the group of Korean-as-L2 speakers. Therefore, it makes sense that both groups would show syntactic persistence from the L1 primes to L2 descriptions but that the less proficient Korean-as-L2 group did not show a syntactic priming effect in L1 production with L2 primes, whereas the more proficient English-as-L2 speakers did show an effect with L2 primes.

The inconsistent results between the two groups for transitives, it might be related to proficiency difference between the two groups. In addition, no significant priming effects were shown between double object dative utterances (English) or DAT-ACC dative utterances (Korean) in either group (Korean-as-L2, English-as-L2). With respect to the other dative structures, a significant priming effect was found for prepositional datives by English-as-L2 speakers, but not for ACC-DAT datives by Korean-as-L2 speakers.

The discrepant results between transitive (where an overall priming effect was shown) and dative structures (where overall no priming effect was shown) indicates that differences in the order of case-marked arguments might matter more than the different word order of grammatical relations of constituents (SVO vs. SOV) or the order of
thematic roles (AGENT, PATIENT, THEME, GOAL). As expected, if word order
difference were strongly involved in processing, syntactic priming effects for the
transitive structures would not have occurred. If the order of thematic roles were involved,
the priming effect for dative structures would have been obtained. Instead, the speakers
may have been sensitive to the order of arguments and the case-marked arguments,
possibly being influenced by the cross-linguistically different features of case-marking.
CHAPTER 5
GENERAL DISCUSSION

The current study was motivated by three principal questions: 1) Will Korean-L1 speakers show syntactic persistence as shown in previous studies in English? 2) Will L2 speakers of English and Korean show syntactic priming effects in L2 production? If so, will these effects pattern similarly to those of the L1 speakers of the two languages in a within-language priming paradigm? 3) Will L2 language speakers of English and Korean show syntactic priming effects in a cross-language priming paradigm? This chapter consists of four sections: a summary of findings, discussion of syntactic persistence in the within-language paradigm, discussion of syntactic persistence in the cross-language paradigm, and implications for second language acquisition. It will be discussed how these findings can be accounted in the existing language production theory in section 5.2 and 5.3. Finally, this chapter will conclude by addressing limitations of this study and suggestions for further research.

5.1 Summary of findings

The present study consisted of three major experiments and one replication. The findings from the four experiments are summarized in Table 5.1 for the within-language priming condition and in Table 5.2 for the cross-language priming condition.

Experiments 1A and 1B investigated syntactic priming effects in English for L1 and L2 speakers. Reliable syntactic priming effects were shown in transitive alternative
structures (active vs. passive) in both L1 and L2. However, asymmetrical patterns were shown for dative alternative forms. Firstly, significant priming effects were observed for prepositional datives in L1 and L2 production. However, for double object datives, priming effects appeared only in L1 and not in L2.

Experiment 2 investigated the effects for Korean within-language primes on the production of utterances by L1 and L2 speakers. Interestingly, robust effects were observed in Korean both in L1 and L2 utterances. Table 5.1 contains a summary of these results, where proportions represent the difference between the utterances from the primed condition (the same target utterance to the priming structure) to the unprimed condition (where target utterances differed from the priming structures).

Table 5.1 Summary of Results of Experiments for the Within-language Priming Condition (both English-as-L2 and Korean-as-L2 speakers)

<table>
<thead>
<tr>
<th></th>
<th>Within-language priming</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exp. 1A</td>
<td>Exp. 1B (replication)</td>
<td>Exp. 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>English</td>
<td>English</td>
<td>English</td>
<td>English</td>
</tr>
<tr>
<td>L1</td>
<td>L2</td>
<td>L1</td>
<td>L2</td>
<td>L1</td>
</tr>
<tr>
<td>AC</td>
<td>.31*</td>
<td>.32*</td>
<td>.17*</td>
<td>.03</td>
</tr>
<tr>
<td>PA</td>
<td>.33*</td>
<td>.32*</td>
<td>.19*</td>
<td>.06</td>
</tr>
<tr>
<td>DO/ DAT-ACC</td>
<td>.05</td>
<td>.01</td>
<td>.15*</td>
<td>.04</td>
</tr>
<tr>
<td>PP/ ACC-DAT</td>
<td>.28*</td>
<td>.38*</td>
<td>.23*</td>
<td>.03</td>
</tr>
</tbody>
</table>

*Note*  * means that a main effect of prime type was shown.
Further syntactic priming effects across languages were investigated in Experiment 3. An interesting finding was the differential degree and direction of priming found for both second language groups (Korean-as-L2 and English-as-L2 speakers). Regarding transitive structures, Korean-as-L2 speakers showed asymmetrical priming effects. Significant priming was shown from L1 to L2, but no reliable priming effects were shown from L2 to L1. A possible explanation for this is that these subjects were able to ignore the L2 stimuli when they described the pictures in their first language (English). However, symmetrical priming effects were found in both conditions, from L1 to L2 and from L1 to L2, in the utterances by English-as-L2 speakers. As for dative structures, very weak or no priming effects were found in the cross-language priming paradigm. The only significant effect was for prepositional datives with English-as-L2 speakers from L1 (Korean) to L2 (English). A summary of these results can be found in Table 5.2 below, where proportions represent the difference between the utterances from the primed condition (the same target utterance to the priming structure) to the unprimed condition (where target utterances differed from the priming structures).

