

Effects of imagery value and an imagery mnemonic on memory for sayings

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A vast amount of research shows that memory for single words is affected by the visual imagery values of the words and by the use of imagery mnemonics. The purpose of this study was to extend this research from single words to more complex verbal material. Ten sayings (e.g., "One bad apple spoils the barrel") that had been previously scaled for visual imagery were presented to two groups of college students. One group used a visual imagery mnemonic, and the other did not. Five of the sayings were high in imagery value, and the other five were low. The results were consistent with findings for single words: High-imagery sayings were remembered better than low-imagery sayings, and the imagery mnemonic improved memory for the sayings.

Many studies have found that the visual imagery values of words affect memory for the words (recent examples include Berrian, Metzler, Kroll, & Clark-Meyers, 1979; Christian, Bickley, Tarka, & Clayton, 1978; Griffith & Actkinson, 1978; Richardson, 1979). Recently, research interest in verbal memory has been moving away from word lists toward more complex material (cf. Craik, 1979; Nelson & Narens, 1980). To provide stimulus material that will aid memory researchers in extending their research beyond single words, Higbee and Millard (Note 1) scaled 203 sayings (e.g., "One bad apple spoils the barrel") on visual imagery and familiarity. One purpose of the present study was to use those sayings to extend the visual imagery research from words to more complex material, by determining whether the rated imagery values of the sayings do affect memory for the sayings.

Previous research has also found that a visual imagery mnemonic called the "peg system" can improve memory for words (see Higbee, 1977). A second purpose of this study was to determine whether the peg system can also improve memory for more complex verbal material, such as sayings. Extrapolating from research with single words, it was expected that memory for sayings would be better for high-imagery sayings than for low-imagery sayings, and better for people using the peg system than for people not using it.

METHOD

Subjects and Design

Forty college students enrolled in introductory psychology classes volunteered to participate in the experiment for extra credit. The experiment was conducted early in the semester, before the students had studied memory. The experimental group (peg group) consisted of 6 males and 14 females, and the control group (no-peg group) consisted of 7 males and 13 females. The experiment was a 2 by 2 factorial design, imagery value (high, low) by imagery mnemonic (peg, no peg), with repeated measures on the first factor.

Materials

The verbal material to be learned consisted of a list of 10 sayings that were selected from those scaled by Higbee and Millard (Note 1). Five of the sayings were high-imagery sayings, with a mean imagery rating of 6.28 on a 7-point scale. The other five sayings were low-imagery sayings, with a mean imagery rating of 3.37. The sayings are listed in Table 1.

The two sets of sayings were equated for familiarity (all being selected from the middle one-third in familiarity ratings); the mean familiarity rating of the high-imagery sayings was 5.1, and the mean of the low-imagery sayings was 4.9. The two sets were also equated for length; the total number of words in the five high-imagery sayings was 27, and the total number of words in the five low-imagery sayings was 25. The 10 sayings were randomly ordered, numbered from 1 to 10, and recorded on a tape recorder, with a 5-sec pause following each saying.

Procedure

The 20 students in the peg group were taught the peg system, which consists of 10 rhyming peg words representing the numbers from 1 to 10 (1 = bun, 2 = shoe, 3 = tree, etc.), and were taught how to use the peg words in interacting visual imagery to learn a list of 10 words (see Higbee, 1977). They were then taught how to use the peg words in interacting visual imagery to remember the main ideas from sentences, using the Ten Commandments as examples. The instruction took about 20 min.

Table 1
Sayings Used in Memory Task

Saying	Imagery Value	Familiarity Value
High-Imagery Sayings		
A man's home is his castle	6.49	5.56
Don't rock the boat	6.20	5.56
One bad apple spoils the barrel	6.29	4.66
Put on your thinking cap	6.22	5.02
Too many cooks spoil the broth	6.18	4.68
Low-Imagery Sayings		
It's all in a day's work	3.71	5.04
Let well enough alone	3.06	5.34
Necessity is the mother of invention	3.67	4.08
The end justifies the means	2.73	4.22
Wonders will never cease	3.67	5.68

The subjects were then told to use the peg words in visual images to remember the recorded list of 10 sayings, which was played for them once. The no-peg group also listened to the recorded list once, with instructions to remember the sayings any way they could. Both groups were told that recall of the main idea of the sayings was more important than the exact words, and both groups recalled the sayings in writing immediately after hearing the recording.

