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Five male preschool students performing a black-white square sorting task were prompted by an adult experimenter alone, five trainable mentally retarded male adolescents alone, the experimenter and five adolescents jointly, or were not prompted at all. The social behaviors of the adolescents were observed in their classroom for changes as a result of being a peer mediator. Also recorded was the percentage of time the experimenter spent immediately mediating the preschool students. Praise, tokens, and varied edible reinforcers were contingently administered to both the preschool students and the adolescent mediators.

The results showed that any mediation was significantly superior to no mediation, the five adolescents were as effective as the adult, and joint mediation by the adult and five adolescents was superior to the adult alone mediation. Joint mediation was also significantly superior to mediation by the adolescents alone in producing high rates of preschool student square sorting. No significant changes in the social behavior of the adolescent mediators occurred in their classroom as a result of serving as a mediator.

A crucial variable which determined the rate of square sorting was the overall number of praises emitted by the experimenter and adolescents in the various experimental conditions. It was concluded that the most effective mediation would occur by having adolescent mediators supervise small groups of preschool students in the presence of an active adult teacher. Further research is needed, however to determine whether the most effective role of an adult teacher is to aid in the supervision of students directly or to mediate the adolescents to supervise the students.

TEACHER ACTIVITY LEVEL AND THE PRESENCE OR ABSENCE OF RETARDED ADOLESCENT MEDIATORS ON SORTING PERFORMANCES OF PRESCHOOL RETARDED CHILDREN

by

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Mentally retarded individuals are increasingly being recognized as potentially useful citizens worthy of specialized forms of education. Currently, much research is being aimed at maximizing the effectiveness of education for retarded students. The use of the teacher's time, the educational content presented, the manner in which the content is presented, and the contingencies on educational task successes are a few of the factors under scrutiny in research with the mentally retarded student (Whalen and Henker, 1969).

In contemporary society, there is an increasing use of mentally retarded individuals performing essential and diverse responsibilities. In order for them to learn these responsibilities, there is an urgent need for individual educational instruction and individual shaping of social behavior. Although there is an urgent need for individual instruction for mentally retarded students, there is a corresponding deficit of funds to employ the number of teachers needed for individual instruction. Although one alternative would be increased funding, historically, considering the priorities for government expenditures, this seems unlikely. Another more probable alternative would be the use of nonpaid mediators. Mediation by peers is already being used in some educational settings and peer

mediation could be increased to alleviate the problems of education such as lack of funding and shortage of teachers.

The field of behavior modification has produced a number of innovative methods which have contributed to the education of mentally retarded students. These methods include the use of material reinforcement, social reinforcement, and token economies. Unfortunately, considering the number of retarded children, there are relatively few trained behavior modifiers to implement these procedures. As a result, behavior modifiers are increasingly training mediators to implement behavior modification programs with individual retarded children.

In this paper "mediator" will be used to refer specifically to any individual directly or indirectly effecting a behavior change upon another usually less trained individual, with the mediator usually being supervised by a more highly trained individual. Perhaps the first mediator recorded in the history of psychology was the father of Hans psychoanalyzing Hans via written instructions from Sigmund Freud (1940). Because of the difficulties in evaluating psychoanalysis, it is impossible to evaluate the effectiveness of this first recorded use of a mediator in therapy.

Although there are a number of sources in the literature which indicates that teachers can serve as

effective mediators for retarded children, unfortunately, the number of teachers is small compared to the large number of retarded children requiring individually administered behavior modification programs. If older retarded children could be used effectively this would significantly increase the number of individuals able to implement behavior modification programs in classrooms and institutions for retarded children.

In summary, the problem is that mentally retarded students and many "normal" students need individual instruction often involving behavior modification procedures, but the number of trained teachers and trained behavior modifiers are insufficient to meet the demand, so peer mediators have been suggested as one solution to the problem.

The following review evaluates the effectiveness of adult mediators, normal peer mediators, and retarded peer mediators in supervising normal and retarded children. As will be seen the empirical evidence warrents the use of mediators and indicates that further investigations are needed to determine specific variables which produces optimal supervision for specific populations.

Much of the research investigating the use of peers as mediators has used "normal" mediators to supervise "normal" students. Since techniques used in special education classes for mentally retarded students are often

the same techniques found successful with "normal" students, research citing the successful use of "normal" mediators supervising "normal" individuals is relevent to the use of retarded mediators. The following research demonstrates the successful use of "normal" peers, usually adolescents, as mediators.

Although the use of adolescent mediators to elicit positive behavior is relatively recent, the elicitation of negative behavior by peers has long been recognized. Buehler, Patterson, and Furniss (1966) observed that a group of adolescents continually mediate each other, shaping both delinquent and positive behavior. In one discouraging instance, "normal" elementary school peers were observed to be socially reinforcing disruptive behavior 100 per cent of the time while completely ignoring prosocial behavior (Solomon and Wahler, 1973). Thus, it appears that peers can be effective mediators although they may encourage disruptive behavior.

With professional intervention, the usual "normal" peer mediation of negative behavior can be modified to elicit positive behavior. Phillips (1968) and Phillips, Bailey, and Wolf (1969) investigated a token administrated program using juvenile delinquents as mediators and subjects. One juvenile was chosen as the token administrator for one half his peers and he administered tokens to them for cleaning their bathrooms. Meanwhile, the experimenter

administered tokens to the other half of the delinquents for cleaning their bathrooms. They found that the peer-administered token program was as effective as the experimenter-administered program in increasing bathroom cleanliness.

Even "normal" preschool children can successfully mediate the behavior of their peers. Bushell, Wrabel, and Michaelis (1968) found that "normal" preschool children acting as mediators increased the attending behavior of their peers when the preschool mediators administered tokens contingent upon attending behaviors. In a similar study, Axelrod, Hall, and Maxwell (1971) taught elementary children to administer praise, rather than tokens, to significantly increase attending behavior in their peers.

The successful mediation of task performance by older peers was also demonstrated by Surratt, Ulrich, and Hawkins (1969). The attending behavior of four first-graders, who were about to be placed in a special education class, was successfully increased by the mediation of one fifth-grader who contingently gave visual feedback and a back up reinforcer of free time to the first graders. Later, and without the active mediation of either the fifth-grader or an adult, the attending behavior of the first-graders was partially maintained during the regular classroom environment with only the presence of an adult

observer. The maintained responding merely due to the presence of the adult who was nonverbal suggested that a mediator could serve as a discriminative stimulus in a classroom as well as a reinforcing stimulus.

Surratt et al (1969) has emphasized that peer mediators are an abundant and optimal source of individual mediation needed for various child behavior problems. He also observed that many disruptive behaviors have been reinforced and as a result increased in frequency and intensity due to a lack of additional teachers which could provide individual treatment to reduce these disruptive behaviors.

Although direct training of mediators is one way to mediate behavior, the use of group contingencies and rewards where the behaviors of individuals earn or remove rewards for the group also mediates the behavior of peers. In this instance, the peer group subsequently reinforces or punishes the peer for causing the group to be reinforced or deprived of reinforcers. Evans and Oswald (1968) set up a contingency where they rewarded a classroom of "normal" elementary children when one target child emitted appropriate studying behaviors. They found that when the target child was socially reinforced by the group of children for studying behaviors and socially punished by the group for non-studying behaviors, the target child significantly increased his studying behavior. In a similar study,

Packard (1970) reinforced an entire group of "normal" elementary children with positive activities only when every child of the group emitted a certain quantity of studying behaviors. Subsequently, each child mediated his peer to emit studying behaviors. This significantly increased the studying behaviors of every child in the group. An advantage of Packard's study is that every child was emitting mediator behavior and his behavior was being mediated by his peers.

In addition to serving as discriminative and reinforcing stimuli for peers, mediators can influence peer behavior by simply modeling appropriate behavior. Borden, Bruce, Mitchell, Carter, and Hall (1970) found that using social reinforcement to reinforce attentive behavior in one "normal" elementary child produced a significant increase in attentive behavior in another peer sitting near and observing the reinforced child.

In summary, research investigating the use of "normal" individuals as mediators has shown that peers may reinforce disruptive behavior, that "normal" peer-administered token programs can be as effective as adult-administered token programs, that peer attention can significantly increase peer responding, that one older peer can successfully decrease the disruptive behavior of several younger peers, that a classroom of peers can reinforce and increase the performance of one peer, and

that peers can respond to reinforcement contingencies through observing other peers being reinforced. These results provide significant evidence that "normal" children can be trained as mediators to successfully supervise "normal" peers. The following studies demonstrate that retarded children can be successfully supervised by "normal" and retarded peers.

First, studies comparing the relative effectiveness of normal versus retarded mediators will be reviewed. Terrell and Stevenson (1965) demonstrated that "normal" children performed at higher rates when the reinforcing agents were "normal" mediators. However, retarded children performed equally as well with both retarded and "normal" mediators. "Normal" female children were especially sensitive to the intellectual level of the mediators. The "normal" female child's productivity actually decreased when they were given supportive statements by retarded girls.

Stamm and Gardner (1969) presented evidence which complemented the experimental results of Terrell and Stevenson (1965). They found that their mentally retarded adolescent subjects reacted differentially to the sex as well as the intellectual level of the mediator, whereas the retarded adolescents in the Terrell and Stevenson experiment did not respond differentially to the sex of the mediator. In a cognitive task, female

retarded adolescents responded at higher rates when their mediators were female retarded mediators. However, male retarded adolescents responded with higher rates when their mediators were "normal" adolescent males. These differential effects were explained by Stamm and Gardner as being due to male retarded adolescents having had more social contact with "normal" males, while female retarded adolescents had little social contact with "normal" females. Hence, the "normal" males became effective models for the retarded males, while "normal" females were ineffective models for retarded females.

