# Differential Difficulty

## -- Second Language Acquisition of English Prepositions --

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English prepositions seem to be difficult to master for adult Japanese Speaking learners (JSLs) of English as a second/foreign language (L2) (Bong 2011). How about Korean Speaking Learners (KSLs) and Chinese Speaking Learners (CSLs)?[1] Why are they difficult to master? Which preposition(s) are more difficult to learn than others? Which uses (senses) of English prepositions are more difficult than others? Why are those uses (senses) more difficult to master? Does the word-order difference between learners' first (native) language (L1) and the target language (TL) play important roles? Does the agglutinative language type of L1s cause difficulty in learning the semi-analytic language target L2, English? What are the main factors influencing the difficulty or for the late development/identification of senses for a particular preposition? This paper will pursue these questions, dealing with the most frequent ten prepositions: *at, by, for, from, in, into, of, on, to,* and *with* and especially with the three prepositions *in*, *into*, and *to*.[2]

This paper begins with a brief overview of theoretical assumptions, followed by a comparison of the three L1s, namely Japanese, Korean, and Chinese, and one L2, English. Specifically, the syntactic and semantic properties of post-posed particles (Japanese and Korean), and (pre-posed) prepositions (Chinese and English) are identified and compared. I then present a methodology of the current experimental study and research questions. After examining an overall result of the experimental study on the L2 acquisition of the ten English prepositions by Japanese-, Korean-, and Chinese-Speaking Learners of English, I examine the results for the three prepositions *in, into,* and *to,* and discuss various L2 research issues including Learnability, and Differential Difficulty, Variability and L1 roles. I conclude that the deterministic approach requires improvement, that the 'Via-L1-Learnability' view of 'Full L1 Transfer' should be amended to the Lexicon Contact view of L1 Lexical Influence, and that the variability in the L2 acquisition should be accounted for by other means: i.e. variability should not be attributed to individual differences as far as language acquisition is concerned.

## 1. Theoretical Assumptions

In the framework of innate specification and universality of principles and linguistic features (see Innateness of language and Nativism), current second language (L2) research is often couched in deterministic terms, expecting difficulty or impossibility (apparent failure) in L2 acquisition when there are parametric differences between the first (native) language (L1) and the second (secondary) language (L2). This deterministic approach adopts transfer of L1 or availability of Universal Grammar (UG) to account for such L2 phenomena as 'apparent failure' (see Bong 2009). This deterministic view has been modified by incorporating a more fully specified understanding of both Language and Learnability from the Minimalist perspective (Bong 2005, 2007, 2009). While the traditional generative approach to second language research (e.g. government-binding theory based second language research) mainly deals with parametric differences in grammar or so-called parameters in functional categories, the current minimalist approach can expand the coverage of L2 research to the field of semantic difference, owing to the minimalist feature matrix and lexical operations: e.g. selection of features, construction (assembly) of features, agree operation, and so on.

Research in the acquisition of semantics has been in effect directed to 'Innateness' or 'Semantic Universals.' For example, negative polarity items have been found to be understood by 4- to 5-year-old children (O'leary and Crain 1994). There are a great number of studies on acquisition of semantics (understanding the universal quantifier, boundary condition, semantic relations such as spatial, temporal, and abstract relations and so on), which in turn have brought us to the idea of the innateness of semantic knowledge. Here we can assume that children (first language acquisition) have full access to the innate semantic knowledge, as well as other universal linguistic features and operations which constitute UG.

However, research in adult second language (L2) acquisition has been directed to 'partial access' or 'mapping problems' or 'via-L1-learnability (or Full L1 transfer)' or 'reconstruction problems' when attempting to account for the difficulty in learning a secondary language (see Bong 2009 onwards). In the field of L2 acquisition of English prepositions, there are two different views (see Bong 2011, 2012, 2013, 2014a, 2015b).

One is the cognitive view, which adopts the prototype theory in the semantics of polysemous words such as prepositions. The prototype theory employs graded categorization in the cognitive framework. This prototype theory postulates that senses of prepositions are hierarchically organized and each preposition has a prototypical sense (or group of senses) which is expanded to other less prototypical senses. For example, the most typical senses of prepositions are locative and literal senses while the least prototypical ones are abstract. In other words, prototypical instances are those which take a concrete noun as their objects, and the senses are determined by the nature of the objects, namely the bottom-up process. Under this cognitive view, the prototypicality hypothesis is formulated for L2 acquisition of English prepositions: that is, prototypical senses are easy to acquire, while less prototypical ones are

difficult to acquire and depending on L2 learners' L1, the less prototypical senses may vary (e.g. Hayashi 2001 among others). This prototypicality hypothesis predicts a particular differential difficulty in the L2 acquisition of various senses of English prepositions but cannot predict which prepositions are easier than others. This hypothesis postulates learnability: as 'Via-L1-learnability' that L2 learners can learn L2 only through their L1, unlike L1 acquisition, in which children learn prepositions through body movement (see Bong 2013). In addition, it predicts that the most difficult sense(s) should vary depending on the L2 learners' L1.

