The Effects of Contingency-Management on Probationary Students' Academic Behavior

Brian Delano Yancey
Western Michigan University

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THE EFFECTS OF CONTINGENCY-MANAGEMENT ON PROBATIONARY STUDENTS' ACADEMIC BEHAVIOR

by

Brian Delano Yancey

A Thesis
Submitted to the
Faculty of The Graduate College
in partial fulfillment of the
requirements for the
Degree of Master of Arts
Department of Psychology

Western Michigan University
Kalamazoo, Michigan
December 1983

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THE EFFECTS OF CONTINGENCY-MANAGEMENT ON PROBATIONARY STUDENTS' ACADEMIC BEHAVIOR

Brian Delano Yancy, M.A.
Western Michigan University, 1983

The purpose of this study was to evaluate the effectiveness of procedures designed to reduce student attrition. The contingency-management approach was presented as an alternative to other approaches which assume student attrition to be a function of personality differences, study-skills deficiencies, and ecological deficits. Forty undergraduate students on academic probation were referred to the Self-Management Course offered by the Psychology Department at Western Michigan University. The Self-Management Course was designed to deliver behavioral consequences for study behavior more immediately than is normally the case. Students taking the Self-Management Course completed several worksheets, participated in group discussions, and attended a study center. The experimental students outperformed the control students on all relevant measures. The improvement in GPA during the course was statistically significant for the experimental but not for the control students; and, the grade point average for the semester was statistically significantly higher for the experimental group.

Several recommendations were given for improving the Self-Management Course. These recommendations included (a) improving staff and student feedback, (b) improving instructional materials, (c) reducing the staff-to-student ratio, and (d) it was recommended that the experimenters reinforce the production of academic accomplishments and not mere student compliance. It is believed that these recommendations might contribute to the improvement of the Self-Management Course so that it will consistently raise the GPAs of probationary students.
ACKNOWLEDGEMENTS

I would like to acknowledge the guidance and friendship of Dr. Richard Malott, whose support I greatly appreciate. In addition, I would also like to thank Dr. Barbara Fulton for her guidance and confidence in my managerial ability. I would also like to thank Dr. Dale Brethower for his friendship and thoughtful advice. I also appreciate the University administrators who supplied me with the data needed to conduct this research.

Brian Delano Yancey
DEDICATION

This work is dedicated to my parents whose love, encouragement, and understanding have made this work possible.
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THE EFFECTS OF CONTINGENCY-MANAGEMENT ON PROBATIONARY STUDENTS' ACADEMIC BEHAVIOR

WESTERN MICHIGAN UNIVERSITY

M.A. 1983

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The managed self is composed of what is significantly called selfish behavior—the product of biological reinforcers to which the species has been made sensitive through natural selection. The managing self, on the other hand, is set up for teaching a person to alter his behavior in such a way that it becomes less aversive and possibly more reinforcing to others.

B. F. Skinner
CHAPTER I

INTRODUCTION

Nationally, college administrators are finding it difficult to maintain student enrollment at a level which guarantees the economic survival of the university. At Western Michigan University, student fall semester enrollment declined from 20,698 in 1980 to 18,965 in 1982. As a result, students amassed fewer credit hours. They took a total of 252,485 credit hours during the fall semester of 1982. This is a difference of 23,701 credit hours (Boyle & Miars, 1982). Furthermore, 907 students left the University following the Fall semester of 1982. Of these students, 535 voluntarily withdrew, while 372 were dismissed for low grade point averages (C. A. Carson, Personal Communication, September 27, 1983).

Attrition figures like these have caused administrators to seek methods to retain the student who would otherwise leave the university before completing degree requirements. They have looked to such professionals as statisticians and psychologists, but these authorities have offered few effective strategies. Instead, they note that the factors which produce student attrition are complex and difficult to manage; and, unfortunately, many of these same authorities attempt to measure and manipulate variables assumed to
account for attrition which are equally complex.

Research on student attrition seems to fall into one of four approaches, though these approaches should not be viewed as mutually exclusive. They are (a) The Trait Approach, (b) The Ecological Approach, (c) The Study-Skills Approach, and (d) The Contingency-Management Approach. As we shall see, most of the above approaches have certain drawbacks.

The Trait Approach

Researchers supporting the trait approach "...seek correlations among an individual's patterns of responses to different standardized eliciting conditions or tests." (Mischel, 1969, p. 73) They record common behavioral and biographical characteristics of students who respond similarly to test items. Students identified as being "high risk" are eventually to receive support directed at their need deficit.

Studies representative of this approach follow: Griffin (1977) studied personality and biographical variables to assess their affect on student first-semester grade-point average (GPA). He found that personality variables collectively accounted for 19 percent of the variance in GPA. The variable which accounted for most of the variance was "delay of avoidance". That is, students had difficulty working toward goals with indirect-acting contingencies (Malott, 1982).
Similarly, Ross and Elton (1966) categorized students as Defaulters (students who withdrew from the University during the semester in which they were enrolled), ProbationPersisters (students who persisted unsuccessfully through one year), and Dropouts (students who persisted successfully through one year but voluntarily did not return for the second year). They found that the dependency variable was the only one that differentiated Probation Persisters and Defaulters from Successful Persisters and Dropouts, with Defaulters and Probation Persisters being less dependent.

