

Inhibition Mechanism of Phonological Short-term Memory in Foreign Language Processing

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This study examined phonological short-term memory (phonological STM) capacity and the individual difference of the range for inhibition. About the relation between phonological STM capacity and foreign language processing and acquisition, there are many antecedence studies (e.g., Baddeley, Gathercole & Papagno, 1998). However, the degree of similar of a native language and a foreign language and the relation of phonological STM are seldom clarified. Then, in this research, it investigated the relation between the degree of similar of the item to memorize and an interference item, and the individual difference of inhibition capability.

Method

Subjects

The subjects were 25 undergraduate and graduate students. They were all native Japanese speakers who had studied English for 6-10 years.

Materials

<Word-Span Task>The phonological STM capacity was measured with the use of a word-span task written in Japanese and English. In each span task, the first three sets consisted of three words, the next three sets of four words etc. The largest set size was seven words, making total number of items 75.

<Dual-Task of Word Retention> A total of 144 word-sentence pairs were grouped into four lists of 36 pairs each. The first list contained Japanese words and English sentences, and second list contained English words and Japanese sentences. The other two lists were same language structure in word-sentence pairs. In each list, the first four sets consisted of two word-sentence pairs, the next four sets of three word-sentence pairs etc. The largest set size was four word-sentence pairs.

Table 1: Correlation with the results of a dual-task and of the word-span task(n=25).

dual-task (word-sentence)	L1-L1	L1-L2	L2-L1	L2-L2
WST	0.56**	0.37+	0.30 n.s.	0.65**
+ p < .10	**p < .01			

Procedure

<Word-Span Task>Word span was assessed in both Japanese and English. On each measure, subjects were required to recall a sequence of words immediately after visual presentation.

<Dual-Task of Word Retention>A primary task was to recall words. Reading sentences aloud have been used as a method of the background task. First words, first sentence, second word, second sentence were presented successively. After reading all words and sentences, the subject tries to recall.

Results and Discussion

Correlations between the Japanese and English version word-span tasks showed significant at $p < .01$ level($r = .51$). It divided into the high-span group and the low-span group by the mean score of the results of the Japanese and English version word-span task.

The main results are presented Figure 1. It is that the difference was found by the results pattern of a retention word between the group with high-span, and the low-span group with the combination of the language kind of a retention word and interference sentence. Then, the correlation with the results of a dual-task and the results of the word-span task was investigated (Table 1). It was suggested the memorizable number of words not only increases that a phonological STM capacity is large, but that it can be inhibited to what has the high degree of similar of the information used as interference.

References

Baddeley, A. D., Gathercole, S. E., & Papagno, C. (1998). The phonological loop as a language learning device. *Psychological Review*, **105**, 158-173.

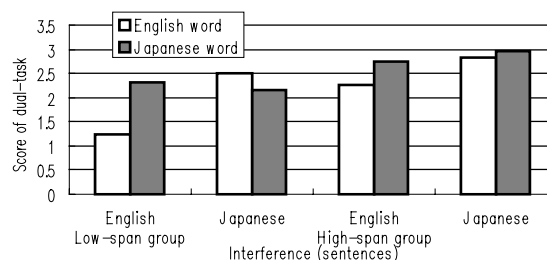


Figure 1: Score of the dual-task between each condition.