

AN INVESTIGATION OF THE EFFECTS OF CONTINGENCY
CONTRACTING UPON ATTENTION TO ACADEMIC TASK
BEHAVIORS OF PREADOLESCENT CHILDREN
REFERRED TO A MENTAL HEALTH
CENTER FOR DIAGNOSIS
AND EVALUATION

by

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CHAPTER I

INTRODUCTION TO: AN INVESTIGATION OF THE EFFECTS OF CONTINGENCY CONTRACTING UPON ATTENTION TO ACADEMIC TASK BEHAVIORS OF PREADOLESCENT CHILDREN REFERRED TO A MENTAL HEALTH CENTER FOR DIAGNOSIS AND EVALUATION

Introduction

The evaluation and diagnosis of children's behavior is a major concern to those involved with education and mental health fields. Examples of evaluation procedures range from school report cards and parent conferences by school personnel to extensive psychoeducational evaluations by mental health centers and psychiatric hospitals.

In general, the purpose of an evaluation should be to provide relevant information and knowledge appropriate to the presenting problem, and in accord with the assessment intent. This is subject to the potential influence of a number of variables and interactions within and across disciplines and between persons with different relationships to the child. Specialists in the fields of education and mental health are often concerned with evaluation and assessment of children exhibiting what Whelan (1966) has described as excesses or deficits of certain behaviors under different environmental or stimulus conditions.

Children experiencing difficulty to such a degree as to require the services of psychologists, psychiatrists,

and special educators often evidence behaviors which are contradictory to or in conflict with behaviors associated with academic and interpersonal success. Hyperactivity, unmanageability, inattention, classroom disruption, fighting, tantruming, and academic failure are terms often utilized in describing this population, as are psychiatric terms such as neurotic, passive-aggressive, adjustment reaction to childhood, schizophrenia, character disordered, etc.

Medical, biological and neurological factors may account for a proportion of the population experiencing or evidencing difficulty. However, the majority of those children that might potentially be labeled emotionally disturbed, behaviorally disordered, or learning disabled exhibit behavior similar in kind but different along dimensions of behavioral response measures (such as frequency, amplitude, duration, intensity, and rate), and in environments which elicit and maintain appropriate behaviors of most children of similar age/grade norms.

Recently, a considerable amount of research has accrued indicating the efficacy of the application of learning theory principles to a wide variety of behaviors and in numerous environments of the child.

Background of Theory and Research

Supplying behavioral information and advising parents in the application of learning theory principles

to effect change is reported by Bernal (1969), Mira (1970), Russo (1964), and Straughan (1964) to be an effective and efficient procedure for parents to employ in managing children's behaviors. Similarly, studies by Haring and Phillips (1962), Hawkins and others (1966), Hewett (1968), and Zimmerman and Zimmerman (1962) indicate that behavior modification techniques are effective in producing significant change in academic and other behaviors of children in the classroom.

Studies by Bailey, Wolf and Phillips (1970), Cantrell and others (1969), Kroth, Whelan and Stables (1970) show that behavior modification can be used by parents and others to produce beneficial changes in children's classroom behaviors by delayed consequence at home.

Studies by Ayllon and Azrin (1954,1965) and Ayllon and Haughton (1962) have indicated the applicability of behavior modification to the restricted environments of psychiatric hospitals, while research by Tharp and Wetzel (1969) has suggested the potential of employing learning theory principles in the natural environment to alter children's behavior.

While it is evident that learning theory or behavioral approaches are being utilized to a considerable degree, in remediation and treatment of a variety of academic and behavior disorders evidenced by children, there are far fewer indications that a systematic effort is being made to assess the ability of persons responsible for

children's behavior and education to effectively consequate behavior in other than immediate environments; and especially those ultimately responsible for the child's well being, his parents.

Mental health agencies, psychiatric hospitals, schools, and other institutions expend considerable time and effort in conferencing, evaluating, and interviewing parents and others who deal directly with children in attempts to determine their relative influence on the child's past, present and potential behavior. Few attempts are made to assess this ability directly. Further, inferences, interpretations, and subjective reflections or judgments are postulated by various professional and paraprofessional personnel concerning these persons' abilities to alter the child's behavior. Varying degrees of credibility may be given to one or more assessments of the persons' abilities to change or influence the behavior, which may be of questionable value given the reliability and validity of the assessment or evaluative procedures. This seems an area deserving of research, in light of the potential value for utilization of such information in determining treatment, remediation, or educational plans and procedures for children evidencing behavior disorders and academic disabilities.

Purpose

The present study was designed to investigate the feasibility of employing a particular behavior modification

methodology, contingency contracting, to increase attention to academic task behavior of preadolescent children referred to a mental health center for diagnosis and evaluation. Further, this study was concerned with whether mental health personnel differed appreciably from parents in effecting change utilizing this behavioral change technique.

Procedure

Instructions in the application of learning theory principles were given to mental health personnel and parents who attempted to effect change in the subject's attention to academic task behaviors. Feedback to contingency managers of the effects of the modification effort was provided daily through the use of report cards and notes. Consequence, contingency arrangements and/or reinforcement procedures were determined individually by the managers according to their own value systems and in consultation with the investigator.

Hypotheses

To answer the question of whether contingency contracting could be utilized to increase attention to academic task behavior, the following null hypothesis was formulated.

Ho₁ There are no significant mean differences of attention to academic task behavior of subjects prior and subsequent to intervention.

In order to answer the question of whether mental health personnel differed appreciably from parents in effecting change using contingency contracting, the following null hypothesis was formulated.

Ho₂ There are no significant mean differences of attention to academic task behaviors of subjects managed by parents and subjects managed by mental health personnel subsequent to intervention.

Definition of Terms

Contingency Contracting: For the purposes of this study, a contingency contract consisted of an agreement or arrangement between the manager and a subject as to the consequent reinforcement to be administered contingent upon receipt of a daily report of the subject's level of attention to academic task in class.

Attention to Academic Task: Attention to academic task was defined as visual attention on academic work assigned, writing behavior by the subject, and other visible evidence indicating study behavior, such as counting, talking to the teacher about the assignment, and signaling the teacher by hand raising.

Measurement

Attention to academic task data was collected by the investigator and others through the use of time

sampling procedures. The data was analyzed using a two factor mixed design analysis of variance with repeated measures on one factor (Bruning and Kintz, 1968), Tukey's (1949) test of gaps between means, F-max tests, t-ratios for correlated variances, and correlated t-tests for mean differences within subgroups of the sample.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

Behavior modification methodologies have been utilized in altering various behaviors in numerous environments. This review is concerned with behavior modification research in the laboratory, home, and classroom environments.

Emphasis was given to those studies using natural mediators as change agents and to studies attempting to alter behavior occurring in environments outside of immediate manager proximity.

Laboratory and Home Environments Using Parents as Therapists

Recently, a number of single subject studies have demonstrated that learning theory principles can be applied by parents to ameliorate a wide range of behavior problems of children in laboratory settings. Russo (1964) reports two cases where mothers observed the therapist working with the child and applying social reinforcement for appropriate responses. The mother took over the role of therapist through a process of successive approximations as the therapist gradually withdrew from interactions with the child. Straughan (1964) reports a similar study involving a mother and daughter with the problem stated as the mother being too inhibitive. The mother observed the therapist-child

interaction and gradually moved into the playroom. The same principles were used to shape the mother's behavior as were used by the therapist with the child, that of attention to appropriate responses and ignoring inappropriate responses. Wahler and others (1965) report three cases in which mothers were trained to use behavior modification techniques to change their child's behavior. They indicated that a mother's social behaviors may function to positively reinforce her child's deviant behaviors as well as his socially acceptable behavior. Bernal (1969) used video recording and feedback to mothers in training sessions with specific instruction for management of "brat" behaviors of the child. Marked improvement was noted to occur within a 25 week period.

Hawkins and others (1966) investigated the application of behavior modification techniques by mothers in the more natural environment of the home. The mothers received instruction on how and when to interact with the child as the investigators were able to determine the consequences used by the mother that were maintaining the inappropriate behaviors of the child. The behaviors of both mother and child were recorded and the mother was able to consequence appropriate behavior by attention and social rewards, rather than reinforcing inappropriate behaviors as she had been doing previously. Zeilberger and others (1968) report a similar study in which the mother was able

to successfully modify several behaviors of her child after being given instructions in behavior modification techniques and specific instruction about how to respond to specific behaviors exhibited by her child. O'Leary, O'Leary and Becker (1967) report the results of a modification program for a six year old boy and his three year old brother who frequently engaged in assaultive and destructive behavior. Treatment was carried out in the home using the experimenter and later the mother as the therapist. The boys' undesirable behavior changed markedly as a result of a token reinforcement system and a time out from reinforcement procedure. Also, behaviors reinforced during the experimental hour generalized to other times and situations.

More recently, Mira (1970) reports the results of a behavior modification training program for parents and teachers in terms of group data. Procedures included having the parents and teachers pinpoint, record, and consequate behaviors of concern to them on advisement by the psychology staff conducting the training sessions. In 11 per cent of the cases direct parent training in the playroom was utilized, as the parents and child lived too far away to come to weekly sessions. Remaining in the training program required participants to present data records weekly on the behavior which was under modification. If three appointments were missed without effecting behavioral change, the trainee was dropped from the program.

Of the 82 cases in which a manager came to at least one training session, 39 per cent demonstrated no recorded successful modification. Mira's criterion for success was considerably more stringent than might ordinarily be employed, and, as a result, this group included cases which might be counted as therapy successes using verbal reports or questionnaires for reported success. Fifteen per cent of the managers significantly modified the presenting problem behavior and then dropped out of the training program, thus not meeting success criterion. A rate change of the target behavior at the .01 level using the Fisher Exact Probability Test was the criterion for successful modification of a behavior. Forty-six per cent of the managers who came at least once did modify at least two target behaviors of the child. Results indicated that teachers, social workers, or psychiatrists were no more successful than parents in meeting success criterion. Two other points of particular relevance were the utilization of incompatible response classes to accelerate or positively reinforce, in order to work on building appropriate behaviors, and also finding that group training was more expensive in terms of staff time than individual training or advisement by almost half.

In conclusion to the studies reviewed above dealing with single subject behaviors modified by parents or others in laboratory, home or other immediate environments, the writer is in accord with Mira's (1970) statement that

Although a valid endeavor is the exploration of new problems to which operant tools can apply, behavior therapists should begin to honestly and continually assess the effectiveness, cost and applications of their treatment in terms of the total patient population served. This would allow us to compare our procedures with other treatments, to relate success and failure to characteristics of the population and to the topographical and functional aspects of the behavior targets, and to answer questions of treatment strategy (p. 311).

Psychiatric Ward Environments

The application of operant conditioning procedures to behavior and academic problems in restricted environments has also received considerable attention from researchers in the behavioral sciences. Mental hospitals, psychiatric wards, special and regular classrooms all constitute environments in which control of and access to various portions of the environment are exercised to varying degrees in therapeutic, educative, and remedial endeavors for the populations these institutions serve.

Research by Ayllon and his colleagues is perhaps the best example of behavior modification strategies applied to psychiatric and mental health ward environments. It is representative in that the approaches utilized regular ward personnel and concentrated on behaviors and events that were of concern to those in charge of the patient's day to day care and welfare, such as nurses, aides and attendants. Ayllon and Azrin (1964) in an attempt to modify a socially desirable response, obtaining eating

utinsels appropriately, of 43 long-term adult, female mental patients found that instructions to the patients had no enduring effect unless accompanied by reinforcement. Further, it was found that reinforcement was not effective unless the reinforcement procedure was accompanied by instructions that specified the basis for the reinforcement. This in effect constituted what Homme (1966) has referred to as contingency contracting, an agreement or arrangement to dispense reinforcement contingent upon desired behavior. Another interesting point of the above study made by Ayllon was that it was necessary to arrange consequences in addition to providing instructions to ward attendants, as well as patients, to assure appropriate behavior. This was provided through audio recording feedback plus observational records. A further finding was that a slight delay of reinforcement (food) was a very effective consequence to employ in altering behavior.

In an earlier study by Ayllon and Haughton (1962) operant conditioning principles using food as a reinforcer were applied to control the behavior of 45 chronic schizophrenic patients. Approximately 50 per cent of the ward population was selected as subjects because of a history of refusal to eat. Spoonfeeding, tubefeeding, intravenous feeding, and electroshock had been utilized prior to the experiment in attempts to overcome this problem. The first experimental procedure consisted of keeping the

nurses away from the patients at mealtime. The meal was called and thirty minutes thereafter the dining room door was locked. This time was later reduced to twenty, fifteen, and five minutes respectively. Eating behavior rose to about 80 per cent, dropped off slightly as the time was shortened, then rose again to the previous level. In a second experiment with 38 patients, 13 of which were classified as "eating problems," a behavioral response using pennies as tokens to be dropped into a can to gain admittance to the dining room was employed. This behavior was quickly acquired by all patients. Additionally, the experimenters noted that verbal behavior of patients increased concerning how to acquire the tokens and how to gain access to the reinforcement.

A third experiment was conducted to determine if patients with eating problems could be conditioned to cooperate to obtain food. Seven more problem eaters were added to the experimental group, and two were dropped from the previous group. The second experiment was continued until the new subjects had acquired the behavioral response of dropping a token into the can to gain admittance to the dining room. The cooperative or social response condition required two patients to push buttons simultaneously at opposite ends of a long table. This action activated a buzzer and light in the middle of the table and resulted in dispensement of a token to each of the two patients

making the response. When this behavior was apperceived by the subjects as required to earn a token to gain access to the reinforcer, two lines quickly formed at each end of the table. Additionally, patients shaped each other and engaged in increased verbal behavior under this stress condition.

