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ABSTRACT

A study was conducted at the University of Maryland to determine how consistently students perform on examinations in a given class and whether it is possible to alter this relationship through the introduction of an intervening variable, such as a reinforcing and encouraging letter from the instructor. Letter grades and test scores were obtained for all 315 students in an introductory psychology class in the Fall of 1969. Prior to the second exam, the 71 students who received grades of A or B on the first exam were randomly assigned to two groups, and 35 students in one of the groups received a letter from the instructor commending their performance and indicating expectations of similar subsequent performance. Correlations among the first three exams were computed for students receiving A's and B's on the first exam and the group receiving C's, D's, or F's, and for those in the A and B group who did and did not receive letters. Scores on subsequent tests were more highly related to the first exam for the group of students who received A's or B's on the first test than the group which received C's, D's, or F's. The difference was not great, and interpretations must consider the limitation in range of the A and B group, which may result in lower correlations than the more heterogenous condition of the C, D, and F group. The distribution of "Reinforcement" letters to a sample of students who received A's or B's on the first exam had no observable effect on subsequent test performance. (SW)

COUNSELING CENTER

Office of Vice Chancellor for Student Affairs

UNIVERSITY OF MARYLAND

College Park, Maryland

THE CONSISTENCY OF STUDENT PERFORMANCE IN A COURSE AND THE EFFECTS OF ATTEMPTED REINFORCEMENT

Robert C. Lynch and William E. Sedlacek

Research Report # 8-70

A considerable amount of educational research is devoted to developing more accurate prediction of academic performance by students. Multiple regression equations abound, and weighted predictors have been provided for a plethora of variables and settings, with students' grade point average as the criterion. The rationale for these procedures, as well as the findings themselves, indicate that some aspects of previous behavior are at least a fair approximation of future behavior.

Educators have undoubtedly heard scores of students espouse optimism about their ability to "pull up" the grade they received on an early examination. To these students, past performance is not the best predictor of future performance; intentions are.

It has long been contended that evaluation is necessary to fulfill the complex purposes and functions of higher education. Certainly grades constitute a major system of reward and punishment for the college student. Lehman (1) proffers some worthwhile considerations in the area of evaluation of students. If the student is to receive some satisfaction with his progress, his motivation must be considered as an important factor. Students who recognize their performance as successful may find reward in this realization, but encouragement and approbation by the instructor may provide even greater satisfaction.

However, the true spirit of experimental science is the search for manipulative variables, rather than mere verbal explanations (Skinner, 2). Educational psychologists and researchers have not undertaken extensive investigations of the impact of such manipulative variables. The large number of students of human behavior who subscribe to principles of operant conditioning may justly be concerned about and desirous of their theories and practices making a "flight from the laboratory."

A significant aspect of instructional practice is the management of reinforcing operations. A reinforcer may be defined as an event or a stimulus which changes subsequent behavior when it follows the behavior in time. If an intervening (manipulative) variable can be adjudged a reinforcer, the instructor's repertoire of reinforcing operations would be increased.

The issues raised so far could be formulated into the two relevant questions investigated: (1) In a given course, how consistently do students perform on examinations? (2) Is it possible to alter this relationship through the introduction of an intervening variable, such as a reinforcing and encouraging letter from the instructor?

Procedure

Letter grades and test scores were obtained for all students (N=315) in a Psychology I class (Fall, 1969). Students who received grades of A or B (N=71) on the first exam were randomly assigned to two groups. Prior to the second exam, one group (N=35) each received a letter from the instructor commending their performance and indicating expectations of similar subsequent performance (see Appendix).

Product-moment correlations were computed for all students among their scores on tests 1,2, and 3 (test 3 reviewed the first two exams and material studied since the second exam), and among the letter grades assigned to their performance on tests 1 and 2 and the final course grade. Correlations among the three exams were computed for those students receiving A's and B's on the first exam and the group receiving C's, D's, or F's, and for those in the A and B group who did and did not receive letters.

The group of A and B students receiving a reinforcement letter after the first exam were compared, by t test and chi square analysis, with the control group, which did not receive a letter.

Results

The relationships among the three test scores for all students in the class were fairly substantial (Table 1). No statistically significant differences appeared between males and females on their test scores, although the females seemed to do just slightly better on tests 2 and 3 and in the letter grades assigned. The relationship between the grade assigned to scores on tests 1 and 2 was considerably lower than the relationship between the course grade and the letter grade received on test 2 (Table 1). No letter grade was assigned to test 3.

