

Processing of Auditory- and Visually-presented Orthographically/Semantically Similar and Different Two-kanji Compound Words by Native Chinese and Korean Speakers Learning Japanese

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The mechanism of orthographic and phonological interaction between bilingual lexicons is a major issue in the arena in bilingual processing. Previous studies (e.g., Caramazza & Brones, 1979; Dufour & Kroll, 1995) indicated a *facilitation effect* on the processing of cognates in mostly alphabetic languages. On the contrary, Hayakawa (2010) demonstrated an *inhibition effect*, so that cognates (forms orthographically and semantically similar between both languages, S-type, such as 未来 meaning ‘future’) are phonologically processed for auditory-presented lexical decision more slowly than non-cognates (forms without similarity in Chinese and Japanese, N-type, such as 注文 meaning ‘to order’) for Chinese speaker learning Japanese. Therefore, the present study examined these conflicting results in the bilingual lexicon by conducting an experiment on both phonological and orthographic processing of N-type and S-type words by 38 native Chinese and 38 Korean speakers learning Japanese.

In this experiment, 22 tokens each of S-type and N-type compounds (44 in total) were used for stimuli. The target words were controlled by word frequency, morphological differences between Chinese and Japanese characters, phonological similarity, and lexical difficulties based on formal Japanese Language Proficiency Test. These were counterbalanced among the participants of two native languages. A linear mixed effect model 2 (native Chinese and Korean speakers) \times 2 (visually- and auditory-presentation) \times 2 (S-type and N-type compounds) \times 2 (high and low word frequency) four-way analysis of variance (ANOVA) was

conducted for reaction times (ms) of lexical decisions. For reaction times all the main effects were significant: native languages [$F(1, 61)=6.780, p<.05$] (Chinese<Korean), presentation method [$F(1, 660)=786.538, p<.001$] (visual<auditory), word type [$F(1, 2410)=13.266, p<.001$] (N-type<S-type), and word frequency [$F(1, 2607)=6.512, p<.05$](high<low). Among these four variables, two interactions were significant. First, the interaction of native language and presentation method [$F(1, 667)=47.128, p<.001$] indicates that native Chinese speakers processed N-type faster than S-type in both visual- and auditory-presentations, whereas native Koreans processed both types at equal speed in both presentations. Second, the interaction of presentation methods and word frequency [$F(1, 2555)=5.397, p<.05$] implies that frequency effects were apparent in visual, but not in auditory-presentation.

The interest of the present study rests upon differences in the word processing of S-type and N-type between native Chinese and Korean speakers. Unlike facilitation effects on cognates, S-type words were processed slower in both visual and auditory presentations than N-type words among native Chinese speakers. S-type words activate Chinese phonological representations, which further inhibits activations of Japanese phonological representations. In contrast, N-type words receive no inhibition from activations of Chinese lexical representations. The difference in cognates' inhibition effect created slower speed in S-type when comparing to N-type. Likewise, under visual presentation, S-type words experience inhibitions from Chinese orthographic representations during activation of Japanese orthography. The visual inhibition effect needs further clarification since it implies that separate orthographic representations in Chinese and Japanese lexicons interfere with each other, even though S-type words share two kanji that are the same or very similar two kanji in both languages. The likelihood of inhibition effects, however, was not observed among native Korean and Japanese speakers.

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