The experimenters concluded that social reinforcement in such forms as coaxing, persuading, and feeding the patient tend to shape patients into eating problems so they are conditioned to eat only with assistance. When refusal to eat was no longer followed by social reinforcement, the patients soon started eating unassisted.

In a later experiment, Ayllon and Azrin (1965) conducted a series of six experiments utilizing tokens as conditioned reinforcers to bridge the delay between response and reinforcement. The first experiment studied the influence of the reinforcement procedure on the patients' choice of jobs from among those within the hospital but outside the ward. The second experiment studied the absolute level of performance on these jobs. The third experiment studied performance of jobs on the ward. In the fourth experiment, the relationship between the token reinforcers and the back up reinforcers was discontinued. Experiment five studied the choice of on-ward jobs. The final experiment studied the effect of the reinforcement procedure and of staff interaction on choice of off-ward jobs. Reinforcers were those natural to the hospital environment and were

determined by observing what the patients did, or tried to do. Examples ranged from what patients hoarded under mattresses to requests for special interviews with social workers.

After eighteen months of preliminary work, reinforcers were grouped into six main categories: privacy, leave from the ward, social interaction with staff, devotional opportunities, recreational opportunities, and commissary items. These were subcategorized and assigned values in terms of cost in number of tokens required in accordance with popularity or desirability as evidenced by the patients' behavior in attempting to attain them. Token exchange was available three times per day for 45 minutes.

Subjects were 44 female mental patients with a mean chronological age of 51, who had been hospitalized for approximately 16 years. Most were diagnosed as schizophrenic, were not receiving therapy, and approximately half were receiving tranquilizers on a maintenance dosage.

To summarize, the results demonstrated that reinforcement procedure was effective in maintaining desired behavioral performance. In each experiment, the performance fell to almost zero when the established response-reinforcement relationship was discontinued. Reintroduction of the reinforcement procedure restored performance rapidly and maintained it as long as the reinforcement procedure was in effect. This was true for both on and off ward job

behaviors. The procedure for reinforcement was to provide tokens contingent upon the desired behavior and to allow exchange of the tokens for a variety of reinforcers. The subjects' performance was decreased when (1) this response-reinforcement relation was disrupted by delivering tokens non-contingently, (2) by discontinuing the token dispensement but allowing access to the reinforcers, and (3) by discontinuing tokens for previously reinforced responses while providing tokens for a different, alternative response. Further, patients selected and performed the job that provided the larger number of tokens when reinforcement was available for more than one assignment.

In conclusion, the experimenters utilized reinforcers that were selected by observation of what the patients liked. Access was made contingent upon appropriate behavioral responses (job performance). Eight patients who evidenced no naturally occurring behavior other than self-care were relatively unaffected by the reinforcement procedure. The experimenters suggest that adjustive behavior might have been created with these patients if the experimental procedure had been instituted earlier when some behavior patterns were still intact. The token procedure eliminated the need to discover what reinforced the patient when the response occurred. It was only necessary to deliver the tokens contingently and allow the patient freedom to exchange them for a wide variety of different reinforcers.

The author of the study states that this system has been adopted by Spradlin at Parsons State Hospital with retarded children, by L. Krasner at a Veterans' Administration Hospital with adult male psychotics, and by H. Cohen with delinquent boys at the National Training School for Boys.

Classroom Environments

Token systems have recently been utilized for application in various classroom environments with the majority of researchers reporting positive results.

O'Leary (in press) in an extensive review of the literature, evaluated the effectiveness of token programs with respect to their probability of modifying four broad classes of behavior: (1) decreases in disruptive behavior, (2) increases in study behavior, (3) increases in academic achievement, and (4) changes in behaviors not selected as targets for change effort.

Decreases in disruptive behavior were noted to have occurred in the study by O'Leary and Becker (1967) from an average of 76 per cent in the baseline period to an average of 10 per cent during the two month token period. The subjects were seventeen emotionally disturbed children, and the procedure involved dispensement of a rating to each child every twenty minutes in class.

In a more complex study, O'Leary and others (1969) investigated the application of a token procedure in combination with other forms of behavioral control, that of

verbal and written rules clarification, four structured half hour academic sessions in the afternoons, and a praise and ignore condition. After the last condition, that of praise and ignore, in addition to the other two conditions, a token system was instituted for five weeks, then withdrawn, then reinstated for two weeks. O'Leary indicated that all of the procedures except that of the token system were not effective in reducing disruptive behavior.

O'Leary and Drabman (in press) report that "In brief, different investigators repeatedly report significant decreases in disruptive behavior associated with token programs (Kuypers, Becker & O'Leary, 1968; Martin, Burkholder, Rosenthal, Tharp & Thorne, 1968) (pp. 8-9)." Additionally, O'Leary reports that increases in study behavior were noted to occur upon contingent dispensement of reinforcement by Bushell, Wrobel and Michaelis (1968), by Walker, Mattson and Buckley (1969) in combination with other treatment procedures, and by Broden and Hall (1969) in a reading class of seventh and eighth grade students. The study by Walker indicated that the acquired behavioral gains generalized somewhat to other environments and situations.

Hewett (1968) utilized six classrooms for emotionally disturbed children to evaluate the effects of systematic reinforcement procedures upon arithmetic achievement, reading achievement, and task attention. The classes were matched for intelligence, age, reading ability, and

achievement level. The procedure involved dispensing tokens contingently to one class for the entire year, a control class with no token procedure, two classes with control procedures the first semester and tokens the second semester, and two classes with the experimental procedure employed the first semester and control conditions for the second semester. There was a significant difference in favor of the experimental procedure over the control conditions on arithmetic and task attention. Additionally the two control/experimental classes significantly improved in arithmetic and task attention during the second semester over the control group. One confounding result was the finding that the subjects who received the experimental procedure during the first semester evidenced a significant increase in task attention when the token program was discontinued for the second semester. O'Leary and Drabman (in press) note that the study by Hewitt (1968) stands in contrast to many other experiments which show that appropriate behavior generally declines unless steps are taken to maintain the behavior as the token system is withdrawn.

In five experiments reviewed by O'Leary and Drabman (in press) results indicated that

. . . a token reinforcement program will significantly increase desired behaviors of a wide variety of students. However, a detailed examination of the behavior of individual children reveals that some children fail to change with the introduction of the token program (Kuypers, Becker & O'Leary, 1968; Zimmerman, Zimmerman & Russel, 1969). Nonetheless, one should not conclude that such children's

behavior could not be influenced by a token program; the investigator may not have known or had control of the appropriate variables (p. 14).

Other behaviors noted to change with the utilization of token systems were enhanced attendance, desire for additional or increased opportunities to earn reinforcement, and bartering behaviors among subjects.

Environments Outside of Immediate Manager Proximity

Recently, a number of experiments have been conducted in which natural mediators, such as parents or other significant persons in the lives of the subjects, attempted to alter target behaviors occurring in environments outside of immediate manager proximity and potential manipulation. These studies are similar in that delay of reinforcement is usually greater than in most token systems with back up reinforcers, and often natural events or reinforcers are dispensed on a contingent basis (Tharp and Wetzel, 1969).

. . . reinforcement is frequently dispensed by people articulated into the individual's social environment. . . . These people control reinforcers, in that they may either administer them or withhold them. Depending upon the pattern of control, they may modify the behavior of the individual by strengthening it or weakening it. Thus it may be seen that the potent reinforcers for an individual ordinarily lie within his natural environment, and these reinforcers are controlled by those people to whom he is naturally related. The task of contingency management comes to be the reorganization of the patterns of reinforcement control exercised by the people of an individual's environment (p. 3).

The remainder of this review will be concerned with those studies fitting the above general description and

involving "contingency contracting," so called after Homme's (1966) work using written contracts with adolescents to spell out the reinforcers that were to follow completion of academic tasks.

Martin and others (1968) conducted an experiment with nine subjects ranging in age from 13 to 18, who had been placed on homebound instruction programs because of misbehavior in school. Two token procedures with back up reinforcers were first employed, in addition to notes taken home to exchange for previously agreed upon reinforcement. The authors report that there was a great deal of variability in the behavior categories employed for measurement, with only one child making steady appropriate behavioral and academic gains. Class size was then reduced to five subjects and the class was reorganized for the second semester employing five general levels of graduated behavioral tasks. Generally, the higher the level a student achieved, the more reinforcing events and stimuli were made available. These general levels of behavioral tasks were printed in handbook form and used as a guide for appropriate behavior and resultant consequences.

In addition to the above, a sustained effort to reinforce parents was employed, as well as arranging the environment to provide a maximum of extensive social reinforcement not ordinarily provided in any child's life. Decreases in disruptive behavior were noted in three subjects

and steady increases in classroom work by four of the subjects.

Although the procedures utilized in the study above may be criticized in terms of cost/efficiency ratios, it does indicate the feasibility of employing more natural reinforcers potentially available in the child's environment contingent upon desired behavior.

McKenzie and others (1968) conducted an experiment using grades as tokens and allowances as back up reinforcers in the modification of academic behaviors of ten students in a learning disabilities class. Recess, teacher attention, free time activities, special privileges, and eating lunch with classmates were made contingent upon completion of academic assignments. Parents were also told to praise good grades. Each child's academic level was assessed with the Durrell Reading and SRA Achievement tests, and assignments were made weekly using workbooks and programmed materials in reading, arithmetic, spelling, penmanship, and English composition and grammar. The teacher or an aide recorded the number of responses completed and number correct for each child in all five areas assigned each day.

Observation was conducted on attention to academic work during the morning, that of reading and arithmetic. Each child was observed once every three minutes for attending or non-attending behavior. The above constituted baseline procedure.

When the pay for weekly grades procedure was instituted, parents were instructed to administer allowances contingent upon grades. That is, a parent might pay ten cents for each A in all subject areas, subtract ten cents for each incomplete, and pay five cents for each B or C grade. Maximum earnings varied from \$.70 to \$3.50. Parents were also told to make the pay procedure each week an important event. Further, access to obtaining money from other sources or means were curtailed. In addition to the above, certain specifications were made to the child regarding how some of the money was to be spent.

Results indicated an increase in attending to reading from a median of 68 per cent over the baseline to 86 per cent during the pay for grades period. Attending during the arithmetic period increased from a median of 70 per cent during baseline to 86 per cent in the pay period. Trend analysis was conducted to assure that these differences were not due to a gradual increase over the baseline condition. Percentages of attention were determined by dividing the number of possible attending intervals by the number of observed attending instances times 100.

The authors report that after observation was terminated, the subjects' percentages of correct responses and incompletes indicated that the academic behavior maintained for the rest of the school year. It is unfortunate that none of the academic data was presented. The authors also

indicate that the subjects were working successfully one to four levels above their starting levels at the end of the academic year. This was not elaborated further and the data was not presented. No test was made as to the effect of the back up reinforcer by making money available noncontingently, as it was felt that this could adversely affect the subjects' academic progress.

A further interesting aspect of the above study was that six of the ten subjects returned to regular class and the pay for grade system, with some modification, was continued.

The authors conclude that grades as tokens is a feasible and efficient procedure to be employed by teachers, and that this system can open communication and cooperation between parents and teachers for the educational advancement of the child.

Cantrell and others (1969) report utilizing written contingency contracts between children in the first through eleventh grades in public school with parents and teachers dispensing reinforcers. After careful analysis of the target behavior, abilities of the child, present and potential reinforcers, possible incompatible behavioral response classes, and possible punishment or extinction procedures, specific and individual contracts were employed to modify the child's behavior. Often these involved both school and home and were consequated in both environments.

While the authors present a concise and lucid delineation of contingency contracting procedures and principles, only two examples are cited, with no data presented to substantiate the reported positive effects of contingency contracting.

Ayllon, Smith and Rogers (1970) report the results of a single subject experiment on the behavioral management of an eight year old child diagnosed as suffering from school phobia. Techniques involved having the mother withdraw the rewards of staying at home, a home-based contingency system to reinforce school attendance, and a punishment procedure for refusal to attend school. Prompting and shaping were used first to initiate school attendance. This was discontinued and school attendance returned to zero. Arrangements were then made for the child to leave for school at the same time as her mother and siblings instead of remaining with the mother for an hour if she refused to go to school. Attendance remained at zero. A system was then established for each child so that they could earn candy each day and a special weekend activity for going to school voluntarily each day. Further, if the subject failed to accompany her siblings voluntarily, she was to be taken to school fifteen minutes later by the mother. The subject continued to refuse to go to school voluntarily, but, accompanied each day by her mother, went willingly. The final procedure involved having the mother leave ten

minutes before the children and meet them at the school with a reward. If the subject failed to accompany her siblings to school, the mother then had to walk back home (about a mile), get the subject, and walk back to school with her. The subject remained at home the first day, and the mother had to fetch her. At home that evening the subject was given a piece of candy and praised for attending school, but no star for voluntary attendance was given. The second day she attended voluntarily. The third day she stayed home again, resulting in the mother having to return home and back to school in the rain. The mother literally pushed the subject out of the house, ignored excuses, and hit the subject with a switch. Thereafter, the subject attended school each day with no further difficulty. All formal procedures were dropped within a month, and school attendance continued at 100 per cent for the following three quarters. In addition, academic performance increased markedly as did cooperative social behaviors.

