Memorial consequences of choosing nonwords: Implication for interpretations of the self-choice effect¹

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Verbal materials are more likely to be remembered if they are chosen by the subject, rather than by the other subjects or the experimenter. This self-choice effect, as it is called, has been demonstrated under a various conditions. The experiment was designed to determine whether a self-choice effect could be found with nonwords, and if so, how much of its magnitude compared to that found with words. A 2×2 factorial design was employed to investigate item type (words versus nonwords) and input condition (choice versus force) on free recall. One hundred and ninety-two female college students were asked to remember one TBR item from each pair items. In the choice condition, TBR items were chosen by the subjects. In the force condition, TBR items were selected randomly by the experimenter. At the end of the lists, subjects were asked to recall the all of the items. A significant interaction was found for item type and input condition: a self-choice effect was obtained only for words not for nonwords. This result is inconsistent with the explanations of the self-choice effect's being due to an enhanced state of motivation or greater degree of attention. Rather, this result is discussed in terms of the subjects' metamemory.

Key words : self-choice effect, metamemory, motivation, recall.

Monty and his colleagues (Monty & Perlmuter, 1975; Monty, Geller, Savage, & Perlmuter, 1979; Perlmuter & Monty, 1973; Perlmuter, Monty, & Kimble, 1971) have shown that verbal materials are more likely to be remembered if they are chosen by the subject, rather than by the other subjects or the experimenter (e.g., Takahashi & Umemoto, 1987). In their experiments, a paired-associate learning paradigm has been most frequently used. Basically, two conditions were employed, one of which was the choice condition in which subjects were shown a slide with a set of verbal materials consisting of a single stimulus word presented on the left and up to five potential response words on the right. The subjects were instructed to read aloud both the stimulus and

response words and to choose the response word they wished to learn to associate with the stimulus word. The subjects then proceeded to learn the word pairs by using the conventional anticipation method. The other condition is the forced condition in which the subjects also read aloud the stimulus and potential response words. Following this reading, the response word was assigned to the subject. This word had been a response word chosen by the previous subject in the choice condition. Thus the subjects in the forced condition were yoked to those in the choice condition. Using this technique, Perlmuter et al. (1971) found that the subjects in the choice condition learned more rapidly and to a higher level than those in the forced condition. Thus allowing subjects to choose the responses they wished to learn seemingly facilitated performance.

This so-called self-choice effect has been found to occur in not only paired-associate learning, but also recall and recognition memory tests (for a review, Takahashi, 1989).

The present experiment was designed to determine whether a self-choice effect could

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be found with nonwords, and if so, how its magnitude would be compared to that found with words.

Several interpretations have been suggested to explain the self-choice effect. For example, it has been suggested that the effect might be due to a general enhancement in motivation (Monty, Rosenberger, & Perlmutter, 1973) or greater degree of attention (Monty, Perlmutter, Libon, & Bennet, 1982; Perlmutter & Monty, 1982). These interpretations of the self-choice effect do not implicate the meaningfulness of the chosen materials as its locus. Rather, they are based on an assumption that the effect is due to intrinsic differences between having to choose and not having to choose. It is the choosing process itself, not the meaningfulness of the materials, that acts to enhance memorability of chosen materials. These interpretations would expect a self-choice effect to be observed for any degree of the meaningfulness of the materials.

Takahashi and Umemoto (1987) argued that motivational factors were not a sufficient condition for self-choice effects to occur, and they proposed instead a metamemory interpretation. According to this interpretation, it is not the act of choice that is crucial but the subject's use of metamemory; choosing the easier-to-remember word involves the subject's metamemory. When TBR-words are forced on the subjects, there is no use of metamemory. Thus, assuming that complex cognitive processes lead to richer episodic memories, chosen words are more likely to be remembered than forced ones. On the other hand, when nonwords rather than words are involved in the task, metamemory may be less useful in choosing the easier item to remember. Hence, there should be less difference in recall between choice and forced conditions with nonwords than with words. The present experiment tested this prediction.

