

Restructuring Foreign Language Lexical Knowledge: Do Cognitive Linguistic Insights Contribute to Foreign Language Learning?

Nobuhiko Akamatsu

ABSTRACT

This study examined the effectiveness of a cognitive linguistics (CL) approach in improving the foreign-language learner's knowledge of polysemous English prepositions (*at, in, on*). Japanese learners of English as a foreign language studied the target prepositions, using either the materials focusing on the core and peripheral senses of each preposition (i.e., the CL-approach group) or those listing the definitions and usages of each preposition from a bilingual dictionary (i.e., the control group). Before and after the learning stage, an original test developed to evaluate the participant's knowledge in usage of the target prepositions was administered. Results showed no observable advantages of learning the core and peripheral senses of the prepositions over the control group. Two potential reasons are proposed: the difficulty in learning the peripheral senses of a polysemous word and first-language effects on conceptualization in foreign language learning.

Key words: cognitive linguistics, lexical knowledge, foreign language learning

I. INTRODUCTION

Cognitive linguistics (CL) has attracted recent attention in research on second language acquisition (SLA) and foreign language learning (FLL) (e.g., Achard & Niemeier, 2004; Boers & Lindstromberg, 2008; Byrnes, Weger-Guntharp, & Sprang, 2007; de Knop & de Rycker, 2008; Jarvis & Pavlenko, 2008; Robinson, 2008). Cognitive linguistic perspectives on and theoretical bases of grammatical structure and lexical representation are appealing, because they provide new viewpoints on language learning and instruction that appear to make a unique contribution to SLA and FLL. In fact, studies exploring the applicability of cognitive linguistic frameworks to SLA and FLL have shown that second language (L2) or foreign language (FL) learners benefit from cognitive linguistic insights into idioms or figurative expressions (e.g., Boers, 2000; Boers & Demecheleer, 2001; Boers, Eyckmans, & Stengers, 2007), metaphors (e.g., Deignan, Gabrys, & Solska, 1997), polysemous words (e.g., Boers & Demecheleer, 1998; Csábi 2004; Verspoor & Lowie, 2003), multi-word or phrasal verbs (e.g., Boers, 2000), and prepositions (e.g., Lindstromberg, 1996). Although these studies vary in the target linguistic item, they suggest that the learning approach based on cognitive linguistic insights (the CL approach) leads the learner to a better understanding than do the conventional approaches.

The majority of the studies emphasize the “conceptual relatedness” of to-be-learned items. They argue that overt explanation of the conceptual relatedness between the target items enhances the learner’s awareness of their underlying commonalities and helps the learner understand their usage in depth. The CL approach claims that SLA or FLL should take into account the relationship between language and cognition. This claim appears to be

supported by empirical research where learners study novel grammatical or lexical items (e.g., Boers, 2000; Verspoor & Lowie, 2003); there are, however, few, if any, studies that investigate whether or to what extent the CL approach helps learners improve knowledge already developed through more conventional approaches to SLA or FLL.

The present study examines the effectiveness of the CL approach in helping FL learners restructure their knowledge of lexical items to which they have been frequently exposed but which they have not yet fully learned. The study focuses on whether or to what extent the CL approach benefits FL learners in overcoming difficulties that hamper their further development. This focus is motivated by research findings implying the facilitative advantage of the CL approach over the conventional approaches. If the CL approach leads to a better understanding of grammatical and lexical items, it is important to examine whether or to what extent the CL approach could eliminate the blockage rooted in the course of FLL by the conventional approaches.

1. Cognitive linguistic insights: Conceptual relatedness

A key concept underlying cognitive linguistic frameworks is that language reflects a person's general conceptualization, individual experience, and cultural background. Language is seen as a medium between human cognition and the world, and CL focuses on the interplay between language and human representations of the world in its linguistic analysis and theorization where semantics plays a primary role. For example, grammar is regarded as "an essential aspect of the conceptual apparatus through which we apprehend and engage the world" (Langacker, 2008, p. 4). Accordingly, grammatical forms and elements are analyzed on the basis of their

conceptual relations with meanings.

The conceptual relatedness expressed by a single word (e.g., polysemy), multiple words (e.g., prototypicality), and phrases and expressions (e.g., metaphor) is also explored, focusing on shared semantic characteristics. The focus on “shared semantic characteristics” is vital in the cognitive linguistic investigation of lexical items. In CL, the lexicon is viewed as reflecting the general cognitive principles of human beings, and thus research on the lexicon focuses on the associations of lexical items with their corresponding senses and meanings. This view contradicts the traditional perspective of the lexicon as a static, arbitrary list of words and word classes. While the traditional position views the lexicon as a list of words that play no major linguistic roles apart from syntax, the cognitive linguistic view emphasizes cognitive relatedness between lexical items. This view is also applied to the investigation of single words with multiple meanings: polysemy.