Ayllon et al. (1970) notes that a psychodiagnostic evaluation was performed prior and subsequent to the behavioral intervention, and that the examiner indicated that the school phobia may have been treated successfully, but that it did not "mean anything" to the subject in that the examiner still felt that the subject had deviations in the area of maturity, aggression, reality testing, and extreme concern over sexuality and men.

Kroth, Whelan and Stables (1970) conducted an experiment to determine if parents could be taught to apply behavioral principles successfully in the home environment to effect their child's growth in academic and nonacademic competencies in the classroom.

Subjects for the study were five emotionally disturbed junior high students attending a special class based on the Structured Approach (Haring and Phillips, 1962; Whelan, 1966). Baseline data was accumulated for four weeks and consisted of number of pages read correctly, number of correct arithmetic problems completed, a gym class score, percentage of scores for accuracy in history and literature assignments, and ratings by the teacher of interpersonal adequacy and personal care or hygiene.

A group parent conference was held after the baseline was completed. Behavior change principles and applications were explained, as was the report card system. Instructions were given on preparing and displaying graphs at home, and the parents were requested to select two areas to consequence (in accordance with their own value system) from the report cards they were to receive each day. The teacher was not informed of the categories selected for consequence. Two more parent conferences were held during the four week experiment for additional information on the application of behavioral principles.

Results indicated a statistically significant gain at the .031 level for the areas selected for consequence by the parents. A decrease in non-selected areas was noted, but was not statistically significant. The authors conclude that the procedure used would be of value to teachers in enlisting parental involvement in their child's academic and social advancement in his educational environment.

Bailey, Wolf and Phillips (1970) in a well controlled series of three experiments, found that home-based reinforcement could effectively alter school rules violation and study behavior of seven predelinquent boys.

In the first experiment, five boys, age 11 to 15 years, who had been placed at Achievement Place, a home-style treatment program, and who were declared dependent-neglected by the court, served as subjects. They all had a history of behavior and academic problems. Rules of the class were written on the board and explained to the subjects on the first day of a special class for the five boys. Two observers collected data on rules violation and study behavior utilizing a ten second interval observation technique for the two thirty minute class sessions each day. The subjects brought a report card from home each day to be marked yes or no for rules violation and studying all period. During the first phase, the teacher marked all cards with a "yes" regardless of behavior. These were exchanged for privileges of snacks, TV, and permission to go outdoors.

During the second phase, yes or no was marked on the cards contingent on less than 10 per cent of the data reflecting rules violation and 90 per cent or more study behavior.

One "no" in any of the areas was to result in loss of the privileges at home. In the third phase, dispensement of privileges was non contingent on obtaining yes or no marks on the report cards. The fourth phase involved the yes or no condition being reinstated.

Results indicated that study behavior deteriorated from 85 to 35 per cent of the time over the baseline period, while rules violations went from zero to more than 60 per cent. The "yes" only condition resulted in improved study behavior and decreased rules violations, but soon study behavior decreased even further than in the baseline, while rules violations increased more than 25 per cent. On the first day of the contingent reinforcement condition all subjects lost privileges. Thereafter, study behavior remained close to 95 per cent and rules violations were less than 5 per cent. Again when reinforcement was made noncontingent, the study behavior rapidly decreased and rules violation increased markedly. The reinstatement of the contingency arrangement brought study behavior back up to 90 per cent and rules violation down to less than 2 per cent. Production of problems worked covaried with study behavior performed and the Pearson correlation coefficient was +0.64 for this relationship. However, the number of

problems correct decreased from 92 to 73 per cent.

The second experiment was designed to determine if the above effects could be obtained in a regular public classroom, and used a single subject; a fifteen year old boy with a history of disruptive behavior. A ten second time sampling technique was used by an observer from the back of the class. After a baseline of nine days, the subject took a daily report card to the teacher every day after class to be marked yes or no for acceptable use of class time, assignment completed on time, overall good behavior, and homework and quiz scores. If all were marked "yes," snacks, TV, and permission to go outdoors were allowed. Four days of noncontingent reinforcement were then instituted, and then the yes or no condition reinstated for approximately 24 days.

During the nine days of baseline, study behavior ranged from 45 per cent to 3 per cent, with a mean of approximately 24 per cent. Use of the daily report card resulted in an immediate increase in study behavior with a mean of approximately 80 per cent. On the two days when the report card was not utilized, study behavior dropped to 25 per cent and 10 per cent respectively. Upon reinstatement of the report card and the yes or no condition, study behavior began at 80 per cent, decreased for three days, was marked "no" one time, went up to almost 100 per cent the next day and remained very high thereafter.

In the final experiment, another youth from Achievement Place with a history of disruptive classroom behavior was used in a single subject study. The same procedure and methods were employed as in the previous experiment, with the addition of a fading procedure using the report card only on Tuesdays and Fridays of each week. The card could, however, be marked yes or no for the previous day or days in all categories.

Results indicated that during baseline study behavior ranged from 40 to 60 per cent. With the report card condition, study behavior maintained above 90 per cent. When reinforcement was made noncontingent by the subject not having to take the card to class, study behavior decreased to the baseline level. Upon reinstatement of the daily report card marking contingency, study behavior again rose and maintained at approximately 90 per cent. With the fading procedure employed for five weeks, study behavior averaged 87 per cent.

In discussion of the above results, the authors point out that the decrease noted in number of problems correct in the first experiment might be due to progressively harder problems or an adaptation of the subjects to the fact that the number of problems correct was not differentially reinforced. They further point out that the relative strengths of the reinforcers were not assessed.

Bailey et al. (1970) concludes that although contingency contracting has been shown to be a viable technique to employ, whether or not parental cooperation can be gained without great trouble is a critical question.

Many parents of delinquents care little for the academic achievements of their children or may be home so little of the time as to be unable to monitor or deliver reinforcers after school. Others may profess great interest but may simply not be consistent or systematic enough to make home-based reinforcement work. Clearly this procedure, then, requires the full cooperation of parents or guardians to disperse reinforcers at home.

Attempts to apply the procedures outlined in the present experiments will no doubt yield evidence on this point. Only when this further research is carried out will the practical implications for the widespread application of the technique be known (p. 233).

The final research to be reviewed is reported by Tharp and Wetzel in their book, Behavior Modification in the Natural Environment (1969). They reported on the results of the Behavioral Research Project, a federally financed project of the Office of Juvenile Delinquency and Youth Development of the Department of Health, Education and Welfare, to provide children's services to a wide and sparsely populated area. The intervention technique employed was that of contingency contracting, utilizing consultation between project staff and those with natural relationships to the child experiencing difficulty in school, at home or in the community. Most often, this consisted of a rearrangement of the consequences or

reinforcement, usually made contingent on acceleration or deceleration of one or several specified behaviors. Records were kept on 163 behaviors of 77 subjects. Of the total, the authors report 135 contained enough pre- and post-intervention information to use in an outcome evaluation. Baseline rate was determined by dividing some measure of the number of responses by time units. The change in rate was represented by expressing the rate during intervention as some percentage of the rate during baseline. The data was subsumed in four categories of baseline rate percentages, that of 0 per cent baseline, indicating that the behavior did not occur during intervention; less than or equal to 50 per cent of the baseline rate, greater than 50 per cent of the baseline rate, and equivalent, indicating that there was no change of the behaviors during intervention. Behavior categories were home-chore failure, poor academic work, disruptive behavior, defiance, fighting, truancy and tardiness, property destruction, bedwetting and soiling, and stealing.

Of the 135 cases reported, 21 were reported in the 0 per cent classification, indicating that the behaviors did not occur once intervention was begun. Ninety-nine cases were less than or equal to 50 per cent of the baseline rate. A behavioral rate of greater than 50 per cent of the baseline was reported for ten subjects, while no change from baseline rate was reported for five subjects.

The largest number of interventions (40) were for home-chore failure, with 36 cases of poor academic work, and 20 cases of disruptive behavior. It is interesting to note that by far the greatest percentages of successful change were also in these categories.

Two follow up ratings by the home mediators were conducted. Both indicated that, in general, behaviors were considerably improved, including non-intervened behavior. Possible explanations were expressed by the authors.

. . . successful strengthening of incompatible responses would reduce some non-intervened behaviors; instituting positive reinforcement control would reduce the problems occasioned by counteraggressive behaviors. We hypothesize that one important effect may be establishing the mediator, his associates, and more desirable peers as the sources of positive reinforcement, thus making more civilized people the child's models. Furthermore, the correction of the intervened problem behaviors might allow the targets to move into the general pattern of social control which makes most of us want to do what we should do (p. 176).

While the above results may be criticized on a number of points, including lack of reversal designs, no reported reliability measures, no statistical measures of significance of change in rates and the inability to hold other possibly relevant variables constant, Tharp and Wetzel's research represents the most extensive attempt to date of the application of a behavior modification technique, that of contingency contracting, to a broad variety of behaviors in the natural environments of the child.

In summary, the research reviewed has indicated the feasibility of employing learning theory principles to ameliorate behavior disorders in children at home and in the laboratory. Further, academic gains, increases in study behavior, and decreased disruptive behavior in the classroom have been attained utilizing direct intervention procedures, token systems with back up reinforcers, and contingency contracting with reinforcement dispersed by those within the natural environment of the child, and nonproximal to the child and the environment in which the changes occurred. Additionally, these procedures have been shown to be effective when applied in controlled environments of mental hospitals, psychiatric wards, and home style treatment facilities.

There are, however, numerous questions yet unanswered by the applied research of behavior modification, and a number of these have been pointed out in the review.

In general, cost/efficiency ratios and relationships in regard to manager training are still in question, as is the feasibility of employing the acceleration of general behavioral response classes incompatible to socially undesirable behaviors. The application of contingency contracting procedures by hospital or ward personnel to alter behavior in remote environments has only recently begun, with no research noted utilizing children as subjects.

CHAPTER III

METHOD AND PROCEDURES

Introduction

This study investigated the effectiveness of employing a particular behavioral treatment methodology, that of contingency contracting, to increase attention to academic task behaviors of preadolescent children diagnosed, or with the potential of being diagnosed, as emotionally disturbed.

Further, this study was concerned with whether parents of children of this same population differed appreciably from mental health personnel in effecting change utilizing this technique. The investigation involved comparing attention to task scores of children attending a diagnostic classroom on a day patient basis at a mental health center with attention to task scores of children admitted as inpatients. This chapter introduces the design and methodology used in the experiment.

Design

The following null hypotheses were postulated to investigate the problem stated above:

Ho₁ There will be no significant mean differences of the subjects' attention to academic task behaviors prior and subsequent to intervention.

Ho₂ There will be no significant mean differences on attention to academic task behaviors of subjects managed by parents and subjects managed by mental health personnel subsequent to intervention.

The two groups comprised of day patient subjects managed by parents and inpatient subjects managed by mental health personnel were compared on attention to academic task behavior scores over baseline and treatment conditions. A two factor mixed design analysis of variance with repeated measures on one factor was utilized for the comparison. In addition, F-max tests for homogeneity of variance, Tukey's (1949) test of gaps between means and subsequent t-tests, and t-ratios for testing differences between correlated variances were employed.

The independent variables of the above hypotheses were the reinforcement operations applied by the managers prior to manager status. The dependent variable was the subjects' mean attention to task scores prior and subsequent to intervention.

Subjects and Setting

The subjects of the study were selected from the total number of preadolescent children admitted to either a day patient or inpatient evaluation program of a large

midwestern mental health center. The samples were comprised of fifteen children admitted as inpatients and fifteen children admitted to a particular day program for more rapid evaluation.

As a part of both programs, the children attended classes two hours each morning and for an hour and a half in the afternoon, for a total of approximately twelve to fifteen hours per week.

The inpatients attended one of two classrooms, usually dependent upon age, for evaluation of their classroom behavior and academic abilities. This opportunity was also utilized for remediation and furthering the child's academic skills during the course of his hospitalization.

The fifteen subjects of the parent managed sample attended another diagnostic classroom for two weeks primarily for an educational and behavioral evaluation intended to determine the most appropriate available services and treatment to meet the needs of the child.

Both the inpatient and day patient children attended a scheduled activities period of forty-five minutes in the morning three or more times per week. Day patients occasionally attended an afternoon activities period with inpatients if their parents were late or transportation home at 2:30 each day could not be arranged.

Patients of both programs ate lunch and had rest period from 11:30 to 1:00 on the ward four or five days

per week, and on some Fridays field trips or picnics were arranged.

The length of stay for inpatients varied from six to 120 days during the course of the experiment. The length of stay for children admitted to the day patient program was limited to two weeks by the short term nature and intent of the program.

Criteria for Subject Selection

When the study was begun, children admitted to the day patient and inpatient classrooms became potential subjects for the experimental procedure. Five days after admission, attention to academic task data was analyzed to determine if the potential subject attended below an 80 per cent level over the baseline period. If this mean percentage score was below 80 per cent, the patient automatically became a subject of the study. If an admission was made other than on Monday, baseline consisted of not less than four days of attention data, and in several instances was collected over a longer period of time.

Methodology

Attention to academic task behavior was defined as visual attention on academic work assigned, writing behavior by the subject, and other visible evidence indicating study behavior, such as counting on fingers or an abacus, talking with permission to the teacher about the

assignment, and signaling a desire for help from the teacher by hand raising. All other behaviors were scored as non-attention.

