Behavioral Contracting: The Effects of Metacontingency Contracting on Math Performance of At-Risk Students

Vernard V. J. Jones
BEHAVIORAL CONTRACTING: THE EFFECTS OF METACONTINGENCY CONTRACTING ON MATH PERFORMANCE OF AT-RISK STUDENTS

by

Vernard V. J. Jones

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
June 1994
The purpose of this study is to determine the effectiveness of behavioral contracting in providing parents with a means of assisting their child with homework from school. Following the baseline condition, the subjects were introduced to the intervention [behavioral contracting including parent(s)] one at a time to provide a concurrent check between baseline and treatment conditions.

Six students from the Kentwood Public School District served as participants in the study. All participants were between eleven and thirteen years of age. Each participant was identified by the teacher as “at-risk” based on their sustained academic performance.

Four out of six participants demonstrated that contracting was an effective means for increasing homework completion. If parent involvement was one of the variables responsible for this improvement is inconclusive. In this study, contracting had a commensurate effect on homework accuracy. Four out of six participants demonstrated a marginal or minimum to moderate increase in homework accuracy according to the data.
ACKNOWLEDGEMENTS

The author would like to express his sincere appreciation to Dr. Howard Farris for his patience and support throughout this project. The author would also like to express his gratitude to his other committee members, Michael Bahr and Richard Malott. Finally, the author thanks Mrs. Ruel and the administrators of the Kentwood Public School, Kentwood, Michigan.

This project is dedicated to all of the young Black men who strive to make a difference and choose to be a part of the solution.

Vernard V.J. Jones
# TABLE OF CONTENTS

ACKNOWLEDGEMENTS ............................................. ii

LIST OF FIGURES .................................................... iv

CHAPTER

I. INTRODUCTION ...................................................... 1

II. METHOD .......................................................... 12

  Settings and Subjects .......................................... 12

  Experimental Variables and Design ........................... 13

  Procedure ....................................................... 13

III. RESULTS ........................................................ 19

IV. DISCUSSION ..................................................... 25

APPENDIX

A. Human Subjects Institutional Review Board Approval ......... 30

REFERENCES ......................................................... 32
LIST OF FIGURES

1. A Blank Contract Used for Parent Involvement ......................... 14
2. A Blank Daily Parent Checklist Used for the Study .................... 17
3. Percentage of Homework Completed ..................................... 20
4. Percentage of Accuracy Rate ............................................. 23
CHAPTER I

INTRODUCTION

According to the data published by the United Nations Educational Scientific and Cultural Organization (UNESCO, 1988), students from Canada, France, United Kingdom, Japan and other countries, out performed those from the United States in academic achievement. In some cases the United States spends far more than any of the above named countries for educational resources (Hood, 1990). Many students from the United States scored well below those from the above named countries. Given that resources in these countries are potentially adequate for public education, what variables could contribute to this discrepancy?

Although the determinants of the type and quality of education in a society are very complex and constantly debated, some are well known and are directly embedded within the societal framework. These include variables like history and cultural practices, financial and physical resources, stages of cultural development, and what is most important, the commitment of the adults in a society to the education of themselves and their children. The value placed on education within a society may be one of the most important determinants of the quality and extensiveness of its educational system (Bowman, 1986).
If education is highly valued, participation is likely to be widely reinforced, thus setting examples for the children and establishing some basic assumptions and expectations about participation in the educational process. It is well known that commitment to education by adults expressed through modeling and general leadership will very likely lead to involvement by the younger members of a society. Similarly, if education has a lack of commitment and leadership by adults, whether at the local, state or national level, this will be directly reflected in the views of the youth, and more generally reflected in the overall quality of the educational system (UNESCO, 1988). Besides the United Nations report, many national studies have been conducted in the United States over the last decade exploring many different aspects of our educational system. The reports vary greatly in their intent and conclusions, all clearly emphasize the importance of strong societal value and commitment to education (National Commission on Excellence in Education, 1983).