Polysemy has never attracted much attention in mainstream linguistics. It only plays a minor role in structuralist and generative linguistics and it is often regarded as the unusual case, with monosemy (where lexical items have one meaning) being the norm. By contrast, the focus on relationships between language and cognition in CL shows polysemy in a new light. Polysemy has been explored as a major research theme in CL, and it is pointed out that the distinct senses or meanings of a polysemous word are highly motivated¹ (Cuyckens & Zawada, 2001).

For example, Evans and Tyler (2004) propose that the preposition *in* emerge as a complex polysemous category, which has a radial structure of different meanings consisting of a core sense and several clusters of senses that derive from the core sense (see Figure 1). According to Evans and Tyler, the core sense of *in* represents a spatial relation (interior, boundary

and exterior) and a functional element of containment (e.g., “John is *in* the house”). Major clusters of senses derived from the core sense relate to (a) location, (b) vantage point (interior), (c) vantage point (exterior), (d) segmentation, and (e) reflexivity. Some clusters contain several distinct senses, while others consist of a single sense. For example, the location cluster contains four different senses, such as the in situ sense (e.g., “He stayed *in* for the evening”), the state sense (e.g., “We are *in* a hurry”), the activity sense (e.g., “She is *in* graduate school”), and the means sense (e.g., “She wrote *in* ink”).

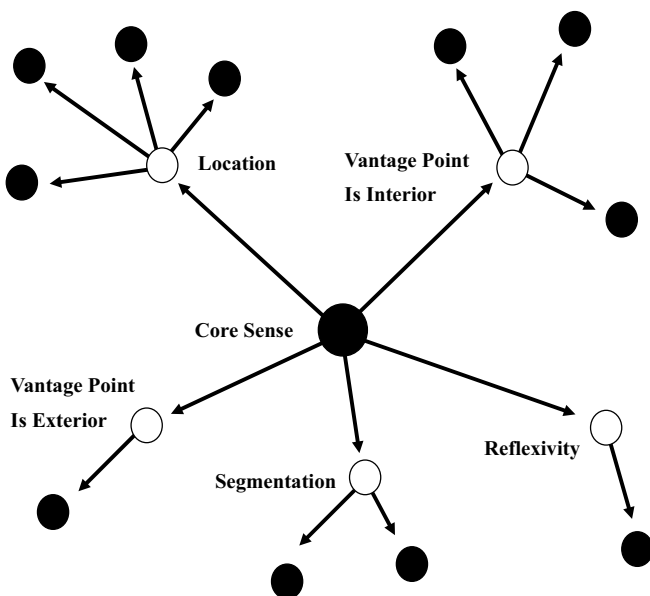


Figure 1: A Schematic Image of A Partial Semantic Network for the Preposition IN Note. This schematic image was adapted from Evans and Tyler (2004, p. 173). Shaded circles indicate distinct senses. Un-shaded circles indicate clusters of senses.

2. Cognitive linguistic insights into SLA and FLL

Regardless of diversity in the target lexical item (e.g., idioms, metaphors, phrasal verbs, prepositions), a majority of studies examining the effectiveness of the CL approach in SLA and FLL appear to focus on the key concept underlying cognitive linguistic frameworks: “conceptual relatedness” or “shared semantic characteristics.” Specifically, cognitive linguistic proposals such as conceptual metaphors or the radial structure of lexical senses are considered as a major facilitating factor in SLA and FLL.

Boers (2000) demonstrated that primary conceptual metaphors (e.g., more is up, active is up, visible is out) helped FL learners memorize unfamiliar figurative expressions. Seventy-four French learners of English in Belgium were divided into two groups and asked to memorize a list of phrasal verbs (e.g., turn down, cheer up, come up with an idea). One group received a list where the phrasal verbs were categorized under the headings of their underlying conceptual metaphors, and for the other group, the phrasal verbs were listed alphabetically with explanatory notes from an English grammar book.

Both groups studied 20 target items for 10 minutes and then answered a cloze test, filling in each blank in a passage with the most appropriate phrasal verb. There were a total of 20 blanks in the cloze test, and the same number of choices (phrasal verbs) were given; however, only half of the previously studied verbs were included in the test. The test items that were not previously studied were incorporated into the test to examine whether knowledge of the learned conceptual metaphors was transferable.

Boers (2000) found that the group who studied unfamiliar figurative expressions with the underlying conceptual metaphors outperformed the group who received the explanatory notes of the figurative expressions.

For the test items that were not previously studied, however, there was no statistically significant difference in the test score between the two groups. These results suggest that conceptual metaphors helped FL learners memorize unfamiliar phrasal verbs, although knowledge or awareness of conceptual metaphors did not in itself allow the learners to guess the meanings of novel phrasal verbs.