The other view is the minimalist view. Within the minimalist framework, in forming a phrase or a sentence (i.e. phases), a particular use of a preposition is determined by a higher projection or an upper head that selects a PP (prepositional phrase) undergoing an Agree Operation, and the head P then selects its Complement undergoing an Agree-Operation between the Head P (Preposition), and the Complement object NP (Noun Phrase) with respect to a set of lemmatic properties (syntactic and semantic properties). This way of analyzing polysemous lexical items can be viewed as a structure based top-down process contrasted to the cognitive bottom-up process in determining senses of PPs. In the minimalist framework, discerning a particular use of a preposition requires both syntactic and semantic properties of various constituents such as Heads of higher projections (e.g. IP, vP, VP, etc.) that select a PP as a complement (in other words, as an attachment point for the higher projections) and heads and complements of lower projections (e.g. PPs, NPs, etc.). This contrasts with the cognitive view which requires identification of semantic properties of its complement. Having examined various dictionaries and databases, I have found that TPP (the Preposition Project) of the Computational Lexicons Research (2005-2007) to some extent meets the requirements of this top-down process based analysis of senses of prepositions.[3] TPP provides a comprehensive characterization of English preposition uses by assigning to each preposition-in-use a semantic role or relation name, and characterizes the syntactic and semantic properties of its complement and attachment point. It also provides definitions of each use type with sample usages from the *Oxford Dictionary of English*, the basic syntactic placement of a preposition, other syntactic forms in which the semantic role may be realized, and so on.

For example, the PP (prepositional Phrase) consists of a Head P (preposition) and a Complement NP (noun phrase) whose sets of lemmatic features should be matched : i.e. PP= [$_{pp}$ P $\overset{agree}{}$ NP]. In addition, Ps (prepositions) function to relate NPs (Noun Phrases) in a sentence. Importantly, modifying the localistic theory advocated by Bennett (1975) it is assumed that in English prepositions can have the various localistic functions which determine how things are related: i.e., Spatial, Temporal, and various Abstract relations (i.e. Tandem, Backdrop, Possession, Topic, Means/Medium, and so on). Ps can function as expressing these relations between NPs and carry such lemmatic properties as [±Physical], [n-Dimension], [±Directionality], [±Temporality], [±Boundary], and so on depending on the nature of the things (NPs) related. When a Head P has a function of abstract relation and carries a set of features (+Abstract, 3-Dimension, +Directionality), a Complement NP, which consists

of features, must be matched with the Head P's feature set (+Directionality, +Abstract). More specifically, polysemous words (lexical items) such as prepositions are assumed to have a set of particular features, from which a smaller set of features is selected for each particular use of that word. In the process of language acquisition, all these features and semantic functions (relations) are innate, but have to be identified for each lexical item of an individual language through parsing words, phrases, and sentences and testing hypotheses about a particular pool of linguistic features for a lexical item (lexical development) and about a set of parameters. Under the minimalist feature matrix view, differential difficulty of uses of a preposition is in accordance with learners' parsing ability and primary (or secondary) linguistic data (Input Quality and Quantity play important roles, see Bong 2005). In L2 acquisition, learners' L1 may exercise an influence both in identifying features and in assembling them for a particular use. This line of argument has given rise to the Reconstruction Hypothesis for Differential Difficulty, and the Lexicon-Contact Hypothesis for L1 roles and mis-development in L2 acquisition.

In addition, this minimalist view assumes the same language acquisition device for L1 and L2 development (UG based learnability) while there are various assumptions about UG accessibility (e.g. full access, partial access, no access). In addition, this view takes L2 learners' L1 as one of the internal factors that may cause ambiguity or obscurity when L2 learners parse the L2 input and when they test various hypotheses about the L2 lexicon (feature specification) and grammar (operations and principles). In addition, this view also takes into account not only the L2 input quantity but also quality, which may be ambiguous and obscured by various causal factors (See Bong 2005, 2009). In L2 acquisition, learners' L1 linguistic knowledge (competence) and pragmatic knowledge (competence) play important roles in identifying features for lexical items and semantic operations (rules) of the target language. Note that this line of argument is not compatible with 'Via-L1-Learnability/Full L1 transfer,' but is partially compatible in the sense that the L2 learners' L1 does exert an influence or play a role by providing easy or economical options in testing hypotheses about the target language (See Bong 2005 and 2009 for a minimalist model of language acquisition).

In order to test whether L1 plays important roles in learning L2, English or not, I have chosen three L1s: Japanese, Korean, and Chinese. These three languages all use to a greater or less extent the Chinese Characters, so that the literal meanings of many lexical items that have been derived (borrowed) from the Chinese characters or from the Old Chinese Language, could be similar. Of course, the uses (senses) of those Chinese-origin words have necessarily been influenced by pragmatic factors or by practical factors in the various L1 communities. However, the post-posed particles of Japanese and Korean are not derived from the Chinese Characters or the Old Chinese Language, and are quite different from the prepositions of Chinese and the prepositions of English. Let us compare the three L1s (Japanese, Korean, and Chinese) and one target language.

## 2. Linguistic Background: Similarities and Differences

First, Japanese and Korean are both classified as agglutinative languages in the morphological scheme devised by von Humboldt (1836). In this classification, agglutinative languages exhibit a tendency toward 'agglutination' or 'sticking together' of simple components to form words. In other words, agglutinative languages include a morphological process in which individual morphemes (including stems and affixes) have a single semantic meaning, but remain in every respect unchanged after combination/assembly. This fact that the morphemes remain unchanged in meaning results in generally deducible word meaning.

Second, Chinese is more or less the same word-order as the target language, English, in that both languages are of an SVO (Head-First) type, have **prepositions** (which are unbound morphemes and are uninflected) and are semi-analytic. Fusional or analytic languages allow modifications in phonetics or spelling of one or more morphemes within a word. On the other hand, Japanese and Korean are SOV (Head-Final) languages, and have **post-posed particles**. The canonical (typical) word-order of Japanese and Korean transitive sentences is S(subject)-O(object)-V(verb). The order of adverbial PP (prepositional phrases) is [P(preposition)+NP(noun phrase)] in English whereas in Japanese and Korean it is [NP+P(particles)]. These word-order differences among the four languages (English, Chinese, Japanese, and Korean) can be illustrated as follows.