Data Collection Method

Data was collected by the investigator, teachers, and other personnel assigned to the children's unit of the mental health center. Twice each morning and once each afternoon, when the children were seated at their desks, tables, or study carrels working on academic assignments, the observer entered the classroom unannounced and sat where he could observe all the children from a vantage point. Usually this was found to be in close proximity to where the teacher was seated. When data collection was completed for the sample period, the observer usually left the room. Sometimes the observer stayed and talked to the teacher, worked with one or several children, or performed other classroom tasks. On occasions when the teacher collected data, the sampling procedure was begun when all the children were working on academic assignments at their desks. If interrupted, observation and recording were discontinued and then reinstated after the interruption.

Data collection was often preceded by a verbal statement from the teacher to the students to the effect that they all had academic assignments they should be working on for a specific or undefined amount of time and reinforcement.

Time Sampling Procedure

A time sampling technique was employed by the observers to obtain the data from which mean percentages of attention to task scores were derived. This consisted of having the observer note the occurrence or nonoccurrence of the subjects' attention to task behavior at the end of five second intervals in rotational order 34 times per subject per sample; i.e., at the end of the first five seconds of the time sample, the first subject was observed and recorded for attention or nonattention. At the end of the second five seconds the second subject was observed and recorded for attention or nonattention, then the third subject, and so on. The first subject was observed five seconds after the last subject, until a total of 34 observations per subject was obtained. The number of instances of attention to task was then divided by the number of instances of possible attention (34) for each subject. This dividend times 100 represented the subject's percentage of attention for the sample.

The above procedure was altered two weeks after the study was begun, as it was determined to be too time consuming to be utilized by teachers and other observers when more than three children were being observed in one classroom. Time sampling took 8.5 minutes using three samples per subject per day. With three children being observed, this amounted to 25.5 minutes per day per class.

The following procedure was then instituted and continued for the duration of the study.

The number of intervals were reduced from 34 to 20 per subject and the observer was instructed to look up and note attention behavior around the class in rotational order every fifteen seconds; i.e., when the observation period began, every fifteen seconds the observer would look up and around the classroom noting which children were attending. He then marked the record form accordingly with this information for each child in the first interval. When fifteen seconds had elapsed from the first observation, the same procedure was repeated for the second interval, and so on until twenty observations and intervals were completed. Percentage of attention was computed as in the first procedure.

The two procedures were compared to determine if attention to task percentage scores differed appreciably using the two procedures simultaneously on the same subject. This was determined by comparing percentage differences obtained by two observers using the two procedures during the same observation time sample. Differences ranged from 7 per cent to zero, indicating that the two procedures yielded closely similar percentage scores when other factors were held constant. This does not imply that both procedures were equal in reliability and accuracy of the sampling technique to represent the subject's true attention to

academic task behavior. It was felt that the first procedure would be a more accurate representation due to more intervals and therefore more behavior samples. Additionally time between observations continued to lengthen as subjects were added, thereby increasing the amount of time overall on which the samples were based. This advantage was also the major deterrent to employing the procedure by teachers and others with a limited amount of time available for observing and recording attention to task behavior of several students in different classes three times per day.

Reliability

Reliability was determined by the percentage of interobserver agreement of two observers recording attention simultaneously throughout one of three observation periods. Interobserver agreement ranged from 79 per cent to 100 per cent, with a mean of 90 per cent agreement between four observers and the investigator computed eleven times over the course of the study.

Instructions and Procedures of the Experimental Condition

If a patient's attention to academic task was below 80 per cent over the baseline period, he became a subject of the investigation.

A three by five inch card with the child's name, teacher, and mean attention to task over the baseline period was prepared by the investigator. The card also had

the words Contingency Contract and Manager with space available for filling in this information. The reverse side was ruled off into five sections and labeled Day 1 through Day 5. Space for recording the subject's daily mean percentage of attention and space for recording what action was taken each day by the manager followed those designations on the card.

After the baseline procedure, if the subject was an inpatient, the investigator went to the nurses' station after the evening staff arrived and asked one or another of the staff members to institute a contingency contract with the subject to try to increase his attention to academic task behavior. This was described as attending and working on academic assignments rather than looking around the class, talking to others, and generally engaging in behaviors contradictory to good academic performance.

These managers were instructed to provide reinforcement contingent upon the subject's daily level of attention to task performance that they deemed appropriate. Reinforcement was described as rewarding the subject for doing better on his academic task behavior. Examples were given by the investigator as illustrations of what might be potential reinforcers or reinforcing events. The following is typical of such instruction: "T____, I'd like you to see if you can get M____ to attend to his schoolwork more in class. He has been attending on an average of about

60 per cent over the last five days. (Potential manager is shown the report card.) What I'd like you to do is make an arrangement or deal with M_____ to reward him for attending to and working more on lessons assigned by the teacher rather than looking around the room, talking, and doing other things when he should be working on his assignments. You can use whatever you think he would work for, like buying him a coke, playing a game with him, or letting him watch his favorite TV program. If you want to buy him a coke or something, I'll pay you back for it. Talk to him before he goes to class tomorrow and write down the deal on the card where it says contingency contract. Put the card in the envelope with my name on it. I'll pick it up, fill in the percentage each day, and get it back to you."

The same general procedure was utilized for instructing the parent managers, with the omission of the statement concerning reimbursement. The instructions were given by the investigator when the parent or parents arrived to take the child home on the day that the subject's baseline was completed.

The parents were told to return the report card each day to the investigator or the child's teacher.

If report cards were not returned, new report cards and/or notes were sent everyday they were not returned, asking that the report card be returned each day and reporting the child's task attention score of that day compared to

his baseline mean score. If the card was returned incomplete (i.e., without the contingency contract specified or with no indication of action taken each day) notes were written on or included with the report card requesting the information.

Report card delivery to managers was effected by the most expedient method available. Effected delivery to inpatient managers was assumed with more confidence generally than with parents, since a note could be left in the nurses' station, while often the only means of message delivery to parents depended upon the investigator contacting them before they left with the child, and the child giving his parent(s) the note or report card.

The study was conducted over a five month period, from the second week of March through the second week of July, 1971.

With the exception of two day patients, only subjects with data available for a minimum of four days of baseline and four days of intervention were included for analysis at the completion of the experiment.

CHAPTER IV

ANALYSIS AND EVALUATION

Purpose

The purpose of this study was to investigate the effectiveness of employing a behavioral treatment methodology, contingency contracting, to increase attention to academic task behaviors of preadolescent children admitted as inpatients or day patients to a mental health facility. Further, this study was concerned with whether parents differed appreciably from mental health personnel in effecting change utilizing this technique.

The two groups, comprised of day patient subjects managed by parents and inpatient subjects managed by mental health personnel, were compared on attention to academic task over baseline and treatment conditions. A two factor mixed design analysis of variances with repeated measures on one factor (Bruning and Kintz, 1968) was utilized for the comparison. Additionally, F-max tests for homogeneity of variance, Tukey's (1949) test of gaps between means and subsequent t-tests, and t-ratios for testing differences between correlated variances were employed. Further, a subanalysis was performed using correlated t-tests for mean differences.

The independent variables were the reinforcement operations applied by the managers prior to manager status. The dependent variable was the subject's mean attention to

task score prior and subsequent to intervention. The .05 level of confidence was set to determine significant differences.

Two Group Pre and Post Intervention Analysis

To answer the question of whether contingency contracting could be utilized to increase attention to academic task behavior, the following null hypothesis was formulated.

Ho₁ There are no significant mean differences of attention to academic task behaviors of subjects prior and subsequent to intervention.

In order to answer the question of whether mental health personnel differed appreciably from parents in effecting change using contingency contracting, the following null hypothesis was formulated.

Ho₂ There are no significant mean differences of attention to academic task behaviors of subjects managed by parents and subjects managed by mental health personnel subsequent to intervention.

To test hypotheses 1 and 2, a two factor mixed design analysis of variance with repeated measures on one factor was employed. The repeated measure was mean attention to academic task prior and subsequent to intervention. This analysis yielded three F values, an F for conditions, which was the two groups, inpatient and outpatient, an F

for trials, which was baseline and intervention, and an F for interaction of trials by conditions.

TABLE 1
ANALYSIS OF VARIANCE SOURCE TABLE

Source	Sum of Squares	df	Mean Square	F	p
Total	8529	59	-	-	-
Between Subjects	4721	29	-	-	-
Conditions (Groups)	183	1	183	1.129	>.05
Error _b	4538	28	162	-	-
Within Subjects	3808	30	-	-	-
Trials (BL vs. INTV)	1016	1	1016	10.262	<.005
Trials X Conditions	3	1	3	.030	>.05
Error _w	2789	28	99	-	-

The F value for conditions was 1.129, which was not significant at the .05 level of confidence, indicating that there were no significant differences in variance overall between the two groups.

The F value for trials was 10.262, which indicated that there was a significant difference on attention to task behavior subsequent to intervention beyond the .005 level of confidence, thus rejecting H_{01} .

The F value for trials by conditions interaction was .030, which was not significant at the .05 level of confidence, indicating that there was no significant interaction between trials and conditions. H_0 was thus retained as there were no statistically significant differences in variance between the two groups (conditions) and no significant interaction between baseline and treatment conditions of day patient or inpatient groups.

To test within the significant F value found for trials, Tukey's (1949) test of gaps between means and subsequent t-test were employed for mean differences between baseline and intervention of the inpatient group and the day patient group (Figure 1). A mean difference of 8.36 or above was required for the .05 level of confidence. It was found that the inpatient group exhibited a mean difference of 8.60 between baseline and intervention which was accepted as a statistically significant difference at the .05 level of confidence, while the day patient group mean difference of 7.86 was below the t value of 8.36 needed for the .05 level of confidence. The direction of the differences for both groups was found to be in favor of the intervention procedure by examination of the mean scores of both groups for the baseline and experimental conditions (Table 2).

TABLE 2

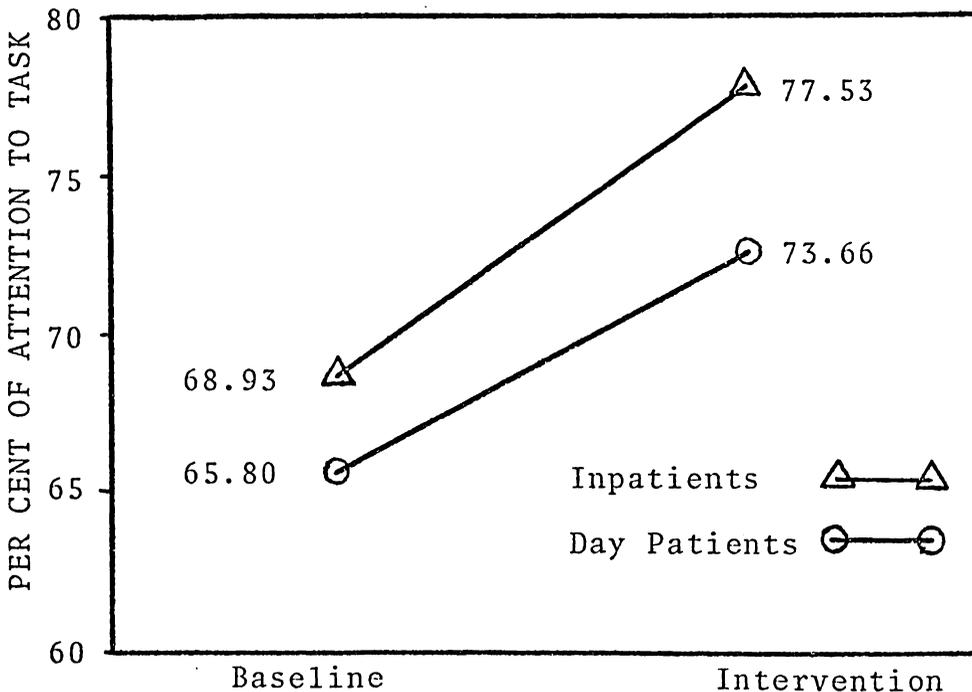
MEANS, MEAN DIFFERENCES, AND t-VALUES NEEDED
AT THE .05 LEVEL OF SIGNIFICANCE

Group	Baseline	Intervention	Mean Difference
Inpatient	\bar{M} 68.93	\bar{M} 77.53	MD = 8.60*
Day Patient	\bar{M} 65.80	\bar{M} 73.66	MD = 7.86

*with $df = 30$, $t .05 = 2.042$, $\sigma_{dm} = 4.11$
a difference $\bar{s} = 8.38$ needed for $p < .05$

FIGURE 1

COMPARISON OF INPATIENT AND DAY PATIENT MEAN ATTENTION
FOR BASELINE AND TREATMENT CONDITIONS



Comparing Variances of Inpatient and Day Patient Groups

As previously mentioned, an F value of 1.129 was generated in the analysis of variance for conditions (groups), which was not significant at the .05 level of confidence, indicating that there were no significant differences overall between the variances of the two groups. To determine if there was homogeneity of variance between the two groups over the baseline condition and homogeneity of variance between the two groups over the treatment condition, F-max tests were used. An F of 1.24 was the result of the F-max test between the two groups over baseline condition, and an F of 1.34 resulted from the F-max test between the two groups over the treatment condition. Neither were found to be significant at the .05 level of confidence.

Changes in Variability

In order to determine if there were statistically significant changes in variance between the baseline and treatment conditions for the inpatient group and between the baseline and treatment conditions for the day patient group, two t-ratios for differences between correlated variances were computed. A t-ratio of .92 was obtained from the computation for the difference between variances of the inpatient baseline and treatment conditions, and a t-ratio of 1.95 was obtained from the computation for the difference between variances of the day patient baseline and treatment conditions. Neither were found to be

significant at the .05 level of confidence.