Although education in a society occurs at several different levels, none is more important than the local community, for it is at this level, particularly in the U.S. that the initial commitment to education is made and includes many different components of society. These include the community at large, local institutions (church and other organizations), family units, and schools. To be successful education must have a broad base of support and must be defined as more than schools or what schools do. In communities where the quality of education is judged to be good, a priority is placed on participation with a focus on parents, family, and extended family members. Where education quality is lacking it is equally evident that weak parental
involvement in the education of their children is a critical correlate, if not a causal, variable (Williams & Long, 1972).

Major efforts to improve education in the United States have occurred at all levels of our society in the past. Currently, similar efforts are underway and are generally beyond the scope of this paper. Instead, this project will focus on the effects of a practical home-school-based procedure designed to facilitate the cooperative involvement of students, parents and teachers in the use of a well known educational procedure, behavioral contracting. Specifically, the purpose of this study is to test the effectiveness of a behavioral contracting procedure for assisting parents, teachers, and students with follow-through on commitments toward active school involvement.

Contracting has a long and varied history in many settings and has considerable success in schools (Walker, Hedberg, Clement & Wright, 1981). It has often been used as one means to increase the involvement and commitment of those involved in school-related activity. This study will seek to identify specific functional relationships in the behavioral contracting process as related to parental/school involvement.

In its simplest form, behavioral contracting, sometimes called contingency or performance contracting, is an agreement for action between two and more people. The content of the contract specifies the terms of the agreement with an emphasis on the details of the behaviors of the participants and the benefits to be gained by each person involved (Walker et al., 1981). For example, in the current project children
were to be reinforced for completing specified tasks. Parents and teachers were reinforced for their role in assisting with the child’s success in school; thus, everyone achieved a common educational objective.

As a behavioral technique contingency or behavioral contracting is used to increase or change a variety of behaviors. It is generally viewed as one of the more promising vehicles for intervention with several problems (DeRisi & Butz, 1975), these include marital problems (Tearnin & Lutzker, 1980), drug addiction, alcohol, and smoking addictions, (Paxton, 1980), self-injurious behaviors (Balaschak & Mostofsky, 1980), sleep disorders (Framer & Sanders, 1980), family counseling (Framer et al., 1980), educational tasks (Arwood, William & Long, 1974; Cantrell, Cantrell, Huddeston & Wooldrige, 1969; Esbensen, 1972; Homme, Csanyi, Gonzales, & Rechs, 1969; Williams & Anandam, 1973; Williams & Long, 1972; Yarber, 1974) and social problems (MacDonald, MacDonald & Gallimore, 1970; Stuart, 1971; Walker et al., 1981), to name a few. Contracting is a simple but highly effective technique with a clear structure designed to reduce the possibility of ambiguity by explicitly and objectively stating behavioral goals (DeRisi & Butz, 1975). Contingencies between behaviors and rewards are clearly identified in the contract, as are the criteria for performance, timelines, methods of evaluation, opportunities for adjustment, and possible penalties for failing to meet the agreed upon conditions. Finally, besides providing a highly effective framework for success of the participants, a primary benefit of contracting is the strengthening of interpersonal
relationships through increasing the accessibility of reinforcers to the individuals from their own environment (Walker et al., 1981).

In most situations, developing an effective contract is straightforward. First, the desired behavior(s) and the outcomes are discussed and a contract is developed with all participants who are involved. An agreement on all terms and conditions of the contract must be reached for it to be valid. Next, participants are responsible for acknowledging their role in the activity by signing the contract and receiving a copy for their records. DeRisi and Butz (1975) propose several components of a contact: the date the agreement begins, ends, or is renegotiated; the target behavior; the benefits or reinforcers involved; a schedule of delivery of the reinforcer; signatures of all involved; and a bonus or penalty clause. Although researchers have not employed all these components in their work, the first four are essential for minimal success.

