

Lematic Transfer in the Second Language Acquisition of English Prepositions

Bong, Hyun-Kyung Miki

School of General Education, Shinshu University

hkb22cam@gmail.com, hkb22@shinshu-u.ac.jp

Abstract

This study sets to investigate how Japanese-speaking learners (JSLs) acquire English prepositions and how learned cross-linguistic associations are formed and how they are represented in a second language (L2) users' mental lexicon. This paper argues that the prototypicality effects can account neither for developmental patterns of semantics of English prepositions nor for the variability observed in the L2 preposition production by JSLs. In order to test the hypotheses derived from the discussion, research questions on (i) Different Difficulty; (ii) Influence of Lematic Properties; and (iii) Variability. Reporting some interesting findings from the experimental study, I propose that the observed patterns of 'some commission/substitution errors' are the outcome of 'lemmatic properties' of L1, building on the account developed in Bong (2005, 2009, 2010a, b): the 'misdevelopment hypothesis'. Interestingly, both the results documented in the existing literature and the results obtained from the experiment do not *confirm* the 'prototypicality effect' argued in the previous studies, but support the claim on what determines the patterns of errors of preposition omissions (intentional, not accidental ones) and commissions/substitutions. This study suggests a new perspective of the determinant factors in L2 acquisition of English prepositions.

Keywords

Differential Difficulty, SLA, English Prepositions, Lematic Properties, Variability, Misdevelopment.

Introduction

Why do some second language (L2) learners (especially Japanese and Korean) find it difficult to master English prepositions? Why do some second language learners show persistent variability in the L2 English preposition production? Which prepositions are more difficult to acquire than others? Attempting to answer these questions, several studies of L2 acquisition on English

prepositions have been carried, and put forward various hypotheses and possible applications of linguistic theory to L2 acquisition: for example, the Prototypicality Hypothesis (see Yamaoka 1995; 1996, and Hayashi 2001; 2008; cf. Bong 2010a), or the Misdevelopment Hypothesis (i.e., the so-called the Economy driven Misdevelopment affected by multiple misdevelopment factors such as lexicon-contact, obscurity and ambiguity embodied in the input (input matters) and so on discussed in Bong 2005, 2009, 2010a, b). The former hypothesis was derived from an adaptation of the theory of prototype put forward in the semantics of prepositions in cognitive linguistics. The latter was put forward as a 'weak deterministic' model of language acquisition that can accommodate first language (L1) acquisition, language change, and second language (L2) acquisition (see Bong 2005, 2009).¹ Bong (2010a) points out that the so-called 'prototypicality effect' is not as clear-cut as proponents argue, and argues that her findings cast doubt on the prototypicality hypothesis.

In order to examine closely and to carry out not only testing hypotheses: which hypothesis is more explanatory and compelling in accounting for the L2 acquisition of English prepositions, but also addressing research questions on (i) different difficult, (iii) influence of lemmatic properties of L1 and L2, and (iii) variability in L2 acquisition of English prepositions by Japanese-speaking learners (JSLs), an experiment was conducted with JSLs as a follow-up experiment to the previous experiment reported in Bong (2010a). Reporting the results from the experiment, this study also argues against the prototypicality hypothesis, instead supporting the Misdevelopment Hypothesis. The Misdevelopment hypothesis states that multi factors such as types of verbs, nouns, adjectives, and so on

¹ Although there are lots of remaining issues related to any theoretical tenets which are though based on these two competing but contradicting hypotheses, it is important to recognize that the discussions over the so-called empirical data of L2 acquisition on English prepositions are valuable and contribute to various fields such as language teaching.

that co-occur with prepositions (e.g. compatibility of syntactic features), semantic features (such as ‘dimension’), features in the Lexicon, and sets of features in L1 lexicon and so on are crucial to constructing features for lexical items to form a lexicon for the target L2 and thus play an important role in determining the development pattern in the process of L2 acquisition.

This paper is structured as follow. Briefly discussing some theoretical tenets and reexamining the studies by Bong (2010a) and Hayashi (2008), the following section discusses some motivations for the current study. In what follows, the experimental study is presented in the order of its methodology, the data selected for this paper, discussions of the results and implications of findings. The last section concludes the discussions.

