The Relationship between Contracting and the Level of Academic Achievement of High School Students

John Philip Kirkpatrick
Western Michigan University

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THE RELATIONSHIP BETWEEN CONTRACTING AND
THE LEVEL OF ACADEMIC ACHIEVEMENT OF
HIGH SCHOOL STUDENTS

by

John Philip Kirkpatrick

A Thesis
Submitted to the
Faculty of The Graduate College
in partial fulfillment
of the
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John Philip Kirkpatrick
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STUDENTS.
WESTERN MICHIGAN UNIVERSITY, M. A., 1979
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Introduction

Contracting has come into widespread use over the last 10 years in several areas of both the clinical and educational fields. A contract is nothing more than an agreement between two or more people. We all make oral, informal contracts everyday—"If you do this, I will do that." When these informal contracts are completed, the results of them are the same as those of the more formal contracts employed in the clinical and educational fields; behaviors are changed, and objectives are accomplished.

Lloyd Homme coined the term contingency contracting in 1966, and initiated the use of contracts which then burgeoned in the clinical and educational fields. The term contingency contracting refers to an explicit quid pro quo agreement between two or more people. Homme was working with a group of school dropouts and potential dropouts and was employing the Premack Principle with them (Homme 1966). In its simplest form the Premack Principle states that when high probability behaviors follow low probability behaviors, and the high cannot be performed elsewhere, then the probability of the low occurring in similar circumstances in the future increases. The high probability behaviors reinforce the low. Since each of the students with whom Homme worked had different high probability behaviors, he and his co-workers were forced to specify in advance what the dependent relationships (contingencies) were going to be.
for each student in advance. This evolved into the contingency contract.

According to Stuart (1970) a contract has at least four essential parts, and perhaps a fifth. First there is a specification of the responsibilities of each person or of the behaviors which each much perform. Second, there is a specification of the privileges or rewards to be earned. Third, there is a specification of the sanctions for failure to live up to the contract. Fourth, there is a specification of how the responsibilities will be monitored. In addition to these four parts, there may be a fifth part, the specification of possible bonuses for going beyond the contract requirements. All contracts in the clinical and education fields include at least some of these parts. However, it is unclear how many of these are truly essential for efficacious contracts.

The advantages of contracting are numerous. Significant among these advantages is the individualization that contracting provides. All individuals have distinctive behavioral repertories. The skills of one individual are greater than those of another in some areas, and lesser in other areas. Contracts can be tailored to fit the requirements of each individual. Contracting may also be beneficial in that it can provide certain self management skills. The responsibility for choosing goals and working for them can be shifted more to the client or student instead of the professional. Contracting may offer greater flexibility and choice while still maintaining a structure within which the contractors can accomplish
their respective objectives. In addition to these advantages, contracting is straightforward and easy to institute.

Contracting has been used as a therapeutic tool in the clinical field since the late sixties and early seventies. The areas of the clinical field in which contracting has been used are numerous including weight control, drug abuse, alcoholism, smoking, marital discord, and other (Lochman & O'Breyer 1977). Research has been conducted in these areas in an effort to demonstrate the effectiveness of contracting in altering behaviors and accomplishing objectives.

Some of the earlier studies of the effects of contracting were merely case reports which lacked the control necessary for rigorous scientific research. One case was reported by Miller (1972) and was concerned with an alcoholic client. The client contracted to reduce the number of drinks he consumed each day. When the number was not reduced, he had to pay his wife twenty dollars which was to be spent frivolously. Miller reported a significant reduction in the number of drinks consumed during contracting and continuing through a six-month follow up.

Another case was reported by Boudin (1972) and was concerned with the amphetamine use of a client. The client gave the therapist her entire saving of $500 to be put in a joint bank account. The contract stipulated that upon the occasion when the client took amphetamines, the therapist would write a $50 check of her money and send it to an organization which the client vehemently opposed. The
client reported only one remission during a three-month contract period, and a two-year follow up indicated no return to amphetamine use.

In other studies conducted in the clinical field some control was incorporated. For studies with single-subject designs control was often incorporated by way of reversals. With reversal designs as with other single-subject designs, the individual is his own control. Mann (1972) conducted a weight control study with contracts using a reversal design. He showed that items considered valuable by the subject and originally his property, could be used to modify the subject's weight gain. The subject earned back the valuables contingent upon a weight gain.

Some of the clinical research with contracting in the late seventies has been concerned with the specific and nonspecific components which contribute to an effective treatment using contracts. Spring, Spich, Trimble, and Goechner (1978) conducted a study with subjects who wanted to reduce their rate of smoking cigarettes. With a group design three contract conditions were superimposed on a four-week smoking modification program. The three conditions were a contingency contract condition in which subjects lost money contingent upon failure to quit smoking, a noncontingency contract condition in which subjects signed a pledge to quit smoking, and a no contract condition. The authors showed that endorsing a contract per se was less important for initial abstinence than the contingency imposed by the contract.
Jacobson (1978) has conducted research in the area of marital discord. He has attempted to separate the nonspecific components of contracts from the specific ones. Without minimizing the importance of consequences per se, he suggested that the explicit statement of contingencies inherent in the quid pro quo types of contracts is unnecessary. Furthermore, he predicted that good faith contracts would be more effective than quid pro quo contracts for severely disturbed couples.

