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Acceleration of Academic Progress Through the Manipulation of Peer Influence

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Every teacher has several students in each class who are not performing at the desired level. Verbal exhortations often fail. In this study, the underachieving students were identified by the teacher and baseline measures were taken of their performance. Then, contingent upon their performance, these underachievers were put in the position of helping the class get things that they and their classmates wanted. Under these conditions of peer approval-disapproval, the problem children were significantly more successful than students not under the conditions.

Behavior-modification techniques have been successfully applied to a variety of behavior problems associated with the classroom, e.g., hyperactivity (Homme, et al., 1963; Patterson, et al., 1965), peer isolation (Allen, et al., 1965; Patterson & Brodsky, 1966), and school phobia (Patterson, 1965). In spite of the successes in these areas, few attempts to manipu-

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late academic achievement have been reported. Zimmerman and Zimmerman (1964) reported a case study of academic progress obtained by selective teacher-approval of correctly spelled words. The study by Patterson, et al. (1965), indicates that peer influence is helpful in reducing hyperactivity in the classroom, but its effect on academic achievement was not investigated.

This paper reports an attempt to accelerate academic progress of selected individuals by arranging contingencies in such a manner that peer influence is brought to bear on the subjects’ academic performance. The specific procedures used in the following experiments resulted from the assumptions that (a) most grade-school children will approve of behavior which leads to a story period or early dismissal from class, (b) peer approval has reinforcing properties for the underachieving child.

**Experiment 1**

*Subjects:* The Ss were 22 students from a fourth-grade spelling class. Two experimental Ss ($S_1$ and $S_2$) were selected by the classroom teacher and the other 20 students served as control Ss. Experimental Ss were students who were, according to the teacher, “capable of doing considerably better work than they are presently doing.”

*Procedure:* This experiment was conducted over a 13-week period. On the final day of each school week during this period, the teacher constructed and administered a ten-word spelling test covering words that had been presented during that school week.

The first four weeks (Phase 1) was a baseline period in which weekly test scores were recorded but no treatment was introduced. During weeks five through nine (Phase 2), the teacher announced daily, five minutes prior to the morning recess, that the class would be dismissed for recess immediately if $S_1$ could correctly spell a specified word (or words). The teacher then presented a word for $S_1$ to attempt to spell (the word was selected from those covered during the preceding period). If $S_1$ spelled the word correctly, the class was dismissed immediately. If his spelling of the word was incorrect, class work was continued until the customary dismissal time. During weeks ten through thirteen (Phase 3), the procedure was identical to that of Phase 2, with the exception that early dismissal was made contingent on $S_2$’s responses rather than $S_1$’s. No questions were asked of $S_1$ in Phase 3.

*Results:* The results are illustrated in Figure 1. The results clearly show that the test performance of both $S_1$ and $S_2$ showed considerable improvement when the experimental treatment was in effect. Once the experimental condition was discontinued however, $S_1$’s performance declined to its previous level relative to the control Ss. The control Ss
showed a slight decline in test performance throughout the experiment. Whatever the reason for this decline (e.g., more difficult tests, spring weather), it does serve to illustrate that the improvement manifested by $S_1$ and $S_2$ during the experimental phases was not due to the presence of elements common to the class as a whole.

**Experiment 2**

*Subjects:* The Ss were 20 students from a fourth-grade arithmetic class. Two experimental Ss ($S_3$ and $S_4$) were selected by the classroom teacher...
(the teacher of this class also taught the spelling class described in Experiment 1). Again, the two experimental Ss were students who the teacher believed were performing below their capabilities. The remaining 18 students in the class served as control Ss.

**Procedure**: This experiment was conducted over a 14-week period. On the final day of each school week during this period, the teacher constructed and administered a ten-problem arithmetic examination covering material that had been presented during the school week.

Again, the first four weeks (Phase 1) was a baseline period in which weekly test scores were recorded but no treatment was introduced. During weeks five through nine (Phase 2), the teacher announced daily, five minutes before the class was scheduled to be terminated, that she (the teacher) would read a story to the class for the remainder of the period if $S_3$ could solve a specified arithmetic problem. The teacher then presented a problem, selected from material presented during the period, for $S_3$ to attempt to solve. If $S_3$'s solution were correct, the teacher read aloud to the class for the remainder of the period. If $S_3$'s solution were incorrect, normal classwork was continued until the end of the period. During weeks ten through fourteen (Phase 3), story reading was made contingent on $S_4$'s responses, rather than $S_3$'s. Daily questions were asked of $S_3$ in Phase 3, but no experimental consequences were associated with her answers.

**Results**: The results are illustrated in Figure 2. Again, the results clearly show that the experimental Ss showed considerable improvement when placed under the experimental condition. Notice, however, that $S_3$'s performance did not deteriorate in Phase 3 when the treatment was discontinued. This finding differs from that of Experiment 1 where $S_1$ failed to maintain his improved performance when the treatment was discontinued. The control Ss' test performance remained quite stable over the three phases of the experiment, illustrating that improvement manifested by $S_3$ and $S_4$ was not due to the presence to the class as a whole.

**Experiment 3**

**Subjects**: The Ss were 24 students from a sixth-grade social-science class. One experimental S($S_6$) was selected by the teacher on the basis that he had not been doing as well as he should have been doing in his classwork. The remaining 23 students served as control Ss.