The following experiments discuss mentally retarded mediators and "emotionally disturbed" mediators who successfully supervise the task performance of their peers. An experiment by Drabman (1972) using "emotionally disturbed" children as mediators provides relevent information concerning mentally retarded children, since many of the same child behaviors are arbitrarily labeled as either "emotionally disturbed" or "mentally retarded". Drabman divided twenty four "emotionally disturbed" children into four groups and compared the two token programs administered by "emotionally disturbed" child mediators with the two token programs administered by an adult teacher. He found that the peer-administered token programs were as effective as the teacher-administered token programs in reducing disruptive behaviors. Drabman also compared the effectiveness of peer and teacher verbal

feedback. His results demonstrated that peer verbal feedback was more effective than teacher verbal feedback in maintaining the high rates of responding produced by the token programs. He also found that a token program can be withdrawn and replaced by verbal feedback without a concomitant decrease in responding.

Whalen and Henker (1969) taught trainable mentally retarded adolescents to serve as mediators using behavior modification techniques with children who were inpatients in a hospital for the mentally retarded. The adolescent mediators were taught to use modeling, and social and edible reinforcers to elicit an increase in attentive behavior, and to elicit an increase in both verbal and nonverbal communication in the severely mentally retarded children. Whalen and Henker (1969) termed this hierarchical training process a "therapeutic pyramid". The "tip of the pyramid" begins with the experimenter-trainer who trains the "second level of the pyramid", which is the trainable mentally retarded adolescents, who train the "foundation of the pyramid", which is the severely mentally retarded children. Six mentally retarded subjects were divided into three dyads each composed of one trainable mentally retarded adolescent and one severely mentally retarded child. The authors predicted that the "therapeutic pyramid" would teach the mediators to be more "self sufficient, confident, and aware" of their own behavior and of the consequences of

their behavior, and would improve their social and verbal skills. In the first dyad the imitative vocabulary of a six year old severely mentally retarded child was increased from unintelligible verbalizations to fifty words in forty-five training sessions. In the second dyad, a ten year old boy with an IQ of 19 emitted unintelligible verbalizations before the mediation. At the end of fifteen training sessions and as a result of the peer mediation he was able to emit over fifty words. In the third dyad, a six year old boy with an IQ of 37 had only emitted unintelligible verbalizations. After the peer mediation and thirty training sessions he was able to emit three vowel sounds.

The mediators learned to ignore disruptive behavior, to lower the frustration level of the retarded children by beginning with easy tasks and progressing to difficult tasks, to appropriately prompt a response and successively fade that prompt, and to successfully discriminate between correct and incorrect responses. Whalen and Henker (1969) asserted that these learned behaviors would better enable the adolescent mediators to adjust to community settings.

In summary, the research using retarded mediators to supervise retarded children demonstrates that retarded mediators can be as effective as "normal" mediators, and that retarded mediators can be taught to utilize behavior modification techniques with their peers to significantly improve various behavioral performances.

Determining the superiority of social versus edible reinforcements for specific populations would be an important finding to determine the resources to be used by peer mediators. A recent study by Tramontana (1972) compared the effectiveness of social versus edible reinforcements for subjects with different levels of intelligence. Seventy two preschool and elementary students were divided into three groups according to their mental status: average intelligence students, mildly retarded students, and severely retarded students. The subjects were immediately given verbal, edible, or no reinforcers contingent upon dropping a marble into a box.

For the mildly and severely retarded group, the edible reinforcement condition produced a significantly higher response rate than the social reinforcement condition. These data suggested that mediators working with moderately and severely retarded children should use predominately edible reinforcers.

A major issue in the use of peer mediators in education is the effect on mediators from participating in a controlled mediating task. This effect could be evaluated by investigating the relative change in positive verbal and physical behaviors in the participating mediators. It is hypothesized that the mediators would increase their positive interactions with their peers as a result of being a mediator.

Drabman (1972) found evidence that a positive change occurred in the social behavior of his mediators. As a result of being mediators, these "emotionally disturbed" children emitted the lowest levels of disruptive behavior in their class. The positive behavior of the mediators generalized from their classroom to their dormitory area. In addition, the mediators volunteered to help adult attendants in routine work, and to help care for other children. These results demonstrate that the consequence of being a mediator in this experiment was a behavioral improvement.

The studies reviewed thus far have shown that "normal" children can successfully supervise "normal" peers, that "normal" mediators can supervise retarded children, that trainable mentally retarded mediators are as effective as adults in supervising severely mentally retarded peers, that trainable mentally retarded mediators can be taught behavior modification skills, that edible reinforcements are the most effective reinforcers for trainable mentally retarded children, and that the social behavior of the "emotionally disturbed" adolescents increased in frequency as a result of being mediators.

The previous studies have compared token programs administered by mentally retarded peers with token programs administered by adults. The current experiment compares the joint supervision by retarded peer mediators and an

adult teacher with peer supervision alone with adult supervision alone. More specificly, the current experiment investigates whether joint supervision produces a higher rate of square sorting among retarded preschool students as compared to the rates of square sorting produced by adult supervision or peer supervision. The current experiment also compares the total number of praises emitted by the peer mediators without the active presence of the adult and with the active presence of the adult to determine if the adult facilitates or inhibits the mediating skill of the peer. During the adult supervision condition, the percentage of time the adult spent directly with each preschool student was estimated and compared to his rate of square sorting to determine if his rate of sorting is correlated positively or negatively with the amount of direct supervision by the experimenter.

Lastly, the current experiment investigated if there was a significant increase in the social behavior of the trainable mentally retarded peers in their classroom as a result of serving as mediators.

In the current experiment, prompts, praises, and a token system was used. Prompts and praises were used because they are the predominate methods used in classrooms. Edible reinforcements and praise were used because they were powerful enough to produce a high sorting rate which would be sensitive to the different types of mediation.

CHAPTER II

METHOD

Subjects

Preschool Students

Five preschool students from McIver School for the Trainable Mentally Retarded, Greensboro, North Carolina, were chosen as subjects because they reached the criterion of sorting 100 black and 100 white squares during a sixty minute training period.

S. B. was a five year old Negro male whose Stanford Binet Intelligence Quotient was assessed at 60. The older brother of S. B. was diagnosed as autistic.

C. C. was a five year old Caucasian male who scored a mental age of 2.0 on the Vineland Social Maturity Test.

M. C. was a five year old Negro male, and due to his disruptive behavior he was unable to be tested to determine an intelligence quotient.

D. H. was a five year old American Indian male whose Stanford Binet Intelligence Quotient was assessed at 60.

G. L. was a five year old Caucasian male whose Stanford Binet Intelligence Quotient was assessed at 41.

Adolescent Mediators

Five adolescents were selected from the oldest class of male students to act as mediators because they were recommended by the teacher and because they demonstrated the highest proficiency of prompting and counting squares during the training sessions.

T. S. was a 19 year old Negro male whose Stanford Binet Intelligence Quotient was assessed at 32.

M. R. was a 18 year old Negro male whose Stanford Binet Intelligence Quotient was assessed at 39.

B. G. was a 21 year old Caucasian male whose Stanford Binet Intelligence Quotient was assessed at 48.

M. S. was a 19 year old Caucasian male whose Stanford Binet Intelligence Quotient was assessed at 32.

S. W. was a 20 year Caucasian male whose Stanford Binet Intelligence Quotient was assessed at 37.

Materials

The experiment was conducted in the classroom of the preschool students. Materials used in the experiment consisted of two tape recorders, 1400 (cardboard, 1" by 1") black squares, 1400 (cardboard, 1" by 1") white squares, ten one-gallon sized cans, one stopwatch, two large student work tables (4' by 2'), and 100 tokens (plastic circular red checkers). The two large work tables were marked by taped lines which divided one table into three areas and the other table into two areas. Each area was 18" square; and was again divided in half vertically. On each half of this area, a black square and a white square were respectively taped with transparent tape. Each preschool student had two cans. Can number 1 initially held 100 white and 100 black squares. Can number 2 held the squares that had been sorted. Each can had the name of the preschool student and the number "1" and "2" painted on it. Back-up reinforcers consisted of hard candy, M.M.s, raisins, and cookies. Exchange ratios used were two M.M.s per token, two raisins per token, one piece of hard candy per token, and a half cookie per token.

Procedure

Preschool Student Training

Five male preschool students were chosen as subjects because they reached the criterion of sorting 100 black and 100 white squares during a 60 minute training period. During these 60 minutes, the experimenter trained each preschool student individually in the classroom to place the appropriate squares in the appropriate areas. Initial attempts by the preschool students to sort the black and white squares were physically prompted by the experimenter.

If the preschool student attended to and performed the sorting task, he was reinforced by a edible reinforcer at the end of the first ten squares correctly sorted, the second ten sorted, and the third ten sorted. After the preschool student correctly sorted his fourth set of ten squares, he was administered a token, which was immediately exchanged for an edible reinforcer. As the preschool student correctly sorted his fifth, sixth, seventh, eighth, ninth, and tenth set of ten squares, he was given a token at the end of each set of sorted squares. These last six tokens were cashed in for edible reinforcers at the end of the training. Fading of edible reinforcer administration into token administration established the reinforcing value of the tokens.

At the appropriate time for an exchange of tokens for back up reinforcers, the experimenter displayed the tray of edible reinforcers to the preschool student, and said "Do you want these?" When the preschool student said "Yes", the experimenter said "You have to work for these. For every one of these (the experimenter picked up the preschool student's earned token), I will give you two raisins..." The experimenter required the preschool student to exchange the tokens for the back-up reinforcers.

The preschool student had to correct his errors by putting all incorrectly sorted squares into the appropriate area half, or he failed the training procedure.

If the preschool student refused to sit at the table to be trained, the experimenter reinforced the reluctant preschool student only once with a primary reinforcer for sitting in the chair.

When pretraining continued for the experimental preschool students, they were paired permanently with their adolescent mediator, and the preschool student again had to achieve the criterion of sorting one hundred squares. The adolescent played the mediating role and the experimenter shaped the role behaviors of the adolescents and the preschool students.