The use of contracting has been extensive in the field of education as well as the clinical field. Becker, Engelman, and Thomas (1975) have discussed three areas of education in which contracting has potential use. The first area relates to the subject-area teacher who has students for one period a day. The teacher can specify the requirements for earning grades for each unit and for the semester. Students then contract for grades. The second area relates to students who need special help. A home-school contract can be designed which will draw the parent or guardian into the educational system. The third area relates to the use of contracts in learning centers. In this area a high degree of individualization can be systematically programmed.

Much research has shown the effectiveness of contracting in increasing the level of academic achievement and modifying inappropriate behavior in the three areas that Becker et al. (1975) discussed. In the area of term-course contracts or contracting for grades, Tansey (1974) compared the test results of students who contracted for grades in a high school physics class with the test scores of students.
who had been taught by traditional lecture method the year before. The group mean and median scores of the students who contracted were significantly better than the scores of the students who were taught by the lecture method. The tests were similar for both groups and included many of the same questions.

A more controlled study of the effects of contracting for grades was conducted by Williams and Anadam (1973). Some social behavior was also contracted. The subjects were seventh graders who attended a junior high school located in a disadvantaged metropolitan area. Teachers contracted with two groups of students for grades and optional activities contingent upon specified academic achievement and desirable social behaviors. The results of these two groups were compared with a third group of seventh graders who did not contract. The results showed an increase in the level of academic achievement and an increase in positive social behavior for those groups that contracted compared to both their performance prior to contracting and to the performance of the control group. Other studies confirm the efficacy of contracting for grades and with social behavior (Clark 1978).

Research has also been conducted in the area of home-school contracting. A demonstration of the effects of home-school contracts on assignment completion and school attendance was conducted by Cantrell, Cantrell, Huddleston, and Wooldridge (1969). One student earned preferred activities at home or money contingent upon assignment completion in school. Another student earned privileges for approximations to the desired terminal goal of attending school without resistance.
The results of the demonstration were promising. In comparing six-weeks grades for the report before intervention with the report after intervention, the grades of the first student increased in three out of the six subject areas. One of the grades improved two letters. For the second student the goal of attending without resistance was achieved after only eight days.

Studies with greater control have confirmed the effectiveness of home-school contracts in modifying school related behavior and performance. Bailey, Wolf, and Phillips (1970) conducted a study with five pre-delinquents from Achievement Place who were attending a special summer school math class. Variables relating to study behavior and rule violation were measured. Incorporating a reversal design in the study, the authors showed that the home-school contracts could significantly improve classroom performance. Two other studies conducted in public schools by the same authors demonstrated the generality of the findings. The generality of these findings have been further confirmed (MacDonald, Gallimore, and MacDonald, 1970).

The third area of education in which Becker et al. (1975) described as holding promise for the employment of contracts was that of learning centers. A dearth of studies have been published which have been concerned with learning-center contracts. Becker et al. (1975) mentioned the use of contracts in a learning center designed for poor readers. Stinson (1979) described a learning center which students of any academic standing could voluntarily attend. She discussed the feasibility of implementing the contract learning center in public schools. Her conclusions were favorable.
The present study relates to contracting in the area of educational learning centers. In particular, the study stems from the work initiated by Stinson (1979) at the Guided Study Center (GSC), the contract center which students voluntarily attend. The present study was designed in an attempt to determine what effects contracting has on the level of academic performance of the student participants attending the contract center. A multiple-baseline single-subject design was incorporated in the study in order to control for factors extraneous to the contract process.

There are at least three differences between the contracting at the GSC and the contracting in other areas of both the clinical and educational fields. First, the duration of the contract is quite short, lasting no more than one class period. Second, the people who help the student participants fill out the contracts are not professionals, but are peers of the student participants. Finally, and perhaps most significantly, the contracts do not stipulate the explicit rewards for meeting the criteria specified on the contracts.

Despite these differences, it is expected that contracting will increase the level of academic achievement for one or more of the high school students who attend the contract center. There are two reasons for this. First, it is expected because of the wide generality of beneficial effects which contracting has been shown to have in both clinical and educational fields. Second, it is expected because of informal data gathered at the GSC which indicates some academic improvement in the performance of students attending the center.
Method

Subjects

The subjects of the study were six students from a rural high school of 300 students. Four of these subjects were male and two were female. Four were from the 10th grade and two were from the 11th grade. Two of the subjects were selected from an English grammar class, while the remaining four were selected from a pre-algebra class. The academic standing of the subjects in the classes from which they were selected ranged from a level of B- to E. All of the subjects volunteered to attend the Guided Study Center, the academic contracting center in which the study was conducted.