One question that frequently arises regarding contracting is on the nature and appropriateness of using contrived reinforcement for the acquisition and management of behavior. Is this different from bribery? Sulzer & Mayer (1986), in their book on excellence in education speak clearly to this issue. They propose that the use of positive reinforcement with clearly defined contingencies is a highly desirable way of providing a consistent and fair approach to motivating children to achieve academically. Its strengths lie in a positive means to effect change in behavior. Too often, children live in settings where conditions are punitive and not supported to learn. Under conditions of threat and punishment, youngsters often rebel and exhibit
a variety of interfering behaviors that are not only disruptive to the learning process, but often allow the youngster to escape or avoid a critical learning situation. Traditionally, negative consequences have been used because they are quick and easy to do. However, negative consequences must no longer be accepted for motivating educational participation. Research clearly shows that positive consequences are more effective in motivating educational participation, such as those possibilities through behavioral contracting. Procedures with a positive focus are not only important and successful for accomplishing educational tasks, but also instrumental in developing self-confidence and self-esteem in participants (Keltikangas, 1992; Kloosterman, 1988).

As noted earlier, contracting has been successfully used to help people in a variety of settings and tasks. However, the most common reference to contracting in current literature is to its use in facilitating academic achievement (MacDonald et al., 1974) and for dealing with disruptive behavior in educational settings (Cantrell et al., 1969; Stuart, 1971; Williams & Long, 1972).

In one study Parker (1982) designed a structural environment, (Guided Study Center, GSC), to increase academic achievement. She evaluated contractual study time for sixth-grade students. The room was structurally designed to facilitate academic growth for its participants. Preceding the use of the GSC, participants negotiated a contractual agreement that specified work completion. After all of the work was completed, the participant returned to the classroom. This was the first phase. In the second phase, participants monitored the result of their performance on
assignments resulting from the GSC. Parker found that the results were, at best, marginal. Most noticeable was the variability resulting in the data. Participants displayed a higher increase in academic achievement when self-recording was done. The study, overall, lacked consistent use of contracting procedures. Similarly, the antecedent and consequences employed in the GSC were also inconsistent. For these reasons it is plausible that a natural source in the participants' environment is more capable of monitoring the participants' progress and control antecedents and consequences more consistently.

A landmark study in behavioral contracting in education, frequently cited in research literature, was done by Cantrell et al. (1969). These researchers used contingency contracting to manage the behavior of school-aged children and involved both parents and teachers in the process. Their method was primarily based on the development of reinforcing contingencies to strengthen acceptable behaviors through the systematic approximation of final goals. Their first step, after the child was referred for participation, was to interview the parent(s). Contacts with parents were primarily by phone and without follow-up. The child was accepted for participation in the study only if school personnel has been unsuccessful in dealing with the child's behavior at school. In some cases, both parents and the school had worked with the child.

The contract in the Cantrell et al. (1969) study was developed with all participants and involved identifying the area of behavior change. Their contract focused primarily on appropriate social behaviors with goals for improvements. After
six weeks of intervention, parents and teachers reported that the child’s behavior was dramatically improved. However, the child’s academic performance, as reflected by grades, showed minimal change. This observation should not be surprising, since change in grades was not the focus of the intervention. Similarly, no effect was observed for classwork, homework, and study time. This should be expected since the primary focus of the contract was social and general participatory behaviors of the student in the classroom. A more valid concern with the Cantrell et al.'s study was the failure to learn whether the child’s problem was a “can’t do” or a “won’t do” problem. Finally, the contingency was diminished by the child. To be effective, contingencies need to be controlled by someone other than the contracted person to maintain its effectiveness (Homme et al., 1969), in this case the teacher or parent(s).

Like Cantrell (1969), the MacDonald et al. (1970) study’s primary focus was on participation, particularly school attendance. Here the school counselor acted as a mediator between the school and the child. The assumption was that if the child’s attendance increased, his/her grades would improve commensurately. MacDonald et al. used verbal contracting in discussion involving the mediator and the child. Although contingency contracts can be developed verbally, a strong preference is expressed for written contracts to ensure clarity and to serve as a tangible record to guide behavior (DeRisi & Butz, 1975). The attendance counselors in the above study made verbal “deals for rewards” with the students contingent upon certain behaviors. Occasionally the “deals” were out of the control of the attendance counselor, such as
those involving new clothing, money, weekend privileges and time with friends. Results and procedures were otherwise similar to those in the Cantrell et al. study.

