

CONTINGENCY MANAGEMENT IN THREE PSYCHOLOGY COURSES: A CASE REPORT

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This paper reports a method of handling classes on the basis of the findings and developments in the experimental analysis of behavior. The main contingency for reinforcement consisted of the mastery of a given section of the course material as indicated by a student's performance in an examination, whereupon the student was assigned another section to study. Response units which the students could easily handle were used and mastery of each response unit was required before the next unit was introduced. Aversive situations were kept at a minimum and the reinforcements in the form of student's scores were given almost immediately. A description of the contingency applied to three classes is reported and the corresponding results as reflected by grades are compared.

There are now several psychology courses being conducted based on the principles derived from the experimental analysis of behavior. One such set-up was used by Keller (1968) and variations of his procedure was applied by Ferster (1968), Malott and Svinicki (1969), and Shepard and MacDermot (1970). These courses are handled by programming the sequencing of course material such that each unit builds up on the preceding one, and the scheduling of reinforcements is contingent upon the student's mastery of a given unit. The student under this program goes at his own pace depending upon his ability and his available time. This last feature is important in tackling problems concerning different rates of learning and the shortage of textbooks. Unscheduled examinations, which is a feature of the contingency program, gives the student time to study until he is ready and allows him more access to books from classmates who are not yet going to take an examination or have just finished one.

Three programmed courses all handled by the author are reported here: two courses in behavior analysis and one course in introductory psychology. One of the courses in behavior analysis was conducted during the summer term and the other one was conducted the regular

semester following the summer term. The introductory psychology course was also conducted during the same regular semester.

METHOD

Procedure for the Programmed Courses in Behavior Analysis

The two courses were conducted according to the procedure used by Ferster (1968) and Ferster and Perrot (1968). The course material was based on 17 chapters of the book entitled *Behavior Principles* by Ferster and Perrot (1968) designed specifically for a programmed course. These chapters were arranged in a certain order such that each new chapter builds on the preceding one. The interview method suggested by the authors was used. It required each student to report to or be interviewed by a peer for at most ten minutes on a given part of a chapter he is currently studying. The interviewer was also expected to have read the same portion. After the interview both of them determined whether the interviewee had successfully discussed the contents of the assigned section. If so he was certified ready to proceed to the next section. If not he studied the same section again, usually within the same class hour. After a student had been interviewed he changed roles with his interviewer who became the interviewee. The value of this procedure lies in the fact that it requires the active participation of the interviewee and provides for his immediate reinforcement. As soon as the student has satisfactorily studied the section he then takes the examination on that section. If he passes it he goes on to the next chapters assigned and

proceeds studying at his own rate till he finishes the course. If he fails the test he studies the chapters again and takes a retest until he passes it or until he had received a passing score that he wanted. Only his highest score was recorded. Since examinations were usually unscheduled the students were thus free to take them when they feel ready provided that they have passed the previous examination on the preceding chapter.

This procedure requires that test papers are checked and returned immediately to the students so they get an immediate feedback on their performance and can then take a retest or proceed to the next chapters.

Attendance was not compulsory although the students were requested to use the class hour for study when they are not taking a test. There were only a few lectures and these were given whenever the students found a section too difficult to understand or additional information had to be presented or when there was a topic of general interest which was not assigned. Otherwise, the interaction between the students and the teacher was on an individual basis.

Summer term

Thirty-five students were subjected to programmed instruction for five weeks. At the start of the summer session the examination schedule was presented to the students and the work units were defined as follows:

Order of Examinations	Chapters
1 (scheduled)	1-4
2	5-8
3	9-13
4	14-17
5 Final examination	All 17 chapters

Except for the first, all the other examinations were unscheduled; that is they could be taken on any of the class hours during the term as soon as the student finished the required chapters and interviews. No student was allowed to take a test without first passing the previous one, passing being a score of at least 70%. Failure to pass an examination was not penalized however, since the student could retake any of the unscheduled tests. Only his highest score, which in all instances was the last, was recorded. During this term the examinations consisted of six to eight questions from which the student chose five or six. There was only one form for each test so it was possible for a student to know the questions in advance by asking those who had already taken it - and some students did. The author saw no harm in this since whether a student knew the questions beforehand or not he would still have to study the answers to them - which was what was wanted in the first place.

Only a few lectures were delivered and these were mostly to clarify certain portions of the text which the majority of the class found difficult to understand. Although attendance was checked at intervals no penalties were given for absences. The students were graded on the basis of the grades they received on each of their essay examinations across all the chapters. Only a few took the final examination since some students have finished the course before the final examination period

and have stopped at the grade they wanted. The rest chose to get *Incompletes* since they could still make-up even after the term is over.