Brief profiles describing each of the subjects were assembled on the basis of the behavior of the subjects in the GSC, on the basis of reports of their behavior throughout the school year from teachers and other school personnel, and on the basis of the academic performance of the subjects in the classes from which they came. Subjects 1 and 2 were close friends. Their English teacher considered them to be bright and to be capable of high achievement if they would put forth some effort. Their English grades upon first attending the GSC were Ds, their performance was erratic, and the work of each was probably not independent. Both subjects had been in trouble with administrators for petty vandalism, and both received failures for
their semester course work because of too many unexcused absences. Subject 1 was expelled from school near the end of the academic school year for cursing a teacher and then lighting a cigarette in front of the principal on school grounds.

Subjects 3 and 4 also displayed behavior and performance patterns which were similar to each other. Their math teacher stated that they wanted to do only enough work to pass the course. Indeed, both subjects were completing quizzes and tests at a very low rate compared with other students in the class. Both were failing in the course for doing too little work. They were not completing the minimum objectives required to pass the self-paced math class for which the students contracted for their grades. These subjects began attending the GSC after they were given the opportunity to complete their minimum objectives at the center.

Subject 5 was considered by the teacher to be very bright. However, this subject completed quizzes sporadically. The subject would do very little for periods of two to three weeks and then race through so much work that the subject could complete as many as three quizzes in a week. The norm of the class was about one each week. The math teacher knew the family of this subject. He speculated that little work was accomplished for long periods of time because of the subject's personal problems both at home with the parents and at school with an intimate friend. Events during the course of the semester corroborated the report. Subject 5 was performing at a level of about B- to C in the math class before attending the GSC.
The final subject was number 6. The math teacher did not consider this subject to be a high achiever. Despite this, the subject did complete quizzes at a consistent rate throughout the year. Subject 6 was performing at a level of about C- to D+ before attending the GSC. Upon initially attending the GSC, both the math teacher and the GSC staff considered the subject to be very difficult to approach. Academic assistance was accepted grudgingly.

Setting and Materials

The Guided Study Center was designed to provide a structured setting in which students can work on academic assignments on a daily contractual basis. It was also designed to provide an alternative to the traditional study hall. The GSC was operated by Western Michigan University Precision Teaching Staff who served as GSC managers, and student staff members who served as assistants to the students participants attending the center. Help was provided to the student participants for both academic work and study skill development.

The GSC was located in a vacant classroom adjoining a combination study hall-lunch room. When student participants came to the GSC, they filled out performance contracts which specified precisely the nature and amount of work to be accomplished, as well as the amount of time which they had to complete the work. The criteria specified on the contracts had to be met before the contracts were deemed complete. The criteria for contract completion were determined by the student participants in conjunction with the student staff.
Results of the work of the student participants were written on the contracts at the end of the period in which contracts were to be completed. This was done in order to provide feedback to the student participants and to the teachers. Student participants came to the GSC from both academic classes and from study hall.

Numerous materials were needed in the GSC during its operation. A packet of forms included some of the materials needed (Appendix A). The forms most used in this packet were the attendance form, the performance contract, which also served as a pass for the student participants who had to return to their classes at the end of the hour, and the student review form which related to both the academic and nonacademic behavior of the student participants while attending GSC. The exact number of student participants which the GSC could accommodate depended largely upon the number and quality of the student staff working at the GSC with the center manager. With two good student staff members 10 or more student participants could be accommodated during a class period. The original contracts were retained at the GSC while duplicates were given to the student participants which they could give to their classroom teachers.

**Procedure**

Two criteria had to be met before student participants were considered as potential subjects for the study. First, they must have attended the GSC on at least two occasions. This selection criterion was established to ensure that the subjects who were eventually selected demonstrated an interest in the GSC and a need
for the services offered there. Student participants who had attended the GSC at least twice would more likely continue than those who had initially attended the GSC only once possibly because of the novelty.

Second, only student participants who did not already frequently complete contracts at the GSC would be asked to participate in the study. In order to compare the effects of contracting on academic achievement it was necessary to increase the number of contracts completed per week. It would have been too difficult to increase the rate of contract completion for subjects who already completed them at a high rate. In addition, this selection criterion eliminated the possibility of selecting subjects who were already beginning to perform better in class before being asked to attend more frequently.

If the student participants met these initial selection criteria, they were asked some questions about their academic performance in the class from which they came as well as their general impression of the GSC. Two typical questions were as follows: "How are you doing in class X?" "Do you think the GSC is of any help to you or to others?" No student participants were excluded from selection on the basis of their academic standing in the classroom alone. However, student participants who were performing in their respective classes at an A level were excluded if the evaluation systems of the classes from which they came were judged too insensitive to detect improvement. The reason for asking the second question was not to select subjects who were already improving in
their classes. The reason for asking the question was to determine their attitude toward the center. Once again, subjects with a favorable attitude toward the GSC would be more likely than others to continue attending it through the termination of the study.

