The Effects of Contracting and Self-Monitoring on the Academic Performance of Middle School Students

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THE EFFECTS OF CONTRACTING AND SELF-MONITORING ON THE ACADEMIC PERFORMANCE OF MIDDLE SCHOOL STUDENTS

by

Carol Elaine Parker

A Project Report
Submitted to the
Faculty of the Graduate College
in partial fulfillment of the
requirements for the
Degree of Specialist in Education
Department of Psychology

Western Michigan University
Kalamazoo, Michigan
April 1982

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The Guided Study Center (GSC), a contractual study center for middle school students, was described as a potential cost-effective method of individualizing education. The effects of attending the GSC, self-monitoring, and GSC attendance in conjunction with self-monitoring were examined in a multiple baseline design across seven fifth and sixth grade students. Of five subjects who participated in the contracting and self-monitoring phases of the study, three showed increases in average percent correct performance of 10 to 15 percent during contracting, one showed an increase of 8 percent during contracting in conjunction with self-monitoring, and one showed no changes in performance. Of the two subjects who participated in only the self-monitoring phase of the study, neither showed changes in average performance. It was concluded that although the GSC was an effective form of individualization for some students, a more comprehensive plan was needed for others.
ACKNOWLEDGEMENTS

I would like to express my gratitude to Hazel Ickes, Kelly Kent, and Dr. Howard Farris for their assistance in completing this project.

My special appreciation is expressed to Dr. Alan Poling. His invaluable comments, encouragement, and support allowed me to see this project to completion when I thought it impossible.

Carol Elaine Parker
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CHAPTER I

INTRODUCTION

Elementary and secondary educators have long recognized the role of individual differences in learning and have wrestled with the problem of meeting the needs of the individual in an educational system for the masses. As early as 1798 Lancaster concerned himself with these issues and developed a monotutorial system of education (Reigart, 1916). During the early part of this century, the ideas of Frederick Burk influenced the developers of a number of plans for self-paced education (Mitzel, 1974).

More recently, a profusion of programs indicates educators' continued interest in individualizing education. The surge began during the 1950s when Skinner (1954) advocated the use of teaching machines for individualization (Mitzel, 1974). Another highly structured approach followed in the form of programmed instruction (Holland and Skinner, 1961).

During the 1960s development continued as the Wisconsin Research and Development Center designed a nongraded system of schooling to replace the traditional, age-graded classrooms (Klausmeier, 1975). Westinghouse Learning Corporation marketed it as the Program for Learning in Accordance with Needs (PLAN) (Planagan, Shanner, Brudner, and Marker, 1975), a program which can be adapted to a variety of facilities and budgets.
Glaser and his associates later developed a program known as IPI (Individually Prescribed Instruction) (Becker and Engleman, 1976) which is based on a set of behavioral objectives which are sequenced from the simpler to more complex. Objective-based, criterion referenced tests control progress. After the objectives and tests were developed, materials were either borrowed from existing programs or were created for teaching purposes. This program also represents a flexible form of individualization.

Despite the proliferation of programs allegedly offering individualized education, research in this area has been sporadic (Glaser, 1972), and we seem to be no closer to empirically validated, widely accepted individualized education than we were at the turn of the century. Unfortunately, the economic climate is such that the development and evaluation of broad spectrum programs of individualized education seems unlikely. Glasser (1969) has perceptively pointed out that successful programs will have to fit into the current school structure, largely because we cannot afford to build more schools, hire more specialists, and staff more classrooms. Scriven (1975), in discussing the prospects of individualization, asserts that most of the large individualized programs extant today have failed to demonstrate that they are worth the stupendous investments they currently entail.

Individualized education is not, however, synonymous with large scale projects. Many teachers and school systems have developed their own programs at a much lower cost than most marketed plans. In the face of unconvincing evidence for the effec-
tiveness of the large scale plans, as well as economic necessity, it appears wise to turn our attention to evaluation of the smaller, possibly more cost-effective alternatives.

One such method of individualization which has received periodic attention and holds much promise is contingency contracting, described recently by Homme, Csanyi, Gonzales, and Rechs (1969). Godfrey (1976) describes a contract simply as an agreement between student and teacher. Most often contracts specify a time frame, the exact tasks required, and the consequences if the tasks are or are not completed (DeRisi and Butz, 1975). For example, the teacher may require that the student perform some academic task within a certain period; in return for completing the task, the student will receive a grade or some privilege (reinforcer) from the teacher. This arrangement is specified on the contract, which is signed by both teacher and student. Although specific formats and wording may vary, all contracts are written in the form, "if you do X, you will get Y" (Homme et al., 1969).

According to Homme et al. (1969), contracts are most effective when they are individualized. One way to assure that contracts are individualized is through negotiation of appropriate time lines, assignments, and reinforcers with each student. In this way the goal of individualized instruction, meeting the needs of each separate student, is met through self-pacing, appropriate academic work levels, and personalized reinforcers. Gambrell and Wilson (1973) suggest that the negotiation of the contract terms between student and teacher is essential. A study conducted by Lovitt and
Curtiss (1969) which demonstrated that students did in fact respond at a higher rate under self-imposed contingencies, as compared to teacher imposed, supports this contention.

Contracting in education is not an innovation of recent times, however; in 1922 the Dalton Plan utilized contracting of assignments and independent study in laboratories as a means of individualization (Parkhurst, 1922). These contracts specified two of the three components necessary for a contract as outlined by DeRisi and Butz (1975): a time frame and the exact tasks required for completion. Although younger students signed their contracts, older students dispensed with the practice, and teachers never signed them. The consequences for failure to complete a month-long assignment contract were not specified. A student simply continued work until the assignment was completed. In addition, although the students were free to allot their time as they pleased to various activities, they never negotiated the amount of work with the teacher.

Several authors have more recently described, but not evaluated, individualized contracts in elementary, secondary, and post-secondary settings. For example, Godfrey (1976) describes their use in elementary classrooms. Hoffer (1980) instituted a workable contract-based summer reading program for children of all ages, while Brooks (1974) reported the successful treatment of truancy in adolescents through the use of behavioral contracts. College instructors have also employed contracting in courses on such topics as study skills (Goldman, 1978), technical speech communi-
cation (Wolvin and Wolvin, 1975), and psychology (Poppen and Thompson, 1971).

A limited number of studies have actually evaluated the use of individualized contracts in education which clearly specify the time frame, task, and consequences for completion. The results are generally inconclusive and contradictory. Thompson and Davis (1970) have shown significant improvement in the grades of eighth grade math students under a contract system of grading as compared to their prior grades, as well as to the grades of a control group, under a traditional approach to grading. Brigham and Amith (1973) instituted a verbal contract system with individual second grade male students in order to increase both accuracy and rate of responding in a reading program. Rate and accuracy of responding by each of the students did increase when contracts were arranged, but large individual differences in gains were found. In comparing academic performance under a grade contracting system with that under a traditional approach to grading in a college speech course, Wolvin and Wolvin (1975) found that the proportion of As and Bs increased, while the proportion of Cs decreased.

In contrast to the above results, Yarber (1974) reported that there was no difference in knowledge gained between ninth grade health classes under grade contracting and those under traditional grading. It should be noted, however, that the comparison only lasted for nine class sessions, and the contracting procedure as described did not include negotiation of appropriate time lines and specific tasks. Poppen and Thompson (1971), in a more extensive
study conducted in four college educational psychology classes, also found no significant difference between traditional and individual contracting grading procedures. These contracts were negotiated between the student and teacher and clearly specified the tasks and consequences for completion.

As Arwood, Williams, and Long (1974) have pointed out and contradictory research results indicate, it is not entirely clear what constitutes an effective contract. Students of all ages have been included in both studies which show academic improvement under contracting and those which do not. One successful study used a vocal contract while the others were signed by both teacher and student. The consequences, time lines, amount and type of work required, and performance levels of students are not comparable across the various studies.

It has been suggested by Arwood et al. (1974) that contracts may be successful in improving academic performance by lending structure and consistency to the environment. According to this analysis, when contracts are in effect, students know exactly what is expected of them, and likewise, what they can expect from the teacher. Thus the success of the contracting procedure depends upon the accurate specification of behaviors and their consequences and the consistency with which those consequences are applied. Others have suggested that contracting teaches effective study skills (Godfrey, 1976) and fosters independence (Dunn and Dunn, 1972), thus accounting for improved performance.

If these assertions are true, then contracting procedures
would not necessarily have to be applied in individual classrooms as a grading system, but instead could be applied outside the classroom during study periods to aid students in self-management and the acquisition of effective study skills. Redmon (1981) developed a school-wide contractual study program for use with high school students to investigate the effects of contracting outside the classroom on the academic performance of students inside the classroom.

In order to investigate the usefulness of such a program with other populations, the present study was designed to show the effects of attending a contractual study center three times weekly on the academic performance of middle school students. In addition, the benefits of self-recording in conjunction with study center attendance was also investigated.
CHAPTER II

METHOD

Subjects

Seven fifth and sixth grade students, two males and five females, served as subjects. All of the students were of normal physical and intellectual development and attended the same middle school in a small, midwestern community. The subjects were chosen for participation on the basis of 1) their average performance (grade of C, corresponding to approximately 70 percent correct) during the first semester of the school year in math classes taught by the same teacher, and 2) an average attendance of less than one time per week in the Guided Study Center (GSC, described in detail below) during the first semester.

The GSC procedures were explained to each subject after which he or she gave vocal informed consent to participate in the study.

Procedure

The Guided Study Center, patterned after a similar project (Redmon, 1981) for high school students, was the program through which contractual study was evaluated. It provided a structured setting where any student could work on academic material. The GSC was located in a 12 by 12 foot room adjacent to the middle school library. The room contained 10 desks and chairs and a small,
two-drawer file cabinet.

In order to use the GSC, a student must first have received a pass from a teacher to attend the center during independent study periods, either in a study hall or within another scheduled class. The student then brought the pass to the GSC at the designated time. A contract (see Figure 1), which included a clear specification of the type and amount of work and time allotted to complete it, was promptly negotiated between the student and a staff member. When all work was done or the class period was over, the student returned to his or her classroom with a report of his or her progress for the teacher in the form of a carbon copy of the contract.

The behaviors necessary for continued use of the center were specified in writing on the bottom of the contract (see Figure 1). Each student was shown this list and reminded to adhere to the requirements. The student's behavior was evaluated following each use of the center by circling yes or no for each of the items. If at any time during a study period a student became disruptive, the appropriate items were checked no, and the student was sent back to class.

The center was staffed by both high school and middle school students who were familiar with the center and had been recommended by teachers as advanced and capable students. Typically, one or two staff members were available during any particular hour of operation. The staff members not only negotiated contracts with the students, but also provided assistance when students requested it.
GUIDED STUDY CONTRACT

TIME

DATE

IN THE NEXT _____ MINUTES, I WILL ACCOMPLISH THE FOLLOWING TASK(S)

TASK 1
DESCRIPTION:
RESULTS
COMPLETE

CRITERION:
INCOMPLETE

TASK 2
DESCRIPTION:
RESULTS
COMPLETE

CRITERION:
INCOMPLETE

I UNDERSTAND THAT IF I WORK QUIETLY AND THAT IF I HAVE MY WORK REVIEWED AT THE END OF THE PERIOD, I CAN CONTINUE TO USE THE GUIDED STUDY CENTER.

STAFF SIGNATURE

STUDENT SIGNATURE

REVIEW INFORMATION

1. Obtained a pass and had it signed by teacher. Yes No
2. Completed a contract form and had it signed. Yes No
3. Arrived at the center on time from class. Yes No
4. Began working within 4 minutes of filling out contract. Yes No
5. Remained on task 90% of the time. Yes No
6. Refrained from disturbing others. Yes No
7. Obtained feedback on contract and review form before leaving the center. Yes No
8. If left center, took a pass and returned within five minutes. Yes No

Pass Information

Time left center__ Returning to__

Signature of Coordinator

Figure 1. A blank contract used in the Guided Study Center.

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Rather than simply supplying the answers to questions, this assistance typically consisted of directing the students to where the answers could be found in their academic materials.

The contracts negotiated in the GSC were not typical contingency contracts; three distinguishing characteristics bear note here. First, the contract was written for one class period (55 minutes) or less. Many times contracts are written for several days or weeks. Second, the task description and criterion for completion were specific but brief. It was not uncommon for only one study question or problem to be included. The third and unique characteristic of the contract concerns the consequences administered for work completed or not completed. The contract was simply marked complete or incomplete upon review of the work. No attempt was made to individualize the consequences or to ascertain whether those employed were in fact reinforcing for the students. Although the student's teacher may have applied other consequences to the student's work, no such attempt was made by the GSC staff.

Experimental Design

A multiple baseline across subjects design was used to evaluate both the effects of contracting and self-recording.

Baseline

Performance in the classroom in terms of percent of correctly solved problems on daily, objectively scored math assignments was recorded during Baseline and all subsequent phases of the study.
The length of assignments ranged from 10 problems to 75 problems, with the majority containing from 20 to 35 problems. After grading the assignments, the teacher placed them in a folder where the number correct and the total number of problems per assignment were recorded prior to returning them to the students. During all phases of the study, the grades were recorded by either the experimenter, another graduate student, or the teacher.

Phase I

During contracting, each of five subjects was asked to attend the GSC at least three times per week. Following the regular class lesson, the teacher provided each of these students with a pass, and he or she was allowed to attend the center for the remainder of the class hour. The subject then negotiated a contract in the same manner as all other students attending the GSC who were not participating in the study. There were no consequences for the subjects for failure to attend the GSC.

Phase II

During this phase of the study, the five subjects from Phase I were provided with graphs (see Figure 2) and were asked to record each of their assignments and grades. These graphs were examined weekly by the experimenter for accuracy and timeliness. Two additional subjects who had not participated in the first phase of the study also were asked to graph their grades and acted as controls for Phase II.
Interobserver Agreement

During all phases of the study, on one day per week a second observer independently recorded grades for computation of interobserver agreement. The first observer was always unaware of the second observer. Throughout the study, the lowest agreement between percent correct recorded and true percent correct on an assignment was 98 percent. Errors occurred on 26 percent of the assignments checked. All percentages recorded by the experimenter,
the observer, and the teacher were compared to letter grades recorded in the teacher's grade book, and no errors were found.

Teacher grading accuracy was checked weekly, at which time the teacher was unaware of evaluation. During the time in which the observer ordinarily recorded grades, she also regraded each of the students papers, recording teacher errors. Once during the semester the teacher was observed to incorrectly mark a problem wrong, once was observed to incorrectly calculate percent correct, and never was observed to incorrectly mark a problem right.
CHAPTER III

RESULTS

Phase I of the study indicated that the subjects used the GSC at almost every opportunity and that the contracts were of reasonable length (i.e., greater than 15 minutes in duration). Table I summarizes the number, length, and outcome of the contracts written for each of the subjects during the course of the study. Included in the number of total contract opportunities were all days during which the GSC was staffed and the subjects were in their regularly scheduled classes. Not included were days on which the subjects were required to attend a special activity. Subject 1 wrote a contract on 25 of 27 opportunities, Subject 2 on 27 of 27 opportunities, Subject 3 on 14 of 17 opportunities, Subject 4 on 15 of 18 opportunities, and Subject 5 on 11 of 12 opportunities. Only Subjects 1 and 2 failed to complete all contracts, each of them leaving one contract incomplete. The contracts ranged in duration from 9 to 35 minutes, with the average for each of the subjects ranging from 19.4 minutes to 20.2 minutes. Subjects 1, 2, 4, and 5 had 3, 1, 1, and 2 contracts less than 15 minutes in duration, respectively. An examination of each contract for each subject revealed that every contract clearly specified time, task, criterion for completion, and outcome (i.e., complete or incomplete). In addition, all review information at the bottom of the contracts was marked affirmatively, save one contract on which the review was
<table>
<thead>
<tr>
<th>Information</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<td>27</td>
<td>17</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>opportunities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>25</td>
<td>27</td>
<td>14</td>
<td>15</td>
<td>11</td>
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<tr>
<td>written</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>total complete</td>
<td>24</td>
<td>26</td>
<td>14</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td>contracts</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>total incomplete</td>
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<td>0</td>
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<td></td>
</tr>
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<td>20.2</td>
<td>19.4</td>
<td>19.5</td>
<td>19.6</td>
</tr>
<tr>
<td>duration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>of each contract</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in minutes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>number of contracts</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>less than 15 minutes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1

Number and Duration of Contracts Written and Completed by Each Subject During the Course of Treatment
Table 2

Average Number of Assignments Not Handed in During Baseline, Phase I, and Phase II

<table>
<thead>
<tr>
<th>Condition</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6&lt;sup&gt;b&lt;/sup&gt;</th>
<th>7&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>0.00 (0)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.25 (1)</td>
<td>0.38 (3)</td>
<td>0.13 (1)</td>
<td>0.20 (2)</td>
<td>1.00 (7)</td>
<td>0.50 (5)</td>
</tr>
<tr>
<td>Contracting</td>
<td>1.00 (4)</td>
<td>1.75 (7)</td>
<td>0.30 (1)</td>
<td>0.00 (0)</td>
<td>0.30 (1)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Contracting and Self-Recording</td>
<td>0.60 (4)</td>
<td>1.70 (11)</td>
<td>0.80 (3)</td>
<td>0.00 (0)</td>
<td>0.80 (2)</td>
<td>0.38 (3)</td>
<td>0.00 (0)</td>
</tr>
<tr>
<td>Contracted Assignments Not Handed In</td>
<td>3</td>
<td>9</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<sup>a</sup>Numbers in parentheses indicate the total number of assignments per condition not handed in.

<sup>b</sup>These subjects did not participate in the contracting portions of Phases I and II.
In general, contracting had no effect on the percent of assignments not handed in. As Table 2 shows, the weekly average number of assignments not handed in increased from Baseline to Contracting for Subjects 1, 2, and 5. This average decreased during the same period for Subjects 3 and 4. In addition, Subjects 1, 2, 3, and 5 contracted for 3, 9, 3, and 1 assignments, respectively, which they did not hand in. Likewise, Contracting plus Self-Recording had minimal effects on the number of assignments handed in.

As the graphs in Figure 3 indicate, either Contracting or Contracting in combination with Self-Recording had a moderate effect on classroom grades. It appears from the graphs that Self-Recording alone had little, if any, consistent effect on grades (see Figure 4). Subjects 1, 2, and 5 increased average percent correct performance on daily assignments by 10, 14, and 15 percentage points, respectively, during Phase I. This gain in performance corresponded to a letter grade increase from C to B. Although average percent correct for these subjects decreased by 3, 5, and 1 percentage points, respectively, during Phase II, this decrease was not large enough to affect their earned letter grades.

Subjects 3 and 4 decreased in average percent correct performance during Phase I by 5 and 2 percentage points, respectively. Thus Subject 3 increased in average percent correct performance by 5 percentage points between Baseline and termination of treatment, but this increase was not sufficient to improve the earned
letter grade. Subject 4 increased in percent correct performance by 8 percentage points during the course of the study, a gain sufficient to increase the earned letter grade from a C to a B.

Although Subject 7 increased 6 percentage points in average percent correct performance and Subject 6 decreased 4 percentage points, these changes were not sufficient to affect either of the corresponding earned letter grades (see Figure 4). Thus it appears that Self-Recording alone was not sufficient to improve academic performance as reflected by grades.
Figure 3. Grades on consecutive assignments for Subjects 1 through 5 during Baseline, Contracting, and Contracting in conjunction with Self-Recording. The mean grade for each phase is represented by the horizontal line.
Figure 4. Grades on consecutive assignments for subjects 6 and 7 during Baseline and Self-Recording. The mean grade for each phase is represented by the horizontal line.
CHAPTER IV

DISCUSSION

Several large scale programs for individualization have been developed (e.g., Becker & Engleman, 1976; Flanagan, Shanner, Brudner, & Marker, 1975; Klausmeir, 1975), but lack of practical feasibility and questionable effectiveness lead to the inexorable conclusion that more cost-effective alternatives need to be found. Contracting was evaluated as an alternative in the present study.

Based on the assumption that contracting provides the necessary structure in the environment for effective academic performance, the GSC was opened in an effort to improve classroom academic performance from outside the classroom. The results of the present study indicate that contracting in the center significantly increased the academic performance of Subjects 1, 2, and 5. An increase was also seen in the performance of Subject 4, but not until self-recording of grades was instituted. The treatment failed to have any significant effect on the academic performance of Subject 3.

The present study suggests that a highly structured study environment is beneficial for some students. Although four of the five subjects evidenced an improvement of one letter grade, this increase was not observed following the initial introduction of contracting for Subject 4. Further, none of these increases were as large as they might have been.
Several explanations can be offered for these somewhat inconsistent and less than overwhelming results. Perhaps the dependent variable simply was not sufficiently sensitive to show changes in performance. This is unlikely, however, since the assignments contracted for in the center were objectively graded, and these grades constituted the dependent variable measure. Further, there was no ceiling effect in the present study, for all grades were low enough to have been improved through treatment.

The present results could also be explained by any inconsistencies in implementation of the contract procedures. If the GSC contracts were to provide structure for the students' study time, it was essential that the contract procedures be followed consistently. That is, the tasks contracted for had to be specified in behavioral terms, the criteria for complete performance had to be clear, and the time allotted for completion noted. An examination of all contracts written by the subjects revealed that all of this information was indeed included on every contract. Thus, lack of consistency in implementation cannot account for the results.

Ineffectiveness of the antecedents and consequences employed in the GSC in controlling study behavior may provide a third reason for the inconsistent results in grade changes. If writing the contract did not control study behavior in the GSC, then items 4 (Began working within 4 minutes of filling out contract.) and 5 (Remained on task 90% of the time.) on the review information at the bottom of the contract (see Figure 1) would be marked "No." All contracts save one reported affirmative responses to the items.
If the consequences of complete or incomplete contracts were ineffective, then a high number of incomplete contracts could have been expected. In fact, only two contracts during the entire study were marked incomplete. It might be noted that, as time allotted for completion of a contract ran out, students often rushed to complete the contract or asked for "just another minute" to finish the last problem.

It appears, then, that the GSC provided the structure for students to know what was expected of them and specified the consequences for their behavior during study periods. Adelman and Taylor (1977), however, have suggested that not only must one establish an environment which is conducive to learning, but this environment must also take into account a student's entering repertoire. This perhaps may explain the present results. Not only must the environment (GSC contracting) be individualized, so must the learning materials for some students. In the same way that students cannot be expected to work and complete assignments at the same pace, they cannot be expected to have identical histories providing them with equal preskills for a particular assignment.

In the present study, no attempt was made to manipulate classroom assignments; the teacher continued as usual to lecture and assign the same work to all students. The GSC merely provided an environment where they could work on those assignments, and graphing was an attempt to bring the students in contact with the classroom consequences of completing assignments. The lack of systematic change in the number of assignments not handed in suggests that the
progress expected of some children given the specific academic materials and their preskills may not have been appropriate. It appears that materials and learning activities, as well as study time, requires individualization for some students. The inconsistent results of previous studies (e.g., Brigham & Amith, 1973; Poppen & Thompson, 1971; Wolvin & Wolvin, 1975), which have individualized assignments or learning materials but have failed to address study time, support this contention.

Several attempts have been made to develop a system for maximizing the achievement of every student in the classroom. There are no panaceas, however. The very definition of individual precludes the possibility that any one sequence of learning materials will provide every student with a sufficient degree of exposure to academic material. What is required, therefore, is a knowledge of each student's preskills (learning history) in order for a structured study environment such as the GSC to be maximally effective.
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