Performance (scores) on subsequent tests were more highly related to the first exam for the group of students who received A's or B's on the first test than the group which received C's, D's, or F's (Table 2). The difference was not great, however, and interpretations must consider the limitation in range of the A and B group, which may result in lower correlations than the more heterogenous condition of the C,D, and F group.

The distribution of "reinforcement" letters to a sample of students who received A's or B's on the first exam had no observable effect on subsequent test performance. As Table 3 demonstrates, the means of the two groups were not significantly different. A chi-square analysis of the subsequent letter grades received by the two groups also yielded no significant difference. While 74% of the non-recipients received course grades of A or B, 63% of the recipients received A or B grades for the course.

Discussion and Implications

This study was undertaken primarily as a pilot examination of the feasibility of intervening, with a minimum of effort, in the "grade-getting" process, in the hopes of effecting improvement. The results do not permit an expression of any effect having been made, at least on those students studied here, a rather limited sample of A and B students.

Correlations between successive test scores and letter grades lend further credence to the axiom of "prior grades are the best predictor of future grades." Students depending on a final exam to significantly affect their course grade may be facing imposing odds if the results of this study can be generalized to other courses.

Interpretation and generalization of the results, as well as future related studies should take into account several limitations of the study. No internal reliability of the tests was established. Students receiving A's and B's on the first exam were an extremely homogeneous group; the range of those test scores was very small. Finally, the determination of the course letter grades included the three examinations plus several ten-point quizzes; total points obtained constituted the basis for letter grades. No attempt was made here to analyze the relative contribution and relationships of these quizzes.

Additional study of the consistency of academic performance within a single class seems warranted. The analysis of students' overall grade-point average and its consistency obfuscates the differential abilities and curricula of students. It may well be that the reinforcement letter used in this study was strong and relevant enough. The search for manipulative variables commends itself if educators seek to enhance learning by students.

One possibility suggested by the study is an examination of the differential effect of several such variables. Selected student subgroups (divided by performance) within a given class could receive different intervening contingencies, "positive regard," "encouragement," or "aversive" letters suggest themselves as possible independent variables. Possibly students not performing at the top of the class can be motivated more successfully than those already performing well. Likewise, it may be worth investigating the effect of more than just one "commendation letter."

Most certainly, the educational practices and demands on faculty of today's institutions would necessitate practical modes of intervention. A letter is one possibility to examine; the number of other variables is limited only by the imagination of educators.

Table 1.

Correlations Among Test Scores and Letter Grades *

	All Students N=315	Males N=142	Females N=173	Letter Recipients N=35	Non-Recipients N=36
Test 1 vs Test 2	.57	.59	.55	.49	.47
Test 1 vs Test 3	.58	.61	.56	.56	.42
Test 2 vs Test 3	.62	.60	.65	.50	.68
Grade 1 vs Grade 2	.48	.48	.48	.36	.30
Grade 1 vs Course Grade	.63	.63	.64	.48	.27
Grade 2 vs Course Grade	.76	.78	.75	.71	.70

* All correlations shown are significant beyond .05 except the .30 and .27 shown in the Non-Recipient column.

Table 2.

Correlations Between Test Scores for Two Achievement Levels *

	Exam 1 A's and B's N=71	Exam 1 C's, D's and F's N=244
Test 1 vs Test 2	.48	.37
Test 1 vs Test 3	.48	.43
Test 2 vs Test 3	.60	.52

* All correlations shown are significant beyond the .05 level

Table 3.

Means and Standard Deviations of Recipients and Non-Recipients

	Recipients N=35		Non-Recipients N=36		t
	Mean	S.D.	Mean	S.D.	
Test 1	40.78	2.45	41.26	1.98	.8
Test 2	36.44	5.56	37.36	5.25	.71
Test 3	65.19	9.37	66.05	10.51	.36

Appendix

Dear

I would like to commend you on your fine performance on the recent hourly examination in Psychology 1. Your grade demonstrates a very good command of the material covered up to the time of the examination, and I trust you will be able to keep up the good work.

Best wishes for continued success.

Cordially,

James D. McKenzie, Ph.D.
Associate Professor of Psychology

References

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