Adolescent Mediator Training

Before the joint training with the preschool students, the adolescents went through a similar, but separate, training period in their classroom. The experimenter briefly modeled the square sorting to the adolescents. The experimenter role-played as a "preschool student" while prompting one adolescent to prompt, praise, and administer tokens to him as the "preschool student". The other four adolescents observed this procedure, which was repeated with each adolescent mediator. During the adolescent training, the experimenter continuously shaped correct mediator behavior. To completely prepare the adolescent mediator, the experimenter role-played the problem behaviors of the preschool student, including refusing to attend, grabbing handfuls of squares instead of one square at a time, and handling the squares without sorting them. The experimenter then modeled the appropriate procedure for each problem behavior. The experimenter trained the adolescents to a criterion of ten successful token administrations. Hence during training, each adolescent prompted the experimenter acting as a "preschool student" to sort one hundred squares. The experimenter shaped the adolescent to praise each one of the correct sortings.

Joint Training of Preschool and Adolescent Students

The joint training of the adolescent mediators and preschool students consisted of the experimenter pairing the subjects together in the classroom of the preschool students and prompting the five adolescents to prompt, praise, and administer ten tokens to their five preschool students while the experimenter was also prompting the task sorting behavior of the preschool student.

Conditions

The current experiment included four experimental conditions which manipulated three independent variables: 1) adult "teacher" - supervision: active or passive; 2) adolescent mediation: absent or actively present; and 3) the order effect of having different conditions temporally follow each other. Four permutations of the four experimental conditions, A, B, C, and D were presented according to the randomization of the permutations: CABD, ACDB, DBCA, and BDAC. A repeated measures design was used with all subjects undergoing all conditions.

Sessions were conducted twice each day from 9:00 a.m. to 9:15 a.m. and from 1:30 p.m. to 1:45 p.m. in the classroom of the preschool students. Every condition within a permutation consisted of three consecutive 15 minute sessions. Thus, each permutation of the four conditions consisted of twelve sessions and the entire experiment continued for forty eight sessions. The experiment lasted twenty six school days, excluding days when sessions were cancelled. Two sessions were cancelled because five or more preschool students or adolescent mediators were absent.

During the four experimental conditions, the regular school teacher was in the classroom but on the opposite side of the room from the experimental area. The experimenter either supervised and observed the task performance of the preschool students or only observed their task performance.

Each condition began with a one minute instruction period during which the experimenter prompted the preschool students. In conditions B and D, the experimenter also prompted the adolescent mediators to perform their respective tasks. The standard instructions to the experimental subjects consisted of "Remember to put the white square on the white side and the black square on the black side (the experimenter always physically modeled this). Take out only one square at a time. Keep number one can in your lap. Look only at your can and your table. Do not "play" with your squares. Work hard and remember, if you want lots of candy, you have to work hard. Do it right. I will be watching you. Work until I tell you to stop." The above instructions were verbalized for one minute and were repeated in conditions A, B, C, and D.

The experimenter did not intervene when an adolescent made a mistake. When the adolescent mediator placed squares incorrectly sorted in can number two, the experimenter noted this mistake and subtracted the number of incorrectly sorted squares from the total number of squares in can number two. The experimenter and/or the adolescent mediators prompted the preschool student to re-sort the squares which he incorrectly sorted. When the preschool student refused, the experimenter and/or the adolescent returned these incorrectly sorted squares to can number one. When the preschool student performed at a slow rate, the experimenter and/or

adolescent said, "Hurry up, so I can give you a token. Do you see this (holds up the token)? If you want it to buy candy, you have to put this square on this square." The earned tokens were exchanged for edible reinforcers at the end of each session.

Each session was tape recorded to ascertain the number of verbal praises administered by the experimenter and by the adolescent mediator.

In condition A, the experimenter was inactive and the adolescents were absent. Condition A evaluated the preschool student performance without the effect of supervision. After the experimenter gave the five preschool students instructions for one minute, he did not interact with the preschool students during the remaining fourteen minutes and sat at a desk five feet from where the students were working. The preschool student held his can number one on his lap and sorted black and white squares on the table. When a preschool student asked him a question during the fourteen minute interval, the experimenter smiled and said "I have given you your instructions". During this condition, the experimenter made no attempt to keep the preschool student working or in their seats during the fourteen minute period. In this condition, the experimenter administered tokens after the fifteen minute session, rather than after each ten sortings. Condition A provided delayed reinforcement and

no supervision to the preschool students. This was in contrast to the other three conditions where the preschool students experienced immediate token reinforcement and direct supervision.

In condition B, the experimenter actively supervised the preschool students without the aid of the adolescent mediators. The experimenter did not have a set order or a standard amount of time to supervise each preschool student. When the preschool student was not performing or performing incorrectly, the experimenter spent more time mediating the preschool student, such as praising the successive approximation of correct sortings. The percentage of time the experimenter spent with each preschool student during each session was estimated by the experimenter and recorded on the daily tally sheet. In this condition, the experimenter intermittently talked to the five preschool students as a group urging them to attend to the sorting task and to perform faster. Can number two was kept two feet in back of the chairs of the preschool students so they could not directly put the squares in can number two, thereby bypassing the sorting task. In condition B, the adult experimenter contingently administered prompts and immediate praise and tokens to the five preschool students.

In condition C, the experimenter was inactive and the five adolescents supervised the preschool students.

After giving the one minute instructions, the experimenter refused to give any information to the adolescents or the preschool students. The adolescents prompted the preschool students to sort ("Put the black square here"), praised him when he sorted ("Good boy, that is smart"), corrected the preschool student when he made a mistake ("No, the white square goes with this taped-on white square"), administered a token for each ten squares sorted, put the sorted squares in number two can, kept the preschool student in his seat, and urged the preschool student to be attentive to the task. After the session, the experimenter gave verbal feedback to the adolescent by verbalizing statements similar to "Keep telling Johnny to put the squares in the right place"; "Don't daydream", and "Keep your hands to yourself". The adolescent mediators were given a backup reinforcer for every thirty squares his preschool student sorted.

In condition D, the experimenter and five adolescents separately but simultaneously supervised the preschool students. For the next fourteen minutes, the experimenter and the adolescents praised, prompted, and administered tokens to the preschool students. Since the adolescents were successful in administering tokens, the supervision of the experimenter usually consisted of prompts and praise to the preschool students. Even though the experimenter did not interact directly with the adolescents, he was modeling behaviors expected of the mediators.

Adolescent Social Behavior

The classroom social behavior of each experimental adolescent was observed to determine if serving as a mediator affected his social responding. Each day and after one of the two sessions with the preschool students, an observer proceeded to the classroom of the adolescents for a period of fifteen minutes to record the social behavior emitted by each of the five adolescents. Observer reliability was assessed once every other day by a second observer who observed the same adolescent simultaneously but independently.

The observers recorded the following behaviors on a code sheet: Verbal Positive (Code VP) -- any talking which was not abusive such as asking questions and talking about the experiment; Verbal Negative (Code VN) -- any negative talking directed to another adolescent such as cursing, threatening, and teasing; Physical Positive (Code PP) -- any positive physical approaches such as touching for attention, and shaking hands; Physical Negative (Code PN) -- any negative physical approaches such as hitting, and throwing objects; and Absent (Code AB) -- a lack of or undistinguishable social behavior.

Using fifteen second intervals and continuous observations, the observers recorded these social behaviors on the code sheet. Each behavior was recorded only once during each interval. For three consecutive minutes the

observer observed each adolescent. The order in which the adolescents were observed was randomized.

Before starting the regular observation sessions, the two observers were trained by the experimenter and they practiced for at least three fifteen minute sessions. Simultaneously but independently, the observers observed the social behavior of the five adolescents during the practice sessions until their overall reliability was assessed at 80%. This reliability statistic was calculated by dividing agreements by agreements plus disagreements.

The major dependent variables were the number of squares correctly sorted by the preschool student during each session and the above defined social behavior emitted by the mediators in the adolescent classroom for three minute intervals after each session. An operational definition of the square sorting measure would be the preschool student grasping one black or white square and placing it on the table area of the taped square of identical color, the adult or adolescent placing the correctly sorted squares in can number two, and the adult recording the number of squares correctly sorted by each preschool student. Both the square sorting and the social behavior dependent measures should reflect the effect of the independent variables of adult supervision, adolescent-peer supervision, the order effect, and their interactions.

RESULTS

Figure 1 depicts the mean number of squares correctly sorted by the five preschool students during each condition of each permutation. Since all errors in sorting occurring during the experiment were corrected, there is no difference in number of squares sorted and number of squares sorted correctly. Condition A, the no-supervision condition, produced the lowest preschool student square sorting rate, while condition D, the joint-supervision condition, produced the highest sorting rate. Conditions B and C, the experimenter-supervision condition and the adolescent-supervision condition respectively, produced relatively equivalent sorting rates.

Table 1 presents the analysis of variance of mean number of squares sorted by the preschool students. A Randomized Block Factorial design analyzing two levels of two independent variables, presence of adolescents and activity level of the experimenter, and four levels of one independent variable, order effect, was used: a_1 = adolescents absent; a_2 = adolescents actively present; b_1 = experimenter inactive; b_2 = experimenter active; c_1 = first permutation, sessions 1-12; c_2 = second permutation, sessions 13-24; c_3 = third permutation, sessions 25-36; and c_4 = fourth permutation, sessions 37-48. The variable B, experimenter-active versus experimenter-passive,

was highly significant demonstrating that higher sorting rates occurred when the experimenter was active than when he was inactive.

The variable C, representing the effect of time on the square sorting of the preschool students, was significant. A Schefe analysis failed to reveal any mean significant differences.

Table 2 provides a trend analysis performed on the time effect variable C, the Order Effect. The linear trend was highly significant indicating that the effect of time or practice produced a positive linear increase in performance. However, also highly significant was the departure from linear trend. This means that there are higher order trends, as well as linear trends for the C variable. Both the Quadratic Trend and Cubic Trend analysis were nonsignificant, so the higher order trends were other than quadratic or cubic. Kirk (1968) states that "it is unlikely that tests of trend components beyond the cubic or quartic degree will add materially to the experimenter's understanding of the data".