Baseline was decided by past attendance records and the increases in student attendance may be the results of the "deals." Although the attendance of the subjects increased, academic performance did not. No parental involvement was mentioned in the MacDonald study.

Williams & Long (1972) used contingency contracting with eighth-graders. Sometimes, it was necessary for the parents to provide the contingency, but when parents were not available, teachers took the role of the contingency provider. Participants were culturally disadvantaged students who responded positively to the contracts showing gains in rates of study, appropriate social behavior, and better grades. In a second study, Williams & Long (1972) involved parents and/or teachers with students who were academically proficient. They used contingency contracting together with another behavior program to increase motivation for the children. Unlike contingency contracting, behavior programs focused more on the teacher than student behavior. In this case the teacher formulated a classroom management plan, controlled all of the contingencies, and imposed the plan without endorsement of the students, much like a token economy system. They wanted to learn the outcome of such a program with proficient students. They learned that neither the behavior program nor the contingency contracting greatly affected proficiency in the classroom. They concluded that students who were already achieving at a high level had no motivation to become more proficient.
In the first study, they discovered that although contracting worked successfully, performance was difficult to maintain. They attributed this to the lack of parental involvement, and as such, a lack of significant environmental influences necessary to maintain lasting results. This position is consistent with that of Stuart (1971) whose research showed that the greater the level of participation in the natural environment throughout treatment, the greater the likelihood that behavior change will be maintained (Stuart, 1971).

More recently, Nock (1982) attempted to show the effectiveness of parent involvement on a contracting basis with students who were certified handicapped. She used written contracts to specific performance criterion and provided a reward for each task completed. She measured homework completion and academic improvement. The contingencies were provided by the parents after a number of points were earned, as specified by the contract. The results showed a great deal of variability and were, consequently, inconclusive. The study neglected to provide adequate reliability for the dispensing of contingencies by the parents. In some cases, there was no verification of whether the contingency was provided at all.

In summary, contracting is successful in many areas of work with youngsters, particularly in the area of school achievement; most research has focused on increased achievement or on-task behavior. In general, contracting for other than academic behaviors, either in or outside the classroom, has been minimally effective. However, most of the research has made little use of natural environmental resources, i.e., parents or significant others. Where parents were included, prior research neglected
to include them as a direct part of the contracting process. Parents were generally absent from the interactions between the child and the teacher. Thus, not all participants were working toward the same goal, nor do they all have common interest in the outcome (metacontingency). There is a clear need for additional work on the use of behavioral contracting in the educational area that includes parents directly in the contracting arrangement.

The purpose of this study is to decide if contracting can be used to provide parents with a means of helping their child with schoolwork. In this study, parents contracted to spend at least two and one-half hours weekly with their child on a school-related activity. They were also involved with the teacher to obtain information on their child’s progress in school.

In the proposed research, children were engaged in contracting with their parents and teacher. The contract specified goals achieved through a metacontingent contract between the parent, teacher, and the child for increased academic performance. The child was a participant in the development of the contract. The teacher was responsible for coordinating the contract and for collaborating with the parent and the child to find the benefits of the contract.

The independent variable was the parental involvement in the contracting process. The dependent variables were the specified changes in homework completion and homework accuracy indicated by curriculum-based measures of performance and permanent products from the participants.
CHAPTER II

METHOD

Settings and Subjects

This project was conducted in a west Michigan public school district. Six participants were selected based on teacher recommendations and student needs. Participants were selected at the end of the second of four marking periods. All of the participants ranged between 12-14 years of age, with no stipulation on race or gender. With exception for Subject Six, who met the state of Michigan’s guidelines as learning disabled, the other subjects were general education students. All of the subjects were instructed in a general education classroom, with resource support as necessary for Subject Six.