Recall responses were scored by a rater who was blind to the nature of the study. The rater gave credit for each answer that captured the main idea of the saying; for example, for the saying "One bad apple spoils the barrel," credit was given for "One rotten apple ruins the bunch." The recall score for each student was the number of sayings he or she received credit for. A second rater, who was also unfamiliar with the study, scored the response of 10 students, to provide a measure of interrater reliability.

RESULTS AND DISCUSSION

The raters agreed on 42 of the 43 responses scored, yielding a satisfactory interrater reliability ($r = .94$). A *t* test for each group of 20 subjects showed no differences in recall between males and females.

A two-way analysis of variance of the recall scores (imagery value by imagery mnemonic) showed a main effect of imagery value [$F(1,38) = 37.47$, $p < .001$]: The mean recall score for the high-imagery group was 3.00 of a possible 5 (60%), and for the low-imagery group, it was 1.73 (35%). There was also a significant main effect of imagery mnemonic [$F(1,38) = 7.77$, $p < .01$]: The mean recall score for the peg group was 2.58 (57%), and the mean for the no-peg group was 1.88 (38%). The interaction was not significant [$F(1,38) = 1.17$, *n.s.*].

The finding that high-imagery sayings were recalled better than low-imagery sayings when equated for familiarity indicates that the ratings of Higbee and Millard (Note 1) do have implications for the memorability of sayings. It suggests that the effects of visual imagery ratings on recall of verbal material are not limited to single words but also apply to more complex verbal material. In addition, the finding that the use of an imagery mnemonic can improve memory of verbal material more complex than single words supports suggestions that the value of visual mnemonics is not limited just to word lists (see Higbee, 1978, 1979).

Craik (1979) has recently observed that "in a sort of Gold Rush of Verbal Learning, investigators are

increasingly turning from the humdrum study of nonsense syllables and word lists to the more exciting exploration of sentences, paragraphs, and stories" (p. 64). The availability of normative materials such as those provided by Higbee and Millard (Note 1) will help such investigators by providing more complex verbal material of known scale values on important attributes. The results of this study indicate that such normative ratings do affect memory for the sayings and that visual mnemonics can also improve memory for sayings; they thus have implications for extending verbal learning research beyond nonsense syllables and word lists.

REFERENCE NOTE

1. Higbee, K. L., & Millard, R. J. *Visual imagery and familiarity ratings for 203 sayings*. Manuscript submitted for publication, 1981.

REFERENCES

- BERRIAN, R. W., METZLER, D. P., KROLL, N. E. A., & CLARK-MEYERS, G. M. Estimates of imagery, ease of definition, and animateness for 328 adjectives. *Journal of Experimental Psychology: Human Learning and Memory*, 1979, 5, 435-447.
- CHRISTIAN, J., BICKLEY, W., TARKA, M., & CLAYTON, K. Measures of free recall of 900 English nouns: Correlation with imagery, concreteness, meaningfulness, and frequency. *Memory & Cognition*, 1978, 6, 379-390.
- CRAIK, F. I. M. Human memory. In M. R. Rosenzweig & L. W. Porter (Eds.), *Annual review of psychology* (Vol. 30). Palo Alto, Calif: Annual Reviews, 1979.
- GRIFFITH, D., & ACTKINSON, T. R. Mental aptitude and mnemonic enhancement. *Bulletin of the Psychonomic Society*, 1978, 12, 347-348.
- HIGBEE, K. L. *Your memory: How it works and how to improve it*. Englewood Cliffs, N.J: Prentice-Hall, 1977.
- HIGBEE, K. L. Some pseudo-limitations of mnemonics. In M. M. Gruneberg, P. E. Morris, & R. N. Sykes (Eds.), *Practical aspects of memory*. London: Academic Press, 1978.
- HIGBEE, K. L. Recent research on visual mnemonics: Historical roots and educational fruits. *Review of Educational Research*, 1979, 49, 611-629.
- NELSON, T. O., & NARENS, L. Norms of 300 general-information questions: Accuracy of recall, latency of recall, and feeling-of-knowing ratings. *Journal of Verbal Learning and Verbal Behavior*, 1980, 19, 338-368.
- RICHARDSON, J. T. E. Correlations between imagery and memory across stimuli and across subjects. *Bulletin of the Psychonomic Society*, 1979, 14, 368-370.

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