Those student participants who responded unfavorably to the second question were not asked to attend more often. Those subjects who did respond favorably were told of the author's interest in the effectiveness of the GSC on academic achievement, and were asked to attend the GSC more frequently. Those student participants who then attended the GSC more frequently were selected as subjects for the study. To the extent that the criteria described above select subjects that are predisposed to improve during intervention, the results of the study will be biased in that direction.

The independent variable of the study was the author's prompting or encouraging the subjects to attend the GSC more often than they did during baseline. The author was not interested in which of the many forms of prompting were effective in getting the subjects to attend more often. The interest was in the relationship between the number of contracts completed and the level of academic achievement. Any prompts were used which might induce the subjects to attend the center more. Questions and mild commands such as "Are you coming to the Guided Study Center third hour today?" and "Come down to the GSC today" were used to prompt the subjects to attend the GSC. The subjects were prompted as many as three times whenever they failed to attend the GSC at a rate greater than baseline. If this failed to increase the attendance rate, prompting
was discontinued.

The dependent variable to which the prompting was related was the number of contracts completed at the GSC. The contracts had to meet three criteria before they were counted as complete: the duration of the contract had to be at least 20 minutes; the criteria on the contracts specifying the nature and amount of work to be accomplished had to be met; and the contract had to pertain to the academic subject area in which academic achievement was measured. If contracts were completed which pertained to the subject area of science, but the academic achievement level of the subjects was measured for math, then the science contracts would not be counted in the study as completed contracts. The number of contracts completed by each subject was recorded directly from the original contracts which were retained at the GSC.

The dependent variable to which the number of completed contracts was related was the academic achievement level of the subjects. Their achievement level was ascertained from their results on class assignments or exams (quizzes and tests). The measures of academic achievement were those used by the teachers from whose classes the subject came. The particular measures were determined by the availability of sufficient results to be able to demonstrate any trends in the level of academic achievement. For example, the subjects from the English class contracted to work on their weekly assignments at the GSC. In addition, there was a sufficient quantity of results relating to their performance to reveal any trends in their level of achievement. Because of these factors, a measure of
performance of weekly assignments was included in the study. Both of these factors were not present for either quizzes or tests. Consequently, measures of these were not included in the study. The measure of performance which was included in the study for subjects 1 and 2 was the number of points earned on weekly assignments. A maximum of 14 points could be earned. The measure of performance for math subjects was the percentage of points earned on quizzes. The percentage of test points earned was also included for Subject 6.

The measures were collected from both the subjects and the teachers from whose classes the subjects came. An initial attempt was made to collect the data from only the students in an effort to reduce the possibility of teacher grading bias which might have arisen due to the author's apparent interest in the subjects. Unfortunately, two problems arose which caused the author to modify this method of data collection. Subjects sometimes could not remember their exact scores on class work, and often the teacher did not evaluate academic work quickly. When work was evaluated, a teacher sometimes would not inform the students about their performance.

To circumvent these difficulties the achievement measures were sometimes obtained from the teachers of the subjects. For the subjects from the math class the intervention data were obtained from the subjects while the baseline data were obtained from the teacher. For the subjects from the English class both the intervention and baseline data were collected from the teacher. The intervention data of all subjects were collected on a weekly basis. The teachers were not informed that a study was being conducted, although the principal and
school superintendent were.

A single-subject design was used. Each subject proceeded through two phases. The first was the baseline phase, a period of at least six weeks before the subjects were asked to attend the GSC more often. The second was the contract intervention phase, a period of time beginning with the first week during which subjects were asked to attend more, and ending with the termination of the academic school year. The design was a multiple baseline across subjects and teachers. Contract intervention began on four separate weeks. Subject 1 began intervention in the week beginning February 19, 1979. Subject 2 began intervention the following week. Subjects 3 and 4 then began intervention on April 9. Subjects 5 and 6 began intervention last on April 23, 1979.
Results

The results of the study showed that academic performance was significantly affected by contract intervention. The effects of intervention were apparent with four measures of performance. A summary of the obtained values for these measures can be seen in Table 1 (page 19). The first measure was the percentage of points earned on weekly assignments for the subjects from the English class, or the percentage of points earned on exams for the subjects from the math class. According to this measure, the percentage of points earned for five out of six subjects during intervention increased or remained equivalent compared to their respective scores during baseline. The percentage of points earned during intervention decreased for one subject.

The second measure was the range of scores earned on assignments and exams. This measure was feasible with the performance of four out of the six subjects. Subjects 3 and 4 from the math class could earn a ceiling of 60% on the minimum objective quizzes. With regard to the ranges of scores for the four subjects during intervention, all decreased or remained equivalent compared to ranges during baseline. The range of scores for none of the subjects increased.