Regular Semester

The same program was applied to fifty-seven students for a period of five months, the length of a regular semester. However, the following schedule was followed:

Order of Examinations	Chapters
1	1-4
2	5
3 (scheduled)	6-8
4	9-13
5	14
6	15
7	16
8	17

It was originally planned to follow the summer schedule of examination and work units. However, the regular semester class took a very slow pace so an attempt was made to increase the pace by changing the size of work units from four to one. Furthermore, the third examination was scheduled so the slow students or late starters could catch up with the chapters assigned. The chapter assignments were reduced after that so students will spend less time preparing for the examination and reinforcement will become more immediate and frequent.

The method of giving examinations was also changed for this term. Instead of having the questions on a single sheet of paper, they were written on 3 x 5 cards. These cards were shuffled and given face down to the student who then drew the required number of questions. Thus, although a student might know all the questions which were being asked he would not know beforehand which questions in particular he would be answering. If a student failed to answer one question he was considered to have failed and had to restudy the assigned part before drawing another set of questions for a retest.

It was initially required in the class that students finish all the assigned chapters as in the summer courses. However, their progress was slower than expected and this requirement was dropped. A compensatory mechanism was established by basing the grades not only on the mastery of each section but also on the number of chapters finished. The grading system was correspondingly adjusted and students were graded on their cumulative scores. This score was a combination of the ratings on their mastery of each unit and the number of units covered. One feature of this arrangement is that the student need not finish all the chapters. He could simply work toward a particular grade and stop. Because of this possibility a minimum number of chapters to cover was set below which the student would automatically receive an *Incomplete* grade and above which his grade will depend on his cumulative scores up to that point where he stopped.

The introductory course was conducted along the same principles. However, there were some procedural variations. The text, *Introduction to psychology* (4th edition) by Hilgard and Atkinson (1967) was not designed for a programmed course necessitating the rearrangement of the order of the chapters. The interview was not required of the students instead they were told to try whatever method they thought best for them. They were encouraged to use the class hour for study so as to set it as an occasion for study and not for anything else.

The course material was based on 17 chapters of the textbook. The examinations were given on a gradually increasing ratio, that is it initially covered a chapter each while the succeeding ones covered two or three. No examination was scheduled and thus students were free to take them when they were ready provided they have passed the test on the preceding chapter and they are adequately prepared for the next one. The passing score was set at 60% and retests were allowed. The following schedule was programmed for the class:

Order of Examinations	Chapters
1	2
2	11
3	17
4	3
5	5-6
6	7
7	9-10
8	13-14
9	16, 18-19
10	20-22

A final examination was given at the end of the semester. Since this was done at the latter part of the semester when some students have already finished the course and there were more absences due to pressure from other subjects, not all students were given the final test. Results from the final examination were not included into the final grade.

As in the other programmed classes, minimum lectures were given and attendance was not compulsory. The range of grades based on the student's cumulative

TABLE 1
SUMMARY OF THE DISTRIBUTION OF GRADES OF ALL CLASSES
UNDER PROGRAMMED INSTRUCTION

GRADES	Behavior Analysis Classes		Introductory Psychology
	(summer)	(regular semester)	
	N = 35	N = 57	N = 45
1.0	13%	15%	38%
1.25	10%	—	—
1.5	13%	9%	13%
1.75	7%	—	—
2.0	24%	9%	4%
2.25	13%	—	—
2.5	7%	7%	2%
2.75	1%	—	—
3.0	—	14%	6%
Incomplete	6%	36%	20%
Dropped	3%	—	2%
Leave of Absence	—	5%	2%
No Grade	3%	5%	13%
Totals	100%	100%	100%

scores was released before the end of the semester. The students could then choose to stop taking examinations when their total scores up to that point was equivalent to a grade they wanted. Some students who had not finished all the required chapters at the end of the semester chose to get an *Incomplete* so they could work for a better grade later.

RESULTS

The distribution of grades of the students for the three programmed courses are summarized in Table 1 and Figures 1-4. While the number of students getting high grades in these programmed courses is larger than in any of the author's previous courses handled in the conventional way, the batting average is low compared to those of other programmed courses elsewhere. Malott and Svinicki (1969) report from 80% to 90% of students getting A's under programmed instruction.

Figure 1 shows the distribution of grades in the summer session of Behavior Analysis. We can see that no student got a grade of 3 (or merely passing mark). Six percent of students got grades of *Incomplete* but this figure is not an indication of failure since the students with *Incompletes* can still maximize their scores to pass.

