ACADEMIC RESPONSE RATE AS A FUNCTION OF TEACHER- AND SELF-IMPOSED CONTINGENCIES¹

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The purpose of this study was to assess the effects of the contingency manager (teacher or pupil) on a pupil's academic response rate. The results of two such experiments disclosed that higher academic rates occurred when the pupil arranged the contingency requirements than when the teacher specified them. A third study manipulated only reinforcement magnitude to ascertain whether amount of reinforcement had interacted with pupil-specified contingencies to produce the increase in academic response rate. The latter findings revealed that the contingency manager, not reinforcement magnitude, accounted for this subject's gain in performance.

The management of one's own behavior has often been expressed as one of the prime objectives of our educational system. The problem in programming toward such an end has been one of definition—specifying those variables that constitute self-management. Until the skills or traits that lead to a self-managing individual are clearly detailed and explicitly defined, the objective of self-management may never be realized. If, however, certain subproperties of self-management can be determined, sequentially ordered, and systematically presented, the probability of realizing this objective is greatly increased.

An individual who can control or manage his own behavior may be a person who has the ability to assess his own competencies, set his own behavioral objectives, and specify a contingency system whereby he might obtain these objectives. Translated to a school situation, this would be an individual who knew his academic capabilities in terms of skill levels and rate of performance, could arrange a series of activities or steps to achieve a variety of self-imposed objectives, and could grant himself reinforcers on a prearranged schedule to accomplish certain behavioral sequences.

This last behavior, self-specification of contingencies, has been a neglected area of investigation. Traditionally, it is the teacher

who arranges the contingencies in the classroom, saying to the pupil: "If you do these arithmetic problems, you will receive a gold star", or, "If you correctly answer these questions you will be allowed to go out for recess". Infrequently is the student allowed to arrange his own educational environment.

The purpose of this study was to analyze functionally the effects of self-imposed *versus* teacher-imposed contingencies on the behavior of a particular pupil. In this study the specification of contingencies was the independent variable, while academic response rate was selected as the dependent variable.

METHOD

Student and Conditions

The student was a 12-yr-old member of a class for children with behavioral disorders at the Experimental Education Unit, University of Washington. The student had been a member of this class, whose management system was based on the Premack design of high- and low-probability behaviors (Haring and Kunzelmann, 1966; Haring and Lovitt, 1967), for two academic years. Contingent upon academic responses (low-probability behaviors), the students in this class were given points in each of the academic areas. These points were later converted to minutes of time in the high-interest (high-probability behavior) room. The ratios of points-per-answer were individually specified, not only among class members but also among subject matter areas for any one student.

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Procedures

This investigation consisted of three separate experiments; two manipulated the contingency manager and one manipulated magnitude of reinforcement. During Exp. I, baseline data relevant to the student's academic response rate were obtained for nine days. Each day a response rate figure was calculated that represented the student's performance in all of his scheduled subject matter areas. Throughout this period no attempt was made to explain to the student the response-per-point ratio in each academic area.

After this baseline period, Stage 1 was instituted. It was the intent at this time to instruct the student as to the relationship between correct answers and contingent points. Each day in this 12-day stage the teacher verbally explained the contingencies and placed a written copy of them on the student's desk. Table 1 outlines the contingency system in effect throughout Exp. I. The contract was composed of nine agreements, each of which had a response-per-point ratio. For example, the student was granted two points for each page read (Sullivan Associates Program, 1963) and one point per 10 mathematics problems (Singer Mathematics Program, 1965). As the student completed each academic assignment, he was shown how many responses had been made and was asked to calculate the corresponding points he had earned.

In Stage 2, which extended for 22 days, the copy of the response-point requirements was

removed from the student's desk. He was now asked to specify verbally his own payment in each of the nine areas and to record his decisions, which were then attached to his desk. As in Stage 1, when each assignment was completed the student was asked to calculate the points he had earned. Finally, in Stage 3, which lasted for seven days, the teacher-imposed contingencies were again in effect.

In Exp. I, as in all experiments of this study, the sequencing of academic areas was basically the same each day; reading was followed by math, then spelling, English, and writing. Furthermore, the time allotted to each subject was about the same each day: 2 hr for reading, 1 hr for math, and a total of 1.5 hr for spelling, English, writing, and library reading.

