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The Effect of Modeling on Cooperation in the Laboratory and in the Natural Environment

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THE EFFECT OF MODELING ON COOPERATION IN THE LABORATORY AND IN THE NATURAL ENVIRONMENT

by

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Janice V. Siegel

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The Effect of Modeling on Cooperation
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by

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In this study a multiple-baseline design was used to determine the effectiveness of three different modeling sequences in increasing cooperative behavior in children in a laboratory situation. The research also assessed the short- and long-term effects of the laboratory procedures on children's behavior in a free-play setting.

Subjects were 9 pairs of preschool-aged children. In the laboratory situation pairs of subjects performed a block-stacking task which allowed them to respond either cooperatively or independently. Following baseline periods of varying lengths, the pairs of children were exposed to one of three videotapes of cooperative models. In Tape 1 adult models demonstrated cooperative behavior, but exhibited no verbal behavior. In Tape 2 the models made positive statements about cooperation contiguous with the demonstration of cooperative behavior. In Tape 3 the models demonstrated cooperation, made contiguous

positive statements about cooperation, and in addition, they received differential positive reinforcement for cooperation.

Although three of nine teams showed a significant increase in mutually cooperative responding, consistent multiple baseline control was not demonstrated. Therefore, it could not be conclusively stated that the videotaped cooperative models were effective in increasing children's mutually cooperative responding in the laboratory.

A significant increase in parallel play was noted between laboratory partners in free-play periods immediately following the laboratory sessions; however, this increased interaction was not obvious when 5-day and 6-week follow-up observations were made.

(129 pages)

INTRODUCTION

Hake and Vukelich (1972) conclude that the defining characteristics of any cooperation procedure are:

> 1) that the reinforcers of both individuals are at least in part dependent upon the responses of the other individual, and 2) that the procedure allows such responses, designated as cooperative responses, to result in an equitable division of responses and reinforcers. (p. 333)

Such a definition allows for procedural variability. For example, cooperation has been defined by several researchers (e.g., Altman, 1971; Azrin & Lindsley, 1956; Weingold & Webster, 1964) as a synchronized motor response. Other researchers have studied cooperation by observing children build block towers (Goldberg & Maccoby, 1965) or by placing them in marble "tug-of-war" games (Madsen, 1971).

In his 1975 review of the cooperation literature, Bryan points out that there have been two major research thrusts in the area of cooperation in children. One large body of research has dealt primarily with the influence of various subject characteristics such as age, sex, race, and cultural differences upon the cooperation process. This research has been reviewed by Cook and Stingle (1974) and Bryan (1975). This paper will briefly summarize the research regarding sex and age differences since these have relevance to the current research.

Another body of research has dealt with methods of influencing cooperation. For example, a number of authors (Azrin & Lindsley, 1956; Brotsky & Thomas, 1967; Mithaug & Burgess, 1967, 1968; Vogler, Masters &

Morrill, 1970, 1971; Weingold & Webster, 1964) have studied the influence of reinforcement upon the development of cooperation in children. Other authors (Jensen & Moore, 1977; Kagan & Madsen, 1977) have found that instructional sets influence the way children perform in a cooperative task. However, as Cook and Stingle (1974) and Bryan (1975) point out, even though modeling is considered a powerful technique for behavior change, few studies have dealt with the influence of modeling on cooperative behavior. Chittenden (1942) used doll models in an attempt to reduce aggression and increase cooperative play in a group of preschool children who displayed excessive aggression and domination of classmates in the classroom situation. In this study dolls played the role of preschool children who were trying to work out solutions to problem situations where there was one toy to be used by two children. During training sessions an adult and child worked out solutions to the problems together. The child was then given a series of test situations in which he had to determine an appropriate solution to the problem. Children who had received training performed better on the post-test than did a control group of aggressive children who had received no training. The children who received training were observed in the classroom situation before the test program began, immediately after the program ended, and then one month later. The children displayed significantly less aggression and more cooperative play after training than they did prior to training. The decrease in aggression was still obvious one month after training; however, the increase in cooperative responding was not evident. The observational data provided by this study must be accepted with caution, however,

since the control group of children was not observed in the classroom situation. It is conceivable that other factors such as increased familiarity with classmates or the preschool situation could have accounted for the reported results. It should be noted also that this study, although it did use models to teach cooperation, is somewhat different from typical studies on imitation learning. Typically children are shown a model performing the experimental task for a relatively brief period of time. Then they are placed in a test situation to see if they will imitate the model's behavior. In the Chittenden study the children interacted extensively with adults, discussing the model's behavior during the training sessions. It is not clear from the study whether the obtained results were due to the model's influence, the interaction and discussion with the adult, or a combination of factors.

Hoeckele (1972), using 5-, 6-, 7-, and 8-year-olds, showed a cooperative modeling film, a competitive modeling film, or no film to children prior to placing them in a block-building situation where they could respond either cooperatively or independently. Results of the study indicated that the cooperative model was not effective in fostering cooperative behavior; however, the competitive model did increase competitive behavior, particularly in males. This study, unlike the Chittenden (1942) study, allows one to evaluate the effects of modeling alone without confounding factors such as discussion with adults; however, a number of other factors about the methodology of the study make the results somewhat difficult to interpret. First, unlike previous research where children are placed in pairs or groups in a cooperative task, the children in the Hoeckele study were placed

individually in a block-building task. The child was given the option of (a) building a house for himself/herself (defined as a competitive response) to be exhibited in a block-building competition or (b) of working on a house that his/her "team" was supposed to complete to enter in the contest (defined as a cooperative response). None of the team members were present, and the subject was not told who the members of the team were. Second, no incentives were offered or mentioned for building his/her own house or the team house. Finally, the tasks performed by the cooperative or competitive puppets in the film models were different from the experimental task presented to the child.

In reviewing the literature on cooperation, it appears that these two studies (Chittenden, 1942; Hoeckele, 1972) provide the only data available regarding the effectiveness of modeling procedures in training cooperative behavior. The results of the two studies are not in agreement; i.e., one study suggests that modeling procedures may be useful in increasing cooperative behavior in children, while the other indicates that they are of little or no value. The contradictory results are probably due to the very different procedures used by the two researchers. As was described earlier, however, factors about the methodology of both studies make the results difficult to interpret. Thus, no clear statement can be made regarding the effectiveness of modeling procedures in training cooperative behavior.

An important concern for researchers in the behavioral sciences is the generality of behavior change from one environmental situation to others. As Baer and Wolf (1970) point out, the results of behavioral intervention "should be manifest in all environments, should expand

in detail and scope, and should endure" (p. 319). A few studies have dealt with the impact of a laboratory cooperation task upon social behavior in children outside of the laboratory task situation. Hingtgen, Sanders, and DeMyer (1965) taught children who had been diagnosed as childhood schizophrenics to perform a cooperative task in which a lever-press response by one partner made reinforcement available to the other, and vice versa. These authors report that all subjects directed vocal responses and facial expressions toward their partners and, in a number of cases, the partners made physical contact with each other. It appeared that making the children dependent upon each other caused them to attempt to communicate. Powers and Powers (1971) report a similar effect when retarded children worked together on a cooperative task where one partner's response was necessary for the other's reinforcement. Neither of these studies report any generalization of the effect of increased social responsiveness to situations outside the laboratory, however. Hingtgen and Trost (1966) reinforced pairs of children who had been diagnosed as schizophrenics for cooperative lever-presses and, in addition, provided direct reinforcement for social interaction within the laboratory situation. These authors found that social responsiveness generalized to adults in the natural environment, but not to other peers.

Blau and Rafferty (1970) measured friendship status among pre-schoolers by having them rate classmates in terms of desirability as playmates in various situations. They found that children who were paired and reinforced for a cooperative response (placing styli in matching holes at opposite ends of a table) in the laboratory situation

increased in friendship status in their partner's eyes. The effect was not present in pairs of children who performed the task but did not receive reinforcement. In this study no attempt was made to restrict pairs on the basis of sex.