The third measure was the rate of completing exams. This
Table 1
Summary of Obtained Values

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<table>
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<th>Test (T)</th>
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measure was feasible with the academic performance of subjects from the self-paced math class. The rates of all of these subjects during intervention increased or remained equivalent compared to their respective rates during baseline. The rate of completing exams decreased for none of the subjects.

The fourth measure was the ratio of weeks in which one or more exams were completed. This measure was also feasible only with the performance of subjects from the math class. As with the results from the third measure, the values of this measure for all of the subjects during intervention increased or remained equivalent compared to those values during baseline. The proportion decreased for none of the subjects.

In addition to the global effects of contracting on academic performance, the results showed specific relationships between measures of academic performance and the particular number of contracts completed. The academic performance of all subjects was affected when three contracts were completed per unit of study. When three contracts were completed per quiz by the subjects from the math class, their range of scores decreased, and the percentage of points they earned increased.

No statements can be made with regard to the relationships between one or two completed contracts and the effects on academic performance which would be applicable to every subject. However, when two or more contracts were completed each week by the subjects from the English class, the range of their scores decreased compared to the range of scores when fewer contracts were completed.
Figure 1 (page 22) shows in detail the effects of contracting on academic performance. Subject 1 from the English class was the first subject to begin contracting. Graph 1 shows the number of points Subject 1 earned each week as a function of the number of contracts completed. The number of points earned each week was obtained by calculating the mean of the number of points earned on all daily workbook pages assigned for each week. As seen with Graph 1 of Figure 1, the mean number of points earned during intervention decreased from 7.5 points during baseline to 5.2 points, an absolute decrease of 17%.

The effects of contracting on the performance of Subject 1 were also apparent with the measure of range. The number of points earned each week ranged from 1 point to 13 points during baseline. By subtracting the smallest score from the largest, a range of 12 points was obtained. Scores ranged during intervention from 3.6 points to 8.2 points for a difference of 4.6 points. The range decreased by 7.4 points (53 percentage points) from baseline to intervention. In addition, when two or more contracts were completed each week by Subject 1, the range of scores during these weeks was 2.4 points or 17 percentage points.

Subject 2 was the next to begin contracting. Graph 2 shows the number of points Subject 2 earned each week as a function of the number of contracts completed. As seen in Graph 2, scores ranged during baseline from 2 points to 12.5 points. The range was 10.5 points or 75 percentage points. Scores ranged during intervention from 4 points to 10 points. The range during intervention was 6
Figure 1. Number or percentage of points earned as a function of the number of contracts completed.
points or 43 percentage points. The range decreased from baseline to intervention by 4.5 points or 32 percentage points. In contrast to the baseline, there was an upward trend in performance near the termination of intervention. The number of points Subject 2 earned in the last four weeks appears as an asymptotic line reaching 10 points. During these last four weeks, two or three contracts were completed each week. The range of scores during this period was 1.4 points or 10 percentage points. In addition to this trend, when two or more contracts were completed each week, the range of performance was 4 points or 29 percentage points.

Two subjects from the self-paced math class were the next subjects to begin contracting. These subjects contracted to work on material related to minimum objectives. They could earn maximum scores of 60% on their quizzes regardless of their actual scores. Graphs 3 and 4 show the percentage of points earned on quizzes each week by Subjects 3 and 4 as a function of the number of contracts. The percentage of points earned was calculated by dividing the number of points earned on quizzes each week by the total number of points possible. The graphs also show the number of quizzes completed each week.

As seen in Graph 3, Subject 3 completed quizzes at a rate of .4 per week ($\frac{4}{10}$) during the baselines. The rate was calculated by dividing the total number of completed quizzes by the total number of weeks in which the subject could complete them. During intervention the rate increased to .75 quizzes per week, an increase of .35 quizzes per week. In addition to the rate measure, the ratio
of weeks in which one or more contracts was completed also increased. The pacing ratio was calculated by dividing the number of weeks in which one or more quizzes were completed by the total number of weeks in which quizzes could be completed. The ratio increased from .33 during baselines to .75 during intervention. When the subject stopped attending the GSC, no more quizzes were completed. Subject 3 completed one math quiz when a mean of 3.3 contracts were completed.

Graph 4 shows the percentage of points earned on quizzes each week by Subject 4. As seen in Graph 4, the rate at which Subject 4 completed quizzes increased from .45 during baselines to 1.67 during intervention, an increase of 1.22. In addition, the pacing ratio increased from .45 during the baselines to 1.0 during intervention. Once Subject 4 stopped attending GSC, one quiz was completed in five weeks.

Subjects 5 and 6 were the last subjects to begin contracting. As with Subjects 3 and 4, these subjects came to the GSC from the self-paced math class. Unlike Subjects 3 and 4, these subjects contracted to work on material which related to quizzes pertaining to minimum objectives as well as to other objectives.

