Predictors of Course Grade in Undergraduate Psychology Courses

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1979
LOCUS OF CONTROL AND MODE OF INSTRUCTION AS PREDICTORS OF COURSE GRADE IN UNDERGRADUATE PSYCHOLOGY COURSES

A Thesis
Presented to
the Faculty of the Department of Psychology
Western Kentucky University
Bowling Green, Kentucky

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

by
Susan Edwards
December 1979
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Locus of Control and Mode of Instruction as Predictors of Course Grade in Undergraduate Psychology Courses

Susan Edwards
December 1979
17 Pages

Directed by: L.P. Metze, D. Roenker, and Elsie A. Dotson
Department of Psychology Western Kentucky University

Abstract

Research has shown that some students benefit more from certain instructional modes than do others (Harper, 1973; Allen, Giat, and Cherney, 1974; Doty, 1967). A personalized system of instruction and the traditional lecture-discussion format were used as alternate modes of instruction in the present study. This study used locus of control and mode of instruction, along with mental ability, to increase predictability of course performance. Predictability was not increased by these variables. Results of a regression analysis showed that only a total of 11.6% of the variance in final course grades could be accounted for by the predictor variables (i.e. locus of control, mode of instruction, and mental ability). Possible confounding factors include different individual teaching styles, different textbooks, and quantity of reinforcement given to the students for progress. Further research in which these variables are controlled may indicate different results.
CHAPTER I

INTRODUCTION

Relatively recent advances and innovations in educational technology have provided today's educators with a variety of teaching methods, including such approaches as Postlethwait's Audio-Tutorial System, Keller's Personalized System of Instruction, Ferster's Interview Method, and others (Kulik and Jaska, 1977). As a result, most instructors at the college level are faced with the task of choosing between a number of alternative modes of instruction to most effectively teach course material to their students.

Two modes of instruction that are frequently chosen are the traditional lecture-discussion format (L-D) and Keller's Personalized System of Instruction (PSI). Basically the L-D format includes instructor-set deadlines, group administered exams covering relatively large amounts of material, and course material presented mainly through lectures and group discussion. The basic features of PSI as outlined by Keller (1968) include self-pacing, unit mastery before advancement to other units, a minimum of lectures, and the use of undergraduate proctors for individual or small group testing and tutoring. The present study utilized these two general modes of instruction. Present day educators are likely to be choosing between the two, and may find predictive information about student performance useful in their decision.

Several studies have indicated benefits to using the PSI mode of instruction. For example, a study done by Yeazell (1974)
compared student achievement in a course taught by PSI and by lecture. In both sections student achievement was defined as the student's total point count in the course at the end of the semester. This point count included points gained for written assignments, attendance at group discussions, and objective test scores. The data analysis indicated that the self-paced students achieved significantly higher levels of performance than the instructor-paced students (Yeazell, 1974). Dawson (1977) reported that undergraduate students in a PSI course would be expected to achieve 6.7% more of their potential improvement than those in conventional lecture courses. (Potential improvement was predicted from the student's grade point average and ACT scores.)

Not all studies have shown superior student performance under the PSI format. Ainsworth (1979) compared student performance in two sections of an introductory psychology class, one taught by personalized instruction and one by L-D (Performance was measured by percentage of passing grades and drop rate.). He concluded that students did better in the lecture-discussion section that did students in the personalized instruction section.

It may be that some students perform better in a PSI taught course, and other students perform better in a L-D taught course. Harper (1973) has proposed that instructional effectiveness could be increased by matching student characteristics with modes of instruction. A number of studies have been conducted to determine the kind of students who perform
better under different instructional modes. Among the characteristics that have been studied are mental ability (Harper, 1973; Nazzaro, Todorov, and Nazzaro, 1972), creativity and social needs (Doty, 1967), learning styles (Jellema, 1976), reading efficiency (Decimall, 1976), and Locus of Control (Allen, Giat, and Cherney, 1974; Johnson and Croft, 1975).

