Mnemonic Strategies in Learning Chinese as a Foreign Language through Computer-Assisted Learning Process

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Abstract. In the case of learning Chinese as a foreign language, learners whose native language is a derivative of Roman language always have problems in associating Chinese pronunciation (acoustic code) with the Chinese characters (non-alphabetic code). This problem arises because the learner's native language is fundamentally different from Chinese. Roman languages are based on a phonological - alphabetical system while Chinese language is based on a pictographic-semantic system (sometimes called logographic language). For Roman language speakers to learn Chinese, it requires a different learning strategy. This study proposed to use keywords in combination with pictographs enhanced learning Chinese words in the practice of computer-assisted instruction.

**Keywords:** mnemonic strategies, pictograph method, keyword method, visual Imagery, cognitive process.

Introduction

There is no single instructional method that will fit all kinds of learning. Since learning tasks are different, they require different strategies to fulfill the learning purposes (Tulving, 1978). In the case of learning Chinese as a foreign language, learners whose native language is a derivative of Roman language always have problems in associating Chinese pronunciation (acoustic code) with the Chinese characters (non-alphabetic code). This problem arises because the learner's native language is fundamentally different from Chinese. Roman languages are based on a phonological - alphabetical system while Chinese language is based on a pictographic - semantic system (sometimes called logographic language). For Roman language speakers to learn Chinese, it requires a different learning strategy. In this study the researcher hypothesized that using keywords in combination with pictographs enhanced learning Chinese words.

Statement of Problems

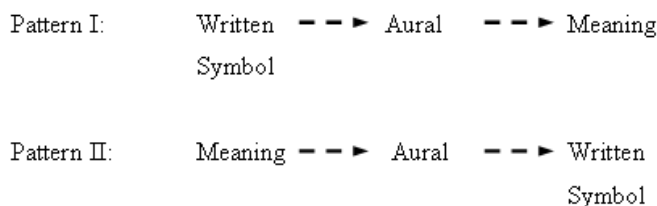In the case of learning Chinese as a foreign language, learners whose native language is English may have problems in associating Chinese pronunciation with the Chinese characters. Liu (1978, p.154) has diagrammed the two different neurolinguistic pathways (see Schema 1 and 2) that are used to transform the different language systems.
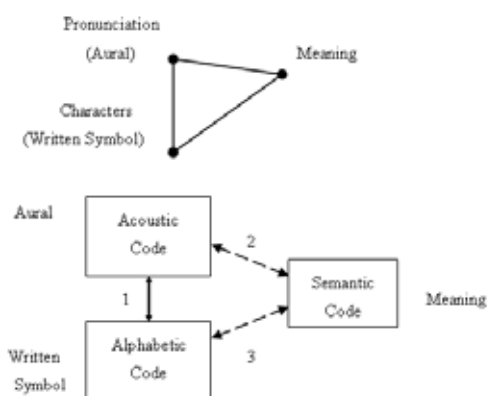

Schema 1: Diagram of the Roman Language System

First, an English learner can automatically associate the acoustic code with the alphabetic code. Second, one may learn the meaning of the acoustic code when s/he hears others say the word during daily life. Third, even if a learner can read the Eng-

lish alphabetic code aloud perfectly, s/he may or may not understand what s/he reads. So, the learning pattern can be as follows:

Pattern I: Written - - ► Aural - - ► Meaning
Symbol

Pattern II: Meaning - - ► Aural - - ► Written
Symbol

The meaning seems to be "disconnected" from written symbols in the course of an automatic and inevitable cognitive process (Broida, 1979). Acoustic links serve as an "undirected intermediary" between semantic code and alphabetic code.

