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Interlanguage Driven by Bilingual Abstract Lexical Structure

Longxing Wei[1]

[1] Department of Linguistics, Montclair State University, New Jersey, USA

Abstract

This study explores the nature of interlanguage (IL) in terms of bilingual abstract lexical structure and its role in the formulation and development of IL as learners' developing linguistic system. Adopting the Bilingual Lemma Activation Model (BLAM) (Wei, 2002, 2003), it assumes that IL is a composite developing linguistic system because at different times different linguistic systems are in contact, such as learners' first language (L1), the developing IL, and the target language (TL), and each contributes different amounts to the developing system of IL. The important claim of this study is that the mental lexicon contains abstract entries, called "lemmas", which contain pieces of information about particular lexemes, and the bilingual mental lexicon contains language-specific lemmas, which are in contact in IL speech production. The other important claim of this study is that IL is fundamentally driven by bilingual abstract lexical structure, which contains several discrete but interacting subsystems: lexical-conceptual structure, predicate-argument structure, and morphological realization patterns, and such an abstract lexical structure in IL may have different sources, such as those from learners' L1 and/or the TL. The typical instances of learner errors discussed in this study offer some evidence that IL is a composite developing linguistic system.

Keywords

abstract lexical structure, bilingual, mental lexicon, lemma, composite, learner error

1. Introduction

In second language acquisition (SLA) research, much attention has been paid to cross-linguistic influence in second language (L2) learning, and various opposing theories and models have been proposed to account for the nature and sources of language transfer or learner errors. Some researchers who (e.g., Kellerman & Sharwood Smith, 1986; Færch & Kasper, 1987; Ringbom, 1987; Odlin, 1989; Dechert & Raupach, 1989; Gass & Selinker, 1992; Gass, 1996) now believe that it is not incompatible to consider two views regarding the processes of SLA. The fist view as advocated by Lado (1957) is that learners tend to utilize their L1 knowledge and other languages known to them, and the second

view as advocated by Dulay, Burt, and Krashen (1982) is that learners test the hypotheses formed on the basis of the available L2 data, that is, they always try to use some newly acquired L2 knowledge. Other researchers (e.g., Selinker, 1972; Eubank, Selinker, & Sharwood Smith, 1995) now assume that SLA involves at least three linguistic systems: learners' L1, TL and IL (i.e., the developing learner variety). Some other more recent researchers (e.g., Jake, 1998; Fuller, 1999; Myers-Scotton & Jake 2000; Wei, 2000a, 2009c) propose an explanatory account of the structural sources of IL. Along these recent lines of thinking, Wei (2002, 2003) proposes the Bilingual Lemma Activation Model (BLAM) to account for the developing nature of IL in relation to sources of language transfer beyond surface levels of observation and description.

To make IL studies descriptively and explanatorily adequate, The BLAM considers some essential questions to start with: If learners build up and revise the developing or interim linguistic system by gradually increasing the complexity of the TL system, what is the origin of IL? If the TL is not sufficiently known to learners, how are the TL items lexically projected and morphosyntactically realized? Is there evidence that learners may fall back on their L1 lexical and morphosyntactic procedures and then incrementally move toward the ones as required in the TL? To answers such questions, the BLAM makes several assumptions about the nature and activity of the bilingual mental lexicon during IL development, and these assumptions are made at a rather abstract level.

This study introduces some essential findings and implications of bilingual lexical and conceptual representation for understating the nature of the bilingual mental lexicon, lays out the theoretical assumptions about the abstract nature and activity of the bilingual mental lexicon as proposed in the BLAM, applies the BLAM to the description and explanation of some typical IL performance data, and offers some implications for IL studies.

2. Implications of Bilingual Lexical Processing and Conceptual Representation

Researchers have explored how cross-linguistic differences affect bilingual lexical processing and conceptual representation. One of the essential questions is whether the bilingual's two lexicons are linked to a shared conceptual store or two separate ones. One of the central issues remaining open in theories and research is how word forms and meanings are mapped in the bilingual lexicon as different models make various assumptions about the strength and interlingual connections and cross-linguistic conceptual representation. The BLAM draws on some outstanding models which are directly relevant to the current study of the nature and activity of the bilingual mental lexicon as a driving force for IL as a developing linguistic system.

Kroll and Stewart (1994) propose the Revised Hierarchical Model (RHM) to find how less proficient L2 learners retrieve lexical items in speech production. Two findings on early-stage learners' interlingual connections offer implications of bilingual lexical processing conceptual representation. One finding is that early stage learners can translate from L1 to L2 faster than do L2 picture naming, and the other finding is that they can translate from L1 to L1 faster than from L1 to L2. Thus, early

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stage learners' L1 words seem to be more strongly connected to the translation equivalents in their L1 than to concepts, and, as revealed in the picture-naming task, conceptual access takes place mainly through their L1 "lexical mediation". As predicted, as learners' L2 proficiency increases, the direct conceptual links between L1 words and concepts will become stronger and learners will rely more on such "conceptual mediation". The crucial assumption underlying the RHM is 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 offers the implication that conceptual equivalence through relinking between L1 and L2 word forms and lexical concepts, that is, the gradual lexical-conceptual links, makes the developmental change possible. The weakness of the RHM is that it assumes such a unified and stable conceptual store in learners' mental lexicon but ignores partial equivalence or non-equivalence between L1 and L2 lexical concepts. Consequently, the RHM is too perfect to allow us to trace the sources of learners' non-target-like performance or learner errors. What becomes directly relevant to the BLAM is the RHM's prediction that less proficient learners may reply more on their L1 in language selection at the conceptual level. According to the RHM, L1 lexical links may be needed for less proficient learners' conceptual processing because such learners' L2 lexical links need to be sufficiently developed before they are able to directly access the L2 lexical meanings. According to the BLAM, early-stage learners' relative activation of L1 lemmas underlying particular lexical items is higher in IL production, and thus more learner errors will result.

