# Translation in Light of Bilingual Mental Lexicon: A Psycholinguistic Approach

Congmin Zhao*

*School of Foreign Languages, North China Electric Power University, 2 Beinong Road, Changping District, Beijing 102206, China*

**Corresponding Author:** Congmin Zhao, E-mail: cmzhaocm@hotmail.com

## ARTICLE INFO

## ABSTRACT

This paper gives insight into the translating process of second language learners in language use in light of the mechanism of bilingual mental lexicon. Structure and development of second language mental lexicon explains the existence of first language items and translation equivalents. Conversely translation can promote the construction of second language mental lexicon and ultimately second language acquisition.

## INTRODUCTION: TRANSLATION AS A NATURAL COGNITIVE PROCESS

Homles (1988) distinguishes between translating and translation: the former is a mental process, decontextualized translating of individual words or phrases, enacting processes of signification; the latter refers to the polished contextualized product of a text with connotations and tacit assumptions. This distinction is insightful and significant. This paper adopts the term translation and defines it as a cognitive translating process both in language use tasks and the translation tasks.

Translation has been strongly condemned as exerting a negative influence on second language acquisition (SLA) and learners have been frequently advised to think in English and not to resort to their first language (L1) in the use of second language (L2). But the fact is translation is a cognitive process and a natural learning strategy. Learners tend to engage in mental translation in reading and overt translation especially when comprehension is blocked by difficult words or phrases or complicated sentence structure. Translation is inevitable in writing as well. Leonardo believes in an innate translation function which is activated in dealing with writing or speaking tasks (2010: 28). It is a widespread practice that learner writers may think about the topic in L1 to generate ideas during the planning stage, thinking through L1 much of the time and even write out a L1 version and then translation it into L2. Titford (1985:78) comments that learners at all levels do "translate silently" while they are encoding or decoding L2…. Why does translation come naturally to learners in L2 comprehension and production? This concerns with the relationship between L1 and L2 in bilinguals. This paper examines theoretical models and experimental studies of bilingual mental lexicon to justify the psycholinguisitc basis of translation and explores the role of translation tasks in the development of bilingual mental lexicon through one translation activity.

## BILINGUALISM AND NEUROLOGICAL EVIDENCE

Weinreich (1953) identified three types of bilingualism: compound bilingualism refers to two languages being learned in one and the same environment with a single meaning unit for a word and its translation equivalent; coordinated bilingualism means the learning of two languages separately and their meanings being kept separate; subordinate bilingualism is the acquiring a second language at an earlier stage by processing L2 words through their first language equivalents. Most learners of English as a foreign language probably fall into the last category including the Chinese learners of English.

In the Chinese context, English is a foreign language. Learners' access to English input is limited to the classroom and textbooks. Due to motivation and proficiency considerations it is impractical for large scale immersion programs. The majority of learners study English mostly serving ac-

ademic purposes to pass examinations and don't have ample opportunities outside the classroom to use English for real communication. Most Chinese students learn English through bilingual vocabulary list and in classroom where the teacher usually engages in bilingual talk and language switch and the translation method is adopted. Chinese is the dominant language. For bilingual learners, the role of L1 or the native language and L2 or a foreign language are different and their interrelationship is complicated. L2 learners make strategic use of their L1 in the process of understanding and producing messages in the L2 and in the acquisition of an L2 (Ellis, 2008:405). Abundant research has been done on the acquisition of L2 and the relationship between L1 system and L2 system.