Pronunciation (Aural) → Meaning
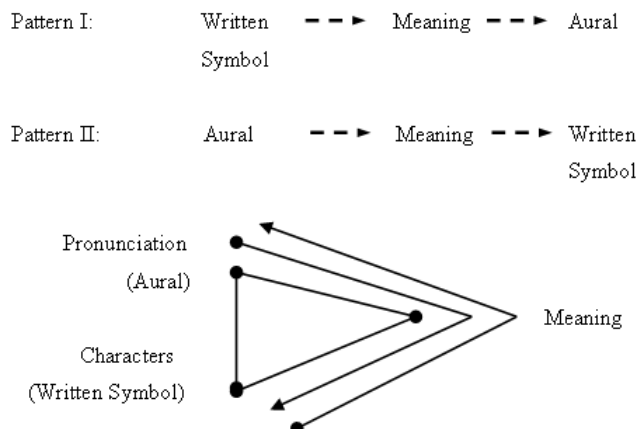
Alphabetic Code (Written Symbol)
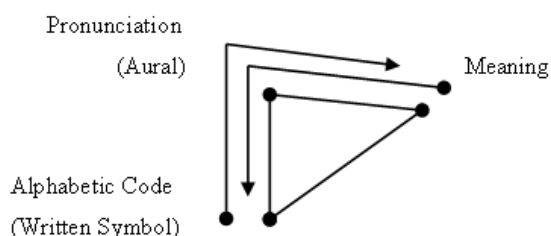
In contrast, the Chinese language strongly associates the character code with the semantic code from the beginning. Second, native speakers learn the meaning of the acoustic code from their daily lives. Third, even if a second language learner can read the Chinese character silently, s/he may or may not know how to pronounce what s/he has read. Chinese characters represent written symbols that map into meaningful units rather than phonemes.

Aural — Acoustic Code — 2 — Semantic Code — Meaning
3
Written Symbol — Character Code — 1
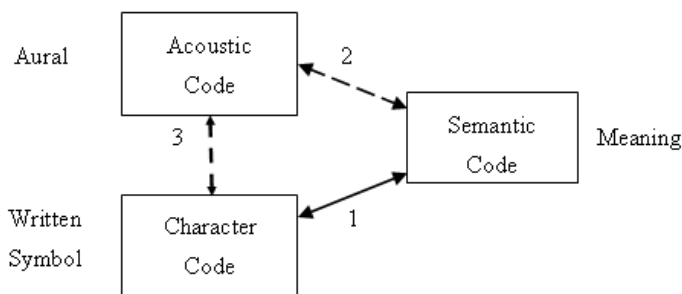
Schema 2: Diagram of the Chinese Language System

The meaningful link serves as an "undirected intermediary" between the acoustic code and the character code/written symbol. Therefore, a mnemonic learning strategy that can provide a visual link and a meaningful link is expected to enhance both recognition of Chinese characters and recall of the meanings of Chinese characters. And then a mnemonic strategy that can provide an acoustic link and a meaningful link is expected to enhance recall of the meanings of Chinese pronunciations.

Pattern I: Written   - - ►   Meaning   - - ►   Aural
                    Symbol

Pattern II: Aural   - - ►   Meaning   - - ►   Written
                                                         Symbol

Pronunciation
(Aural)

Characters
(Written Symbol)   Meaning

Review of the Literature

Mnemonic Devices - the Origin of the Keyword Method

Atkinson and his associates introduced the keyword method in 1975. A number of studies on keyword method and vocabulary learning have been done since then. The keyword method has been proven to be one of the most effective methods in learning foreign languages (Pressley, Levin, and Delaney, 1982; and Pressley and Levin, 1985).

The keyword method is a two-stage learning strategy, As Atkinson and Raugh (1975) wrote:

The first stage requires the subject to associate the spoken foreign word with the keyword, an association that is formed quickly because of acoustic similarity. The second stage requires the subject to form a mental image of the keyword "interacting" with the English translation; this stage is comparable to a paired-associate procedure involving the learning of unrelated English words. To summarize, the keyword method can be described as a chain of two links connecting a foreign word to its English translation. The spoken foreign word is linked to the keyword by a similarity in sound (what I call the acoustic link), and in turn the keyword is linked to the English translation by a mental image (what I call the imagery link). (p.821)

This strategy makes an association between the new foreign word (unfamiliar) and the meaningful imagery link (familiar). This meaningful link not only helps encode the foreign word to the image, but also helps decode the image of the keyword into the foreign word form. The keyword should be an English word that sounds like some part of the foreign word (Solso, 1991, p.241). For example, "pato" is the Spanish word for "duck", we can use "pot" as the keyword for an acoustic link, such as a drawing can be a pot cover a duck's head.

