A Review of Research on Trilinguals' Mental Lexicon Representation Structure

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Abstract: Structures of mental lexicon representation are fundamental in psycholinguistics. However, previous studies have either witnessed wide disparities or done little work in terms of relevant investigations into trilingualism. With increasingly thriving trilingualism, it is imperative to delve into the basic psycholinguistic question concerning trilingualism, and to lay a solid foundation for other relevant inquiries. This paper explains key terms, and reviews psycholinguistic studies of trilingualism with special foci on models proposed. Limitations of studies reviewed are summarized, and possible directions for future studies are given, with a view to addressing existing problems, and complying with the ongoing global trend.

1. Introduction

With advancement of globalization, trilingualism is becoming more and more prevailing. It is different from bilingualism, and unique in nature. Just as Herdina and Jessner argued [1,2], trilingualism not only produces a quantitative shift from bilingualism but, above all, it leads to a substantial change of quality in the speaker's language system(s). Clyne also pointed out that "the additional language complicates the operations of the processes" (p. 113) [3]. Given its more complicated nature, previous research on trilingualism is insufficient compared with that on bilingualism.

Trilingualism can be investigated from many perspectives, among which the psycholinguistic perspective has always been dynamic. However, despite the fact that many fruitful results in this regard have been obtained, these results can by no means be claimed reaching a consensus. More specific mappings within the trilingual models still await further work as well.

In light of the above, this paper intends to review, compare and comment on existing models and findings in terms of trilinguals' mental lexicon representation, with an aim to sort out possible directions for future studies in this regard.

2. Term explanations

2.1 Trilingual and trilingualism

In the current world, bilinguals are only too common and as it is there are many trilinguals, quadrilinguals, and people who can speak even more languages. However, most relevant studies, for example studies involving trilingualism, have been done within the framework of bilingual ones, and seldom has an attempt been made to single trilingualism out of bilingualism.

There, however, do exist sporadic studies into establishment of trilingualism as a concept in its own right. For example, Cook [4,5] argued that multicompetence is not an aggregate of several mono-competences, and that difference between monocompetence and multicompetence is not only that of degree, but also that multicompetent speakers have a different knowledge of their languages from that possessed by monolinguals. Hoffmann [6] pointed out that "certain social, cultural and, above all, psychological and personality-related factors may assume disproportionately high significance in influencing trilingual competence, as compared with their influence in the case of bilingual competence" (p. 2). She further elaborated that concerning language acquisition and use, trilinguals have a larger linguistic load, that in terms of communicative competence, trilinguals also possess more loads on the linguistic component and moreover may use all the more complex

strategies when it comes to pragmatic component, and that as regards language processing and metalinguistic awareness, a difference that goes beyond a quantitative one was spotted. For this reason, there is a much more complex picture for trilingualism and there are more types of trilinguals than there are of bilinguals.

Therefore, "trilingual" and "trilingualism" should be defined separately so as to indicate their uniqueness and independence as subjects of study of their own, and they are defined as "owning knowledge of three languages (or dialects) and capable of its use" and "phenomena and regularities about acquisition and use of three languages (or dialects)" respectively in the current paper.

2.2 Mental lexicon and its representation structure

2.2.1 Mental lexicon

The notion and hypothesis of "mental lexicon" were first put forward by Treisman [7]. According to the hypothesis, every language user has a mental lexicon (also known as internal lexicon), which is a systematic and easily accessible organization of words represented in the mind. "Systematic" and "easily accessible" were echoed by Gui [8] who encompassed mass storage and effective retrieval of words as two features of mental lexicon (p. 251). These two features are, at the same time, among mental lexicon's three distinctive characteristics from a book dictionary, in Aitchison's view [9]. According to her, mental lexicon contains much more information such as nonce words, and connotations and syntactic knowledge of existing words than a book dictionary does. Besides, in a normal sense, in daily communications, people spend much less time in searching for words in mental lexicon than in a book dictionary. She further pointed out that mental lexicon has a different way of organization, which has long been where researchers' interests lie, and which is to be discussed later in more details.

Following studies in this regard [10-13] abound in their findings and diversity of opinions. It is, however, generally agreed on that mental lexicon consists of numerous lexical entries and that a lexical item is perceived or retrieved if its activation exceeds its threshold.