Primarily there is sufficient research on the investigation of the regions of the brain which are involved in L2. Neuroscientific evidence shows that there is no distinct brain devoted to the L1 and L2 but only differences within these regions. Late bilinguals uses two distinct cortical areas for the two languages. For early bilinguals, there are distinct areas, but the overlapping part is dominant, with 2 languages sharing the same cortial area (Elke, 2012). Similarly vocabulary is stored 'in almost the same area for both languages for both early and late bilinguals. Even with syntactic know, neural areas may be only partially separated" (Elke, 2012). Abutalebi, Cappa, and Perani (2001) reviewed neuroimaging studies on comprehension and production. They found advanced L2 learners the neural machinery involved in a listening task was the same as in L1 learners, whereas for low proficiency learners, fewer areas are active. As to L2 production, in advanced L2 learners a common neural network is involved for both L1 and L2 production. For low proficiency learners cerebral activation increases. There are other studies that also show the activation of identical brain areas in the performing of the same task in two languages. Perani et al. (1998) proposed that low-proficiency learners employ multiple and variable brain regions to handle dimensions of the L2 that differ from the L1 whereas highly proficient bilinguals use the same machinery for both languages. These studies indicate that the neural mechanism involved in L1 and L2 is different for learners of different proficiency levels. For low L2 proficiency learners, the neural mechanism is divergent whereas for the high proficiency learners, it is more divergent. This may provide insight into the study on bilingual mental lexicon.

## WORD KNOWLEDGE

Words are a fundamental language component and together with grammar compose the basic unit and task of SLA. They are essentially three levels of word knowledge: the conceptual level (representing concepts), the lemma level (syntactic knowledge) and the lexeme level (the phonological properties of words). Schmitt (1998) identified four components of word knowledge: form (spelling), meaning, grammatical features (such as word class and morphological knowledge) and association (i.e. the extent of correspondence in the learners' word associations to those of native speakers).

From the perspective of the process of SLA, learners' knowledge of words lies in three dimensions (Haastrup and Henriksen: 1998): the partial to precise understanding continuum, depth of knowledge (such as its syntactical function and its collocations) and the receptive-productive continuum (understanding and producing the word). Similarly Paribakht and Wesche (1993) developed the Vocabulary Knowledge Scale on the basis of the developmental stages of being able to recognize a word (feeling familiar but not knowing the meaning), give a definition (such as a correct synonym or translation), and produce the word semantically appropriately and grammatically accurately.

The words as meaningful units of a language do not exist in isolation. Instead, they are interrelated and connected constructing semantic networks as is manifested by various sense relations, such synonymy, antonymy, hyponymy etc. According to Aitchison (1987), mental lexicon refers to the human word-store with the words being organized "in a gigantic multi-dimensional cobweb, in which every item is attached to scores of others" (78).

It can be generalized that word knowledge objectively consists of four aspects of (phonological and orthographic) form, (conceptual) meaning, (syntactic/grammatical) function, and external associations. As such a comprehensive and complicated structure, it is no easy task to acquire the vocabulary of an L2. From recognizing the word form, to understand its meaning to productively using it in communication, it is increasingly cognitively demanding. This is also one reason why the size of one's passive vocabulary far exceeds that of active vocabulary.

For learners of an L2, how do they undergo the process of acquiring L2 lexicon? And with two languages in the bilingual brain, how are the two systems of mental lexicon organized and interrelated?

Different models are developed and experimental studies have been done to prove or modify these models.

## BILINGUAL MENTAL LEXICON

### Models Of Binlingual Mental Lexicon

Obler (2007) outlined a three-stage development of research on binlingual mental lexicon in recent years: the middle of 20th century saw the research focusing on whether or not the bilingual's two languages were shared or separate systems; in the final decades of last century that discussion incorporated lexical connections between words in given language and their translation-equivalents in the other language of bilinguals; the past decade witnessed the discussion on binlingual mental lexicon processing to complement representation studies.

Early research on binlingual mental lexicon supports the independence model which assumes the mental lexicons of two languages are kept in separate storages systems. This model finds support from modularity theory and formal differences between languages (singleton, 1999). Grosjean's (1982) study on aphasic patient who recovered several languages one by one can be empirical support. Nevertheless, the independence model seems to represent an extreme position. Singleton (1999:172) presented a moderate position by concluding that there is probably

a level at which each language is separately represented with the lexicon of each being activated more or less by results of lexical search and according to strength of each language.

The interdependence model takes bilingual lexicon as a common storage system with one underlying representation common to a word and its translation equivalent. However, this model was not popular with researchers many of whom accepted it partially. Kroll (1993) arrived at the conclusion that the conceptual representations are shared, but lexical representations are independent across different languages.