Locus of Control is a concept that refers to internal vs. external control of reinforcement or the extent to which an individual feels that he has control over the reinforcements that occur relative to his behavior (Rotter, 1966). The scale which measures this concept is called the I-E Scale and consists of 23 I-E items and six filler items. There is some evidence that this characteristic may be used to predict student performance in different teaching situations. For example, Eilerson (1972) found that undergraduate college students in the internal group demonstrated high levels of achievement and participation in an "unstructured" introductory psychology class, but failed to do better than students in the external group in a traditionally structured classroom. Allen, Giat, and Cherney (1974) studied the effect of locus of control on the performance of 88 college students in an abnormal psychology class which was taught in the PSI format. The results showed that the students labeled as internal contracted for and earned higher grades in the course than did the students labeled external. A similar study was done, however, by Johnson and Croft (1975) with college students in a personality
course taught by the PSI method. Their results did not reveal a relationship between locus of control and course performance. Based on their results, Johnson and Croft suggested that personality factors are not predictors of PSI course performance. The present study will attempt to shed further light as to whether locus of control can be used to predict student performance under different instructional modes, and perhaps provide educators with a useful tool in the task of matching student with teaching mode to optimize performance.

Another variable which has been found to interact with method of instruction is mental ability. Harper (1973) researched the effect of mental ability on student performance in a self-paced college course. She found that those students in the upper third and the lower third in mental ability benefited more from a self-paced class than did students with medium mental ability. Nazzaro, Todorov, and Nazzaro (1972) also researched this subject and found low correlations between student performance (i.e. number of errors on the final exam and time required to complete the course) and mental ability (i.e. SAT scores). Nazzaro, Todorov, and Nazzaro concluded that the individualized mode of instruction may provide the weaker student with the structure needed to improve his study skills and in that way help him perform like the high scoring student. Mental ability, therefore, may be another student characteristic that could be used to effectively predict performance under various modes of instruction. For this reason, mental ability was assessed and included in the data analysis in the present study.
In summary, mode of instruction, locus of control, and mental ability were analyzed in the present study as to their relationship to student performance (course grades). If specific student characteristics can be defined, measured and used to predict performance differences under various instructional modes, educators will gain a greater ability to match student with mode of instruction to maximize student performance and the benefits of college instruction.
CHAPTER II

METHOD

Subjects

The sample for this study consisted of undergraduate psychology students enrolled in Psychological Statistics and Experimental Psychology (These two courses were taught as one six-hour block.). The study took place at Western Kentucky University during the fall semester of 1977 and the spring semester of 1978. If for some reason (i.e. late enrollment or early withdrawal) data were not complete on a particular subject, that subject was deleted from the final analysis. Data were complete on 71 of the possible 83 subjects used.

Settings

Lecture-Discussion Class. The L-D classes proceeded under the format previously described. Two sections of the class were offered each semester taught by the L-D method. One section of the class was taught in a two-hour block every other day. The other section met every day for one hour. Students could choose one of two instructors under this method. The textbooks used in the lecture classes were Experimental Psychology, A Methodological Approach by McGuigan (1968) and Fundamental Statistics for Psychology by McCall (1975). Grades were assigned according to student performance on three major exams, written lab reports, and a book report. In the fall of 1977 the exam scores accounted for 50% of the final grade and the reports accounted for the other 50%. In the spring of 1978 exams were 60% of the final grade and
reports were 40%.

**Personalized System of Instruction Class.** Only one section of the course was offered under PSI each semester. The PSI class proceeded according to the features outlined by Keller (1968). Students were on their own to come to a learning center to ask for help and to take quizzes. The textbooks used in the PSI class during the fall of 1977 were *Inferential Statistics* and *Descriptive Statistics*, both by Richard P. Runyon (1977), and *Research Methods in Psychology* by Metze and Craig (1979). In the spring 1978 semester, *Introduction to Statistics Purposes and Procedures* by Ary and Jacobs (1976) and *Experimental Psychology, A Methodological Approach* by McQuigan (1968) were used. There were a total of twenty units, six minor labs, and one major lab. Students were evaluated according to the amount of course material they had passed at mastery criterion (90%) by the end of the semester.

**Materials**

Rotter's (1966) Internal-External Locus of Control Scale (I-E Scale) was given as a pretest to differentiate students on a personality characteristic (internal vs. external). The scale consists of 29 multiple-choice questions and takes approximately 15 minutes to administer. Subjects were labelled internal if their scores were below 10 and external if their scores were 10 or above, according to Rotter's (1966) grading scale.

