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ABSTRACT

The effectiveness of passive, covert, and overt methods of student response in individual television instruction was investigated. Students were classified on the basis of high and low achievers, then randomly assigned to one of four treatment groups. Group 1 (passive) was given conventional television instruction without opportunity to respond during the instruction. Group 2 (covert) was given multiple-choice recall questions during the instruction and asked to make a mental selection of the correct answers. Groups 3 and 4 (both overt) were also given questions during the instruction and asked to actively select the correct answers. A two-way analysis of variance of the criterion test scores revealed significant differences on both the posttest and the delayed retention test. On the posttest, significant differences were found between the passive group and each of the three student response groups in both achievement levels. However, no significant differences were found among the three student response groups. On the retention test given one week later, low achievers in the covert group obtained significantly higher scores than the low achievers in the passive group. These findings, in favor of student response in individual television instruction, support the related research which has generally found student response superior in group instruction. They also support the concept that retention seems to be influenced more by the initial level of learning than by the method. (Author/BJG)

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STUDENT RESPONSE IN TELEVISION INSTRUCTION

Fenton W. Brashear

ABSTRACT

The objective of this study was to investigate the effectiveness of passive, covert and overt methods of student response in individual television instruction. Students were classified on the basis of high and low achievers, then randomly assigned to one of four treatment groups. Group I (passive) was given conventional television instruction without opportunity to respond during the instruction. Group II (covert) was given multiple-choice recall questions during the instruction and asked to make a mental selection of the correct answers. Groups III and IV (both overt) were also given questions during the instruction and asked to actively select the correct answers. A two-way analysis of variance of the criterion test scores revealed significant differences on both the posttest and the delayed retention test. On the posttest, significant differences were found between the passive group and each of the three student response groups in both achievement levels. However, no significant differences were found among the three student response groups. On the retention test given one week later, low achievers in the covert group obtained significantly higher scores than the low achievers in the passive group. These findings, in favor of student response in individual television instruction, support the related research which has generally found student response superior in group instruction.

Numerous experimental studies have been conducted using various methods of student response during group instruction. Most of these studies have utilized instructor presentations, training films and television instruction. Related literature reveals very little research involving student response in individual or self-paced instruction with the exception of programed instruction. The students participating in this experimental study received individual television instruction with particular interest on the effectiveness of conventional passive, covert and overt methods of student response during instruction.

PROCEDURES

The learning conditions for the study were provided by a student carrell equipped with a television monitor and headset. A video tape was produced from a lesson in the Automotive Repairman (63H20) Course at the U. S. Army Ordnance Center and School, Aberdeen Proving Ground, Maryland. Modified versions were prepared from the basic video tape to provide for four treatment methods. Group I (passive) students received the subject matter of the lesson with intermittent summaries of the major teaching points during the presentation. Group II (covert) students received the same subject matter presentation plus the addition of twelve multiple-choice recall questions at intervals within the television presentation. Students in this group were

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instructed to review the choices presented as each question appeared and to "think" the correct choice. After a pause, the correct answer was given by the tape. Group III (pencil/paper) students received the same subject matter and questions but were instructed to mark the correct answer on a test sheet as each question was presented. After a pause, they were given the correct answer. Group IV (responder unit) students were given the same instruction and questions but were instructed to push a button (A, B, C or D) on a responder unit to indicate their choice. After a pause, they were also given the correct answer, or remedial instruction by the tape if they had selected the incorrect answer.