Csábi (2004) also underscored the effectiveness of conceptual metaphors in learning polysemous verbs. Fifty-two Hungarian students were taught the polysemous verbs *keep* and *hold* in two different ways. Half of the students were provided with the distinct senses of the target verbs, ranging from the primary or core sense to more peripheral senses (i.e., more distant from the core sense). When the senses of *keep* and *hold* were introduced, their underlying conceptual relatedness (i.e., motivation) were illustrated and explained, using conceptual metaphors (e.g., control is holding something in the hand and control is up), keywords (e.g., “hand and control” for the verb *hold*), drawings, and representative example sentences. The other half of the students learned the target verbs in a conventional manner, using expressions containing the target verbs with their Hungarian translations. On the basis of the results of the immediate and delayed posttests², Csábi concluded that the CL approach (e.g., clear explanation of how the seemingly different senses of a polysemous word are motivated) was more effective in learning polysemous words than the conventional approach, such as memorizing words with their first language (L1) equivalents. A similar finding in favor of the effectiveness of conceptual metaphors in FLL is also reported by Boers and Demecheleer’s study where FL learners studied prepositional usage (Experiment 2, Boers & Demecheleer, 1998).

Verspoor and Lowie (2003) examined the effectiveness of vocabulary

learning based on the radial structure of lexical senses. Eighteen unfamiliar polysemous English words were chosen and the distinct senses of each polysemous word were categorized into three types according to their conceptual relatedness: a core sense (S1), a peripheral or figurative sense (S2), and a more figurative or abstract sense (S3). For each type, one sentence was prepared; three different sentences were created for each polysemous word.

Seventy-eight Dutch learners of English were provided with 18 pairs of English sentences containing the target polysemous words, which were underlined. Each pair consisted of a target and a cue sentence. The target sentence contained a polysemous word in a peripheral or figurative sense (S2), while the cue sentence contained a polysemous word in either a core sense (S1) or a more figurative or abstract sense (S3) with its Dutch translation. The learners were asked to guess the meanings of polysemous words in the target sentences (i.e., the S2 context), using the corresponding cue sentences (i.e., the S1 or S3 context). After the guessing stage, the learners were given worksheets listing the target and cue sentences; however, this time, the polysemous words (S2) in the target sentences were provided with the correct translations of the words. They were asked to memorize the meanings and discover semantic connections between the senses of each polysemous word. A recall test was given immediately after the verifying and memorizing stage, and a delayed retention test was administered between two and three weeks later.

Comparing the learners who received the S1 cue sentences with those who received the S3 cue sentences, Verspoor and Lowie (2003) concluded that providing the core senses of polysemous words (i.e., the S1 context) promoted more correct guessing and better retention of the figurative senses

of unfamiliar polysemous words. Along with Boers (2000) and Csábi (2004), this finding also appears to support the effectiveness of the CL approach in FLL.

3. Rational of the present study

Previous studies examining the CL approach in SLA or FLL highlight the usefulness of cognitive linguistic insights, such as conceptual metaphors or the radial network of lexical senses. They argue that an understanding or awareness of the conceptual relatedness between to-be-learned items facilitates SLA and FLL. This claim is supported by empirical studies focusing on the learning of novel grammatical or lexical items. There are, however, few, if any, studies investigating the effectiveness of the CL approach in correcting misconceptions developed in the course of SLA or FLL.

The major purpose of the present study is to explore whether the CL approach is effective in restructuring lexical knowledge developed through more conventional FLL approaches. Specifically, the study investigates whether the CL approach could advance FL performance that has plateaued somewhere short of full accuracy. The focus of the study, therefore, is not on the effectiveness of the CL approach in learning novel lexical items. Rather, it is on how much the CL approach improves FL learners' knowledge of lexical items to which they have been frequently exposed, but which they have not yet fully learned.

English prepositions are chosen as the target lexical items for this study, because they are regarded as one of the most difficult aspects for L2 and FL learners to master despite frequent exposure (Taylor 2003; Tyler & Evans 2003). From a cognitive linguistic perspective, such difficulty stems from

the nature of polysemous prepositions and the cross-linguistic diversity in the structure of the polysemous senses of prepositions. In other words, L2 and FL learners with various L1 backgrounds find usage of the English prepositions perplexing, because “the range of uses associated with any one preposition in one language rarely overlaps with the meanings of any single linguistic form in another language” (Taylor, 2003, p. 112).

Some cognitive linguists contend that another potential reason for difficulty in mastering English prepositions relates to the conventional methods through which the prepositions are taught (e.g., Tanaka, Sato, & Abe, 2006; Tyler & Evans, 2003). They argue that the conventional approaches to L2 or FL instruction lack attention to the conceptual relatedness among the distinct senses of prepositional polysemy, resulting in sketchy explanations along with a list of various meanings associated with a preposition. They suggest that cognitive linguistic insights into polysemy be taken into account in SLA and FLL. For example, Tyler and Evans (2003) propose that a CL approach based on the radial network of polysemous senses may provide “a more clearly articulated framework on which to build a systematic, accessible account of [English prepositions] for EFL/ESL teachers and learners” (p. 234).