Although the A variable, representing the presence of the adolescents, did not produce a significant difference in the preschool student sorting, the AB Interaction variable, representing the joint effects of the presence of the adolescents and the activity of the

experimenter, was significant. The effectiveness of the adolescent mediator varied as a function of the presence or absence of the experimenter.

The differences among means of the Interaction AB are presented in Table 3 and analyzed by the Scheffe S (Kirk, 1968) method. Representative of the four AB interactions are the four conditions of the experiment. Compared to the other three conditions, the experimenter passive-adolescent absent condition produced a significantly lower sorting rate. This means that supervision by an adolescent or by an adult or by a combination of an adolescent and an adult produces significantly higher sorting rates than no supervision. Supervision by a combination of an adolescent and an adult was significantly superior to supervision by an adolescent alone and approached significantly superior to supervision by the experimenter alone.

A significant difference of means existed between the experimenter passive-adolescent present condition and the experimenter active-adolescent present condition. The activity of the experimenter significantly increased the sorting rate elicited by the adolescents. Likewise, since the means of the experimenter active-adolescents absent condition and the means of the experimenter active-adolescents active condition were not significantly different, this adds further evidence that the effect of the

adolescents was inferior to the effect of the experimenter in producing high sorting rates. All other mean differences were nonsignificant.

The AC Interaction of the presence of the adolescents and the effect of time on the square sorting of the preschool students was highly significant.

Table 4 presents the differences among means of the Interaction AC which represents the interactions of the presence of the adolescents and the time effect. The mean differences were analyzed by the Scheffe S Method. This significant interaction is accounted for by the extremely low sorting rate which occurred in the adolescent absent conditions during the first permutation of conditions. In permutation c_1, the absence-of-adolescents condition produced a significantly lower sorting rate than the other AC conditions in permutations c_2, c_3, or c_4.

The BC Interaction of the activity level of the experimenter and the effect of time on the square sorting was also significant. A Schefe analysis failed to reveal any mean significant differences.

Figure 2 presents the mean number of squares correctly sorted by the preschool student M. C. during each condition of each permutation. M. C. produced the highest sorting rates under adolescent supervision in conditions C and D.

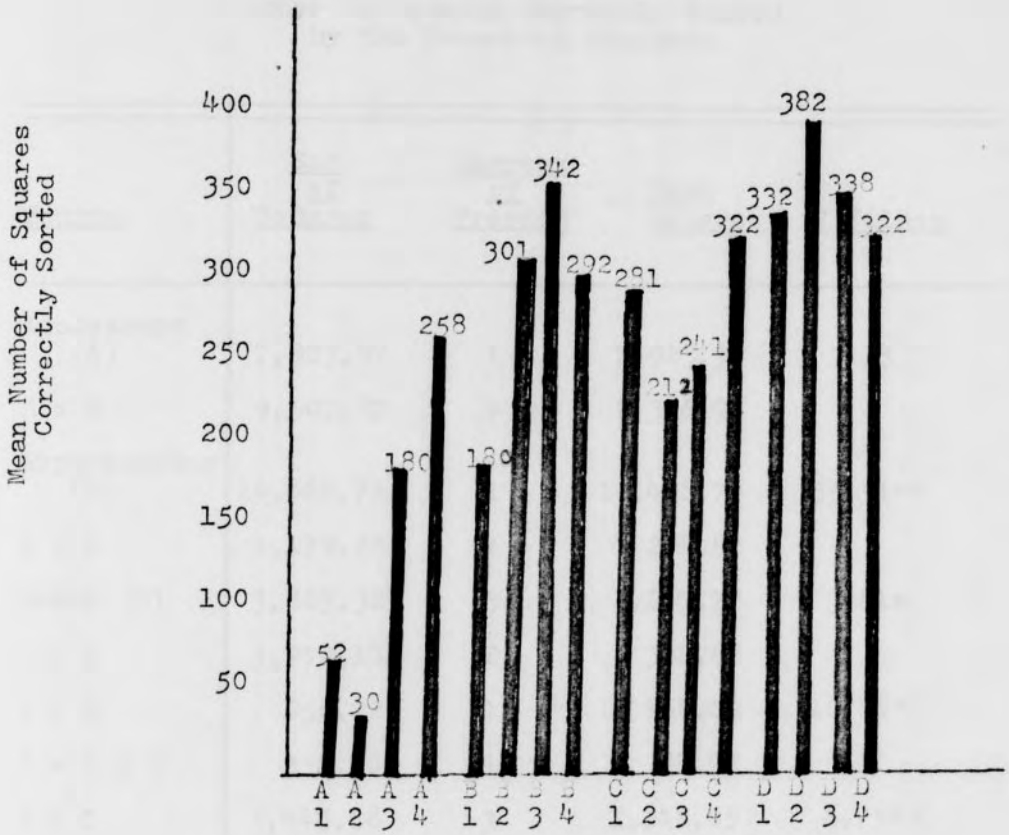

Figure 1. Mean Number of Squares Correctly Sorted by the Five Preschool Students during each Condition of each Permutation

TABLE 1

Analysis of Variance of Mean
Number of Squares Correctly Sorted
by the Preschool Students

Source	Sum of Squares	Degrees of Freedom	Mean Squares	F Values
Adolescent (A)	7,923.97	1	7,923.97	3.33
A x S	9,507.87	4	2,376.97	
Experimenter (B)	10,468.74	1	10,468.74	35.51**
B x S	1,179.28	4	294.82	
Order (C)	3,803.32	3	1,267.77	3.81*
C x S	3,992.18	12	332.68	
A x B	958.22	1	958.22	10.86*
A x B x S	352.86	4	88.22	
A x C	3,446.66	3	1,148.89	8.75**
A x C x S	1,575.26	12	131.27	
B x C	4,343.44	3	1,447.81	4.27*
B x C x S	10.684.17	12	890.35	
A x B x C	35,724.10	3	11,908.03	2.35
A x B x C x S	60,820.52	12	5,068.38	

*p < .05 **p < .01

TABLE 2

Trend Analysis of the Order Effect (C)

Source	Sum of Squares	Degrees of Freedom	Mean Squares	F Values
Linear Trend	14,858.15	1	14,858.15	44.66**
Departure from Linear Trend	7,337.88	2	3,668.94	11.03**
Quadratic Trend	3.32	1	3.32	.01
Cubic Trend	345.33	1	345.33	1.04
Within Groups (C x S)	3,992.18	12	332.68	

**p < .01

F = 3.96

TABLE 3

Schefe S Test of the Experimenter by Adolescent Interaction (AB) for the Square Sorting of the Preschool Students

	Condition A a_1b_1	Condition B a_1b_2	Condition C a_2b_1	Condition D a_2b_2
a_1b_1=25.97	-	29.81*	26.83*	42.79*
a_1b_2=55.78		-	2.98	12.98
a_2b_1=52.80			-	15.96*
a_2b_2=68.76				-

*$p < .05$ S=13.19

TABLE 4

Schefe S Test of the Adolescent by Order Effect Interaction (AC) for the Square Sorting of the Preschool Students

	a_1c_1	a_1c_2	a_1c_3	a_1c_4	a_2c_1	a_2c_2	a_2c_3	a_2c_4
a_1c_1=23.13	-	10.00	29.19*	31.79*	38.24*	26.30*	34.89*	41.17*
a_1c_2=33.13		-	19.19	21.79	28.24	26.30	24.89	31.17
a_1c_3=52.32			-	2.60	9.05	7.11	5.70	11.98
a_1c_4=54.92				-	6.45	4.51	3.10	9.38
a_2c_1=61.37					-	1.94	3.35	2.93
a_2c_2=59.43						-	1.41	4.87
a_2c_3=58.02							-	6.28
a_2c_4=64.30								-

*p $<$.05

S=29.14

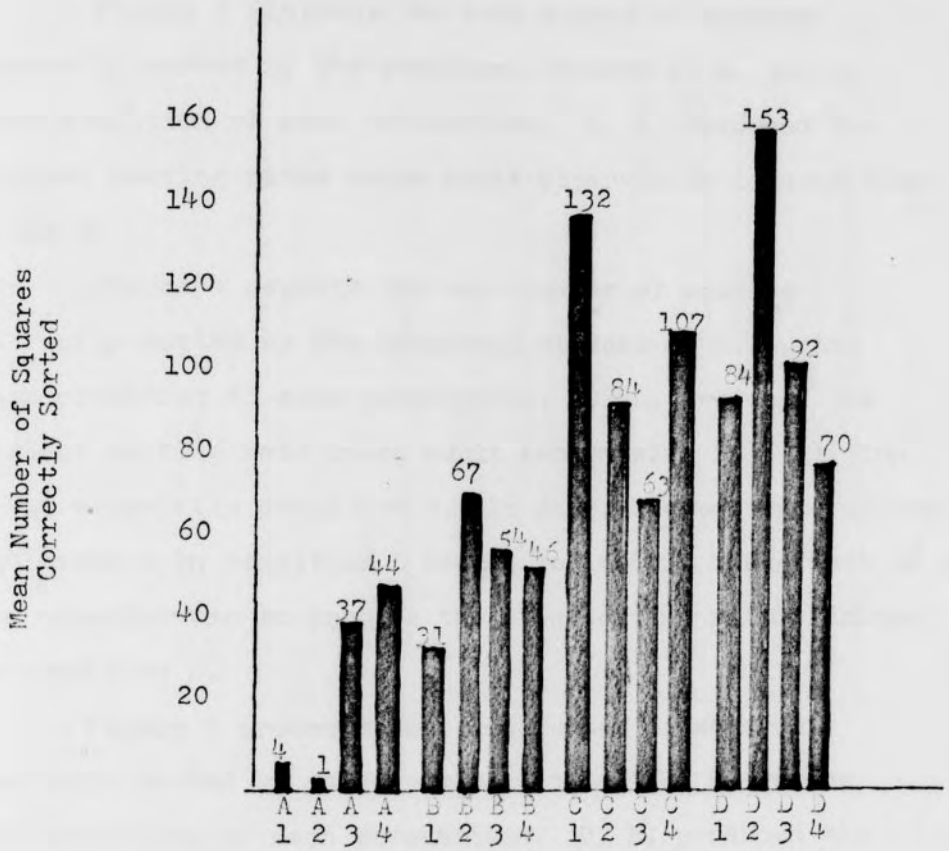

Figure 2. Mean Number of Squares Correctly Sorted by the Preschool Student M. C. during each Condition of each Permutation

Figure 3 displays the mean number of squares correctly sorted by the preschool student G. L. during each condition of each permutation. G. L. produced the highest sorting rates under adult supervision in condition B and D.