Rossman and Kirk (1970) categorized entering freshmen into four groups based upon their first-year cumulative GPA. The categories were Persisters (students who completed four consecutive quarters), Withdrawals (students who had earned a GPA above 2.0, returned to the University the first, second or third quarter, but did not enroll for the first quarter of the second year), Failures (students who withdrew after the first, second or third quarter with a CPA below 2.0), and Withdrawal/Returnee (this category was subdivided. The first subdivision included students who completed three consecutive quarters, did not enroll for either the fourth quarter of the first year or the first quarter of the second year, but did enroll for the second quarter of the second year. The second subdivision consisted of students who had a GPA above 2.0, who withdrew after the first quarter and did not enroll again until the first quarter of the second year).
The above students were asked to complete the School College and Ability Test, the Ominibus Personality Inventory and the Student Questionnaire. The authors reported that students categorized as Voluntary Withdrawals had higher verbal scores than did Persisters, but found no significant difference in quantitative scores. There were significant differences, however, between Voluntary Withdrawals and Failures on both of the above measures. Voluntary Withdrawals differed significantly from both the Persisters and Failures on seven of the fourteen scales of the OPI. The authors concluded that freshmen with high scholastic ability and interest in intellectual matters are among the first to withdraw from college.

Finally, Johnson and Rossman (1973) collected data on students over a five-year period to identify the factors related to persistence in college. The authors gathered student first-term GPA and cumulative GPA through the term in which the student graduated or withdrew. Students were put into the following categories: Persisters (students who graduate with a 2.0 or better), Failures (students who left with a 2.0 or better). The authors reported no significant difference between Voluntary Withdrawals and Persisters on SAT scores. However, there were significant differences in cumulative GPA, with Persisters scoring significantly higher. In other words, the better a student's academic performance, the more likely she/he was to stay in school. Voluntary
Withdrawals differed significantly from Failures on pre-college ability and achievement variables. Measures of attitude and values, high-school rank, distance from college and participation in an experimental advising program did not differentiate between Persisters, Voluntary Withdrawals and Failures. No comparisons between Persisters and Failures were made.

Analysis.

It would seem obvious that academic failures need more academic assistance than do students who voluntarily withdraw. However, categorization alone does little to provide such assistance. Separating students into groups based upon their academic performance can give the educator a starting point, whereby s/he can direct intervention programs at specific student needs. But once the target population has been identified, strategies which reduce student attrition must follow. Only Rossman and Johnson made an attempt to reduce student attrition via an experimental advising program, and that attempt was unsuccessful. The other authors primarily measured personality variables, and these measures failed to reliably predict student academic success in college.

It is surely the case that predictable behavior patterns occur in a variety of situations. But this consistency does not necessarily constitute an unchangeable personality structure. It can, however, result from an environmental structure which hinders student academic success. Therefore,
the proper intervention might be to change that environmental structure.

The Ecological Approach

The ecological approach to student attrition is one in which researchers attempt to deal with those environmental events. They attempt to isolate those events which co-vary with attrition, for it is assumed that these events affect a student's effective integration into the social and academic mainstream of the college community. The researchers propose that a reduction in student attrition will follow once the inhibitory environmental events are identified and modified.

As stated earlier, the different approaches to student attrition should not be viewed as mutually exclusive. Accordingly, the ecological approach has many of the defining features found in the trait approach. The following research was placed in this section by virtue of the fact that the variables assumed to account for student attrition seemed more quantifiable in the ecological approach.

Research supporting the ecological approach follows: Hackman and Dysinger (1970) examined parental support and student commitment to college. They believed that these factors were effective in predicting student academic success. The students were asked to complete a questionnaire about one week after the beginning of the semester. The authors report that Persisters were highest in commitment.
to college and Voluntary Withdrawals lowest. Students whose parents did not mail back the questionnaire were more than twice as likely to withdraw than students whose parents did. The authors also found that students with better educated parents tended to be more committed to college as did students who viewed their relationship with their parents as good.

Hackman and Taber (1979) studied student success and nonsuccess patterns as seen by individuals throughout the college community. Respondants (116 faculty members and 260 undergraduates) were asked to select two students they viewed as "most successful" and two they considered "least successful". The respondents rated each student using the College Criteria Questionnaire. The authors identified seven successful performance categories and five unsuccessful performance categories. The authors found that the "most successful" students (1) earned a higher mean GPA (successful 3.37; unsuccessful, 2.70), (2) earned more University honors, (3) earned more departmental honors, and (4) earned more academic prizes. The authors concluded that several academic behavior patterns are rewarded by the college community.

Churchill and Iwai (1981) compared five groups of students in terms of their use of campus facilities and their response to a checklist of personal problems. The five groups were Dropouts (academic dismissals), Low Stopouts (voluntary leavers with low GPA), Low Persisters (continuing
students with low GPA), High Persisters (continuing students with high GPA), and High Stopouts (voluntary leavers with high GPA). The authors found that Dropouts had a significantly lower mean use of facilities than did Low Stopouts. However, there was no significant difference in service use between High Stopouts and HighPersisters, between Low Persisters and High Persisters and between Low Stopouts and High Stopouts.

Mannan and Preusz (1980) attempted to determine why students dropout, and suggested strategies for reducing student attrition. The authors found that 592 black students failed to return to the University (404 had GPAs less than 2.0), while 682 Special Program students with marginal GPAs failed to return to the University (640 had GPAs below 2.0). The authors cited increased mobility and alternative growth experiences as possible reasons for student withdrawal. They recommended that a quarter or semester-long course be mandatory for all entering freshmen students, with the objective of encouraging academic, social and career integration.

Analysis.

The analysis used in the ecological approach seems to be an improvement over that used in the trait approach. This is because variables said to affect student attrition can be observed. The ecological approach is limited, however, by the fact that academic behavior, as a datum, seemed subordinate to
the study of environmental events. Emphasizing environmental events may serve to increase rather than limit the number of variables which must be considered when studying student attrition. Therefore, a student's academic behavior is a more convenient datum. Furthermore, in the analysis of student attrition, student behavior (i.e., academic persistence) should naturally be of primary concern because student withdrawal (leaving the university) is the crucial issue.