In summary, this study is motivated by (a) previous research findings favoring the effectiveness of the CL approach in SLA and FLL and (b) the claim that cognitive linguistic insights into the lexicon facilitates SLA and FLL, even where the most difficult lexical items, such as prepositions, are concerned. The major focus of the study is on the extent to which a CL approach based on the radial network of polysemous senses restructures FL learners’ knowledge of English prepositions.

II. METHOD

1. Participants

A total of 63 FL learners participated in this study. All the participants were Japanese university students majoring in English, and they had received formal English education for approximately 6 to 8 years at the time of the study. No one had lived in an English-speaking country for more than one year.

2. Tests

All the participants had taken an institutional TOEFL approximately three months before the time of the study; the scores were used to assess the participants' English proficiency. The total TOEFL scores ranged from 370 to 583 (max = 680; M = 491.8, SD = 45.6). The listening comprehension scores ranged from 37 to 58 (max = 68; M = 48.1, SD = 4.5); the grammar scores ranged from 40 to 66 (max = 68; M = 49.9, SD = 5.7); the reading comprehension scores ranged from 31 to 58 (max = 68; M = 49.6, SD = 5.9).

An original test was developed to evaluate the participants' ability to use the target prepositions: *at*, *in* and *on*. The preposition test consisted of 60 incomplete sentences, with 20 items for each preposition. The participants were asked to choose one preposition to complete each sentence in the best way possible (see Appendix A for a sample test). The test items were developed with reference to several English-Japanese bilingual dictionaries that have been widely used among Japanese learners of English. Three native speakers of English (i.e., university professors) examined the appropriateness of each test item. These 60 test items were used for a pretest

as well as a posttest; the test items were randomized each time, so that the item order was different in each test. The estimated reliability of the pretest (i.e., Cronbach's alpha) was 0.75.

3. Study design

The study consisted of three stages: pretest, learning, and posttest. At the pretest stage, the original preposition test was administered. The administration time was 20 minutes. After the test, the participants were given a questionnaire on their educational backgrounds and experience in living abroad. According to the preposition-test and institutional TOEFL scores, the participants were divided into two groups in such a way that each group was equivalent in English proficiency and in knowledge in using the target prepositions.

At the learning stage, approximately one week after the pretest, the participants in one group (i.e., the CL-approach group) were provided with written material that explained the core and peripheral senses of each target preposition in the learner's L1, Japanese. The material was adopted from an English textbook that focused on the usefulness of core senses (Tanaka, Sato, & Kawahara, 2006); it contained visual aids (i.e., illustrations) and sample sentences with Japanese translations (see Appendix B for sample material). The participants in the other group (i.e., the control group) were given a copy of pages from a bilingual dictionary (Konishi & Minamide, 2001) that defined the target prepositions. The material listed the definitions and usages of each target preposition as well as sample phrases and sentences with Japanese translations. The participants in both groups were told to pay attention to differences and commonalities in usage among the target prepositions (*at*, *in*, and *on*) while they were studying the given

material. Because it was important that each participant have enough time to learn the target items, the participants were told to take as much time as necessary until they were sure that they learned the target items³.

After the participants finished the learning stage, they took an immediate posttest that contained the same test items as those in the pretest but in a different order. The administration time for the posttest was 20 minutes. The estimated reliability of the posttest (i.e., Cronbach's alpha) was 0.78.

4. Experimental design and data analysis

Data were analyzed with group (CL approach group and control group) as a between-subjects factor, and test (pretest and posttest) and preposition (*at*, *in*, *on*) as within-subjects factors, using a repeated measures ANOVA. The scores in the preposition tests constituted the dependent measures.

In addition to the test scores, residual scores were also used to measure each participant's gain in learning the target prepositions. The use of residual scores was motivated by the claim that residual scores — which are calculated by partialing out each participant's score for the pretest from that for the posttest — are more sensitive to developmental changes than are gain scores that can be obtained simply by subtracting pretest scores from posttest scores (e.g., Segalowitz, Segalowitz, & Wood, 1998). While gain scores are susceptible to the impact of either pretest or posttest scores and thus may not accurately reflect developmental changes, “residual is an unambiguous measure of the degree of change from the Initial to Final test” (Segalowitz *et al*, 1998, p. 61). In other words, the use of residual scores avoids a potentially misleading analysis based on gain scores only.

III. RESULTS

Table 1 lists the means and standard deviations of preposition-test scores under all the conditions. The main effect of test was significant, $F(1, 61) = 4.32, p < .05, \eta_p^2 = .07$; the preposition-test scores in the posttest ($M = 42.2, SD = 6.3$) were significantly higher than those in the pretest ($M = 40.9, SD = 6.4$). The two-way interaction between test and learning approach was marginally significant, $F(1, 61) = 2.27, p = .08, \eta_p^2 = .08$, suggesting that gains in the preposition test for the CL-approach group (pretest: $M = 41.5, SD = 5.7$; posttest: $M = 43.7, SD = 4.2$) were larger than those for the control group (pretest: $M = 40.4, SD = 7.0$; posttest: $M = 40.7, SD = 7.6$), although the difference did not reach statistical significance. No other main effects or interactions were statistically significant. Furthermore, ANOVA based on residual scores also showed similar results.