Figure 4 depicts the mean number of squares correctly sorted by the preschool student C. L. during each condition of each permutation. C. L. produced the highest sorting rate under adult supervision in condition D and especially condition B. In fact, the presence of the adolescents in condition D seemed to inhibit the effect of the experimenter to produce the high sorting rate elicited in condition B.

Figure 5 presents the mean number of squares correctly sorted by the preschool student D. H. during each condition of each permutation. D. H. produced the highest sorting rate under the joint supervision of condition D. Among the preschool students, he emitted the highest square sorting rate during the last permutation of the no supervision Condition A.

Figure 6 depicts the mean number of squares correctly sorted by the preschool student S. B. during each condition of each permutation. S. B. produced the highest sorting rate under the adult supervision of conditions B and D.

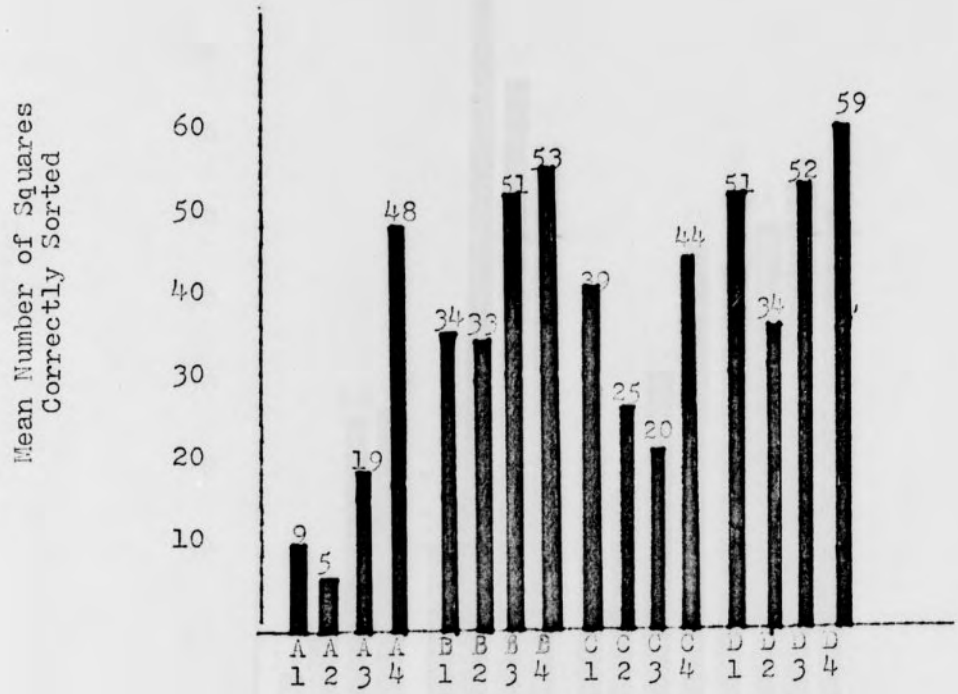

Figure 3. Mean Number of Squares Correctly Sorted by the Preschool Student G. L. during each Condition of each Permutation

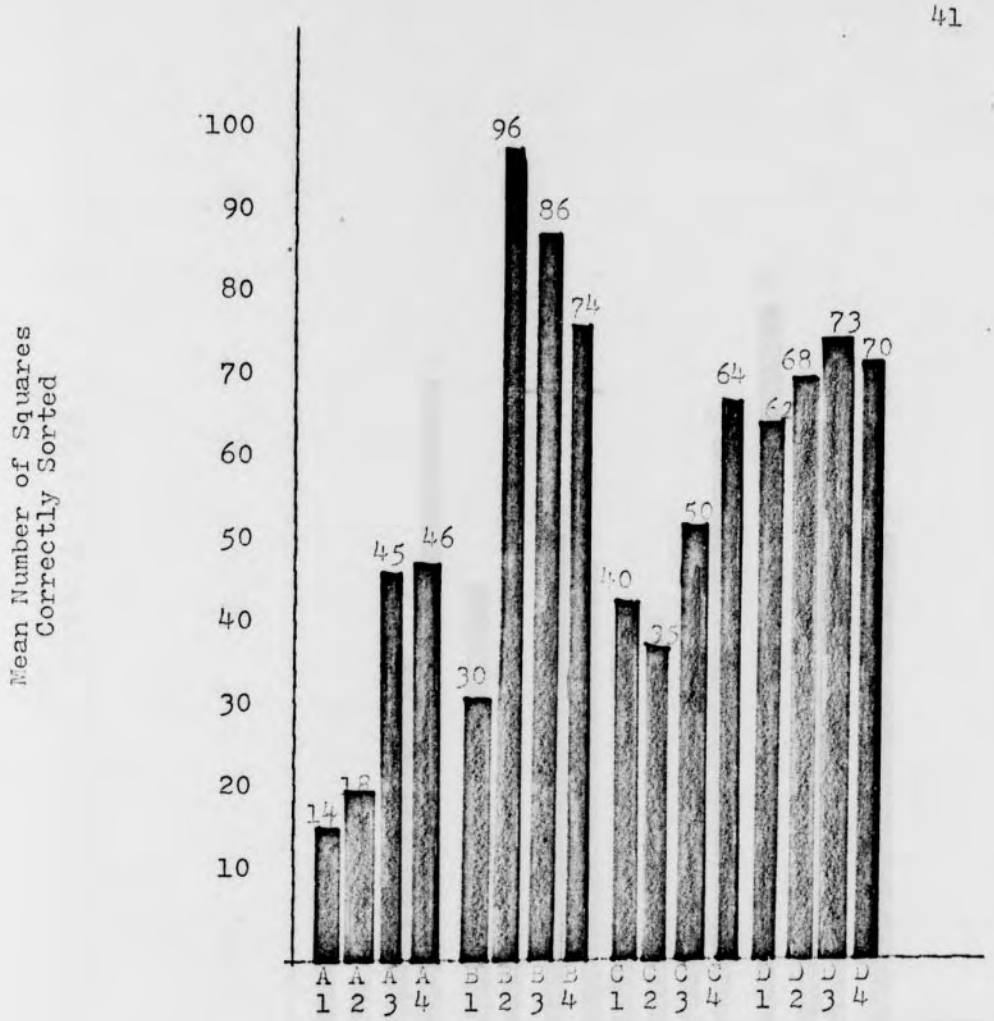

Figure 4. Mean Number of Squares Correctly Sorted by the Preschool Student G. L. during each Condition of each Permutation

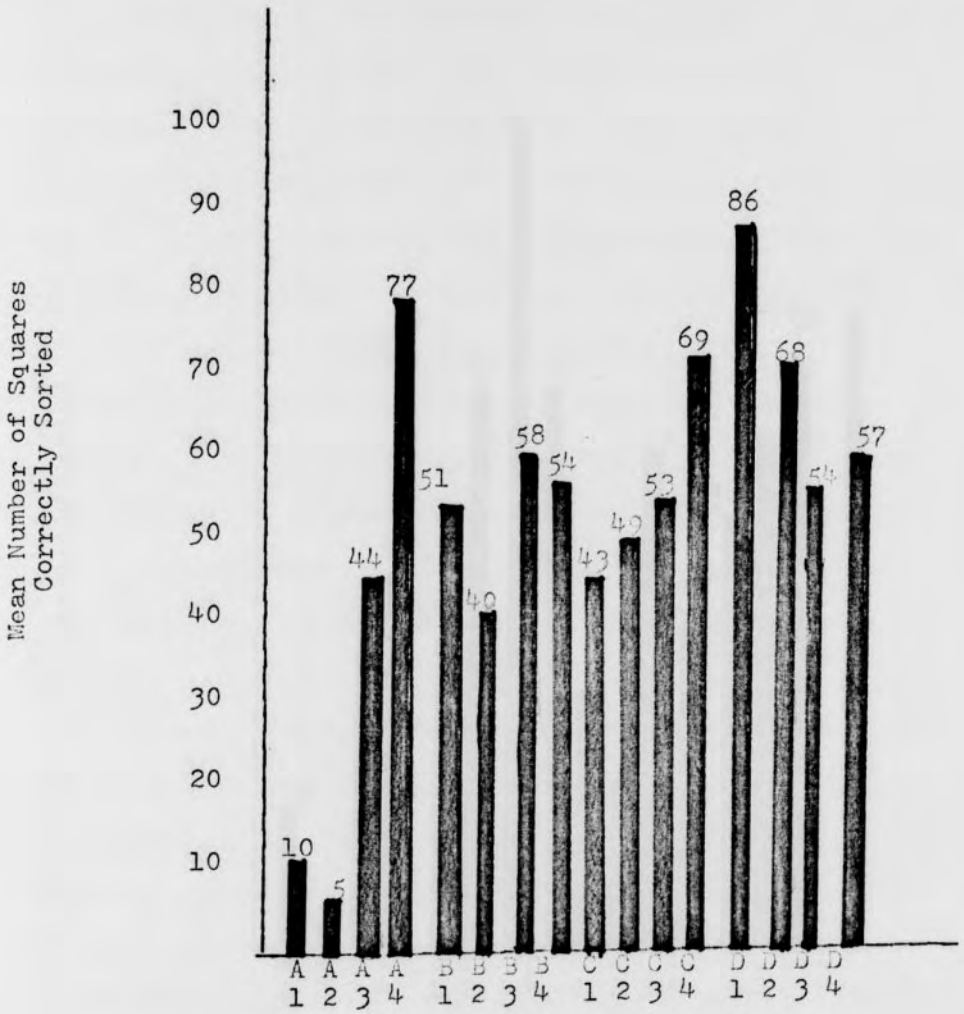

Figure 5. Mean Number of Squares Correctly Sorted by the Preschool Student D. H. during each Condition of each Permutation

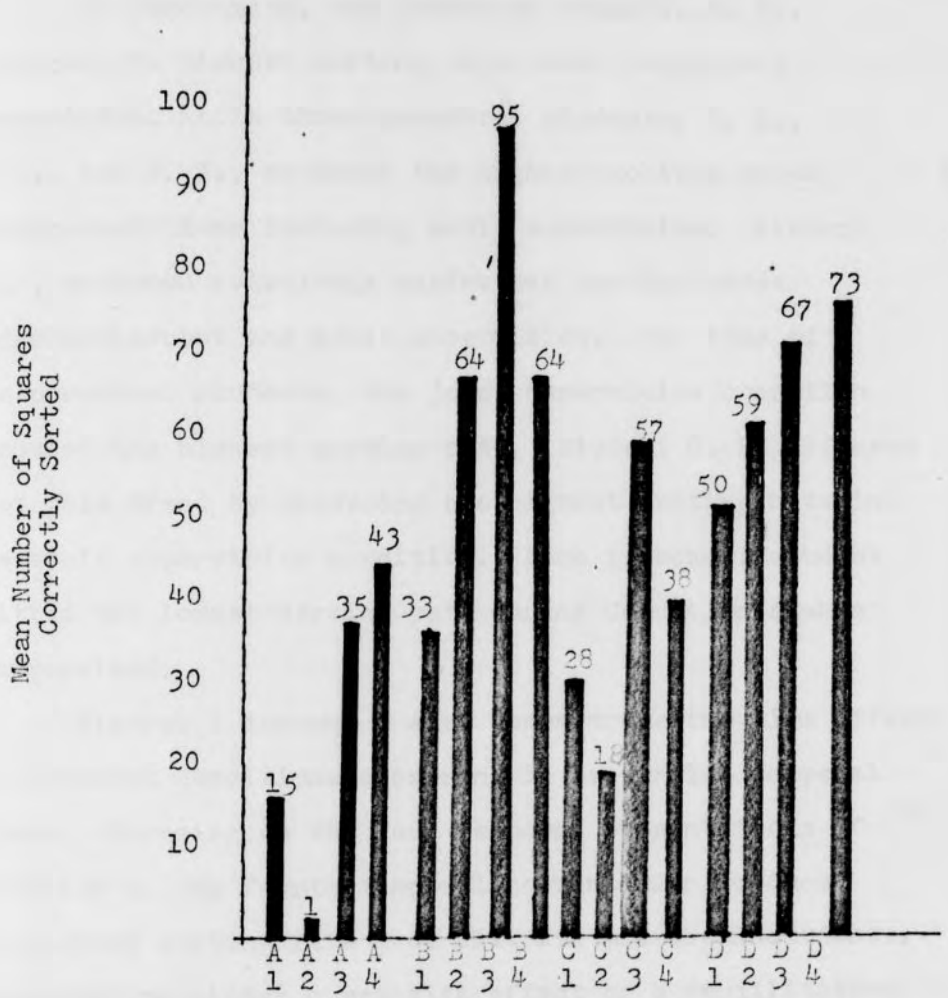

Figure 6. Mean Number of Squares Correctly Sorted by the Preschool Student S. L. during each Condition of each Permutation.

In conclusion, one preschool student, M. C., produced the highest sorting rate under adolescent supervision, while three preschool students, G. L., C. L., and S. B., produced the highest sorting rates during conditions including adult supervision. Student D. H. produced relatively equivalent sorting rates under adolescent and adult supervision. For four of the preschool students, the joint supervision condition produced the highest sorting rate. Student C. L. differed from this trend by producing his highest sorting rate in the adult supervision condition. Each preschool student emitted the lowest sorting rate during Condition A when unsupervised.

Figures 1 through 6 also demonstrate the time effect of different conditions occurring in sequential temporal orders. Focusing on the four temporal presentations of condition A, the fourth temporal presentation produced the highest sorting rate from all five preschool students, demonstrating either a practice effect or a facillitative effect of being exposed to the supervision conditions B, C, and D. The other conditions demonstrated differential sorting rates for the five preschool students and were effected by order of presentation in an unsystematic manner.

Table 5 presents the analysis of variance of praises emitted by the experimenter in condition B and the praises emitted by the adolescents in conditions C and D relative to the order of each permutation. The effect of the order

of permutation was nonsignificant while the effect of the mediation of the experimenter versus the adolescents versus the adolescents in the presence of the experimenter was highly significant. Table 6 presents the Schefe S test of the means of the total praises emitted by the experimenter, the adolescents, and the adolescents in the presence of the experimenter. The adult experimenter in condition B praised more than the combined five adolescent peers in either condition. The experimenter without the presence of the adolescents in condition B produced a significantly higher sorting rate than the total sorting rate elicited by all five adolescents in the presence of the experimenter. Likewise, the experimenter in condition B produced a significantly higher rate than the rate elicited by the five adolescents without his presence in condition C.

Table 7 presents the effect of having the experimenter immediately supervise the preschool students on sorting behavior. The sorting rate of one student, M. C., correlated moderately positively with the amount of time the experimenter directly supervised him, while the sorting rate of another student, D. H., correlated in a highly negative direction with experimenter supervisory time.

Analysis of variance of the classroom behaviors including 1) the positive verbal approaches, 2) the negative verbal approaches, and 3) the negative physical approaches were nonsignificant and are reported in Appendix 1. Table

8 consists of the analysis of variance of positive physical approaches emitted by the experimental adolescents in their classroom. The B variable, experimenter activity, was significant. The Experimenter Passive Condition, b_1, produced a significantly higher rate of positive physical behavior than b_2, the Experimenter Active Condition. This shows that the adolescents produced the lowest number of positive physical approaches when they were in the presence of the active experimenter.

TABLE 5

Analysis of Variance of Praises Emitted by the Experimenter and the Experimental Adolescents, B, in the Order of Permutation, C

Source	Sum of Squares	Degrees of Freedom	Mean Squares	F Values
Mediation (B)	9,317.18	2	4,658.59	45.23**
Order (C)	171.78	3	57.26	.56
Residual	617.93	6	102.99	
Total	10,106.89	11		

**p < .01 F = 10.9

TABLE 6

Schefe S Test for the Total Praises Emitted by the Experimenter, B; the Adolescents, C; and the Adolescents in the Presence of the Experimenter, D

	B	C	D
B = 95.89	-	77.42*	80.4**
C = 18.47		-	2.72
D = 15.75			-

**p < .01 *p < .05 S = 23.02

TABLE 7

Product Moment Correlation of the Percentage of Time the Experimenter Immediately Supervised the Preschool Student with the Mean Square Sorting Rate of the Preschool Student during Condition B

Preschool Students	Correlation
G. L.	.20
D. H.	-.81
S. B.	.04
C. L.	.26
M. C.	.59

TABLE 8

Analysis of Variance of Positive Physical Approaches Emitted by the Experimental Adolescents

Source	Sum of Squares	Degrees of Freedom	Mean Squares	F Values
Blocks	1.2716	4	.3179	2.7547
Treatment	1.0501	3	.3500	
Adolescents (A)	.1322	1	.1322	1.1455
Experimenter (B)	.9075	1	.9075	7.8639*
A x B	.0103	1	.0103	.0892
Residual	1.3857	12	.1154	
Total	3.7074	19		

*p < .05 F = 4.75

DISCUSSION AND CONCLUSION

The present experiment sought to answer the question whether simultaneous mediation by an adult and five retarded adolescent peers would produce a higher performance rate from retarded preschool students than adolescent mediation alone, adult mediation alone, or no mediation. Results showed that simultaneous mediation by an adult and adolescent produced higher preschool student performance than separate supervision by an adult or an adolescent. Separate mediation, by either an adolescent or an adult, however, was superior to no mediation at all. One reason for the significantly higher performance when mediated by both an adolescent and an adult could be the increased number of mediators and amount of mediation. Also, the adult and adolescents could be eliciting a higher frequency of mediator behavior from each other due to their simultaneous supervision. One practical application of this result would be to use simultaneous supervision for those subjects who are unresponsive to either group supervision by an adult or individual supervision by an adolescent.

The finding that adult mediation alone was not superior to adolescent mediation alone is consistent with Drabman's (1972) results which showed a statistical equivalence of performance produced by adult or peer mediation. One practical application of the previous

finding would be to divide the classroom into small groups of students mediated by adolescent mediators, with the groups of students most difficult to mediate also being supervised by the adult teacher.

The finding that the adult experimenter emitted more praises than the five adolescents reaffirms the belief that adults have a more advanced repertoire of effective mediator behavior than adolescents or children. Possible reasons for the relatively low frequency of praises emitted by the five adolescents could be the low verbal skills of the adolescents, and their expectancy that the experimenter would intervene and praise the preschool students, thereby relieving them of the responsibility. Also, the frequency of praises emitted by the adolescents decreased when the experimenter was present as compared to when the adolescents alone served as mediators. One practical application of this result would be to allow adolescents whose mediating behavior is inhibited by the experimenter to supervise their subjects without the presence of the adult teacher. A second practical application would be to reinforce the adolescents for praising the preschool students rather than to reinforce the adolescents according to the number of tasks their students complete, thereby reinforcing the behavior of the mediator rather than the result of his mediation.

