

# THE EFFECTS OF FEEDBACK AND MOTIVATION ON PERSISTENCE, PERFORMANCE, AND SATISFACTION IN AN INTRODUCTORY PSYCHOLOGY COURSE

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Feedback in the form of self-test quiz results and the motivational variables of achievement, affiliation, and test anxiety were examined in relation to persistence at optional tutorials, grade performance, and satisfaction with various aspects of an introductory psychology course. Sixty-three second-year university students were timetabled to one of four tutorial groups, two of which received planned feedback. Analyses of variance indicated that: (a) feedback was significant in satisfaction with all aspects of the course, and interacted in a complex manner with the motivational variables to influence grades, and (b) subjects with high achievement and low affiliation motivation attended the greatest number of tutorials. The findings were discussed in terms of motivational theory and educational implications.

Previous studies (Cameron, 1966; Clarke, 1972; Isaacson, McKeachie, Milholland, Lin, Hofeller, and Zinn, 1964; Johnston and Nawrocki, 1967; Marron, 1963) have indicated that feedback enhances task performance. Feedback refers to information about a person's performance by comparison with other persons and with ways of improving performance. However, task performance is probably dependent upon the interaction of feedback with different motivational variables (Feather, 1961; French, 1955, 1958; French and Thomas, 1958; Heilbrun, 1962). When feedback communicates more achievement cues than affiliation cues, performance is related to achievement motivation scores rather than to affiliation motivation scores, and vice versa (French, 1955, 1958). Moreover, subjects with high achievement motivation scores are more persistent in working at an achievement-related task than those with low achievement motivation scores (French and Thomas, 1958).

Atkinson and O'Connor (1966) hypothesized that achievement motivation and affiliation motivation interact jointly, such that when tasks are undertaken in the immediate presence of an examiner, subjects who are low in achievement motivation and high in affiliation motivation persist longer at tasks which call for rapid discrimination among competing response tendencies. Further, Clarke (1972) found that high school students who were high in achievement motivation and low in affiliation motivation persisted longest at insolvable figure-tracing tasks. The lowest persistence scores were obtained by the group high in both achievement and affiliation motivation. Tasks of this kind are sensitive to the decrement in discriminative performance produced

by too intense motivation that was first reported by Yerkes and Dodson (1908). Hence, subjects who are high in both achievement and affiliation motivation would receive lower performance scores than those with high achievement and low affiliation motivation or those with low achievement and high affiliation motivation.

In the classroom situation, feedback is effective in attaining objectives as a necessary component of reinforcement (Solomon and Rosenberg, 1964). It is inadequate to tell a student that his solution is wrong, unless he is shown or told the expected solution. From a review of literature in this area, Solomon and Rosenberg found several sources from which the student receives feedback. The sources include his ongoing behaviour, his own judgment of its effect, and the cues and comments from the instructor or other students. The authors indicate that a teacher may appeal to status groupings if he gives feedback for an individual in front of the whole class. Therefore, where possible, feedback should be privately given. Since feedback interacts with the values and motives of the students, it is urged that these variables be included in studies of feedback.

By providing feedback in terms of the correctness and value of responses to course content, Cameron (1966) found that the feedback group scored significantly higher on an educational psychology examination. Stanlee and Popham (1960) explored the possibility that weekly quizzes might influence grades. Although they reasoned that quizzes increase achievement motivation and hence grades, no specific measures of motivation were obtained. On the mid-semester examination in educational psychology, the group whose quizzes were marked and recorded received significantly higher grades than the group not given quizzes.

Other studies (Birney and McKeachie, 1958; McClelland *et al.*, 1953; McKeachie, 1961; McKeachie *et al.*, 1966; Morgan, 1952; Robinson, 1964; Weiss *et al.*, 1959) found that students high in achievement motivation obtained better grades than students low in achievement motivation. However, since most of the researchers chose only those subjects with extreme achievement motivation scores, there may not have been a linear relationship between achievement motivation and grades.