Altman (1971) is the only study which provides observational data with normal children regarding the effects of a laboratory cooperation task on behavior outside the laboratory situation. The purpose of the study was to determine whether cooperative responses developed in a laboratory would influence social behavior in a free-play situation. In this study pairs of preschool children were seated beside each other facing a large panel. Each child had two levers, one above the other. Cooperation was defined as pulling the two top levers or the two bottom levers simultaneously. He found that all children (19 dyads) who participated in the study showed an increase in social interaction with the partner they had worked with in the laboratory when they were returned to the free-play setting; however, those children who actually learned the cooperative task (7 dyads) showed an increase in social interaction with other children, not only their partners, in the free-play setting. The actual behaviors observed to increase after participation in the cooperation task by these authors were two categories: (a) association, which was defined as children's being "aware of a common interest, activity, or goal;" and (b) friendly approach, which was defined as "the use of neutral, pleasant, friendly, or helpful words" (p. 390) to another person. Observations were made immediately after the children participated in the laboratory task. Although one might hypothesize that increases in social interaction

would be maintained over time if the children's increased social responsiveness was reinforced by peers, no data was given regarding the durability of the behavior change over time. As was the case with the Chittenden (1942) study, the results of this study must be accepted cautiously. The authors did not observe a group of children who had not received training on the cooperative task; therefore, the possibility that increases in social interaction were the result of variables other than the experimental manipulations cannot be discounted.

STATEMENT OF THE PROBLEM AND PURPOSE

A review of available research on cooperation with children indicated several problem areas. First, there were few studies investigating the effectiveness of modeling procedures in teaching cooperative behavior. The results of those studies which had investigated this variable (Chittenden, 1942; Hoeckele, 1972) had a number of procedural irregularities which made the results difficult to interpret. For example, Chittenden (1942) who found that cooperative models increased cooperation in children, included extensive interaction and discussion with adults as a part of the modeling procedure. This made it difficult to determine whether the results obtained from the study were due to the model's influence, the discussion with adults, or a combination of these and other factors. Hoeckele (1972) concluded that viewing a cooperative model did not increase cooperative responding; however, she attempted to measure cooperation by placing children individually in the cooperative task. All past studies have defined cooperation as involving two or more individuals. The problem addressed by the research that follows was that existing data are contradictory in terms of the effect of modeling on cooperative behavior in children.

One purpose of the present study was to determine whether viewing a cooperative model would increase cooperative responding in normal children in the laboratory situation. A review of the literature also

suggested that variables such as verbal expressions and the reinforcement given to models might influence whether or not children imitated the behavior of models; therefore, the present study used three different modeling sequences to attempt to increase cooperative responding in children. In one sequence adult models demonstrated cooperative behavior, but exhibited no verbal behavior. In another sequence the models made positive statements about cooperation contiguous with the demonstration of cooperative behavior. In a third sequence, the models demonstrated cooperation, made contiguous positive statements about cooperation, and in addition, they received positive reinforcement for cooperation.

There was only one study with normal children (Altman, 1971) which provided observational data suggesting that cooperative responding developed in the laboratory generalized to other settings. The validity of this finding has not been established. A second purpose of this research was to determine whether cooperation, if developed via modeling procedures in the laboratory situation, generalized (i.e., increased social responding) to the free-play situation.

The Altman (1971) study provided information regarding the short-term generalization effects of participation in a cooperative task; however, no data were available regarding the durability of this effect over time. The third purpose of the present research was to determine whether any observed increase in social responding in the free-play situation was durable over time.

To summarize, the purpose of the present research was three-fold; (a) to determine the effectiveness of three different modeling

sequences in increasing cooperative behavior in normal children in the laboratory situation, (b) to determine whether cooperation developed in the laboratory generalized to the free-play situation, and (c) to determine the durability of changes in behavior in the free-play situation.

REVIEW OF THE LITERATURE

The purpose of this review of literature is to discuss those aspects of the cooperation and modeling/imitation literature that have relevance to the design of the current research. It is not meant to be a review of the entire scope of literature in these areas since both areas have been extensively reviewed by other authors. Bryan (1975) and Cook and Stingle (1974) have published extensive reviews in the area of cooperation in children. Flanders (1968) and Bandura (1969) have reviewed the literature on modeling effects.

The following review will discuss: (a) procedures that have been used to study cooperation in the laboratory and in the natural environment; (b) certain subject characteristics (age and sex) that have been found to influence cooperation in children, (c) a number of characteristics of the modeling situation that have been found to affect imitation, and finally, (d) the effects of modeling on pro-social behavior other than cooperation.

Cooperation--Methodological Strategies and Concerns

Laboratory studies of cooperation. Procedures used to study cooperation in the laboratory have varied widely. A number of researchers have defined cooperation as a synchronized motor response. Azrin and Lindsley (1956) placed children at opposite sides of a table.

In front of each child were three holes and a stylus. In this situation a cooperative response was defined as both children placing a stylus in a hole opposite each other within .04 sec. Variations of this procedure, where cooperation is defined as synchronized pushing of plungers, levers, or buttons, have been used by a number of other authors (Altman, 1971; Blau & Rafferty, 1970; Brotsky & Thomas, 1967; Cohen, 1962; Wasik, Senn, & Epanchin, 1969; Weingold & Webster, 1964). Mithaug and Burgess (1967), studying the development of cooperation in triads of children, made the task somewhat more complex. Children were placed in front of a 14-key panel and required to simultaneously play the correct key when a musical note was flashed on a screen (the children could not read music).

Goldberg and Maccoby (1965) and Jenson and Moore (1977) used a block-building task to study the development of cooperation in groups of children. In that situation each child involved in the task was given a stack of blocks of a different color. The group was given 15 seconds to build a single tower. At the end of this time period, each child was given a prize for each of his/her particular colored blocks in the tower. If the tower was in a state of collapse at the end of the time period, none of the children received rewards. In this situation it was adaptive to learn to cooperate by taking turns stacking the blocks.

Another task that has been widely used in the study of cooperation in children is called the "Madsen Cooperation Board" (Madsen, 1967; Nelson & Madsen, 1969; Shapira & Madsen, 1969; Thomas, 1975). This game consists of a square board with an eyelet screwed into each corner.

An object is placed in the center of the board and strings run from the object to all four corners of the board. A child is seated at each corner of the board. Children are instructed to try to move the object from the center of the board to his/her particular goal located somewhere on the board (but not directly in front of him/her) to win a prize. Since the string passes through the eyelet the child can pull the string only in his/her own direction, and thus needs aid from the other children playing the game to reach his/her goal. If all four children compete, no one reaches their goal, so cooperative behavior such as taking turns is adaptive. This game has been used with subjects as young as 4 years of age. A similar game called the circle matrix game was devised by Kagan and Madsen (1971). The game board is composed of columns of circles. Children seated at opposite sides of the board try to move the marker from inside the matrix of circles to their goal on the outside edge of the circle. Again, competition is non-adaptive; children must devise some scheme of cooperation to win.

Madsen (1971) devised a marble "tug-of-war" game to be used in the study of cooperative behavior in young children. In this situation children are placed at opposite ends of a table. Strings are attached to a marble holder positioned in the center of the table. The children are allowed to retrieve and keep the marble in the holder when it reaches their own side of the table. If the children compete by both pulling on the holder at the same time, the holder falls apart and the marble is lost to both of them; a cooperative turn-taking strategy is necessary.

Hake and Vukelich (1972) reviewed the procedures that have been used to study cooperation and classified them along several dimensions: (a) the degree to which reinforcement of an individual is dependent upon responses by the partner, (b) the degree to which responses and reinforcers are equally distributed between partners, (c) the degree to which subjects are aware of their partner's participation in the cooperation situation, and (d) the availability of alternative non-cooperative responses.