To determine if a subject required close, direct supervision by the mediator to emit a high sorting performance, a correlation was calculated between the percentage of time the experimenter spent directly supervising the preschool student and the subsequent effect on the preschool student's square sorting. The results showed variable correlations depending on the subject, indicating that while some subjects responded better to close supervision, the subject D. H. responded better to more distant supervision.

The finding that the social behavior of the adolescents in the classroom did not improve significantly as a result of being a mediator is also consistent with Drabman (1972). This consistency is not surprising considering that similar classes of social behavior were measured. Drabman measured changes in the disruptive behavior of the mediator and mentioned anecdotal changes in positive social behavior. The Verbal Negative and Physical Negative categories of this experiment corresponded to the disruptive behavior category of his experiment. Drabman found a decrease in the disruptive behavior of his mediators, although it was not statisticly significant. Although classroom social behaviors of retarded adolescents may not improve as a result of serving as mediators, future research should examine possible improvements in academic performance resulting from serving as a mediator.

Although serving as a mediator did not effect the classroom social behaviors of the mediators, improved square sorting performance of the preschool children occurred during the last two replications of the mediator absent condition as compared to the first two phases of this condition. Although this could be due to increased practice in sorting, it may indicate that for the preschool children, receiving training from a mediator facilitates later performance even when the mediator is not present.

Based on the preceding results and discussion, it can be concluded that trainable mentally retarded adolescents can be used effectively as mediators eliciting high levels of square sorting in trainable mentally retarded preschool students, but that an even more effective method of mediation would be the adolescent mediators supervising individuals or small groups of preschool students in the presence of an adult teacher who also actively supervises the students.

SUMMARY

Five male preschool students performing a black-white square sorting task were prompted by an adult experimenter alone, five trainable mentally retarded male adolescents alone, the experimenter and five adolescents jointly, or were not prompted at all. The social behaviors of the adolescents were observed in their classroom for changes as a result of being a peer mediator. Also recorded was the percentage of time the experimenter spent immediately mediating the preschool students. Praise, tokens, and varied edible reinforcers were contingently administered to both the preschool students and the adolescent mediators.

The results showed that any mediation was significantly superior to no mediation, the five adolescents were as effective as the adult, and joint mediation by the adult and five adolescents was superior to the adult alone mediation. Joint mediation was also significantly superior to mediation by the adolescents alone in producing high rates of preschool student square sorting. No significant changes in the social behavior of the adolescent mediators occurred in their own classroom as a result of serving as a mediator.

A crucial variable which determined the rate of square sorting was the overall number of praises emitted

by the experimenter and adolescents in the various experimental conditions. It was concluded that the most effective mediation would occur by having adolescent mediators supervise small groups of preschool students in the presence of an active adult teacher. Further research is needed, however to determine whether the most effective role of an adult teacher is to aid in the supervision of students directly or to mediate the adolescents to supervise the students.

It can be concluded that trainable mentally retarded adolescents can be used effectively as mediators eliciting high levels of square sorting in trainable mentally retarded preschool students, but that an even more effective method of mediation would be the adolescent mediators supervising individuals or small groups of preschool students in the presence of an adult teacher who also actively supervises the students.

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Appendix 1

Number of Squares Sorted by Preschool Students

Condition C of the First Permutation CABD			Condition A of the First Permutation CABD	
Students	Number of Squares Sorted	Number of Adolescent Praises	Students	Number of Squares Sorted
Session 1			**Session 4**	
G. L.	30	9	G. L.	0
M. C.	145	32	M. C.	11
C. L.	49	0	C. L.	33
D. H.	37	7	D. H.	absent
S. B.	5	3	S. B.	10
Session 2			**Session 5**	
G. L.	52	33	G. L.	5
M. C.	136	32	M. C.	10
C. L.	40	2	C. L.	7
D. H.	34	1	D. H.	20
S. B.	10	0	S. B.	14
Session 3			**Session 6**	
G. L.	34	20	G. L.	21
M. C.	115	22	M. C.	1
C. L.	29	9	C. L.	3
D. H.	37	13	D. H.	0
S. B.	70	1	S. B.	20

Appendix 1

Number of Squares Sorted by Preschool Students

Condition B of the First Permutation CABD			Condition D of the First Permutation CABD		
Students	Number of Squares Sorted	Experimenter Time Percentage	Students	Number of Squares Sorted	Adolescent Praises
Session 7 with 62 total experimenter praises			Session 10		
G. L.	30	22%	G. L.	55	6
M. C.	2	18%	M. C.	73	45
C. L.	11	20%	C. L.	69	3
D. H.	48	22%	D. H.	absent	absent
S. B.	31	18%	S. B.	absent	absent
Session 8 with 94 total experimenter praises			Session 11		
G. L.	43	25%	G. L.	49	4
M. C.	51	20%	M. C.	71	31
C. L.	50	22%	C. L.	43	2
D. H.	60	15%	D. H.	absent	absent
S. B.	31	18%	S. B.	absent	absent
Session 9 with 59 total experimenter praises			Session 12		
G. L.	30		G. L.	49	0
M. C.	41	not	M. C.	97	15
C. L.	30	recorded	C. L.	72	0
D. H.	45		D. H.	86	0
S. B.	36		S. B.	50	4

Appendix 1

Number of Squares Sorted by Preschool Students

Condition A of the Second Permutation ACDB

Students	Number of Squares Sorted
Session 13	
G. L.	0
M. C.	2
C. L.	30
D. H.	2
S. B.	0
Session 14	
G. L.	11
M. C.	0
C. L.	24
D. H.	12
S. B.	0
Session 15	
G. L.	5
M. C.	3
C. L.	1
D. H.	0
S. B.	0

Condition C of the Second Permutation ACDB

Students	Number of Squares Sorted	Adolescent Praises
Session 16		
G. L.	23	0
M. C.	absent	absent
C. L.	70	9
D. H.	50	1
S. B.	28	5
Session 17		
G. L.	30	7
M. C.	76	50
C. L.	0	5
D. H.	43	5
S. B.	18	5
Session 18		
G. L.	22	0
M. C.	92	55
C. L.	absent	7
D. H.	53	6
S. B.	9	4

Appendix 1

Number of Squares Sorted by Preschool Students

Condition D of the Second Permutation ACDB			Condition B of the Second Permutation ACDB		
Students	Number of Squares Sorted	Adolescent Praises	Students	Number of Squares Sorted	Experimenter Time Percentage
Session 19			Session 22 with 75 total experimenter praises		
G. L.	59	7	G. L.	48	
M. C.	103	59	M. C.	79	
C. L.	69	1	C. L.	116	not
D. H.	68	12	D. H.	40	recorded
S. B.	74	7	S. B.	61	
Session 20			Session 23 with 68 total experimenter praises		
G. L.	24	4	G. L.	23	
M. C.	123	40	M. C.	51	
C. L.	65	0	C. L.	94	not
D. H.	59	15	D. H.	30	recorded
S. B.	43	8	S. B.	60	
Session 21			Session 24 with 36 total experimenter praises		
G. L.	20	8	G. L.	30	
M. C.	235	37	M. C.	72	
C. L.	70	7	C. L.	80	not
D. H.	77	8	D. H.	50	recorded
S. B.	61	2	S. B.	70	

Appendix 1

Number of Squares Sorted by Preschool Students

Condition D of the Third Permutation DBCA

Students	Number of Squares Sorted	Adolescent Praises
Session 25		
G. L.	41	6
M. C.	92	35
C. L.	69	0
D. H.	absent	absent
S. B.	79	1
Session 26		
G. L.	65	3
M. C.	absent	absent
C. L.	91	9
D. H.	59	3
S. B.	62	2
Session 27		
G. L.	50	8
M. C.	absent	absent
C. L.	60	6
D. H.	48	6
S. B.	59	4

Condition B of the Third Permutation DBCA

Students	Number of Squares Sorted	Experimenter Time Percentage
Session 28 with 105 total experimenter praises		
G. L.	60	22%
M. C.	52	18%
C. L.	103	22%
D. H.	70	18%
S. B.	51	20%
Session 29 with 76 total experimenter praises		
G. L.	41	25%
M. C.	50	22%
C. L.	64	20%
D. H.	61	18%
S. B.	90	15%
Session 30 with 90 total experimenter praises		
G. L.	absent	absent
M. C.	60	30%
C. L.	90	20%
D. H.	42	30%
S. B.	143	20%

Appendix 1

Number of Squares Sorted by Preschool Students

Condition C of the Third Permutation DBCA			Condition A of the Third Permutation DBCA	
Students	Number of Squares Sorted	Adolescent Praises	Students	Number of Squares Sorted
Session 31			Session 34	
G. L.	absent	absent	G. L.	37
M. C.	60	17	M. C.	55
C. L.	47	0	C. L.	52
D. H.	50	2	D. H.	55
S. B.	60	1	S. B.	30
Session 32			Session 35	
G. L.	0	2	G. L.	6
M. C.	60	25	M. C.	23
C. L.	62	13	C. L.	41
D. H.	69	2	D. H.	38
S. B.	28	3	S. B.	44
Session 33			Session 36	
G. L.	40	8	G. L.	15
M. C.	70	23	M. C.	32
C. L.	40	7	C. L.	43
D. H.	39	4	D. H.	40
S. B.	83	2	S. B.	31

Appendix 1

Number of Squares Sorted by Preschool Students

Condition B of the Fourth Permutation BDAC			Condition D of the Fourth Permutation BDAC		
Students	Number of Squares Sorted	Experimenter Time Percentage	Students	Number of Squares Sorted	Adolescent Praises
Session 37 with 51 total experimenter praises			Session 40		
G. L.	40	20%	G. L.	59	4
M. C.	27	18%	M. C.	43	21
C. L.	75	20%	C. L.	69	3
D. H.	51	20%	D. H.	absent	absent
S. B.	60	22%	S. B.	73	1
Session 38 with 63 total experimenter praises			Session 41		
G. L.	54		G. L.	absent	absent
M. C.	50	not	M. C.	82	19
C. L.	73	recorded	C. L.	70	6
D. H.	60		D. H.	60	1
S. B.	60		S. B.	60	1
Session 39 with 74 total experimenter praises			Session 42		
G. L.	72		G. L.	absent	absent
M. C.	62	not	M. C.	83	17
C. L.	absent	recorded	C. L.	60	4
D. H.	52		D. H.	54	0
S. B.	72		S. B.	85	2