(1) Target Language: English – Head-First, Prepositions
    a. He is ***at/in*** school.
     (at = he could be either in the building or outside the school)
     (in = He is in the building of the school)
    b. He went to school on foot.

Note that the English sentence '*He is **at** school*' implies that he could be either in the building or outside the school, while the sentence '*He is **in** school*' means that he is in the building of the school. With respect to the use of *in* and *to* as in the sentences (1a) and (1b), the cognitive view assumes that owing to the concreteness of the object *school*, the prepositions *in* and *to* convey the core (proto) sense of 'inclusion' and 'culmination' respectively, regardless of the nature of the verb *be* (*is*) in (1a) and of *go* (*went*) in (1b). Note that these senses 'inclusion' and 'culmination' are the most frequent uses (in other words, salient elements appear to be easy for learners to identify). Now let us move onto another Head-First language, Chinese.

(2) Learners' L1: Chinese – Head First, Prepositions
    a.  Tā shì   zài    xuéxiào..( 他是在学校)
       He is   in/at   school →   'He is in/at school.'
    b.  Tā    dào            bùxíng   shàngxué. (他到步行上学)
       He    go/went (reach)    on-foot   to-school  → 'He went to school on foot.'
    c.  Tā qù    shàngxué (他去上学)
       He go    to-school → 'He went to school.'

d.　Tā de jū qù shàngxué. (他的车去上学。)

　　　　He by-car go to-school. → 'He goes to school by car.'

Note that depending on the NP object (Complement) and the verb (Head), different prepositions are placed in Chinese: *He went to hospital.*. In the English –Chinese dictionary, the English *in* entry is described as ①(first meaning) [表示地点、場所、部位] 在..里、在.. 上 (approximately, expressed location, place, part/section: Zài (in)..lǐ (inside), Zài (in).. Shàng(top). Notice that Lǐ(里) (inside) and Shàng(上) (top/above), the locative words are used to express the meaning of the English prepositional phrases like *in the room* (在房间里 Zài (in) Fángjiān (room)..Lǐ (inside), or *in the world* (在世界上 Zài (in).. Shìjiè(world) Shàng (top/above)), in addition to the preposition Zài (在) (in). Let us examine Japanese and Korean.

(3) Learners' L1 : Japanese – Head-Final, Post-Posed Particles

　　a.　Karewa Gakkou-*Ni* Imasu. (彼は学校にいます。)

　　　　He-Top School-Particle be –present-honorific

　　　　He School-at/in is. → He is at/in school. (ambiguous)

　　b.　Kare-Wa Gakkou-*No-Naka-Ni* Imasu. （彼は校内にいます・学校の中にいます）

　　　　He-Top School-*of-inside-in*　be-present-honorific　→He is in School.

　　c.　Kare-Wa aru-ite Gakko-*Ni* iki-masita.(彼は歩いて学校に行きました。)

　　　　He-Top walk-particle school-particle go-past-honorific

　　　　He　　foot-on　　　school-to　　　went → He went to school on foot.

(4) Learners' L1: Korean – Head First, Post-Posed particles

　　a. Ku-Nun　Hakkyo-E　　　Isseoyo.

　　　He-Top　School-Particle be-present-honorific

　　　He　　　at/in　　　　　is . → He is in/at school. (ambiguous)

　　b. Ku-Nun　Hakkyo-*AN-E* Isseoyo.

　　　He-Top　 School- *Inside-In* be-present-honorific. → He is in School.

　　c. Ku-Nun　Keol-eoseo Hakkyo-E Kasseoyo.

　　　He-Top　walk-particle　School-to go-past-honorific

　　　He　　　foot-on　　　　school-to went　→ He went to school on foot.

In relation to the Head-Final characteristic in Japanese and Korean, the locative adverbial-nouns such as NAKA(中 inside)-NI (in), and UE（上 top/above）-NI (in) and so on in Japanese, and AN(inside)-E (in) in Korean should be mentioned, since they are similar to Chinese locative adverbs, which come after the complement (noun) of a preposition in a prepositional phrase as in (2). Similar to Japanese, Korean language also has such locative adverbial-nouns as 'UI' (top/above), 'AN (inside)' and so on.

(5) Japanese quasi-nouns/locative adverbial-nouns

　　a. TSUKUKE-*NO-UE-NI/KARA* →'On the table', 'From the table'

　　　table　　　of-top (locative adverbial noun)-on/from

　　b. KABAN-*NO-NAKA-NI/KARA* → In the bag, From the bag

　　　bag　　　of-inside (locative adverbial nous)-in/from →In the bag/From the bag

## 3. Methodology

Given the syntactic and semantic differences and similarities between the L1s, and the target L2 English, I have conducted an experiment on the L2 acquisition of English prepositions by the L2 learners of the different L1s: Japanese, Korean, and Chinese. The main experiment of the current study has been conducted with adult Japanese Speaking Learners (JSLs) of English who were college students, and Korean Speaking Learners (KSLs) and Chinese Speaking Learners (CSLs) of English who were either exchange students or international students at a university in Japan when they participated in the experimental study. The experimental study consisted of a questionnaire which asked participants' linguistic background, their second language exposure, and so on, a proficiency test for which Allan's (1992, 2004, 2006) Oxford Placement Test was employed, and a cloze test of 137 sentences in which the 10 major prepositions *(at, by, for, from, in, into, of, on, to, with)* were incorporated.