1 Background: Rationale

Bong (2010a) argues that *prototypical senses are not necessarily easier (or earlier) to acquire* than less prototypical ones, providing the data that are not consistent with the prototypicality hypothesis, undermining the claim of the influence of prototypicality by Yamaoka (1995, 1996) (cf. Hayashi 2008) in the L2 acquisition of English prepositions by Japanese-speaking learners (JSLs). In addition, Bong (2010a) points out the variable L1 transfer claim by Hayashi (2008) that L1 transfer operates in L2 acquisition at the conceptual level but differs in the degree of L1 influence depending on the prepositions is rather vague and not consistent with her data. This current paper sets out to test the prototypicality hypothesis and the various L1 transfer hypothesis as well as the Misedevelopment Hypothesis. To clarify what motivates the current study, this section examines the two representative studies on L2 acquisition of English prepositions by JSLs: namely, Bong (2010a) and Hayashi (2008).

Let us first consider the methodologies of the two studies in question. In order to reduce other factors that might obscure the results due to different words or structures, Bong (2008) employed the token sentences for her experimental study that were used in Hayashi’s (2008) study: 16 sentences with *at*, 17 sentences with *on*, and 18 sentences with *in*. The representative examples are given below:

- (1) Conventional (Correct) Use of *at*, *in*, and *on*.
 - a. Look at this map. (C sense)
 - b. There is someone at the front door.(Proto)
 - c. There is a picture on the wall. (Proto Sense)
 - d. San Francisco is on the Pacific Ocean.(Proto)
 - e. We live in the country during summer (Proto)
 - f. Go in the house. (Proto Sense)

However, Bong (2010a) modified the method of scaling by giving a slight different scale with a clear demarcation point in judging acceptability: from the scale of 1 (being totally unacceptable), 2, 3, 4, 5 (being totally acceptable), to the scale of -2 (being totally unacceptable), -1, 0 (not sure), 1, 2 (being totally acceptable). In addition, Bong (2010a) conducted the experiment with not only JSLs but also Korean-Speaking Learners (KSLs) to draw a more convincing generalization about L2 acquisition and to benefit from examining a more variety of L2 acquisition data.

Moving onto rationales for the two studies, it seems important to note that the theory of prototype is a mode of graded categorization in the semantics of preposition within the framework of cognitive linguistics. In the theory, senses of prepositions are hierarchically organized or are more central than other, so that each preposition has a prototypical sense (or prototypical senses) and lower/less prototypical senses: for example in the order of the proto sense, A sense, B sense, C sense and so on. To be more precise, the most typical senses of prepositions are *locative and literal senses* while the least prototypical ones are *abstract senses*.² In the application of the theory to L2 acquisition, proponents for the prototypicality hypothesis claim that prototypical ones are easy to acquire, while less prototypical ones are difficult to acquire.

Given the assumptions of the prototypicality hypothesis, it is now possible to test the hypothesis: that is, if there is a case that less prototypical senses are acquired earlier than the most typical ones, then we can say that the hypothesis is undermined or falsified. In effect, Bong (2010a) presents the data that cast doubt on the prototypicality hypothesis: that is, there are cases that both subject groups of JSLs and KSLs performed better with less prototypical senses than with more or the most prototypical senses of prepositions used in sentences in judging sentences.

Table 1. Accuracy Mean Scores of *On*

Instances	Japanese	Korean	Sum	Remark
O-on one foot	2.46 (61.5%)	3.44 (86.0%)	2.54 (63.5%)	A-sense
O-on her finger	2.12 (53%)	3.78 (94.5%)	2.27 (56.8%)	Proto
O-on the Pacific Ocean	1.78 (44.5%)	1.78 (44.5%)	1.78 (44.5%)	Proto
O-on business	2.64 (66.0%)	3.11 (77.8%)	2.68 (67.0%)	C-sense

(Extracted from Bong 2010)

As for the results of *On* preposition in Table 1, both learners groups performed much better with

² This paper will not discuss any theoretic problems or arguments over defining prototypicality

C-sense which is assumed to be less prototypical than with Proto sense. Furthermore, ‘on’ in the two difference contexts is assumed to have the same proto sense (the most prototypical), but seems to be different to both groups of L2 learners (See Bong (2010a) for further discussions). Importantly, note that different objects of the preposition *on* are categorized as having/meaning the same ‘proto sense’ in sentences. While the both groups of learners performed much better with a sentence with ‘on her finger’ than with a sentence with ‘on the pacific ocean’, the theory of prototype cannot account for this differential difficulty. It might be argued that the characteristics of the object of the preposition ‘on’ in this case may be crucial in determining the use(s) of prepositions or the compatibility between the object and the preposition. Keeping this in mind, the current study is designed incorporating various objects with different characteristics/natures.