The criterion for teacher recommendation was based on that of an “at-risk” child. For this study, an “at-risk” child is any student who does below the average level of his/her current grade and curriculum placement. This may include, but is not limited to, students who are criminal offenders, runaway youths, neglected or abused children, children with poor attendance, children who display chronic school misbehavior, or children who display low school motivation (Howard E. Farris, personal communication, April 1991).
Experimental Variables and Design

The independent variable for this study is parent involvement through a behavioral contract. The contract specifies tasks performed by the teacher, parents, and students. Parent involvement included parents working with their student for a minimum of fifteen minutes. Parents were also required to contact the teacher on a regular basis and attend at least one parent-teacher conference.

The dependent variables consisted of the subject’s weekly homework completion and weekly percentage of homework received as decided by the teacher. Daily homework completion and weekly homework grades were collected from the teacher’s record book.

A multiple baseline research design across subjects was used to control for the effects of extraneous variables. Any effects of the intervention will be shown by a change across phases for each individual when, and only when, the intervention is introduced. Following the baseline condition, Subject One will enter the intervention phase. Each subject, after that, will enter the intervention phase in two-week intervals.

Procedure

A behavioral contract (see Figure 1) specifies expectations for all participants involved. Each student in the school receives an agenda with which
Contract

Effectives Dates_____ to ______

We, the undersigned parties, agree to perform the following behaviors in order to increase math achievement for ________________________________:

Student

________________ responsibilities

Student

1. Complete homework and return it to school, with a parent's signature.
2. Return progress note to school with parent's signature.
3. Carry agenda to class, and take it home daily.

________________ responsibilities

Parent

1. Work with student for 15-30 minutes daily or until homework is completed.
2. Provide feedback to teacher through notes, phone calls, or meetings as necessary.

________________ responsibilities

Teacher

1. Provide assistance and guidance for student and parent(s) as necessary.
2. Provide feedback to parents through notes, phone calls, or meetings as necessary.

Student Signature_________ ________
Parent Signature______________
Teacher Signature______________

This contract will be reviewed in four week on

______________________________

Figure 1. A Blank Contract Used for Parent Involvement.
to record grades, copy assignments and organize schoolwork. Students are required to carry their “school-wide” agenda to each class. They are also required to bring the agenda home on a daily basis. Written material for this project was developed in the agenda. The materials include progress notes, contracts, and a parent checklist.

Parents were required to work with their student for a minimum of fifteen minutes a day. Usually, parents reported working with their student for as much as thirty minutes daily. The academic school year was divided into four marking periods for which students earned grades based on their progress. Marking periods two served as baseline and qualification for the participants during the study.

The intervention occurred during the third and fourth marking periods. The contract specified tasks to be done by the participants involved. The parents were required to work with their student for up to thirty minutes a day.

Progress notes were used to monitor homework completion and test achievement on a daily and/or weekly basis. Students were required to use the progress notes to write down homework or other information daily. Any parental concerns with homework assignments could be indicated in the parent section of the agenda. If an agenda was not returned the following day, students were referred to the counseling department for established school-wide consequences. Consequences were beyond the control of the examiner.

Parent checklists (see Figure 2), were used to ensure the stability and accuracy of parental involvement. The checklist provided guidelines for tutoring such as location, setting, time spent in tutoring, and quality of tutoring.
After subjects were selected by the teacher, parents were notified and offered participation in the study. A conference was convened with parents, their student, and the experimenter to discuss fully their participation. Subsequently, each participant agreed by signing a statement of consent and a contract specifying their involvement.

The following week, the subjects were given homework on a daily basis. Parents were required to tutor their children and provide feedback to the teacher regularly. Generally, parent/teacher contact occurred on at least a weekly basis. Throughout the study participants were provided with regular feedback regarding their performance. Sometimes, feedback was given as a weekly homework grade, a test grade, or a weekly quiz grade.