La Heij (2005) proposes the Concept Selection Model (CSM) to find how lexical selection proceeds in bilinguals. This model assumes that selection of the target word becomes a much easier process once language-specific cues are sent to the conceptual level, that is, TL must be activated before lexical retrieval and during preverbalization. In other words, if the preverbal message specifies the concept and the TL, the TL's lexical nodes receive more activation than the nontarget ones. The CSM applies to relatively proficient L2 learners (Bloem & La Heij, 2003; Bloem, Van den Boogaad, & La Heij, 2004), but it is not clear whether it also applies to less proficient L2 learners.

Dong, Gui, and MacWhinney (2005) proposes the Shared Asymmetrical Model (SAM) to describe the process of L2 vocabulary learning and bilingual performance. This model 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. The SAM reflects the asymmetrical interlingual connections. Directly relevant to the BLAM is this model's motivation to bring together cross-linguistic differences in the bilingual lexicon and the L2 vocabulary learning process though it does not clarify how common and language-specific elements are conceptually represented in the bilingual lexicon.

Pavlenko (2009) proposes the Modified Hierarchical Model (MHM) to relate conceptual representation in the bilingual lexicon to L2 vocabulary learning. This model claims that conceptual representations in the bilingual lexicon may be not only fully or partially shared but also fully language-specific. It identifies language-specific categories in terms of both conceptual non-equivalents and

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language-specific aspects of partial conceptual equivalents. Its recognition of language-specific lexical concepts has important implications for theories of bilingual lexical processing in L2 learning (Green, 1998; Pavlenco, 1997, 2002a, 2000b, 2003; Costa, 2005; Pavlenko & Driagina, 2007) and the nature and activity of the bilingual mental lexicon in IL development (Wei, 2009c, 2015). The MHM further claims that "semantic transfer" occurs "at the point of mapping words to concepts and does not involve the structure of conceptual categories" (i.e., inappropriate mapping (Jarvis & Pavlenko, 2008), 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" (i.e., inadequate knowledge of the structure of a target lexical category) (Pavlenko, 2009, pp. 148-149). Such a differentiation between semantic and conceptual transfer also has important implications for the study of language transfer in general and sources of language transfer in particular.

L2 vocabulary learning is commonly recognized as one of the most critical components of SLA. Bialystok and Sharwood Smith (1985) suggest that learners' L2 "lexical knowledge" and "lexical control" in speech production are related but not the same. This implicates that there may be a gap between the two. As commonly and frequently observed, learners' L2 lexical knowledge tends to be incomplete, and learners may not be able to put the L2 lexical knowledge as acquired into use during L2 speech production. Similarly, Palmberg (1990) views foreign language lexical knowledge as a continuum from understanding the meaning of a word to activating the word in real speech production.

Regarding the mental lexicon, Jarvis assumes that "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). Regarding the bilingual mental lexicon, Jarvis claims that the lexical knowledge and use acquired through L1 can affect L2 learners' mental lexicon. In his study of "lexical-semantic and lexico-syntactic transfer" (2009, p. 101), Jarvis uses the term "lemma" in its original sense as defined by Levelt (1989) that it refers to both the syntactic and semantic properties of a word. Most relevant to the BLAM is the notion of "lemmatic transfer" that Jarvis uses to describe lexical transfer in general and transfer of semantic and syntactic properties of words in particular. Thus, lemmatic transfer specifically refers to two mental processes in the bilingual mental lexicon as involved in lexical transfer: "learned cross-linguistic associations" and "processing interference" (Jarvis, 2009, pp. 102-103). The first mental process involves mental representations of lemmas from two or more languages known to learners, and the second mental process arises when lemmas underlying certain words of one language may be activated in learners' speech production in another language.

What also becomes most relevant to the BLAM is Grosjean's assumption about the nature and activity of the bilingual language mode in speech production. 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 several factors, such as the current speech context, the nature of the task being performed, the stimuli, the discourse participants or interlocutors being

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involved and so forth. Such a notion of the bilingual language mode continuum implies that between the two extremes, the nonselected language is actually never completely inactive in the bilingual's mind. Regarding the degree of activation of individual words within the nonselected or deactivated language, de Bot assumes that the degree of activation of a language can affect the degree of activation of a word or a set of words in that language. This implies that a bilingual's languages may not be equally activated at a given moment. According to the BLAM, the languages known to learners are activated to different degrees at several abstract levels along the IL continuum.

The above models of bilingual lexical processing and conceptual representation offer important input to the current study of IL as a composite developing linguistic system. Along the above lines of thinking and by adopting the BLAM, this study explores the nature and activity of the bilingual mental lexicon in relation to the nature of the IL as a developing linguistic system.

3. Interlanguage as a Linguistic Outcome of Languages in Contact

The BLAM assumes that SLA is a language-contact phenomenon similar to other language-contact phenomena such as pidginization and creolization, primary language attrition, bilingualism, and codeswitching (CS). Thus, structural principles which govern language-contact phenomena is claimed also to govern the developing linguistic system of IL.

Andersen and Shirai (1996) use some empirical observations and insights of pidginization and creolization studies in their SLA studies. According to them, the notion of L1 transfer is insufficient to explain learners' production of certain L2 morphemes for tense/aspect marking, such as overextension of the inflectional morpheme *-ing*. They assume that during the process of L2 learning, an interaction between universal factors such as markedness and prototype and L1 factors may play their individual roles. Such a type of interaction has been observed in IL production of phonology (Eckman, 1977; Major, 1987), phonology and morphology (Hatch, 1983), morphology (Andersen, 1983a, 1983b; Wei, 1996b, 2000a, 2000b; Jake, 1998), syntax (Zobl, 1980a, 1980b; Gass, 1984), and semantics (Tanaka, 1983; Shirai, 1989). One of the most important assumptions underlying the BLAM is that such a type of interaction during the process of L2 learning is in fact a phenomenon of languages in contact, and any IL production of a particular aspect of SLA is a linguistic outcome of languages in contact.