As these results indicate, different patterns of effects have been found for syntactic priming in various conditions. Within-language priming showed both symmetrical and asymmetrical priming patterns, depending on the grammatical structures in question. Cross-language priming also showed symmetrical and asymmetrical priming depending on the L2 proficiency level. These differences in priming effects will be treated in the following sections.
Table 5.2 Summary of Results of Experiments for the Cross-language Priming Condition (both L2-English and L2-Korean speakers)

<table>
<thead>
<tr>
<th>Cross-language priming</th>
<th>Exp.3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Korean-L2</td>
</tr>
<tr>
<td></td>
<td>L1(E)→L2(K)</td>
</tr>
<tr>
<td>AC</td>
<td>.20*</td>
</tr>
<tr>
<td>PA</td>
<td>.17*</td>
</tr>
<tr>
<td>DO/DAT-ACC</td>
<td>.02</td>
</tr>
<tr>
<td>PP/ACC-DAT</td>
<td>.03</td>
</tr>
</tbody>
</table>

*Note* ‘*’ means that a main effect of prime type was shown.

5.2 Syntactic persistence within languages

As discussed above, different patterns of syntactic priming were yielded depending on whether the experiments were conducted within or across languages. The first research question, ‘will Korean-as-L1 speakers show syntactic persistence as shown in previous studies in English?’ treats within-language priming in the participants' first language. Overall, syntactic priming effects were shown in L1 production of English and Korean. The results in Experiment 1A did not show priming effects for the double-object dative utterances, but in the replicated Experiment 1B, some priming effects were shown (see the Discussion section in chapter 2 for detail). These results of structural priming in English confirmed previous studies which investigated effects of syntactic persistence in English (Bock, 1986; Bock & Loebell, 1990; Bock & Griffin, 2000). Moreover, the
present results also showed significant priming effects in Korean-L1 production, which were compatible with the results of English. Especially, the present finding of syntactic priming effects in Korean as L1 and L2 shed more light towards an eventual universal account of syntactic priming.

The second research question also treats within-language priming, but this time in L2 production: 'Will L2 speakers of English and Korean show syntactic priming effects in L2 production? If so, will these effects pattern similarly to those of the L1 speakers of the two languages in a within-language priming paradigm? The first notable point in answering this question is that the results were not consistent between English-as-L2 speakers and Korean-as-L2 speakers. English-as-L2 speakers showed significant priming effects for transitive and dative target structures, whereas Korean-as-L2 speakers did not show a robust priming effect in L2 production. The reliable priming effects in L2 production from English-as-L2 speakers suggest the possibility of implicit learning (this will be discussed further later in this chapter).

While there were reliable priming effects for the English-as-L2 speakers, it is worth noticing that overall speakers appeared to adopt the structural preferences of their L1. For example, English-as-L2 speakers showed strong preference for the prepositional dative structure, whereas English-as-L1 speakers produced a similar frequency of double-object dative and prepositional dative (see Table 2.6). The explanation for this may be explained through contrastive analysis of dative alternative structures between English and Korean. In Korean, DAT-ACC dative and ACC-DAT dative forms are commonly used dative alternatives, and the closest equivalent to the English double-object dative
(ACC-ACC) is used restrictively (Jung & Miyagawa, 2004). This tendency of Korean-as-L1 speakers to prefer prepositional dative structures may indicate that language-specific preferences influence priming. Yamashita and Chang (2002) also suggested the importance of language-specific preferences based on head-directionality. They found that Japanese speakers did not show the ‘heavy NP-shift’ (the tendency to process short NPs earlier and long NPs later) for dative structures in English, although English speakers tend to move ‘heavy NPs’ to the end of sentence. Yamashita and Chang (2002) argued that this preference might be influenced by the head-direction of the language. Yamashita and Chang’s (2002) account may be related to the current study because Korean is a head-final language similar to Japanese.