The Study-Skills Approach

Researchers supporting the study skills approach assume that a student's academic difficulties are a result of poor pre-college training. They assert that programs designed to teach remedial skills can be developed, and that these programs can help students in courses they are currently taking. Examples of such research follows:

Usora (1979) suggested that study skills strategies be designed as to increase academic competence and student retention. He suggested that student's tests be the primary material for teaching skills such as speed reading, comprehension and note taking. The authors also suggested that students (1) show concern for what the professor says (2) nod and smile occasionally when the professor makes certain points and (3) increase personal contact with the professor. The author points out that the latter techniques are by no means "dishonest" but are necessary for effective social interaction. Usora provides no data to support his
suggestions, however.

Robyak and Downey (1979) assessed the degree to which personality variables and prior academic performance affected the GPAs of students after study-skills instruction. Students who had earned a cumulative GPA one standard deviation below that which was predicted by ACT Test Scores were classified as underachievers. "The remaining students" were classified as nonunderachievers. Study-skills usage was assessed by administering the Survey of Study Habits and Attitudes before and after study skills instruction. The authors found that personality type did not differentiate between the two groups. They concluded that both prior academic performance and study-skills usage scores were effective predictors of extended academic performance.

Analysis.

Again, in the above studies, the authors merely placed students into group based upon their academic performance or made suggestions about how effective intervention programs should be designed. Nothing was done to actually reduce student attrition. The basic assumption upon which the study-skills technology rests—that students in academic difficulty need more academic assistance is probably valid. But if programs designed to teach students effective study-skills are not implemented, the technology is only of academic interest.
The Contingency-Management Approach

Researchers supporting the contingency-management approach assert that academic performance is positively correlated with more immediate reinforcement, or in other words, academic performance declines when behavioral consequences for studying are too delayed, small and cumulative, or improbable. Therefore, researchers supporting this approach attempt to design systems which reliably deliver behavioral consequences for high levels of academic performance. They assume that this strategic placement of behavioral consequences will result in improved academic performance.

The following research is presented to emphasize the procedure used to generate higher levels of academic performance. Though most of the students in the following research were not on academic probation, it is assumed that the strategic placement of behavioral consequences will result in higher levels of academic performance, given any target population.

Researcher supporting the contingency-management approach follows: Fulton and Malott (1982) evaluated a structured meeting system with four student assistants. The system consisted of (a) a task assignment form, (b) assignment of task deadlines, (c) deadline monitoring, and (d) weekly meetings. The dependent variables were the percentage of task completion and timeliness. The authors
report that productivity improved from 50.5% to 95.5%, and that timeliness improved from 32% to 84% when the meeting system was implemented.

Dillon and Malott (1981) designed a system to increase the research-task completion rate of MA and Ph.D. students. The components of the system were (a) the specification of written task, (b) the setting of weekly goals and deadlines, (c) weekly meeting with a supervisor who provided (d) weekly feedback and (e) added incentives. The MA and Ph.D. students completed over 90% of their tasks when points were in effect; performance decreased to 76% when points were removed. When feedback was removed, leaving only instructions, task completion decreased to 66%. Eighty-one percent of the students graduated from the program by the beginning of data analysis in the experimental group, while only 57% had graduated from the traditional program. The median time to complete a degree was 20 months for students in the experimental program and 28 months for students in the traditional program.

Dillon, Kent, and Malott (1980) designed a supervisory system to help MA students maintain a steady work rate toward the accomplishment of long-range goals. The structured meeting system as described above was also used in this experiment. MA students were informed that the faculty advisor would write letters of recommendation which would include their cumulative percent of task completion. The
MA students completed a median of 91% of their tasks when the letter of recommendation and feedback was in effect. Task completion dropped to 65% when the letter and feedback were no longer contingent upon performance. The task completion rate climbed to 81% when the letter and feedback were again made contingent upon performance.

Gant, Dillon, and Malott (1980) conducted a supervisory system for undergraduates conducting research. The structured meeting system as described above was also used in this study. Students were told that letters of recommendation would include their cumulative percent of task completion. The authors report that the students completed an average of 12% more research tasks during the letter of recommendation phase, and completed an average of 10% less tasks during the no-letter of recommendation phase.

Dean, Malott, and Fulton (1983) conducted two experiments to determine the effect of self-management techniques, self-developed rule statements, and self-monitoring on student quiz scores. In Experiment 1, eight of nine undergraduate students who were having academic difficulty showed improvement in their quiz scores. They had a median score of 70% before intervention, and a median score of 88% following intervention. In Experiment 2, with some slight modifications, the experimenters replicated the results in Experiment 1. This resulted in a median-quiz
score of 7.4 before intervention and a median-quiz score of 9.2 following it.

Sappington, Fritschi, Sanderfer, and Tauxe (1980) paid 19 probationary students $5.00 an hour to participate in a study designed to improve their overall GPA. The students were taught how to record the amount of time they studied, the principles of operant and classical conditioning and the survey, question, read, recite, and review study technique. Also, 3, one-hour sessions were held to help students develop individualized self-management projects. The no-self-control group received all of the above training, except they were not taught the operant and classical principles and did not design a self-management project. But, members of the no-self-control group received (a) the personal attention of staff, (b) the expectation of improvement, and (c) instruction in monitoring of their own study behavior. The members of the self-control group increased both the amount of effective study time and overall GPA, whereas the control group did not. In both cases the improvement was statistically significant.

Pawlicki and Connell (1981) assigned probationary students to advisors who helped them design a self-management program. In an initial interview, students were shown how to develop a goal, shown how to contract, and how to apply behavioral consequences. The students met with their academic advisor for at least 3, one-hour sessions.
The students were then encouraged to meet with their advisor as they felt necessary. Using the students as their own control, the results show that 72% improved. All but one student increased their GPA by at least .5.