All selected subjects were native speakers of Japanese, Korean, or Chinese, learning English predominantly in a classroom setting in their own country.[4] Four experimental groups were selected for this paper: two intermediate English proficiency groups with two similar L1s and two post-intermediate English proficiency groups with two apparently different L1s. The grouping for the current discussion was carried out using the criterion of English proficiency; the starting age for learning English was not considered. The details of the experimental subjects are illustrated below:

**Table 1. Details of Experimental Subjects:**
      **Japanese-, Korean-, and Chinese-Speaking Learners of English**

| Exp. Group | Number of Subjects | OPT Mean Score | OPT Score Range |
|---|---|---|---|
| Japanese-Intermediate | 13 (Adult JSLs) | 52.00 (52.00%) | 45~55 (50.5 median) |
| Korean-Intermediate | 15 (Adult KSLs) | 50.86 (50.86%) | 45~55 (50.5 median) |
| Japanese-Post Interm | 42 (Adult JSLs) | 64.00 (64.00%) | 56~77 (66.5 median) |
| Chinese-Post Interm | 8 (Adult CSLs) | 62.50 (62.50%) | 56~77 (66.5 median) |
| Total | 78 | | |

The cloze test was designed to investigate how JSLs, KSLs, and CSLs use prepositions and what elements (parts of speech, verb, adjective, nouns, and so on) are important in determining which preposition to place in English sentences with Japanese translations for intended meanings. In the cloze test, the 137 tokens (sentences) contained ten prepositions with various senses (e.g. separation, inclusion, point, accompany, and so on) described in the literature or in the dictionary and various types of relations (temporal, spatial/physical, and various abstract).

# 4. Results and Discussion

## 4.1 Overall Results and Overview
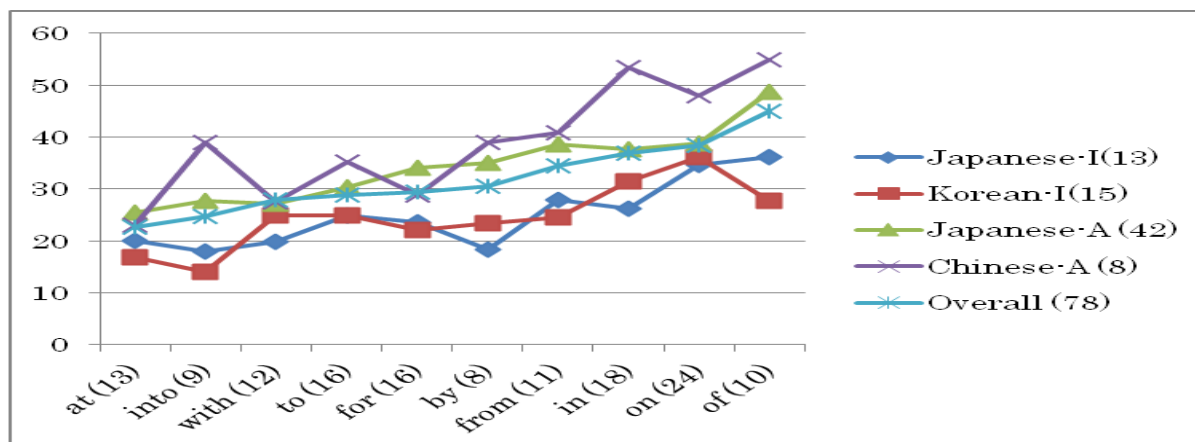


**Graph 1.   Adequate English Preposition Placements**

Overall, very similar to the results reported in Bong (2011),[5] we can only tentatively conclude that the easiest preposition appears to be *of*, and that the most difficult prepositions seem to be *at*, and *into*. In the sense of 'acquired,' only the preposition *of* seems to be learned by the CSLs group exclusively, up to or close to the level of the knowledge of other English grammatical aspects tested in the English proficiency test illustrated in Table 1. However, there are various questions about the results and the experimental tasks unexplored. Leaving various questions for other occasions, this paper focuses on the results of the preposition *into*, and the two prepositions *in* and *to* that are apparently related to one of the most difficult prepositions *into*.[6]

## 4.2 The Apparent Second Most Difficult Preposition *into*
**Table 2. Frequencies of Adequate Preposition Placements of the preposition *into***

| Items | JSLs-I (13) | | KSLs-I (15) | | JSLs-A (42) | | CSLs-A (8) | | Overall |
|---|---|---|---|---|---|---|---|---|---|
| (senses) | Freq. | Ach. | Freq. | Ach. | Freq. | Ach. | Freq. | Ach. | (78)(%) |
| There9 | 0 | 0.00% | 1 | 6.67% | 1 | 2.38% | 0 | 0.00% | 2.56% |
| Lake5 | 0 | 0.00% | 1 | 6.67% | 1 | 2.38% | 0 | 0.00% | 2.56% |
| (12 | 2 | 15.38% | 1 | 6.67% | 3 | 7.14% | 4 | 50.00% | 12.82% |
| (8 | 1 | 7.69% | 1 | 6.67% | 11 | 26.19% | 2 | 25.00% | 19.23% |
| Lake7 | 5 | 38.46% | 3 | 20.00% | 10 | 23.81% | 2 | 25.00% | 25.64% |
| Lake20 | 1 | 7.69% | 4 | 26.67% | 14 | 33.33% | 4 | 50.00% | 29.49% |
| Used18 | 5 | 38.46% | 0 | 0.00% | 17 | 40.48% | 3 | 37.50% | 32.05% |
| Used19 | 1 | 7.69% | 2 | 13.33% | 17 | 40.48% | 6 | 75.00% | 33.33% |
| There6 | 6 | 46.15% | 6 | 40.00% | 31 | 73.81% | 7 | 87.50% | 64.10% |
| 9items | 21 | 17.95% | 19 | 14.07% | 105 | 27.78% | 28 | 38.89% | 24.64% |

First, the results of the performance on the items stated in (6) suggest that regardless of their English proficiency most of the subjects (98%) do not know the illustrated senses in (6a) and (6b). In nine of the English sentences employed in the cloze test, the preposition *into* is used in various ways. The apparently most difficult uses are given in (6).