The Chinese word "breastfeed" (pronounced somewhat like "ROO") contains a sound that resembles the spoken English word "root," such a similar sound English word then becomes a keyword. Next, a learner could form a mental image — combing the keyword and the English meaning — something like the drawing (See Figure 1). Hence, the keyword method provides an acoustic link and a meaningful link to help the learning of meaning of pronunciation.
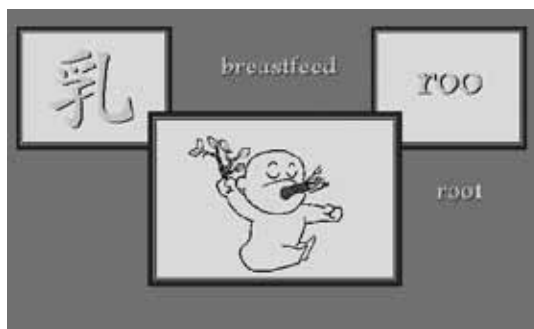

Figure 1. Experimental group study package sample (the keyword method)

Sweeney and Bellezza (1982) also stated that the phonetic link (sometimes called acoustic link) was easily formed. They wrote, "It was easier for the keyword subjects to remember the two associations forming the phonetic link and the imagery

link than it was for the context subjects to remember the one link connecting the new vocabulary word to its definition."

According to the studies above, it seems quite reasonable to utilize the keyword method in facilitating the association of pronunciation and meaning when learning Chinese words. However, the keyword method does not positively affect all aspects of vocabulary learning. Data from previous studies show that the keyword method fails to enhance aspects of vocabulary learning other than the meaning recall of foreign words (so-called forward recall), such as pure response learning tasks – free recall or recognition (Pressley, Levin, Hall, Miller, and Berry, 1980; Pressley and Levin, 1981; and Pressley, Levin, Kuiper, Bryant, and Michener, 1982).

On the basis of numerous empirical investigations (Pressley, Levin, Hall, Miller, and Berry, 1980; Pressley and Levin, 1981; Levin, Shriberg, Miller, McCormick and Levin, 1980; and Levin, Berry, Miller, and Bartell, 1982), research has provided the solution for this problem, e.g., providing the treatment of pre-familiarized target items before conducting the keyword strategy. This pre-familiarized treatment would enhance word recognition in alphabetical language. (Baddeley, 1976). In the other words, another mnemonic cue must be added to this mnemonic strategy to stimulate and retrieve the diminished stimulus to the original target item.

The alphabetic and logographic language systems apparently activate different coding and memory mechanisms. Chinese characters produce a more integrated code involving written symbols and meanings of initial information in memory (Liu, 1978; and Chen and Juola, 1982). A second language learner will confront more difficult tasks in retrieving Chinese characters than in retrieving alphabetic words from the acoustic link of the keyword. Especially for recognizing Chinese characters, the strategy must provide an extra-functional cue to facilitate the Chinese character learning. A similar conclusion can be drawn from Ho's (1984) and Yu's (1987) studies. The final results of those studies generally supported the initial supposition concerning "which phase of memory is affected by what type of cognitive cue." On the other hand, in recognition learning of Chinese characters it needs a mnemonic that provides a perceptual link only.

Mnemonic Devices — the Origin of the Pictograph Method

In fact, the Chinese written symbols directly represent "ideas" and "meanings" rather than "abstract words" which were gradually developed by conventionalized, stylized, and systematized language forms such as pictographs and ideograms. The modern Chinese characters have evolved over the years, making them less and less concrete. The result is that the modern Chinese characters are far more abstract than the ancient Chinese forms. Teach a foreign language learner to learn the Chinese characters, the teacher can make the learning much easier by relating modern Chinese characters to ancient Chinese forms, which are more concrete (Mickel, 1984; and Laychuk, 1983).

However, the ancient Chinese forms are still relatively abstract, so in order to make the learning even easier, realistic pictures can be used to relate to the ancient Chinese forms. Then the learner can link the realistic pictures to the modern Chinese characters by using the ancient Chinese forms as mediators. In addition, the learner may then be able to point out the hidden concepts and understand the patterns of pictographic origins (the ancient form) behind all of the evolutionary forms of the Chinese characters (e.g. breastfeed by a picture of "a mother holds her baby to breastfeed him", see Figure 2).

乳   breastfeed

A mother holds her baby to breastfeed him

Figure 2. Experimental group study package sample (the pictograph method)

This idea is congruent with Paivio's theory. As he wrote "…concrete word logograms have more direct connections with referent imagers than do abstract words" (Paivio, 1986, p.123). The modern (Chinese) word and pictograph are semantically differentiated by the degree of availability

of referential interconnection (Paivio, 1986), and for this purpose the utilization of a realistic picture as a mediator is helpful. Further, pictures have a clearly facilitating effect when used as stimulus or cue items (Postman, 1978).

