

Original Paper

The Bilingual Mental Lexicon and Lemmatic Transfer in Second Language Learning

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Abstract

There have been numerous studies of first Language (L1) transfer in second Language (L2) learning. Various models have been proposed to explore the sources of language transfer and have also caused many controversies over the nature of language transfer and its effects on interlanguage. Different from most previous studies remaining at a surface level of observation, this study proposes an abstract approach, which is abstract because it goes beyond any superficial observation and description by exploring the nature and activity of the bilingual mental lexicon in L2 learning. This approach adopts the Bilingual Lemma Activation Model (BLAM) (Wei, 2006a, 2006b) and tests its crucial assumptions and claims: The bilingual mental lexicon does not simply contain lexemes but abstract entries, called “lemmas”, about them; lemmas in the bilingual mental lexicon are language-specific; language-specific lemmas in the bilingual mental lexicon are in contact in L2 learning, lemmas underlying L1 abstract lexical structure may replace those underlying L2 abstract lexical structure. Lemmas in the bilingual mental lexicon are about three levels of abstract lexical structure: lexical-conceptual structure, predicate-argument structure, and morphological realization patterns. The typical instances of L1 lemma transfer in L2 learning are discussed and explained in support of the BLAM.

Keywords

language transfer, abstract lexical structure, lemma, bilingual, mental lexicon, activation

1. Introduction

As commonly observed, it is not incompatible to regard Second Language Acquisition (SLA) as being affected by two interrelated processes: learners’ utilization of their L1 knowledge and other languages known to them (Lado, 1957), and learners’ build-up of a body of knowledge in which they rest

hypotheses formed on the basis of the available L2 data (Dulay, Burt, & Krashen, 1982). Many researchers now recognize that there are at least three linguistic systems involved in SLA: the L1, the target language (TL), and the interlanguage (IL) (e.g., Selinker, 1972; Eubank, Selinker, & Sharwood Smith, 1995). However, as noted by many recent researchers (e.g., Gass & Selinker, 1983; Flynn, 1987; Gass & Schachter, 1989; White, 1989, 1995; Bialystok, 1995; Yip, 1995), this observation by itself remains descriptive rather than explanatory. Some most recent researchers (e.g., Jake, 1998; Fuller, 1999; Myers-Scotton & Jake 2000; Wei (2000a, 2009, 2015)) offer an explanatory account of the structural nature of IL and TL.

To make IL studies not only descriptively but also explanatorily adequate, this study considers this fundamental question about the nature of IL: If learners build up and revise the interim system by gradually increasing the complexity of the TL system, what is the origin of IL? To answer such a question, this study makes several assumptions about the nature of the developing system of IL:

- 1) The interim system of IL is a composite developing system. It is composite in the sense that several linguistic systems are in contact, such as learners' L1, the developing IL and the TL, and each contributes different amounts at different stages of L2 learning to the developing system of IL (Jake, 1998; Myers-Scotton, 1998; Fuller, 1999; Wei, 2009).
- 2) The mental lexicon is "mental" in the sense that it contains not only lexemes but also abstract entries, called "lemmas", for them. Lemmas for lexemes are language-specific in that different languages may share the similar lexemes, but the lemmas for particular lexemes may differ. Different from the monolingual mental lexicon, the bilingual mental lexicon contains language-specific lemmas, which are in contact in IL production (Levelt, 1989; Bock & Levelt, 1994; Wei, 2002).
- 3) Abstract lexical structure is "abstract" in the sense that it contains several discrete but interacting subsystems: lexical-conceptual structure, predicate-argument structure, and morphological realization patterns. Since lemmas are language-specific, such an abstract lexical structure in IL has different sources, such as those from learners' L1 and/or the TL (Chomsky, 1981; Jackendoff, 1990; Talmy, 1985). Abstract lexical structure is modular and can be split and recombined in novel, yet constrained ways in constructing the linguistic system underlying IL. The crucial assumption underlying this study is that parts of the abstract lexical structure from learners' L1 may influence the abstract lexical structure of the incompletely acquired TL during IL development (Myers-Scotton, 1998; Myers-Scotton & Jake, 1995; Jake, 1998; Wei, 2003, 2009, 2015).
- 4) L1 abstract lexical structure may interfere the acquisition of that of the TL. That is, learners may fall back on their L1 abstract lexical structure in order to map surface form onto functions in the TL. Their increasing familiarity with the TL abstract lexical structure will lead to a gradual fading of initially useful but inappropriate word choices or ill-formed sentences (Wei, 2000a, 2003).

Under the above assumptions, this study explores the nature and activity of the bilingual mental lexicon in IL development by investigating the role of L1 abstract lexical in L2 learning. It claims that since lemmas are language-specific, bilingual lemmas in the bilingual mental lexicon are in contact in IL

production. Learner errors or language transfer in IL production should be understood as L1 lemma transfer of learners' abstract lexical structure at each of the three abstract levels: lexical-conceptual structure, predicate-argument structure, and morphological realization patterns. As predicted, early-stage learners may transfer L1 lemmas in IL production as a learning strategy before they completely acquire the TL abstract lexical structure.