Figure 2 shows the distribution of the grades of the students in Behavior Analysis during the regular semester. More students got lower grades and more people opted for *Incompletes*. A comparison of the distribution of grades in the two classes under comparative treatments can be seen from Figure 3. Since the range of grades for the summer involved grades with .25 and .75 this had been adjusted to make the results comparable to that of the regular term behavior analysis class. We can see from the graph that more students in the summer class got higher grades. In both cases there were more students passing than failing under the program.

Figure 4 shows the distribution of grades of 45 introductory psychology students during the regular semester. Thirty-eight percent of the class got grades of 1 or excellent while only thirty-seven did not make it to a grade at the end of the grading period. Of this figure however, 20% can potentially get a passing grade or even higher by simply retesting and taking more examinations.

For all the classes reported here the rates of study were very low at the beginning of each session but eventually picked up as soon as the examinations started coming in. The inertia was only evident before the first examination but as

FIG. 1 - DISTRIBUTION OF GRADES IN BEHAVIOR ANALYSIS
(SUMMER TERM) N = 35

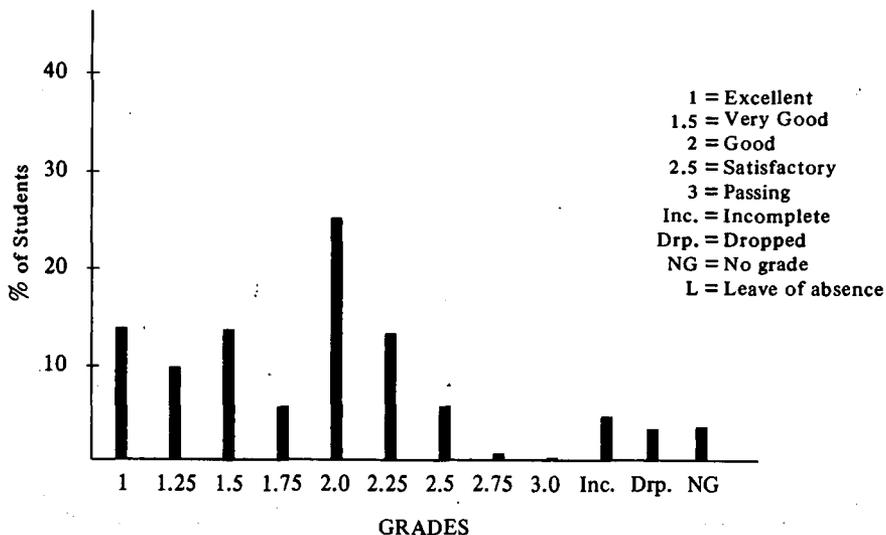


FIG. 2 – DISTRIBUTION OF GRADES IN BEHAVIOR ANALYSIS (SUMMER TERM) N=57

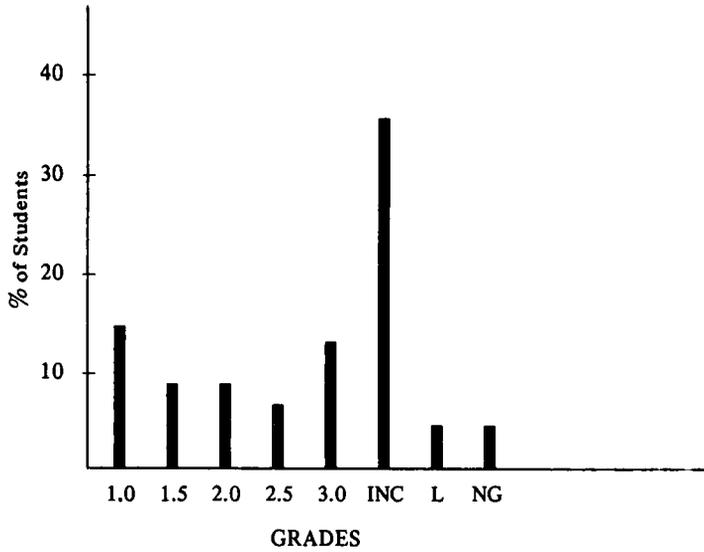
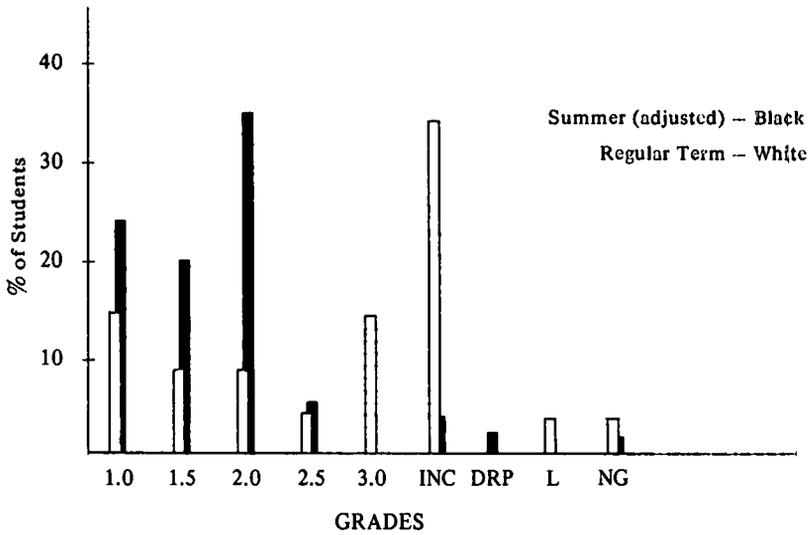