Table 1. *Means and Standard Deviations of Preposition-test Scores under All Conditions*

	Pretest			Posttest		
	at	in	on	at	in	on
CL Approach (n=31)	13.7 (2.6)	13.4 (3.0)	14.4 (2.4)	14.5 (2.4)	14.5 (2.4)	14.7 (2.3)
Conventional Approach (n=32)	13.4 (2.8)	12.8 (4.3)	14.2 (2.4)	13.8 (3.0)	13.0 (3.8)	13.9 (3.0)

Note. Values enclosed in parentheses represent standard deviations.

IV. DISCUSSION

The results showed that the FL learners demonstrated no observable advantages for the CL approach in learning English prepositions. The CL-approach group slightly outperformed the control group in the preposition test; however, their superiority was not robust enough to reach statistical significance. This finding contradicts those of previous studies examining the effectiveness of the CL approach in learning novel grammatical or lexical items in an L2 or an FL; a majority of these studies underscore the facilitative effects of the CL approach in SLA or FLL (e.g., Csábi, 2004; Verspoor & Lowie, 2003).

A potential cause for the discrepant finding may involve the nature of the target items in this study. Unlike a majority of previous studies, this study focused on the effectiveness of the CL approach in improving the FL learner's knowledge of *familiar* items. The three prepositions (*at*, *in*, *on*) were chosen as the target items because the participants had had a substantial amount of exposure to these prepositions and yet their knowledge was not sufficient to allow for proper use. To improve their understanding of the target items, the learners were provided with material explaining the distinct senses of the prepositions and asked to attend to commonalities and differences in usage among the prepositions.

The distinctive feature of the target items of this study is their polysemous nature. Most prepositions are considered to be polysemous, and their distinct senses (or meanings) are seen to be motivated or associated in such a way that the relationship among the senses can be described as core and periphery (e.g., Lakoff, 1987), family resemblance (e.g., Taylor, 2003),

or lexical networks (e.g., Tyler & Evans, 2003). Despite the difference in perspective, however, the distinct senses are considered to be associated through meaning chains, rather than related on the basis of one semantic or cognitive commonality (e.g., Gibbs & Matlock, 2001). This implies that the semantic relatedness of the distinct senses of a preposition may vary according to their mediating chains. The relationship between the senses sharing the same or similar mediating chains is relatively close, while that between those differing in the mediating chains can be quite remote. The “core and periphery” view explains this relationship (i.e., the semantic relatedness of senses) with respect to the distance from the core sense: the more distant from the core sense the peripheral senses are, the more remote their relationship is. This view appears to provide a plausible explanation as to why there was no observable effectiveness for the CL approach in this study.

The test items used in this study involved both the core and the peripheral senses of three prepositions, *at*, *in*, and *on*; the test items measuring the usage of the peripheral senses were larger in number. This arrangement was made to avoid potential ceiling effects, because the participants were expected to have been exposed to the prepositions quite often and thus to have a substantial knowledge of their common usage (i.e., the usage of the core senses). Nonetheless, it is possible that this concern may have led to a collection of peripheral senses that are quite remote from the core senses and have little semantic relatedness. In other words, these peripheral senses were too difficult to learn within the time provided at the learning stage, because the difficulty in learning the peripheral senses increases according to the distance from the core sense (e.g., Boers, 2000; Verspoor & Lowie, 2003).

Another potential reason for no observable effectiveness for the CL approach may relate to the learners' L1 effects on conceptualization of the target items. At the time of this study, the participants had already studied English as an FL (EFL) for six to eight years. They had been exposed to the target English prepositions (*at*, *in*, *on*) in various contexts, and it is quite plausible that they had already conceptualized usage of these prepositions. As the pretest showed, however, they had not fully understood the proper usage. In particular, they had experienced difficulty in grasping subtle differences in usage between *at*, *in*, and *on*, resulting in erroneous usage of these prepositions. This misconception appears to stem from cross-linguistic influence (Taylor, 2003).

The target prepositions can be differentiated according to the dimension of the space or time units involved (Lindstromberg, 1997). For example, the preposition *at* is commonly used when one conceives of a referential item as small in dimension with respect to time [Sentence (a)]. In contrast, the preposition *in* is used to indicate a large dimension, such as a month, a season, and a year [Sentence (b)]; the preposition *on* refers to middle-sized units of time [Sentence (c)].