Method

Subjects. The subjects were 192 female college students from an introductory psychology course at Osaka Musical College. They were randomly divided into two groups of 96 subjects each.

Design. The experimental design was a 2×2 factorial, with item type (words versus nonwords) as a between-subjects variable and input condition (choice versus force) as a within-subject variable.

Materials. Two sets of materials were used in the present experiment, 40 word-word items (e.g., AITE-YAKUME, MOYOU-ASAHI) and 40 nonword-nonword items (e.g., AMANA-ITOKU, IYOSU-EIN). Words were taken from norms provided by Koyanagi, Ishikawa, Ohokubo, and Ishii (1960). The familiarity ratings were based on a 5-point familiarity scale with 1 representing low and 5 high familiarity. All words had a familiar value rating 3.50 or more. Nonwords were taken from the same norms as mentioned above, with a familiar value rating 0.49 or less. All of the nonwords were pronounceable. All items were three-letter.

These items were divided randomly into two lists of 20 items containing two items in one column. Four different study lists were constructed. Each study list was used for 24 subjects. Half of the study items of each type were then randomly assigned to the choice condition; the remaining items were assigned to the force condition.

Procedure. The subjects in the word or nonword groups were tested as a separate groups during their regular classroom period. Subjects in the word group were given two pages of words containing two items per line. The subjects were told they would be required to remember one word from each line, but were not told of the type of memory test. In the choice condition, the subjects were instructed to circle the TBR item that they wished to remember. In the force condition, the TBR item were selected randomly by the

experimenter, and the subjects were instructed to retrace each previously circled item. The subjects were allowed 1.5 min to complete their task. For half the subjects the first 20 items were chosen and the last 20 items were forced, while the reverse was the case for the other half. Subjects in the nonword group were treated identically, except that they were allowed 2 min to avoid floor effects.

Immediately after the acquisition phase, the subjects were required to write down as many TBR items as they could remember. Three minutes were allowed to complete this free recall test. The subjects were told that although the experiment was a test of their ability to remember TBR items, they could write down the occasional non-TBR item that might happen to come to mind when recalling. But no further analysis for these non-TBR items was conducted.²

Results and Discussion

Mean number of recalled TBR items³ are shown in Figure 1. A 2 (item type) $\times$ 2 (input condition) mixed analysis of variance (ANOVA) carried out on these scores showed that there were significant main effects of item type [$F(1,190) = 121.59, p < .01$] and input condition [$F(1,190) = 13.80, p < .01$]. The subjects in the word group recalled more than those in the nonword group and the chosen materials were superior to the forced materials. Of greater interest is the significant interaction between item type and input condition [$F(1,190) = 4.82, p < .05$], shown in Figure 1. Further analysis confirmed that the self-choice effect was reliable only for words [$F(1,190) = 17.41, p < .01$], not for nonwords.

The experiment has demonstrated that a self-choice effect does not emerge with non-

Figure 1. Mean number of items correctly recalled as a function of input condition and type of materials.

words, in contrast to the self-choice effect readily obtained with words. It appears that memory benefits ordinarily accruing from choice are not an automatic consequence of the act of choosing. The self-choice effect, therefore, cannot be due to any intrinsic aspect of the choice task such as an enhanced general state of motivation (Monty et al., 1973) or increased attention (Monty et al., 1982; Perlmutter & Monty, 1982). The presence of the self-choice effect for words but its absence for nonwords can easily be accounted for by the metamemory interpretation (Takahashi & Umemoto, 1987).

However, all of these data were based upon free recall. The problem arises when recognition tests are taken as the basis of measurement. So, further research is needed to determine whether a self-choice effect could be found with nonwords, with recognition as the measure of retention.

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² Mean number of non-TBR items were 1.10, 0.09, 0.06, and 0.01 for word-choice, word-force, nonword-choice, and nonword-force conditions, respectively.

³ Mean number of errors were 0.50 and 1.79 for word and nonword conditions, respectively.

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