It was necessary for the teacher to adjust assignments so that students were provided with instruction and practice then given the remainder of the assignment for homework. Parents were responsible for sitting with their student according to specifications of the parent checklist. Often, parents were not familiar with current math concepts but communicated with the teacher through progress notes or a phone call. Parents were required to sign their names and return the progress note to school the following day.
Dear Parent,

Date: __________
Start Time: __________
Stop Time: __________

Please complete this brief worksheet every time you work with your child. Thank you!

In what location did you study with your student?
   a. living room  b. kitchen  c. dinning room  d. bed room  e. other.__________

Describe your perception of your child's motivation.
   a. highly motivated  b. somewhat motivated  c. slightly motivated  d. unmotivated

Describe the specific activity studied with your student.
   a. division  b. multiplication  c. charts/graphs  d. other.__________

Comments:

Parent Signature __________________________

Figure 2. A Blank Daily Parent Checklist Used for the Study.
Weekly data were collected each Tuesday by obtaining participants grades, homework completion, and accuracy scores from the math teacher. Notes from phone calls and written messages were taken for antidotal data.

The reliability for parent involvement was based on the subject's report. However, verification was made by each parent on at least a weekly basis through phone conferences or visits. Although parents were provided with a daily checklist they were reluctant to complete the sheet as required. The experimenter received less than 1% of the daily checklists.
CHAPTER III

RESULTS

The graph in Figure 3 shows the percentage of homework completed during the baseline and intervention conditions for Subjects One through Six and means for homework completion for baseline and intervention conditions. With the exception for Subject Two, contracting generally greatly affected homework completion. All subjects were observed during baseline for a minimum of eight weeks. Subject One entered the intervention at week 8. Each subject after that, entered the intervention in intervals of two weeks. Subject One, consequently, contracted for 15 weeks. Each subject, after that, contracted for two weeks less than the previous subject.

During weeks 4, and 7 of baseline, Subject One completed 0% homework. This was also observed in weeks 13 and 20 during the intervention. The data for subject was highly varied from baseline to intervention.

Subject Two earned 100% on homework completion for the first week during baseline conditions. After that, this subject worked consistently until week 7, where she earned 0% on homework completion. Following week 9, Subject Two displayed extreme variability through week 15 of the intervention. For Subject Two, homework completion ranged between 0% and 100%.
Figure 3. Percentage of Homework Completed.
Subject Three maintained a consistent range in pattern for homework completion during baseline condition. With exception for week 7, which this subject earned 0% on homework completion, the data for Subject three ranged between 50% and 100%. During the intervention, the data stabilized for five consecutive weeks at 100%. Subject Three earned 66% on homework completion at week 18, followed by three consecutive weeks at 100%.

Subject Four showed a sustained effect on homework completion during baseline with data ranging between 0% and 70%. This subject entered the intervention at week 14. Following the intervention, Subject Four progressively increased the number of homework assignments completed. Subject Four earned the most noticeable increase in homework completion from baseline to intervention.

Subject Five maintained a relative consistent rate of homework completion for most of the baseline condition. With exception for weeks 3, 4, 12, and 13, this subject earned 100% on homework completion throughout the baseline condition. The data for Subject Five maintained consistently at 100% throughout intervention.

From weeks 1 through 6 of the intervention, the data for Subject Six was highly varied and ranged from 0% to 100% on homework completion. Following week 6, Subject Six’s rate of homework completion was stabilized at 100% through week 11. The data continued to vary until the subject was introduced to the intervention. With exception of week 20 of the intervention, Subject Six maintained a 100% rate of homework completion.
Figure 4 shows the percentage of homework accuracy earned by Subjects One through Six on a weekly basis, and means for homework accuracy for baseline and intervention conditions. With exception of Subjects Two and Five, subjects’ homework accuracy mean increased by 9% and 32% between baseline and intervention conditions.

The homework accuracy data for Subject One was highly varied from baseline through intervention. During baseline, Subject One earned 0% on weeks 4 and 7. Similarly, Subject One earned 0% during weeks 12, 15, and 21 during the intervention. Homework accuracy for this subject was minimally increased from baseline to intervention.