Brief definitions are also found in many reference books. For example, Oxford Concise Dictionary of Linguistics defines "mental lexicon" as "a lexicon as assumed by psycholinguists to be represented in the minds of speakers" [14]. The Routledge Linguistics Encyclopedia (3rd Edition) explains "mental lexicon" as "an active store in which lexical items are collected and organized" [15].

2.2.2 Mental lexicon representation structure

How information of words is organized within mental lexicon has been a topic of study for many researchers, and the pattern is usually called mental lexicon representation structure in literature.

The Routledge Linguistics Encyclopedia (3rd Edition) counts the following as "central" types of information stored with a lexical item, namely "semantic representation", "lexical category or word class", "syntactic properties", "morphological properties and internal structure" and "phonetic-phonological form" [15]. Carroll [10] summarized that "our stored knowledge of word includes phonological, syntactic, morphological, and semantic aspects" (p. 110). It can be seen as an academic consensus that morphological, phonological, syntactic and semantic information of lexical items all lie in mental lexicon [16].

As to arrangement of the above information in mental lexicon, some scholars [17] named two parts, namely lemma where semantic and syntactic information of a word is represented and lexeme, which houses phonological and morphological aspects of a word. Other researchers [18] classified mental lexicon representation into three parts, which are phonological, orthographic and semantic representations. Among them, phonological representation harbors phonological codes enabling a word's pronunciation; orthographic representation contains a word's morphological properties; semantic representation consists of a word's meanings. They further pointed out that phonological and orthographic representations constitute the form level of a word while semantic representation is the conceptual level.

A closer look at the above two classifications enables one to conclude that despite all their

differences, mental lexicon representation is generally believed to have a two-fold storage of all information, namely storage for phonological and morphological information and that for semantic and syntactic aspects of words. Later studies may have different findings or classifications of mental lexicon representation, but they more or less share the above view. Despite the facts that mental lexicon representation structure is becoming more and more complex, and that sub-lexical exploration is increasingly elaborate, most psycholinguists maintain that mental lexicon representation generally consists of conceptual representation and lexical representation [19].

In a word, it is generally held that mental lexicon representation contains conceptual representation and lexical representation, two separate but closely interconnected parts.

3. Relevant previous models and findings

Meara [20] maintained that the L1 mental lexicon is qualitatively different from the mental lexicons of other languages. This shows favor for separate storage. Similar arguments are found in Chomsky [21] and Fodor [22]. Evidence also comes from studies on multilinguals' aphasia and language loss [23].

On the other hand, there is also research that opposes separate storage. Cook [24] believed in the complete integration of language competence across several languages, and Franceschini et al. [25] concluded, with the aid of brain-imaging, in Szubko-Sitarek [26]'s words, that "lexical-semantic aspects of the processing of all languages known to an individual are subserved by essentially the same areas of the cortex" (p. 81). More evidence for this view comes from A. Dijkstra [27], and T. Dijkstra and van Heuven [28].

Modeling was also attempted. Herwig [29] proposed one, and in her view, the mental lexicon is comprised of "dynamically interacting subsystems of a common linguistic system, subject to individual variation and change over time" (p. 115). She mentioned that similar to the developmental pattern of mental lexicon during L2 acquisition, in L3 acquisition, there is an extended system, in which L3 is strongly related to either L1 or L2, and that with advancement of L3 proficiency, L3 network gradually picks up its independence. As to whether it is L1 or L2 that is closely associated with L3 in the initial stage of L3 learning, and structure of mental lexicon representation, Herwig [29] stated that "the structure of the lexicon, the connectivity of its subsystems and their interrelation depend on a number of factors, such as perceived linguistic distance, proficiency of the user, or method of acquisition" (p. 115), without giving a clear-cut answer.

Singleton [30] put forward another model. He analyzed empirical data and concluded that in the initial L3 learning stage, L3 is subordinate to the language, which is typologically closer. He hypothesized that the second stage of L3 learning features a compound pattern of L3 representation and of representation of the language closely associated to L3 in the initial stage, signifying that the two languages are mainly connected via the shared concept only. He further inferred that in the most advanced stage of L3 learning, all three languages are likely to develop a coordinate structure, having separate conceptual and lexical representations each, and a high degree of connectivity therein.