The Henmon-Nelson Test of Mental Abilities (H-N) was used to define and measure the subjects' mental ability. It took 40 minutes to administer and yielded three scores: a verbal score,
a quantitative score, and a composite of the two.

Procedure

Students were free to choose the specific course section at registration. Information was available at this time as to whether the course was L-D or PSI in format.

Before any course material was presented, students were given the I-E Scale and the H-N pretests. Classes then proceeded as described above, and course grades were recorded at the close of each semester.
CHAPTER III

RESULTS

A regression analysis indicated that no more than 11.6% of the variance in course performance as measured by course grades could be accounted for by the predictor variables (i.e. instructional mode, locus of control, and mental ability). Locus of control accounted for less than one percent. The amount of variance accounted for by each variable individually is shown in Table 1.

It can also be seen in Table 1 that the greatest amount of variance accounted for by any one variable was approximately eight percent. That amount was accounted for by the quantitative score of the Hemmon-Nelson Test of Mental Abilities.

As may be seen in the correlation matrix in Table 2, there was a slight negative correlation between mode of instruction and course grade. This would indicate slightly lower grades in the classes taught by the L-D format. The correlation between mode of instruction and mental ability was slightly positive which indicates that the L-D classes had slightly higher mental ability than the PSI classes. The correlations are all too low to be significant.
Locus of Control as a Predictor

CHAPTER IV
DISCUSSION

The results indicate that locus of control and mode of instruction do not interact in such a way as to affect course grade. Therefore, it would seem that under the conditions of the present study, locus of control scores would not be an effective student characteristic with which to predict performance (under different modes of instruction) as defined by course grades.

The present results do suggest that mental ability may be one characteristic that could be used to predict classroom performance, as the majority of the variance found was attributable to mental ability. Although the effects are weak at best, further research could be done to determine which range of ability might do best under which mode of instruction.

It may be interesting to note that it is the quantitative score, specifically, which accounts for the most variance and correlates highest with course grade. A large portion of the course is statistical in nature, and it seems intuitive that students with quantitative (mathematical) ability would do well in a course involving statistical skills. Overall, mental ability still does not account for much variance, and the correlation is not significant.

It is possible that two uncontrolled variables lead to confounding in this study: 1) the same instructor did not teach both types of classes and 2) the arrangement of the two types of classes facilitates different interaction styles.
As an example of how the class structure influenced interaction styles, the students in the PSI class were given more frequent feedback than were the students in the L-D classes. During the semester those students who were falling behind in the PSI course were given more attention and were reinforced with praise for any progress they would show. Although this practice of reinforcing the performance of the individual students may have helped the student, it nevertheless may have had a confounding effect on the data. Students may not have actually been allowed to work at their own pace if that pace was inappropriately slow. Social reinforcement was given contingent upon the student's rate of performance. Those students who were working slowly may have been shaped to work at a faster pace. The structure of the L-D class does not allow for this type of student-teacher interaction.

Other possible confounding factors include the different teaching styles of the individual instructors. Dawson (1977) pointed out that a technique that works well for one instructor may not work well for another therefore, the fact that there were three different instructors involved in this study may have effected the results. Further research in which these variables are held constant may provide more informative results.
REFERENCES


Locus of Control as a Predictor


Locus of Control as a Predictor


Table 1
Summary of Variance Accounted for by the Independent Variables

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<thead>
<tr>
<th>Variable</th>
<th>Variance</th>
<th>Cumulative Variance</th>
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<tr>
<td>Quantitative Score of Henmon-Nelson</td>
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<td>0.0799</td>
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<tr>
<td>Verbal Score of Henmon-Nelson</td>
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<td>0.0803</td>
</tr>
<tr>
<td>Score from I-E Scale</td>
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Correlation Matrix of Variables

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<th>Verbal</th>
<th>Locus of Control</th>
<th>Mode</th>
<th>Grade</th>
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<td>1.0452</td>
<td>0.1644</td>
<td>0.2827</td>
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<td>Score</td>
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<td></td>
<td></td>
</tr>
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