Then, how can this phenomenon of syntactic priming be explained in a language production model? A lot of empirical evidence provided implies that the locus of syntactic priming occurs during grammatical encoding (Bock & Levelt, 1994), separate from the conceptual level. Bock and Loebell (1990) provided apparent evidence that surface phrase structures are “persistent” more than conceptual roles are (such as agent, patient, locative, etc.). The speakers in their study appeared to make reference more to the surface syntactic structures than to the thematic roles of the arguments. This was demonstrated by the fact that prepositional dative sentences were primed by locative sentences having same prepositional phrases as the datives. Further, passive sentences were primed by locative sentences having the same by-phrases as the passives. These results support the notion that grammatical encoding is separated from the message level.
in the language production model (Garrett, 1988; Bock & Levelt, 1994), as depicted in Figure 5.1.

According to the language production model of Bock and Levelt (1994) which is based on Garrett’s proposals (1980, 1982, and 1988), language production processing consists of four levels: the message level, the functional level, the positional level, and the phonological level. At the message level, the speaker captures the features of the intended meaning. Conceptual information is involved at this level as a pre-linguistic form of the message is constructed that serves as input for processes of grammatical encoding. Grammatical encoding occurs at the functional level and at the positional level. Grammatical function (subject, predicate) of elements such as nouns and verbs is assigned at the functional level. During lexical selection, concepts are mapped onto particular lexical items, specifically the word’s lemma (Kempen and Huijbers, 1983), which includes grammatical information (e.g., noun, verb, etc). Function assignment involves grammatical role specification or syntactic function assignment such as assigning a subject to nominative and an object to dative case. Next, at the positional level, constituent assembly proceeds, the order of elements is fixed, and inflection is applied to words (e.g., aspect, agreement, tense etc.). Lastly, phonological encoding includes spelling out the phonological structure of the utterance.
Bock and Levelt (1994) argued that the structure of the sentence can be determined as early as the functional level, because of language-specific syntactic information such as word order variations. For example, some languages allow more freedom of word order as in Dutch, Italian, French, and Korean. The finding in this study
of the possible language-specific preference in dative structures can be seen as empirical
evidence of language variance in the functional level.

5.3 Syntactic persistence across languages

Overall, the syntactic priming effects within-language priming appeared to
corroborate the existing findings. Regarding the third question with respect to the cross-
language priming, ‘Will L2 speakers of English and Korean show syntactic priming
effects in a cross-language priming paradigm?’, the present data cannot provide one
positive straightforward answer to this question. Instead, there were several important
findings to be considered, such as a contradictory pattern of priming effects between
transitive and dative structures and an asymmetrical priming pattern between priming
directions.

First of all, the current results of cross-language priming showed different results
for transitive structures and dative structures. Syntactic persistence was shown for
transitive alternations except for the L2 (K) to L1 (E) priming direction for Korean-L2
speakers. However, with regard to dative structures, syntactic priming occurred only for
the prepositional dative for English-L2 speakers with the L1 (K) to L2 (E) priming
direction. This discrepant tendency between the two structures corroborates the account
of syntactic persistence of Loebell and Bock (2003) rather than that of Hartsuiker et al.
(2004). To briefly review these two accounts regarding bilinguals’ syntactic
representation, Hartsuiker et al. (2004) proposed “shared” syntactic representations,
based on their finding of syntactic priming effects for passive structures from English and
Spanish bilinguals who were highly proficient Spanish-L2 speakers. On the contrary, Loebell & Bock (2003) argued that bilinguals whose two languages undergo different syntactic constructions may not show syntactic priming effects, at least regarding those different syntactic structures, although the similar surface forms between the two languages may facilitate some priming effects. The present finding can support Loebell and Bock’s (2003) account, in the sense that priming effects were facilitated in transitive structures, but not in dative structures (see chapter 4 for similar linguistic features and dissimilarity discussed in chapter 4).

Based on Loebell and Bock’s (2003) account, it would be important to consider what possibly facilitated or interfered with the priming effect across languages (English and Korean). Consider that word order and case-marking are two principal differences between the two languages: did these cross-linguistic differences matter to the L2 speakers in the cross-language priming paradigm? Given that priming effects were shown for transitive structures from both groups of speakers in the cross-language priming paradigm (at least in the L1 to L2 priming direction), the speakers do not seem to be very sensitive to the different word order of the two languages (SVO in English vs. SOV in Korean). Regarding the differences of case-marking between Korean and English, the present results (non-significant priming effects for double-object dative and DAT-ACC dative) may be attributed to different sequence of cases. For example, the cases in the double object dative in English (analogous to Korean ACC-ACC) conflicts with the sequence of the preferred Korean DAT-ACC dative. On the contrary, the prepositional dative in English has the sequence of ACC-DAT, which is consistent with that of ACC-
DAT dative in Korean. This account indicates that Korean native (English-L2) speakers seem to be sensitive to the sequence of case-marked arguments (e.g., ACC-DAT, DAT-ACC, or ACC-ACC). This account is also supported by findings in a Japanese study by Yamashita and Chang (2002), in which Japanese L1 speakers appeared to be sensitive of the sequence of case-marked arguments for the dative structures.