Subject Two’s homework accuracy was relatively consistent with an exception for the 0% earned at week 7. During baseline, the homework accuracy data for this subject ranged between 50% and 100%, excluding week 7. Following baseline, Subject Two earned 0% for weeks 11 and 15 of the intervention. Subject Two did not show a change in homework accuracy as a result of the intervention.

Subject Three clearly showed the most improvement following the intervention. The baseline data for Subject Three was consistently low and ranged between 0% and 70% with exception for week 11, at which point the subject was invited to join the study. Following the intervention condition, the data for Subject Three continued to vary, but ranged between 64% and 92%. The upward trend in data resulted in a mean difference of 32.8% from baseline to intervention conditions.
Figure 4. Percentage of Accuracy Rate.
For the first week of baseline, Subject Four earned 0% on homework accuracy. In the following weeks, Subject Four maintained a relatively consistent pattern of homework accuracy throughout baseline which ranged between 0% and 50%. This trend continued until the subject was introduced to the intervention condition, at which time the subject’s homework accuracy steadily increased. The mean difference from baseline to intervention for this subject equaled 9.9%.

Subject Five showed the least improvement as a result of contracting. Like Subject Two, Subject Five performed less well under the intervention condition. The data remained relatively consistent for Subject Five from baseline to intervention. With an exception for the 0% earned by this subject in the 4th and 7th weeks of the baseline, the data were relatively consistent.

Subject Six showed a 21.8% increase in the homework accuracy from baseline to intervention. For the first week of baseline, Subject Six earned 92% accuracy on homework. Following the first week, this subject’s homework accuracy rate varied between 0% and 79%. By week 10 of the intervention, the data stabilized at a consistent range between 50% and 71%. Subject Six’s homework accuracy increased considerably and averaged 79% during the intervention.

Each subject’s final grade increased between .5 and 1.2 points on a 4.0 scale. The subjects’ grades were monitored as a supporting variable. They were not directly contiguous to behavioral contracting, as the grades are inclusive of the students’ total academic performance.
Several program applications have been developed for school-wide use to improve student grades, (e.g., Sulzer & Mayer, 1986; Parker, 1982; Nock, 1982; Walker et al., 1981; Arwood et al., 1974; MacDonald, 1970), but many of them lack "doability" and practicality in general-education, and in some cases, they lack long-term effectiveness. This study relies on the simplicity of parental involvement through means of behavioral contracting.

Contracting implies a willingness of all parties involved. Each party agrees to a specified goal and follow-through based on the mutual motivation negotiated regarding the outcome goal. This study attempted to prove that when parents participate in their student's educational process regularly, students would complete homework consistently and possibly achieve at a higher academic rate.

Contingency contracting proved to be a cost-effective alternative to current methods of educational instruction for today's youth. The results presented in this study suggest that behavioral contracting had at least a minimum to moderate effect on students' academic achievement in the area of homework completion, and consequently, general achievement. There are at least two explanations for these
somewhat and less-than-overwhelming results on homework completion and homework accuracy.

One explanation and limitation of this study is the degree of consistency with which parents spent time studying with their student. Verification of parent involvement was difficult to obtain. Initially, parents were required to participate with their child and complete a daily feedback sheet. Students were required to turn in the feedback sheet at the beginning of the day; then, at the end of the day, pick up another for parents to record comments and sign. Throughout the study, less than 1% (in fact, only .63%) of the feedback sheets were returned. As a result, the feedback sheets were abandoned. This limitation generalizes into both practice and research and requires future practitioners and researchers alike to identify means for obtaining treatment integrity when contracting with parents on school issues, such as homework completion. Treatment integrity refers to the degree with which a plan is implemented as intended (Gresham, 1989). The empirical data, regarding treatment integrity, suggests that there is little evidence which support the idea that behavior change is greater under conditions of high versus low consultation. In this case, consultation was limited to the poor response of the feedback sheets. Moreover, it is uncertain the degree to which parents deviated from the original plan and still maintained effectiveness.