Table 2. Accuracy Mean Scores of *In*

Instances	Japanese	Korean	Sum	Remark
O-in the country	3.68 (92.0%)	3.22 (80.5%)	3.64 (91.0%)	Proto
O-in ten minutes	2.43 (40.5%)	1.89 (47.3%)	2.39 (59.8%)	C-sense
O-Go in the house	0.98 (24.5%)	1.22 (30.5%)	1.00 (30.5%)	Proto
O-in mud	1.15 (28.8%)	1.89 (47.3%)	1.22 (40.1%)	A-sense
O-in her sixties	2.29 (57.3%)	2.67 (66.8%)	2.33 (58.3%)	C-sense

(Extracted from Bong 2010)

Similar to the results of *On preposition*, Table 2 indicates that there are some cases that both groups of L2 learners performed much better with sentences with C sense than with sentences with Proto sense. One crucial point to be noted here is that the antecedent ‘verb’ to a preposition seems to play a crucial role in judging the acceptability of the occurrence of the preposition in a sentence. Consider the sentences ‘Go in the house’ as in (1) and ‘The boy was covered in mud’ and their results. Both learners readily reject both sentence types which are assumed to be ‘acceptable’ or ‘conventional’. The compatibility between the antecedent verbs such as ‘go’ and ‘covered’ and the preposition ‘on’ in this case seem to be crucial factors in judging acceptability of sentences. Taking this into consideration, the current study incorporates various antecedents (such as verbs or adjectives) to prepositions into the experimental study.

Although Hayashi’s (2008) study sheds light on the underdeveloped areas of L2 studies, Bong (2010a) points out that the influence of ‘prototypicality’, various senses of prepositions,

various structures of preposition occurrences, the role of L1 and development patterns of the L2 acquisition of English prepositions need to be further explored. In consideration of these suggestions from Bong (2010a) the experimental study for the current study was designed. Let us now move onto the current experimental study.

2 Methodology

The main experiment of the current study was conducted after a pilot study reported in Bong (2008). The pilot study was conducted with 27 JSLs of English, who were first-year college students at the time of the test. The pilot was consisted of a questionnaire, a proficiency test, and a cloze test on various prepositions. The results obtained from the pilot study were taken into consideration in designing the main experiment, in order to find out not only whether JSLs are sensitive to the types/characteristics of the complement/object of prepositions or other factors such as heads (namely co-occurring verbs) and the distance between prepositions and objects, but also to see whether there is any evidence of the influence of prototypicality in the L2 acquisition of English prepositions by JSLs. In addition, keeping those suggestions and arguments from Bong (2008), and those motivations from reexamining Bong’s (2010a) study in mind, the current experimental study has been conducted.

2.1 General Procedures and Limitations

The experimental study consisted of a proficiency test for which Allan’s (1992) Oxford Placement Test was employed, and a cloze test of 140 sentences in which the 10 major prepositions (*at, by, for, from, in, into, of, on, to, with*) were incorporated. The proficiency test was conducted first, followed by the cloze test in 2011. The data discussed below have been singled out from the experiment study undertaken among JSLs of English as a foreign language (EFL). In addition, due to the space and time limitation, this study reports and discusses only part of the results obtained from the main experiment that are essential for the main purpose of this study.

2.2 Proficiency: Subjects

Three experimental groups have been selected for this paper: three groups of Japanese-speaking learners (JSLs) on the basis of their English proficiency: elementary, pre-intermediate and intermediate. In addition, one control group of English native speakers to act as a control for the reliability of the tokens used the experiment tasks. Most of the Japanese participants were first-year

college students in Japan at the time of the experiment. The participants took the English proficiency test of Oxford Placement Test (OPT Allan 1992) that was incorporated in standardizing their English proficiency in the experiment. The proficiency test consists of a multiple-choice listening test with 100 items and two multiple-choice grammar tests with 50 items each and is intended to identify grammatical proficiency levels. On the basis of performance in the proficiency test, for the current study only 57 experimental subjects have been selected to act as an experimental sample (OPT score range 100~150, OPT mean 126.49 (68.8%)), and grouped into three: elementary (OPT score range 100~120, OPT mean 112.69 (56.3%)), pre-intermediate (OPT score range 121~129, OPT mean 124.67 (62.3%)), and intermediate (OPT score range 130~150, OPT mean 137.65 (63.2%). The details of the experimental subjects are illustrated below:

Table 3. Details of Experiment Japanese Subjects

Prof./Group	JSL G1	JSL G2	JSLG3
Listening (100)	61.08 (61.1%)	64.38 (64.4%)	69.80 (69.9%)
Grammar 1 (50)	24.31 (48.6%)	29.25 (58.5)	33.35 (66.7%)
Grammar 2 (50)	27.31 (54.6%)	31.04 (62.1%)	34.50 (69.0%)
Total (200)	112.69 (56.3%)	124.67 (62.3%)	137.65 (68.8%)

All selected subjects were native speakers of Japanese learning English predominantly in a classroom setting in Japan. In addition, the participants who had a lower proficiency than the range 100~120(50~60%) were not selected, partly because there were not enough participants for that group, and partly because the experimental study deals with preposition-production and with complex sentences.

2.3 Production Driven Cloze Test

The cloze test was designed to investigate how JSLs use prepositions and what elements (parts of speech, verb, adjective, antecedent noun or object noun, or sentence as a whole) are main factors to determine which preposition to use in English sentences. The token sentences used in the test were presented in both English and Japanese in order to provide clear contexts for the participant, and to find out whether JSLs make use of Japanese translation of each token when they fill the gap in the cloze test. The token sentences used in the experiment were selected, after studying and modifying sample sentences from Ishii (2008), in order to meet the requirements of the current experiment design.

In the test, there were a total of 140 English sentences with Japanese translation each. The 140 token sentences contained 10 prepositions with various senses and various types of parts of speech/various sentence structures. Note that 6 token sentences were not selected for the following discussion since some of them contained ambiguity and obscurity. The numbers of token sentences for each preposition that are used in the test, and that are employed in this study for discussion are illustrated below:

Table 4 Types and Tokens Employed and Selected³

PP/ token	No. of Sentences used in the test	No. of Sentences Used in the analysis
at	14	13
by	8	8
for	18	16
from	10	10
in	19	18
into	9	9
of	10	10
on	24	22
to	16	16
with	12	12
Total	140	134

2.4 Research Questions

The data selected for this study were examined in order to address the following research questions:

(I) Differential Difficulty

- (a) Which prepositions are easier (develop earlier/faster) than others for L2 learners to acquire?
- (b) Which senses of prepositions are easier (faster, develop earlier/faster) than others?

(II) Influence of Lemmatic properties

- (a) What roles do lemmatic properties of L1 play?
- (b) What role do lemmatic properties of the target language (L2) – antecedents of and objects of prepositions- play?

(III) Misdevelopment/Variability

- (a) Is there any evidence for misdevelopment of prepositions?
- (b) If there is, why does L2 production often differ from the target language norm?

3 Results and Discussion

The cloze test on the acquisition of the prepositions ‘at’, ‘on’, and ‘in’ has incorporated sentences involving various types of objects (place, time, abstract) and various types of antecedents (verbs,

³ Some sentences could have two possible prepositions for the control group of English Native Speakers, or vague context implication for the experimental JSLs group.

adjectives, or nouns). Sample sentences for the preposition ‘at’ are given below:

- (2) Space – different dimensions & Japanese
- I was () the dentist when he telephoned me.
彼が電話してきたとき、私は歯医者にいました。
 - Two lines meet () a point.
2本の線が1つの点で交わっている。
 - He hit () the ball, but missed.
彼はその球を狙って打ったが、当たらなかった。
- (3) Time – different temporality .
- Can you meet me () 4pm in the afternoon.
午後4時に会ってこないか？
 - The farewell party ended () dawn.
お別れ会は夜明けに終わった。
 - He started to study hard () the beginning of September.
彼は9月初めに勉強を真剣に始めた。

3.1 Overall Results of 10 prepositions

In order to see how JSLs complete (form) each sentences with English prepositions, 140 sentences with Japanese translation were employed in the cloze test. Based on the Standard English criteria for preposition occurrences obtained from English native speakers’ judgment/completion of the task, I have counted adequate preposition insertions (productions) in a sample of 57 JSLs of English, cross-classified by three proficiency groups, displayed below:

Table 5 Adequate English Preposition Placements

Types of P (tokens)	JSL G1(13) (Elementary)	JSL G2 (24) (Pre-Interm.)	JSL G3 (20) (Intermediate)
At (13)	31/169 (18.34%)	74/312 (23.71%)	66/260 (25.38%)
By (8)	25/104 (24.04%)	59/192 (30.73%)	59/160 (36.88%)
For (16)	37/592 (17.79%)	118/384 (30.73%)	129/320 (40.31%)
From (10)	51/130 (39.2%)	84/240 (35.0%)	89/200 (44.5%)
In (18)	75/234 (32.05%)	139/432 (32.18%)	129/360 (35.83%)
Into (9)	24/117 (20.51%)	55/216 (25.46%)	52/180 (28.89%)
Of (10)	56/130 (43.08)	103/240 (42.92%)	99/200 (49.5%)
On (22)	105/286 (36.71%)	186/528 (35.23%)	194/440 (38.44%)
To (16)	57/208 (27.40%)	101/384 (26.30%)	111/320 (34.69%)
With (12)	32/156 (20.51%)	66/288 (22.92%)	75/240 (31.25%)
Total (134)	493/1742 (28.30%)	985/3216 (30.62%)	1003/2680 (37.42%)

This overall result indicates that there is a clear trend suggesting that with increasing proficiency the Japanese subjects develop English prepositions, although it is very slow. Since the cloze test employed in the experiment is measuring learners’

ability of ‘production’, this result of very low performance is in effect expected at the onset of the experiment. Nevertheless, the result suggests the mild-gradual development of 10 prepositions.

In addition, the result of this gradual development of each preposition type suggest that the token sentences of a type (typed by prepositions) employed in the experiment are justified in terms of their degrees of difficulty in judging them by the learners.⁴ However, this overall result of frequencies cross-classified by three groups and prepositions does not give any clear yardstick to compare among preposition types.

3.2 Different Difficulty among Prepositions

To find out which preposition is the easiest or the most difficult and to decide a possible yardstick, averages of preposition types are calculated and cross-classified by the three groups and by the 10 prepositions as follow:

Table 6 Frequencies of Adequate Preposition Placements Cross-Classified by Prepositions and Three Groups

Preposition /No.Tokens	G1 13	G2 24	G3 20	Sum	TT	Ave.	
at	13	31	74	66	171	741	0.2311
by	8	25	59	59	143	456	0.3136
for	16	37	118	129	284	912	0.3114
from	10	51	84	89	224	570	0.3930
in	18	75	139	129	343	1026	0.3343
into	9	24	55	52	131	513	0.2554
of	10	56	103	99	258	570	0.4526
on	22	105	186	194	485	1254	0.3868
to	16	57	101	111	269	912	0.2950
with	12	32	66	75	173	684	0.2529
TT	135	494	987	1006	2487	7965	0.3122

Noticeably, given the average of the total frequencies of preposition production ‘0.3122’ (31.22%), we can induce the differential difficulty of L2 acquisition of English prepositions by JSLs.

Table 7 displays the scale of the difference difficulty in learning/acquiring the 10 English prepositions by JSLs, and answers the research question on Different Difficulty among preposition. The easiest for JSLs is the preposition ‘of’, while the most difficult one for JSLs is the preposition

⁴ One might argue that token sentences employed in the experiment could be interpreted in terms of their degrees of difficulty not in replacing missing word (s) by the learners, but in understanding the task sentences, since there are significant differences not only between the groups but also between preposition types. However, the token sentences of a type used in the cloze test-task were explained in the sense that each English sentence is given each context creating Japanese translation according to the intended replacements.

‘at’. JSLs seem to find it more difficult to acquire the preposition ‘at’ than other prepositions such as ‘in’ or ‘on’.