Our finding, mentioned above, appears to provide empirical evidence for the influence of cross-linguistic differences in cross-language priming, in the sense that overt case markers, which are linguistic features in Korean, may induce the speakers to be sensitive to the sequence of case-marked arguments when they produce their L2, even though overt case markers do not exist in English. Hence, the order of case-marked arguments might persist in language production with cross-language priming between Korean and English.

Furthermore, another informative finding in this study is that the asymmetrical pattern regarding priming direction (Schoonbaert et al., 2007) was not consistent. Recall that Schoonbaert et al. (2007) obtained asymmetrical priming effects from English-Dutch bilinguals, in which syntactic priming effects were shown in the L1 to L2 priming direction, but reliable priming effects were not observed in the L2 to L1 priming direction. In the present study, a similar pattern was observed in the Korean-L2 group for transitive structures, but this was not consistent with the other group (English-L2) or for the dative utterances. The correlation with proficiency was discussed as a possible explanation for this asymmetrical priming pattern. However, it remains a puzzle and leaves room for investigation in further research.
Moving onto the accounts of cross-language priming effects in language production theory, the current results provide empirical evidence that syntactic priming occurs during the grammatical encoding process (according to Bock and Levelt’s (1994) production model adapted from Garrett(1982) seen in Figure 5.1) The process can be explained as follows. After the functions (Nominative, Accusative, and Dative) are assigned from the message level (Agent, Theme, Recipient, etc.), the order is fixed at the constituent assembly at the positional level. Given that the speakers are sensitive to the sequence of case-marked arguments, syntactic persistence appears to be more involved with the positional level (during the constituent assembly) even with cross-language priming. In addition, language variances between English and Korean may be more involved in the functional level. Therefore, the conflicts of function assignments for the dative structure between Korean and English interfere with syntactic priming in the cross-language condition.

As for more direct accounts related to cross-language priming, Hartsuiker et al. (2004) and Schoonbaert et al. (2007) proposed different ideas. As mentioned earlier, The studies conducted lexicon-mediated paradigm, in which verbs were provided in sentence completion tasks (Pickering & Branigan, 1998) or picture description tasks (Branigan et al, 2000), proposed that the lemma stratum is the locus of syntactic representation following Level et al.’s (1999) model of the lexical access in production. Roelofs (1992, 1993) and Levelt et al.(1999) propose a production model incorporating three levels: a conceptual stratum, which contains semantically defined concepts, a lemma stratum, which contains syntactic information of lexical entries, and a word-form stratum, which
encodes morphological and phonological information. Roelofs (1992) proposes that each category (e.g., noun, verb, etc) and feature (e.g., gender, plural) is represented by a node. Thus, the lemmas with similar features or belonging to the same category are linked via these nodes. Based on a lexically-driven account for syntactic representation (see Vigliocco & Hartsuiker, 2002), Hartsuiker et al. (2004) proposed a shared lemma node in their model of bilingual language representation in English-Spanish bilinguals, as shown in Figure 5.2. Cross-language priming was observed for this population.

![Conceptual and Lexical Stratum](image)

Figure 5.2 Example of lexical entries for “to chase” and “to hit” in an integrated account (shared lexicon, shared syntax) of bilingual language representation, adapted from Hartsuiker et al. (2004)

They suggest a shared lexicon and syntax such that each language-specific lemma node (e.g., HIT, GOLPEAR) is strongly connected to the same conceptual node (e.g., HIT(X, Y)), category node (e.g., Verb), combinatorial nodes (Active and Passive), as
well as a language node (e.g., English and Spanish). Thus, the English verb lemma *hit* can activate the Spanish verb lemma *golpear* through integrated nodes between the languages.

However, Hartsuiker et al.’s (2004) shared-representation model cannot explain the asymmetric priming effects between L1 production and L2 production (priming effects from L1 to L2, but no priming effects from L2 to L1) as Schoonbaert et al. (2007) can. They found a boost in priming from L1 to L2 using translation-equivalents, but not from L2 to L1. Hence, Schoonbaert et al. (2007) propose a weak lexical-conceptual link whereby the link between the L2 lexical representation and its concept is weaker than the link between the L1 lexical representation and its concept, as presented in Figure 5.3.

![Figure 5.3 Asymmetry activation between L1 and L2, from Schoonbaert et al. (2007), adapted from Hartsuiker et al. (2004)](image-url)
Schoonbaert et al.’s (2007) account explains syntactic representations for unbalanced bilinguals.

The current study may not be directly comparable to these two models, since the current study was not designed as lexically-mediated paradigm. However, the general concepts associated with the current results are contrary to the Hartsuiker et al. (2004) model, but partially support Schoonbaert et al.’s (2007) model. Again, Hartsuiker et al. (2004) cannot explain the priming asymmetries found in this study. However, Schoonbaert et al.'s (2007) model builds an explanation for the asymmetries into its system of varied strengths for conceptual links.