Post Hoc Subgroup Analysis

It was determined that the inpatient mean attention scores were significantly different subsequent to intervention. The day patient mean attention scores, while not significantly different at the .05 level of confidence, were in the direction of the treatment condition. A subanalysis of both groups was undertaken in an attempt to ascertain the source of those differences.

Inpatient Subanalysis

The inpatient group was apportioned into six subgroups (Appendix E), dependent upon the nature and extent of information on each subject's report card.

- A. those with no contingency contract written on the card
 - 1. those with no contingency contracts, but with action taken written on the card
 - 2. those with no contingency contract and no action taken written on the card
- B. those with contingency contracts written on the card
 - 1. those with contingency contracts and action taken written on the card
 - 2. those with contingency contracts without action taken written on the card

The following hypotheses were formulated to test for differences among the subgroups;

- Ho₁ There are no significant mean differences on attention to academic task scores between baseline and treatment conditions of the subgroup (B) with contingency contracts written on the report card.
- Ho₂ There are no significant mean differences on attention to academic task scores between baseline and treatment conditions of the subgroup (A) with no contingency contracts written on the report card.
- Ho₃ There are no significant mean differences on attention to academic task scores between baseline and treatment conditions of the subgroup (B₁) with contingency contracts and action taken written each day on the report card.
- Ho₄ There are no significant mean differences on attention to academic task scores between baseline and treatment conditions of the subgroup (B₂) with contingency contracts, but without action taken written on the report card each day.
- Ho₅ There are no significant mean differences on attention to academic task scores between baseline and treatment conditions

of the subgroup (A_1) with no contingency contract, but with action taken written on the report card each day.

H_{o_6} There are no significant mean differences on attention to academic task scores between baseline and treatment conditions of the subgroup (A_2) with no contingency contract and no action taken written on the report card.

Correlated t-tests were used to determine if mean differences between baseline and treatment conditions were significant at the .05 level of confidence for each of the six subgroups respectively (Figures 2,3,4). Those t-scores that were found to be significantly different at or beyond the .05 level of confidence were for subgroups B, B_1 , and A_1 , thus rejecting H_{o_1} , H_{o_3} , and H_{o_5} of the inpatient sub-analysis. Examination of the baseline and treatment means of subgroups B, B_1 , and A_1 indicated differences in favor of the treatment condition.

FIGURE 2

COMPARISON OF INPATIENT SUBGROUP WITH NO CONTINGENCY CONTRACTS WRITTEN TO INPATIENT SUBGROUP WITH CONTINGENCY CONTRACTS WRITTEN.

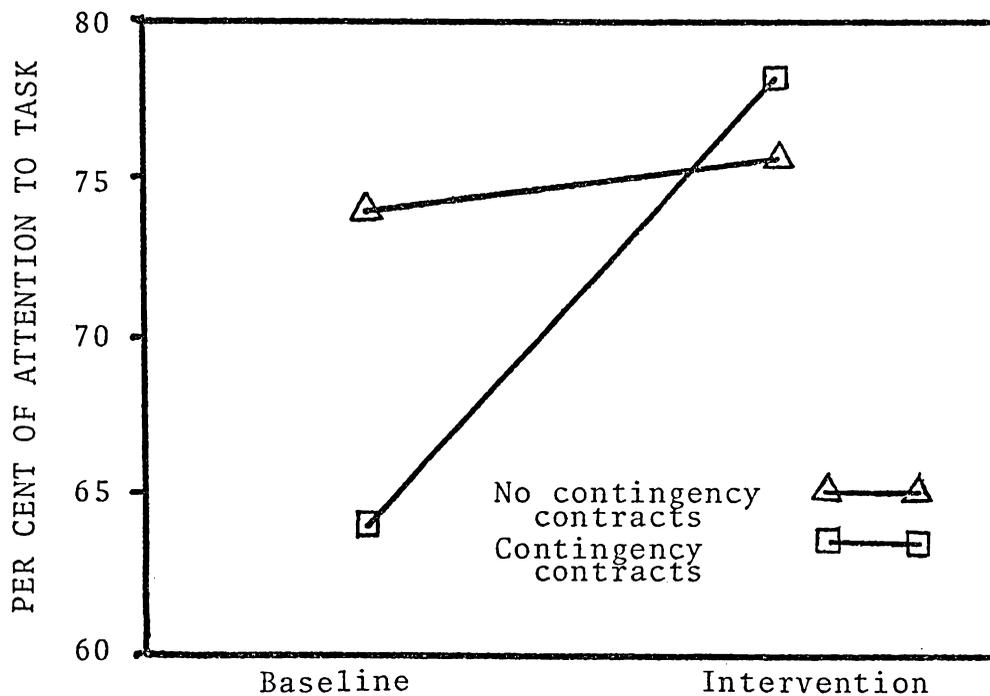


FIGURE 3

COMPARISON OF INPATIENT SUBGROUP WITH CONTINGENCY CONTRACTS AND ACTION TAKEN WRITTEN TO INPATIENT SUBGROUP WITH NO CONTINGENCY CONTRACTS AND NO ACTION TAKEN WRITTEN

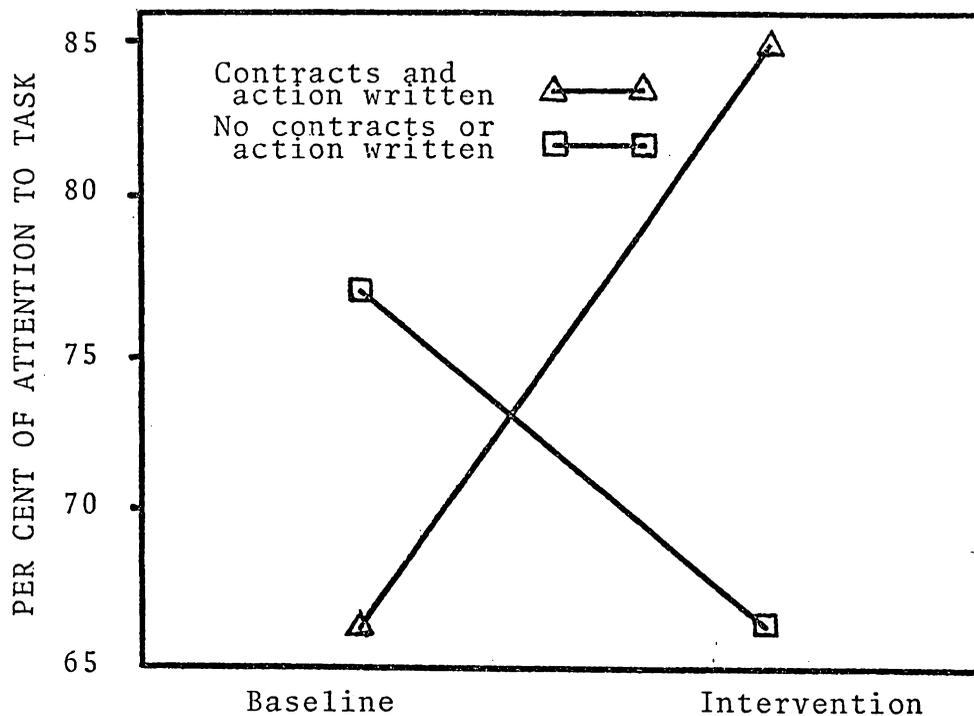
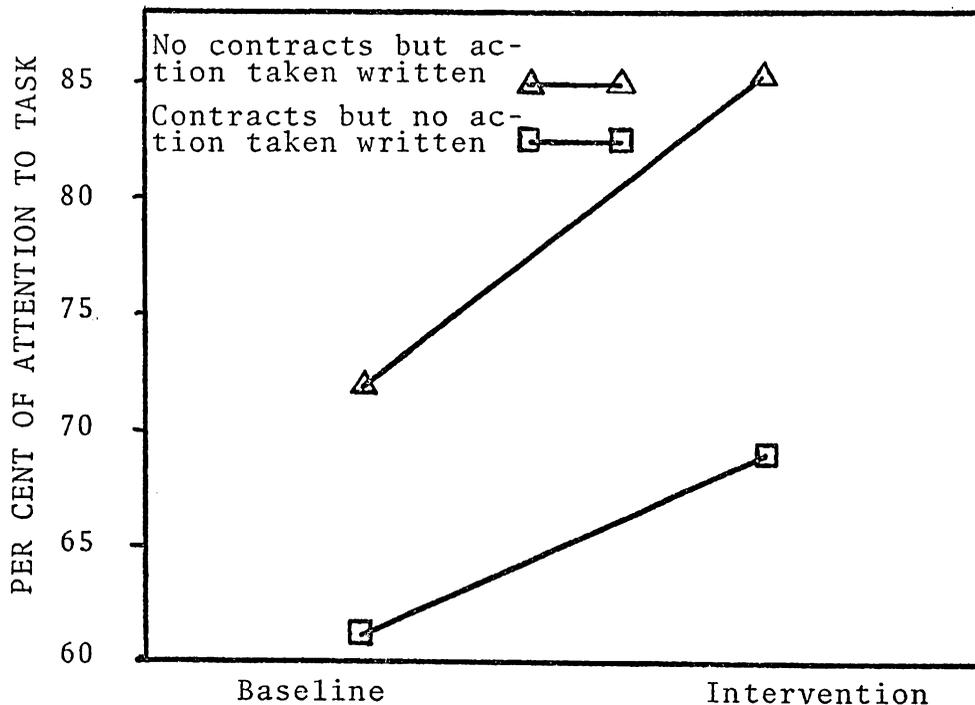


FIGURE 4

COMPARISON OF INPATIENT SUBGROUP WITH NO CONTINGENCY CONTRACTS BUT WITH ACTION TAKEN WRITTEN TO INPATIENT SUBGROUP WITH CONTINGENCY CONTRACTS BUT NO ACTION TAKEN WRITTEN



Subjects Excluded from the Subanalysis

Two inpatient subjects were excluded from the subanalysis because their report cards were lost. A visual examination of the graphs and means for the two subjects (Appendix A) indicates that Subject 2 improved on mean attention to academic task behavior over the treatment condition, while Subject 7 showed little if any mean improvement.

TABLE 3
INPATIENT SUBGROUP ANALYSIS USING CORRELATED
t-TESTS FOR MEAN DIFFERENCES

Subgroup	Baseline \bar{M}	Treatment \bar{M}	Mean Difference	df	t	p
A	74.33	75.83	1.50	5	.22	>.05
B	64.00	78.14	14.14	6	3.68	<.05
B ₁	66.25	85.00	18.75	3	2.92	<.05
B ₂	61.00	69.00	8.00	2	.43	>.05
A ₁	71.66	85.33	13.66	2	5.02	<.05
A ₂	77.00	66.33	10.66	2	1.35	>.05

Day Patient Subanalysis

The day patient group was first separated into two groups, (A) those with report cards returned, and (B) those with no report cards returned. The subgroup with report cards returned was then divided into three subgroups.

A₁ those with no contingency contracts written

A₂ those with contingency contracts written

A₃ those with action taken written on the card

The following hypotheses were formulated to test for differences among the day patient subgroups:

Ho₁ There are no significant mean differences on attention to academic task scores between baseline and treatment conditions

- of the subgroup (A) with report cards returned.
- Ho₂ There are no significant mean differences on attention to academic task scores between baseline and treatment conditions of the subgroup (B) with no report cards returned.
- Ho₃ There are no significant mean differences on attention to academic task scores between baseline and treatment conditions of the subgroup (A₁) with no contingency contracts written on the card.
- Ho₄ There are no significant mean differences on attention to academic task scores between baseline and treatment conditions of the subgroup (A₂) with contingency contracts written on the card.
- Ho₅ There are no significant mean differences on attention to academic task scores between baseline and treatment conditions of the subgroup (A₃) with action taken written on the card.

Correlated t-tests were then utilized to determine if mean differences between baseline and treatment conditions were significant at the .05 level of confidence for each of the five subgroups (Figure 5,6,7).