As evidenced in Seliger's research (1996), bilinguals exhibit primary language attrition when they start using mixed cross-linguistic forms in situation that are not sociolinguistically appropriate and where the audience does not chare or speak the same L2, that is, primary language attrition surface performance features may resemble forms of language mixing. Seliger considers two internal sources of change in the primary (i.e., L1) grammar. "One source of change is the other grammar that exists in the mind of the bilingual the grammar of the L2 and the other sources is what remains of UG abilities" (1996, p. 617). As a result of primary language attrition, changes in the L1 grammar contain transfer from various linguistic elements in the L2. Pfaff (1979), Kuhberg (1992), and Cook (2003) also provide evidence that primary language attrition manifests itself in syntactic and morphological features as

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observed in L2, including calquing of language materials from L2 to L1. Polinsky holds that "The loss of grammatical system is non-random" and that "Even significant language loss has a principled grammar of its own" (1997, p. 401). Myers-Scotton posits that "A language may be marked by extensive analogical leveling and substitutions, but there is always a clear morphosyntactic frame, even if a composite Matrix Language is its source" (2002, p. 185). It seems that whatever the sources of change in the primary language may be, primary language attrition is another linguistic outcome of languages in contact.

Studies of bilingualism provide evidence that any bilingual system, whether individual or societal, is a linguistic outcome of languages in contact. Dorian (1981) holds that a proficiency continuum may develop between two languages in contact, resembling in some respects a creole continuum. Thus, individual bilingual can be located at various points along this continuum. Dorian's observations reveal the effects of language contact on "healthy" languages, such as simplifications resulting in the elimination of one or more competing structures or the reanalysis of structures. Andersen (1982) finds that speakers of a language undergoing attrition tend to preserve and overuse syntactic constructions that reflect more transparent underlying semantic and syntactic relationships. In her research in societal bilingualism, Romaine finds similar linguistic consequences of languages in contact. "Where languages are in contact, linguistic phenomena such as borrowing, interference and transfer will generally be found" (Romaine, 1989, p. 77). Consequently, the balance between languages in contact becomes unstable and may change over time. As a result of long-term contact, a bilingual community may shift from the use of one language to another, causing gradual linguistic changes. Romaine holds that the bilingual system is not the same as the monolingual's because such bilinguals may not have the same proficiency as monolinguals in either of the languages.

Research in CS also provides evidence for structural constraints on switched codes and inputs to current theories of grammar. CS is seen as a language contact phenomenon because two or more languages are involved in the same sentence. Directly relevant to IL research is the distinction between the Matrix Language (ML) (the language traditionally identified as the "host" language) and the Embedded Language (EL) (the language traditionally identified as the "guest" language) as identified in CS (Myers-Scotton, 1993 [1997]; Myers-Scotton & Jake, 1995). One of the crucial arguments is that the ML and the EL play unequal roles in CS. It is the ML which provides the grammatical frame, all syntactically relevant system (grammatical) morphemes and most content (lexical) morphemes, but the EL only provides some content morphemes for some semantic/pragmatic reasons. One of the most crucial claims of the BLAM is that like CS, IL consists of several linguistic systems in contact: learners' L1 (NL), L2 (TL) and IL, and the ML of IL is a composite (Wei, 2009a, 2009b, 2015).

Following the above lines of thinking, and adopting the BLAM, this study also reviews SLA as a language-contact phenomenon. It claims that structural principles governing other language-contact phenomena, such as CS, also govern IL, but at a rather abstract level. It further claims that that IL is not the same as CS in terms of a clear distinction between the ML and the EL, and it is the composite

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nature of IL that affects IL development. To be discussed in the following sections, IL contains abstract entries of lexical items, types of morphemes, and grammatical structures from two or more languages. It is in this sense that IL is an outcome of languages in contact.

4. Sources of Abstract Lexical Structure in Interlanguage

The BLAM claims that IL performance and development are governed by the similar general principles governing all linguistic systems of languages in contact and supports the central argument that in all language contact situations, there must be an ML projecting a grammatical frame that structures the surface constituents (Myers-Scotton, 1993 [1997]). However, the BLAM further argues that IL is a very peculiar developing linguistic system because the incompletely acquired TL cannot be the ML projecting the grammatical frame for IL utterances. As evidenced in all SLA studies, IL utterances cannot be fully composed of TL-based material at various linguistic levels. In addition, the TL cannot be the ML governing IL because it is not fully available to all learners, especially early-stage learners. Furthermore, the L1 cannot be the ML either because L2 learners are fully aware that it is not their intended or targeted language. Wei (2009a, 2009b, 2015, 2020) provides the IL performance data in support of the assumption that several potential linguistic systems are involved in IL, such as learners' L1, their current IL, and their TL. For this reason, the ML of IL is defined as a composite of the *de facto* ML (i.e., a mix of the L1 and the IL) and the intended ML (i.e., the TL), and learners' L1 is identified as the EL (Jake, 1998; Wei, 2015). According to the BLAM, this EL may influence the *de facto* ML and thus may partially contribute L1 abstract lexical structure to IL utterances (Jake, 1998; Fuller, 1999; Wei, 2000a, 2009c).