5.4. Syntactic priming as an implicit learning in language acquisition

Implicit learning has been considered as one mechanism of syntactic priming effects (Bock & Griffin, 2000; Branigan, 2007). Several studies have investigated whether the persistence effect is due to the mechanism of implicit learning. The effect has been considered to reflect “the transient activation of already-existing static knowledge” (Savage et al., 2006, p. 28), so some scholars (e.g., Bock & Loebell, 1990; Pickering & Branigan, 1999) suggest that priming should also be seen as a form of implicit learning. In other words, the syntactic persistence effect can be considered as a way to indirectly access existing knowledge and hence to facilitate the implicit learning of structures.

Several studies with young children have found that using syntactic primes as language input impacted their language acquisition (Huttenlocher et al., 2004; Savage et al., 2007). Verbs were provided either in sentence completion tasks (Pickering & Branigan, 1998) or confederate script technique (Hartsuiker et al., 2004; Schoonbaert et al., 2007).
Savage et al. (2003) investigated syntactic priming in 3-, 4-, and 6-year-old children. The dialogue paradigm was used, in which a prime picture was presented and was described by the experimenter. The children had to repeat the experiment’s priming sentence, and described a newly presented target picture with their own sentences. Savage et al. (2003) found differing performance between younger (3 and 4-year-olds) and older groups (6-year-olds). In their study, degree of lexical-overlap was manipulated, with a high-overlap condition (e.g., ‘It is pushing it’) and a low-overlap condition (e.g., ‘The digger pushed the bricks’). Also, repetition of the priming sentence was manipulated: Study 1 included repetition whereas Study 2 did not. The older age group, showed both lexical priming and syntactic priming, whereas the younger-age group showed the lexical priming effect only. Given that the 6-year-old children showed structural priming effects, they appear to have abstract syntactic constructions independent of lexical items, which is a similar pattern to that of the adults. This may not yet be the case for the younger group who only show the lexical effects.

In a similar way, Huttenlocher et al. (2004) conducted three experiments investigating syntactic priming in preschool children, aged 4;5-5;8 years. They investigated priming effects for transitive and dative alternative sentences using a picture description task. In a prime trial, children described the prime picture by repeating aloud after the experimenter’s picture description. Then, in a target trial, children were asked to describe the target picture. In Experiment 2, children were presented with priming sentences but they did not repeat them aloud in a prime trial. Also, in Experiment 3, after children were divided into two blocks of groups, one group of children was tested in
transitive primes first and then dative primes, and the other group was tested in the opposite order. Children listened to the experimenter’s descriptions of 10 consecutive prime pictures, and then they were asked to describe a new set of 10 pictures. Significant effects of prime type were shown in all three conditions: repetition, no-repetition, and consecutive and multiple trial. Huttenlocher et al. (2004) corroborated the findings from Savage et al.’s (2003) study that a common representational system plays a role in both the production and comprehension of syntactic structures. Furthermore, the effect persisted over time through ten trials which indicates the possibility of implicit learning through structural priming.

Savage et al. (2006) confirmed the findings from the previous study and extended the investigation to first language acquisition. The target structures tested were transitive items. They conducted experiments with one control group and two experimental groups. The control group did not receive priming at all. Experimental group 1 received five identical primes. Experimental group 2 received five different primes. Also, they met with the participants three times: Time 1, Time 2 (a week later), and Time 3 (a month after Time 2). Different target pictures were used at each session. They found more significant priming effects on the varied prime condition than on the identical prime condition. Also, the priming effect on the varied prime condition lasted longer than that of the identical prime condition. The findings suggested that the various prime types influenced the strength of the priming effect and that the priming effect persisted across different time intervals, which can be an implicit learning effect.
The present findings as possible instances of implicit learning therefore have significant implications for second language acquisition. For the second language speaker who learns a language whose syntax differs from that of the first language, shared syntactic information may facilitate implicit learning through syntactic priming.

5.5 Limitations and suggestions for future study

While many interesting results came from the present study, there were also several limitations. Firstly, the proficiency account does not seem to explain the present data wholly through the four experiments including the within-language priming paradigm and the cross-language priming paradigm. It was assumed that proficiency may be involved with the weak priming effect for Korean-L2 speakers in the cross-language paradigm. However, it does not seem to apply to explain the different magnitudes of effects between English-L2 speakers (Experiment 1B) and Korean-L2 speakers (Experiment 1B). Secondly, since the materials between the two languages are unrelated (that is, not based on translation equivalents), it may not be reasonable to compare the results between Experiment 1B and Experiment 2. It would have been more meaningful if the materials had been implemented with translation equivalent items and non-related items not only in the within-language paradigm but also in the between-language paradigm. In that way, it would help to investigate better the plausible cross-linguistic difference effects.