(6) Most Difficult Uses – Abstract Relation: [TANDEM]. [TOPIC]

　　a. #There9 : When he got married, he was well (into) his fifties. [TANDEM]

　　b. #Lake5: She has an insight (into) character of others.[TOPIC]

　　c. #Used18: The security firm got (into) trouble.[TANDEM]

One finding observable from Table 2 is that all four groups found it difficult to place *into* in the sentences in (6a) (6b) and (6c). In the sentence (6a), *into* is used to convey the TANDEM relation between the subject NP *he* and the NP *his fifties* and between the subject *the security firm* and the NP *trouble* in (6c), both implying <the sense of belonging to the state, condition, or form of>: {Tandem Relation [+Movement, +Direction, +Inclusion]}, and the TOPIC relation between the NP *an insight* and the NP *character of others* in (6b), denoting <the sense of being directed towards; about>: {Topic Relation [+Movement, +Direction, +Inclusion]}. Recall that the relations 'TANDEM' and 'TOPIC' did not receive attention until TPP, which is called the Preposition Project (TPP) had provided a comprehensive characterization of English preposition uses (senses) suitable for use in natural language processing. TPP also describes a collection of prepositions with a **semantic role or relation name** and characterizes the **syntactic and semantic properties of its complement and attachment point.**

　　Let us further examine those sentences on which all four groups of L2 learners performed badly as illustrated in (6). What makes it difficult for L2 learners to place *into*? Recall that spatial, temporal, and various abstract relations are assumed to be determined by the nature of the higher NPs and the nature of the complement NPs of the preposition *into* in the minimalist view adopted in this paper, not solely by the object NPs of the preposition *into* as assumed by the cognitive theory (see Bong 2011, 2013). That is, the minimalist view assumes that both the nature of the higher projections (NP *he* of IP, NP *an insight*, and NP *the security firm*) and the nature of complements of *into* (NP *his fifties*, NP *character of others*, and NP *trouble*) are important factors allowing learners to identify lemmatic (syntactic and semantic) properties. It can be conjectured that the difficulty may lie in the specification of lemmatic properties for the lexical items of Heads (here, V, N, P, N) and the lexical items of Complements (here P's object NPs). As for (6a), the Head V (light verb *was*) selects the PP (preposition phrase): [$_{PP}$ [$_{Spec}$ *well*] [$_{P'}$ [$_P$*into*], [$_{NP}$ *his fifties*]]]. In short, the L2 learners could not have identified [+Movement, +Directionality] in the object NPs such as *his fifties*, *character of others*, and *trouble*, while they could have specified [+Inclusion].

　　Let us now examine those uses (senses) that seem to be easier than others.

(7) Easiest Uses – Spatial Relation

　　a. #There6: Three police officers burst (into) the office.

　　b. #Used19: The teachers divided the class (into) three groups.

It can be observed from the results illustrated in Table 2 that when two objects whose relation is determined by a preposition are distinct or prominent (physical entities), the L2 learners seem to find it easy to place a correct preposition *into*. In (7a), the preposition *into* denotes Spatial relation, expressing <movement or action with the result that someone or something becomes enclosed or surrounded by something else>, whose lemmatic properties can be identified as [+Movement, +Directionality, +Inclusion] between *three police officers* and *the office*. Recall that under the minimalist view, the semantic relations (i.e. spatial, temporal, and other abstract relations) and other lemmatic properties such as [+Movement, +Directionality, +Inclusion] are innate, therefore they do not need to be learned or developed in L2 acquisition, but need to be constructed in accordance with the L2 input. This assumption predicts that the L2 learners will find it difficult to learn when the object NPs (complements of a P) have abstract nature so that it is difficult to identify such features as [+Movement, +Directionality] as in the L1 acquisition, while they may find it easy to learn when the object NPs have physical nature so that it is easy (neither obscure nor ambiguous) to identify such features as [+Movement, +Directionality]. Let us now move on to the preposition *to*, which is assumed to have lemmatic properties of [+Movement, +Directionality] discussed here.