Regardless of any variability in the ordering of the subject areas or the time allotted to them, the teacher, not the student, always arranged the day's academic program. Thus, the subject could work only on each academic activity as it was scheduled, math during the math period and reading during the reading period. He could not switch freely from one academic area to another, regardless of the contingencies in effect from one activity to another, or who had imposed the contingencies.

After a period of four weeks, which separated the academic quarters at the University of Washington, Exp. II was begun. No baseline data were obtained during this second experiment, since the student was now fully

Table 1
Contingency Specifications
During Experiment I

Subject Area	Contingency Manager	
	Teacher-Specified	Child-Specified
MATH	10 problems: 1 min of free time	10 problems: 1 min of free time
SUPPLEMENTARY Math	10 problems: 1	10 problems: 1
READING (No errors)	1 page: 2	1 page: 2
(Errors)	1 page: 1	1 page: 1
SPELLING	18 words: 1	*10 words: 2
WRITING	20 letters: 1	*10 letters: 2
LIBRARY READING	1 story: 3	*1 story: 10
CYCLO-TEACHER Multiplication	1 side: 1	1 side: 1
Spelling	1 side: 2	1 side: 2

*Indicates where the child-imposed requirements differ from those imposed by the teacher.

Table 2
Contingency Specifications
During Experiment II

Subject Area	Contingency Manager	
	Teacher-Specified	Child-Specified
MATH	10 problems: 1 min of free time	*10 problems: 2 min of free time
READING		
(No errors)	1 page: 2	*1 page: 3
(Errors)	1 page: 1	*1 page: 2
SPELLING	18 words: 1	*5 words: 1
WRITING	20 letters: 1	*10 letters: 2
LANGUAGE ARTS	10 answers: 1	*10 answers: 2
LIBRARY BOOK	1 story: 3	*1 story: 6
	3 questions: 1	*3 questions: 2

*Indicates where the child-imposed requirements differ from those imposed by the teacher.

acquainted with the response-per-point contingencies. Other procedures were carried out as detailed above, for the purpose of replicating Exp. I.

Teacher contingencies were explained, written out, and attached to the student's desk in Stages 1 and 3, while during Stage 2 the student's contingencies were in operation. The only difference between Exp. I and II was that in the first experiment, nine specific agreements were involved; in the latter investigation, eight were included. In both experiments, however, the student's complete program was included in the study. The response-per-point requirements of Exp. II are presented in Table 2.

Following this replication study, Exp. III was conducted. Since during Exp. II the student had altered all of the teacher-imposed requirements to grant himself more points per response, it was necessary to determine whether self-contingencies had affected the academic rate increase or whether this increase was due to increased payoff. Experiment III, therefore, consisted of three stages: (1) the teacher specified the response-per-point requirements she had placed in effect throughout Exp. I and II; (2) the teacher specified the requirements that the student had instituted during Exp. II; and (3) the teacher again specified her original requirements. These requirements were identical to those listed in Table 2. The only difference between Exp. II and III was that in Exp. III, the teacher imposed the contingency requirements throughout, whereas in Exp. II the student set his own contingencies during Stage 2.

RESULTS

Experiment I

During the baseline period (unspecified contingencies), the student's median rate of response was 1.8 while his median rate during Stage 1 was 1.65. The response range during the baseline observations, which lasted for nine days, extended from 1.1 to 2.7; during the 12 days of Stage 1 it extended from 1.1 to 2.4. Stage 2 consisted of 22 daily sessions; in this stage the student's median rate of response was 2.5, ranging from 1.4 to 3.6. A median of 1.9 was obtained in the final stage of the experiment, which consisted of seven daily sessions, while the student's performance extended from 1.0 to 2.2 responses per minute. The data from this experiment are displayed in Fig. 1.

Experiment II

Throughout the 13 days of the first stage, the student's rate of response ranged from

Fig. 1. Daily response rate throughout Exp. I.

Fig. 2. Daily response rate throughout Exp. II.