Table 7: Scale of the Different Difficulty

← Easy ===== Difficult →	Prepositions	Performance	Degree
	of	0.452632	Easy
	from	0.392982	
	on	0.386762	
	in	0.334308	
	by	0.313596	Middle
	for	0.311404	Middle
	to	0.294956	
	into	0.255361	
	with	0.252924	
	at	0.221805	Difficult

To account for the reason(s) why the preposition ‘of’ is easier to acquire than others, we can refer to its categorical status of the ‘of’ preposition. Prepositions have represented a problematic contradictory category for theories of syntax: i.e. distinction between lexical vs. functional category (see Rauh 1993 for a review) and been studied within acquisition studies (e.g. Littlefield 2003). According to Rauh (1993) prepositions are a heterogeneous category, and using syntactic and semantic properties a distinction between lexical and non-lexical prepositions can be made.⁵ If we follow opponents for classifying ‘of’ as ‘syntactic functional category’ - ‘place holder’, we can predict that the result of placing ‘of’ in a sentence as a syntactic place holder would be matched with or in line with (about the same time) other grammatical elements’ development. Compared with the results of OPT (English proficiency test), the results were found to be correlated: that is, the statement about ‘of’ as ‘functional category’ or as a syntactic place holder/grammatical elements is surprisingly justified.

Moving on to the other prepositions, the results suggest that the preposition ‘from’ is easier than the others. This result of ‘from’ can be accounted for by referring to Kato’s transparency claim along with a classification of convergent and divergent prepositions (2008) that there are prepositions that are transparent both in meaning(s) and in syntactic roles (semantic and syntactic features). Kato’s classification predicts that those prepositions that are convergent (e.g. from, after, behind) are easier to acquire than those prepositions that are divergent (e.g. by, with). In order to justify Kato’s claim and

⁵ See Rauh (1993) for his suggestion that non-lexical prepositions are those that have undergone some form of grammaticalization (cf. Bong 2005 for a discussion of ‘grammaticalization’ effect in L2A and language change)

predictions, we still need more data and further investigation and discussion.⁶

To sum up the findings, out of ten prepositions attested, the easiest preposition is ‘of’, while the most difficult preposition is ‘at’. To conclude tentatively, not only semantic features (properties) but also syntactic features (properties) are important factors in determining the degrees of difficulty in the process of L2 acquisition.

3.3 Different Difficulty among Senses: “at”

In order to find out which sense of the most difficult preposition suggested above, namely ‘at’, is more difficult to acquire than others. Based on the traditional classification of ‘prepositions’ as forming closed (lexical category), their basic meanings are assumed ‘spatial’, ‘temporal’ and ‘abstract’ relation. I broke down the frequency scores cross-classified by the three proficiency groups and by the three basic meanings as displayed in Table 8.

Strikingly, the result of No.3 token of ‘at’ indicates that JSLs find the temporal use (*time point-zero dimension*) use (sense/meaning) of ‘at’ the easiest (in this case, time point in zero dimension involved: see Kuroda 2011), and the abstract use of ‘at’ the most difficult, answering the research question (I). This result casts doubt on the prototypicality hypothesis in that the proto senses of ‘at’ are assumed to be senses of ‘spatial relations’ as classified in the theory of proto type.

Interestingly, JSLs performed better with the sense that involves with either time or space point in zero dimension in both temporal and spatial uses of the preposition ‘at’: the token 11 (*~meet at a point*) for Spatial Relation and the token 3 (*~meet me at 4 in the afternoon*). Results of this kind indicates that as far as the most difficult preposition ‘at’ is concerned, the concept of point or the meaning/sense of point that involves ‘zero dimension’ seems to be easier to acquire than others such as line/linear-Mono dimension, Di-dimension, or Tri-Dimension for L2 learners. In other words, such dimensional aspects (semantic features in the technical term in the semantics of prepositions) are important in determining the degree of difficulty in acquiring prepositions: that is, *not the proto sense*, but *the semantic feature of ‘dimension’* in the semantics of prepositions may be one of the crucial factors that determine L2 development in L2 acquisition process. This line of argument leads us to suggest that it is necessary to explore further into what semantic features involve in determining degrees of difficulty or development patterns of

⁶ Due to the space limit, I will leave not discuss other interesting results in this paper.

acquisitions of both L1 and L2.