**Procedure**: This experiment was conducted over a ten-week period. On the final day of each week, the teacher administered a ten-item test covering material presented during the week.

Again the first four weeks (Phase 1) was a baseline period in
which weekly test scores were recorded but a treatment was not introduced. During weeks five through ten (Phase 2), the teacher announced daily, five minutes prior to the customary noon dismissal time, that the class would be dismissed five minutes early if $S_5$ could correctly answer a question over material covered during the class period. The teacher then asked $S_5$ a question and, if he responded correctly, the class was dismissed. If he responded inappropriately to the question, classwork was continued until the customary dismissal time.

Results: The results are illustrated in Figure 3. The results show that $S_5$ showed some improvement relative to the control $S$s, but the
extent of the improvement was considerably less than that manifested by experimental Ss in the first two experiments.

**Experiment 4**

*Subjects:* The Ss were 24 students from a sixth-grade general-science class. An experimental $S(S_6)$ was selected by the teacher (the teacher of this class also taught the social-science class described in Experiment 3). Again, the experimental $S$ was a student who the teacher believed should be doing better work than he was currently doing. The remaining 23 students served as control Ss.
Procedure: The procedure and time periods were identical to those employed in Experiment 3 with the exception that dismissal time was contingent on a correct response from $S_6$ five minutes prior to afternoon recess, rather than noon hour.

![Graph](image)

**Experimental Phases**

Figure 4. Mean percent of correctly answered items on weekly science tests under phase 1 (baseline) and phase 2 (experimental treatment applied to $S_6$).

Results: Figure 4 illustrates that the test performance of both $S_6$ and the control group declined during Phase 2. Since there was little change in $S_6$'s standing relative to the control group, the decline was probably due to an environmental element (such as more difficult examinations) other than the experimental treatment.
Analysis of Results

A mean change score was obtained for each experimental S by subtracting his mean test score during the preceding baseline phase(s) from his mean test score during the treatment phase. Thus, the mean change score for $S_1$ was his mean test score in Phase 2, minus his mean test score in Phase 1. The mean change score for $S_2$ was his mean test score in Phase 3, minus his mean test score in Phases 1 and 2 combined. Mean change scores were also obtained for the control groups so that mean change scores for each experimental S could be compared with an appropriate group change score.

The difference between each experimental S's change score and the change score of the appropriate control group was obtained. These six difference scores were analyzed statistically by means of the paired $t$-test. The mean difference was found to be statistically significant beyond the .02 level of confidence ($t = 3.678; df = 5$). Whereas the experimental Ss showed a mean gain of 1.73 items per test (17.3%) under the treatment conditions, the control Ss showed a mean loss of .37 items per test (3.7%) under these conditions.

Discussion

The results of these experiments demonstrate that the procedures described can accelerate the academic performance of underachieving grade-school children. The lack of uniformity of results may have been due to:

1. Age or educational differences between fourth-grade and sixth-grade children.
2. Teacher differences in attitude toward or execution of the program.
3. Subject matter differences.
4. Individual differences among subjects.

The question of the relative effects of these different variables cannot be answered by the data obtained in these experiments. A confounding of effects is present due to the fact that one teacher taught both fourth-grade classes and the other teacher taught both sixth-grade classes. The difference in responsiveness to the treatment may have been due to certain attitudinal differences between the teachers, or the fact that the program was more effective with fourth-grade Ss than with sixth-grade Ss may have led to attitudinal differences between the teachers.

Anecdotal reports by the teachers indicate there was a difference in the manner in which the fourth-grade and sixth-grade children reacted
to the program. The fourth-grade teacher reported several attempts by peers to influence the experimental S's success (e.g., urging S to study his material and offering assistance). No such attempts by peers were noticed by the sixth-grade teacher. Both teachers reported, however, that their classes were pleased when early dismissal occurred. Differences in teacher attitudes toward the program were indicated by their verbal reports. The fourth-grade teacher spoke very favorably of the program, while the sixth-grade teacher was unimpressed. Further experimentation to isolate teacher, grade, and subject matter differences is planned.

Experimentation is also planned to identify procedures which will prevent relapses after the treatment is discontinued, such as the one exhibited by S1. At least two possibilities suggest themselves. One possibility is to continue to ask the child questions but eliminate the consequences of his answer. This treatment was applied to S3 in Phase 3 (Experiment 2) and her performance did not deteriorate. A second possible preventative of severe deterioration after the treatment condition is removed is to gradually decrease the treatment frequency until the desired behavior comes under the control of positive natural consequences.

A comment on the generalization of learned behavior seems appropriate at this point. Note that the dependent variable employed in this study, weekly test performance, was not the behavior that was actually reinforced. The finding that reinforcing daily performance will affect behavior on weekly tests which is not reinforced, though not particularly surprising, demonstrates that behavioral generalization does occur under the conditions of these experiments.

Acquisition of control over an individual's behavior by making a class-reinforcer contingent on the behavior of the individual is a treatment technique that lends itself to a variety of behavior and learning problems in the classroom. In addition to its versatility, the technique has the advantage of requiring very little of the teacher's time or energy. Tests and records are necessary only to evaluate the effectiveness of the procedure. Once the conditions under which the procedure is effective are established, tests and records are not a necessary part of the program. Hopefully, these features will serve to make the technique both effective and practical for general use in the classroom situation.

References