**Analysis.**

The experimenters directly affected student academic performance in the above studies. They did not simply place students into categories. This approach benefited the student by directly affecting their academic performance. Though the participants in most of the above studies were not on academic probation, the generality of the techniques used in the contingency-management approach are illustrated by the fact that their implementation increased the task completion rate of student assistants, Ph.D., M.A., advanced undergraduate, introductory psychology, and probationary students.

The present study is an attempt to demonstrate the effectiveness of the contingency-management approach with "high risk" students who are on Academic Review.
CHAPTER II

METHOD

Subjects

Experimental

Forty undergraduate students on academic probation who had earned a cumulative GPA of below 2.0 participated in this study. All students in the College of Arts and Sciences at Western Michigan University were put on a probationary status if they had earned a cumulative GPA of below 2.0. A student's probationary status depended on the number of honor points s/he fell below the 2.0. Students falling 1-6 honor points below were put on Continued Probation. They had to achieve a 2.0 or better in their overall GPA by the end of the term. Students 7-12 honor points below were put on Probation. These students were required to improve their GPA by the end of the semester or be dismissed from the University. Students 13 or more honor points below were put on Academic Review, and required to achieve better than a 2.0 for the semester or be dismissed from the University.

An academic advisor for the College of Arts and Sciences referred some of the students on Academic Review to the Self-Management Course offered by the Center for the Self-
Management of Academic Performance of the Psychology Department because (a) they had been dismissed from the University, and (b) their GPAs were 13 or more honor points below 2.0. Prior to the time of the present study, these students had attempted an average of 45.7 credit hours, had been dismissed from the University an average of 1.4 times, and had GPAs from .62 to 1.94. Their educational majors included psychology, biomedical science, chemistry, economics, engineering, political science and others.

Control Group

The control group also consisted of students who were on academic probation, but who had not, as yet, been dismissed from the University.²

Matching Procedure.

Members of the control and experimental groups were matched in terms of their GPA prior to the Fall semester of 1982. The difference in GPA was not statistically significant at the .05 level. Similarly, there were no significant differences between the experimental group and control group in regard to the number of credit hours each group took during the Fall semester of 1982 (see Table 1).

Materials

Students in the experimental group completed a series of worksheets in the present study. A brief description of each
follows (see also Appendix A).

**Daily Accomplishment Record**

Students were required to complete Daily Accomplishment Records every day, even if they did not study. They listed (a) each of their classes, (b) the departments in which their classes were held, (c) the days on which the classes met, (d) whether or not they attended class when held, and (e) the amount of reading/writing they completed for each class. Also, spaces were provided for students to write and specify tasks other than reading and writing.

**Hourly Schedule Record**

The Hourly Schedule Record was a $3 \times 5$ matrix, with time blocks from 7 a.m. to 9 a.m. Students were to put a word or phrase that described the activity they engaged in during that hour.
The comparison between the control and experimental groups' GPA prior to the Fall semester of 1982, along with the number of credit hours each group took during the Fall semester of 1982.

<table>
<thead>
<tr>
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<th>Control</th>
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<tr>
<td><strong>GPA</strong></td>
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<tr>
<td>Mean</td>
<td>1.55</td>
<td>1.59</td>
</tr>
<tr>
<td>Mdn.</td>
<td>1.68</td>
<td>1.64</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>.74</td>
<td>.26</td>
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<tr>
<td>t-test</td>
<td>-.3981</td>
<td>-1.829</td>
</tr>
<tr>
<td>Correl. t</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-.99*(1.69)</td>
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<table>
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<tr>
<th></th>
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<td><strong>Credit Hours</strong></td>
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<tr>
<td>Mean</td>
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<td>11.26</td>
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<tr>
<td>Mdn.</td>
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</tr>
<tr>
<td>Std. Dev.</td>
<td>2.8</td>
<td>3.72</td>
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<tr>
<td>t-test</td>
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<td>-.8487</td>
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<tr>
<td>Correl. t</td>
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<td></td>
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<tr>
<td></td>
<td>(1.99)</td>
<td>(1.69)</td>
</tr>
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*Critical Values

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Task Analysis Form

Students used the Task Analysis Form to compute the average amount of reading they had to complete in order to be prepared for future tests and assignments. They computed both daily and weekly goals. For example, they wrote the course for which the reading was assigned, the current date, the date in which the reading was to be completed, the total number of pages, and the number of days between the current date and the due date.

Weekly Work Schedule

On the Weekly Work Schedule, students specified their academic goals for the week. For reading tasks, they specified the course, the number of pages targeted, and the number of pages actually completed. For writing tasks, they specified the number of words targeted and the number of words written. Also, a section was available for tasks other than reading and writing.

Graphs

Students used graphs to record their rate of task completion. The typical graph had days along the y-axis.

Procedure

Students earned points which counted toward their Self-Management Course grade. They earned these points for
completing worksheets, updating their graph and for meeting other course requirements. See Table 2 for point allocations.

Table 2

Point allocations for meeting course requirements. Students earned these points each time the required assignments were completed.

<table>
<thead>
<tr>
<th>Worksheets and Other Course Requirements</th>
<th>Points Possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worksheets</td>
<td></td>
</tr>
<tr>
<td>Daily Accomplishment Records (DARs)</td>
<td>1</td>
</tr>
<tr>
<td>Updated Graph</td>
<td>1</td>
</tr>
<tr>
<td>Study Center Attendance</td>
<td>5</td>
</tr>
</tbody>
</table>

Lecture

There were a total of seven formal lectures. Of these seven, the concepts presented in four of them were considered fundamental to the success of the students' self-management program. These four were (a) Operational Definition, (b) Behavior/Accomplishment Distinction, (c) Graphing, and (d) Task Analysis. A brief description of each lecture follows:
Operational Definition.