Furthermore, it would be more informative to distinguish between the unbalanced bilinguals and balanced bilinguals to better investigate the issue of whether syntactic
information in the lemma is shared or not in cases where cross-linguistic differences arise regarding syntactic information such as the DAT-ACC dative and the double object dative. Finally, it is important to establish whether some of the factors ruled out for intra-language priming or other factors (e.g., frequency) can be ruled out in cross-language priming also.
APPENDIX A: Items for Experiment 1A

Active transitive priming sentences

1. The government increased the price of gas.
2. The chairperson suggested the coffee break.
3. The mayor welcomed the visitors.
4. The policeman chased the burglar.
5. The frustrated man kicked the bending machine.
6. A child ate an ice-cream cone.
7. A small dog chased the thief.
8. My friend dropped the vase on the ground.
9. Her father cleaned the table.
10. The maintenance man repaired the heater.

Passive transitive priming sentences

1. The price of gas was increased by the government.
2. The coffee break was suggested by the chairperson.
3. The visitors were welcomed by the mayor.
4. The burglar was chased by a policeman.
5. The bending machine was kicked by the frustrated man.
6. An ice-cream cone was eaten by a child.
7. The thief was chased by a small dog.
8. The vase was dropped on the ground by my friend.
9. The table was cleaned by her father.
10. The heater was repaired by the maintenance man.

Double-object dative priming sentences

1. The salesman offered a customer a deal.
2. The students baked the teacher cookies.
3. A secretary made her boss a cup of tea.
4. The lifeguard threw the struggling swimmer a life saver.
5. The foundation gives the department several million dollars.
6. A rock star sold the dealers many music albums.
7. The teacher sends the parents the report cards.
8. The school leases the parent association one office.
9. The team coach told the players the game plan.
10. The cheer leader saved her boyfriend a seat.
APPENDIX A -continued

Prepositional dative priming sentences

1. The salesman offered a deal to a customer.
2. The students baked cookies for the teachers.
3. A secretary made a cup of tea to her boss.
4. The lifeguard threw a life saver to the struggling swimmer.
5. The foundation gives several million dollars to the department.
6. A rock star sold many music albums to the dealer.
7. The teacher sends the report cards to the parents.
8. The school leases one office to the parent association.
9. The team coach told the game plan to the players.
10. The cheer leader saved a seat for her boyfriend.

Target pictures eliciting transitive utterances

1. A male figure skater lifting his partner.
2. A car hitting a man.
3. A little reading a book.
4. A bowling ball hitting balling pins.
5. A person cutting a tree branch.
6. A boy dragging a tree.
7. A car crashing a train.
8. A ball hitting a lady.
9. A person killing a bug.
10. A dentist checking a boy’s teeth.

Target pictures eliciting dative utterances

1. A boy giving money to the clerk.
2. A nurse reading a story to a boy.
3. The father taking a boy a picture.
4. A girl giving a toy cup to a teddy bear.
5. A little boy offering an apple to an adult.
6. A boy giving a back massage to an old lady.
7. A boy giving a present to the little girl.
8. A man throwing a ball to a little girl.
9. A teacher handing a prize to a student.
10. A man showing a map to a woman.
APPENDIX B: Items for Experiment 1B

Active transitive priming sentences

1. The government increased the price of gas.
2. The chairperson suggested the coffee break.
3. The mayor welcomed the visitors.
4. The policeman chased the burglar.
5. A child ate an ice-cream cone.
6. A rock star sold the dealer many music albums.
7. The frustrated man kicked the bending machine.
8. My friend dropped the vase on the ground.
9. A small dog chased the thief.
10. The maintenance man repaired the heater.
11. Her father cleaned the table.
12. The cleaning lady found the missing coin.
13. A tree root tripped the jogger.
14. The socialist party ruled the country.
15. A big company dominated a market.

Passive transitive priming sentences

1. The price of gas was increased by the government.
2. The coffee break was suggested by the chairperson.
3. The visitors were welcomed by the mayor.
4. The burglar was chased by a policeman.
5. An ice-cream cone was eaten by a child.
6. Many music albums were sold by a rock star.
7. The bending machine was kicked by the frustrated man.
8. The thief was chased by a small dog.
9. The vase was dropped on the ground by my friend.
10. The table was cleaned by her father.
11. The heater was repaired by the maintenance man.
12. The missing coin was found by a cleaning lady.
13. The jogger was tripped by a tree root.
14. The country was ruled by the socialist party.
15. A market is dominated by a big company.
16. My jacket was misplaced by my roommate.
APPENDIX B - continued

Double-object dative priming sentences

1. The salesman offered a customer a deal.
2. The students baked the teacher cookies.
3. The music tutor taught his student the clarinet.
4. A secretary made her boss a cup of tea.
5. The foundation gives the department several million dollars.
6. The school leases the parent association one office.
7. The lifeguard threw the struggling swimmer a life saver.
8. A rock star sold the dealers many music albums.
9. The teacher sends the parents the report cards.
10. The team coach told the players the game plan.
11. The cheer leader saved her boyfriend a seat.
12. The waitress served the customer the main course.
13. The father bought his son a game boy on his birthday.
14. The fitness center mailed the students membership application.
15. The mother promised her son a pet.
16. The grandson read his grandfather a short story.