Two alternative methods of verifying treatment integrity were attempted in this study; behavioral interviews during scheduled parent visits and phone conferences between parents and student self-report. However, the alternative methods lacked
sufficient evidence about whether parent involvement is the result of the effect on homework completion. Similar studies have reported difficulty obtaining verification on parent involvement and treatment integrity (Cantrell, 1969; Gresham, 1989; Nock, 1982; Stuart, 1971; Williams, 1971).

Several alternatives are suggested to increase the fidelity of treatment integrity. Future researchers and practitioners may choose to include the completion of feedback sheets by parents as a requirement of the contract. In the current study's contact, parents were required to work with their student and to provide feedback to the teacher but not to complete feedback sheets. Other factors which might be considered when working with parents on school issues include the complexity of treatment for parents, the time required to implement treatment, the level of materials and resources required for treatment, and the motivation of the treatment agents (Gresham, 1989).

There are at least two other methods of reliability measures available for future investigation: on-site parental tutoring, and parent observation during tutoring. Parents could be required to work with their student after school where they could be observed and study time could be standardized across subjects; or parents might choose to have an observer in their home during study time to verify the extensiveness of their involvement.

In this study, the one variable that was clearly observable and measurable was the participation of students and teacher through behavioral contracting. How then might one explain the general trends in the participants' homework completion? The behavioral contracting may very well be the sole variable responsible for the observed
improvement in students' homework completion. Other studies confirm behavioral contracting as an effective method for obtaining students' academic improvement under similar circumstances (Arwood et al., 1974; MacDonald, 1970; Parker, 1982; Walter et al., 1981).

However, for this study it is difficult to separate parent involvement for the behavioral contracting as they are essentially the same. Thus, without valid treatment integrity to verify parent involvement, any progress observed is merely speculative. In this study, treatment integrity was attempted through a daily checklist and weekly contact; these proved to be ineffective and unreliable.

This study shows that parent involvement through behavioral contracting reasonably effects the homework completed and homework accuracy by students. Clearly, there is a need for a reliable measure of parent involvement. Without adequate treatment integrity, one might contribute the effects to behavioral contracting itself. However, other indicators, such as antedotal notes, suggest that parent’s attitude does have an impact on student academic progress. For example, one subject reported that she and her mother were “getting along better” and attributed this improved family relation to the project. She also reported she had a better attitude regarding school in general. Similar information was verified by parents and the teacher alike. Another parent reported their daughter was doing “better” at home and was showing less resistance toward authority. The strengthening of interpersonal relationships was also substantiated in a study conducted by Walker et al. (1981).
In summary, the present study learned that behavioral contracting is an effective intervention for improving homework completion and homework accuracy, with middle-school students. It is not clear whether parental involvement had a significant effect in this study. However, the results of this study does not conclude that parental involvement or behavioral contracting are ineffective interventions to increase student homework completion. It appears that at least two conditions were involved in the present study’s intervention: parental involvement and behavioral contracting. Whether it was the combination of these two factors or just one which influenced the performance of the students is uncertain. One thing is clear, nonetheless, in-school and out-of-school contracting is a simple procedure that is manageable and easily implemented. (e.g., Sulzer & Mayer, 1986; Parker, 1982; Nock, 1982; Walker et al., 1981; Arwood et al., 1974; MacDonald, 1970). It not only allows for student/teacher participation, but minimally informs parents of their child’s academic progress. Whether in-school or out-of-school, contracting is a positive influence on student academic performance.
Appendix A

Human Subjects Institutional Review Board Approval
Date:       January 29, 1993
To:         Vern Jones
From:       M. Michele Burnette, Chair
Re:         HSIRB Project Number 93-01-17

This letter will serve as confirmation that your research protocol, "Behavioral contracting: The effects of metacontingency contracting on math performance of at-risk students" has been approved after full review by the HSIRB. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the approval application.

You must seek reapproval for any changes in this design. You must also seek reapproval if the project extends beyond the termination date.

The Board wishes you success in the pursuit of your research goals.

Approval Termination:       January 29, 1994

xc:       Farris, PSY
REFERENCES