This study claims that the composite nature of IL as a whole is mostly caused by the sources of abstract lexical structure in the bilingual mental lexicon. This claim is based on the following assumptions:

1). The mental lexicon contains abstract lexical structure at a "deep" level, and this deep level is rather abstract because the mental lexicon does not simply contain lexemes and their semantic content but abstract elements called "lemmas". Lemmas are abstract entries in the mental lexicon that support the surface realization of actual lexemes (Levelt, 1989). In other words, for each lexical item, the mental lexicon contains its lemma information about the word's lexical content (i.e., semantics) and its syntactic environment (i.e., morphosyntax). For example, the lemma for *give* requires a subject which is assigned the thematic role of AGENT, a direct object which is assigned the thematic role of THEME, and an indirect object which is assigned the thematic role of RECIPIENT (e.g., *John gave Mary a gift*). The lemma for *give* also specifies that the indirect object can occur in another syntactic environment, that is, introduced in a prepositional phrase (e.g., *John gave a gift to May*). Lemmas also contain information about the word's morphosyntax. For example, the lemma for *he* requires the word to be used of a male and that any following present-tense main verb must be inflected with *-s* (i.e., inflectional morphology for tense marking) for the subject-verb agreement. In addition, lemmas contain information about the word's phonological structure, syllabic composition, and accent structure.

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Furthermore, lemmas may contain information about the word's register and its pragmatic function. One of the most important claims of the BLAM is that lemmas in the bilingual mental lexicon are language-specific, and language-specific lemmas are in contact in IL production (Myers-Scotton & Jake, 1995; Wei, 2001b, 2002). In other words, sources of abstract lexical structure in IL together is a kind of composite. This is because IL is always the learner language which shows the surface forms of the intended TL, but it also contains sources of abstract lexical structure from both the L1 and the TL (Myers-Scotton, 1994; Jake, 1998; Wei, 2000a, 2015).

2). Abstract lexical structure contains several discrete but interactive subsystems: lexical-conceptual structure, predicate-argument structure, and morphological realization patterns, each of which is an indispensable component of every linguistic system. Lexical-conceptual structure conflates universally available semantic and pragmatic information; predicate-argument structure specifies the properties of verbs in different subcategories and the grammatical encoding of the expressed arguments; morphological realization patterns spell out surface devices for word order, case assignment, agreement, tense/aspect/voice/mood marking, etc. (de Bot & Schreuder, 1993; Myers-Scotton, 2002; Jake, 1994; Wei, 1996a, 1996b, 2002). The BLAM claims that such an abstract lexical structure in IL has different sources, and it is the different sources of abstract lexical structure which drive IL as a developing linguistic system.

3). Because the abstract lexical structure in IL have different sources, parts of the abstract lexical structure from learners' L1 lexical entries may influence the abstract lexical structure of incompletely acquired TL lexical entries. Consequently, each of the three subsystems of the abstract lexical structure in IL may contain elements from learners' L1 and/or the TL, resulting in a composite IL system. According to Jake (1998), abstract lexical structure is modular and can be split and recombined in novel, yet constrained ways in constructing the IL linguistic system. Thus, since IL is a developing linguistic system, learners' L1 may contribute different amounts of its abstract lexical structure to the TL along the IL continuum. Due to the composite nature of IL as a developing linguistic system, the complete acquisition of the TL abstract lexical structure becomes the determinant factor in successful SLA.

The abstract lexical structure in the bilingual mental lexicon and the composite nature of IL as a developing linguistic system have some important implications for IL construction:

1). The ML of IL is defined as a composite of the *de facto* ML and the intended ML. This is because the ML of IL contains elements of the abstract lexical structure from learners' L1 and TL, resulting in learners' current IL construction. IL is recognized as a phenomenon of languages in contact. Like in other language-contact situations, the languages involved do not paly equal roles in structuring constituents containing elements from both languages. While there is always a clearly identified ML in a language-contact setting and the grammatical frame projected by the ML is always complete, in L2 learning situations, learners may not have complete access to the intended ML (i.e., the TL). In other words, learners' knowledge of the TL, which is the intended ML, is incomplete.

2). As evidenced in all language-contact situations, IL construction is necessarily projected by the abstract lexical structure of the ML. However, the ML of IL is composite or incomplete because it lacks certain aspects of the abstract lexical structure of the TL. Consequently, learners may turn back on their L1 abstract lexical structure and/or their partially acquired TL abstract lexical structure in place of the intended ML in order to frame IL constituents.

3). Thus, language transfer in L2 learning should be understood as transfer of L1 abstract lexical structure as part of the abstract lexical structure in the bilingual mental lexicon. Such a transfer becomes predictable and necessary in IL development for learners to fill particular gaps in the incompletely acquired TL lexical items and grammatical constructions. However, the contributions of L1 abstract lexical structure to the composite ML of IL are more constrained than those of the TL. This is because learners always try to construct the IL from the TL abstract lexical structure to the extent possible (cf. *the target-language principle*, Jake (1998)).

Along the above lines of thinking, the BLAM explores sources of language transfer by investigating the nature of the bilingual mental lexicon in general and the activity of the abstract and complex lexical structure of IL in particular. One of the major claims of this study is that in SLA, L1 abstract lexical structure, to be more specific, lemmas underlying L1 abstract lexical structure, may fill gaps at each of the three abstract levels: lexical-conceptual structure, predicate-argument structure, and morphological realization patterns.

Lemma transfer of L1 lexical-conceptual structure

While the conceptual structure may not be language-specific because it may contain universally available semantic and pragmatic information (Levelt, 1989; Bierwisch & Schreuder, 1992), languages may lexicalize the components of a given conceptual structure in different ways (Talmy, 1985; Levin & Pinker, 1991; Jackendoff, 1991; Jake, 1994; Fuller, 1999; Jiang, 2000; Wei, 1998, 2003). As commonly observed, before the L2 lexical items that learners have learned are fully specified in terms of their semantic/pragmatic feature bundles (i.e., only partially acquired), the lexical-conceptual structure of some L2 lexical items may contain semantic/pragmatic features from L1 counterparts. As also commonly observed, learners' L2 vocabulary development is incremental and may not be sufficient enough at a certain stage of learning to fully express their intended meanings. As one of the models of the bilingual mental lexicon, the MHM relates the nature of the bilingual mental lexicon to implications of distinct conceptual equivalence relationships for L2 vocabulary learning. Pavlenko assumes that "Conceptual equivalence facilitates L2 vocabulary learning through positive transfer …; partial (non)equivalence facilitates learning through partial overlap (positive transfer), yet also complicates it when learners assume complete equivalence and display negative transfer …; non-equivalence simultaneously complicates learning, as learners have to develop new categories …" (2009, p. 152).