The lecture instructed students on how to define their own behavior such that it was measurable and observable. For example, sitting at a desk, with a book was distinguished from understanding the material contained within it. Similarly, taking lecture notes was distinguished from "processing" information. In both of the above cases, the former examples are observable and measurable.

Behavior/Accomplishment Distinction

The lecturer stressed that behavior was valuable only to the extent that it produced academic accomplishments, and that these accomplishments should be defined such that they are observable and measurable. So, an accomplishment may not necessarily be the number of hours spent reading, but the number of pages read or the pages of notes written. It was emphasized that behaviors which produce quantifiable outcomes (permanent products) are necessary for academic success.

Graphing

The lecturer asserted that if a student has operationally defined his/her behavior such that it produces academic accomplishments of value in other classes, then the frequency with which s/he produces those accomplishments can be graphed. This procedure gave students a means to measure their rate of task completion.
Task Analysis (and the Task Analysis Line)

Students should produce accomplishments at a steady rate in order to avoid studying a large amount of material shortly before an exam. Therefore, the lecturer taught students how to divide the amount of material required for an exam by the number of days until the exam, giving the student the average number of units of material s/he should produce before the exam. For example, if a student's major accomplishment in a class is reading, then the student should count the number of pages s/he needs to complete before the exam. Then s/he should divide this total by the number of days left before the exam. Once this average has been computed, the student should draw a line starting from the current date to the day of the exam. (These procedures are illustrated in Figure 1.) Students would then be able to see how their current accomplishment contributes to their overall goal.

Even Week Meetings

Meeting 1—Lecture

During the lecture, students were instructed on how to correctly complete their worksheets and graphs. Students also asked questions relating to the lecture, and completed worksheets during this period.
Meeting 2--Discussion Group

Students stated their academic accomplishments and called attention to those features of the Self-Management Course they believed most and least helpful during group discussions. Students also helped solve each other's self-management problems during this period. For example, a student would tell class members how s/he solved the problem of being distracted by frequent visitors.
Figure 1. A graph with a task analysis line can be an effective tool for the self-monitoring of academic productivity.

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Odd Week Agenda

Individual Meetings

Students were required to meet with the graduate assistants for a minimum of fifteen minutes biweekly. At these meetings the graduate assistants probed for those potential academic problems a student may not have wished to discuss in the larger group. Also, the assistants helped students evenly space their work load at these meetings.

Study Center

Students were required to attend a one-hour study center. A listing of when the study center rooms would be open was circulated so that students could select a convenient time. Each student had their own study booth, and the study center was routinely monitored.

Center for Educational Opportunity

A few students in the experimental group as well as a few in the control group attended workshops offered by the Center for Educational Opportunity (CEO). A listing of those students who attended the CEO during the Fall semester of 1982 was obtained. Workshops offered by the CEO included Critical Thinking, Effective Note Taking, Spelling and other (see also Appendix B). Students could sign-up for any of these workshops.
Staff Accomplishments

Staff members were assigned responsibilities. The faculty supervisor was responsible for (a) developing course policy, (b) lecturing, and (c) developing worksheets. The graduate assistants were responsible for (a) lecturing, (b) holding individual meetings with students, and (c) gathering and recording the students' points in the gradebook. The undergraduate assistant's responsibilities were (a) inserting data into the computer, (b) generating cumulative graphs of points earned by each student, and (c) posting graphs on hall board weekly.
CHAPTER III

RESULTS

The experimental students performed better than the control students on all relevant measures, and most of these differences were statistically significant at the .05 level.

During the fall semester, the semester of the self-management course, the experimental students earned a higher GPA (2.14) than did control students (1.71). The experimental students showed a greater improvement in their fall semester GPA (0.59) than did the control students (0.12) when each group was compared with its GPA prior to the fall semester of 1982. More 72. For further detail, see Table 3.

Figure 1 is a scatter diagram of the relationship between the self-management course grade and the fall semester GPA (the overall fall semester GPA excludes the students' self-management course grade). Figure 2 is the cumulative GPA of students in the control and experimental groups prior to the fall semester of 1982, along with their fall semester GPA.

The experimental student completed more credit hours above 2.0 (7.05) than did the control students (5.6). (The # of credit hours ≥ 2.0 includes the credit hours students earned for the self-management course). The experimental students dropped fewer classes (1.37) than did the control
students (1.82). See Table 4 for a more detailed summary of this information. Students (n=14) in the control group left the University without completing any of their classes (i.e., left the University with a 0.0 grade point average). All students in the experimental group at least completed the semester.

The experimental students attending CEO during the Fall semester of 1982 had a higher GPA (2.51) than did those experimental students who did not attend (1.94) CEO. The control students who attended CEO during the Fall semester of 1982 had a lower GPA (.66) than did those control students who did not attend (1.75), and also the experimental students who attended CEO had a higher Fall semester GPA (2.51) than did the control students who did attend only (.66). See Table 5 for a more detailed summary of this information.
Table 3

The comparison between the experimental group and the control group Fall semester GPA; also, their respective GPAs prior to the Fall semester of 1982.