In most of the methodologies described above, cooperation is forced; there is no alternative response which will lead to reinforcement. Mithaug (1969) devised a study to determine the variables that control a child's choice to cooperate or to play individually when he/she is provided with a reinforced alternative to cooperation. In the study an independent response by the child produced the same reinforcer as the cooperative response. Using triads of children between the ages of 5 and 10 years in the 14-key response situation described earlier, this author found that children generally chose to respond independently. Children cooperated in the situation (a) if rewards for cooperation were greater than rewards for individual responding and (b) if subjects could discriminate the relative reinforcement available for cooperation and individual responding.

Naturalistic studies of cooperation. In contrast to the laboratory situation where cooperation is generally one clearly defined response, cooperation manifests itself in many different behaviors of the child in the natural environment. Most of the studies of cooperation in

the natural environment have dealt with preschool age children. Parten (1932) studied the development of social behavior in children from 2 to 5 years of age. Forty-two children attending a nursery school were observed for one minute daily in a free-play setting for a period of approximately nine months. This author defined cooperation as follows:

> The child plays in a group that is organized for the purpose of making some material product, or of striving to attain some competitive goal, or of dramatizing situations of adult and group life, or of playing formal games. There is a marked sense of belonging or not belonging to the group. The control of the group situation is in the hands of one or two of the members who direct the activity of the others. The goal as well as the method of attaining it necessitates a division of labor, taking of different roles by the various group members and the organization of activity so that the efforts of one child are supplemented by those of another. (p. 251)

Parten concluded from her observations that cooperative behavior increases with age. Before reaching a stage where cooperative behavior is evident, children progress through a series of other stages: solitary play, looking on at group play, parallel play, and associative group play. Associative group play, the stage just under cooperative play, differs from cooperative play in that any one child's play is not dependent upon another child's activities as is the case in cooperative play.

Graves (1937) defined cooperation as "the carrying on of an activity with definite regard for and dependence upon another child" (p. 344). This author observed 29 children ranging in age from 27 to 66 months in a free-play setting. Results of this study also indicated that cooperation increases with age.

Bijou, Petersen, Harris, Allen, and Johnston (1969) describe a general response code to be used to study behavior in the field setting. These authors describe cooperative behavior as children "engaged in a 'shared play' activity, in which reinforcement is derived largely from the mutual use of materials or from the presence of the other child" (p. 186). Cooperative play is differentiated from parallel play where the children play together primarily because of the reinforcing properties of the play material or because activity is being structured by an outside agent such as the teacher. Some examples of cooperative play would be children pulling one another in a wagon; children wrestling or playing an organized game such as "cowboys"; individuals playing with the same toy; or a couple of children exchanging objects with each other, like throwing leaves at one another. Examples of parallel play would be children digging with separate shovels in the same general location with no interaction or sharing between them; two children observing fish in a fish tank; or children playing in a doll corner independently of one another.

Differences between sharing and cooperation. Some recent researchers have attempted to differentiate between various forms of pro-social behavior (such as sharing and cooperation) that in past studies have been included under the same definition. For example, Bijou, et al. (1969) use the words "shared play" in their definition of cooperation.

Hake, Vukelich, and Olvera (1975) attempted to differentiate between sharing and cooperation in the laboratory setting using a matching-to-sample procedure. These authors suggest that sharing

occurs when one subject allows another individual to take reinforcers; for example, "one child takes X number of cookies and then does not respond while the other child takes the same number of cookies" (p. 71). According to the authors, sharing becomes cooperation when one subject must make an overt response before the other can take a reinforcer; "the reinforcers of each individual would then be in part dependent upon the letting response of the coactor. . . the letting responses would be cooperative responses" (p. 71).

In order to make the distinctions between cooperation and sharing indicated by Hake, et al. an observer must know the status of the coactors (i.e., who has control of reinforcers) and see the beginning of the sharing/cooperative incident. Using an interval method of recording to observe several subjects in sequential order, an observer would have difficulty making such distinctions because he/she often would not be observing a particular child at the beginning of a sharing/cooperative behavioral incident. Because of this difficulty the current study will not attempt to differentiate sharing from cooperation in making observations in the natural environment.

Subject Variables

Past research on cooperation has indicated that the development of cooperation may be related to various characteristics such as the age and sex of the child. This review will summarize these research findings since they have relevance to the design of the current research.

Age variables. Cooperative behavior tends to increase with age throughout the preschool years (Graves, 1937; Parten, 1932). Barnes (1971) replicated the Parten study and also found that cooperative

play increased with age. Barnes concluded, however, that the preschoolers in his sample were less socially oriented than the children observed by Parten in 1932. The author suggests a number of variations between the two populations sampled which might, at least in part, account for this difference: (a) Parten's sample came from an urban population whereas Barnes' sample was drawn from a smaller community; (b) the children were not matched on such variables as IQ, race, and proportion of mothers working; and (c) Barnes sampled Canadian children whereas Parten's sample was American. Friedrich and Stein (1973) in observing children ranging from 3.8 to 5.5 years of age concluded that older children were more socially interactive, particularly in the areas of cooperation and nurturance, than were younger children.

Beyond the preschool years, however, there is considerable evidence that indicates that cooperative behavior decreases or takes a different form and competitive behavior increases. Kagan and Madsen (1971), using children from three cultures to play the circle matrix game, found that 4- and 5-year-olds in all cultures were more cooperative than 7- to 9-year-olds. Madsen (1971), looking at American children, found that 4- to 5-year-olds were significantly more cooperative than were 7- to 8- or 10- to 11-year-olds on the marble "tug-of-war" game. Even when the older children were given specific instructions on how to take turns (cooperate) in order to win, competitive behavior remained at a high level (7- to 8-year-olds continued to compete on 44% of the trials; 10- to 11-year-olds, on 62% of the trials). Using the same game, Madsen and Conner (1973) compared the behavior of 6- to 7- and 11- to 12-year old retarded children with children of normal intelligence.

Retarded children were found to be significantly more cooperative than non-retarded children, and younger retarded children were more cooperative than older. It appears, then, that age of the subjects can be a significant factor in studying cooperative behavior. Because older children seem to compete rather than cooperate, regardless of the reinforcement contingencies, preschool children were chosen to serve as subjects in the current study.

One explanation for this decrease in cooperative behavior across age might be that as the child develops, society places greater emphasis on individual achievement as compared to socialization skills and group-oriented activities that are frequently emphasized at the preschool age. Bryan (1975) points out another possible explanation. Most of the studies that indicate that cooperation increases with age have used preschoolers in naturalistic settings. The studies with older children, however, have been experimental studies where the child has only two possible alternatives--to compete or to cooperate. Bryan suggests the possibility that older children in the naturalistic setting might be able to cooperate without sacrificing competition and compete without decreasing cooperativeness.

Sex variables. Most studies of cooperative behavior fail to show sex differences (Brotsky & Thomas, 1967; Graves, 1937; Madsen, 1971; Nelson & Madsen, 1969). For those studies that do show sex differences the results are inconclusive. For example, Wasik et al. (1969) found boys to be more cooperative than girls whereas Shapira and Madsen (1969) found boys to be more competitive than girls. Tedeschi, Hiester, and Gahagan (1969), studying children in the Prisoner's Dilemma Game,

found females to be more cooperative than males when rewards were relatively great or small in magnitude. When rewards were in the intermediate range, males were more cooperative than females. These results suggest that various environmental factors may affect boys' and girls' cooperative behavior differently. Thus, broad generalizations regarding sex differences in cooperative tasks may not be useful or valid.

Model Characteristics

Research in the area of modeling and imitation suggests a number of characteristics of the modeling situation (e.g., age of the model; whether or not the model is reinforced for responses) that may increase or decrease the probability that an individual will choose to imitate a specific model's behavior. This review will discuss some areas of this literature that are relevant to the design of the current research.