Yet another model is called the Parasitic Model, which was originally to explain bilingual mental lexicon development, and applied to trilinguals' case later. This model is based on people's ability to detect similarity between new lexical items and existing lexical knowledge, and to further integrate both. Hall and Ecke [31] held that this ability is "essential for the development of conceptual relations and networks as well as for the acquisition and organization of the mental lexicon" (p. 71). According to this model, "new lexical representations will be integrated where possible, into the rest of the network via connections with preexisting representations… at points of similarity or overlap between them" [31]. Szubko-Sitarek [26] described the model as integrating new vocabulary with previous lexical knowledge "with the least possible redundancy and as rapidly as possible" (p. 82). Similarly, this model makes no detailed comments on how the trilingual mental lexicon is structured.

Gabryś-Barker [32] proposed an adaptation of the revised hierarchical model for multilinguals (illustrated in Figure 1).

It is believed that, in the multilingual memory words are accessed either via lexical links or conceptual links depending on a set of factors, such as language dominance in the multilingual competence and performance of a learner, language proficiency in all the languages, the form of a linguistic task, and the type of a linguistic stimulus [32].

However, this model is also only a vague one, which emphasizes a host of possible influencing factors, yet remains unclear as to how these factors exert effects and interact with each other.
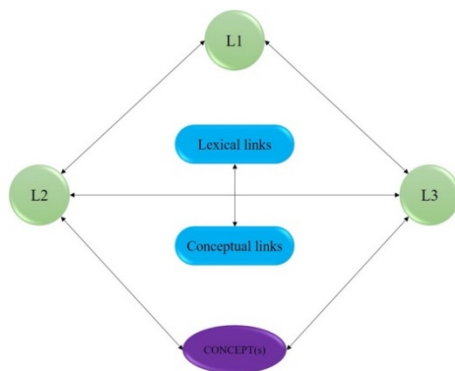
Figure 1 Model of multilingual memory representation [32]

Cui [33] had a trilingual study involving Mandarin, and mapped out the following mental lexicon representation structure for Tibetan-Mandarin-English trilinguals (Figure 2).
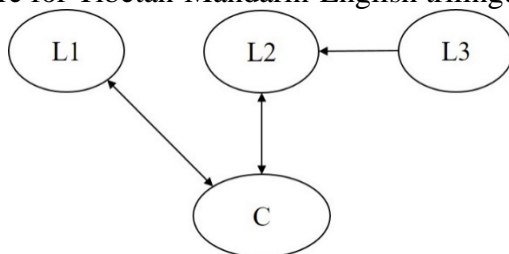
Figure 2 Tibetan-Mandarin-English trilinguals' mental lexicon representation [33]

The above five trilingual mental lexicon representation models may serve as the starting point for future relevant studies.

4. Limitations of previous studies

Previous relevant studies have at least four limitations sorted out as follows.

First of all, studies on trilinguals' mental lexicon representation are far fewer than those in bilinguals' case and given the more complicated nature of trilingualism, more studies should be done. Worse still, in the field of trilingualism, studies looking into mental lexicon representation models are far lacking in quantity and comparisons and contrasts can only be the next step.

Moreover, instruction language as a factor in influencing trilinguals' mental lexicon representation has not been investigated profusely. Mixed statuses as mother tongue and instruction language of one language serve as one of the reasons, yet should not inhibit academic efforts into gaining more insights on this factor unique to trilingualism compared with bilingualism. Flaws, however, can still be spotted with studies that did look into this factor. For instance, in Cui and Zhang Jijia [34], Tibetan as mother tongue is contrasted with Mandarin as instruction language in Tibetan-Mandarin-English trilinguals' mental lexicon representation. In fact, strengths of interlingual connections may be swayed by a host of other factors, including language proficiency level, the context of their acquisition and use, orthographic similarity or difference and the frequency of coactivation of particular word pairs [35,36]. Other differences between Tibetan and Mandarin are indeed also prominent, such as orthographic one and it is dangerous to jump into a

conclusion that any phenomenon concerning for example, conceptual access for L3 English is caused by the two languages' different statuses, instead of any other factor or a combination of factors.