TABLE 4

DAY PATIENT SUBGROUP ANALYSIS USING CORRELATED
t-TESTS FOR MEAN DIFFERENCES

Subgroup	Baseline \bar{M}	Treatment \bar{M}	Mean Difference	df	t	p
A	68.40	78.30	9.90	9	2.67	<.05
B	60.60	64.40	3.80	4	.43	>.05
A ₁	70.00	75.16	5.16	5	1.07	>.05
A ₂	66.00	83.00	17.00	3	6.91	<.05
A ₃	67.75	78.75	11.00	3	3.66	<.05

FIGURE 5

COMPARISON OF DAY PATIENT SUBGROUP WITH REPORT CARDS
RETURNED TO DAY PATIENT SUBGROUP WITH NO
REPORT CARDS RETURNED

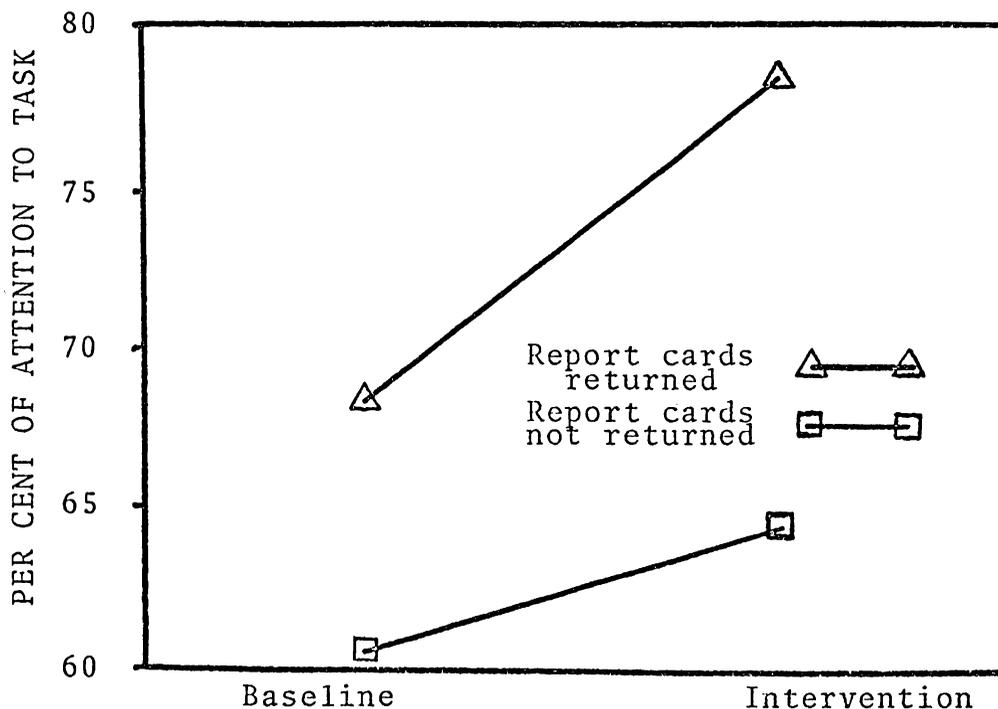


FIGURE 6

COMPARISON OF DAY PATIENT SUBGROUP WITH CONTINGENCY
CONTRACTS WRITTEN TO DAY PATIENT SUBGROUP WITH
REPORT CARDS RETURNED, NO CONTINGENCY
CONTRACTS WRITTEN

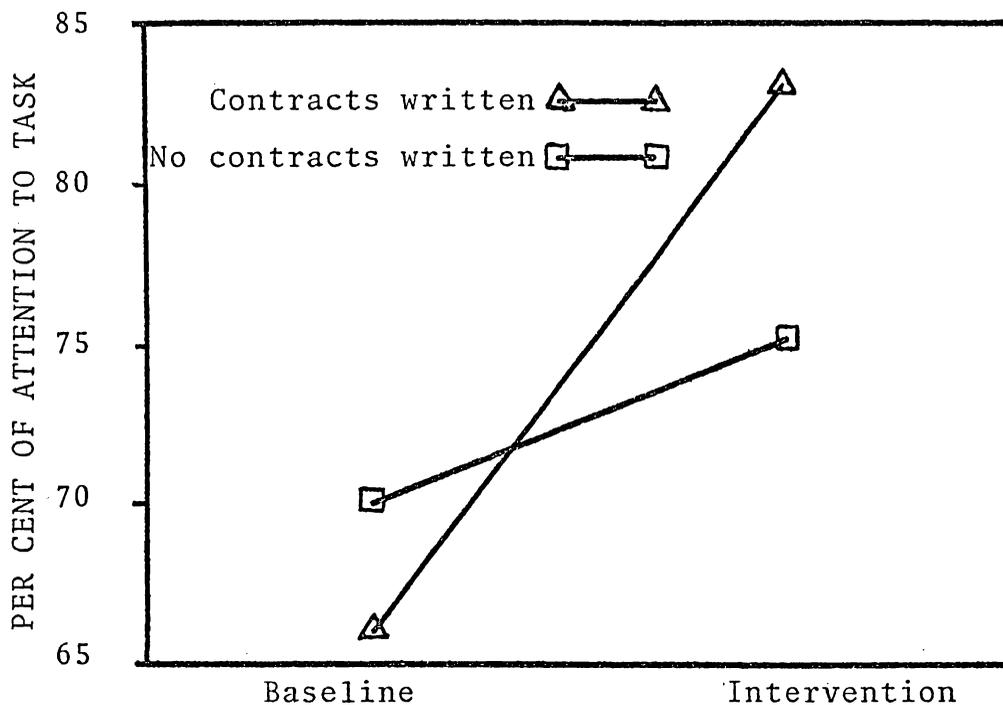
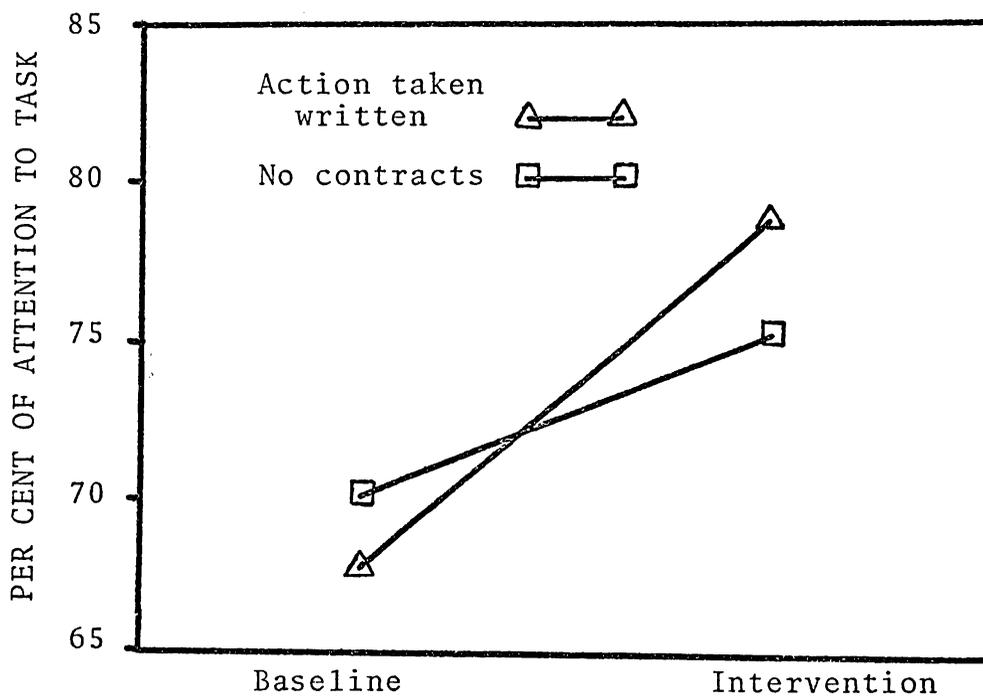


FIGURE 7

COMPARISON OF DAY PATIENT SUBGROUP WITH ACTION
TAKEN WRITTEN TO DAY PATIENT SUBGROUP
WITH NO CONTINGENCY CONTRACTS WRITTEN



Those t-scores that were found to be significantly different at or beyond the .05 level were subgroups A, A₂, and A₃, thus rejecting H₀₁, H₀₄, and H₀₅ of the day patient subanalysis. Examination of the baseline and treatment means of subgroups A, A₂, and A₃ indicated differences in favor of the treatment condition.

Summary of Results

This study investigated the feasibility of employing contingency contracting to increase attention to academic

task behaviors of preadolescent children admitted as inpatients and day patients to a mental health facility. In addition, this study investigated whether parents differed appreciably from mental health personnel in effecting change using this technique.

The two groups, comprised of day patient subjects managed by parents and inpatient subjects managed by mental health personnel, were compared on attention to academic task behavior scores over baseline and treatment conditions. A two factor mixed design analysis of variance with repeated measures on one factor yielded an F value for trials (baseline versus treatment) significant beyond the .005 level of confidence, indicating a significant difference in favor of the treatment condition.

Tukey's (1949) test of gaps between means and subsequent t-test revealed a statistically significant difference between baseline and treatment means of the inpatient group above the .05 level of confidence. The difference between the baseline and treatment means of the day patient group was not significant at the .05 level.

Variances were compared between the day patient group and the inpatient group prior and subsequent to intervention using F-max tests. They were found not to be significantly different at the .05 level of confidence. To determine if there were significant changes in variance between baseline and treatment conditions, t-ratios for

difference between correlated variances were computed for both the day patient and the inpatient groups. Neither were found significant at the .05 level of confidence.

A post hoc subanalysis of the inpatient group using correlated t-tests for mean differences revealed significant differences at or above the .05 level of confidence for the subgroups with contingency contracts and/or action taken written, and for the subgroup with no contingency contracts, but with action taken written.

A post hoc subanalysis of the day patient group using correlated t-tests for mean differences revealed significant differences at or beyond the .05 level of confidence for the subgroup with report cards returned, for the subgroup with contingency contracts written, and for the subgroup with action taken written.

Discussion

The questions of this study were concerned with the effectiveness of employing contingency contracting to increase attention to academic task behavior of children referred to a mental health center for diagnosis and evaluation. Whether parents and mental health personnel differed in effecting change utilizing this technique was also investigated. The following is a discussion of the results obtained.

The analysis of variance indicated that contingency contracting was associated with significant change in

attention to academic task behavior when compared to the baseline condition of the sample. This result indicated that parents and mental health personnel could effect change in emotionally disturbed children's attention to academic task behavior in the classroom by the use of contingency contracting. The test of gaps between means revealed that although the change in behavior was significant for the sample as a whole, the parent managers did not effect a significant change as a group.

In view of these findings and the relatively small amount of time needed for instructions to managers, contingency contracting could be considered an effective technique to employ to alter children's attending behavior in the classroom. Further support of the effectiveness of contingency contracting resulted from the post hoc subanalysis. The post hoc subanalysis of the parent managed group data resulted in the finding that when the parents returned the report cards with a notation that a specific contingency contract had been arranged with the child or that specific action had taken place, the children improved the attention to academic task behavior over baseline performance. The finding that managers who took action were associated with children who improved significantly on attention to academic task behavior was also true for the inpatient group. It was found that six of the nine inpatient managers were associated with subjects significantly

different in favor of the treatment condition, while five of the fifteen parent managed subjects evidenced significant change in favor of the treatment condition. This was confounded, however, by the finding that mental health personnel sometimes comanaged children.

The question of why some managers failed to instigate the treatment condition (as evidenced by the lack of contingency contracts and action taken written on the report card or failure to return the report card) was not discernable by this investigation. Bailey et al. (1970) mentioned this question, and concluded only that manager cooperation was seen as a necessity to effect behavioral change using contingency contracting. The point made by Ayllon and Azrin (1964) that it was necessary to arrange consequences in addition to providing instructions to assure appropriate behavior by contingency managers is probably the key to why some managers took action. It is possible that following instructions and altering patterns of reinforcement to produce behavioral change in children was associated with past and potential reinforcement for mental health personnel by the nature of their job function. Conversely, the parent group may have previously experienced considerable negative reinforcement in connection with report cards of their child's classroom behavior and also in connection with advisement on altering their child's behavior. Providing reimbursement and effecting more

manager contacts with the inpatient manager group may have been differentially reinforcing to the various managers.

Limitations

A limitation of the study was the inability of the investigator to hold constant the amount of time and number of contacts within and between managers of the two groups and the investigator. The investigator spent a total of approximately 15 to 45 minutes over approximately three to four contacts with each manager of the inpatient subjects, and approximately 15 to 25 minutes over one to three contacts with the managers of the day patient subjects. Efforts were made to keep these factors equitable, but much less time and fewer contacts between the investigator and parent managers was the rule rather than the exception for the day patient group.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study investigated the feasibility of employing a behavior modification technique, contingency contracting, to increase attention to academic task behavior of pre-adolescent children referred to a mental health center for diagnosis and evaluation. This study was also concerned with whether mental health personnel differed appreciably from parents in effecting change using this behavioral technique.

Methodology

Two groups, comprised of day patients and inpatients, were compared on attention to academic task behavior over baseline and treatment conditions. Instructions in the application of behavioral principles were given to parents (day patient managers) and mental health personnel (inpatient managers) who were to attempt to effect change in the subjects' attention to academic task behaviors. Contingency arrangements and reinforcement procedures were determined individually by the managers according to their own value systems and in consultation with the investigator. Feedback was provided to the managers through the use of report cards and notes.

Criteria and Sample

Beginning in the second week of March and continuing through the first week of July, 1971, attention to academic task data of children admitted to the day patient and in-patient classrooms was analyzed to determine if the potential subject(s) attended below an 80 per cent level over a minimum of four days in class. If this mean percentage score was below 80, the patient automatically became a subject of the study.

Data Collection

Attention to academic task data was collected by the investigator and other mental health personnel through the use of daily time sampling procedures.

Hypotheses

In order to answer the question of whether contingency contracting could be used to increase attention to academic task behavior, the following null hypothesis was tested:

Ho₁ There are no significant mean differences of attention to academic task behavior of subjects prior and subsequent to intervention.

In order to answer the question of whether parents differed appreciably from mental health personnel in effecting change using this technique, the following null hypothesis was tested:

Ho₂ There are no significant mean differences of attention to academic task behavior of subjects managed by parents and subjects managed by mental health personnel subsequent to intervention.

A two factor mixed design analysis of variance technique with repeated measures on one factor, a test of gaps between means, F-max tests, and t-ratios for correlated variances were used to test the above hypotheses using mean attention scores for baseline and treatment conditions of the two groups.

Results

The analysis of variance design yielded an F value significant beyond the .005 level of confidence for mean differences between baseline and treatment conditions for the sample as a whole, thus rejecting Ho₁. The F value for conditions (groups) and the F value for interaction of trials (baseline and intervention) by conditions was not significant at the .05 level, thus Ho₂ was retained. The test of gaps between means and subsequent t-test revealed a statistically significant difference between baseline and treatment means of the inpatient group, while the difference between the baseline and treatment means of the day patient group was found not to be significantly different. Tests for homogeneity of variance and t-ratios for differences between correlated variances yielded no statistically significant

differences.