Appendix 1

Number of Squares Sorted by Preschool Students

Condition A of the Fourth Permutation BDAC		Condition C of the Fourth Permutation BDAC		
Students	Number of Squares Sorted	Students	Number of Squares Sorted	Adolescent Praises
Session 43		Session 46		
G. L.	45	G. L.	20	
M. C.	67	M. C.	51	not recorded
C. L.	50	C. L.	168	
D. H.	49	D. H.	60	
S. B.	56	S. B.	70	
Session 44		Session 47		
G. L.	50	G. L.	48	1
M. C.	65	M. C.	40	55
C. L.	51	C. L.	61	4
D. H.	1	D. H.	63	0
S. B.	47	S. B.	34	0
Session 45		Session 48		
G. L.	0	G. L.	63	2
M. C.	0	M. C.	115	25
C. L.	38	C. L.	70	0
D. H.	0	D. H.	73	2
S. B.	25	S. B.	28	0

Appendix 2

Number of Social Approaches Emitted by Experimental Adolescents

Subjects	Verbal Positive	Verbal Negative	Physical Positive	Physical Negative	Absent
	Session 1 - Condition C of Permutation CABD				
M. R.	7	1	4	0	4
T. S.	10	1	1	0	0
M. S.	0	0	0	0	12
S. W.	1	0	1	0	10
B. G.	0	0	0	0	12
	Session 5 - Condition A of Permutation CABD				
M. R.	3	0	0	0	9
T. S.	4	0	1	0	8
M. S.	1	0	0	0	11
S. W.	1	0	0	0	11
B. C.	2	0	1	0	9
	Session 9 - Condition B of Permutation CABD				
M. R.	3	0	1	0	8
T. S.	0	0	0	0	12
M. S.	0	0	0	0	12
S. W.	0	0	0	0	12
B. G.	absent				
	Session 11- Condition D of Permutation CABD				
M. R.	2	0	0	0	10
T. S.	absent				
M. S.	2	1	0	0	9
S. W.	1	0	1	0	10
B. G.	0	0	0	0	12

Appendix 2

Number of Social Approaches Emitted by Experimental Adolescents

Subjects	Verbal Positive	Verbal Negative	Physical Positive	Physical Negative	Absent
Session 13 - Condition A of Permutation ACDB					
M. R.	3	0	0	0	9
T. S.	2	0	0	0	10
M. S.	0	0	0	0	12
S. W.	11	0	0	0	1
B. G.	3	1	0	0	8
Session 14 - Condition A of Permutation ACDB					
M. R.	3	0	0	0	9
T. S.	3	0	0	0	9
M. S.	0	0	0	0	12
S. W.	0	0	0	0	12
B. G.	0	0	0	0	12
Session 16 - Condition C of Permutation ACDB					
M. R.	absent				
T. S.	0	0	0	0	12
M. S.	0	0	0	0	12
S. W.	0	0	1	0	11
B. G.	6	0	0	0	6
Session 17 - Condition C of Permutation ACDB					
M. R.	2	0	0	0	10
T. S.	11	0	0	0	1
M. S.	2	0	0	0	10
S. W.	0	0	0	0	12
B. G.	6	0	0	0	6

Appendix 2

Number of Social Approaches Emitted by Experimental Adolescents

Subjects	Verbal Positive	Verbal Negative	Physical Positive	Physical Negative	Absent
	Session 19 - Condition D of Permutation ACDB				
M. R.	6	0	0	0	6
T. S.	7	0	0	0	5
M. S.	7	0	0	0	5
S. W.	8	0	0	0	4
B. G.	1	0	0	0	11
	Session 22 - Condition B of Permutation ACDB				
M. R.	3	0	0	0	9
T. S.	2	0	0	0	10
M. S.	1	0	0	0	11
S. W.	0	0	0	0	12
B. G.	4	0	0	0	8
	Session 27 - Condition D of Permutation DBCA				
M. R.	absent				
T. S.	1	0	0	0	11
M. S.	0	0	1	0	11
S. W.	0	0	0	0	12
B. G.	1	0	0	0	11
	Session 28 - Condition B of Permutation DBCA				
M. R.	8	0	0	0	4
T. S.	1	0	0	0	11
M. S.	3	0	0	0	9
S. W.	1	0	0	0	11
B. G.	absent				

Appendix 2

Number of Social Approaches Emitted by Experimental Adolescents

Subjects	Verbal Positive	Verbal Negative	Physical Positive	Physical Negative	Absent
	Session 30 - Condition B of Permutation DBCA				
M. R.	0	0	1	0	11
T. S.	0	0	0	0	12
M. S.	6	0	0	0	6
S. W.	6	0	1	0	5
B. G.	absent				
	Session 31 - Condition D of Permutation DBCA				
M. R.	0	0	0	0	12
T. S.	1	0	0	0	11
M. S.	2	0	2	0	8
S. W.	0	0	0	0	12
B. G.	absent				
	Session 32 - Condition C of Permutation DBCA				
M. R.	1	0	3	0	8
T. S.	2	0	1	0	9
M. S.	0	1	0	0	11
S. W.	1	0	3	0	9
B. G.	0	1	0	0	11
	Session 33 - Condition C of Permutation DBCA				
M. R.	3	0	0	0	9
T. S.	9	0	0	0	3
M. S.	1	0	0	0	11
S. W.	0	0	0	0	12
B. G.	5	0	0	0	7

Appendix 2

Number of Social Approaches Emitted by Experimental Adolescents

Subjects	Verbal Positive	Verbal Negative	Physical Positive	Physical Negative	Absent
Session 35 - Condition A of Permutation DBCA					
M. R.	1	0	2	0	9
T. S.	6	0	2	0	5
M. S.	2	0	0	0	10
S. W.	1	0	0	0	11
B. G.	1	4	0	0	7
Session 36 - Condition A of Permutation DBCA					
M. R.	5	0	10	0	0
T. S.	4	0	1	0	7
M. S.	5	0	1	0	7
S. W.	0	0	1	0	11
B. G.	5	0	0	0	7
Session 37 - Condition B of Permutation BDAC					
M. R.	10	0	2	0	1
T. S.	2	0	3	0	7
M. S.	9	0	0	0	3
S. W.	1	0	0	0	11
B. G.	6	0	0	0	6
Session 38 - Condition B of Permutation BDAC					
M. R.	1	0	0	0	11
T. S.	2	0	0	0	10
M. S.	4	0	0	0	8
S. W.	0	0	0	0	12
B. G.	2	0	1	0	10

Appendix 2

Number of Social Approaches Emitted by Experimental Adolescents

Subjects	Verbal Positive	Verbal Negative	Physical Positive	Physical Negative	Absent
	Session 39 - Condition B of Permutation BDAC				
M. R.	2	0	0	0	10
T. S.	absent				
M. S.	0	0	0	0	12
S. W.	6	0	0	0	6
B. G.	0	0	0	0	12
	Session 40 - Condition D of Permutation BDAC				
M. R.	1	0	0	0	11
T. S.	absent				
M. S.	2	0	0	0	10
S. W.	2	0	0	0	10
B. G.	1	0	0	0	11
	Session 42 - Condition D of Permutation BDAC				
M. R.	6	0	0	0	6
T. S.	6	0	0	0	6
M. S.	0	0	0	0	12
S. W.	0	0	0	0	12
B. G.	8	0	0	0	4
	Session 44 - Condition A of Permutation BDAC				
M. R.	3	0	0	0	9
T. S.	absent				
M. S.	9	0	0	0	3
S. W.	absent				
B. G.	0	0	0	0	12

Appendix 2

Number of Social Approaches Emitted by Experimental Adolescents

Subjects	Verbal Positive	Verbal Negative	Physical Positive	Physical Negative	Absent
	Session 45 - Condition A of Permutation BDAC				
M. R.	3	0	0	0	9
T. S.	absent				
M. S.	3	0	1	0	8
S. W.	6	0	0	0	6
B. G.	2	0	0	0	10
	Session 47 - Condition C of Permutation BDAC				
M. R.	1	0	1	0	10
T. S.	2	0	1	0	9
M. S.	0	0	0	0	12
S. W.	2	0	0	0	10
B. G.	3	1	0	0	8

Appendix 3

TABLE 9

Analysis of Variance of Positive Verbal Approaches Emitted by the Experimental Adolescents

Sources	Sum of Squares	Degrees of Freedom	Mean Squares	F Values
Blocks	5.74	4	1.44	.94
Treatments	1.78	3		
Adolescents (A)	.07	1	.07	.05
Experimenter (B)	.17	1	.17	.11
A x B	1.54	1	1.54	1.00
Residual	18.39	12	1.53	
Total	25.91	19		

*p < .05 F = 4.75

Appendix 3

TABLE 10

Analysis of Variance of Negative Verbal Approaches Emitted by the Experimental Adolescents

Sources	Sum of Squares	Degrees of Freedom	Mean Squares	F Values
Blocks	.23	4	.06	1.68
Treatments	.13	3		
Adolescents (A)	.01	1	.01	.16
Experimenter (B)	.13	1	.13	4.09
A x B	.00	1	.00	.01
Residual	.38	12	.03	
Total	.74	19		

*p < .05 F = 4.75

Appendix 3

TABLE 11

Analysis of Variance of Negative Physical Approaches Emitted by the Experimental Adolescents

Sources	Sum of Squares	Degrees of Freedom	Mean Squares	F Values
Blocks	0	4	0	0
Treatments	0	3	0	
Adolescents (A)	0	1	0	0
Experimenter (B)	0	1	0	0
A x B	0	1	0	0
Residual	0	12	0	
Total	0	19		

*$p < .05$ $F = 4.75$