Mnemonic Devices — Summary

In this study, it seems interesting and valuable, therefore, to test whether the keyword method can facilitate the learning of the meaning of Chinese word with the phonetic sign test cue. The keyword method was found not to facilitate the learning of word recognition or word recall in the previous study. The empirical studies and Baddeley's (1976) theoretical belief cited above indicate that providing another mnemonic strategy in company with the keyword method can enhance the learning of word recognition or word recall. Based on the previous findings and the literature on the development of the Chinese characters, the pictograph method is the appropriate mnemonic strategy to enhance the learning of Chinese characters and meanings. The study is also supported by Levin's (1981) theoretical belief stating that while the keyword method provides the transformational imagery as acoustic and meaningful cues, the pictograph method provides the representational imagery as perceptual and meaningful cues. The combination of operating these two strategies might produce a powerful effect on learning Chinese words.

Research

The main purpose of the study was to test the effectiveness of the combined pictograph and keyword methods for enhancing the learning Chinese as a second language. The proposed strategy — the combined method — was based on the theory of the educational psychology, the previous findings and the literature on the development of the Chinese characters, and the research findings and the practice experience of the computer-assisted instruction.

The study assumed that the use of the pictographic strategy plus the keyword strategy would enhance Chinese words learning by providing a more integrated code involving written symbols pronunciation, and meaning. Since the pictographic mnemonic that served both cognitive functions in providing a perceptual link and a meaningful

was expected to enhance both recognition of Chinese characters and the recall of the meanings of Chinese characters. The keyword method mnemonic that served both cognitive functions in providing an acoustic link and a meaningful link was expected to enhance both recall of meanings and pronunciations of Chinese characters.

In addition, the new methods and techniques of the computer-assisted instruction learning environment have provided the possibility of the design and the development of the combined pictograph and keyword method in this study.

41 male and female junior high school students who are native English speakers were asked to take a Chinese words pretest, those who got zero testing result would be asked to participate in the experiment. Hence, all subjects for sure, had no knowledge of Chinese words prior to the experiment. The subjects were randomly assigned in to two groups to study 20 Chinese words. The experimental group was assigned to learn by using the combined pictograph and keyword methods while the control group was assigned to learn without any specified method.

The effectiveness of the immediate recall on the combined method in learning Chinese words would be examined in the study. From the t-test table (see Appendix) it showed that the mean scores of the posttest of the experimental group (= 5.85) were statistically significant higher than the posttest score of the control group (= 2.95).

The outcome of the present study, together with the outcomes of the prior studies (Ho 1984 and Yu 1987), suggested that the combined pictograph and keyword method (e.g. experimental group) did result in significantly better performance on the recalls of Chinese characters, their meanings and pronunciations than not providing any method (e.g. control group) at all.

It would be of interest to study the individual difference variables that can be included to investigate differences in age levels, cognitive styles, verbal abilities, etc, with relation to pictograph method and the keyword method.

Second, the combined pictograph method and the keyword method should be evaluated in an actual teaching situation to test whether or not the pictograph method and the keyword method can be implemented effectively in actual (Chinese) foreign language courses. "In the real world of

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learning second languages, students are expected to rehearse, individually and in groups, outside of class; thus, we argue that evidence of spontaneous rehearsal during the retention interval is desirable to evaluate the effectiveness of a teaching method" (Fritz et al, 2007, p519). "Retrieval practice and the keyword method offer considerable opportunities to help learners of all ages and in many situations to acquire new information with speed, reliability and comparative ease. These techniques can be organized by teachers on behalf of a class or group and used as an effective way of spending class time. Teaching students to use the techniques independently as well, could extend the effectiveness of the method and equip them with effective learning strategies for wider application" (Fritz et al, 2007, p520).

Finally, a replication of the present experiment with a long term learning variable will shed light on the effectiveness of the pictograph method and the keyword method in learning Chinese words. Gruneberg commented the keyword method as "highly advantageous when compared to rote learning", but "it is still an open question as to whether keyword usage is advantageous on motivational grounds alone" (Gruneberg, 1998, p.532). One major concern surrounding this mnemonic is its effectiveness in testing long term learning. The keyword method seems to work best when learning concrete nouns and when it is tested immediately. Ashcraft (2002) suggested that the effectiveness of the keyword method is in the long term learning and the subsequent retrieval.

The limitation to generalizing from this study's results needs to be pointed out. One of the limitations is that not all of the Chinese words can be learned by the pictograph method and the keyword method. The other limitation is that since this study as well as many other similar studies did not apply randomized selection of subjects, the results of the study might not be generalized to the whole population of Secondary School students of International School Bangkok.