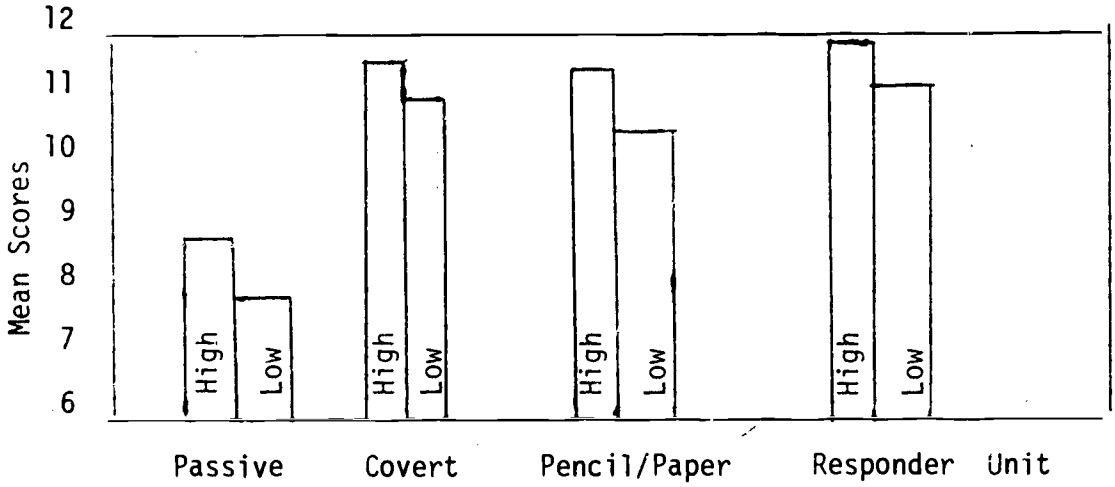
In addition to the methods variable (of four categories above) the students were classified on the basis of high and low achievers. Selection was determined by the relation of each student's cumulative achievement score in the course just prior to the experimental instruction to the class mean. High and low achievers were then randomly assigned to one of the four method groups. This provided two independent variables for study (methods of instruction and achievement levels) and resulted in a 4 x 2 mixed effects factorial experimental design based on the four methods of instruction and two levels of achievement.

DATA COLLECTION AND ANALYSIS

The criterion scores for evaluation were the number of correct responses to the same twelve questions that were presented during the experimental instruction on the posttest and the delayed retention test. Scores of 112 students in eight equal cell entries were provided for the evaluation of the posttest which was administered immediately following the experimental instruction. The retention test, given one week later, provided 80 useable scores in the eight equal cells for evaluation. Data analysis was made using a two-way analysis of variance. This analysis permitted the segregation of the two independent variables so that any significant differences would be revealed and any interaction variances identified.

RESULTS

The results of the posttest are graphically shown in Figure 1.



Posttest Methods of Instruction and Achievement Levels
Figure 1

Both high and low achievers of the passive method were much lower than the means of the three response methods. High achievers exceeded low achievers in all four methods of instruction.

The statistical analysis revealed significant differences in the post-test data as shown in the two-way analysis of variance summary Table 1 below.

Table 1. Posttest Analysis of Variance Summary Table

Mixed Design Source	d.f.	Mean Square	F-Ratio	P
Main Effect				
Methods of Instruction	3	64.3571	24.50	.0005
Achievement Levels	1	26.0357	128.65	.001
Interaction				
Methods of Instruction Achievement Levels	3	0.2024	.08	.972
Within cells	104	2.6264		

The variance among the methods of instruction was highly significant at the .0005 level of probability. The achievement levels also resulted in a very significant difference at the .001 probability level. No interaction variances were found on the posttest results since the F-ratio was less than 1.

Since significant differences were found in the independent variables, further analysis was necessary to identify the sources of variation. This was accomplished by the comparison of pairs of means to determine which pair or how many pairs contributed to the significant differences within each variable. The Scheffe value of minimum significance test was applied to identify pairs of means having significant differences. In Table 2 are six of twelve possible comparisons found to have significant differences at acceptable levels of probability.

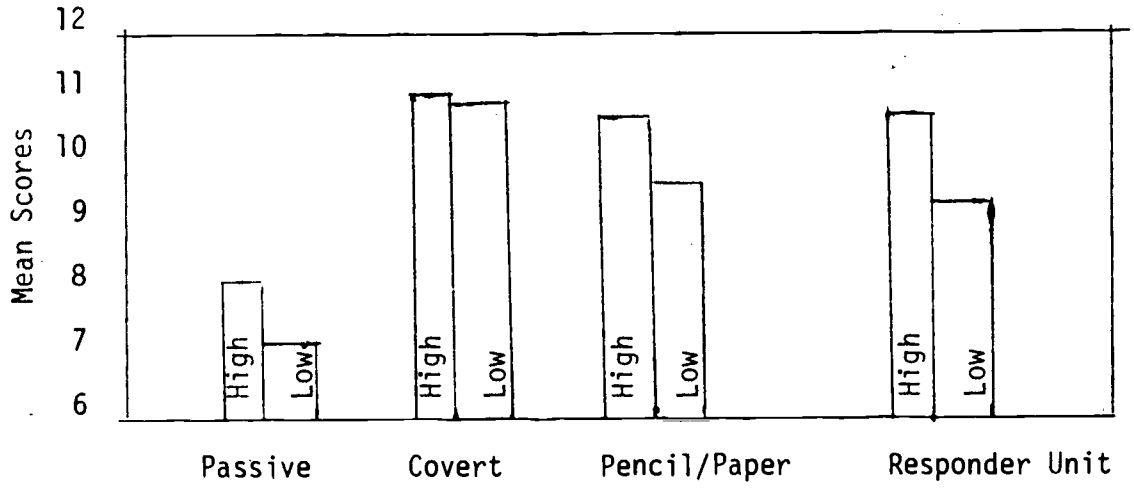
Table 2. Significant Differences of Achievement Levels and Methods of Instruction

Level	Methods Compared	Mean Difference	P
High Achievers	Passive-Covert	-2.858	.005*
	Passive-Pencil/Paper	-2.715	.010*
	Passive- RU	-3.215	.001*
Low Achievers	Passive Covert	-3.214	.001*
	Passive-Pencil/Paper	-2.714	.010*
	Passive-RU	-3.286	.001*

*Probability at an acceptable level of significance.

The significant differences above indicated that each of the student response methods (covert, pencil/paper and RU) were superior on the posttest to the passive method for both high and low achievers. However, no significant differences were found in the comparison of any pairs of the three student response methods.

The results of the retention test are graphically shown in Figure 2.



Retention Test Methods of Instruction and Achievement Levels
Figure 2

As in the posttest, the retention test means on both achievement levels of the passive method were considerably below the means of each of the three student response methods. Although high achievers exceeded low achievers in all four methods, as in the posttest, the mean difference in the covert achievement levels on the retention test above was exceedingly small (.100).

The statistical analysis revealed significant differences in the retention test data as shown in the two-way analysis of variance summary Table 3 below.

Table 3. Retention Test Analysis of Variance Summary Table

Mixed Design Source	d.f.	Mean Square	F-ratio	P
Main Effect				
Methods of Instruction	3	44.9125	14.444	.0005
Achievement Levels	1	19.0125	10.69	.047
Interaction				
Methods of Instruction Achievement Levels	3	1.7792	.57	.635
Within cells	72	3.1097		