Live versus film models. One question of importance in designing the current research was the effectiveness of film models as compared to live models. Bandura, Ross, and Ross (1963a) compared the effects of three kinds of aggressive models in increasing aggressive behavior in nursery school children. In this study 48 boys and 48 girls were divided into three experimental and one control group. The children in the experimental groups saw one of the following: a real-life adult aggressive model, a film of an adult aggressive model, or an aggressive cartoon character. They observed the aggressive models playing with toys and then were given the opportunity to play with similar toys. The control group of children were observed in the generalization situation with no exposure to models. Results of the study indicated

that all experimental procedures were effective as compared to control procedures in increasing aggressive play behavior. There were no significant differences between the three experimental groups in total aggression; however, the authors suggest that the human film may have been the most influential condition because children in this group performed significantly higher than those in the remaining conditions on aggressive gun play.

Since this study by Bandura et al., several other studies (e.g., Liebert & Baron, 1972; Steuer, Applefield, & Smith, 1971) have shown that observation of filmed aggression significantly increases aggressive behavior in children. Friedrich and Stein (1973) demonstrated that observing prosocial film models increased task persistence, rule obedience, and tolerance of delays in preschool children. In addition, these authors found that viewing prosocial television programs increased cooperative play, nurturance, and verbalizations of feelings in children from low socioeconomic backgrounds.

The results of the studies cited above indicate rather clearly that filmed models are highly effective in modifying behavior. Since film models are effective they were chosen for the current study for practical reasons. First, the experimenter can be certain that all subjects view the model behaving in exactly the same way (this does not assure, however, that all children's perceptions of the model are the same). Live models might inadvertently change their behavior in subtle ways across repeated performances. Secondly, film models are more convenient because they save on research assistant time and scheduling.

Age. A number of studies with children have investigated the effectiveness of models as a function of age, i.e., peer versus adult models. Jakubczak and Walters (1959) measured the suggestibility of 8- to 10-year-old boys who were rated as having either high or low dependency needs. The boys were placed twice in an experimental situation where they were required to make judgments regarding the movement and visibility of a light. On one occasion an adult confederate expressed opinions that were contrary to the subject's; on another occasion, contrary opinions were expressed by a peer. Results indicated that children with high dependency needs were more susceptible to suggestions from either adults or peers. Results, in general, indicated that adults were more effective in giving suggestions (i.e., adult models caused children to alter their judgment more often than did peer models).

Bandura and Kupers (1964), using children 7 to 9 years of age, investigated the effect of imitative learning on self-reinforcement. In this experiment children observed a model--either an adult or a peer--reinforcing himself/herself with candy for playing a bowling game. After viewing the model the child was given the opportunity to play the game. Results of the study indicated that children matched self-reward patterns of adult models more precisely than peer models.

Hicks (1965), using preschool-aged children, studied the effectiveness of filmed adult models as compared to filmed peer models in increasing aggression with a procedure similar to that used by Bandura et al., (1963a). One-half of the children observed a model of the same sex; the remaining children observed a model of the opposite sex. After observing the model playing aggressively with various toys, the

children were placed individually in a room with toys similar to those used by the model and incidents of aggression were observed. Results of the study indicated that all experimental groups significantly increased aggressive responses in children. Children who observed a peer male scored significantly higher than children who observed an adult male or peer female (but not significantly higher than those who observed an adult female). Only children who observed an adult male showed increased aggression at a six month follow-up.

Looking at the data then, there is evidence to suggest that children may be more influenced by an adult model than by peer models. Adult models were chosen for the current research for this reason.

Bandura and Kupers (1964) give one possible explanation for the finding that adults are more influential models for children than peers:

> Because of differential competencies, adults are likely to exhibit more successful and rewarding responses than peers and, therefore, to the extent that children are differentially rewarded for matching adult and peer models, adults would eventually become the more powerful modeling stimuli. (p. 2)

Sex. The influence of the sex of the model upon imitative behavior is another characteristic that has been investigated. McDavid (1959), using 32 preschool children, did an experiment to determine the effects of sex of the subject, sex of the model, and age of the subject on imitative behavior. The children were reinforced on all trials for imitating an adult model on a sample matching task (choosing behind which door candy was located). Looking at the total number of imitative responses, the authors concluded that none of the variables affected imitation. Bandura and Kupers (1964), in the study on self-reinforcement described earlier, found no effect due to the sex of the model.

Other studies such as Bandura, et al. (1963a) and Hicks (1965), both of which were described earlier, found sex of the model to interact with other variables (for example, with age of the model in Hicks, 1965). Flanders (1968) concludes from his review of the literature that no dependable effects can be seen in the data regarding the effects of the sex of the model upon imitative behavior. Therefore, generalizations regarding the variable cannot be made at this time.

Positive affect of model. Rushton (1976), in looking at the characteristics that make models effective in influencing altruistic behavior, suggests that possibly the best inducer of imitative altruism is a powerful model who demonstrates positive affect prior to or contiguous with behaving in a specific manner. Rushton (1975), using children 7 to 11 years of age in a factorial design, investigated the effects of a model's generous versus selfish behavior and the model's generous versus selfish versus neutral preachings upon children's donations of winnings to a "needy" child. In the generous preaching condition an adult model said things such as: "We should share our tokens with Bobby [a needy child];" "It's good to give to kids like him." The selfish model said, "It's not good to give to kids like him." Neutral models made statements like, "This is a nice game;" "I really like playing this game" (p. 461). Surprisingly, Rushton found that the neutral models were the most effective. If the children saw a sharing model saying it was fun to share, they shared more; if they saw a greedy model saying it was fun to hoard, they hoarded more. The authors concluded that "rather than the model providing a 'neutral' preaching, he provided a source of positive affect" (p. 464). Rushton

and Owen (1975) replicated this finding with a similar population of children using filmed models instead of live models. Again the authors found that the models who talked about how "fun" the game was were most effective whether they modeled selfish or generous behavior.

Midlarsky and Bryan (1972), using fourth and fifth grade children, studied the effects of contiguous versus non-contiguous positive affect of a model on increasing altruistic behavior in children. For example, in the contiguous positive affect condition, each time the model made a donation to charity (i.e., each time he dropped chips into a jar) he smiled and said something such as, "It feels good to give money" (p. 198). In the non-contiguous affect condition the model expressed positive affect each time he won a chip, but not at the time of donating. Results indicated that contiguous positive affect was more effective in increasing imitation in children. Midlarsky and Bryan (1976) also found that non-contiguous model affect had no significant effect on altruistic behavior.

It appears then that, at least in the area of altruistic or sharing behavior, positive verbalizations by a model presented contiguously with behavior will increase children's imitation of the model's behavior.

Reinforcement of the model. A number of past studies have shown that providing reinforcement to a model contingent upon a specific behavior will increase the probability that observers will imitate the model's behavior.

Bandura, Ross, and Ross (1963b), using 80 nursery school children as subjects, did a study to determine the effect of various consequences

to a model upon the imitative aggressive play behavior of children. One group of children saw a filmed adult model reinforced for playing aggressively with toys. Another group saw the model punished for playing aggressively with the toys. Another group of children saw a model playing non-aggressively, and a final control group saw no model. The children were observed for 20 minutes while they played with toys similar to those used by the model in the film, and imitative aggressive responses were tallied. Children who saw an aggressive model reinforced imitated significantly more than those in the other three conditions.

Clark (1965) compared the effects of continuous reinforcement and non-reinforcement of a peer model on a button pressing task. Subjects were 18 boys between the ages of 9 and 11 years. The models were boys of the same age. Subjects were seated beside a model at a button pressing task, and 50 unreinforced (neither the model nor the subject was reinforced) trials were given to determine the child's baseline level of imitation. For 50 trials following the baseline trials the children received tokens for imitating the model's response. One-half of the subjects saw a model who was reinforced on each trial. The remaining subjects observed a model who never received reinforcement. Results indicated that during baseline both groups of children imitated the model at about chance level. During the conditioning period the children who saw a model who was reinforced significantly increased in imitation. The children who observed a non-reinforced model tended to respond in the opposite direction (counter-imitated) from the model, even though they were being reinforced for imitation.