Prepositional dative priming sentences

1. The salesman offered a deal to a customer.
2. The students baked cookies for the teachers.
3. The music tutor taught the clarinet to his student.
4. A secretary made a cup of tea to her boss.
5. The lifeguard threw a life saver to the struggling swimmer.
6. The foundation gives several million dollars to the department
7. A rock star sold many music albums to the dealer.
8. The school leases one office to the parent association.
9. The teacher sends the report cards to the parents.
10. The team coach told the game plan to the players.
11. The cheer leader saved a seat for her boyfriend.
12. The waitress served the main course to the customer.
13. The father bought a game boy for his son on his birthday.
14. The fitness center mailed membership application to the students.
15. The mother promised a pet to her son.
16. The grandson read a short story to his grandfather.
APPENDIX C: Items for Experiment 2

Literal English translation of Korean sentences are presented in the parenthesis.

Active priming sentences

1. 경찰이 도둑을 잡았다. (‘A policeman caught the thief’)  
2. 개가 아이를 물었다. (‘A dog hit the child.’)  
3. 베토벤은 교향곡 합창을 작곡했다. (‘Beethoven composed No.9 symphony.’)  
4. 젊은이들은 빠른음악을 많이 부른다. (Young people sang fast songs)  
5. 언니가 동생의 인형을 빼앗았다. (‘A older sister took her younger sister’s doll’)  
6. 고양이가 생쥐를 잡아 먹었다. (A cat caught a mouse.)  
7. 유명한 작가가 이소설을 썼다. (The famous novelist wrote this novel.)  
8. 사람들이 쓸만한 물건을 버린다. (People discard the useful stuff.)  
9. 부동산 업자가 그 빌딩을 팔았다. (The real estate agent sold the building.)  
10. 축구선수가 공을 찼다. (A soccer player kicked the ball.)  
11. 철수가 영희를 안았다. (Chulsoo hugged Youghee)  
12. 수영강사가 아이들 옷을 숨겼다. (The swimming teacher hid the students’ clothes.)  
13. 아이들이 꽃을 꽃렸다. (Children picked the flowers)  
14. 손님이 고기요리를 주문했다. (The customer ordered the meat.)  
15. 신문기자가 그 사건을 알렸다. (A news reporter announced the accident.)  
16. 치과의사가 씹은이를 뽑았다. (The dentist pulled out the tooth with cavity.)

Passive priming sentences

1. 도둑이 경찰에게 잡혔다. (The thief was caught by a policeman)  
2. 아이가 개에게 물렸다. (‘A child was bitten by a dog.’)  
3. 교향곡 합창이 베토벤에 의해 작곡되었다. (No. 9 symphony was composed by Beethoven)  
4. 빠른음악이 젊은이들에게 많이 불려진다. (Fast songs were sung by the young people.)  
5. 동생의 인형이 언니에게 빼앗겼다. (The younger sister’s doll was taken by her older sister.)  
6. 생쥐가 고양이에게 잡혔다. (‘a cat caught a mouse.’)  
7. 이 소설은 유명한 작가에게 쓰여졌다. (This novel was written by a famous novelist)  
8. 쓸만한 물건이 사람들에 의해 버려진다. (‘The useful stuff was discarded by people.’)  
9. 그 빌딩이 부동산업자에게 팔렸다. (The building was sold by the real estate agent.)
APPENDIX C – continued

10. 영희가 철수에게 안겼다. (‘Youghee was hugged by Chulsoo’)  
11. 아이들 옷이 수영강사에게 숨겨졌다. (‘The children’s clothes were hidden by a swimming teacher.’)  
12. 공이 축구선수에게 차여졌다. (The ball was kicked by a soccer player.)  
13. 꽃이 아이들에 의해 걷여졌다. (The flower was picked by the children.)  
14. 고기요리가 손님에 의해 주문되었다. (The meat was ordered by the customer.)  
15. 그 사건이 기자에게 알려졌다. (The accident was announced by a news reporter.)  
16. 쌍은이가 치과의사에 의해 뽑혔다. (‘The tooth with the cavity was pulled out by a dentist.’)