<table>
<thead>
<tr>
<th>FALL 1982 GPA</th>
<th>GROUPS</th>
<th>Mean</th>
<th>Mdn.</th>
<th>Std. Dev.</th>
<th>t-test</th>
<th>correl-t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>2.14</td>
<td>1.36</td>
<td>.74</td>
<td></td>
<td>-1.7</td>
<td>-1.8</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>(1.99)</td>
<td>(1.69)</td>
</tr>
<tr>
<td>Control</td>
<td>1.7</td>
<td>2.1</td>
<td>1.2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXPERIMENTAL GROUP'S FALL SEMESTER GPA AND ITS PRIOR GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUPS</td>
</tr>
<tr>
<td>Pre-Fall 1982 GPA</td>
</tr>
<tr>
<td>Fall 1982 GPA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONTROL GROUP'S FALL SEMESTER GPA AND ITS PRIOR GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUPS</td>
</tr>
<tr>
<td>Pre-Fall 1982 GPA</td>
</tr>
<tr>
<td>Fall 1982 GPA</td>
</tr>
</tbody>
</table>
Figure 2. The relationship between the grade students received in the Self-Management Course and their overall GPA was computed. The overall GPA does not include the grade earned in the Self-Management Course. The number within the table itself indicates that 2 and 3 data points, respectively, met at that intersection.
Figure 3. The cumulative GPA of students in both the control group and experimental groups prior to the Fall semester of 1982 and their Fall semester GPA was calculated. The figure illustrates the improvement in the experimental group's GPA, whereas it illustrates that the control group's GPA remained basically the same.
Table 4

The comparison between the experimental group and the control group credit hours completed above 2.0 and the number of hours not completed.

<table>
<thead>
<tr>
<th></th>
<th>HOURS COMPLETED ABOVE 2.0</th>
<th>CREDIT HOURS NOT COMPLETED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mdn.</td>
</tr>
<tr>
<td>Experimental</td>
<td>7.05</td>
<td>8.0</td>
</tr>
<tr>
<td>Control</td>
<td>5.6</td>
<td>5.5</td>
</tr>
</tbody>
</table>

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Table 5

The comparison of students who attended CEO and those students who did not attend CEO for both the experimental group and the control group.

<table>
<thead>
<tr>
<th></th>
<th>EXPERIMENTAL STUDENTS ATTENDING CEO vs EXPERIMENTAL STUDENTS NOT ATTENDING CEO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GROUPS</strong></td>
<td>Mean</td>
</tr>
<tr>
<td>Attending CEO</td>
<td>2.51</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td>Not Attending CEO</td>
<td>1.94</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>CONTROL STUDENTS ATTENDING CEO vs CONTROL STUDENTS NOT ATTENDING CEO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GROUPS</strong></td>
<td>Mean</td>
</tr>
<tr>
<td>Attending CEO</td>
<td>.66</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td>Not Attending CEO</td>
<td>1.71</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>EXPERIMENTAL AND CONTROL STUDENTS, BOTH ATTENDING CEO</th>
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</thead>
<tbody>
<tr>
<td><strong>GROUPS</strong></td>
<td>Mean</td>
</tr>
<tr>
<td>Experimental</td>
<td>2.51</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>.66</td>
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CHAPTER IV

DISCUSSION

This study was designed to evaluate the effectiveness of the contingency management approach to the reduction of student attrition. The approach was presented as an alternative to those approaches which assume that attrition can be accounted for through trait differences, study-skills deficiencies, or ecological deficits. The present procedures generated significant differences between the experimental (contingency-management) and control group along relevant measures.

The contingency-management approach is most effective when the consequences for academic behaviors are more immediate and definite. The likelihood that a student will attain his/her long-term goal is increased under these circumstances. But academic behavior diminishes when consequences are delayed, small and cumulative, or improbable. Therefore, retention systems must provide more immediate, significant and probable consequences for academic behavior.

The procedure used in the present study significantly improved the GPAs of students on Academic Review possibly because the contingencies (appropriate behaviors, behavioral consequences and contingency relationships)
which supposedly resulted in academic success were more immediate and reliable than is normally the case. Therefore, to replicate the procedures used in the present study it is appropriate to (a) identify the behaviors on the part of the student that will produce an increased GPA, (b) to determine the behavioral consequences that will act as effective rewards and punishers for those behaviors, and (c) to set up a system that will deliver those behavioral consequences more promptly. These recommendations might result in raised student GPAs.

One should not assume that the self-management staff members did not have a great many problems, in spite of results which may suggest otherwise. So, the following section will begin with a brief description of each of the major problems found in the current system, followed by a recommendation for improvement.

In addition, other, more conceptual issues will be addressed. The section entitled "Theoretical Issues" will examine the similarities and differences between the present study and the works of the authors discussed earlier.

System Design

The present procedures would have been even more effective if not limited by the following problems: (a) Information-flow problems, (b) instructional design problems, and (c) quantity problems.
Information-Flow Problems

At the time of the present study, the graduate and undergraduate assistants were not experienced managers. Managing the contingencies for forty probationary students proved difficult. Assistants should meet weekly with the faculty supervisor to discuss specific problem areas.

When staff performance declines, student compliance declines in response. Staff performance declines in the absence of effective incentives. Feedback has proven effective in generating higher levels of performance (Ford, 1980; Lutzher & Blackburn, 1979; Van Houten & Hau, 1981). Therefore, staff feedback should be posted weekly as one means of maintaining performance levels.

Feedback

Students did not find the cumulative graphs generated by the computer very informative, for they found the graphs difficult to interpret. This confusion is understandable since the percentage on the y-axis fluctuated as a function of a student's cumulative percent (see Figure 4). When these students were told to check their graphs for accuracy, they did so, but without understanding what the data points represented. The students should be given a lecture on the performance feedback procedure, and a clearer feedback system should be developed.
Instructional Design Problems

The lecture was not an effective instructional technique, for it was difficult to determine whether or not the students had mastered the concepts presented during the lecture. Programmed-instruction techniques may prove to be an effective alternative (Brethower, Markle, Rummler, Schrader, Smith, 1964; Brethower, 1963). Such instructional programs should replace lecture if they turn out to be an effective alternative.