Thus, when learners' L2 lexical items are only partially acquired or insufficient for learners to achieve their communicative intentions, they may turn to similar or seemingly equivalent items in their L1 in their IL speech production (Talmy, 1985; Choi & Bowerman, 1991; Wei, 1995; Dewaele, 1998; Jake,

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1998). The BLAM explores the nature of the bilingual mental lexicon at a deeper or more abstract level by claiming that the bilingual mental lexicon contains language-specific lemmas for particular lexemes, and such language-specific lemmas can be activated in IL speech production, resulting in lemma transfer as a source of inappropriate lexical choices. Below are some typical instances of lemma transfer of L1 lexical-conceptual structure.

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

[2] **Open** air condition.

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

(Chinese L1; Wei, 1995)

[4] When I've cold I **eat** medicine, cold medicine.

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

(Japanese L1; Wei, 2003, p. 65)

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

(Japanese L1; Wei, 1996a, p. 423)

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

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

(Chinese L1; Jiang, 2000, p. 61)

[9] watashi wa mai nichi juuni ji ni hirugohan ga **aru**.

"I have lunch at 12 o'clock every day."

[10] kare wa shaken o **toru**.

"He'll take the test."

[11] watashi wa tenisu o **asobu**.

"I play tennis."

[12] yoru anta ni denwa o **ageru**.

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

(English L1; Wei, 2003, p. 65)

In [1], the learner uses "do" as influenced by the Chinese lemma for the equivalent verb in Chinese, which may express several concepts such as "cook", "play", "work", "write", etc. In [2], the learner uses "open" rather than "turn on" based on the Chinese lemma for "open", which means "turn on" or "start". In [3], the learners uses "house" rather than "home" based on the Chinese lemma for "house", which includes the concepts of "house", "building", "apartment" or "home". In [4], the learner

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produces "eat medicine" rather than "take medicine" as influenced by the Japanese lemma for the same concept. In [5], the learner produces "do many tests and exams" rather than "take many tests and exams" based on the Japanese lemma for "do" to express the same concept. In [6], the learner uses "look" rather than "read" most probably because the Japanese lemma for "look" includes "read", "see", "look at", "visit" or "observe". In [7] the learner uses "oven" rather than "bakery". It seems that either the learner has not learned "bakery" or does not make a lexical-conceptual distinction between "oven" and "bakery". 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 Chinese, causing some lexical-conceptual gaps between English and Chinese. In [8], the learner uses "long" rather than "tall" most probably because the learner is not aware of the lexical-conceptual distinction between the two adjectives in English. In [9], the learner uses "aru (have)" as used in English for "have lunch" rather than the Japanese equivalent "taberu (eat)" for the same concept. In [10], the learner uses "toru (take)" rather than "ukeru (receive)" for the equivalent expression "take the test" in English. In [11], the learner uses "asobu (play)" based on the English expression rather than "suru (do)" as used in combination with other relevant nouns to express a particular activity. In [12], the learner uses "ageru (give)" rather than "kakeru" as lexical-conceptually required in Japanese.

The above instances of lemma transfer of L1 lexical-conceptual structure reveal that learners acquire simple TL content morphemes first which match up possible L1 conflation categories of semantic notions (Pinker, 1989a, 1989b; Jake, 1994), but the TL lexical-conceptual structure is not fully available to such learners. In other words, although learners produce the TL lexical items, the selection of those items may be caused by their incomplete knowledge of the TL lexical-conceptual structure of particular lexemes.

Lemma transfer of L1 predicate-argument structure

Lemma transfer may also occur at the level of predicate-argument structure. As often observed in SLA, though learners may choose the right TL verbs, because of their incomplete knowledge of the predicate-argument structure underlying those verbs, they may use them inappropriately in their IL speech production. Wei (1996a, 1996b, 2009c) finds that such incompletely acquired TL verbs may project the number of arguments as required (i.e., nouns as required by a particular verb to satisfy its particular predicate-arguments structure) and assign the thematic roles to the relevant arguments as their counterparts in learners' L1, resulting in lemma transfer of L1 predicate-argument structure in IL speech production. Also, certain incomplete TL lexical-conceptual structure may map onto incomplete TL predicate-argument structure, one inducing the other. Below are some typical instances of lemma transfer of L1 predicate-argument structure.

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

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

(Japanese L1; Wei, 1995)

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[15] He not **help** my homework.

[16] I first **fill** water in glass.

(Japanese L1; Wei, 1996a, p. 422)

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

[18] You're **listening** music?

(Chinese L1; Wei, 1995)

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

(Chinese L1; Wei, 1996a, p. 422)

[20] densha o **totte** gakkoo e iku.

"(I) take the train to go to school."

[21] gozen chuu kare o **yonda**.

"(I) called him in the morning."

[22] kereno uchi made **noseru o ageta**.

"(I) gave him a ride home."