The Revised Hierarchical model (Kroll and Stewart, 1994) posits that the connections between words in the second language shift from linking to their meaning via translation-equivalents in the first language to establishing direct relationship with their meanings in the concept store. That is the links between an L2 word and its translation-equivalents will become weaker with the growing of L2 proficiency and the conceptual links within a word itself will be stronger. In a similar vein, Jiang (2000) presented three stages of L2 vocabulary acquisition: the first stage is marked by the separate storage of semantic, syntactic, and morphological information with L2 word and L1 translation equivalents being strongly linked; at the second stage, the conceptual meaning of an L2 word is accessed through L1translation equivalent and the connections L2 items and their conceptual meanings are weak; the third stage is unlikely to be reached when the semantic, syntactic, and morphological information of L2 word are integrated presenting a structure similar to that of L1. Hulstijn (2007:260) also believes that in the learning of vocabulary items L2 beginners seem to "link the L2 word form directly to a corresponding L1 word form", and gradually "the L2 word from is directly linked to its meaning".

The hierarchical model above is challenged by the Bilingual Interactive Activation model proposed by Dijkstra and Van Heuven (1998). According to this model, the bilingual lexicon is integrated and lexical access is non-selective, candidates in both languages are activated when matched with input features. The interactive model seems to be more plausible and more widely accepted.

### Experimental Studies On Bilingual Mental Lexicon

Maldonado's (1997) study of the organization of the bilingual's mental lexicon firstly examined three major hypotheses: Shared Semantic Store or interdependence hypothesis, Separate Semantic Store hypothesis, and Shared-&-Separate Semantic Store hypothesis. Other factors influencing organization of information are also considered, including degree of difference between the two languages, degree of language dominance, and the demands imposed by linguistic tasks. An experiment was conducted with 45 native Spanish speakers involving a lexical decision task with repetition priming. There were four independent variables: task language, second language proficiency, degree of cognates (same and different), and repetition (repetition within languages, repetition between languages, no repetition). Results indicate the subjects had different reaction times depending on language used, proficiency, and repetition condition when considered

separately; there was no interaction of variables found. It is concluded that current theories about the organization of bilingual lexicon are oversimplified, and further research is needed.

Dong et al. (2005) proposed a shared, distributed, asymmetrical model for the bilingual mental lexicon. Two experiments were conducted to test the sharing of conceptual relations across translation equivalents. The first experiment used the classical priming paradigm and found shared storage for the conceptual representations of the bilingual's two vocabularies and asymmetrical links between concepts and lexical names in the two languages. The second experiment examined the details of meaning separation by eliciting semantic closeness rankings for conceptual relations that are equivalent across language translations and those that are not. The results indicate that bilinguals tend to integrate conceptual differences between translation equivalents, but that they also display a "separatist" tendency to maintain the L1 conceptual system in the representation of L1 words and to adopt the L2 conceptual system in the representation of L2 words.

Isel (2010) carried out a functional magnetic resonance study to examine the effect of neural maturation on the attainment of lexical knowledge in L2 via a cross-linguistic neural adaptation paradigm. It was suggested that, as for grammatical knowledge, the attainment of lexical knowledge in L2 is affected by neural maturation. The findings also supported neurocognitive models of bilingual word recognition postulating that, for both early and late bilinguals, the two languages are interconnected at the conceptual level.

Both the theoretical models and experimental researches on bilingual mental lexicon point to the integrative nature of bilingual mental lexicon, with a common and shared conceptual level whereas the L2 mental lexicon becoming more sophisticated and self-contained as the L2 proficiency level enhances. When words with lexical meanings are concerned, they automatically activate L1partners in mental lexicon (Elke, 2012). Originally the conceptual meaning of an L2 word is accessed through L1translation equivalent; through constant lexical activation and access as takes place in language comprehension and production tasks, the connections between L2 items and their conceptual meanings become stronger and associations among L2 items become tighter.

### BILINGUAL MENTAL LEXICON AND TRANSLATION

Theoretical models and experimental studies of bilingual mental lexicon point to the existence of L1 items and their translation equivalents. The structure and evolution of bilingual mental lexicon necessitate translation, justifying translation as a cognitive process. Learners' knowledge of L2 vocabulary grows with the mediation of L1. This is in accordance with the cognitive mechanism of the brain – the processing of new information on the basis of old information or knowledge, considering the limitations of both the working and the long-term memory. Translation reduces the load on working memory (Cohen and Brooks-Carson 2001).With accumulated exposure to L2 input and language use, the L2 system grows more independent and autonomous, resulting in less recourse to L1.

**Table 1.** Target words and frequency (freq.) of students' translations

| Target word | freq.≥7 | freq. 6 | freq. 5 | freq. 4 | freq. 3 | freq. 2 | freq. 1 |
|---|---|---|---|---|---|---|---|
| package | package16 | | | | | bags, parcel | pack, packet, things |
| overtake | beyond7 | | | ahead of | | overtake, pass, beat | exceed, replace, instead of, overtake, beat, catch up with |
| retailers | sellers7 | | | businessman | retailer/sale businesses | shop | retail dealer, , grocer, tailors, sales, stores, dealers |
| platform | platform8 | | stage | | | center, store | net, flat, space, web, website, station |
| worthy | value7 | | | cost | | | count, worth, price |
| expansion | expand12 | develop | extend | | | | raise, become better, spread |
| no surprise | not surprising7 | | | not strange | no wonder | reasonable | undoubtedly, not special, common/not uncommon, comprehensible, amazing |

The construction of L2 mental lexicon can be promoted by translation activities. In other words, translation can strengthen the links and associations inside and outside of L2 mental lexicon.

In an exploratory study of the Chinese-English translation task of a Band 4 examination, the translations of 38 freshmen students in a Chinese university are analyzed. Seven key words and their translations are identified and the frequency of these translation equivalents is calculated. The results are listed below in Table 1.

Apparently these translation equivalents are not randomly chosen by students, differing from the target words semantically or syntactically as synonyms, hyponyms or paraphrases and composing a comprehensive pictur3e of semantic field. After the analysis of students' versions of translation, some generalizations can be made. Students tend to get it right when nouns and verbs are concerned, especially where literal translation can be applicable; the frequency of different translations may reflect the general developmental route of L2 mental lexicon in learners. Undoubtedly in the translation process learner's internal knowledge of L2 mental lexicon (grammatical knowledge and collocations) and external associations with other lexicons are tapped into, consequently expanding and consolidating L2 mental lexicon.

## CONCLUSION

Translation is inevitable in SLA. Theoretical models and experimental studies of bilingual mental lexicon point to the existence of L1 items and their translation equivalents of L2. The cognitive process of translation finds its psycholinguistic origin in bilingual mental lexicon. Conversely, translation activities play an indispensable role in promoting the construction of L2 mental lexicon and ultimately SLA. With L1 translation equivalents, learners find the key and hold it to unlock the treasure of L2 mental lexicon. Translation activity may serve as a walking stick to assist learners to stand firm on the alien land of an L2 and gain strength and power in the acquisition process. The adoption of translation tasks in language classrooms can be justifiably useful in the acquisition of L2 vocabulary and the overall language system. Obviously with the enhancement of L2 proficiency, learners tend to have less recourse to L2 and accordingly translate less.

## REFERENCES

Abutalebi, J., Cappa,S. & Pernai, D. (2001). Bilingual Brain as Revealed by Functional Neuroimaging. *Bilingualism, Language and Cognition*. 4: 179-90.

Aitchison, J. (1987). *Mind: An Introduction to the Mental Lexicon*. Oxford: Basil Blackwell.

Cohen, A. D. and Brooks-Carson, A. (2001). Research on Direct versus Translated Writing: Students' Strategies and Their Results. *The Modern Language Journal*: 85, 169-188.

Dong, Yanping, Gui, Shichun & MacWhinney, B. (2005). Shared and Separate Meanings in the Bilingual Mental Lexicon. *Bilingualism: Language and Cognition*, 8 (3), 221-238.

Ellis, R. (2008). *The Study of Second Language Acquisition*. Oxford: Oxford University Press.

Grosjean, F. (1982). *Life with Two Languages: An Introduction to Bilingualism*. Cambridge, Mass: Harvard University Press.

Haastrup, K. & B. Henriksen. (1998). Acquisition: from Partial to Precise Understanding. In K. Haastrup and Viberg, A. (eds.): *Perspectives on Lexical Acquisition in a Second Language*. Lund: Lund University Press.

Hentschel, E. (2012). Translation as an Inevitable Part of Foreign Language Acquisition. In Witte, A. Harden, T., & Ramos de Oliveira Harden, A. (Eds.) *Intercultural Studies and Foreign Language Learning, Volume 3: Translation in Second Language Learning and Teaching*. Oxford: Peter Lang, 79-98.

Holmes, J. S. (1988). The Name and Nature of Translation Studies. In James S Holmes. Translated!: Papers on Literary Translation and Translation Studies.Amsterdam: Rodopi, pp. 66-80.

Hulstijn, J. H. (2007). Incidental Second Language Vocabulary Learning: a Reappraisal of Elaboration, Rehearsal and Automaticity. *Cognition and Second Language Acquisitio*n, 258-286. Beijing: World publication corporation.

Isel, F. (2010). Neural Circuitry of the Bilingual Mental Lexicon: Effect of Age of Second Language Acquisition. *Brain and Cognition*, 72 (2), 169-180.

Kroll, J. F., & Stewart, E. (1994). Category Interferences in Translation and Picture Naming: Evidence for Asymmetric Connection Between Bilingual Memory Representation. *Journal of Memory and Language,* 33, 149-174.

Leonardi, V. (2010). *The Role of Pedagogical Translation In Second Language Acquisition: From Theory To Practice*. Bern, New York: Peter Lang.

Li, hong. (2007). *Investigation on Bilingual Mental Lexicon and English Learning for Chinese L2 Learners L2 learners*. Chongqing: Chongqing University Press.

Maldonado, C. S. (1997). Lexical Processing in Uneven Bilinguals: An Exploration of Spanish-English Activation of Form and Meaning. *Edinburgh Working Papers in Applied Linguistics*, 8, 76-97.

Obler, L. K. (2007). Bilingual Lexica. In Gonia Jarema and Gary Libben (Eds.) *The Mental Lexicon: Core Perspectives*. Oxford: Elsvier.

Paribakht,T, & M. Wesche. (1993). Comprehension and Second Language Development in a Comprehension-based ESL Programme. *TESL Canada Journal,* 11: 9-27.

Perani, D., Paulesu, Sebastian-Galles, E. D., Duoux, E., Dehaene, S., Bettibardi, V., Cappa, S., Fazio, F. & Mehlcr, J. (1998). Bilingual Brain: Proficiency and Age of Acquisition in a Second Language. *Brain,* 121: 1841-52.

Schmitt, N. (1998). Incremental Acquisition of Second Language Vocabulary: a Longitudinal Study. *Language Learning,* 48: 281-317.

Singleton, D. (1999). *Exploring the Second Language Mental Lexicon*. Cambridge: Cambridge University Press.

Titford, C. (1985). Post-communicative Activity for Advanced Learners. In Christopher Titford & A.E. Hieke (Eds.) *Translation in Foreign Language Teaching and Testing*. Tubingen: Narr, 73-86.

Weinreich, U. (1953). *Languages in Contact*. The Linguistics Circle of New York, New York.

Witte, A. (2012). From Translating to Translation in Foreign Language Learning. In Witte, A. H., Harden, T. & Ramos de Oliveira Harden, A. (Eds.) *Intercultural Studies and Foreign Language Learning, Volume 3: Translation in Second Language Learning and Teaching*. Oxford: Peter Lang, 79-98.