Carney and McKeachie (1963) found that the condition of low achievement motivation and high anxiety was negatively related to grade point average. It has been suggested that anxiety and academic criteria are related in a curvilinear fashion: there is an optimal level of tension, such that students with high anxiety improve under relaxed conditions while students with low anxiety are likely to do worse (Cronbach, 1970).

Although most of the feedback and motivational literature has concentrated on persistence and performance variables, it may be important to consider satisfaction with didactic methods as a dependent variable, as indicated by Solomon and Rosenberg (1964). The feedback provided

in the present study attempted to satisfy individual needs; i.e., arouse achievement motivation, while minimizing threat. Hence, achievement motivation and anxiety could be considered as motivating factors in satisfaction with the course.

Since feedback and motivation have not been examined adequately in relation to academic criteria, the following comparisons were made with mean number of tutorial sessions attended, mean satisfaction ratings of the courses, and mean grades: (1) Feedback *vs.* Control groups; (2) High achievement motivation *vs.* low achievement motivation; (3) High affiliation motivation *vs.* low affiliation motivation; (4) High *vs.* moderate *vs.* low anxiety; (5) The interaction effects of feedback with achievement and affiliation motivation; and feedback with achievement motivation and anxiety; (6) The interaction effects of achievement and affiliation motivation with each other; and, (7) The interaction effects of achievement motivation and anxiety with each other.

## METHOD

### *Subjects*

Sixty-three second-year university students were involved in the study. The average age of the 34 men and 29 women was 21.1 years.

### *Procedure*

The introductory psychology course for second-year university students consisted of two one-hour lectures to over 300 students and one hour tutorial each week for twelve weeks. Four of the eight tutorial groups with approximately 40 students in each had the same tutorial leader. The first and third group in the week were designated as experimental (feedback) groups. The other two comprised the control group.

Of the original 160 students in the four groups, 63 had complete sets of data for the study. Eight students had dropped the course; others had changed tutorial groups, or were unavailable at times when data were collected. The 63 students were divided into motivation groups according to their scores above or below the mean standard scores of 46.5 for achievement motivation and 44.8 for affiliation motivation on the Adjective Check List (Gough, 1955). They were also divided into groups of high (8-10), moderate (5-7), and low (1-4) anxiety, according to their sten scores on the IPAT Self-Analysis Form (Cattell and Schein, 1963).

Because of timetable limitations, it was not possible to assign students randomly to experimental and control groups, nor to keep equal numbers in each group. Statistical comparisons revealed no significant differences between the experimental and control groups on age, sex, choice of major study area, father's occupation (Blishen, 1958), first-year grade point average, and the motivational variables of achievement, affiliation, and anxiety.

For the experimental groups, at the beginning of each tutorial session for eleven sessions the students completed a short self-scoring quiz based on the current lecture material. Reasons for correct answers were given by the tutorial leader. The remaining part of each session involved working on standardized extension material in psychology. The control groups worked only on the extension material.

Two examinations for all course members were given in the lecture hall: one mid-way into the second semester and one at the end of the school year. The performance dependent variables consisted of the first examination result out of 15, and of the final percent grade based on the examinations and one essay. Separate analyses for the two examinations were performed, since the first examination for the two experiments resembled the format of the quizzes. The persistence score for each subject was the number of optional tutorial sessions attended out of 12. The course satisfaction score was obtained from a seven-point rating sheet on various aspects of the course. Three-way analyses of variance for cells with unequal numbers were performed on the appropriate dependent variables. One set involved two levels each of feedback, achievement motivation, and affiliation motivation, and the dependent variables of persistence and performance. The other set involved two levels each of feedback and achievement motivation, three levels of anxiety, and the dependent variables of performance and satisfaction. Table 1 presents the number of subjects for each cell of the two sets.

## RESULTS

With persistence as the dependent variable, the interaction effect of achievement motivation with affiliation motivation was significant [ $F(1,55)=7.00$ ,  $p < .01$ ]. Students with high achievement and low affiliation motivation attended a greater number of tutorial sessions than students with high achievement and high affiliation motivation (Figure 1).