A post hoc subanalysis of the inpatient group using correlated t-tests for mean differences revealed significant differences between baseline and intervention means for the subgroup with contingency contracts written, for the subgroup with contingency contracts and action taken written, and for the subgroup with no contingency contracts but with action taken written.

A post hoc subanalysis of the day patient group using correlated t-tests for mean differences revealed significant differences between baseline and intervention means for the subgroup with report cards returned, for the subgroup with contingency contracts written, and for the subgroup with action taken written.

Conclusions

On the basis of this study, and in relation to questions of effectiveness, cost, and applicability of the treatment to different populations (Mira, 1970), it may be concluded that contingency contracting is an effective technique to employ in improving attention to academic task behaviors of preadolescent children diagnosed as, or with the potential of being diagnosed, emotionally disturbed. This conclusion supports the results of research by Bailey et al. (1970), Cantrell et al. (1969), Kroth et al. (1970), Martin et al. (1968), McKenzie et al. (1968), and

Tharp and Wetzel (1969) that contingency contracting is an effective procedure to employ in effecting change in children's classroom behavior.

In view of the time spent by the investigator instructing and contacting managers, it may be concluded that contingency contracting can be utilized as an inexpensive procedure to employ in altering children's classroom behavior.

It was found that managers of both the day patient group and the inpatient group who reported taking action were associated with children who improved significantly on academic attention behavior. This suggests the conclusion that the treatment is applicable by mental health personnel and parents to the population and environment with which they are articulated. The probability of effecting significant differences on mean attention to academic task behavior using contingency contracting was somewhat higher for mental health personnel managing inpatient subjects than for parents managing their own child in a day patient program. However, parents who report evidence of consequence effort have a much higher probability of effecting significant change in their child's attention to academic task behavior than do parents who do not report this information.

The above conclusions are based upon attention to academic task behaviors, and while generalization to a

wider population must be tempered by the number of managers and subjects within subgroups, contingency contracting is concluded to be an effective, inexpensive and generally applicable technique to have parents and mental health personnel employ in altering children's classroom behavior by delayed consequence and in environments nonproximal to the environment in which the behavior occurs.

Recommendations

On the basis of this investigation, it is recommended that specialists in the behavioral sciences concerned with evaluation and diagnosis of children's behavior begin to have parents, teachers, and mental health personnel attempt to effect positive change in classroom behavior of children for whom they are responsible. Further, these managers should be encouraged to attempt to effect behavioral changes in environments other than those environments subject to manager control and manipulation. Results of such efforts should yield information pertinent to treatment strategies and remediation plans for the child.

The results of this study indicated that as a group mental health personnel were more likely to report instituting contingency contracts and action taken than were parents. This finding, in conjunction with Tharp and Wetzel's (1969) statement that the task of contingency management comes to be the reorganization of patterns of

reinforcement exercised by managers, suggests further research on the feasibility of providing alternate, differential, or prosthetic reinforcement to parents for altering reinforcement operations to change their child's behavior. This may be a necessity until natural reinforcers from the child's changed behavior accrue to maintain the behavioral change of the parents.

Since the effectiveness of mental health personnel to effect change using contingency contracting was confounded by comanagement of children, this variable should be controlled for in further research in this area. The amount of time spent in the instructing of managers, the number of contacts between investigator and managers, and differences in information feedback procedures by report card delivery may also be relevant variables to control for in further applied research comparing manager ability to effect change in children's behavior in other environments.

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BIBLIOGRAPHY

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Unpublished Material

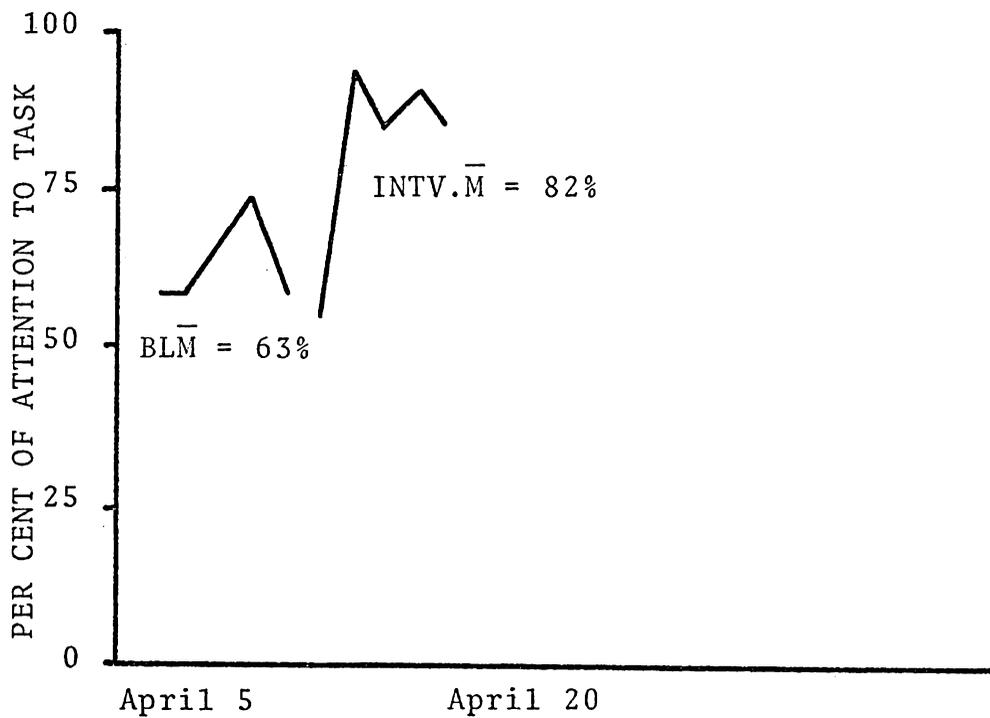
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APPENDIXES

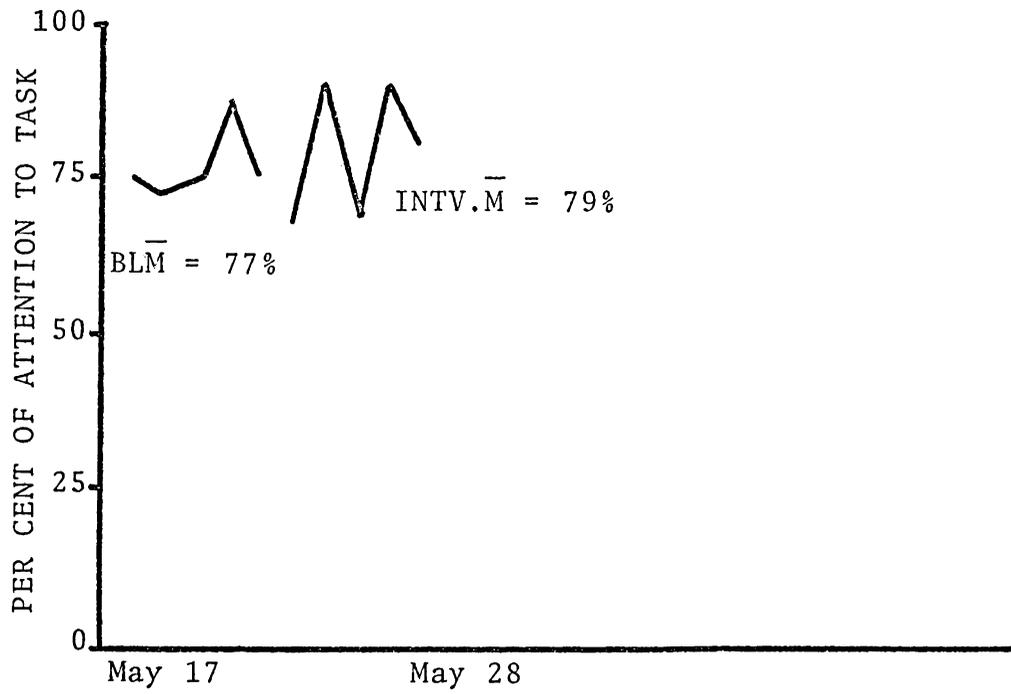
APPENDIX A

GRAPHS OF SUBJECTS EXCLUDED FROM THE SUBANALYSIS

SUBJECT 2 (D.L.) EXCLUDED FROM THE SUBANALYSIS



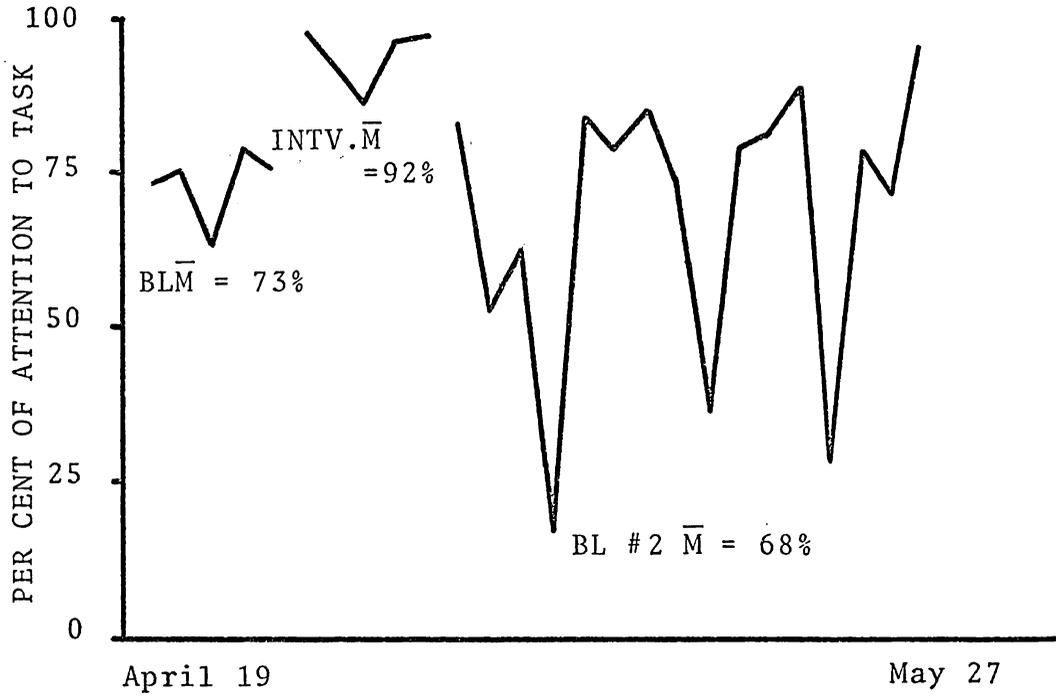
SUBJECT 7 (S.V.) EXCLUDED FROM THE SUBANALYSIS