A closer look at the not so many psycholinguistic studies of trilingualism involving Mandarin in the language repertoires of participants will render a conclusion that a common point with these studies is that their participants have native or near native level of Mandarin or that they acquire Mandarin either as mother tongue or from very early ages. Overseas relevant studies involving Mandarin are mostly bilingual ones yet still with Mandarin as L1 in most cases. These studies set brilliant examples in exploring mental lexicon representation of speakers of languages that are orthographically much dissimilar. Nevertheless, little knowledge can be obtained about the process of learning Mandarin as a foreign language, which is a prevailing phenomenon now. This gap, however, is incompatible with the status quo and the increasingly strong discourse power of Mandarin.

In addition, most studies are not dynamic ones to include developmental trajectories of mental lexicon representation as their subject of investigation. However, only by possessing such knowledge can one grasp the learning process and be enlightened with the nature of learning a foreign language.

5. Conclusion

Despite abundant relevant studies and models built, psycholinguists have yet reached a consensus concerning trilinguals' sharedness or separateness of conceptual and lexical storage patterns, and symmetry or asymmetry in terms of link strength in mental lexicon representation. Among the few existing psycholinguistic investigations into trilingualism, participants with Mandarin as L3 have been scarcely studied, which is incompatible with the evergrowing demand for overseas Mandarin education, let alone the dynamic trajectories. "Instruction language", as a unique factor of trilingualism compared with bilingualism, is also rarely looked into. In light of the above, future studies can address these limitations by involving Mandarin as L3 to contribute research results and observations to the already much inadequate psycholinguistic investigations into trilingualism, and to add to extensiveness of relevant studies. Future studies may also delve into roles of instruction language, and take a developmental perspective to examine trilinguals' mental lexicon representation.

Acknowledgements

References

[1] Herdina, P., & Jessner, U. (2002). A dynamic model of multilingualism. Clevedon: Multilingual Matters.

[2] Jessner, U. (2013). Dynamics of multilingualism. In C. A. Chapelle (Ed.), The encyclopedia of applied linguistics (pp. 1798-1805). Chichester: Wiley-Blackwell.

[3] Clyne, M. (1997). Some of the things trilinguals do. International Journal of Bilingualism, 1(2), 95-116.

[4] Cook, V. J. (1992). Evidence for multicompetence. Language Learning, 42(4), 557-591.

[5] Cook, V. J. (1993). Wholistic multicompetence: Jeu d'esprit or paradigm shift? In B. Kettemann & W. W. Wieden (Eds.), Current issues in European second language research (pp.4-8). Tübingen: Gunter Narr.

[6] Hoffmann, C. (2001). Towards a description of trilingual competence. The International Journal of Bilingualism, 5(1), 1-17.

[7] Treisman, A. M. (1960). Contextual cues in selective listening. Quarterly Journal of Experimental Psychology, 12(4), 242-248.

[8] Gui, S. C. (2000). Psycholinguistics (New edition)]. Shanghai: Shanghai Foreign Language Education Press.

[9] Aitchison, J. (2003). Words in the mind: An introduction to the mental lexicon (3rd ed.). Oxford: Blackwell Publishing Ltd.

[10] Carroll, D. W. (2008). Psychology of language (5th ed.). Beijing: Foreign Language Teaching and Research Press.

[11] Marslen-Wilson, W., Tyler, L. K., Waksler, R., & Older, L. (1994). Morphology and meaning in the English mental lexicon. Psychological Review, 101(1), 3-33.

[12] Shu, H., Bai, X. L., Han, Z. Z., & Bi, Y. C. (2003). The theory on lexical representation and processing and its evidence from cognitive neuropsychology. Chinese Journal of Applied Psychology, 9(2), 41-45.

[13] Zhang, Y. H. (1998). Mental representation and lexicographic definition [Electronic version]. Modern Foreign Languages, (3): 46-61.

[14] Matthews, P. H. (2000). Oxford concise dictionary of linguistics. Shanghai: Shanghai Foreign Language Education Press.

[15] Malmkjaer, K. (2010). The Routledge linguistics encyclopedia (3rd ed.). New York: Routledge.

[16] Zhang, X. S. (2012). Research on vocabulary teaching in the classroom in TCFL from a perspective of cognitive psychology. Ph.D. dissertation. Central China Normal University.

[17] Levelt, W. (1989). Speaking from intention to articulation. Cambridge, MA: MIT Press.

[18] Dijkstra, T., & van Heuven, W. J. B. (1998). The BIA model and bilingual word recognition. In J. Grainger & A. M. Jacobs (Eds.), Localist connectionist approaches to human cognition (pp.189-225). Mahwah, NJ: Lawrence Erlbaum Associates.

[19] Gao, L. Q., Meng, L., & Liu, Z. J. (2003). An experimental study of Japanese-Chinese bilingual's mental lexicon representation structure. Contemporary Linguistics, 5(2): 120-132.

[20] Meara, P. (1982). Word associations in a foreign language. Nottingham Linguistics Circular, 11(2), 29-38. Retrieved from http://www.nottingham.ac.uk/research/groups/cral/documents/nlc/nlc-1980-1985/nlc-volume11-number2-dec82.pdf

[21] Chomsky, N. (1988). Language and problems of knowledge. Cambridge, MA: MIT Press.

[22] Fodor, J. (1989). Why should the mind be modular?. In A. George (Ed.), Reflections on Chomsky (pp: 1-22). Oxford: Basil Blackwell.

[23] Smith, M. C. (1997). How do bilinguals access lexical information?. In A. M. B. de Groot & J. F. Kroll (Eds.), Tutorials in bilingualism: Psycholinguistic perspectives (pp: 145-168). Mahwah, NJ: Lawrence Erlbaum Associates.

[24] Cook, V. J. (2007). Multi-competence: Black-hole or worm-hole for second language acquisition research. In Z. Han (Ed.), Understanding second language process (pp. 16-26). Clevedon: Multilingual Matters.

[25] Franceschini, R., Zappatore, D., & Nitsch, C. (2003). Lexicon in the brain: What neurobiology has to say about languages. In J. Cenoz, B. Hufeisen & U. Jessner (Eds.), The multilingual lexicon

(pp: 153-166). Dordrecht: Kluwer Academic Publishers.

[26] Szubko-Sitarek, W. (2015). Multilingual lexical recognition in the mental lexicon of third language users. Heidelberg: Springer.

[27] Dijkstra, A. (2003). Lexical storage and retrieval in bilinguals. In R. van Hout, A. Hulk, F. Kuiken & R. Towell (Eds.), The lexicon-syntax interface in second language acquisition (pp. 129-150). Amsterdam: John Benjamins.

[28] Dijkstra, T., & van Heuven, W. J. B. (2002). The architecture of the bilingual word recognition system: From identification to decision, Bilingualism: Language and Cognition, 5(3), 175-197.

[29] Herwig, A. (2001). Plurilingual lexical organisation: Evidence from lexical processing in L1-L2-L3-L4 translation. In J. Cenoz, B. Hufeisen & U. Jessner (Eds.), Cross-linguistic influence in third language acquisition: Psycholinguistic perspectives (pp. 115-137). Clevedon: Multilingual Matters.

[30] Singleton, D. (2002). Cross-linguistic interactions in the multilingual mental lexicon. In M. Hooghiemstra (Ed.), Proceeding of the second international conference on third language acquisition [CD]. Leeuwarden: Fryske Akademy.

[31] Hall, C. J., & Ecke, P. (2003). Parasitism as a default mechanism in L3 vocabulary acquisition. In J. Cenoz, B. Hufeisen & U. Jessner (Eds.), The multilingual lexicon (pp. 71-85). Dordrecht: Kluwer Academic Publishers.

[32] Gabryś-Barker, D. (2005). Aspects of multilingual storage, processing and retrieval. Katowice: Wydawnictwo Uniwersytetu Śląskiego.

[33] Cui, Z. L. (2008). A psychological study on Tibatan-Mandarin-English trilinguals' representation and processing. Ph.D. dissertation. South China Normal University.

[34] Cui, Z. L., & Zhang, J. J. (2009). A research on lexical and conceptual representations in Tibetan-Mandarin-English trilinguals. Psychological Science, 32(3): 559-562.

[35] De Groot, A. M. B. (1995). Determinants of bilingual lexicosemantic organization. Computer Assisted Language Learning, 8(2-3), 151-180.

[36] Marian, V. (2009). Audio-visual integration during bilingual language processing. In A. Pavlenko (Ed.), The bilingual mental lexicon: Interdisciplinary approaches (pp. 52-78). Bristol: Multilingual Matters.