Table 8 Breakdown of Frequencies of ‘at’⁷

Instances	JSLG1 (13)	JSLG2 (24)	JSLG3 (20)	Sum (57)
Spatial Relation (A)				
11. Two lines meet <u>at</u> a point.	6	14	11	31 (54.4%)
6. I was <u>at</u> the dentist when he	4	6	5	15 (26.3%)
13. I am ~ <u>at</u> Shinshu Uni.	0	8	8	16 (28.1%)
Spatial Relation (B)				
7. She lives <u>at</u> 12 Crystal Street.	1	5	1	7 (12.3%)
8. ~put the microwave <u>at</u> three meters from the table.	2	1	2	5 (8.8%)
Spatial Relation (C)				
4. hit <u>at</u> the ball, but missed.	3	5	5	13 (22.8%)
12. shot <u>at</u> the bear, but the bullet~	1	3	3	7 (12.3%)
5. threw a bone <u>at</u> the dog.	0	2	3	5 (8.8%)
Temporal Relation				
3. meet me <u>at</u> 4 in the afternoon.	9	22	17	48 (84.2%)
2. study hard <u>at</u> the beginning of Sept.	1	5	8	14 (24.6%)
10. ~party ended <u>at</u> dawn.	2	0	1	3 (5.3%)
Abstract Relation				
9. She is <u>at</u> her happiest when she~	1	2	1	4 (7.0%)
1. delicate at heart	1	1	1	3 (5.3%)
Total (13)	31 (18.3%)	74 (23.7%)	66 (25.4%)	171 (23.1%)

Consider the results of the token 6 and 13 in Spatial Relation A. The results of the two tokens indicate that JSLs performed more or less the same. This indicate when the antecedent verbs and complement objects, which are syntactic features (properties) are the same/similar kind, the degree of difficulty seems to be similar, as the results suggest. The same can be said to the similar cases such as the token 4, 12, and 5, whose structures are syntactically similar and involve similar syntactic properties (features). Spatial Relation B & C, difficult to say SPACE is the only factor that determines the degrees of

difficulty in acquiring prepositions.

In sum, the results of ‘at’ undermine the prototypicality hypothesis. Instead, results of this kind suggest that it be necessary to explore the claim that L2 development is more sensitive to other semantic features (e.g. dimension, dynamicity), and to the syntactic features (types of co-occurring elements or compatibility) of the target language.

3.4 Lemmatic Properties & Variability

This section discusses issues (research questions) involved with lemmatic properties (semantic and syntactic features) of L1 and variability in L2 acquisition.

**Table 9 Frequencies of Errors in place of ‘at’:
Omission and Commission Errors**

Instances	Correct. ‘at’	Com. ‘in’	Com ‘on’	Omit/ others
1. delicate at heart	3 (5.3%)	17	5	3/29
2. study hard <u>at</u> the beginning ~	14 (24.6%)	14	19	0/10
3. meet me <u>at</u> 4 in the aft~.	48 (84.2%)	0	8	0/1
4. hit <u>at</u> the ball, but~	13 (22.8%)	0	14	12/13
5. threw a bone <u>at</u> the dog.	5 (8.8%)	0	1	0/51 (to/for)
6. I was <u>at</u> the dentist when he	15 (26.3%)	35	2	0/7
7. She lives <u>at</u> 12~1 Street.	7 (12.3%)	40	8	0/2
8. ~put ~ <u>at</u> three meters ~.	5 (8.8%)	4	20	4/20
9. is <u>at</u> her happiest	4 (7.0%)	24	8	8/13
10. ~party ended <u>at</u> dawn.	3 (5.3%)	18	17	1/18
11. Two lines meet <u>at</u> a point.	31 (54.4%)	3	14	0/9
12. shot <u>at</u> the bear, but ~	7 (12.3%)	1	6	11/32 (to/for)
13. I am ~ <u>at</u> Shinshu Uni.	16 (28.1%)	16	5	0/20 (of)
Total (13)	171 (23.1%)	172 (23.2%)	118 (15.9%)	39/218

An observable variability/*middevelopment* can be found in the results of performances on the sentences like the token 1, 2,6,7,9, and 10. These tokens can be grouped as one by their commission (substitution) errors: i.e. ‘in’ is used more or less the same as or more in the place of ‘at’. The other commission errors found in the tokens 4, 5, 12, 13 can be grouped as one by their translation correspondence: the examples are not directly matched between English prepositions and Japanese post-positions (particles such as ‘ni’, ‘de’ in Japanese) as given in (2) or (3): (2c) in particular.

One possible interpretation of misdevelopment

⁷ Temporal Relation > Spatial Relation>Abstract Relation vs. Spatial Relation > Temporal > Abstract Relation (See Bong 2008 for the discussion).

of this kind is that Japanese learners might have hypothesized a set of features for a lexical item 'at' by referring features in Lexicon, and sets of features (features constructed) in their L1 lexicon,

This finding in effect supports the claim of misdevelopment in the acquisition of prepositions in the sense that the meanings of prepositions the L2 learners develop may diverge not only from the senses that English native speakers have, but also from their L1 equivalents. In other words, the L2 learners may construct semantic and syntactic features in the Lexicon differently from their L1 or L2, establishing a specific and constant system for *interlanguage lexicon*, which may contain divergent lexical items from the native speakers' lexicon, due to misdevelopment of such.