Graph 5 shows the percentage of points earned on weekly quizzes by Subject 5 as a function of the number of contracts completed. As seen in Graph 5, the percentage of points earned on all quizzes increased from 69% during baseline to 87% during intervention, an increase of 18%. The effects of contracting could also be seen with the measures of range and rate. The range of scores decreased from 80 percentage points during baseline to 30 percentage
points during intervention, a decrease of 50 percentage points. The rate of completing the math quizzes increased from .88 quizzes per week during baseline to 1.33 quizzes per week during intervention. This is an increase of .45 quizzes per week.

Academic performance of Subject 5 was most affected when a specific number of contracts were completed per quiz. When the subject completed three contracts per math quiz, the subject earned a composite score of 87% on the quizzes. The range of these quiz scores was 10 percentage points. When Subject 5 contracted to review completed material relating to the next quiz, in contrast to actually completing the material, the subject earned scores of 90% or greater on the quizzes. This was done with the two contracts completed in the week of April 23. The range of these scores was 10 percentage points.

Graph 6 shows the percentage of points earned on weekly quizzes by Subject 6 as a function of the number of contracts completed. As seen in Graph 6, the percentage of points earned on all quizzes increased from 56% during baseline to 77% during intervention, an increase of 21%. The percentage of points earned on all tests increased from 57% during baseline to 90% during intervention, an increase of 33%. The range of test scores decreased from 50 percentage points during baseline to 0 percentage points during intervention. In addition to this, with one exception, all quiz scores in the last six weeks of intervention was 70% or above. During baseline, however, two quiz scores out of a total of eight reached 70%. Finally, when Subject 6
completed three contracts per math quiz, the subject earned 83% on the quizzes. The range of the scores on these math quizzes was 10 percentage points.
Discussion

The results show that contracting is effective in increasing the level of academic achievement of high school students. By doing this the results help establish the generality of the effects of contracting as they relate to the educational area of learning centers. In addition, the results lend support to the efficacy of the Guided Study Center as an alternative study hall.

Academic achievement is defined here by one or more of the four measures of academic achievement. Two of these measures, mean number or percentage of points earned on a weekly study unit and rate of completing exams, correspond well with the concept of achievement. One could view these as measures of quality and quantity, respectively, both of which are viewed as dimensions of achievement. The other two measures, range of scores and ratio of weeks in which one or more contracts were completed, may not correspond as well. These might be viewed as related to self management. Regardless of this, high values obtained for both measures can be seen as accomplishments. To this extent both performance measures can be considered measures of achievement.

The last measure may need further clarification. The ratio of weeks in which one or more exams are completed relates to the consistency over time in which subjects take exams. While range
allows one to measure how variable or erratic the scores of the exams are, the pacing ratio allows one to measure how sporadic the taking of exams is. The greater the value is, the less sporadic and the more consistent the behavior of the subjects are with regard to taking quizzes or tests. And while the rate relates to the mean or average number of quizzes taken per week, the pacing ratio is concerned with whether or not any performance was accomplished in a week.

For each of the four measures the level of achievement either increased during intervention or remained the same for every subject. This is true but for one exception. The mean number of points earned by Subject 1 during intervention appears to have decreased from baseline. At least two explanations can plausibly account for this. First, the subject was having personal problems which continued to worsen as the semester progressed. Those variables relating to the personal problems may have also affected academic performance. The second explanation relates to the subject's baseline performance. The performance of Subject 1 was not completely independent of the performance of Subject 2. It is likely that Subject 1 copied the work of 2. If this is the case, then comparing the performance of the subject during intervention to that during baseline is inappropriate. Given this situation, the most that could be said about the level of achievement of Subject 1 during intervention is that it is not high.

These explanations can account in general for the poor performance of Subject 1 during intervention, but they do not account
for all of the data. During the week of May 7, Subject 1 earned only five out of a possible 14 points despite having completed six contracts. It is not clear whether the subject received full credit for the weekly assignment. Subject 1 was expelled from school the following week. At the time of expulsion, the subject had not turned in all of the workbook pages related to the previous week. The author had to retrieve the workbook which included these pages. Although the workbook was then turned in to the teacher, it is doubtful whether the teacher then corrected and scored it. From the teacher's perspective there was no need to correct it since the subject would have to repeat the class during the next semester.

One other aspect of the results is not clearly represented in Figure 1. It appears that Subjects 3 and 4 answered only 60% of the quiz questions correctly during intervention. However, 60% is the maximum percentage for which they could earn credit. This is because these quizzes related to the minimum objectives which had to be met in order to pass the course. One of the subjects answered 80% of the quiz questions correctly on at least one occasion. This may have occurred in other instances with both subjects.

