LEXICAL AND SUB-LEXICAL PROCESSING OF CHINESE CHARACTERS IN CHINA, TAWAN AND HONG KONG

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Résumé : This study investigates the lexical and sub-lexical processing of Chinese characters in China, Taiwan and Hong Kong where the method of instruction of Chinese characters and the form of character used are different. A reading aloud task and an orthographic task were adminstered to forty participants in each place. The results showed that the processing is different depending on how a reader learns.

Mots-clés : Chinese characters, phonetic compounds, radical, reading aloud

1. Introduction of Chinese characters

The building blocks of alphabetic scripts like English and French are words made up of letters. In Chinese orthography they are the characters, which are square-like entities made up of combination of strokes. About 80% of all Chinese characters are phonetic compounds (Figure 1) which consist of a phonetic radical and a semantic radical giving clues on the pronunciation and meaning of the character respectively. Abundant studies have focused on phonetic compounds, but little is known on non-phonetic compounds. Taft & Zhu (1997) proposed a multilevel interactive-activation framework for the processing of Chinese words which comprises a word, character, radical and the smallest stroke level (Figure 3). However, it does not specify if the processing of phonetic compounds and non-phonetic is the same and what exactly the radical level comprises. Since phonetic radicals were proved to be important processing units in recent literature (Shu, Bi & Wu, 2003), it was hypothesized that phonetic radicals, which are often made up by two or three more smaller components, might also be represented in the model in the form of compound radicals which can be further decomposed into component radicals (Figure 2). Thus the main aim of this study is to investigate these two levels in an extended character processing model (Figure 4). A second aim is to find out if readers from China, Taiwan and Hong Kong process characters differently since the form of character used and the method of instruction are different in these three places: China uses simplified characters which contain less strokes while Taiwan and Hong Kong use the complex characters; and children in China and Taiwan learn a phonetic system first before characters while Hong Kong children just learn the association of character and sound by rote.

1.1. Lexical processing using a reading aloud task

In this study, one hundred and twenty native Chinese undergraduates and postgraduates aged between 18-30 from China, Taiwan and Hong Kong completed two experiments. In the first experiment, all subjects had to read aloud real and pseudo-characters. The real characters consisted of phonetic compounds and non-phonetic compounds of high and low frequencies. The pseudo-characters were pseudo-phonetic compounds made up by combining existing phonetic radicals and semantic radicals. The phonetic radicals used include consistent and inconsistent ones (consistency of a phonetic radical means the degree of consistency of pronunciation of characters with this phonetic radical) and also phonetic radicals that can be a standalone character (independent radicals) and those cannot (dependent radicals). A two-way ANOVA found a significant frequency effect for all three groups in reading real and pseudo-characters. A significant main type effect was found in the Taiwan and China groups when reading real characters - phonetic compounds were read faster than non-phonetic

compounds only in the China and Taiwan groups but not in the Hong Kong group. When reading pseudo-phonetic compounds, the consistency effect was found in all three groups, indicating that phonetic compounds with consistent phonetic radicals were read faster than those with inconsistent radicals. However, phonetic compounds with independent phonetic radicals were read significantly faster than those with dependent radicals only in the China and Taiwan groups but not in the Hong Kong group. These results suggest that in China and Taiwan, readers were more sensitive to the type of characters they read (they read phonetic compounds significantly faster than non-phonetic compounds) and they were more affected by the properties of phonetic radicals than the Hong Kong subjects when reading pseudo-characters, probably because of their phonetic training background.

1.2. Sub-lexical processing using an orthographic task

In the second experiment, the subjects participated in a character radical task, where the component radical in a pseudo-character was missing either in the upper or lower right corner. The subjects had to choose from three choices the one that they thought was most likely to be missing. Pseudo-characters with legal radical combinations were used to prevent the influence of the frequency of a real whole character. Three factors were manipulated: the frequency of the compound radical, the neighbourhood size of the given component radical (the number of other component radicals it can combine with to form legal combinations), and the position of the given component radical. A three-way ANOVA showed that the main effects of neighbourhood size and the position given of the component radical were significant for all three groups. Processing time was faster when the neigbourhood size of the given component radical was small and when the missing radical was in the bottom position. There was no main effect of compound radical frequency but there was a significant interaction of compound radical frequency and position for all groups: processing time was the fastest when the compound radical frequency was high and when the given position of the component radical was in the upper corner. This suggests the presence of a compound radical level and a component radical level which is characterized by positional features and subject to neighbourhood size influence. Error analysis showed that the China group made the most errors but the Taiwan and Hong Kong groups displayed a significantly higher percentage of visual legal choices over unrelated illegal choices than the China group (the visual distracter forms a legal combination with the given component radical but the unrelated distracter does not). These results showed that the China group, who read the simplified script, was less sensitive to the orthographic lexicality of component radicals.

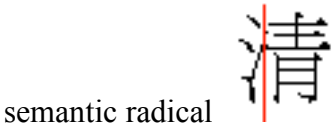
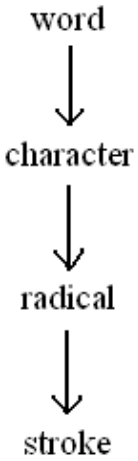


Figure1. A phonetic compound

Figure 2. Two component radicals in a compound (phonetic) radical



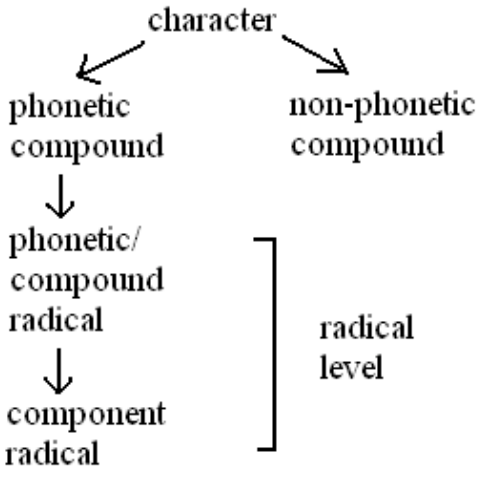


Figure 3. A simplified version of Taft & Zhu (1997)'s model

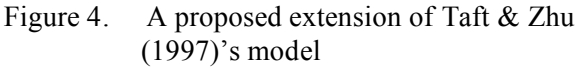


Figure 4. A proposed extension of Taft & Zhu (1997)'s model

2. Conclusion and further research

In conclusion, the findings of this study seem to suggest that phonetic compounds are processed differently from non-phonetic compounds and that the radical level consists of a separate compound radical level and a component radical level. Moreover, readers in China, Taiwan and Hong Kong did show differences in processing characters. Further research may be done in the area of reading acquisition in children in these three different places to investigate if a particular teaching method will benefit a particular population. The implication of the new proposed model has on existing literature, how characters are actually processed and how a reader learns to read Chinese can affect his or her sensitivity to the phonetic and orthographic properties of the orthography will be discussed further.

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