## 4.3. SLA of the Preposition *to*

**Table 3. Frequencies of Adequate Preposition Placements of the preposition *to***

| Items | JSLs-I (13) | | KSLs-I (15) | | JSLs-A (42) | | CSLs-A (8) | | Overall |
|---|---|---|---|---|---|---|---|---|---|
| (senses) | Freq. | Ach. | Freq. | Ach. | Freq. | Ach. | Freq. | Ach. | (78)(%) |
| Lake1 | 1 | 7.69% | 1 | 6.67% | 0 | 0.00% | 0 | 0.00% | 2.56% |
| (20 | 1 | 7.69% | 0 | 0.00% | 6 | 14.29% | 0 | 0.00% | 8.97% |
| The1 | 0 | 0.00% | 0 | 0.00% | 5 | 11.90% | 2 | 25.00% | 8.97% |
| Be3 | 0 | 0.00% | 4 | 26.67% | 2 | 4.76% | 1 | 12.50% | 8.97% |
| The14 | 0 | 0.00% | 2 | 13.33% | 6 | 14.29% | 0 | 0.00% | 10.26% |
| She6 | 3 | 23.08% | 3 | 20.00% | 6 | 14.29% | 2 | 25.00% | 17.95% |
| Be9 | 3 | 23.08% | 10 | 66.67% | 0 | 0.00% | 7 | 87.50% | 25.64% |
| Used1 | 6 | 46.15% | 0 | 0.00% | 15 | 35.71% | 0 | 0.00% | 26.92% |
| There10 | 3 | 23.08% | 4 | 26.67% | 16 | 38.10% | 1 | 12.50% | 30.77% |
| (5 | 1 | 7.69% | 11 | 73.33% | 9 | 21.43% | 6 | 75.00% | 34.62% |
| The12 | 4 | 30.77% | 5 | 33.33% | 15 | 35.71% | 3 | 37.50% | 34.62% |
| He20 | 6 | 46.15% | 2 | 13.33% | 19 | 45.24% | 5 | 62.50% | 41.03% |
| She5 | 1 | 7.69% | 10 | 66.67% | 18 | 42.86% | 4 | 50.00% | 42.31% |
| He3 | 7 | 53.85% | 5 | 33.33% | 22 | 52.38% | 6 | 75.00% | 51.28% |
| There7 | 9 | 69.23% | 2 | 13.33% | 31 | 73.81% | 2 | 25.00% | 56.41% |
| (2 | 7 | 53.85% | 1 | 6.67% | 34 | 80.95% | 6 | 75.00% | 61.54% |
| | 52 | 25.00% | 60 | 25.00% | 204 | 30.36% | 45 | 35.16% | 28.93% |

Strikingly, the results in Table 3 illustrate that the first six items are not learned by all the L2 learners. Let us examine each item in more detail.

    (8) Difficult Uses

        a. #Lake1: Lake Biwa is 10 kilometers (to) the east of Kyoto. [Spatial 2]

        b. #(20: He talked with the U.S. ambassador (to) Japan. [Spatial 1]

        c. #The1: The key (to) the front door is missing. [Target]

        d. #Be3: He devoted himself (to) drinking. [Backdrop]

        e. #The14: You are just talking, but not speaking. Just speak (to) the point. [Backdrop]

        f. #Be9: He went (to) the aquarium at 3:00pm. [Spatial 1]

One finding observable from Table 3 is that all the L2 learner groups must have found it difficult to place *to* in the sentences illustrated in (8). In the sentence (8a), *to* is used as conveying 'spatial relation' between the subject NP *Lake Biwa* and the distance adverb NP *10 kilometers* and the NP *the east of Kyoto* in (8a), expressing <location, typically in relation to a specified point of reference>: Spatial Relation [+Directionality, +Culmination/0 Dimensional Location - Point]. In the sentence (8b), *to* is used as conveying 'spatial relation' between the NP *the U.S. Ambassador* and the NP *Japan*, expressing <motion in the direction of a particular location>: Spatial Relation [+Movement, +Directionality, +Culmination, 3Dimensional Location]. Examining errors made by the experiment subjects, I found that many of the subjects placed the preposition *in* erroneously instead of the preposition *to* in the sentence restated in (8b), and the preposition *from* in the sentence restated in (8a). From this observation of errors we can infer that the L2 learners could have been testing hypotheses about the feature combination. What we can conjecture from the results for the sentences (8a) and (8b) is that the L2 learners have difficulty identifying the syntactic and semantic properties of the preposition *to* that spatially relate the higher projection NP1 *the U.S. ambassador* to the complement (object) NP2 *Japan*.: i.e. {Spatial Relation [+Movement, +Directionality, +Culmination, 3Dimensional Location]}. These properties should be matched between three layers [NP1 *the* [N *U.S. Ambassador* PP [P *to*, NP2 *Japan*]] -- the Head N1 of NP1, the Head P of the Comp PP, and the Comp N2 of NP2. These lemmatic properties should undergo the Agree Operation. Under this analysis of the lemmatic properties involved, the majority of the L2 learner groups might be at the under-specification stage of the lemmatic properties for three constituents: ①the preposition *to*, which is in effect selected by②the NP *the U.S. ambassador* and which selects ③its complement (object) NP *Japan*. I have examined the errors made by the subjects and found that over 50% of the subjects placed *in* instead of *to*. This observation on errors suggests that the L2 learners have not yet identified the lemmatic properties for the NP1 *the U.S. ambassador* in the sentence in (8b), and that the L2 acquisition of English prepositions should take into account the whole structure of the relevant constituents that are related to each other by a preposition. In other words, the difficulty cannot be accounted for by means of referring to the nature of the object NP *Japan*. Results of this kind cast doubt on the prototypicality hypothesis, in which the literal and concrete sense

of the preposition *to*, <u>culmination</u>, is easier than others (See Bong 2011 and onwards for this line of argument). Now let us examine what senses and relations the L2 learners found easy.

    (9) Easier Senses

        a. #(2: (To) our great surprise, the meeting was a great success. [BACKDROP]

        b.#There7: Unfortunately, this apple is rotten (to) the core. [Spatial 2]

In the sentence (9a), the phrase *to our great surprise*, expresses self-evident BACKDROP relation, governing a phrase expressing <someone's (*our*) reaction to something (*the meeting was a great success*) denoted by the main clause (sentence)>: {abstract BACKDROP relation [+Movement, +Directionality, +Culmination/Psychological Dimension]}. This use of the preposition *to* is not prototypical but all the L2 learners performed well. This implies that this use of *to* is easier than other uses such as seen in (8). Results of this kind again cast doubt on the prototypicality, but support the claims of the minimalist view that prepositions relate (undergo agree operation) other constituents that also play important roles in identifying lemmatic (syntactic and semantic) properties that determine individual senses (uses).