In addition to the measures of academic achievement which were obtained, verbal reports from teachers also indicated that the performance of some of the subjects was "improving noticeably." The teachers of Subjects 2 and 6 said that they were pleased with the progress of the students since attending the GSC. Subject 6 may be considered the exemplar of the study. An increase in the level of achievement along a qualitative dimension was most pronounced with
this subject. The math teacher stated that even the "attitude" of Subject 6 had improved considerably.

A student participant from a world history course was initially selected as a subject for the study. This student was achieving at an A level before beginning to attend the GSC. Although the semester ended before enough data could be accumulated concerning a trend in the student's academic performance during intervention, enough was gathered to indicate the maintenance of the high level of achievement.

In addition to the general effects of contracting on the level of academic achievement, the results also showed that the specific number of contracts completed was not a universal predictor of academic achievement. The achievement level increased with some subjects when only one contract was completed. The results for Subjects 3 and 6 are good examples of this relationship. For another subject the achievement level increased when two contracts were completed. As a general rule, the level of achievement increased for all subjects when three or more contracts were completed. This relationship is true particularly with the measure of range.

In attempting to predict the level of academic achievement as a function of the number of contracts completed, the implicit assumption is made that the level of difficulty of every weekly study unit is equivalent. This assumption seems generally valid for the weekly English assignments. These assignments are usually independent of each other; one assignment does not usually build upon the previous one. The assumption is not entirely true however. One of
the English assignments does appear to be much more difficult than the others. This is the assignment for the week beginning on April 9. This assignment relates to specific and nonspecific modifiers, a very complex area. The greater complexity might explain the relatively poor performance of Subject 2 during this week despite the completion of three contracts.

The assumption that the level of difficulty of every weekly study unit is equivalent may not be generally as valid for the math exams as it was for the English assignments. Study units often do build upon previous units. If one did not master a previous unit, then mastery of a later unit might be even more difficult. Because of this, it would be expected that the achievement level near the end of the semester is lower than the level earlier in the semester. To the extent that this is true the results favor the efficacy of contracting in improving performance since intervention generally continued until the end of the semester.

Caution is required when analyzing some aspects of the results. One aspect relates to the classroom contingencies which Subjects 3 and 4 contacted during baselines and intervention. During intervention these subjects were told by the math teacher that the minimum objectives must be met in order to pass the course. It is possible that the subjects completed quizzes at a high rate only because they would more quickly meet the minimum objectives. Once these were met they would be guaranteed a passing mark and would not have to do any more work for the rest of the semester. This contingency may not have been made explicit during the first baseline, and was no longer in effect during the second.
The other aspect of the results which need to be viewed with caution relates to six weeks report cards. It is possible that the level of achievement increased for some subjects only because the teachers would soon report the grades of the subjects to their parents or guardians. The Xs at the bottom of Figure 1 and above the dates indicate when the reports were sent. By scanning the six graphs one can easily see that the reports certainly did not affect the performance of all of the subjects and perhaps affected the performance of none. Grades are cumulative, so the potential influence of the reports is mitigated.

As was mentioned in the introduction, there are at least three differences between the contracting instituted at the GSC and contracting in other areas in the clinical and educational fields. First, the duration of the contracts are short, lasting no more than one class period. Second, when the center is running optimally, student staff members fill out the contracts exclusively; they do so without any managerial assistance. Third, the rewards of completing a contract are implicit and not stipulated in the contract.

With most contracting in other areas the duration of a contract is considerably longer than one hour. But one hour is both necessary and desirable for the maximum duration of contracts at the GSC. It is necessary if the center is to fit into the structure of existing school systems. It is also desirable from a self management point of view. Only a small proportion of high school students study for longer than one hour at a time. If student participants learn to contract effectively with student staff for an hour, it is not
unreasonable to suppose that these students could informally contract with themselves to complete a unit of study at home or in a classroom. Contracting skills may generalize to different locations.

The implications of the student staff successfully contracting with student participants with minimal assistance is significant. Numerous student participants can be present at the center and working on completely different tasks. Assistance can be quickly provided by the student staff upon request. The district incurs no extra cost for their service. In addition, the skills developed by the student staff in the process of contracting can be considerable.

The fact that the contracting conducted at the GSC is effective despite the absence of explicit contingencies is also significant. This is compatible with the results of Jacobson (1978) in the area of marital discord. He showed that good faith contracts are as effective as quid pro quo contracts in modifying certain maladaptive behaviors. Those characteristics of contracts which are considered essential (Stuart 1970) must be re-examined in light of recent research.

Jacobson did not minimize the importance of contingencies per se in regard to the effectiveness of contracts, nor should the evidence presented here minimize it. There are no explicit contingencies stipulated in the GSC contracts other than reviewing the completed works, but some contingencies are implicit. Passing grades in class are minimally contingent upon the completion of certain tasks, whether those tasks are contracted or not. How many students would complete any tasks without the incentive of good or at least passing marks? Other contingencies may be in effect also. Verbal praise is
sometimes contingent upon task completion. Another contingency relates to the privilege of returning to the GSC. Student participants who consistently fail to meet contract criteria because of failure to work while in the center are asked not to return to the GSC for awhile. Attending the GSC may be reinforcing for a variety of reasons; attending may be either approach or escape behavior, or both.

