Presentation modes and immediate recall in children[1, 2]

RODERICK WONG AND GEORGE BLEVINGS
UNIVERSITY OF BRITISH COLUMBIA

Three groups of 10 year old children were required to learn a list of eight CVC trigrams. One group received visual presentation only, another received visual plus auditory presentation, and a third group saw and vocalized the material. The results indicate superior performance for the two groups involving auditory stimulation, and implications were drawn from this to the "additivity-of cues" and "preferred modality" hypotheses.

In a recent study on the recall of vocalized lists, Murray (1965) found that peformance increases monotonically with an increase in the number of modalities by which cues were presented to S, as well as by the vocalization level at which S learned the list. His material consisted of lists of consonants which had to be recalled in their correct serial position, and the responses were spoken by S into a tape recorder. His Ss consisted of male undergraduates or research students at Cambridge University.

The present study consists of partial replication of Murray's (1965) experiment using 10-11 year old children, CVC trigrams, a moderate rate of presentation, and written recall.

Method

The Ss were 30 boys in their fifth grade at the Cascades Heights Elementary School in Burnaby, B.C. They were assigned to three groups by a randomized procedure. The verbal material consisted of eight CVC trigrams with association values between 65-75 on both the Glaze and Kruger scales. The syllables were: BAV, CIF, DEG, JUP, KAC, REW, SUZ, and VEY. These trigrams were printed on individual 5 in. x 8 in. cards.

Three groups of 10 Ss each were formed. One group received only visual presentation of the verbal material (Group R). A second group received both visual and auditory presentation (Group H). The third group received visual presentation of the material and vocalized the material at the same time (Group V).

The Ss were seated opposite E and were read instructions about the nature of the task. Group R was shown the cards with the trigrams, Group V was instructed to pronounce each syllable out loud as it was shown to them, and Group H was shown the syllables while E read them out loud to them at the same time. Each S was given three alternate study and test trials, and was asked to write down as many syllables as he could remember at the end of each presentation. The rate of presentation was maintained at 1.0-1.5 sec. per card with 60 sec. for recall between trials. The trigrams were presented in a random order for each of the three trials.

Results

The mean number of correct responses for each S, based on a criterion of exact reproduction and free recall, was determined from S's written response for each trial. An analysis of variance of these data indicated significant differences among the groups ($F = 7.84$, $p < .01$) over all three trials. Multiple comparisons between the pairs showed differences between Group R and Group V ($tuk = 3.7$, $p < .01$) as well as between Group R and Group H ($tuk = 2.95$, $p < .01$). The difference between Group H and Group V, however, was not found to be significant ($t = 1.06$, $p > .20$).

A plot of these data on the basis of the number of sensory modalities by which cues were obtained by S is shown in Fig. 1. The relationship between performance and number of cues available was essentially monotonic, although the largest increase was due to the addition of the auditory cue and a smaller increase was due to the kinesthetic-motor cue.

Two types of errors were taken into account in the analysis: errors of omission in which S failed to give the appropriate responses during the test trials, and errors of commission in which S made a response, but one which was incorrect. A comparison of these errors is also shown in Fig. 1. An inspection of this figure indicates that the groups did not differ in errors of omission ($F = 1.2$, $p > .05$). However, it is evident that there were differences among the groups in errors of commission ($F = 4.3$, $p < .05$). As the number of cues

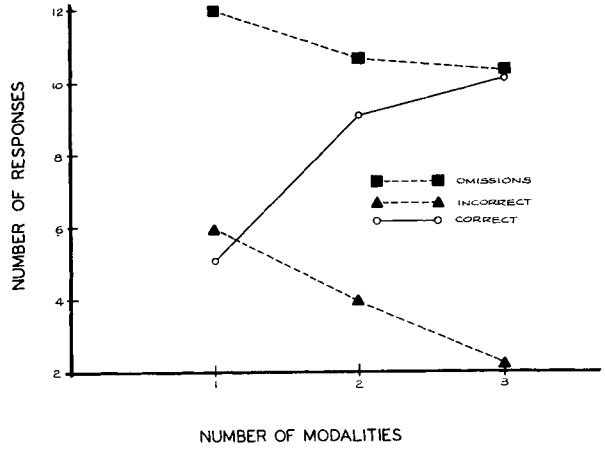

Fig. 1. The mean number of correct, incorrect and omitted responses for each group.

increased, there was a corresponding decrease in the number of incorrect responses made by S.

Discussion

On first sight it would appear that the results provide further support for the "additivity-of-cues" hypothesis. In general, there was an improvement in performance as additional cues were available to S. However, it should be noted that although the difference was in the direction predicted by the "additivity-of-cues" hypothesis, the increase in performance due to the addition of the third cue (the comparison between Group H and Group V) was not statistically significant.

An alternative explanation of these data is that the vocalization variable was effective only in that it allowed S to receive the information in a preferred (auditory) modality (Murray, 1965). The fact that there was no difference between the performance of Group H and Group V and that both these groups were superior to Group R which merely read the items provides strong support for this hypothesis.

The hypotheses under discussion are related to the larger question of mediation in verbal learning. The use of trigrams in comparisons between visual and auditory modes of presentation poses a problem not encountered by Murray with the use of single consonants. The retention of trigrams may involve mediators such as discrete pronunciation units. Pronunciation may be regarded as a coding device because it reduces the number of discrete memory units involved in retaining an item. Depending upon the type of recall, spoken or written, and the type of presentation, visual or auditory, one method may be preferred and/or may be superior to the other.

At any rate the results of this study based on the free recall of children to CVC trigrams of moderate difficulty which were tested by written recall substantiate the findings of Murray (1965). He had found with university students that auditory presentation was superior to visual presentation for the immediate recall of digits or letters in their correct serial position, and that externally produced auditory stimulation did not differ from self-produced auditory stimulation in its effect on recall. The findings of both the present study and Murray's suggest that the auditory element is more important than its kinesthetic-motor element in the facilitation of recall. The data of this experiment also indicate that Ss that were presented the items auditorally made fewer errors of commission than Ss who were given visual presentations of the material.

Reference

Murray, D. J. Vocalization-at-presentation, auditory presentation and immediate recall. *Nature*, 1965, 207, 1011-1012.

Notes

1. The writers wish to thank Mr. A. Evans, Principal of the Cascades Heights Elementary School for his helpful cooperation in providing facilities in obtaining and testing the children.
2. The preparation of this paper was facilitated by a Summer Research Associateship granted to the first author by the University of British Columbia.