Bandura, Grusec, and Menlove (1967), using children between the ages of 7 and 11 years of age as subjects, measured the effect of various model reward conditions on children's imitation of standards of self-reinforcement. Children observed an adult model play a bowling game and exhibit very high standards for self-reward. One-half of the children saw the adult model verbally praised by the experimenter for exhibiting such stringent self-reinforcement standards; the remaining children observed a model who received no reinforcement. Results showed that children who saw the model praised for high standards of self-reinforcement were more likely to imitate the high standards than those who saw the model who received no socially rewarding consequences.

The findings of the studies cited above indicate that children are more likely to match the behavior of models who are reinforced for the same behavior. Other research (Kanfer & Marston, 1963; Marston, 1966) suggests that these findings also hold true for adults.

Effects of Modeling on Other Pro-Social Behavior

Although modeling procedures have not been used extensively in the area of cooperative behavior, these procedures have been useful in modifying other prosocial behavior. O'Connor (1969) demonstrated the usefulness of modeling techniques in increasing social interaction in nursery school children who were rated by their teachers as interacting least with their peers. The social isolates as well as a control group of children were observed for a period of 32 15-sec intervals over a period of 8 days prior to intervention. Children were rated on physical proximity, verbal interaction, "looking at," and "interacting

with" peers. One-half of the children who were rated as social isolates (six children) were then shown a 23-min film showing children interacting with other children in a nursery school setting. The film depicted pleasant consequences for social interaction, and a narrator described the scenes calling attention to relevant cues. The remaining social isolates (seven children) saw a 20-min control film of dolphins performing tricks with a musical background. No human figures appeared in the film. Immediately after the film presentations children were again observed in their classrooms. Results indicated that social isolates who had seen the experimental film significantly increased their level of social interaction to the level of a control group of non-isolate children. Isolate children who saw the control film showed no increase in social interaction. Follow-up observational data was not collected.

More recent follow-up work on this study (O'Connor, 1972) compared the relative effectiveness of modeling with shaping procedures in modifying the behavior of socially withdrawn nursery school children. In this study isolate and non-isolate children were observed before and after various treatments. The children who were rated as social isolates (N=31) were divided into one of four treatment groups: (a) one group saw a film showing nursery school children interacting (the same film used in O'Connor, 1969); (b) another group saw the film of nursery school children, and in addition, received a shaping treatment where social reinforcement for successive approximations to social interaction was given by trained graduate students for a two-week period following the film; (c) a third group of children saw a control film

(O'Connor, 1969); and (d) a final group of children saw the control film but then received the shaping treatment for two weeks following the film. Results of the study indicated that both modeling and shaping procedures were effective in increasing social interaction of the social isolates to the level of non-isolate controls; however, the modeling procedure brought about more rapid behavior change than the shaping procedure. Six weeks following the termination of all treatment, the increased levels of social interaction were still evident in the modeling (nursery school film) alone and modeling plus shaping group; however, children who received the shaping procedure alone were no different from children who had only seen the control film (of dolphins).

Keller and Carlson (1974) used modeling procedures similar to those used by O'Connor (1969, 1972) to try to increase the rate at which preschool isolates dispensed social reinforcers. Isolates (N=19) were observed prior to treatment, immediately after treatment, and then for follow-up three weeks after the final treatment session. Observers counted the frequency with which children dispensed and received social reinforcement as well as other social interactions. One-half of the isolates saw four videotapes, one on each of four consecutive days, showing models delivering social reinforcement to peers. Social reinforcing behaviors were defined as imitation, smiling and laughing, token giving, or affectionate physical contact. Control subjects were shown nature films on four consecutive days. Social isolates who saw the videotapes of models delivering social reinforcement significantly increased their frequency of verbalizations, imitation, smiling and social interaction, in general. Those children were also observed

to receive significantly more reinforcement from peers than did the control group of isolates. However, the authors found that the treatment group was not significantly different from the control group 3 weeks later when the follow-up data was collected. All observations in the study were made by observers who were blind to the isolate or non-isolate status of the subjects, treatment conditions, and the experimental hypotheses.

Jakibchuk and Ameriglio (1976), using a procedure and population similar to that used by O'Connor (1969, 1972) and Keller and Carlson (1974), studied the effect of having the narrator of the films depicting social interaction use first-person (e.g., "I'm glad I decided to play.") versus third-person (e.g., "He's glad he decided to play.") in describing the scenes. These authors found the first-person narrative to be more effective in producing increases in social interaction.

A number of studies have investigated the effects of various modeling procedures on altruistic or sharing behavior in children; and indeed, the research indicates that an altruistic model can enhance a child's subsequent sharing behavior. A number of aspects about the modeling situation have been investigated; for example, the effects of hypocrisy in models (Bryan, Redfield, & Mader, 1971; Bryan & Walbeck, 1970a); the effects of a powerful versus a weak model (Bryan & Walbek, 1971b); and the effect of various affect expressions of the model (Midlarsky & Bryan, 1972). These studies have been reviewed elsewhere (Bryan, 1975; Rushton, 1976) and thus, will not be discussed further in this review.

METHOD

Subjects

Eighteen children enrolled in one classroom at the University of Maryland preschool program served as subjects. These 18 children, 12 boys and 6 girls, comprised the entire class with the exception of one other child (not included in the study) who attended the class on a temporary basis during the middle of the semester. The subjects' ages ranged from 3 years, 8 months to 5 years, 0 months. Approval for the research was obtained from the director of the preschool program and from the Utah State University Human Subjects Committee. Parents of the children gave their consent for their child's participation in the project (see Appendix A for a copy of the consent form). The children were randomly divided into two-member teams, with the exception that two children who spoke English as a second language were not paired. Four teams were composed of two boys; four were boy-girl teams; and one team was composed of two girls. The following demographic data was collected on each child: age, race, number and age of siblings, and parents' occupation.

The racial make-up of the preschool class was quite heterogeneous. There were 4 black children, 3 Japanese children, and 11 white children. For two Japanese boys, Japanese was the primary language spoken in the home situation. One of the boys (SY) had attended the preschool during the previous year and appeared to understand spoken English

(i.e., he followed instructions and answered questions appropriately); however, the other child (SA) did not seem to understand English except for a few phrases that were used daily in the classroom, and he spoke very little English.

Apparatus

Figure 1 is a diagram of the experimental apparatus used in the study. The apparatus consisted of a board (approximately 1 m x 0.1 m) with three attached posts. The two outer posts were equidistant (approximately 0.3 m) from the center post. The outer posts were 6.5 cm in height, and the center post was 13 cm (or twice the height of the outer posts). All three posts were approximately 2 cm in diameter. Each team member was given a different colored square block (6.5 cm). The block had a hole through the center that allowed it to fit onto any of the three posts. Each block was equal in height to the outer posts (thus only one block would fit on the outer posts) and one-half the height of the center post (thus two blocks would fit on the center post).

Teammates were seated beside each other at a short (child-sized) table with the apparatus approximately 15 cm from the edge of the table in front of them. Each child was seated so that he/she was directly in front of one of the outer posts on the apparatus.

When a bell was sounded by the experimenter, the child could choose to put his block on the short post directly in front of him, which was defined as an independent response; or he/she could choose to put his/her block on the taller center post, which was defined as a cooperative response.

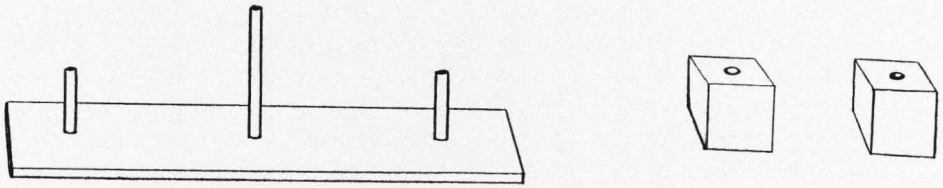


Figure 1. The experimental apparatus.

The apparatus used in the study was devised to allow the child to choose between making a cooperative response or responding independently. As was pointed out in the Review of the Literature, the methodologies of most past studies forced cooperation by failing to provide an alternative response that would also lead to reinforcement. To avoid confounding the effects of reinforcement with other treatments attempting to increase cooperation (in the case of the current study, modeling), it was important that cooperative responding not be more reinforcing than independent responding. Therefore, in the present study reinforcement was given for any response, either cooperative or independent.