(English L1; Wei, 2003, pp. 67-68)

In [13], the predicate-argument structure and also its morphological realization patterns are affected by the incorrectly extended causative lexical-conceptual structure in Japanese. In this instance, the causee is "me" (the PATIENT), which should be "I" (the AGENT) in the TL, and "his words" is the causer, which should be a prepositional stimulus "at his words" in the TL (e.g., *I laugh at this words in the class*.). In [14], "you" (the THEME) is directly introduced by "wait" without the preposition "for" as required in the TL predicate-argument structure. Such a violation seems to be caused by the Japanese counterpart verb "matsu (wait)", which, like any transitive verb, can take its internal argument (i.e., the object). In [15], the preposition "with" as required in the TL to introduce the THEME does not appear. Again, such a violation may be caused by the Japanese counterpart verb "tatsudau (help)", which assigns the thematic role directly to its internal argument. In [16], "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 (e.g., *I first fill the glass with water*.). In [17], "look" assigns the THEME directly to "my child" without the preposition "after" as required in the TL. This violation seems to be caused by the Chinese counterpart verb "zhaoliao (look)", which does not need a preposition to introduce the THEME, that is, in Chinese "zhaoliao" can take the THEME as its internal argument. In [18], "listen" assigns the THEME directly to "music" without the preposition "to" as required in the TL. Again, such a violation is most probably caused by the Chinese counterpart verb "ting (listen)", which does not need a

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preposition to introduce the THEME, that is, in Chinese "ting" can take the THEME as its internal argument. In [19], "cost" takes the AGENT (i.e., the person who spends the money) as its external argument (i.e., the subject), rather than the THEME (i.e., the thing on which the money is spent), but the Chinese lemma for the verb "cost" allows such a predicate-argument structure. In [20], the learner uses the English predicate-argument structure for the verb "toru/totte (take)" where the means of transportation "densha (train)" is assigned the THEME and introduced as its internal argument (i.e., the object). This is a violation of the Japanese predicate-argument structure where "densha" must be introduced as the LOCATIVE by the preposition "ni" as part of the verb "noru/notte (take)" (e.g., *densha ni notte gakkoo e iku.*). In [21], the learner uses 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 "call" takes the RECIPIENT as its internal argument (i.e., the object), in Japanese the RECIPIENT must be introduced by a preposition and the phone-call itself must be introduced as the THEME (i.e., the object) by a specific verb such as "kakeru" or "suru" (e.g., *gozen chuu kere ni denwa o kaketa.* Or: *gozen chuu kere ni denwa o shita.*). In [22], the learner translates the English expression "give a ride" into Japanese, violating the Japanese predicate-argument structure. This is because while in English "ride (noseru)" is introduced by the verb "give" as its internal argument (i.e., the object), the THEME, in Japanese the means of transportation must be introduced by a preposition as its internal argument, the INSTRUMENT, rather than the TMEME (e.g., *kereno uchi made kuruma de okutte ageta* (literally, "I sent him to his home by car".).

The above instances of lemma transfer of L1 predicate-argument structure reveal that though learners' target is always and should be the L2 predicate-argument structure, they may turn back on their L1 seemingly equivalent one in IL production. Thus, the IL developing system is predictably a composite of structures from multiple sources, such as L1 lemmas for certain lexemes and incompletely acquired ones in the TL. As claimed in the BLAM, since the TL is always learners' target, learners try to produce the TL lexical items as needed in their speech production, but they may activate the L1 lemmas for some of those TL lexical items during their IL development.

Lemma transfer of L1 morphological realization patterns

Lemma transfer may also occur at the level of morphological realization patterns, which deal with surface devices for word order, agreement, case assignment, tense/aspect/voice/mood marking, etc. As often observed in early-stage learners' IL speech production, learners may explore their L1 morphological realization patterns before their complete acquisition of the TL ones. Below are some typical instances of lemma transfer of L1 morphological realization patterns.

[23] I English not speak.

[24] My husband in USC study.

(Chinese L1; Wei, 1995)

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

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

(Chinese L1; Wei, 1996b, p. 421)

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

[28] I in Japan my city like.

(Japanese L1; Wei, 1995)

[29] Sorry. Only little English I know.

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

(Japanese L1; Wei, 2003, p. 69)

[31] watashitachi wa shigoto ni iku mainichi.

"We go to work every day."

[32] watashi wa moou kakiowatta watashino repooto.

"I already finished my paper."

(English L1; Wei, 2003, p. 69)

In [23] the direct object "English" is placed before the verb. In [24], the prepositional phrase "in USC" is placed between the subject and the verb. Though the Chinese basic word order is Subject-Verb-Object, any constituent can be placed in the sentence initial position or before the verb for topicalization or emphasis. Also, depending on the speech context, in Chinese any implicit constituent can be left out. In [25], "you", the subject, is missing. Furthermore, in Chinese morphological realization patterns, there are few auxiliary verbs and no system morphemes (i.e., grammatical or functional morphemes) for negation as shown in [23] and [25], 3rd person singular as shown in [24], plural marking as shown in [26] or any other grammatical functions. Chinese is not an inflectional language anyway. It seems that early-stage learners try to express their intended meanings by trying to produce the TL content morphemes (i.e., lexical items) they know and relying on their L1 morphological realization patterns. Early-stage Japanese learners of English also seem to use TL content morphemes but tend to follow their L1 morphological realization patterns. The Japanese basic word order is Subject-Object-Verb, which is used in [27], [28] and [29], where any constituent is placed before the verb. In [30], the prepositional phrase "to New York" is placed before the predicate verb "go". Although the prepositional phrase "with some friends" is placed 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". Some speakers of English learning Japanese as a second/foreign language may also employ their L1 morphological realization patterns. In [31], the sentence basically follows the Japanese verb final word order, but the adverbial of time "mainichi (every day)" is placed in the sentence final position, which is not allowed in Japanese. In [32], the

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sentence elements are ordered in the typical English word order where the object follows the predicate verb.