## 4.4. SLA of the Preposition *in*
**Table 4. Frequencies of Adequate Preposition Placements of the preposition *in***

| Items | JSLs-I (13) | | KSLs-I (15) | | JSLs-A (42) | | CSLs-A (8) | | Overall |
|---|---|---|---|---|---|---|---|---|---|
| (senses) | Freq. | Ach. | Freq. | Ach. | Freq. | Ach. | Freq. | Ach. | (78)(%) |
| She18 | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | 0.00% |
| He5 | 0 | 0.00% | 0 | 0.00% | 2 | 4.76% | 1 | 12.50% | 3.85% |
| He13 | 1 | 7.69% | 0 | 0.00% | 1 | 2.38% | 1 | 12.50% | 3.85% |
| (17 | 1 | 7.69% | 1 | 6.67% | 4 | 9.52% | 5 | 62.50% | 14.10% |
| The4 | 2 | 15.38% | 0 | 0.00% | 12 | 28.57% | 1 | 12.50% | 19.23% |
| He17 | 2 | 15.38% | 2 | 13.33% | 9 | 21.43% | 3 | 37.50% | 20.51% |
| Lake2 | 1 | 7.69% | 2 | 13.33% | 9 | 21.43% | 4 | 50.00% | 20.51% |
| Be14 | 4 | 30.77% | 3 | 20.00% | 16 | 38.10% | 0 | 0.00% | 29.49% |
| Used17 | 3 | 23.08% | 3 | 20.00% | 11 | 26.19% | **8** | **100.00%** | 32.05% |
| Be15 | 4 | 30.77% | 5 | 33.33% | 19 | 45.24% | 5 | 62.50% | 42.31% |
| The5 | 4 | 30.77% | 7 | 46.67% | 20 | 47.62% | 7 | 87.50% | 48.72% |
| The9 | 4 | 30.77% | 8 | 53.33% | 21 | 50.00% | 6 | 75.00% | 50.00% |
| He11 | 7 | 53.85% | 5 | 33.33% | 21 | 50.00% | 7 | 87.50% | 51.28% |
| There1 | 7 | 53.85% | 8 | 53.33% | 24 | 57.14% | 6 | 75.00% | 57.69% |
| Be18 | 6 | 46.15% | 9 | 60.00% | 24 | 57.14% | 6 | 75.00% | 57.69% |
| She2 | 7 | 53.85% | 7 | 46.67% | 28 | 66.67% | 4 | 50.00% | 58.97% |
| (1 | 9 | 69.23% | 14 | 93.33% | 29 | 69.05% | 6 | 75.00% | 74.36% |
| Lake9 | 9 | 69.23% | 11 | 73.33% | 35 | 83.33% | 7 | 87.50% | 79.49% |
| | 71 | 26.30% | 85 | 31.48% | 285 | 37.70% | 77 | 53.47% | 36.89% |

Surprisingly, all the four L2 learners groups performed badly on the following items in (10).

(10) Difficult Uses: the Learners Performed Badly-- Not Acquired.

a. #She18: The instant that she saw me, she ran (*in*) the opposite direction. [Spatial 2]

b. #He5: He was shot (in) his right arm. [Spatial 1]

c. #H13: I rarely write letter (in) pen these days. [Means/Medium]

d. #Be4: It says (in) this book that Taoism is polytheistic. (0% by CSLs)

(10a) and (10b) exhibit the senses that under the prototypicality hypothesis should be easier than other senses. The results for these items, however, tend to undermine the claims of the cognitive view. Under the minimalist view, we can account for what aspects must have caused difficulty, ambiguity or obscurity of the lemmatic features that are involved in the structure tested. First, in the sentence in (10a), the preposition *in* must carry the lemmatic (syntactic and semantic) properties of {Spatial Relation [+Movement, +Directionality, +Culmination, 3Dimension]}: to relate spatially the subject NP *she* to the NP *the opposite direction*, which is selected by the Head V (*ran*) of VP, expressing <motion with the result that something ends up within or surrounded by something else>. While one might argue that the use of the preposition *in* in (10a) is not frequent, results of this kind suggest that the prototype theory should be modified or the assumed proto-sense(s) should be revised by taking into account other elements in the sentences: i.e., other constituents that are related to a P (preposition), namely its Head of a PP (prepositional phrase), its Complement (object) NP and so on. Let us now briefly examine the uses of the preposition *in* that the L2 learners found easier than other uses.

(11) Easier Uses: the learners performed well—'Acquired Class'

a. #Lake9: She is in hospital at the moment, not an outpatient. [Backdrop]

b. #(1: (In) general, humans tend to have an easy time. [Backdrop]

c. #Used17: The patent attorney is always (in) pink. [Backdrop] – (100% by CSLs)

Surprisingly, the easiest uses of the preposition *in* for all the L2 learners illustrated in (11) are not the proto sense(s) of the preposition *in* assumed in the prototypicality hypothesis, but the extended abstract senses which are supposed to be more difficult than the core (proto) sense as in (10a), and (10b) which are assumed to be the core (proto) sense of *in*, namely "inclusion." Again, the results of this kind cast doubt on the prototypicality hypothesis.

Under the minimalist view, in the sentences (11a) and (11c), the preposition *in* relates the subject NP *he* in (11a) and *the patent attorney* in (11c) to the object NP *hospital* in (11a) and *pink* in (11c) without a determiner, expressing <a state or condition>: {abstract BACKDROP relation [+Inclusion, + Psychological Dimension]}. In the sentence of (11b), the prepositional phrase in general governs the sentence by means of abstract backdrop relation, indicating <the manner in which or the degree to which something happens>: {abstract BACKDROP relation [+Inclusion, +Psychological Dimension]}.

