

NOTES AND DISCUSSION

Dissociation of Pure Korean Words and Chinese-Derivative Words in Phonological Dysgraphia

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Phonological dysgraphia is a writing impairment, characterized by marked disability to spell pronounceable pseudo-words as opposed to relatively mild reduction in ability to spell real words. Within the realm of Korean vocabulary, there are two categories of real words: pure Korean words and Chinese-derivative words. We present a patient with a history of CVA, resulting in phonological dysgraphia and, further, a dissociated performance in the aforementioned two categories of real words. It is suggested that the lexicon for pure Korean words is segregated from that for Chinese-derivative words. © 2000 Academic Press

INTRODUCTION

Korean vocabulary consists of pure Korean words (24.4%), Chinese-derivative words (69.32%), and other foreign words (6.28%) (Kim, 1993). Whereas pure Korean and foreign words have no corresponding Chinese characters, Chinese-derivative words can be written either in Chinese ideogram (e.g., ‘東’ meaning ‘east’) or its corresponding Korean alphabet, ‘Hangul’ (e.g., ‘동’ for ‘east’) (both ‘東’ and ‘동’ are identically pronounced as /toŋ/). Koreans with a high-school education or higher are able to discriminate between pure Korean and Chinese-derivative words even though the words can all be written in Hangul. Hangul is one of several representative phonetic alphabets in all languages. Furthermore, compared to English, there is relatively systematic one-to-one correspondence between a grapheme and a phoneme in Hangul. This allows relatively more accurate

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error analysis of dyslexia and dysgraphia. Another characteristic feature of Hangul to be considered is that syllables are visually segmented (that is, syllabic language) and each segmented syllable contains at least a consonant and vocalic nucleus. For example, in English, the word “computer” has three syllables but the word is visually a single unit, which necessitates a segmentation process upon reading and listening. On the other hand, the corresponding word in Hangul, ‘컴퓨터’ /k^həm-p^hu-tə/, has also three syllables but each syllable constitutes a unit unto itself. In this article we present a Korean aphasia patient with phonological dysgraphia who showed a dissociation in writing performance between pure Korean and Chinese-derivative words.

CARE REPORT

MC is a 40-year-old right-handed man with a college degree. Currently he is working as an engineer. Two days prior to admission to Samsung Medical Center, he was found to have right hemiparesis in addition to language disturbances. He was brought to the emergency room of a local hospital where the right hemiparesis improved rapidly over a few hours. On the day of admission, his conversational speech was effortful with mild-severity dysarthria and was interrupted by frequent word-finding episodes. Confrontation naming was impaired but comprehension and repetition of spoken language were relatively preserved, suggesting a transcortical motor aphasia. Right hemiparesis was no longer evident. Reflexes were also normal, as were the results of sensory examination. A magnetic resonance imaging (MRI) scan performed 24 h after admission demonstrated a cerebral infarction involving the left insula and the left basal ganglia (Fig. 1). Except for a history of smoking for 10 years, the medical evaluation including echocardiography failed to reveal etiologies for stroke.

METHODS

A list of word (both pure Korean and Chinese-derivative vocabularies) and pseudoword stimuli was selected based on frequency, imageability, and length. For an accurate error analysis, words with a one-to-one correspondence between phoneme and grapheme were selected. The task was to write to dictation after repeating each word in order to rule out possible impairment at the input level.

RESULTS

As illustrated in Table 1, MC’s performance was significantly reduced in writing pseudowords (average of 74% errors) compared to that of real words (40%). It is of particular interest that he made more errors with pure Korean words (50%) than with Chinese-derivative words (29%) across the length of the stimuli.



FIG. 1. MRI scan of MC indicating a cerebral infraction involving the left insula and the left basal ganglia.

DISCUSSION

As pointed out by Shallice (1981), phonological dysgraphia is typified by the gross impairment of the nonlexical route in writing. Even though MC's real-word writing skills were also compromised (40% error rate), the error rate with real words was much lower than that with pseudowords (74%). In

TABLE 1
Percentage of Errors in Writing Chinese-Derivative Words, Pure Korean Words, and Pseudowords

	Chinese-derivative words	Pure Korean words	Pseudowords
Stimuli comprised of four syllables	50% (5/10)	66% (6/10) ^a	80% (8/10)
Stimuli comprised of three syllables	17% (5/29)	55% (16/29) ^a	79% (23/29)
Stimuli comprised of two syllables	21% (12/57)	33% (19/57)	61% (35/57)
Total across length of stimuli	29% (22/96) 40% (32/96)	50% (41/96)	74% (66/96) 74% (66/96)

^a Only a limited number of pure Korean stimuli with three and four syllables was available because most pure Korean words are comprised of compound words.

writing Korean pseudowords, one may assume that the segmenting process can be bypassed to go to the writing process of individual speech sounds, which appear to be two basic operations in the writing of pseudowords (Shallice, 1981). From MC's real-word writing performance, we postulate that the error rate in real-word writing can be vocabulary-specific. When only Chinese-derivative words were considered, the error rate decreased from 40 to 29%. Based on the observed error rate differential between pure Korean and Chinese-derivative words, it can be postulated that a separate lexicon for each group of stimuli may exist. What would be the system of the lexicons, then? A closer evaluation of the error pattern revealed that errors in response to pure-word stimuli are characterized by the assimilation of graphemes from adjacent syllables in the target word (e.g., 귀뚜라미/kwi-t'u-ra-mi/ → 귀뛰라미/kwi-t'wi-ra-mi/, 시금치/ɕi-gɨ m-c^hi/ → 시금치/ɕim-gim-c^hi/, 도깨비/to-k'æ-bi/ → 도개뻘/to-gæ-p'i/, 티끌/t^hi-k'wul/ → 티클/t^hi-k^hwul/). In contrast, errors in response to Chinese-derivative word stimuli showed limited influence of other syllables within the target word. Instead, they included phonemic paragraphia (e.g., 가정교육/ka-ɟɐŋ-gyo-juk/ → 가죽교육/ka-ɟok-gyo-juk/, 보사부/po-s^ha-bu/ → 보사복/po-s^ha-bok/, 반성/pan-s^hɐŋ/ → 마성/pa-s^hɐŋ/). It can be derived from this observation that with pure Korean words, each word is stored in the lexicon as a whole, no matter how many syllables the word contains. Thus, any impairment in the lexicon will result in errors characterized by assimilation patterns within the target word. On the other hand, with Chinese-derivative words, each syllable containing distinct meaning might be represented in the lexicon as a separate unit, resulting in limited assimilation phenomena across the boundary of units in lexicon.

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