The above instances of lemma transfer of L1 morphological realization patterns reveal that, in addition to the employment of the lemmas underlying their L1 lexical-conceptual structure and predicate-argument structure, learners may also employ the lemmas underlying their L1 morphological realization patterns in IL production. Regarding lemma transfer in this particular subsystem of the abstract lexical structure, the following section explores sources of unequal acquisition of different types of morphemes in L2 learning.

5. Unequal Acquisition of Morpheme Types in IL Development

Assumptions regarding the sources of morphemes refer to differences in the levels of abstract lexical structure. Myers-Scotton and Jake (1995) and Wei (2000a, 2000b) claim that at the conceptual level, speaker intentions are mapped onto semantic/pragmatic feature bundles, and while speaker intentions are not initially language-specific, these semantic/pragmatic feature bundles are. According to them, this is the mapping of speaker intentions to lemma entries. As introduced earlier, lemmas are abstract entries in the mental lexicon which support the surface realization of actual lexemes. Lemmas are understood as abstract entries in the mental lexicon because they contain all aspects of lexical information necessary to project a morphosyntactic frame. In other words, lemmas activate morphosyntactic procedures spelling out the lexical knowledge of a particular lexical entry.

Bock and Levelt (1994), Wei (1996b), Jake (1998), and Myers-Scotton (2002) explore the sources of morphemes in terms of the levels where they are activated. They claim that morphemes activated at the conceptual level are "directly-elected" morphemes, and such morphemes as supported by those activated lemmas in the mental lexicon are "content" morphemes. In addition to directly-content morphemes, some morphemes are selected from a limited number of choices in the projection of the structure required by other lexical items (i.e., directly-elected morphemes). Such morphemes are indirectly-elected along with directly-elected ones because they are required as part of the realization of the predicate-argument structure and morphological realization patterns. However, indirectly-elected morphemes do not represent lexical concepts independent of the directly-elected morphemes with which they are accessed. Indirectly-elected morphemes include prepositions like "to" in "listen *to* the music", "at" in "look *at* the photo", and "on" in "rely *on* my friends", and particles like "on/off" in "turn *on/off* the computer", "up" in "pick *up* the key", "on" in "put *on* my coat", and "up" in look up the word in the dictionary. It should be obvious that without the directly-elected morphemes (i.e., content morphemes), prepositions and particles cannot be activated or accessed for any communication purpose because they are part of their content morpheme heads. Also, in particular semantic/pragmatic contexts, such as "definiteness", "specificity", "identification", etc., the lemma for a noun directly elected by a nominal argument projects the phrase structure with a particular determiner, such as a definite article, a possessive or a demonstrative. All determiners are grammatical morphemes, but in

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this case, they are also indirectly-elected because they are indirectly elected by the functional level projections of the lemma supporting the noun via activated semantic/pragmatic features. This reveals that indirectly-elected lemmas only arise from projections of directly-elected lemmas for content morphemes. For example, "the", "his", and "that" in "*the* student left *his* book in *that* room" are indirectly-elected morphemes with their respective directly-elected morphemes (i.e., content morphemes). Other morphemes are only activated in the projection of morphological encoding at the position level (i.e., surface level of language organization). They do not reflect any semantic/pragmatic features conflated in the lexical-conceptual structure. For example, inflectional morphemes for tense/aspect/voice marking, 3rd person singular on the verb in the present tense for subject-verb agreement, plural marking, and all other grammatical functors are 'structurally-assigned' morphemes (Wei, 1996b).

The BLAM relates the sources of morphemes to lemmas in the bilingual mental lexicon and relates cross-linguistic lemmas to degrees of difficulty in L2 learning. As predicted, since content morphemes are directly-elected in that they are supported by lemma entries activated at the conceptual level, they are learned and acquired before system morphemes. Morphemes whose lexical entries are "called" to map lexical-conceptual structure onto predicate-argument structure or predicate-argument structure onto morphological realization patterns are system morphemes. Indirectly-elected morphemes are activated to be part of particular content morphemes, but structurally-assigned morphemes are activated to meet language-specific grammatical requirements. This difference lies in the fact that some system morphemes represent lexical-conceptual structure but others do not.

Unequal acquisition of L2 content morphemes

As commonly observed in SLA, learners acquire L2 content morphemes before other types of morphemes due to their direct and easy access to the conceptually activated semantic content of these content morphemes. As also observed, learners acquire L2 content morphemes not always at the same rate or with the same ease and accuracy. This is most probably because learners acquire L2 semantic categories which are congruent with those of the L1 before they acquire those which are not. For example, English has phrasal verbs such as "look after", "look into", "look forward to", "look down upon", "look over", "turn on", "turn off", "bring up", "bring down", "give in", and many others. Such phrasal verbs are also recognized as verb complexes in that they contain particular prepositions or "satellites" (Talmy, 1985) and must be accessed as single verbal units. English complex verbs are not congruent with verb forms in languages like Chinese and Japanese and may cause some learning difficulty and are acquired later. Another potential learning difficulty may be caused by the distinction between transitive and intransitive prepositions and their structural constraints. For example, in "look after a child", "after" is a transitive preposition and is structurally unmovable as it introduces an object ("look a child after" is ungrammatical), but in "turn on the radio", "on" is an intransitive preposition and is structurally movable (both "turn on the radio" and "turn the radio on" are grammatical). In terms of morpheme activation at different levels in the mental lexicon, such prepositions or satellites are

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classified as indirectly-elected morphemes. They are indirectly-elected because they are elected with particular verbs, without which they cannot be accessed as independent lexical items. Learners may encounter learning difficulty in acquiring indirectly-elected morphemes because of their incomplete knowledge of certain TL verb complexes. In other words, such content morphemes like "look", "turn", "bring" and "give" without their indirectly-elected morphemes are only incompletely acquired. Below are some typical IL production instances where the required satellites as indicated in [   ] are missing.

[33] A; You're listening [to] music? B: I'm looking [at] pictures.

[34] Please help me look [after] my child.