Lastly, the apparent variability can be observed in Table 2, 3 and 4, but it is very systematic: only the CSLs group performed badly on (10d), and well on (11c), not others. This

kind of development in (10d) is termed 'Mis-Development' in Bong (2005, 2009). Note that in some examples the learners group behaved differently, but those are neither the easiest/easier senses nor the most difficult senses. Instead, we can account for the apparent systematic variability observable from those structures by referring to the L1 influence or the L1 and L2 lexicon contact view in the identification of particular feature sets for a particular use.

In short, regardless of L2 learners' L1 and proto/core senses of the preposition *in* as assumed in the prototypicality hypothesis, such lemmatic properties as {abstract BACKDROP relation [+Inclusion, +Psychological Dimension]} appear to be easy to acquire. In addition, the assumption of the minimalist view that depending on the Head (I, V, or N depending on the structure) that governs a PP, the P selects and combines lemmatic properties in the lexicon in order to relate adequately have provided plausible accounts for the differential difficulty. In other words, what learners have to do in learning prepositions is that they need to identify how constituents are constructed and related to one another and what lemmatic features should be constructed for each lexical item.


## 5. Concluding Remarks

It has been discussed that the results of the three prepositions *into*, *in*, and *to* obtained from the current study do not support the following claims of the prototypicality hypothesis: (a) the earlier acquisition of the prototypical sense because of the learning-strategy adopted at an early development stage, (b) a development order based on differential difficulty derived from meta processes or extensions of the prototypical sense, and (c) the divergence/failure account of L2 acquisition postulated to explain the different L1 and L2 learning strategies. This line of argument supports Bong's series of studies on the L2 acquisition of English prepositions (2011, 2012, 2013, 2014a, 2015b), but casts doubt on the claims of the Prototypicality Hypothesis that the core (proto) should be easier than other senses expanded from the core/proto sense, and that L2 learners use their L1 to expand the prototypical senses so that the most difficult senses will vary depending on their L1. In effect, all the L2 learners regardless of their L1 performed badly in placing prepositions in the same types of sentences: i.e. the same types of lemmatic properties were involved. However, the results discussed support the claims of the minimalist view that adopts TPP as a tool to explain semantic roles/relations and other lemmatic properties and asserts that L2 learners must identify what elements are related, how they are related, and what lemmatic features are involved in the Agree-operation.

In conclusion, the Feature Re/Construction Hypothesis of the Minimalist Model of LA can account for not only the current data, but also the difficulty of identifying lemmatic properties involved in learning English prepositions. In addition, the minimalist view provides plausible accounts for what lemmatic properties (not only syntactic but also semantic properties) L2 learners should find it difficult to identify along with semantic roles and

syntactic relation such as 'temporal relation', 'spatial relation', or 'various abstract relations.' The claims of the Feature Re/Construction hypothesis of other causal factors such as L1 and L2 language contact, ambiguity and obscurity of the input, L2 learning environment caused factors for misdevelopment, and so on are supported by the findings from Bong's studies (2011, 2012, 2013, 2014a, 2015b), and by the results from the current study.

## 6. Acknowledgement

Notes

[1] For studies on second language acquisition of English prepositions by Japanese Speaking Learners (JSLs) and Korean Speaking Learners (KSLs), please refer to Bong's series of work (Bong 2011 and onwards) funded by the Grants-in-Aid for Scientific Research (the project no.: 21520574). This paper will provide some evidence (data) for the arguments that all three first language groups of Korean, Japanese, and Chinese find the English prepositions difficult to master, and more difficult than other grammatical elements such as tense and agreement, but similar to English articles (*a/an*, *the*, null).

[2] See Bong (2015c) for discussion of the three prepositions *in, into,* and *to* based on the data obtained from 57 Japanese-Speaking Learners of English. Bong (2015c), however, does not deal with other data obtained from Korean- and Chinese- speaking learners of English. The current paper compares the results from the experiment conducted with the three different L1s.

[3] In the Preposition Project (TPP) in the Computational Lexicons (CL) Research, each of 673 preposition senses for 334 prepositions has been described with semantic roles or relation names. Each sense is further described by its definition and sample usages from the *Oxford Dictionary of English*.

[4] Note that all the Korean subjects who participated in the experiment started learning English when they were 10 years old at school(at the third grade in primary school) unlike the Japanese subjects who started learning English at Junior high school at the age of around 14.On the other hand, the Chinese subjects varied in their starting age of learning English (not the time of exposure to English) from 8 to 10 years old. Nonetheless, the grouping for the current discussion is carried out on the basis of English proficiency, not by their starting age of learning English. Since the era of internet, it is possible for the participants to have been exposed to English much earlier than the time of institutional learning. Some of the participants were not selected for the current discussion since they fall out from the range of English proficiency.

[5] This result is in fact very similar to the results obtained from 57 Japanese speaking learners (JSLs) in that JSLs find it more difficult to learn the preposition *at* than others and easier to acquire the preposition *of* than others, reported in Bong (2011).

[6] Leaving other grammatical elements behind, we can observe that the CSLs post-intermediate group seem to have performed relatively better than the JSLs post-intermediate group, and that with respect to the development of the ten English prepositions, there is a clear trend suggesting that as proficiency increases, the JSLs place English prepositions adequately. Note that there are other problems remaining unexplained such as item analysis, frequency analysis, differential difficulty in sentence structures, and so on.

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