It was difficult to determine the sequence in which the concepts should be presented; or for that matter, what concepts should be presented. Therefore, future researchers should attempt to identify those concepts and presentation sequences that convey the essence of self-management.

Quantity Problems

Each graduate assistant was assigned 20 students, and responsible for meeting with each of them bi-weekly. This staff-to-student ratio was too great. The staff-to-student ratio should be limited to 1-to-5 so that the staff can establish an effective rapport with each student. This would also resolve other problems in the system. For example, the students collectively submitted a total of 346 forms weekly. The graduate and undergraduate assistants were required to record, file and input the resulting data into the computer. This task proved very difficult. Each
Figure 4. The feedback system was not effective because the cumulative graphs generated by the computer were difficult to interpret. Notice the changing cumulative percents along the y-axis.
staff member should record their own students' performance data.

There were too many lectures; or, more accurately, material was presented which students could not be expected to master in one meeting (e.g., single-subject designs). After the fundamental concepts are presented, the remainder of the course should devote itself to maintaining student performance.

Additional Recommendations

It may be naive to assume that students can acquire the skills necessary to effectively self-manage their own behavior in one semester. Therefore, the self-management course should last at least three consecutive semesters. The first semester should focus on helping students earn a 2.0 or better. They should be taught the principles of self-management in more detail during the second semester; and finally, they should serve as teaching assistants during the third semester. This approach might promote the generalization of the acquired self-management skills.

Behavioral contracting has proven to be an effective and universal strategy for helping individuals attain goals with delayed, small and cumulative and improbably outcomes (Stuart, 1975; Berta, 1974; Bristol & Slone, 1974; Derisi, 1975). Therefore, behavioral contracting should be used
extensively with students entering the program. Incidentally, a modified form of behavioral contracting should be used with staff members to help maintain their productivity.

As stated earlier, students were required to turn in many forms. Most of these forms were designed to help students monitor their rate of task completion. But completing the forms did not necessarily help students produce accomplishments of value in their other classes. This was because the forms were independent of their production of other, relevant academic accomplishments. It cannot be concluded then that a student's overall GPA was a function of the number of forms and task s/he completed. Therefore, the strong relationship between the grade students earned in the Self-Management Course and their overall GPA may be misleading. Students should only earn points for the completion of academic accomplishments, and not for mere compliance.

Theoretical Issues

The Trait Approach

The measurement of personality variables did not adequately distinguish between those who persisted and those who withdrew, and for that matter, the results were inconsistent. Rossman and Kirk found that students categorized as Voluntary Withdrawals had higher SAT Verbal Scores than did Persisters. But Johnson and Rossman found
no significant difference between Voluntary Withdrawals and Persisters on SAT scores. Furthermore, Johnson and Rossman found that Persisters (students who graduated with a 2.0 or better) had higher GPAs than did students who voluntarily withdrew. Well, that should be obvious enough; and Griffin indirectly supported the contingency-management approach, in that he asserted that students often have problems working toward goals with delayed outcomes. In summation, the trait approach does not seem to be useful in the analysis of student attrition.

The Study-Skills Approach

There was not enough research gathered to adequately assess the contributions of the study-skills approach. Further researchers should examine such contributions. The study-skills approach can be examined indirectly in the present study, however. Students who both attended CEO and were enrolled in the Self-Management Course had a significantly higher GPA than did those students who were enrolled in the Self-Management Course but did not attend CEO. It seems reasonable to assume that students who had self-management training would also find study-skills techniques valuable because, with self-management training, they would perhaps then be more likely to make use of those study skills.
The Ecological Approach

The unit of measure appropriate for the analysis of student attrition is academic behavior. But behavior affects the environment and it, in turn, is affected by the environment (Skinner, 1957). Therefore, the ecological approach, an approach which assumes student attrition to be a function of environmental deficits, cannot be ignored. The analysis merely needs revision. As Skinner (1969) has suggested "By using the rate of responding as a dependent variable, it has been possible to formulate the interaction between an organism and its environment more adequately (p. 7). And Ferster and Skinner (1957) have further suggested the specific way in which reinforcement is programmed to occur accounts for many significant features of behavior (p. 2). This implies that reinforcement factors in the environment may account for the rate of study behavior, which, in turn, will account for ultimate academic success.

Summary

The present study demonstrated that the contingency-management approach was an effective alternative to other, more traditional approaches. Several recommendations were given, which should make the Self-Management course even more effective if adopted. These recommendations included (a) improving staff and student feedback, (b) improving instructional materials, and (c) reducing the staff-to-
student ratio. In addition, it was recommended that the experimenters reinforce the production of academic accomplishments and not merely student compliance.

The above recommendations might contribute to the improvement of the Self-Management Course so that it will more consistently raise the GPAs of probationary students. These corrective strategies should make the system more efficient, in that it will bring those behaviors which produce academic accomplishments under more systematic control. Hopefully, these corrective measures will ultimately result in a higher percentage of students leaving Western Michigan University with bachelor degrees.
Footnotes

1 The data were calculated on only thirty-one students in one instance. This was because two students requested that their files not be retrieved, and we could not obtain data on the remaining eight students on a few measures for a variety of other reasons.

2 There were a few students in the experimental group who had not, as yet, been dismissed from the University, as well as a few students in the control group who had previously been dismissed from the University. So it is not the case that all students on Academic Review and only students on Academic Review were sent to the Self-Management Course.