FIG. 3 – DISTRIBUTION OF GRADES IN BEHAVIOR ANALYSIS (BOTH SUMMER AND REGULAR TERM)

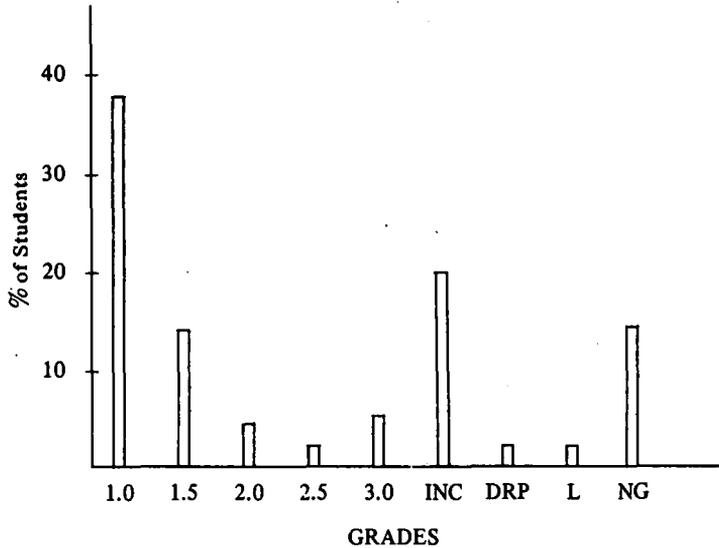


soon as scores were given on the taken examination and students successfully passed it the effect of being allowed to go on in the course became reinforcing and was soon enough to sustain the studying behavior.

DISCUSSION

It should be noted at the outset that the instructor worked under one severe limitation- he had no course assistants. All the work nor-

FIG. 4 – DISTRIBUTION OF GRADES IN INTRODUCTORY PSYCHOLOGY (REGULAR TERM) N=45



mally relegated to course assistants, such as checking papers, proctoring of examinations, checking attendance, went to him. Considerably less time than should have been spent was left for attending to the study needs of the student. For the regular semester, he had about a hundred students enrolled in the programmed courses reported here plus another hundred in three other courses handled in the conventional way. While he was saved from having to prepare lectures the thought of over a hundred blue-books to be checked over the week was sufficient deterrent to his giving more examinations on smaller ratios. Discussions with individual students were limited. It would have been very beneficial to the students if their answers to the tests were discussed with them especially if they had answered incorrectly. Feedback on test performance was limited because of the time it took to check the bluebooks which varied from a few minutes after submission to about a week. Most often the time gap was in the order of three days. Comments on the student's answers were in most cases written on their bluebooks rather than given in a face to face encounter.

A comparison was tried between the students

of the programmed introductory psychology course and another section of the author conducted on the conventional method. Fifteen students under the programmed introductory psychology course were given a part of the final examination given to students of introductory psychology under the conventional method. They were told that they did not have to review for the finals and that the instructor just wanted to know how much they remembered. They were also told that their scores will not be recorded. For comparison the fifteen highest scores on the final examination given to the conventional classes were taken. These scores were taken from the tests of more than a hundred and fifty students. The programmed course students averaged 66.1 points while the conventional students averaged 67.6 points. Although these are almost equal the fact that the comparison was loaded against the programmed course students still tips the scales in their favor.