The results of this study and previous studies suggest the need for future research. Several areas of research would build upon the findings disclosed to date. One area of research which relates to the present study is that of replication. A replication of the effects of contracting by another person would help establish the generality and strength of the present results. Three procedural modifications of the present study might be valuable in a replication. First, the replication could include subjects who come exclusively from study hall. Positive results would lend direct support for the efficacy of the GSC as an alternative study hall. Second, a study in which the GSC staff are blind to whom the subjects are would be valuable, but difficult to engineer. Third, the addition of a measure of timeliness might be informative. One could then examine what proportion of assignments are turned in on time compared to a baseline measure.

If the effects of contracting at the GSC are confirmed, then it would be appropriate to begin to separate the effects of specific and nonspecific components of the global contract package. At least two nonspecific components of the package could be contributing to
the effects on academic achievement. These components do not relate
to the contracting process per se, but are adjunctive to the process.
The two components are the amount of attention the student participants receive at the center compared to the classroom and the amount
of time spent in the quiet study environment provided in the GSC.
If these are contributing factors to a large degree, then the effects
of the contract process per se might be negligible. The number of
contracts completed might merely covary with measures of one or both
of these components.

There are at least three specific components related to contract­ing per se which may contribute to the effects on academic achieve­ment. One is the structure provided by setting a goal and a time limit
in which to complete the goal. Another is the participation of the
student participant in setting the goal. The third is the differential
feedback provided to the student participants by the student staff in
regards to the criteria for contract completion specified on the
contract.

In applied research it is a difficult task to partition the
effective components of a treatment package. To do this at the GSC
it would probably be necessary to obtain as fine grained dependent
measures as possible. It would be desirable to observe the effects
of each contract on the particular task on which the subjects contract.
This performance can then be compared to that on tasks which were not
contracted. A special effort would need to be made to insure that
the level of difficulty of these different tasks is equivalent. In
addition, the difference in duration between contracts may need to
be examined to gain greater control.

There are other areas of research with regard to contracting that could be explored. The performance criteria specified on the contracts at the GSC usually require the student participants to complete some quantity of work. It might be valuable to determine the effects of performance criteria relating to the quality as well as the quantity of work completed. Requiring student participants to review completed work might contribute greatly to the quality of work completed. Evidence for this comes from the results for Subject 5. In the week beginning April 23 the subject contracted twice to review material relating to three quizzes.

The subject performed exceptionally well on each of the three quizzes. Research would be required to substantiate the effects of reviewing completed work on the level of academic achievement. Finally, it was mentioned above that contracting was effective in the GSC despite the lack of explicit contingencies. This does not mean that the stipulation of explicit contingencies would not be more effective than the implicit contingencies alone. There has been some evidence at the GSC which suggests that contracts that do stipulate explicit contingencies can have very powerful effects. It is an empirical question as to the relative influence of implicit versus explicit contingencies which requires further research to answer. Regardless of the future of research in this area, the results of the present research suggest that the use of contracting in learning centers can have a substantial impact on the level of academic achievement of high school students.
References


APPENDIX A

Forms Used for the Operation of the Guided Study Center
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DAILY CONTRACT FOR GUIDED STUDY PROJECT

In the next ______ minutes, I will accomplish the following task(s):

1. Task #1:
   a. Description
   b. Criterion for completion:

2. Task #2:
   a. Description
   b. Criterion for completion

After working quietly to accomplish the tasks, I will have my work reviewed.

1. Results of Task #1:

2. Results of Task #2:

If I work quietly to accomplish my task(s) and if I have my work checked before leaving the Guided Study Center, I can continue to use the Center.

   Student's Signature________________

   GSP Student Staff Signature__________

   Comments:
GUIDED STUDY PROJECT

Student Review Form

Yes  No

1. Obtained GSP pass or contract and had it signed by teacher before coming to GSP area.

2. Completed contract and had it signed by GSP staff member.

3. Arrived at GSP on time.

4. Began working on assignment within four minutes of completing contract.

5. Remained on task 90% of the time.

*6. Refrained from disturbing others. (Record each instance and explain below.)

7. Obtained feedback on the following before leaving GSP area: Daily Contract
   Student Review Form

*8. If student left GSP area for a drink, the locker, etc., he had:
   Left with a pass
   Returned within 4 to 5 minutes
   Been working for 4 to 5 minutes

Criterion: In order to continue to have the privilege of coming to the GSP area:
   a) The starred items must have a mark in the Yes column
   b) A total of six columns must be marked Yes.

Comments:

If you, as staff, observed any problems in the contract or performance, please circle which area(s) correspond:

   TASK   CRITERIA   OFF-TASK   OTHER

__________Recorded