For course satisfaction, in both analyses, only the main effect of feedback was significant [ $F(1,55)=6.82$ ,  $p < .01$ ]. The Feedback groups gave a mean rating of 5.63 for the course, while the Control groups' mean rating was 4.24. On the first examination score, the interaction of feedback with anxiety was significant [ $F(2,51)=3.88$ ,  $p < .05$ ]. Students with high anxiety in the experimental groups obtained a higher average examination score than students with high anxiety in the control groups, and the students with low anxiety in the experimental groups (Figure 2).

Three significant effects were found with the final grade as dependent variable: the main effects of achievement motivation [ $F(1,55)=10.09$ ,  $p < .01$ ] and anxiety [ $F(2,51)=3.20$ ,  $p < .05$ ], and the interaction effect of feedback with achievement motivation [ $F(1,55)=5.29$ ,  $p < .05$ ]. Students with a moderate anxiety score

obtained the highest final grade average (Figure 3). Students with high achievement motivation receiving feedback obtained a higher final grade average than students with low achievement motivation also receiving feedback (Figure 4). All other effects were not significant.

TABLE 1  
Number of subjects per cell

Feedback				Control							
High	nAch	Low	nAch	High	nAch	Low	nAch				
High	Low	High	Low	High	Low	High	Low				
nAff	nAff	nAff	nAff	nAff	nAff	nAff	nAff				
13	6	7	7	5	5	6	14				
High	Mod.	Low	High	Mod.	Low	High	Mod.	Low			
Anx.	Anx.	Anx.	Anx.	Anx.	Anx.	Anx.	Anx.	Anx.			
4	7	8	8	4	2	3	5	2	7	12	1

### DISCUSSION

Several of the laboratory findings by French (French, 1955; French and Thomas, 1958) were supported in the applied educational setting. Feedback in the present study probably communicated more achievement cues than affiliation cues, as evidenced by the interaction effect of feedback and achievement motivation on course grades. The interaction effect of feedback and affiliation motivation on course grades was not significant. Students with high achievement motivation scores were more persistent in attending achievement-related tutorials than those with low achievement motivation scores.

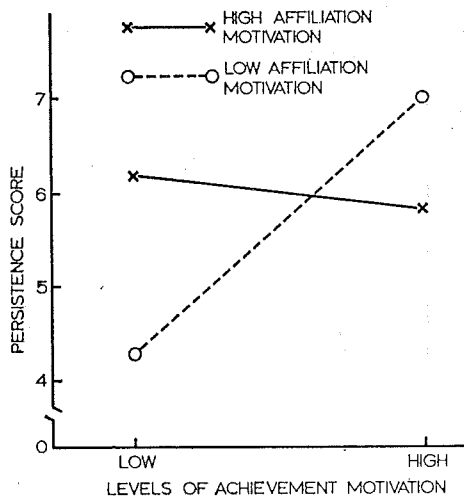


Figure 1. Graph of Achievement X Affiliation Motivation on Mean Persistence Scores (Number of tutorial sessions attended).

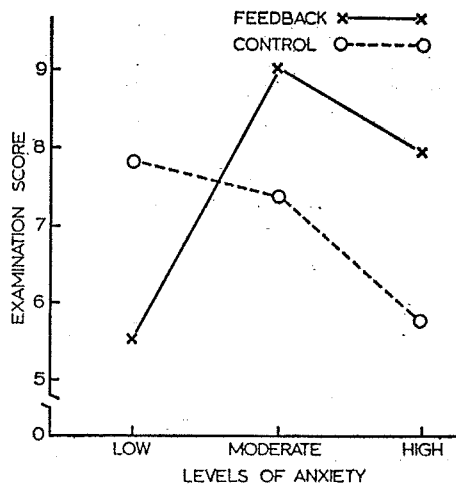


Figure 2. Graph of Feedback X Anxiety on Mean Examination Scores (15-point scale).

The significant interaction of achievement and affiliation motivation shows that the motivational variables are not completely independent from one another, but the effects of one are partially dependent upon the level of the other. Heilbrun's (1962) results were supported by the present study. For Heilbrun, the best persisters at first year college were students with high achievement and low affiliation motivation.