ACC-DAT dative priming sentences
(English equivalent sentences are in order of arguments DAT-ACC)

1. 엄마가 장난감을 아이에게 준다. (‘A mother gave a toy to her child’)  
2. 아이들이 수건을 수영강사에게 주었다. (‘Children gave a towel a swimming instructor’)  
3. 선생님이 수제를 학생들에게 주었다. (The teacher gave a lot of homework to the students.)  
4. 화가가 그림을 사람들에게 보여주었다. (An artist showed a picture to people.)  
5. 경찰이 티켓을 운전자에게 주었다. (A policeman gave a ticket to the driver.)  
6. 심판이 경고를 선수에게 주었다. (A referee gave a warning to the player.)  
7. 손님이 돈을 점원에게 주었다. (The guests gave money to the clerk.)  
8. 학생들이 케이크를 교수님들에게 만들어 주었다. (The students baked the professor cookies.)  
9. 의사가 X-레이 사진을 간호사에게 건네주었다. (The doctor gave X-ray to the nurse.)  
10. 한 신사는 꽃을 여인에게 주었다. (A gentleman gave flowers to the lady.)  
11. 철수가 점심을 영희에게 사주었다. (Chulsoo bought Younghee lunch.)  
12. 엄마가 옷을 딸에게 사주었다. (The mother bought the clothes to the daughter.)  
13. 할아버지가 사탕을 아이에게 주었다. (‘Grandfather gave some candy to the children’)  
14. 백화점 점원은 옷을 손님에게 팔았다. (The clerk sold the clothes to the customer.)  
15. 오빠가 공을 동생에게 던졌다. (The older brother threw a ball to a younger brother.)  
16. 코끼리는 묘기를 관광객들에게 보여주었다. (‘The elephant showed tourists tricks’)
APPENDIX D

Questionnaire on Language History and Proficiency (adapted from Ecke, 1996)

Name: ___________________    Age: _____________

Date: _____________________

Please rate your language proficiency from 1 (very poor) to 7 (perfect):

First Language: ______________

<table>
<thead>
<tr>
<th>very poor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>perfect</th>
</tr>
</thead>
</table>

Second Language: ______________

<table>
<thead>
<tr>
<th>very poor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>perfect</th>
</tr>
</thead>
</table>

Third Language: ______________

<table>
<thead>
<tr>
<th>very poor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>perfect</th>
</tr>
</thead>
</table>

Where and at what age did you start learning these languages?

First Language:

Second Language:

Third Language:

In what context and with whom have you used the languages? (For examples: academia, family, friends, boy/girl friend, work)

First Language:

Second Language:

Third Language:

How often have you used/practiced the languages during the last 6 months?

<table>
<thead>
<tr>
<th>not at all</th>
<th>rarely</th>
<th>occasionally</th>
<th>frequently</th>
<th>very frequently</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Language:</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Second Language:</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Third Language:</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
APPENDIX E

Human Subjects Approval

Boonjoo Park, MA
Advisor: Janet Nicol, Ph.D.
Department of SLAT
TOB, 1731 E. Second Street, Room 211
P.O. Box 210014

BSC: B06.324 SYNTACTIC PERSISTENCE OF LANGUAGE PRODUCTION IN KOREAN AND ENGLISH

Dear Ms. Park:

We received your research proposal as cited above. The procedures to be followed in this study pose no more than minimal risk to participating subjects and have been reviewed by the Institutional Review Board (IRB) through an Expedited Review procedure as cited in the regulations issued by the U.S. Department of Health and Human Services [45 CFR Part 46.110(b)(1)] based on their inclusion under research category 6 and 7. As this is not a treatment intervention study, the IRB has waived the statement of Alternative Treatments in the consent form as allowed by 45 CFR 46.116(d)(2).

Although full Committee review is not required, a brief summary of the project procedures is submitted to the Committee for their endorsement and/or comment, if any, after administrative approval is granted. This project is approved with an expiration date of 24 October 2007. Please make copies of the attached IRB stamped consent documents to consent your subjects.

The Institutional Review Board (IRB) of the University of Arizona has a current Federalwide Assurance of compliance, FWA00004218, which is on file with the Department of Health and Human Services and covers this activity.

Approval is granted with the understanding that no further changes or additions will be made to the procedures followed without the knowledge and approval of the Human Subjects Committee (IRB) and your College or Departmental Review Committee. Any research related physical or psychological harm to any subject must also be reported to each committee.

A university policy requires that all signed subject consent forms be kept in a permanent file in an area designated for that purpose by the Department Head or comparable authority. This will assure their accessibility in the event that university officials require the information and the principal investigator is unavailable for some reason.

Sincerely yours,

Theodoras J. Glasko, Ph.D.
Chair, Social and Behavioral Sciences Human Subjects Committee

TJG:pm
cc: Departmental/College Review Committee
REFERENCES


REFERENCES—continued


REFERENCES—continued


REFERENCES—continued


REFERENCES-continued

