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The Role of Working Memory in Homograph Recognition

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Recognition of homographs is usually assumed to consist of two process stages: automatic access to mental lexicon and inhibition of meanings irrelevant to context (Miyake et al., 1994). Working memory is related to the inhibition: Kobayashi and Takano (1999) showed that readers with larger working memory capacity can inhibit irrelevant meanings faster than those with smaller capacity. The homographs used in the study had only two major meanings. The number of meanings can effect to recognition of homographs. I predicted that readers with larger working memory capacity cannot inhibit when the number of meanings increases more than two meanings.

Method

Subjects
The subjects were 29 undergraduates from the University of Tokyo. All were native speakers of Japanese.

Materials
Lexical Decision Task Fifteen homographs were selected as first primes. Five homographs each had four major meanings, and ten each had two major meanings. They were all written in kana (i.e., Japanese phonogram). Targets were these homographs written in kanji (i.e., Chinese ideogram). Second prime was a pair of kanji related to the target in meanings (consistent condition), an asterisk (neutral condition), and a pair of kanji related to another target in meanings (inconsistent condition).

Japanese Reading Span Test We used Osaka and Osaka’s (1994) Japanese version of the test.

Design
The independent variables were consistency (consistent vs. neutral vs. inconsistent) and number of irrelevant meanings (three vs. one). I examined reading span scores as a pseudo-independent variable, too. The dependent measure was RT for targets.

Procedure
Japanese reading span test Osaka and Osaka’s (1994) test was administered .

Lexical Decision Task After a fixation point was presented for 1s, first prime, second prime and target were presented successively. The SOA of primes was 500ms. Subjects were requested to judge whether the target was word or non-word as accurately and quickly as possible.

Results and Discussion
Subjects with reading spans of 3.0 or grater were considered to be high-span readers; those with spans of 2.5 or less, to be low-span readers.

The main results are presented in Figure 1. High span readers took longer time in inconsistent condition than in neutral condition, whereas low span readers showed no significant difference between neutral condition and inconsistent condition (Figure 1). The number of meanings had no significant interaction with consistency and reading span. High-span readers could inhibit irrelevant meanings though meanings increased, whereas low-span readers couldn’t even inhibit one irrelevant meaning. We conclude that the number of meanings didn’t effect to inhibition in working memory.

Figure 1: Reaction time of low span readers and high span readers.

Reference