4 Conclusion

The findings that we have examined are as follows:

(i) for the Different Difficulty: the easiest preposition to acquire is 'of' followed by 'from and the easiest sense of the preposition 'at' is the sense of 'time point' involved with zero dimension: (ii) for the Lemmatic Properties: not the proto sense but the other semantic properties (features) such as 'point-dimension' feature is more important factor than the proto sense as far as 'at' prepositions is concerned and the syntactic features (involved with such as categorical features and compatibility) of the target language are also important in L2 acquisition; and (iii) for the Variability: JSLs may misdevelop 'at' into [AT] with features (properties) of English 'in' in combination of the semantic features of L1 Japanese 'de' and 'ni'.

In conclusion, the findings cast doubt on the prototypicality hypothesis, but support the claim that the misdevelopment hypothesis that the complex factors are inextricably bound up with establishment of L2 lexicon in the L2 acquisition process. In other words, lemmatic properties of not only L1, but also L2 involve in the construction of sets of features to form a lexicon and lead or guide to establish an interlanguage lexicon which may not be the same as the target language lexicon.

References

- Allan, D. (1992). *The Oxford Placement Test*. Oxford: Oxford University Press.
- Bong, H. K. (2005). 'Economical Parameter-Setting in Second Language Acquisition: Japanese Speaking Learners of English.' Doctoral Dissertation: University of Cambridge.
- Bong, H. K. (2009). *A Minimalist Model of Language Acquisition*. UK: VDM Verlag Dr. Muller Publishing Co.
- Bong, H. K. (2010a). 'Acquisition of English Prepositions.' In the 14th PAAL International Conference Proceeding pp 158-168
- Bong, H. K. (2010b). 'Misdevelopment.' In the 2010 KETA Joint Conference and ETAK International Conference Proceeding pp 276-284
- Bong, H.K. (2008). 'Semantics of Types of English Prepositions: Acquisition of English Prepositions.' Presented in ELSJ Spring Forum 2008. *Manuscript* (to be published in 2011).
- Dirven, R. (1993). 'Dividing up physical and mental space into conceptual categories by means of English prepositions.' In C. Zelinsky-Wibbelt (Ed.), *The semantics of prepositions* (pp. 73-97.) Berlin: Mouton de Gruyter.
- Hayashi, M. (2001) 'The acquisition of the prepositions 'in' and 'on' by Japanese learners of English.' *JACET Bulletin*, 33:29-42.
- Hayashi, M. (2008). *Second language acquisition of English preposition*. Tokyo: Eihosha.
- Ishii, T. (2008) *Complete mastery of English Preposition*. Tokyo: Bere Publishing.
- Herskovits, A. (1988). *Language and spatial cognition: An interdisciplinary study of the prepositions in English*. Cambridge: Cambridge University Press.
- Kato, Kozo. (2008). 'Why do prepositions look polysemous?' Presented in ELSJ Spring Forum 2008. *Manuscript* (to be published in 2011).
- Kuroda, Ko (2011) 'To understand English prepositions' (unpublished manuscript).
- Littlefield, H. (2003) 'Developmental patterns in the Acquisition of Prepositions and Homophonous Adverbs and particles.' Unpublished manuscript. Boston university.
- Rauh, G. (1993). 'On the grammar of lexical and non-lexical prepositions in English.' In C. Zelinsky-Wibbelt (ed). *The Semantics of Prepositions: From Mental Processing to Natural Language Processing*. Berlin, Germany: Mouton de Gruyter. 99~150.
- Yamaoka, T. (1995). 'A prototype analysis of the learning of "on" by Japanese learners of English and the potentiality of prototype contrastive analysis (part I). *Hyogo University of Teacher Educational Journal*, 15 (2): 51-59.
- Yamaoka, T. (1996). 'A prototype analysis of the learning of "on" by Japanese learners of English and the potentiality of prototype contrastive analysis (part II). *Hyogo University of Teacher Educational Journal*, 16 (2): 43-49.A