[35] Pick [up] the key for me.

[36] You can hear [from] me from that university.

(Chinese L1; Wei, 1996a, p. 427)

[37] I can wait [for] you here.

[38] He pick me [up] every day.

(Japanese L1; Wei, 1996a, p. 427)

In addition to indirectly-elected morphemes, Wei (1996a, 1996b) finds that learners acquire the semantic features which are conflated into "semantic/pragmatic feature bundles" (Myers-Scotton & Jake, 1995; Wei, 2001a, 2001b, 2002) close or identical to those in the L1 earlier and vice versa.

[39] My coat is in your car.

[40] My daughter is in house. She is always in home.

[41] You wear this jacket and go to the meeting.

[42] She want me paint her bike blue.

(Chinese L1; Wei, 1996a, p. 427)

In [39] and [40], the preposition 'in' and 'at' are conflated in Chinese, but they are not in English. In [41], MOTION and MANNER are not conflated in Chinese, but they are in English. In [42], MOTION and CAUSE are conflated in Chinese as in English. Thus, learners may encounter less or no learning difficulty with the TL semantic features congruent with those in their L1, as in [39] and [42].

Unequal acquisition of L2 system morphemes

One of the crucial claims of the BLAM is that the reason why morphemes are not acquired at the same rate is that they are projected differently from the mental lexicon. In addition to the major distinction between content and system morphemes, subcategories of system morphemes are identified. As predicted, indirectly-elected system morphemes are activated with content morpheme heads to satisfy lexical-conceptual and predicate-argument structure. Such system morphemes are acquired before

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structurally-assigned system morphemes (Jake, 1994; Myers-Scotton & Jake, 1995; Wei, 1996b, 2015, 2020).

If morphemes are classified in terms of how they are activated from the mental lexicon, some system morphemes are semantically transparent, but others are not. Semantically transparent morphemes may include progressive *-ing*, plural marking *-s*, certain determiners, and modal auxiliaries (*can, may, should, must*, etc.), but other system morphemes under INFL, such as morphemes for tense/aspect/voice marking, auxiliary verbs (*will, shall, do, be, have*, etc.), and subject-verb agreement, do not carry any semantic weight (VanPatten, 1984a, 1984b). According to Myers-Scotton and Jake (1995), a semantically transparent system morpheme is internal to a single maximal category (i.e., within a maximal category) at D-structure, but a semantically nontransparent system morpheme is external to a maximal category (i.e., across a maximal projection) at S-structure. As predicted, semantically transparent system morphemes are acquired with more frequency and accuracy than semantically nontransparent ones.

[42] I living with my Japanese friend.

[43] During the break … next week … I go see my uncle. He live in Atlanta.

(Japanese L1; Wei, 1996a, p. 426)

[44] You doing your homework?

[45] She read fast but not understand.

[46] You not take these two books.

[47] The table leg break.

[48] I not have the car door key.

(Chinese L1; Wei, 1996a, p. 426)

The missing semantically nontransparent system morphemes in the above instances reveal that learners have more difficulty in acquiring external system morphemes, such as auxiliary verbs for tense/aspect marking, negation, and voice, than internal system morphemes, such as plural *-s*, certain determiners and progressive *-ing* (Jake, 1994). Some system morphemes (e.g., determiner) occur in a maximal category (e.g., NP (noun phrase)) projected by a content morpheme. Learners acquire system morphemes that are part of a lexical category (e.g., plural *-s* is part of a noun, and progressive *-ing* is part of the present participle lexeme). As predicted, these are acquired before those requiring morphosyntactic information across maximal projections (e.g., subject-verb agreement or tense/aspect/voice marking under INFL). In other words, system morphemes are subcategorized in terms of their abstract entries in the mental lexicon (i.e., their lemma representations in the abstract lexical structure), based on which, the degrees of learning difficulty can be predicted.

6. Conclusion

This study describes and explains the nature of IL as a developing linguistic system in terms of the role of the bilingual abstract lexical structure. Following the BLAM, it claims that the bilingual mental lexicon is a composite, and the linguistic systems involved in IL, such as learners' L1, their TL, and their IL, contribute different amounts to the IL production. It further claims that sources of learner errors are caused by the activation of language-specific lemmas in the bilingual mental lexicon during the IL speech production process and also by the incomplete acquisition of the TL lexical and/or grammatical items during the IL development.

As described and explained in this study, lemmas contain information about the three subsystems of the abstract lexical structure: lexical-conceptual structure, predicate-argument structure, and morphological realization patterns. Thus, lemmas in the bilingual mental lexicon are language-specific, and learners may overgeneralize lemma specifications for particular lexemes based on their L1 abstract lexical structure. Consequently, learners may activate their L1 lemmas for particular TL lexemes in their IL speech production. In other words, learners' selection or retrieval of the TL lexical items tends to be influenced by their L1 abstract lexical structure at each level of the three subsystems.

This study also regards the IL developmental process as a particular language-contact setting in which the intended ML is a *de facto* ML, and L1 abstract lexical structure can be split and recombined to build a developing target ML. However, it should be noted that the contribution of learners' L1 is constrained because only abstract lexical structure projected by lemmas underlying L1 content morphemes can contribute to the developing composite ML. This study offers some evidence in support of the claim that system morphemes are accessed or activated differently because some system morphemes are activated by certain content morpheme heads (i.e., indirectly-elected system morphemes) but other system morphemes are only grammatically required at the positional level (i.e., structurally-assigned system morphemes). As predicted, indirectly-elected system morphemes are acquired before structurally-assigned system morphemes.

As predicted by *the target-language principle* (Jake, 1998), as more and more TL lexical-conceptual structure, predicate-argument structure, and morphological realization patterns become available to learners, the successful projection of TL at each of these levels of abstract lexical structure will replace those underlying the developing IL system.

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