Reference

Ashcraft, M. H. (2002). *Cognition* (3rd ed.), Upper Saddle River, New Jersey: Pearson Education.

Atkinson, R. C. (1975). Mnemotechnics in second language learning. *American Psychologist, 30*, 821-828.

Baddeley, A.D. (1976). *The psychology of memory.* New York: Basic Books.

Bellezza, F. S. (1981). Mnemonic devices: Classification, characteristics, and criteria. *Review of Educational Research, 51,* 247-275.

Broida, H., (1979). *Communication breakdown of brain injure adults.* College Hill Press.

Chen, Hsuan-Chih and Juola, J. F. (1982). Dimensions of lexical coding in Chinese and English. *Memory& Cognition, 10,* 216-224.

Fritz, C. O., Morris, P. E., Action, M., Voelkl, A. R., & Etkind, R. (2007). Comparing and combining retrieval practice and the keyword mnemonic for foreign language learning. *Journal of Applied Cognitive Psychology*, *21*, 499-526.

Gruneberg, M. M. (1998). A commentary on criticism of the keyword method of learning foreign languages. *Journal of Applied Cognitive Psychology*, *12*, 529-532.

Ho, Hing-Kay (1984). Two experiments on the effects of mnemonic strategies: Is it mode or cognitive function that influences learning? *ECTJ, 32,* 89-100.

Laychuk, J, L. (1983). The use of etymology and phonetic symbols in teaching first year Chinese. *Proceedings of the Annual Meeting of the American Council on the Teaching of Foreign Languages*, San Franscisco, CA.

Levin, J. R. (1981). On functions of pictures in prose. In Pirozzolo, F. J. & Wittrock, M. C., *Neuropsychological and Cognitive Processes in Reading,* New York: Academic Press.

Levin, J. R., Berry, J. K., Miller, G, E., & Bartell, N. P . (1982). More on how (and how not) to remember the states and their capitals. *Elementary School Journal, 82,* 379-388.

Levin, J. R., Shriberg, L. K., Miller, G, E., McCormick, C. B., & Levin, B. B. (1980). The keyword method as applied to elementary school children's social studies content. *Elementary School Journal, 80,* 185-191.

Liu, Stella S. F. (1978). *Decoding and comprehension in reading Chinese cross-cultural perspectives on reading and reading research.* Dina Peitelson (Ed.), 144-156.

Michel, S. L. (1984). Right hemisphere and left hemisphere: Pedagogical implications for CSL reading. *Proceedings of the Annual Meeting of the Chinese Language Teachers Association*, Chicago, IL.

Paivio, A. (1986). *Mental representations: A dual coding approach.* Oxford University Press, New York.

Postman, L. (1978). Picture-word differences in the acquisition and retention of paired associates. *Journal of Experimental Psychology: Human Learning and Memory, 4*, 146-157.

Pressley, M., & Levin, J. R. (1981). The keyword method and recall of vocabulary words from definitions. *Journal of Experimental Psychology: Human, Learning and Memory, 7,* 72-76.

Pressley, M., & Levin, J. R. (1985). Keyword and vocabulary acquisition: some words of caution about Johnson, Adams, and Bruning. *ECTJ, 33,* 277-284.

Pressley, M., Levin, J. R., & Delaney, H. D. (1982). The mnemonic keyword method. *Review of Educational Research*, *52*, 61-91.

Pressley, M., Levin, J. R., Hall, J. W., Miller, G. E., & Berry, J. K.(1980). The keyword method and foreign word acquisition. *Journal of Experimental Psychology: Human Learning and Memory, 6,* 163-173.

Pressley, M., Levin, J. R., Kuiper, R. A., Bryant, S. L., & Michener, S. (1982). Mnemonic versus non-mnemonic vocabulary-learning strategies: additional comparisons. *Journal of Educational Psychology, 74,* 693-707.

Raugh, M. R., & Atkinson, R. C. (1975). A mnemonic method for learning a second-language vocabulary. *Journal of Educational Psychology, 67,* 1-16.

Solso, R. L. (1991). *Cognitive Psychology* (3rd ed..), New York: John Wiley & Sons.

Sweeney, C. A., & Bellezza, F. S. (1982). Use of the keyword mnemonic in learning English vocabulary. *Human Learning, 1,* 155-163.

Yu, Nai-Fen (1987). *Mnemonic strategies in learning Chinese as a second language.* (Doctoral dissertation), Indiana University.