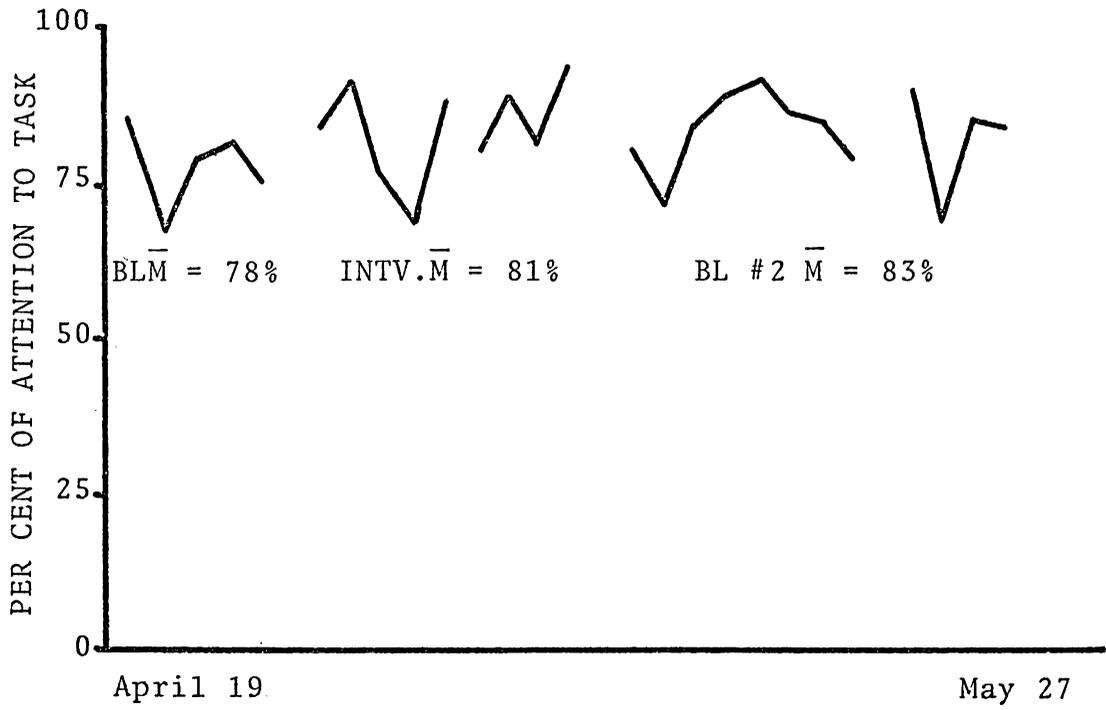
APPENDIX B

GRAPHS OF FIVE INPATIENT SUBJECTS WITH BASELINE,
INTERVENTION, AND POSTINTERVENTION BASELINE

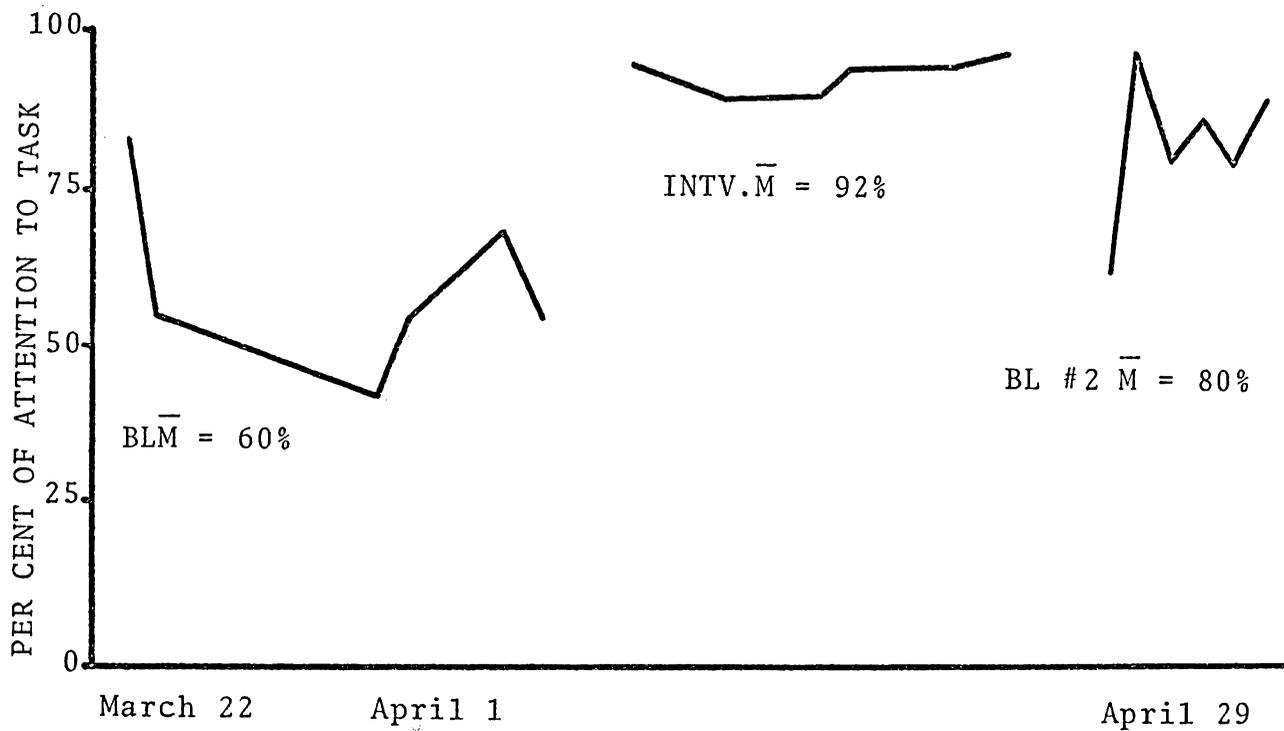
SUBJECT 10 (S.C.)



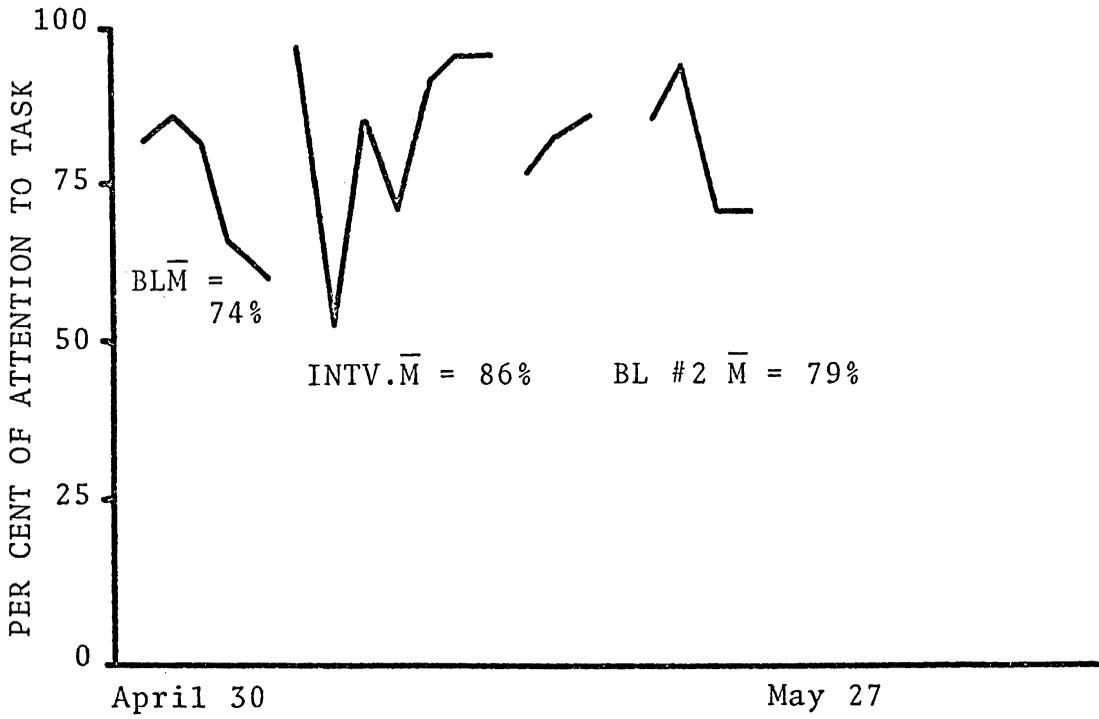
SUBJECT 11 (K.T.)



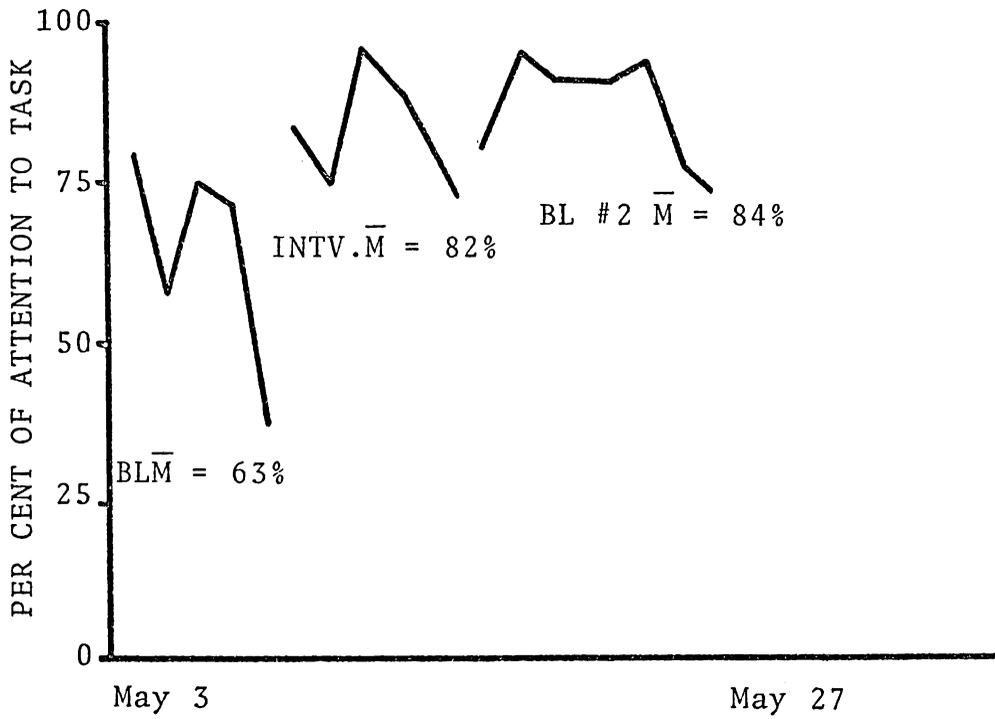
SUBJECT 14 (M.L.)



SUBJECT 12 (M.H.)



SUBJECT 13 (K.C.)



APPENDIX C

TABLE OF BASELINE AND INTERVENTION
MEANS OF INPATIENT SUBJECTS

TABLE OF BASELINE AND INTERVENTION
MEANS OF INPATIENT SUBJECTS

Subject	Number	Baseline Means	Intervention Means	Post Intervention Means
○* W.M.	1	55	75	--
Ⓛ D.L.	2	63	82	--
▢ H.D.	3	74	78	--
▢ R.M.	4	83	60	--
▢ J.S.	5	74	61	--
□* C.B.	6	57	60	--
Ⓛ S.V.	7	77	79	--
□* D.P.	8	74	90	--
□* P.M.	9	52	57	--
○* S.C.	10	73	92	68
○* K.T.	11	77	81	83
△ M.H.	12	74	86	79
△ K.C.	13	63	82	84
○* M.L.	14	60	92	80
△ C.S.	15	78	88	--

- * contingency contracts written
 □ contingency contracts with no action taken written
 ○ contingency contracts with action filled in each day
 △ action taken written in, no contingency contract
 Ⓛ report card lost
 ▢ no contingency contract, no action taken written

APPENDIX D

TABLE OF BASELINE AND INTERVENTION MEANS
OF DAY PATIENT SUBJECTS

TABLE OF BASELINE AND INTERVENTION
MEANS OF DAY PATIENT SUBJECTS

Subject	Number	Baseline Means	Intervention Means
* M.R.	1	74	87
□* R.H.	2	63	91
J.T.	3	67	86
B.H.	4	60	34
○□* T.P.	5	74	82
○□* M.H.	6	63	78
○□* J.H.	7	64	81
* S.B.	8	78	63
W.F.	9	69	64
* N.W.	10	80	83
* L.P.	11	65	71
○ * R.F.	12	70	74
D.P.	13	56	78
R.B.	14	51	60
R.R.	15	53	73

* report cards returned

□ contingency contracts written

○ action taken written in

APPENDIX E

SCHEMATICS FOR RESEARCH DESIGN

SCHEMATICS FOR TWO FACTOR ANALYSIS
OF VARIANCE, REPEATED MEASURES
ON ONE FACTOR

Total sample consisted of
15 inpatients and 15 day
patients.

$N = 30$
Scores = 60

Trials F
Are there significant dif-
ferences between baseline and
treatment of the total sample?
Significant F confirmed
differences.

BL	INTV
$\frac{30}{M}$	$\frac{30}{M}$

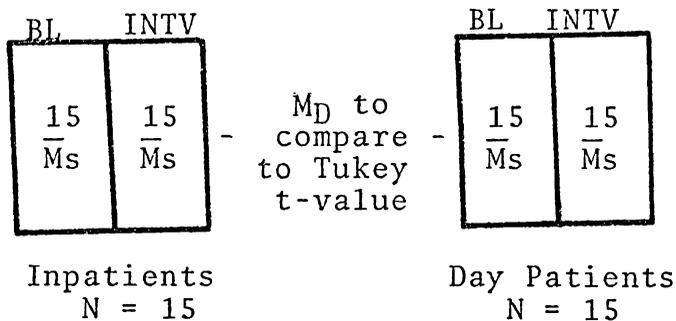
Conditions F
Are the inpatients signifi-
cantly different from the
day patients?

$30\bar{M}$ INPT
DAYPT $30\bar{M}$

Trials by conditions
Interaction F
Inpatients vs. day patients
by baseline vs. intervention
interaction

Was the baseline or the treat-
ment more effective with
inpatients or daypatients, over
either of the two conditions
for either of the two groups?

SCHEMATICS FOR TUKEY'S TEST OF GAPS BETWEEN MEANS



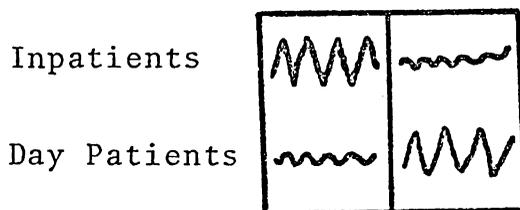
The M_D found for inpatients was greater than the Tukey t-value in favor of treatment.

The M_D found for day patients was not as large as the Tukey t-value. The M_D was in favor of the treatment condition, however.

The non-significant F for the conditions indicated there was no significant differences between the day patient and inpatient groups on overall variance.

However, there could have been the following, or vice versa,

F-MAX TESTS FOR HOMOGENEITY OF VARIANCE

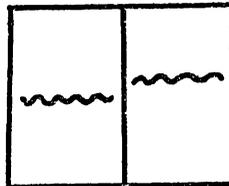


and the F for conditions could have been non-significant, as overall there is no difference in variance between the two groups.

SCHEMATICS FOR t-RATIOS FOR DIFFERENCES
BETWEEN CORRELATED VARIANCES

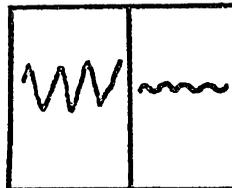
To see if there was a difference in variance over the two conditions (baseline-intervention) for either or both groups, a t-ratio for differences between correlated variances was computed.

For both groups



\bar{M} s are = or \neq but
variance the same

rather than



\bar{M} s are = or \neq but
variance different

t-ratios revealed no significant difference between variance over baseline as compared to intervention for either the day patient or inpatient groups.

SCHEMATICS FOR SUBANALYSIS OF DAY PATIENT GROUP

The day patient group was divided into two subgroups:

