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ABSTRACT

This study compared the effectiveness of a training procedure involving groups of elementary school students to an individualized training procedure, both of which utilized the Raven Learning Potential (LP) measure to assess improved performance. The development of a group training procedure using the Raven Progressive Matrices aimed at an increase in cost effectiveness. The study demonstrated the appropriateness of a group training procedure with the Raven LP measure where results of group training with intellectually normal children resembled those achieved through individual training. The significant interaction between training group and pretest score suggests that the individual training procedure may be more effective with lower IQ children since they are more likely than normal children to have low pretest scores. (Author/LAA)

STUDIES IN LEARNING POTENTIAL

A COMPARISON OF GROUP AND INDIVIDUAL TRAINING PROCEDURES ON THE RAVEN LEARNING POTENTIAL MEASURE

by

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A COMPARISON OF GROUP AND INDIVIDUAL TRAINING PROCEDURES ON THE RAVEN LEARNING POTENTIAL MEASURE[1]

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The purpose of the study was to determine whether a training procedure involving groups of 12 to 15 students was as effective as the individual training procedure used in the past with respect to improving performance on the Raven Learning Potential measure. Since the Raven Progressive Matrices has been found to be an effective learning potential measure when students received individual training (Budoff, 1972), the development of a group training procedure was considered important in increasing the cost-effectiveness of the LP procedure. An increase in cost-effectiveness, however, would be valuable only if it was not attained at the expense of the performance capabilities evidenced by these children of concern.

Method

The sample in the study consisted of 202 first through fifth grade students in an urban community in Massachusetts. The sample was almost entirely white and heterogeneous with regard to social class. Two classes from each of the five grade levels were selected from one elementary school. At the beginning of the study, Sets A, AB, B of the Raven Progressive Matrices

were group administered to students in each of the ten classrooms, one class at a time. At this time each student's age and sex were recorded, and his father's occupation was obtained from school records.

On the basis of scores attained at this test administration, each student was assigned to one of three groups: a group which received group training on the Raven test, a group which received individual training, and a group which received no training and served as a control group.

The assignment procedure for all students in the two classrooms within each grade was as follows: Raven scores of all students in any one grade were rank ordered from low to high. In the event of tied scores a rank position for the two scores was randomly assigned. The three students with the three highest scores constituted a block, and each student within this block was randomly assigned to one of the three groups. Each of the three students with the three lowest scores was then randomly assigned to one of the three groups. This procedure was repeated for each block of three students with the next highest and next lowest scores, working toward the middle of the score distribution.

Students from the two classrooms in each grade who were assigned to the group training group were trained on the Raven Learning Potential procedure together, so that each group training session involved 12 to 15 students.

During the week after group and individual training had taken place, all students were posttested. First graders received Sets A, AB, B. Because initial mean scores became progressively higher at each grade level (17.2, 20.7, 22.4, 26.3, and 27.6 for grades 1 to 5, respectively), it was decided that a number of items on Set C of the Raven test should be included on the posttest for children in the second through fifth grade. In addition to the 36 items in Sets A, AB, B, second graders received the first three items of C, third graders received the first six, fourth graders received the first nine, and fifth graders received all twelve. The maximum possible posttest score was therefore 36 for first graders, 39 for second graders, 42 for third graders, 45 for fourth graders, and 48 for fifth graders. By reducing the likelihood of a ceiling effect on the posttest in this way, it was hoped that students in all grades would have the opportunity to demonstrate improved performance on the posttest. The interval between pretesting and posttesting was approximately three weeks.

A stepwise multiple regression equation was performed with posttest score (R2) as the dependent variable. Six independent variables were entered into the equation in the following order: (a) pretest score (R1), (b) age, (c) sex (coded 1 = male, 2 = female), (d) rating of father's occupation on the Turner Scale (1964), (e) Group 1 =

membership in either training group (coded 1) versus membership in the control group (coded 2), and (f) Group 2 = membership in the group trained group (coded 1), the control group (coded 2), or the individually trained group (coded 3). The latter two variables represented orthogonal contrasts of the training group factor. Partial correlation coefficients of two-way interactions involving these six variables, when the six effects had been entered into the equation, were also obtained.

Results

Means and standard deviations of the three groups on the pretest and the posttest are presented in Table 1. The table indicates that the blocking procedure for assigning students to groups was highly effective in equalizing both the initial means and variances of the three groups. It is evident that the control group improved to some extent on the posttest, probably as a result of practice in taking the test. This group raised their score an average of 4.65 points from pretest to posttest. Both the individually trained and group trained groups demonstrated a higher mean increase than that of the control group: the mean of the group trained group increased eight points, and the mean of the individually trained group increased nine points from pretest to posttest. The mean increases of the two trained groups, then, were similar to each other and greater than

the average gain (4.65) of the control group.

Insert Table 1 about here

Table 2 presents the results of the stepwise multiple regression equation on posttest scores. Pretest score (R1), age, and Group 1 (membership in either trained group versus membership in the control group) were all significantly related to posttest scores. The negative sign of the beta weight of the Group 1 factor indicated that subjects in either training group performed significantly better on the posttest than students in the control group. The fact that the Group 2 factor was not significant (p = .217) indicated that there was no difference in posttest scores of students who received group training and students in the individually trained group. In addition, Raven posttest scores did not differ for students from different socioeconomic backgrounds, nor did they differ between males and females. The percent of variance accounted for by all variables in the equation was 71.6; the multiple r^2 was .716 (F = 81.60, df = 6/194, p <.001).

Inspection of the partial correlation coefficients between posttest scores and the 14 two-way interactions, after main effects had all been entered into the equation, indicated that only one was significant. The partial correlation coefficient of R1 X Group 2 was -.166 (p <.05).

TABLE 1

Means and Standard Deviations of Three Groups on Raven Pretests and Posttests

Group	Pretest		Posttest		N
	$\bar{X}$	SD	$\bar{X}$	SD	
Group trained	22.882	6.502	30.750	8.819	68
Control	22.866	6.517	27.522	9.437	67
Individually trained	22.746	6.527	31.727	8.229	67

TABLE 2

Results of Multiple Regression on Raven Posttest Scores

Variable	Beta	T-test	df
R1	.581	12.12*	194
Age	.348	7.71*	194
Sex	.067	1.74	194
SES	.020	0.47	194
Group 1 (trained vs. control)	-.203	-5.27*	194
Group 2 (group, control, or individual)	.047	1.24	194

$r^2 = .716$

$F = 81.60$, $df = 6/194$*

*$p < .001$

Graphs of this interaction indicated that students with low pretest scores who received individual training got higher posttest scores than students with low pretest scores who received group training.

Discussion

The study has demonstrated that a group training procedure may be used with the Raven LP measure, and that, on the whole, results of group training with intellectually normal children are similar to those that are achieved when these children are individually trained. The significant interaction between training group and pretest score might suggest that the individual training procedure may be more effective with lower IQ children, e.g., educable mental retardates, than a group training procedure, since these children are more likely than normal children to have low pretest scores.

References

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Footnotes

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