3 Special thanks goes to Barbara Fulton for her creative development of the worksheets presented in this paper.

4 The experimenters in the present study managed some of the contingencies for probationary students. But students were responsible for the vast majority of their own academic behaviors. The experimenters merely implemented some additional structure. This paper could quite appropriately be called "The Effects of Self-Management Training on Probationary Students' Academic Behavior" instead of "The Effects of Contingency-Management..." But the present title emphasizes two critical points. First, students on Academic Review will be expelled from the University permanently if they don't achieve a 2.0 by the end of the semester. There-
fore, for a program to be effective, it must manage directly some of the contingencies for these students, given their long history of self-control problems. Second, the present title emphasizes the institution's role in the reduction of student attrition, for the title tends to place the responsibility for the success or failure of the program designed to reduce student attrition on the institution, not the student. This might help to ensure that administrators will actively work to reduce student attrition and not dismiss students, simply by asserting that they have self-control problems and thus could not succeed.
APPENDIX A

WORKSHEETS
DAILY ACCOMPLISHMENT RECORD

Instructions:
(1) Fill in every class for which you are enrolled. Do this every day, even if it didn't meet.
(2) Fill out the required information in each column.
(3) Be sure your studying is specified in terms of accomplishments (e.g., for reading, you would indicate the number of pages read, not just the amount of time spent).

------- STUDY ACCOMPLISHMENT -------

<table>
<thead>
<tr>
<th>CLASS &amp; DEPT.</th>
<th>MET TODAY (yes/no)</th>
<th>ATTENDED TODAY (yes/no)</th>
<th>READING (specify)</th>
<th>WRITING (specify)</th>
<th>(specify)</th>
<th>(specify)</th>
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</table>
Center for the Self-Management of Academic Performance

**HOURLY SCHEDULE RECORD**

Name _____________________________________________

Below is a schedule of the hours in the day. In each box, you should put a word or phrase that describes the main activity in which you were engaged during that hour.

Be as specific as possible, but brief. For example, rather than "studying" say "reading" or "math problems" (more specific).

Report EACH hour throughout the day. Some hours may be nothing but sleeping, watching TV or whatever.

Remember, just the main activity. Be brief and specific.

<table>
<thead>
<tr>
<th>7 A.M.</th>
<th>8 A.M.</th>
<th>9 A.M.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 A.M.</td>
<td>11 A.M.</td>
<td>Noon</td>
</tr>
<tr>
<td>1 P.M.</td>
<td>2 P.M.</td>
<td>3 P.M.</td>
</tr>
<tr>
<td>4 P.M.</td>
<td>5 P.M.</td>
<td>6 P.M.</td>
</tr>
<tr>
<td>7 P.M.</td>
<td>8 P.M.</td>
<td>9 P.M.</td>
</tr>
</tbody>
</table>
Center for the Self-Management of Academic Performance

TASK ANALYSIS FORM I:
Reading Tasks

Name ________________________________

Instructions: Fill out one form for each major task assigned. Recalculate and fill out a new form for the task every week. If you have accomplished more than the weekly goal, then the new goal will require LESS. However, if you have accomplished less than the weekly goal, then the new goal will require more.

Reading Task Analysis:

Course for which reading was assigned ________________________________

Today's date ________________

Due date for reading to be completed ________________

A. Total # of pages to complete ________________ pages.

Weekly Goal

B. # of weeks between current date & due date.

Divide the total # of pages (A) by the number of weeks (B).

Answer: __________ pages

The above number shows the number of pages you should complete each WEEK to make the deadline for the task.

WEEKLY GOAL = __________ pages

Daily Goal

C. # of days between current date & due date.

Divide the total # of pages (A) by the # of days (C).

Answer: __________ pages

The above number shows the number of pages you must complete each DAY on the average to make the deadline for the task.

DAILY GOAL = __________ pages
PSYCHOLOGY 397  
WEEKLY WORK SCHEDULE

NAME ____________________________

DATE: WEEK OF ____________________ to ____________________

READING GOALS THIS WEEK:

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<thead>
<tr>
<th>Course</th>
<th>Pages Targeted</th>
<th>$ Actually Completed</th>
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<tbody>
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<td></td>
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<td></td>
</tr>
<tr>
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</table>

WRITING GOALS THIS WEEK:

<table>
<thead>
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<th>Course</th>
<th>$ Words Targeted</th>
<th>$ Words Written</th>
</tr>
</thead>
<tbody>
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OTHER GOALS THIS WEEK:

<table>
<thead>
<tr>
<th>Course</th>
<th>Task</th>
<th>Amount Completed</th>
</tr>
</thead>
<tbody>
<tr>
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The Center for Educational Opportunity (CEO) provides all students—from freshmen to doctoral candidates—the opportunity to develop or to improve educational skills. Programs are offered within the following framework:

1. Programs carry no academic credit.
2. Programs are free of charge to the student.
3. Students may enter and leave the programs when they wish.

**Tutorial Program**

Qualified tutors work with individuals or small groups of students who need help with the content matter of specific courses. The CEO provides tutors in such areas as accounting, biomedical science, business, chemistry, computer science, economics, electrical engineering, math, mechanical engineering, physics, and statistics.

**Writing Lab**

The Writing Lab's focus is current papers and revisions. When the student's writing reveals a particular difficulty with reading comprehension, grammar, or punctuation, the tutor assigns appropriate exercises.

**Academic Skills (Study Skills, Spelling Skills, Review Skills)**

The Academic Skills programs help students use study time effectively, increase test and note-taking strategies, develop techniques for reviewing and retaining information, and improve vocabulary, spelling, and writing. This program operates as a referral base for other CEO programs.

**Critical Thinking and Content Reading**

This program develops cognitive skills and applies these skills to content reading. Activities should increase comprehension and raise the reading level on national standardized reading tests.

**International Student Communication Program**

The International Student Communication Program works on sentence development with the goal of writing concise, precise sentences. Students are also encouraged to work with the Writing Lab.
BIBLIOGRAPHY