(a) Let's meet **at** 7 o'clock. [7 ji **ni** aimasho]

(b) Let's meet **in** the winter. [fuyu **ni** aimasho]

(c) Let's meet **on** Friday. [kinyobi **ni** aimasho]

Although there are some exceptions, such as idioms, one may be able to properly conceptualize the usage of these prepositions with reference to the size of space or time unit as a criterion. So, what had hindered the participants (Japanese-L1 learners of EFL) from acquiring appropriate

knowledge of the target prepositions?

The Japanese equivalents of the English prepositions *at*, *in* and *on* do not necessarily correspond to their English counterparts in the same or even a similar manner. For example, the three distinct prepositions in Sentences (a) to (c) are translated into the single Japanese particle *ni*, and thus, conceptual differences in usage between the three English prepositions are not reflected in the Japanese translations. This suggests that subtle differences underlying prepositional usage may be lost in translation. Furthermore, the participants in this study had studied EFL in the grammar-translation method. The main resource for learning English prepositions was grammar books and bilingual dictionaries that were written on the basis of mainstream linguistic insights. Due to the nature of the conventional approach, one could imagine that these learners had few, if any, opportunities to attend to the semantic relatedness of the prepositions. Thus, it is plausible that, in the course of conceptualization, the Japanese equivalents (e.g., the particle *ni*) of the English prepositions *at*, *in*, and *on* may have played a major role, resulting in misconceived knowledge of the usage of the prepositions. It is notable that such cross-linguistic effects on conceptualization can be so robust that misconception of this kind may not be easily changed (e.g., Jiang, 2002, 2004).

Enriching knowledge and conceptual change

This study highlighted no observable contribution of cognitive linguistic insights into vocabulary for FLL, and two potential reasons are proposed: the difficulty in learning the peripheral senses of a polysemous word, and L1 effects on conceptualization in FLL. Both reasons concern the possible influence of the learner's prior knowledge on the learning activity involved

in this study, i.e., learning the usage of multiple English prepositions.

As mentioned above, the learners in this study had been frequently exposed to the target prepositions, and thus, it is plausible that the learners had a substantial amount of prior knowledge of both the core senses and the peripheral senses closely associated with them. Nonetheless, there might be some peripheral senses that the learners had never realized before the study; alternatively, or even though the learners had some prior knowledge of those peripheral senses, it might not have been complete. In these cases, one could assume that learning the target prepositions consisted of (a) learning unfamiliar peripheral senses, (b) integrating them into prior knowledge of prepositional usage, and (c) upgrading the semantic network (i.e., linguistic motivation) among the related senses.

In such prior knowledge conditions, learning appears to vary according to the amount of the learner's prior knowledge of the to-be-learned items. In fact, in the *missing* prior knowledge condition, learning is considered as consisting of *adding* new knowledge; in the *incomplete* prior knowledge condition, learning is seen to involve *gap filling* incomplete knowledge (Chi, 2008). These two types of learning, however, are conceived of as one kind, *enriching knowledge* (Carey, 1991).

Enriching knowledge consists in forming a new knowledge structure with no substantial modification of the prior knowledge structure. It mainly involves increasing the quantity of related knowledge within the existing knowledge framework (Carey, 1991; Spelke 1991). Because of its nature, however, the "enriching knowledge" kind of learning may result in misconception or incomprehension, when the to-be-learned concepts do not fit in the learner's prior knowledge structure. In other words, learning of new concepts that conflict with prior knowledge fails to occur, unless the learner

changes the prior knowledge structure so that the conflicting concepts and prior knowledge coalesce in a coherent manner. Thus, constructing a profound understanding of conflicting concepts requires a restructuring of prior knowledge: namely, *conceptual change*, which is considered to be qualitatively different and cognitively more demanding than *enriching knowledge* (Carey, 1991).

It seems that the learning tasks of previous studies examining the effects of the CL approach tend to involve the “enriching knowledge” kind of learning due to the nature of the items targeted for learning. The majority of previous studies focused on effectiveness in acquiring knowledge of novel (or unfamiliar) grammatical or lexical items, and the FL or L2 learners had either no prior knowledge (e.g., Boers, 2000; Verspoor & Lowie, 2003) or related yet limited knowledge of the target items (e.g., Csábi, 2004). Accordingly, learners with no prior knowledge were mainly engaged in *adding new knowledge*; those with limited previous knowledge tended to focus on *filling missing gaps* with new knowledge. In this respect, both the current and previous studies may appear similar in that the learners engage in the “enriching knowledge” kind of learning. This study, however, differs from the previous ones because learning of the target items involves not only *enriching knowledge*, but also *conceptual change*.