In an attempt to have the students master all the parts of a given assignment without the instructor having to check each item of the assignment, a situation was arranged so that they would not know exactly which questions they

would be answering. This was done by making the student draw his question from a bunch of 3 x 5 cards held face down so he could not see the questions written on them. He was made to restudy the section concerned if he failed to answer one of the questions he drew. The student was thus forced to study the whole unit. This requirement is not as aversive as it appears since the students took the examinations only when they felt they were ready. Furthermore, in case they failed they could re-take the examination without deductions in points. With this arrangement not only was the testing time cut short but time was also saved in correcting the papers.

A little anxiety on the part of the instructor was brought about by the very slow pace at the first part of the regular semester. A major factor here was the absence of deadlines except of course for the end of the semester. Even the deadline for dropping was relaxed. If we agree with the observation that most student behavior is generated by the threat of punishment we should expect that behavior to be very low in the absence of the threat. Apparently this was the case with the regular semester students although it is not so much for the summer students who were working under a shorter interval and therefore had a higher overall rate.

Since the introduction of a programmed course would mean a sudden, even radical, change from negative to positive control, the loss of behavior due to the withdrawal of their aversive controlling variables must be countered by the use of positive reinforcement. However, if the loss is so great, one may, so to speak, "lose his pigeon" altogether since he may not be left with any behavior to reinforce. This may be an extreme case, since some behavior may be present due to the novelty of the course, nevertheless it may be necessary to reinforce ratios that are small – even smaller than a chapter. If the ratio for an examination is large it may be possible to use conditioned reinforcers to sustain the responding of the student. The interview is meant to provide this. However, even the interview may break down which was the case with the regular behavior analysis class. A check by

the instructor on two occasions showed that it was taking the students more than twenty minutes to complete a single interview whereas the time allotted for it is only ten minutes. The interview can become a conditioned reinforcer only if a successful interview has been followed by a high test score. A successful interview, of course, is correlated with good study behavior outside of the interview situation.

The students in the introductory psychology course were given one examination each for the first four chapters but it took them almost half the semester to accomplish these. Smaller ratios should have been used at first. These can and should be stretched later in the semester. Stretching the ratio is necessary because we want to sustain studying behavior beyond the semester. Furthermore, this procedure will be highly appreciated by course assistants and the instructor himself who will then have time to attend to their own work which will be piling up as the end of the semester approaches.

The grade based on the cumulative score is probably better than that based on the average of the grades on each test. A cumulative score emphasizes the dependence of subsequent performance on earlier ones. Especially with programmed material; a poor early performance will show in later performances. This fact however is useless unless the student is informed about it, in which case there is still no guarantee that it will improve his studying behavior. An additional argument for the use of cumulative scores which would reflect both mastery and coverage was presented by the students during a discussion on the grading system: A student who has covered all the chapters may still get a lower cumulative score than one who has not completed all the requirements but shouldn't he be given some credit for *trying*? Because the grading system had been presented for discussion and implicitly committed the instructor to a consideration of the views of the students an allowance was made for this cultural value. The range of grades was made such that some compensation was given for effort. Requiring complete mastery or 100% scores on examinations eliminates this problem altogether. Then grades

can be based on ground covered. We would then be reinforcing a response, not because of its topography but because of its effect on the environment, in this case, the teacher.

Some questions may be raised on the number of incompletes in the regular semester class. These were given to students who could not finish the requirements on time. They could have been given a grade based on predetermined range but they chose to get an incomplete in the hope of getting a higher grade later. Although this is inadvisable because the students will no longer be in the environment which could have maintained or increased their behavior there may be some students who will benefit from this. Students who have had a long and sad history of incompletes and failures may get a big lift from getting an incomplete which they can turn into a grade of 1. The best attack on this problem is to schedule reinforcements on smaller ratios very early in the semester. Requiring students to drop if they give indications that they cannot finish the course on time merely skirts the issue.

One last point should be discussed. A course of this type generates very positive reinforcers for both the student and the instructor. Classes are conducted in a very relaxed manner. Students are less scared to approach their instructor and there is less worry on the part of the instructor that he will embarrass the student should he ask about their progress. Students are free to discuss with each other points they do not understand within the classroom since they are not required

to sit in their chairs for the whole period. Contact with the teacher and with each other is on a more personal basis. The students also find it convenient since they can schedule their examinations so that there will be no conflict with their tests in other classes.

The reported procedure is an attempt to rearrange the classroom environment by providing certain teaching arrangements that will directly reinforce those behaviors that need to be established in the repertory of each student. Although the approach will not solve all the problems of student, this technology will make at least a part of his life a happier one.

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