Videotapes used in the study were made in cooperation with the Educational Technology Center at the University of Maryland. The children observed the taped sequences on a 19-inch black and white television monitor. A portable cassette tape recorder with earphones was used in the collection of observational data. Observers heard a recorded message which indicated intervals for observing and recording behavior. A voice on the tape said, "Observe," then after 10 sec, "Record." After a 5-sec recording interval, the voice said, "Observe," again.

Small stickers and edibles (such as raisins and peanuts) were used as reinforcers. Poker chip tokens were used as "money" to purchase these items.

Procedure

Design. The design was a multiple baseline design (Baer, Wolf, & Risley, 1968; Hersen & Barlow, 1976) across subjects. The effects

of three different modeling treatments were assessed. The multiple baseline design is used to indicate the reliability of a procedure in situations where a reversal design is not appropriate. In the design a baseline is established for several behaviors or for the same behavior in several individuals. The experimenter then applies the experimental procedure to each individual (or behavior) at different points in time (i.e., after baseline periods of different lengths). If changes in each baseline are noted after, but not before, the application of the experimental procedure, the effectiveness of the procedure can be assumed (Baer et al., 1968).

Within each of the three modeling treatment conditions one pair of subjects was exposed to a model after 3 days of baseline; a second pair was exposed to a model after 5 days of baseline; and a third, after 7 days of baseline with the exception that teams always remained in baseline until the data from the last session was no more than one standard deviation above the mean of the data from the previous two sessions. Teams of children were randomly assigned a 3-, 5-, or 7-day baseline. Figure 2 is a diagram of the order of the procedures for subjects within each treatment condition.

Sociometric data. On the first day of each child's baseline period, prior to any explanation of what went on in the laboratory, the experimenter took each child aside individually and collected verbal data from each child regarding his/her preferences in playmates. This procedure could not be used with one child (SA); because of language difficulties, he did not understand the questions asked of him. The experimenter showed each subject pictures of all of the students in

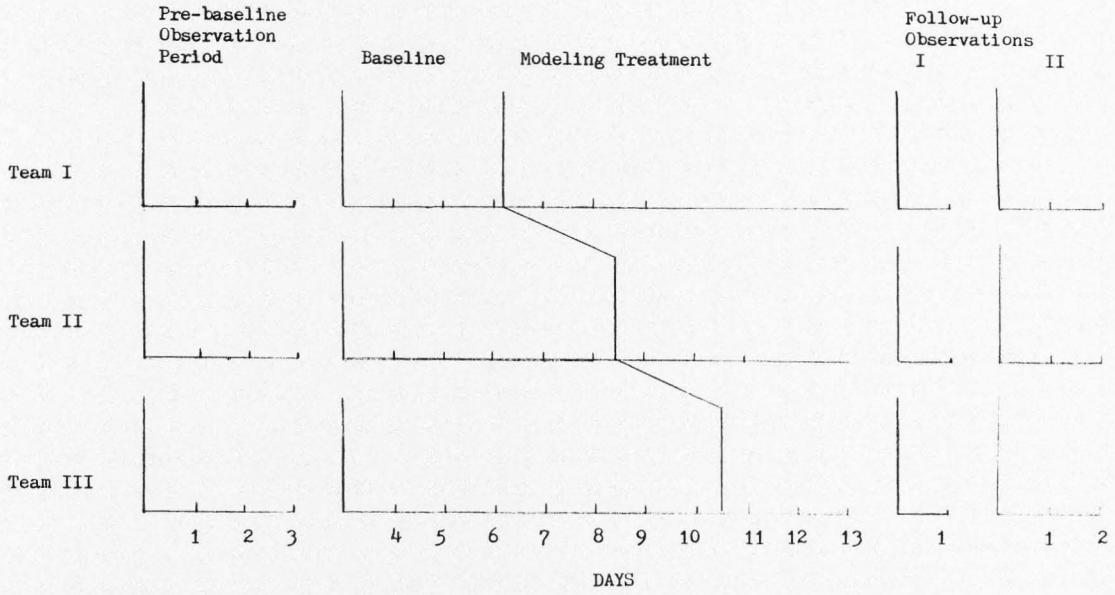


Figure 2. Order of procedures within each treatment condition.

the class and asked the subject to name each child in the pictures. If the subject did not know the names of all the children or if he/she gave an incorrect name, he/she was informed of the correct name. After all the children's pictures had been identified, the experimenter asked the subject to choose two people he/she liked to play with best. This procedure was repeated for each child on the last day of the treatment condition to determine whether there were changes in children's preferences (as indicated by verbal responses) as a function of being paired in the experimental setting. A similar procedure was used by Blau and Rafferty (1970). These authors found test-retest reliability of the procedures to be .546 after 7 days. These authors found that children who were paired and reinforced for cooperative responses in the laboratory increased in friendship status.

Familiarization procedure. Pairs of children were taken from their classroom to the laboratory by the experimenter. Children were taken through a brief familiarization procedure on the first day that they came to a session. The experimenter explained how poker chips could be earned and exchanged for toys as follows:

> These chips are like money. They will buy things at our store. Here are 10 chips which you can spend now. I will show you a way to earn more chips later.

Each child was allowed to spend the 10 chips immediately, so that he/she had the opportunity to sample the reinforcers. Then the children were seated at the table in front of the experimental apparatus.

Baseline. Following the familiarization procedure, on the first day of baseline, the experimenter read the following instructions to the child:

> We're going to play a game today where you can earn chips to buy more toys. When I ring the bell, I will give you a chip for putting your block on one of these three towers (the experimenter pointed to the apparatus).

The experimenter demonstrated how the "game" worked as follows:

> If you (Subject 1) put your block on this tower (experimenter placed a block on the short tower in front of Subject 1), you will earn a chip like this (experimenter dropped a chip in Subject 1's cup). If you (Subject 2) put your block on this tower (experimenter placed the other block on the short tower in front of Subject 2), you will earn a chip like this (experimenter dropped a chip in Subject 2's cup).
>
> (Experimenter then took blocks off the small towers and put them on the center tower.) If you both put them on this tall tower, you will both earn a chip like this (experimenter dropped a chip in both cups). Once you put your block on one tower, do not move it. I will take the blocks off of the towers. (Experimenter then removed the blocks from the tower and laid a block in front of each child.)

In the above description of the experimenter's demonstration, the

experimenter demonstrated how to earn points by playing independently (i.e., putting blocks on short towers) before demonstrating how to earn chips by cooperating. For four pairs of subjects (randomly selected) the demonstration was conducted as stated above. For the remaining five pairs of children, the experimenter demonstrated the cooperative response (filling the tall tower) before demonstrating the independent response.

The experimenter, seated across the table in front of the children, rang the bell to begin a trial. The trial ended when both children had placed their block on one of the towers, and the experimenter had delivered chips to both children simultaneously. Children were given paper cups in which to collect chips. After the chips had been delivered, the experimenter removed the blocks from the towers, and placed them in front of the subjects.

Children received a chip for any response they made, i.e., for putting their block on the short tower or the taller, middle tower. If a child put his/her block on the middle tower, the response was scored as cooperation. If the child placed his/her block on the short tower, the response was scored as independent. Definitions of cooperation used in past studies (see Hake & Vukelich, 1972) required that both children respond cooperatively for either to receive reinforcement. If such a definition had been applied to the current study, children would have received chips if both responded independently; however they would not have received chips for cooperating unless both children placed their blocks on the middle tower. Thus,

if one child placed his/hers on the cooperative tower and the other placed his/hers on the independent tower, the child who responded independently would have received chips for responding independently; the child who attempted to cooperate would not have been reinforced (because the partner chose to play independently). Such a reinforcement procedure might have biased the results against cooperation since on a number of occasions a child might have failed to receive reinforcement for attempting to cooperate. To avoid this bias, reinforcement was given for any response of putting blocks on towers.