A crucial difficulty of the current study’s task follows from the fact that the learners were asked to learn the core and peripheral senses of multiple, familiar English prepositions overlapping in some of their referential domains. Figure 2 depicts a partial semantic network of three polysemous words A, B, and C, which represent the target English prepositions in the study, *at*, *in* and *on*. As they study the core and peripheral senses of each preposition, the learners are mainly engaged in developing their prior

knowledge by learning unfamiliar senses (e.g., adding such new knowledge as the peripheral sense, b-3) and integrating the newly learned senses into the network (e.g., connecting the newly learned peripheral sense, b-3, with the core sense B through the mediating chain, B-2). In other words, learning the core and peripheral senses of a *single* preposition primarily involves adding new knowledge and gap-filling incomplete knowledge. Learning the senses of *multiple* prepositions, however, pertains to a qualitatively different process due to the fact that some peripheral senses of the prepositions partially overlap in their referential domains, and also to the possibility that the learners' L1 affects the knowledge structure of the English prepositional usage.

Many prepositions are polysemous, and their peripheral senses often overlap in their referential domains (Lindstromberg, 1997; Tyler & Evans, 2003). For example, the prepositions *at*, *in*, and *on* are all used in such a referential domain as “time” or “space”; regardless of core-sense differences, the peripheral senses of these prepositions refer to the same domains. (e.g., In Figure 2, the peripheral senses, a-1, a-2, b-1, b-2, c-1, and c-2 have differing core senses, and yet these peripheral senses represent the same referential domain.) This implies that English-L1 speakers possess a semantic network connecting each sense in a coherent manner, so that they realize even subtle differences in usage between the prepositions in the overlapping referential domains. Such a semantic network, however, may not easily come into being in FLL.

In the course of learning English prepositions, the FL learners utilize their prior knowledge regarding prepositional senses or their equivalents in their L1. In the case of Japanese-L1 learners of EFL, the semantic network for the Japanese particles plays a critical role in the understanding

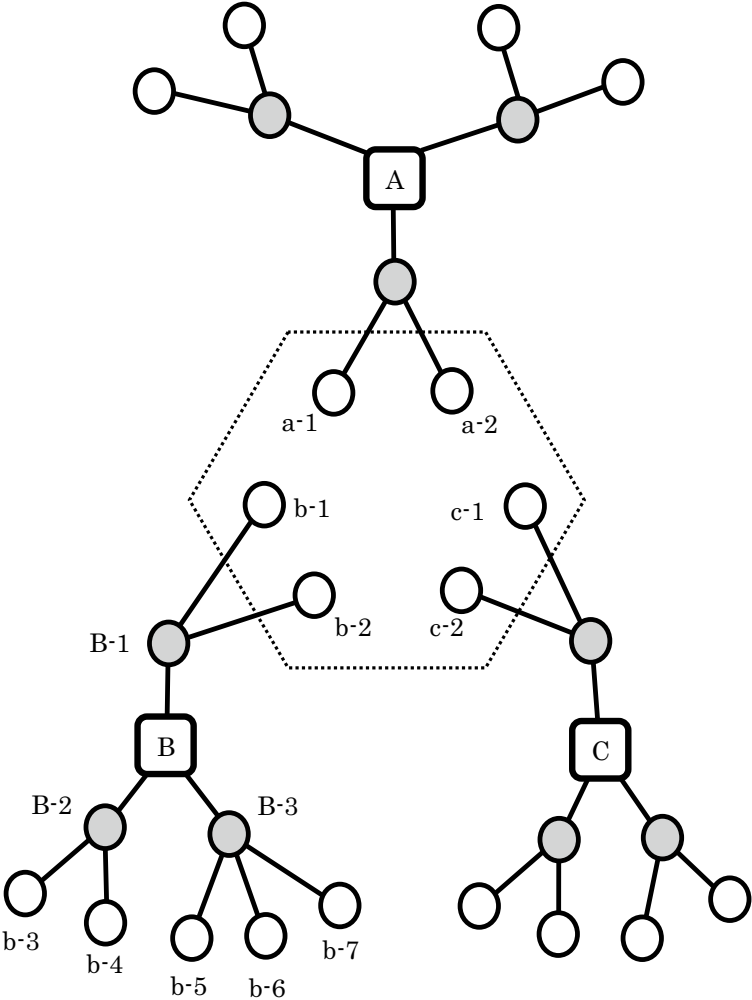


Figure 2: A Schematic Image of A Partial Semantic Network for Polysemous Words A, B, and C.

Note. Un-shaded squares represent core senses; un-shaded circles indicate peripheral senses. Shaded circles indicate the mediating chains of peripheral senses or clusters of senses.

of English prepositional usage; referring to the semantic network for the Japanese particles, the learners develop a semantic network for the English prepositions. When both semantic networks (i.e., the Japanese particle system and the English preposition system) are commensurable, the “enriching knowledge” kind of learning can lead to constructing an understanding of the English prepositions. When both semantic networks are incommensurable, however, the “enriching knowledge” kind of learning may result in incomprehension or misconceived knowledge.

As mentioned earlier, the Japanese equivalents of the English prepositions *at*, *in* and *on* do not necessarily correspond to their English counterparts. In the “time” referential domain, for example, the three English prepositions can be translated into a single Japanese particle, *ni*. This incommensurability between English and Japanese suggests that the differentiated senses represented by the English prepositions play no role in Japanese and the coalescent concepts represented by the Japanese particle play no role in English. To fully understand the usage of the English prepositions, therefore, the learners need to engage in the “conceptual change” kind of learning and radically restructure their prior knowledge.

Restructuring of prior knowledge, nevertheless, is hard to bring about. Research shows that misconceived knowledge in such areas as mathematics, science, and language (e.g., FL knowledge affected by the learner’s L1) is often resistant to change and various forms of explicit teaching have failed to induce the “conceptual change” kind of learning (Sinatra & Pintrich, 2003). Thus, provided that learning of the target English prepositions requires the FL learners in this study to engage in conceptual change, it may be quite plausible that forthright explanation of the prepositional senses did not lead them to a cognitively deep understanding of semantic relatedness

among the English prepositions, resulting in no observable improvement.

In conclusion, it may appear that this study shares commonality with previous studies favoring the effects of the CL approach on FLL (e.g., the learner's related yet limited prior knowledge regarding the target items). This study, however, differs from the previous ones in that the experimental task of this study requires the learners to engage not only in enriching knowledge, but also in conceptual change, which is cognitively more demanding than enriching knowledge. Thus, the results of the current and previous studies may be interpreted as suggesting that, although the CL approach may be a good framework for the "enriching knowledge" kind of learning (i.e., adding new knowledge and gap filling incomplete knowledge) in SLA or FLL, it may not induce the "conceptual change" kind of learning by itself.

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NOTES

- 1 Although there is no definitional consensus regarding the notion of *motivation* in linguistics, motivation is generally viewed as "a matter of degree along a continuum

ranging between the poles of arbitrariness on the one hand and predictability on the other hand” (Radden & Panther, 2004, pp. 1-2).

2 Csábi (2004) did not administer a pretest and there was no information regarding the learner’s knowledge of *hold* and *keep* prior to the intervention. Thus, Csábi’s conclusion is based on the assumption that the two groups, whose overall proficiency in English was controlled, were equivalent in light of the knowledge of *hold* and *keep*.

3 The learning stage ranged approximately from 20 to 25 minutes.

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Appendix A: Sample Test Items

1. These files are (in) the wrong order.
2. I heard it (on) the radio.
3. How long would it take to get there (on) foot?
4. The earthquake occurred (at) midnight.
5. I was really amazed (at) the news.
6. Please pay (in) cash.
7. Drive (at) a safe speed.
8. My sister was born (on) January 7, 1989.
9. I go to university (on) a scholarship.
10. The kid threw a stone (at) the dog.
11. We're getting further and further (in) the red.
12. Getting a *raise* put him (in) a good *mood*.
13. She went out (in) the rain.
14. Bob is (on) holiday.
15. He ran away (at) the sight of the dog.
16. She is annoyed (at) his ignorance.
17. Don't talk (in) a loud voice.
18. The hunter shot (at) the bear but missed.
19. Crime is (on) the increase.
20. You need to be able to walk (on) *tiptoe* in order to become a *ballerina*.

* Italicized words were provided with their translations.

Appendix B: Sample Material for the CL group

Preposition IN

The core image of the preposition *in* is “a container”; *in* is used to code the concept of containment linguistically. Typically the preposition *in* describes the containment of three-dimensional space such as “an apple *in* the box”; however, its usage can be extended to describe containment where the boundaries are not rigid (e.g., “*in* the rain”, “*in* the grass”) or two-dimensional space (e.g., “*in* the east”, “*in* the corner”). Thus, the sentence “the sun rises *in* the east and sets *in* the west” implies the fact that the sunrise is seen within the space of the east and the sunset is seen within the space of the west. Likewise, the expression “play *in* the sun” evokes the image of “being surrounded by sunlight.”

The preposition *in* is used not only to describe spatio-physical situations, but also to express time (e.g., “*in* 2002”, “*in* a minute”), social space (e.g., “*in* a group”, “*in* a society”), and mental or emotional state (e.g., “*in* love”, “*in* trouble”). Furthermore, the phrase “speak *in* English” literally means “to speak English”; it has the image of “speak within the linguistic space of English.” In summary, the preposition *in* is used to describe an object in terms of space.

<Example Sentences>

- (a) The milk is *in* the glass. (This is a typical usage of *in*.)
- (b) Who knows what will happen *in* the 22nd century. (The 22nd century is perceived as time space. Because of the time duration, the preposition *at* cannot be used in this case.)

- (c) I found a worm *in* the apple. (The worm is inside the apple.)
- (d) Cherry blossoms are *in* full bloom. (This sentence implies that one is aware or conscious of the change from the blossom-bud state to the full-bloom state.)
- (e) He is *in* trouble. (This sentence implies that the person is in the mental space (state) of being troubled. Other examples of this type would be “be in despair”, “be in peace”, and “be in need”.)
- (f) Walk *in* the direction of the situation. (The way (direction) to the station is spatially perceived.)