The manner of interaction of achievement and affiliation motivation partially supports Atkinson's and O'Connor's (1966) hypotheses. Persistence scores were greater for students with high achievement and low affiliation motivation. High achievement motivation with high affiliation motivation (involving the need for social approval) produced the third lowest mean on the persistence variable. In addition to the

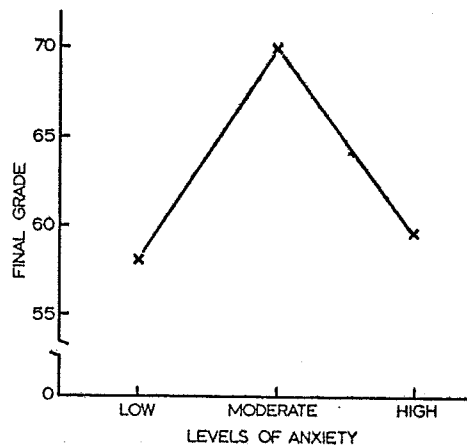


Figure 3. Graph of Effect of Anxiety on Mean Final Grades (Percent).

presence of achievement cues in the tutorial sessions, the tutorial leader may have communicated affiliation cues. These results seem to be consistent with the Yerkes-Dodson (1908) law which states that there is an optimal level corresponding to high motivation on one, but not both variables, that a high score on both is too high a level of motivation and that a low score on both is too low a level of motivation for a given level of task complexity. Stanlee and Popham (1960) reasoned that weekly quizzes increase achievement motivation and hence grades. From the present study, the quizzes provided achievement cues, to which students with high achievement motivation responded with higher grades. The quizzes had minimal effect on students with low achievement motivation. Since the whole range of achievement scores was used in the present study, the linearity of the relationship between achievement motivation and grades seems more definite than in other studies which used only extreme groups. The correlation coefficient of .30 ( $p < .05$ ) between achievement motivation

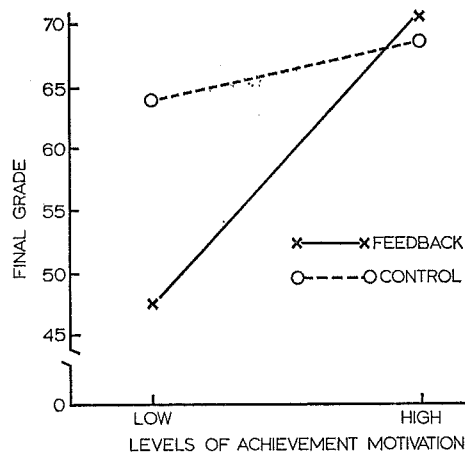


Figure 4. Graph of Feedback X Achievement Motivation on Mean Final Grades (Percent).

scores and final grades in the present study supports the linearity argument.

The interaction effect of achievement motivation and anxiety found by Carney and McKeachie (1963) was partially verified in the present study, since there was a tendency toward significance for the interaction effect of feedback, achievement motivation, and anxiety on the

examination grades [ $F=2.98$ ,  $p < .06$ ]. Feedback assisted the low achievement motivation/high anxiety student to obtain a higher grade. The curvilinear relation of anxiety and grade performance was supported. Students with high anxiety improved in the feedback condition, while students with low anxiety, also in the feedback condition, obtained the lowest examination scores of all groups. Feedback conditions may have provided some relaxed, carry-over effect into the examination, perhaps in raising high anxiety students' self-confidence in practice.

Only the feedback variable influenced course satisfaction. Perhaps the treatment helped satisfy achievement, affiliation, and anxiety needs. However, satisfaction of the needs, which interact in a complex manner with feedback and with each other, does not ensure better academic performance. The above considerations have been based on a sample of both men and women. There were too few subjects to examine the sexes separately in analyses of variance. On visual inspection of the data, there seemed to be similar results for both groups. As applied to an educational setting, two implications may be suggested. First, self-tests, quizzes, and other forms of feedback will not enhance academic performance for all students. The motivational variables of achievement, affiliation, and anxiety interact in a complex manner with each other and with feedback to affect grades and persistence in a course of study. Second, instructors who provide both achievement and affiliation cues to students may find that those who have high needs both in striving for success and in social approval may not persist in the instructional setting.

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