The experimenter avoided initiating conversation with the children during the session. If the children asked questions about which tower they could place their block on, the experimenter responded: "You earn chips by placing your block on either the tall middle tower or the short tower in front of you."

Children received a total of 20 trials each day. At the end of each session children were allowed to exchange their chips for small toys or edibles. (The whole procedure required the children to be absent from the classroom for approximately 10 minutes daily.)

On subsequent sessions (following the first day of baseline) the experimenter did not demonstrate how the game worked. The only instructions given were as follows:

> Remember, you earn chips in this game by putting your blocks on one of the towers. Don't move your block after you have placed it on one of the towers. I will take them off the tower for you.

Cooperative model conditions. After baseline the pairs of subjects were exposed to one of three videotapes (depending upon the modeling treatment condition to which the pair was assigned) of models playing the block stacking game. Two college students, a male and a female, served as models in all three tapes. Adults rather than peers were chosen to serve as models because past research suggests children may more readily imitate the behavior of adults (Bandura & Kupers, 1964; Jakubczak & Walters, 1959). The same experimenter who worked with the pairs of children daily served as the experimenter in all three videotapes. All three tapes were approximately four minutes in length.

Three pairs of children having baselines of varying lengths (see "Design" section) were randomly assigned to each of the following modeling conditions:

1. Cooperative behavior only. This videotape showed the experimenter giving brief instructions on how to play the game to the adult models. Following the instructions the tape showed the college students playing 15 trials and earning chips just as the subjects did each day. The students in the tape always played the game cooperatively; i.e., both players always placed their block on the tall center tower. Neither the models nor the experimenter talked on this tape (except for the experimenter's reading of the instructions).

2. Cooperative behavior plus positive verbalizations. This tape was similar to the tape described above, except that in the present condition at various intervals (Trials 1, 4, 7, 10, 12, and 15) the models in the film made positive statements about cooperation

on the task (e.g., "It's fun to play this game when we both put our blocks on the tall tower;" "It's fun to work together").

3. Cooperative behavior, positive verbalizations, and differential reinforcement to models. This tape showed models who cooperated on approximately half of the trials (Trials 1, 4, 7, 10, 12, and 15) and who played independently on the remaining trials. On the trials where the models cooperated, they made positive statements regarding cooperation; and in addition, the experimenter provided differential positive reinforcement to the models for cooperation. The tape showed the experimenter delivering five chips on the trials where the models cooperated and only one chip for independent responses. See Appendix B for the complete scripts of the three films.

On the day a team was to view the model, the children were seated in front of a TV monitor when they arrived for the session, and the following instructions were read by the experimenter:

> I'd like for you to watch some other people playing the game that you've been playing. Watch very carefully how they play the game.

After reading the instructions, the experimenter was seated on a chair approximately 2 m. behind the children. If the children asked questions of the experimenter during the taped presentation, the experimenter answered: "Watch the TV. We'll have time to talk later."

Following the film the children were placed in front of the experimental apparatus and allowed to play for 20 trials as in the baseline condition.

Regardless of their performance in the experimental setting following exposure to the model, all pairs of children observed the

models three times (i.e., at the beginning of three sessions). This equalization of the number of exposures to the modeling treatment was carried out because children were observed in the free-play setting following each session, and the effect of differing numbers of exposures to the treatment upon the observational data was not known.

After the children had completed the laboratory segment of the experiment (i.e., on the last day of the treatment phase), children were taken aside individually and asked the following question to assess their comprehension of the taped sequence: How did the two people on the TV play the game?

Laboratory data collection. The experimenter recorded on a data sheet whether each subject in a team responded independently or cooperatively (i.e., put his/her block on the short tower or the center, taller tower) on each trial in the laboratory setting.

The experimenter also kept a record of the frequency of two classes of the subject's verbalizations during the 20 daily trials in the laboratory. The verbalizations for each subject were classified as follows:

1. Verbalizations which were a suggestion or were in agreement to respond cooperatively. For example, "I'm going to put my block on the big tower this time," or "If I put my block on this tower (middle tower), you put yours on there, too."

2. Verbalizations which were a suggestion or were in agreement to respond independently. For example, "I'm going to put my block on my own tower this time."

An independent observer sat in a separate booth attached to the laboratory and recorded the behavior of the children in the laboratory situation during seven different laboratory sessions. The observer checked whether each child made a cooperative or an independent response. Due to the physical arrangement of the observation booth, the observer could not hear all the verbalizations of the children, thus could not record verbal behavior.

Observational data. Three categories of children's behavior were observed in the free-play setting to determine the effects of experimental manipulations on the child's behavior in the natural environment. The free-play situation was defined as time in which the teacher did not structure the activities of the children. This does not mean that teachers did not interact with the children during the free-play period. During this period the teachers sometimes played games or read to small groups of children, but the children were free to leave the teacher and play with any toy or at any of a number of activity centers in the room. The behavioral categories observed were as follows:

1. Verbalizations. Subject verbalized to another child. Verbalizations to teachers and other adults were not recorded. Observers classified verbalizations as either positive/neutral or negative.

2. Parallel-play. Subject was engaged in an activity with another child "in which their staying together can be attributed primarily. . . to the reinforcing properties of the play material."

3. Cooperative play. Subject and another child were "engaged in a 'shared play' activity, in which reinforcement is derived largely from the mutual use of materials or from the presence of the other child."

The definitions for the latter two categories were taken from Bijou, et al. (1969, p. 186). For complete definitions and examples of the behaviors observed see Appendix C.

The observers' data sheets had an additional column (independent/other behavior) that was checked if the behavior did not fit into any of the previously defined categories. This was carried out (a) to help observers keep their place on the data sheet by requiring a response on each interval, and (b) so that when reliability checks were being made between two observers, one observer's making a check on the data sheet did not influence the behavior of the other observer.

Each of the 18 children were observed for 72 observational periods of 10 sec each (for a total of 12 minutes of observation time per child) prior to their entering the baseline condition. In most cases, 24 observations were made on each child daily. Observers used a tape-recording with pre-recorded messages which indicated the beginnings of 10-sec observation periods and 5-sec recording intervals to aid in collection of data. During the 5-sec recording intervals, the observer recorded on the data sheet whether or not an incident of the three behaviors (verbalizations, parallel play, or cooperative play) defined above occurred during the previous 10 seconds. In addition, the observer checked on the data sheet whether the verbalizations, parallel play, or cooperative incidents involved a particular child's teammate in the experimental session (teammates were assigned prior to pre-baseline observations; however, the children did not learn the identity of their partner until the first day of baseline).

Each subject was also observed for 24 10-sec intervals daily during baseline and treatment (modeling) conditions. These observations

were made following the child's participation in the laboratory proceedings. (The number of daily observations both in baseline and treatment phases occasionally varied somewhat due to the varying length of time that was allotted for free-play daily.)

Follow-up data to determine the long-term effects of the experimental manipulations were repeated twice on each team of subjects. The exact number of days between treatment and the first follow-up and between the first and second follow-ups varied from team to team due to absences and school holidays. On the average, however, the first follow-up observations of 24 10-sec intervals were made 5 days following the last day of participation in the laboratory setting. The second set of follow-up observations were made on each team, on the average, six weeks following their last day of participation in the laboratory. At the second follow-up subjects were observed in the free-play setting for two days (24 10-sec intervals per day).

Observers and reliability data. The primary observer for the experiment was a doctoral-level graduate student in a developmental psychology program at the University of Maryland. Reliability checks were made approximately twice weekly (on 17 different days) throughout the course of the study. On these occasions a second observer, an undergraduate student in education, independently recorded the behavior of the children. Both observers were blind to the purpose of the experimenter and to the time when treatment occurred (i.e., they knew that children were periodically taken from the classroom by the experimenter, but they did not know what went on in the laboratory sessions). Observers were trained in observing children in the free-play

setting until a reliability of 85% was reached on each category of behavior for at least two days. Both observers received copies of the definitions of behavior that were to be observed (Appendix C). Throughout the training sessions a number of questions and problems arose. Appendix D contains some guidelines that were developed to answer specific problems that developed during the training sessions.