0.8 to 2.1, with a median response rate of 1.6. During the second stage of this experiment, which also lasted for 13 days, the student's median rate was 2.3 responses per minute. His range at this time was 2.0 to 2.6 responses per minute. In the nine days of the final stage, return to teacher contingencies, the student's median rate of response was 1.5; the range, 1.2 to 1.7. The results of Exp. II are shown in Fig. 2.

Experiment III

The data from the final experiment are presented in Fig. 3. The student's median response rate was 1.5 for the 16 days of Stage 1. During Stage 2, which also lasted for 16 days, his median response rate was 1.2; and during the final stage, which consisted of 15 sessions, it was 1.4. The range during Stage 1 was from 1.1 to 2.1; from 0.6 to 1.7 during Stage 2; and from 0.6 to 1.6 during Stage 3.

DISCUSSION

The data from these experiments indicated that, for this student, self-imposed contingencies were associated with an increased academic response rate. This was evidenced in Exp. I and II; during Stage 2 of each experiment, the period of self-contingencies, the student's median performance was higher than during Stages 1 and 3, the periods of teacher-imposed contingencies.

That this response rate increase was attributed to the manipulation of the contingency manager, not to the contingency system being explained or not explained, was demonstrated in Exp. I. Although the latter manipulation might alter the response rate of some

Fig. 3. Daily response rate throughout Exp. III.

students, the data relevant to this variable indicated that, for this student, explaining or not explaining the contingencies produced nearly equal effects (see Fig. 1).

In addition, the data from Exp. III revealed that the response rate increase was due to manipulation of the contingency manager, and not to reinforcement magnitude. As mentioned earlier, although two experiments had demonstrated that during periods of self-specified contingencies the student responded at rates higher than during teacher-specified contingencies, this increased rate may have been due to mere magnitude of reinforcement. Indeed the contrary seemed to be the case; when the reinforcement ratios were increased by the teacher during Stage 2 of Exp. III, the student's response rate decreased, while it increased during Stage 3 when the original payment was in effect.

Throughout this study, response units from the various areas of reading, math, and spelling were grouped under a single category, "academic response". It may be, therefore, that the effects of the student specifying his own contingencies were more pronounced in certain academic areas than in others. It might also occur that a student, when allowed to specify his contingencies in one area but not in another, would, in fact, respond at an accelerated rate in both areas. Research is currently being conducted in which the effects of self-imposed contingencies are being analyzed within separate areas of academic responding in order to specify more precisely the effects of self-contingency management.

The evidence from the present experiment, that self-scheduling of events is associated with accelerated performance, is supported, in part, by a recent experiment (Lovitt and Curtiss, 1968). In order to investigate the effects of choice as an independent variable, students

were given a number of daily sessions, each comprising three phases. One phase consisted of assigned mathematics, one of assigned reading, and one of a choice period in which the students could select either reading or mathematics. The results revealed that the students' rates of responding were greater during choice periods than during no-choice periods. It appeared that, for the students in this study, being allowed to choose (even between two academic tasks) was the critical variable.

If continued explorations with self-contingency management reveal similar findings, the educational implications appear rather obvious, for not only does the individual begin to develop self-managing skills by arranging certain aspects of his own environment, but in so doing his academic performance increases.

Research is now in progress to specify other components of self-management. Once these elements have been detailed, not only can they be scheduled sequentially, but each can be independently manipulated to evaluate its effect on academic responding. One study currently being conducted is comparing differences in student performance when a child has available a graph showing his daily performance rates *versus* when he is not provided a graph of these data. A second investigation is designed to evaluate the effects on academic performance when a student plots his own performance data *versus* when the teacher does the plotting. Another study is concerned with the function of specifying academic require-

ments. During certain phases of this study, the teacher sets the program limits, while during other portions, the student specifies the limits for daily performance.

Self-management no doubt involves behaviors other than those specified in this report. The fact remains, however, that if education is committed to educate students so that they can not only discriminate a number of teacher-arranged stimuli, but also arrange their own environment—hence control their own behavior—we must conceive of these self-controlling behaviors as capable of being taught and learned. The behaviors leading toward self-management, therefore, must be independently investigated and sequentially arranged to formulate a self-management curriculum.

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