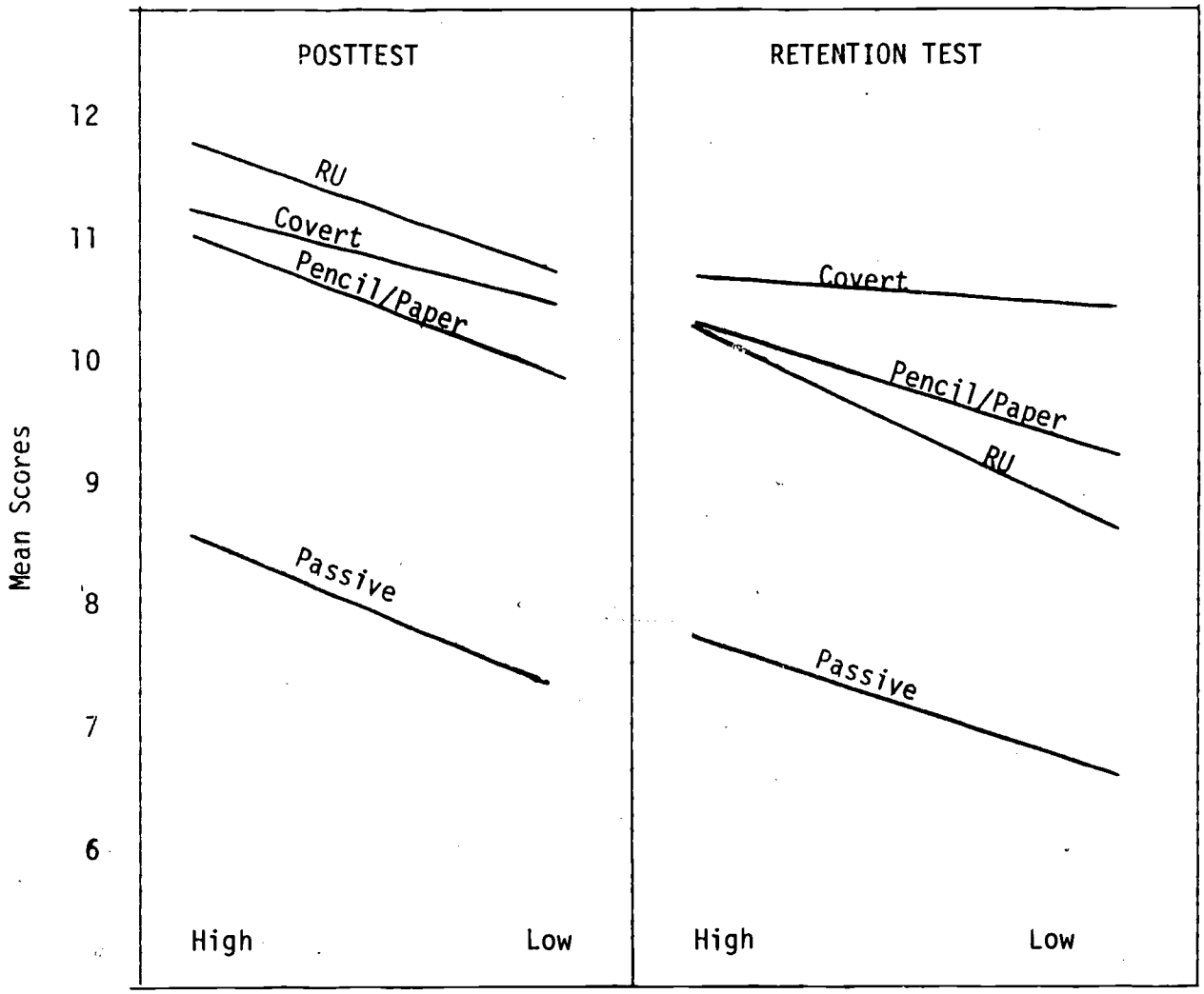
The retention test analysis of variance also resulted in a highly significant difference in methods of instruction at the .0005 level of probability as on the posttest. Achievement levels had a significant difference at the .047 level rather than at the .001 level on the posttest. No interaction variance was found on the retention test; the same as for the posttest. Scheffe's test of means comparison revealed only one pair of means (12 possible) having a significant difference at an acceptable level of probability as shown in Table 4.

Table 4. Significant Retention Test Differences of Achievement Levels and Methods

Level	Methods Compared	Mean Difference	P
High Achievers	(No significant differences)		
Low Achievers	Passive-Covert	-4.100	.001*

*Probability at an acceptable level of significance.

Profiles of the Posttest and Retention Test Data are Presented in Figure 3



Profiles of Posttest and Retention Test Data
Figure 3

DISCUSSION

The data and findings of this study of student response in individual television instruction support the related research on group instruction which has generally found that student response is superior to passive instruction. In this study both high and low achievers in each of the response groups exceeded those instructed by conventional passive instruction on their initial learning. However, the method of student response on initial learning was of little consequence since the covert, pencil/paper or responder unit comparisons did not result any significant differences for high or low achievers.

The retention tests indicated that only the low achievers who "thought" the correct responses to questions during the television instruction were superior to the low achievers who received passive instruction. This would suggest that the marking of a test sheet or pushing a correct button may be a distraction to the learning process. These results would seem to imply that higher initial learning scores resulted in higher retention scores but not significantly so except for the covert treatment. This research adds weight to the concept that retention seems to be influenced more by the initial level of learning than by the method.

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