2. Bilingual Lexical Processing and Conceptual Representation

The central issue in theories of the bilingual lexicon ("the bilingual mental lexicon" is the term more recently used for some good reasons) remains the mapping of word forms and meanings, and different models make various assumptions about the strength of interlingual connections and cross-linguistic conceptual representation (Keatley, 1992; Kroll & de Groot, 1997; de Groot, 1992, 2002; Kroll & Tokowicz, 2005; Altarriba & Basnight-Brown, 2009; Jarvis, 2009; Pavlenko, 2009; Wei, 2006b).

The Concept Selection Model (CSM) (La Heij, 2005) assumes that if language-specific cues are sent to the conceptual level, TL selection occurs before lexical retrieval and during preverbalization, which makes election of the target word a much easier process. This is because once the preverbal message specifies the concept and the TL, the TL's lexical nodes receive more activation than the nontarget ones. Thus, it seems totally plausible that language selection takes place at the conceptual level. The CSM has received much support from Stroop translation tasks for proficient bilinguals (Bloem & La Heij, 2003; Bloem, Van de Boogaard, & La Heij, 2004). However, it is not clear whether the CSM also applies to less proficient L2 learners. As many research findings indicate that less proficient or early stage L2 learners may rely more on their L1 lexical-conceptual structure.

The Revised Hierarchical Model (RHM) (Kroll & Stewart, 1994) is based on two findings in research on early stage learners' interlingual connections: Translation from L1 to L2 is faster than L2 picture naming, and translation from L2 to L1 is faster than from L1 to L2. Such findings suggest that early stage learners' L2 words seem to be more strongly connected to the translation equivalents in their L1 than to concepts, and the picture-naming task seems to reveal that conceptual access takes place mainly through their L1 "lexical mediation". As predicted, as learners' L2 proficiency increases, the direct conceptual links between L2 words and concepts will become stronger and L2 learners will rely more on such "conceptual mediation" (Potter, So, Von Eckardt, & Feldman, 1984). The RHM assumes that word-to-concept connections are stronger for the L1 for less proficient L2 learners, and with increasing proficiency in the L2, the strength of word-to-concept connections for the L2 increases and the lexically mediated processing via the L1 decreases. The RHM captures the developmental nature of IL in terms of the gradual lexical-conceptual links between L1 and L2 word forms. That is, conceptual equivalence through relining between L1 and L2 word forms and lexical concepts makes the developmental change possible.

The Selection by Proficiency Model (SbPM) (Schwieter & Sunderman, 2009) tests the predictions of the CSM and the RHM in a Stroop translation task. 54 native speakers of English learning Spanish as

their L2 were divided into two more proficient vs. less proficient groups. They were asked to translate a given word from the L2 to the L1 with a distractor, such as related words, unrelated words or pictures, appearing with that word. Each participant's response time for translating a particular word was measured. The results reveal that the CSM's assumption holds for the more proficient L2 learners but not for the less proficient ones. The pattern of data for the less proficient learners supports the RHM that learners rely on lexical links to access concepts.

What becomes most relevant to the BLAM is the RHM's prediction that less proficient learners are unable to use the language cue to activate the language of production at the conceptual level. In other words, less proficient learners may rely more on their L1 in language selection at the conceptual level. The RHM claims that L1 lexical links may be needed for less proficient learners' conceptual processing, and such learners' L2 lexical links need to be sufficiently developed before they are able to directly access the lexical meaning in the L2. Following such a line of thinking, the BLAM claims that less proficient learners' activation of L1 lemmas underlying particular lexical items must be much higher than that of more proficient learners.

The Shared Asymmetrical Model (SAM) (Dong, Gui, & MacWhinney, 2005) assumes that the L1 and the L2 lexicons are asymmetrically linked to each other by sharing common conceptual elements but retaining the L1 and the L2 elements respectively. Thus, the SAM brings together cross-linguistic differences in the bilingual lexicon and the L2 vocabulary learning process. This model reflects the asymmetrical interlingual connections but does not describe the actual structure of linguistic categories and does not clarify how common and language-specific elements are conceptually represented in the bilingual lexicon, to be more specific, in the bilingual mental lexicon.

The Modified Hierarchical Model (MHM) (Pavlenko, 2009) relates conceptual representation in the bilingual lexicon to L2 vocabulary learning. The MHM claims that conceptual representations in the bilingual lexicon may be not only fully or partially shared but also fully language-specific. According to this model, language-specific categories should include not only conceptual non-equivalents but also language-specific aspects of partial conceptual equivalents. Such a recognition of language-specific lexical concepts has important implications for theories of bilingual processing and the nature and activity of the bilingual mental lexicon in L2 learning (Green, 1998; Pavlenko, 1997, 2002a, 2002b, 2003; Costa, 2005; Pavlenko & Driagina, 2007; Wei, 2006a). The MHM recognizes conceptual transfer by differentiating between semantic and conceptual levels of representation. Accordingly, it makes two claims: Semantic transfer occurs "at the point of mapping words to concepts and does not involve the structure of conceptual categories" and conceptual transfer is "the use of L2 words in accordance with L1 linguistic categories" or "the use of L1 words in accordance with L2 linguistic categories" (Pavlenko, 2009, pp. 148-149). In other words, semantic transfer is caused by inappropriate mapping, and conceptual transfer is caused by inadequate knowledge of the structure of a target lexical category (Jarvis & Pavlenko, 2008). The MHM views L2 learning as a process of conceptual restructuring for the development of target-like linguistic categories. This view offers important implications for the

study of nature and activity of the bilingual mental lexicon in L2 learning and IL development.

According to Jarvis, “a person’s knowledge of the form-related properties of a word” and “the person’s knowledge of the word’s syntactic constraints and semantic associations” are stored separately in the mental lexicon, and the latter “in turn is stored separately from the person’s conceptual knowledge” (2009, p. 99). Jarvis uses the term “lemma; in its original sense as defined by Levelt (1989) and Levelt, Roelofs, and Meyer (1999) to refer to both the syntactic and semantic properties of a word. He uses the term “lemmatic transfer” to describe lexical transfer in general and transfer of semantic and syntactic properties of words in particular. He holds that the lexical knowledge and use acquired through L1 can affect L2 learners’ mental lexicon and assumes that lexical transfer involves two mental processes on the bilingual mental lexicon: Lemmas from two or more languages are mentally represented, and lemmas underlying certain words of one language are activated by the speaker using another language. The notion of lemma transfer becomes crucial to the BLAM.

In addition to the notion of lemma transfer as assumed by Jarvis (2009), Grosjean’s notion of “language mode” also becomes crucial to the BLAM. According to Grosjean (1999), a bilingual’s language mode at a particular moment can be anywhere along a continuum from completely monolingual to completely bilingual depending on the current speech context, the nature of the task being performed, the stimuli, the interlocutors being involved, etc. This implies that a bilingual’s language mode can be somewhere between the two extremes of the continuum, such that the nonselected language is never completely inactive in the bilingual’s mind. Thus, the degree of the activation of the languages becomes relevant to the study of the nature and activity of the bilingual mental lexicon in L2 learning and IL development.

Along the above lines of thinking about nature of the bilingual mental lexicon in L2 lexical learning and the levels of the activation of the bilingual language mode in speech production, by adopting the BLAM, this study investigates why and how L1 abstract lexical structure may be activated in L2 learning and explores sources of language transfer beyond the surface level.

3. The Bilingual Mental Lexicon and Sources of Abstract Lexical Structure

As briefly introduced earlier, the mental lexicon contains its lemma information about the word’s meaning, and about the word’s syntax and morphology which is necessary for constructing its syntactic environment. For example, the lemmas for *he* requires the word to be used of a male and that any following main verb in the present tense must be inflected with *-s* for the subject-verb agreement; the lemmas for *bite* require a subject that expresses the thematic role of AGENT and an object that expresses the thematic role of PATIENT, and these elements appear in a particular order; the lemmas for *give* requires a subject that expresses the thematic role of AGENT, a direct object that expresses the thematic role of RECIPIENT, and an indirect object that expresses the thematic role of THEME, and these elements appear in two possible orders: Subject-Indirect Object-Direct Object (e.g., *The boy gave his friend a gift*) or Subject-Direct Object-Indirect Object introduced by a preposition (e.g., *The boy*

gave a gift to his friend). The lemma information about each verb is traditionally called a “sub categorization frame” for that verb. The lemma also contains information about the word’s composition in terms of phonological segments and its syllable and accent structure, and it may contain information about the word’s register, the kind of discourse it typically enters into, and about its pragmatics, stylistics, and affect. “It is in the lemmas of the mental lexicon that conceptual information is linked to grammatical function” (Levelt, 1989, p. 162). To be more specific, conceptual information about lexical entries is provided as prelexical feature bundles in the mental lexicon that contain information about the three subsystems of abstract lexical structure: “lexical-conceptual structure” conflating universally available semantic and pragmatic information, “predicate-argument structure” specifying the properties of verbs in terms of their sub categorization frames, how many arguments they may take, and what thematic role each argument receives, and “morphological realization patterns” spelling out surface devices for word order, agreement, tense/aspect/voice/mood marking, etc. As generally assumed, lemmas are language-specific and from interconnections between the lexical features and conceptual features, which map to and from syntax (Kempen & Huijbers, 1983; Levelt, 1989, 1995; Roelofs, 1992; Bock & Levelt, 1994; Kroll & de Groot, 1997; Myers-Scotton & Jake, 2000; Wei, 2002).

As introduced earlier, lexical structure is abstract because lexemes have more abstract elements than surface lexical items and such abstract elements are contained in abstract and complex lexical structure that lexemes have (Talmy, 1985; Rappaport & Levin, 1998; Pinker, 1989a, 1989b; Levelt, 1989; Jackendoff, 1990; Bock & Levelt, 1994; Myers-Scotton & Jake, 1995; Jake, 1998; Fuller, 1999; Wei, 2001b, 2002, 2003). The three subsystems in the abstract lexical structure play their respective and interactive roles in language production. Lexical-conceptual structure maps onto predicate-argument structure because the theta criterion requires the mapping of lexical-conceptual structure (i.e., thematic structure) onto predicate-argument structure (i.e., syntactic structure). In addition to the thematic structure, the lexical-conceptual structure of a particular lexeme contains its semantic and pragmatic feature bundles and pointers to other lexemes with which it occurs (Levelt, 1989; Bock & Levelt, 1994). Morphological realization patterns need to be included as one of the subsystems of abstract lexical structure (Myers-Scotton & Jake, 1995) because the predicate-argument structure of a particular lexical entry specifies that a thematic role is assigned, and the morphological realization patterns encode the realization of a particular morpheme/word order at the surface level. In other words, a particular predicate-argument structure is realized in a particular morphological realization pattern(s). For example, in English, the morphological realization patterns encode the realization of the thematic role of THEME as an object of a verb: *give a gift to his friend*, a verb-satellite: *give up the attempt/give the attempt up*, a verb + preposition: *listen to the music*, a noun + preposition: *students of computer science*, or an adjective + preposition: *very proud of her achievement*. Regarding the details about abstract and complex lexical structure in relation to the speech production process, see the speech production model of Levelt (1989) and Bock and Levelt (1994), the bilingual production model of Myers-Scotton and Jake (1995), and the BLAM of Wei (2002).

The abstract lexical structure in the bilingual mental lexicon and the composite nature of the developing IL system offer three implications for this study. The first is the implication that if IL is regarded as an outcome of languages in contact in L2 learning, IL itself is a composite because learners may not have complete access to their intended TL. If so, learners' knowledge of the TL, which frames constituents, is incomplete. Thus, the composite IL may contain elements of the abstract lexical structure from learners' L1 and the TL, resulting in learners' current IL construction. The second is the implication that if IL is an incomplete linguistic system, it lacks certain aspects of the abstract and complex lexical structure of the TL. Consequently, learners may turn back on their L1 abstract lexical structure and/or their partially acquired TL abstract and complex lexical structure in order to frame IL constituents. The third is the implication that language transfer in L2 learning should be understood as transfer of L1 abstract lexical structure, to be more specific, as L1 lemma transfer in the three subsystems: lexical-conceptual structure, predicate-argument structure, and morphological realization patterns. Since IL is a developing linguistic system, such a transfer becomes necessary for learners to fill particular gaps in the incompletely acquired TL lexical items.

4. L1 Abstract Lexical Structure in IL Production

In Levelt's model (1989), an incomplete L2 knowledge base is accounted for by assuming that some of the L2 lexical items are not yet fully specified in terms of the semantic, syntactic, and phonological information they contain, and the lack of automaticity is simply accounted for by assuming serial, step-by-step processing rather than parallel processing at the morph phonological and articulatory levels. However, Levelt's model is designed for the monolingual speech production process and is insufficient to account for language transfer in L2 learning. Without investigating the nature and activity of the bilingual mental lexicon, sources of language transfer can not be fully accounted for. This study assumes that an incomplete L2 knowledge base also contains language-specific lemmas for the lexical items in the languages known to learners. This means that because of its composite nature, the bilingual mental lexicon is not the same as the monolingual mental lexicon. Thus, it becomes problematic for monolingual models of speech production to deal with the characteristics of L2 production. As commonly observed in SLA, L2 production often carries traces of learners' L1. To account for language transfer in L2 learning, it becomes necessary to explore the nature and activity of the bilingual mental lexicon with special reference to language-specific lemma activation and its consequences in L2 production. This study attempts to account for language transfer in the three subsystems of abstract lexical structure: lexical-conceptual structure, predicate-argument structure, and morphological realization patterns.

4.1 L1 Lexical-Conceptual Structure in IL Production

The first level of abstract lexical structure is recognized as "lexical-conceptual structure". The conceptual structure is assumed not to be language-specific (Levelt, 1989; Bierwisch & Schreuder, 1992), but languages do not lexicalize the components of a given conceptual structure in the same way

(Talmy, 1985; Jackendoff, 1991; Levin & Pinker, 1991). This is because the lemmas for certain lexemes in the bilingual mental lexicon are language-specific. It has been well observed that the lexical-conceptual structure of an IL lexeme may contain certain semantic/pragmatic features from an L1 counterpart. Because of the nature of IL as a developing linguistic system, some of the L2 lexical items that learners have learned are not yet fully specified in terms of the semantic, pragmatic, syntactic and/or morphological information that they contain. Thus, when learners' knowledge of the L2 lexical items is incomplete or when learners' L2 lexical items are not sufficient enough to express their intended meanings, they may turn to equivalent or similar lexical items in their L1 at a certain point in their IL production (Wei, 1995; Dewaele, 1998; Jake, 1998). If we assume that the preverbal message is not language-specific, then we are forced to assume that learners' L1 lexicalization patterns may be enforced at a certain point in IL production (Talmy, 1985; Choi & Bowerman, 1991; Wei, 2015).

If we assume that bilingual lemmas are language specific, we may also assume that such language-specific lemmas can be activated in IL production, as often observed in the bilingual speech production process involved in codeswitching (Wei, 2002). If this happens, transfer of L1 lexical-conceptual structure is predicted to occur, resulting in inappropriate lexical choices in IL production.

[1] My husband doesn't **wash** ... never **wash** the dishes.

[2] When I'm sick, when I've cold I **eat** medicine, cold medicine.

[3] In Japan all students **do** English **study** in school.

[4] In Japan students **do** many tests and exams in class.

(TL: English, with Japanese L1; Wei, 2003, p. 65)

In [1], the speaker uses "wash" rather than "do" as used in English based on the Japanese lemma for the verb in question. It seems obvious that the speaker activates the Japanese lemma before knowing the idiomatic collocation of "do the dishes". In [2], the speaker produces "eat medicine" rather than "take medicine" based on the Japanese lemma for the same concept. In [3], the speaker relies on the Japanese lemma for the lexical-conceptual structure of the lexeme "study" introduced by the verb "do" and the noun expressing the activity itself. In [4], the speaker produces "do many tests and exams" rather than "take many tests and exams" based on the Japanese lemma for the verb in question to express the same meaning.

[5] She now **do** meal.

[6] **Open** air condition.

[7] You **close** light.

[8] You come my **house**?

(TL: English, with Chinese L1; Wei, 1995)

[9] There **have** English class, free. You go?

(TL: English, with Chinese L1, Wei, 1996a, p. 423)

In [5], the speaker uses "do" based on the Chinese lemma for "do", which expresses several concepts

such as “cook”, “play”, “work”, “write”, etc. In [6], the speaker uses “open” rather than “turn on” based on the Chinese lemma for “open”, which means “turn on” or “start”. In [7], the speaker uses “close” rather than “turn off” based on the Chinese lemma for “close”, which means “turn off”, “stop” or “shut”. In [8], the speaker uses “house” rather than “home” based on the Chinese lemma for “house”, which means “apartment”, “building” or “home”, depending on the meaning as intended by the speaker. In [9], the speaker uses “have” based on the Chinese lemma for “have”, which means “possess” or “exist”.

[10] Yesterday in library I **look** Japanese magazine.

(TL: English, with Japanese L1, Wei, 1996a, p. 423)

In [10], the speaker uses “look” based on the Japanese lemma for “look”, which means, “read”, “see”, “look at”, “visit” or “observe”.

[11] watashiwamainichijuuni ji nihirugohangaaru.

I PART/TOP every day 12 o'clock at lunch PART/NOM have

“I have lunch at 12 o'clock every day.”

[12] hahawashokuji no atodeshokki o suru.

mother PART/TOP meal PART/POSS after dish PART/OBJ do

“(My) mother do the dishes after the meal.”

[13] karewa shaken o toru.

he PART/TOP test PART/OBJ take

“He will take the test.”

[14] yoruanatanidenwa o ageru.

evening you to phone PART/OBJ give

“(I) will give you a call in the evening.”

[15] watashiwatenisu o asobu.

I PART/TOP tennis PART/OBJ play

“I play tennis.” (TL: Japanese, with English L1; Wei, 2003, p. 65)

In [11], the speaker uses the English concept “aru (have)” for “have lunch” rather than the Japanese equivalent “taberu (eat)” for the same concept. In [12], the speaker actually translates the English collocated expression “do the dishes” into Japanese by using “suru (do)” rather than “arau (wash)”. In [13], the speaker uses the verb “toru (take)” rather than “ukeru (receive)” for the equivalent English expression “take the test”. In [14], the speaker translates the concept into Japanese by using the verb “ageru (give)” rather than “kakeru” as required in Japanese. In [15], the speaker uses the verb “asobu (play)” based on the English expression rather than “suru (do)” as used in combination with other relevant nouns.

[16] a. In the late of Maracaibo was discovered the oil.

b. I have mentioned that in my country does not appear to exist any constraint on a woman's right to choose a husband.

c. And then at least comes the great day.

(TL: English, with Spanish L1; Rutherford, 1989, p. 178)

In [16], a discourse-pragmatic feature projects the verb-subject order as a structure to focus new information in certain kinds of grammatical structure in Spanish. It seems that the learner has not acquired a particular lexeme “there” in English, and the structure it introduces (i.e., the noun phrase is introduced by a nonthematic pronoun in a “there” existential construction). The gap between Spanish and English is not only pragmatic but also lexical and syntactic.

[17] I go to the **oven** in the morning to buy bread.

[18] My father is a **long** thin man.

(TL: English, with Chinese L1; Jiang, 2000, p. 61)

In [17], the learner uses “oven” (a compartment, as in a stove, for baking or heating) to replace “bakery” (an establishment for baking or selling bread, cake, etc.). It seems that the learner has not learned “bakery” or does not make a lexical-conceptual distinction between “oven” and “bakery”. Also, the potential source of such a learner error may be that the concept of “oven” and the concept of “bakery” are both relatively new to native speakers of Chinese, resulting in some lexical-conceptual gaps between English and Chinese. In [18], the learner uses “long” rather than “tall” for the possible reason that the learner is not lexical-conceptually aware of the distinction between the two adjectives in English.

Talmy (1985), Pinker (1989a, 1989b), Jake (1994), and Wei (1994, 1996a, 1996b) find the evidence that learners acquire certain TL content morphemes first which match up possible L1 conflation categories of semantic notions (i.e., several semantic notions are conflated in a single lexical item). The above typical instances of L1 lexical-conceptual structure in IL production reveal that the lexical-conceptual structure of the TL abstract lexical structure is not available to early-stage or beginning learners. In IL production, learners, of course, try to use the TL lexical items, but the selection of those items may be caused by their incomplete knowledge of the TL lexical-conceptual structure of particular lexemes or based on their L1 lexical-conceptual structure.

Pavlenko assumes that “at the center of L2 vocabulary learning are the processes of *conceptual restructuring*, and ... *conceptual development* ...” (2009, p. 141). Accordingly, “conceptual restructuring” requires learners to readjust the lexical category structure and boundaries in accordance with the constraints of the TL category, and “conceptual development” requires learners to develop lexical representations similar to those of native speakers of the TL (Pavlenko, 1997, 2003, 2009; Pavlenko & Driagina, 2007).

Jiang’s psycholinguistic study of L2 vocabulary learning (2000) reveals two processing constraints on the lexical representational features of L2 vocabulary learning. The first is the use of L2 words tends to be affected by the L1 lemma information in the bilingual mental lexicon, and the second is appropriate L2 morphological specifications become a conscious process. Wei’s BLAM (2006a, 2006b) claims that although learners use the TL lexical items, the selection of those lexical items may be based on the

activation of language-specific lemmas in the bilingual mental lexicon. In other words, the activated language-specific lemmas for the universal concepts based on learners' L1 lexical-conceptual structure may activate or retrieve the TL lexical items in an inappropriate manner. According to Wei (2006a, 2009, 2015, 2020), L1 lexical-conceptual structure in IL production should be understood as cross-linguistic transfer at the lemma level.

4.2 L1 Predicate-Argument Structure in IL Production

The second level of abstract lexical structure is recognized as "predicate-argument structure". Predicate-argument structure is defined as the number of arguments as required by a particular verb and the thematic role(s) as assigned by the verb to each argument(s). In addition to transfer of L1 lexical-conceptual structure, because of their incomplete knowledge of certain TL lexical items, although they may choose the right TL verbs, early L2 learners may not know the predicate-argument structure as required by those verbs and thus draw on their L1 predicate-argument structure, resulting in inappropriate use of those verbs in IL production (Wei, 1996a, 1996b, 2009). It has also been observed that an incomplete TL lexical-conceptual structure may map onto an incomplete TL predicate-argument structure, one inducing the other. For example,

[19] He is funny. His words in class **laugh** me.

[20] I can **wait** you here.

[21] Why you **ask** many questions for me?

(TL: English, with Japanese L1; Wei, 1995)

[22] Wait. I first **fill** water in glass. Wait.

[23] He busy. He not **help** my homework.

[24] Parent **provide** money to me.

(TL: English, with Japanese L1; Wei, 1996a, p. 422)

[25] Will you give your phone number?

[26] My brother also **graduated** New York University. Last year he **graduated** that university.

(TL: English, with Japanese L1; Wei, 2003, p. 66)

In [19], the semantic feature of "cause" is incorrectly extended. The resulting causative lexical-conceptual structure affects the predicate-argument structure and its morphological realization patterns. In this example, the "cause" is "me", the PATIENT, which should be "I", the AGENT, in the TL, and "his words", the "causer", should be a prepositional stimulus ("at his words") in the TL. In [20], the THEME "you" is introduced by "wait" without the preposition "for" as required in the TL, since the Japanese counterpart verb "Matsu (wait)" can take its internal object. In [21], the GOAL "me" is introduced in a prepositional phrase, structurally subordinate to the verb internal object "many questions", the THEME. This predicate-argument structure reflects the Japanese counterpart verb "suru (ask)" which projects the GOAL as a postposition "ni", rather than the verb internal object indicated by the particle "o". In [22], "fill" assigns the THEME to "water", rather than assigning the PATIENT to "glass" and introducing the THEME by the preposition with', and "glass" is assigned the LOCATION

by the preposition “in”, rather than the PATIENT as required in the TL. In [23], the preposition “with” as required in the TL does not appear to introduce the THEME, since in Japanese the verb “help” itself can assign the thematic role directly to the object. In [24], “provide” assigns the THEME, rather than the RECIPIENT, to the object, violating the TL predicate-argument structure where the THEME is introduced by the preposition “with”. In [25], the speaker employs the Japanese predicate-argument structure for the verb “give” rather than the English indirect object dative or double object construction for the same verb. While in Japanese the verb “give” does not require an explicit GOAL or RECIPIENT, in English both the THEME and the GOAL/RECIPIENT must appear either in the indirect object dative construction (e.g., Will you give your phone number (the THEME) to me (the GOAL/RECIPIENT)?) or in the double object dative construction (e.g., Will you give me (the GOAL/RECIPIENT) your phone number (the THEME)?). In [26], the speaker follows the Japanese predicate-argument structure for the verb “graduate” where the SOURCE “New York University/that university” is introduced without the intervention of the preposition “from”.

[27] Please **help** me look my child.

[28] You’re **listening** music?

(TL: English, with Chinese L1; Wei, 1995)

[29] Today he **help** dinner.

[30] She **cost** me hundred dollar, ... bad tooth.

[31] Yes ... teacher **report** parent grade

(TL: English, with Chinese L1; Wei, 1996a, p. 422).

In [27], the preposition “after” does not appear to introduce the THEME “my child”, since the Chinese counterpart verb “zhaoliao (look after)” does not need a preposition to introduce the THEME. Again, in [28], the THEME “music” is the internal object of the verb “listen”, without being introduced by the preposition “to” as required in the TL, since the Chinese counterpart verb “ting (listen)” does not need a preposition to introduce the THEME. In [29], “help” assigns the THEME directly to the object without the preposition “with” as required in the TL, since in Chinese, no preposition is needed for such a thematic role assignment. In [30], “cost” takes the AGENT (the person who spends the money) as the subject, rather than the THEME (the thing on which the money is spent), but such a predicate-argument structure for the verb “cost” is very normal in Chinese. In [31], “report” assigns the GOAL, rather than the THEME, to the object in the double object dative construction, but this is a normal predicate-argument structure for the verb “report” in Chinese.

[32] densha o tottegakkoee iku.

train PART/OBJ take school go

“(I) take the train to go to school.”

[33] hahawashoppingiku.

mother PART/TOP shopping go

“(My) mother goes shopping.”

[34] gozenchuukare o yonda.

in the morning him PART/OBJ called

“(I) called him in the morning.”

[35] kerenouchi made moseru o ageta.

his home to ride PART/OBJ gave

“(I) gave him a ride home.”

(TL: Japanese, with English L1; Wei, 2003, pp. 67-68).

In [32], the speaker uses the English predicate-argument structure for the verb “toru/totte (take)” where the means of transportation “densha (train)” is introduced as the THEME (the direct object). However, in Japanese “densha” must be introduced as the LOCATIVE by the verb “noru/note (take)” in a prepositional phrase headed by “ni”:

densha ni nottegakkoo e iku.

train in take school to go

“(I) take the train to go to school.”

In [33], the speaker actually translates the English expression “go shopping” into Japanese, violating the Japanese predicate-argument structure for the verb “iku (go)”. While in English “shopping” is introduced as the GOAL by the verb “go”, in Japanese “shopping (shopping)” is introduced as the GOAL in the prepositional phrase headed by “ni”:

hahawashopping niiku.

mother PART/TOP shopping forgo

“(My) mother goes shopping.”

In [34], the speaker employs the English predicate-argument structure for the verb “call (yoru/yonda)” where the semantic features of “communicate with by telephone” are conflated in the verb “call”. While in English the object of “call” is the RECIPIENT, in Japanese the RECIPIENT must be introduced by a preposition and the phone-call itself must be introduced as the object, the THEME, by a specific verb such as “kakeru” or “suru”:

gozenchuukerenidenwa o kaketa (or: denwa o shita.)

in the morning him in phone PART/OBJ called (or: phone PART/OBJ did.)

“(I) called him in the morning.”

In [35], the speaker actually translates the English expression “give a ride” into Japanese, violating the Japanese predicate-argument structure. While in English “ride (noseru)” is introduced as the object, the THEME, by the verb “give (ageru)”, in Japanese the means of transportation must be introduced by a preposition as the INSTRUMENT rather than the THEME:

kereno uchi made kuruma de okutteageta.

his home to car by sending gave

“(I) gave him a ride home.”

(Literally, “I sent him to his home by car.)

The above examples show that during the early stage of L2 learning how L1 predicate-argument structures affect IL production and contribute to the developing linguistic system. As commonly observed, learners' "target" is always and should be the L2 abstract lexical structure, in this case, the predicate-argument structure as one of its subsystems, but the IL developing system is predictably a composite of structures from multiple sources. These sources may include not only L1 lexical-conceptual structure or the intended TL lexical-conceptual structure but also L1 predicate-argument structure and incompletely acquired ones in the TL (Myers-Scotton, 1994; Jake, 1998; Wei, 1996a, 1996b, 2009). As one of the crucial assumptions underlying the BLAM, although learners produce the TL lexical items, the L1 lemmas for some of those lexical items can be activated in IL production.

4.3 L1 Morphological Realization Patterns in IL Production

The third level of abstract lexical structure is recognized as "morphological realization patterns". Morphological realization patterns, at the positional level, deal with surface devices for word order, case, agreement, tense/aspect/voice/mood marking, etc. Like the other two levels of abstract lexical structure, transfer of L1 morphological realization patterns may occur in early L2 learners' IL production.

[36] I English not speak.

[37] ...because I study English, just more study English.

[38] My husband in USC study.

(TL: English, with Chinese L1; Wei, 1995)

[39] Outside cold, inside warm.

[40] (on the phone) Hello ... she not in home. She at outside at playground playing You come? You not come? I tell her. Bye.

[41] Go swim? No. Parent no go, you no go swim.

[42] You go too? We have three ticket.

[43] You not go library, I go.

[44] Tomorrow I no go work. I sick.

(TL: English, with Chinese L1; Wei, 1996b, p. 421)

Though the Chinese basic word order is Subject-Verb-Object, any constituent can be moved to the sentence initial position or before the verb for topicalization or emphasis. The above examples show that, among other things, though early-stage Chinese learners of English try to use L2 content morphemes to express their intended meanings, they employ their L1 morphological realization patterns in IL production (Wei, 1996b, 2000a). In [36], the direct object "English" is placed before the verb. In [37], "more" appears before the verb phrase "study English". In [38], the prepositional phrase "in USC" is placed between the subject and the verb. Depending on the speech context, in Chinese any constituent or element, such as the copula, the AGENT or the THEME can be left out, as shown in [39],

[40] and [41]. In Chinese morphological realization patterns, there are few auxiliary verbs and no system morphemes for 3rd person singular, plural, and tense/aspect marking. Thus, in Chinese grammatical concepts, such as tense and aspect are not morphologically realized but implicitly expressed, as in [40], [41], [42], and [43], or realized by other means, such as adverbials of time, as in [44]; negation is realized by placing the negative particle “not/no” immediately before the verb (i.e., no auxiliary is available for the purpose in Chinese), as in [36], [40], [41], [43] and [44]; interrogative is realized by rising intonation, as in [40], [41] and [42]; and plural is realized by specific cardinal numbers, as in [42].

[45] In Japan student English junior high school start.

[46] I in Japan my city like.

(TL: English, with Japanese L1; Wei, 1995)

[47] I from Japan arrive, now live in room ... apartment, I. friend and EPI teacher. EPI teacher help me English

speak ... kind, nice teacher.

[48] Speak English difficult. I English ... speak not well.

[49] Here everything expensive. I everyday use bike. Taxi? No. I live not far.

[50] I go to party with friend tomorrow. We together cook, interesting.

(TL: English, with Japanese L1; Wei, 1996a, p. 421)

[51] I every day by bus go to school.

[52] Tomorrow to New York we'll go with some friends

[53] Sorry. Only little English I know.

(TL: English, with Japanese L1; Wei, 2003 p. 69)

Early-stage Japanese learners of English also seem to use L2 content morphemes but tend to follow their L1 morphological realization patterns. The Japanese basic word order is Subject-Object-Verb, which is employed in [45], [46], [47] and [48], where any constituent is placed before the verb; negation is realized by placing the negative element after the verb, as in [48] and [49]. The Japanese morphological realization patterns do not possess auxiliary verbs for tense/aspect marking, negation, and other grammatical functions as required in English, such as certain determiners as in [49] and [50], 3rd person singular as in [47], and plural as in [50]. In [51], the prepositional phrase “by bus” is placed before the verb phrase “go to school”. This is part of the typical Japanese word order where everything else goes before the verb or verb phrase, in addition to the verb final structure. Again in [52], the prepositional phrase “to New York” is placed before the predicate verb “go”. Although the prepositional phrase “with some friends” is in the position as it usually appears in the English word order, the whole sentence sounds awkward or nonnative like because of the misplace of the prepositional phrase “to New York”. Again, the sentence in [53] reflects the Japanese verb final word order, where the object is placed before the predicate verb.

[54] watashitachiwashigotoniikumainich.

we PART/TOP work to go every day

“We go to work every day.”

[55] watashiwamooukakiowattawatashinorepotoo.

I PART/TOP already finished my paper

“I already finished my paper.”

“I already finished my paper.”

(TL: Japanese, with English L1; Wei, 2003, p. 69)

In [54], the sentence basically follows the Japanese verb final word order, but the adverbial of time “mainich (everyday)” is placed in the sentence final position, which is now allowed in Japanese. In [55], the sentential elements are arranged in the typical English word order where the object follows the predicate verb.

The above typical examples show that during the early-stage of L2 learning, in addition to the employment of their L1 lexical-conceptual structure and predicate-argument structure, learners may employ their L1 morphological realization patterns in IL production to fill a “gap” in this subsystem of the abstract lexical structure as projected by the developing linguistic system.

5. Conclusion

This paper describes and explains sources of language transfer in L2 learning by exploring the nature and activity of the bilingual mental lexicon. Based on the BLAM, the nature of learner errors is defined in terms of the composite nature of the bilingual mental lexicon, and sources of learner errors are described and explained in terms of activation of language-specific lemmas in the bilingual mental lexicon during the IL speech production process.

This study claims that learners’ incomplete knowledge of their L2 includes their incomplete knowledge of lemma specifications for the abstract lexical structure of the TL. This is because lemmas contain information about the three subsystems of the abstract lexical structure: lexical-conceptual structure, predicate-argument structure, and morphological realization patterns. This study further claims that lemmas in the bilingual mental lexicon are language-specific, and learners may over generalize lemma specifications for particular lexemes based on their previously learned L1 abstract lexical structure. Thus, learners may activate their L1 lemmas for particular TL lexemes during the IL production process. If this happens, learners’ selection or retrieval of the TL lexical items is influenced by learners’ L1 abstract lexical structure at each level of the subsystems.

The typical examples of learners’ L1 lexical-conceptual structure, predicate-argument structure, and morphological realization patterns in IL production discussed and explained in this provide some strong evidence that the phenomena of language transfer in L2 learning need to be described and explained beyond any surface level, and language transfer should be understood at language-specific lemma transfer in IL production (Jake, 1998; Wei, 2000a, 2000b). Lexicalization and grammaticalization patterns are language-specific and must be learned as such.

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