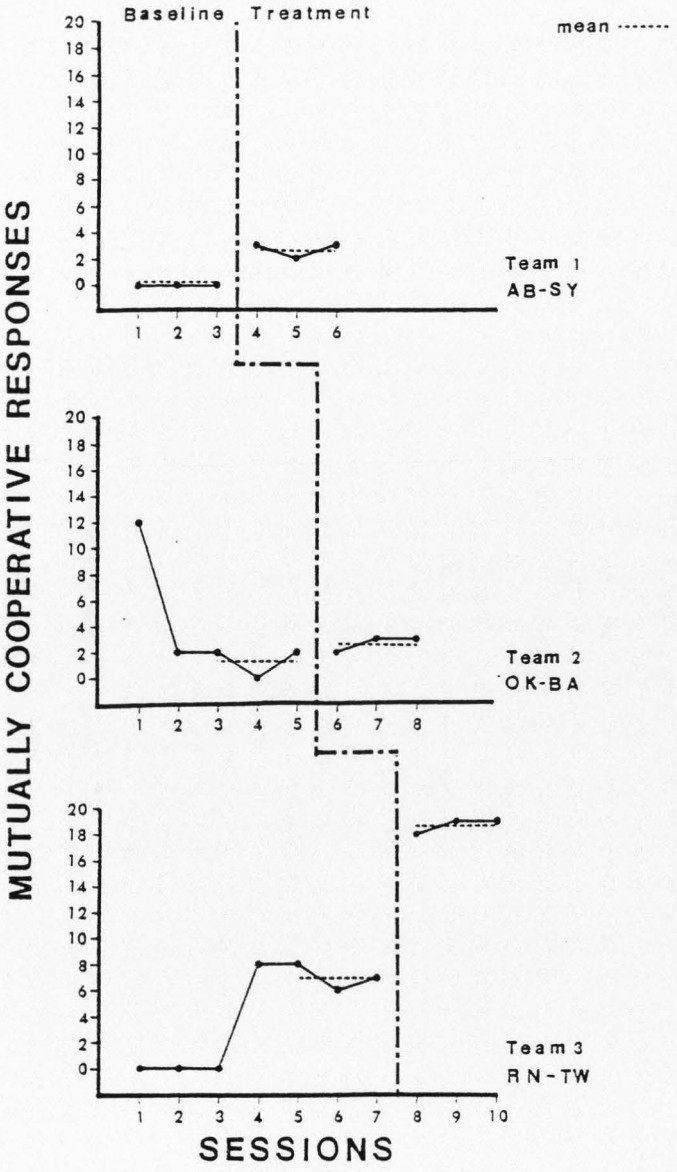
RESULTS

Laboratory Data

Cooperative behavior only model. Figure 3 shows the number of mutually cooperative trials for all experimental sessions for the teams of children who were shown the videotape of the cooperative behavior only models. The dashed lines on the graph indicate the mean number of mutually cooperative responses observed during the last 3 days of baseline and during the treatment phase for each team. Team 1, consisting of subjects AB and SY, had a 3-day baseline prior to viewing the film; Team 2 (OK and BA) had a 5-day baseline; and Team 3 (RN and TW), a 7-day baseline. Comparing the mean number of mutually cooperative responses during the last 3 days of baseline to the mean number of mutually cooperative responses during treatment sessions, Team 1 increased from a mean of 0 during baseline to a mean of 2.67 during treatment. Team 2 increased from a mean of 1.67 to a mean of 2.67. Team 3 showed a substantial increase in mutually cooperative responding, from a mean of 7 during baseline to a mean of 18.6 during the treatment phase, and this increase was maintained throughout the 3 days that the tape was shown.

For the purposes of this study a gain of four (which is 20% of the total number of mutually cooperative responses possible per session) in the mean number of mutually cooperative responses from the last 3 days of baseline to the treatment period was considered to be a

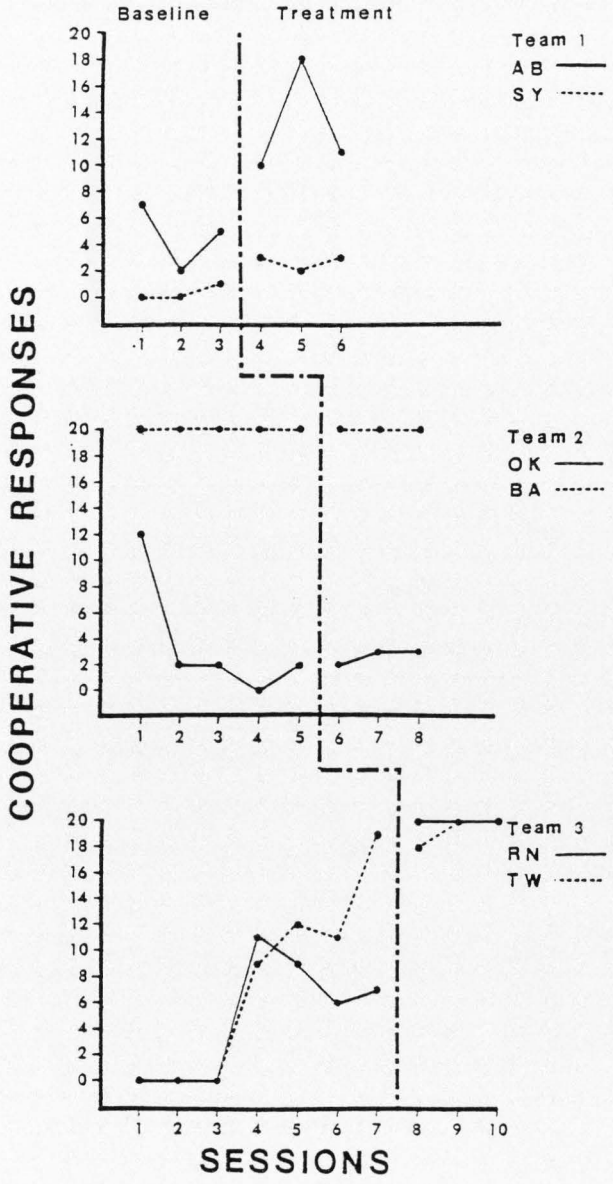
Figure 3. Number of mutually cooperative responses by teams exposed to the cooperative behavior only modeling condition across experimental sessions.


Baseline
Treatment
mean -------
MUTUALLY COOPERATIVE RESPONSES
Team 1
AB-SY
Team 2
OK-BA
Team 3
RN-TW
SESSIONS

significant increase. This criterion was chosen because the criteria used in past studies were not appropriate for the design of the present study. For example, a number of past studies (Azrin & Lindsley, 1956; Blau & Rafferty, 1970; Vogler, Masters, & Morrill, 1971) placed children in the laboratory for specified periods of time and looked at the rate of cooperative responding. Altman (1971) determined that children had learned his cooperative task when they reached a criterion of 10 consecutive cooperative trials. The criteria used in past studies do not take into account the possibility of children's reaching a cooperative state (e.g., in the case of Altman, 1971, making 10 consecutive mutually cooperative responses) and then switching to independent responding. In fact, since the design of most past studies did not provide reinforcement for any other response except cooperation, it would seem unlikely that children would switch from cooperative responding once they had learned the response. The mean statistic used in the present study reflects the pattern of the children's cooperative responding over the entire treatment period. Using the criterion stated above, only one team (Team 3) showed a significant increase in mutually cooperative responding.

Figure 4 shows the number of cooperative trials made by each individual subject who was exposed to the cooperative behavior only condition. Of the six children only three showed a significant gain (defined as an increase of 4 in the mean number of cooperative responses from the last 3 days of baseline to treatment) in cooperative responses from the last 3 days of baseline to the treatment condition. AB of Team 1 increased from a mean of 4.67 responses during the last

Figure 4. Number of cooperative responses by individual subjects exposed to the cooperative behavior only modeling condition across experimental sessions.

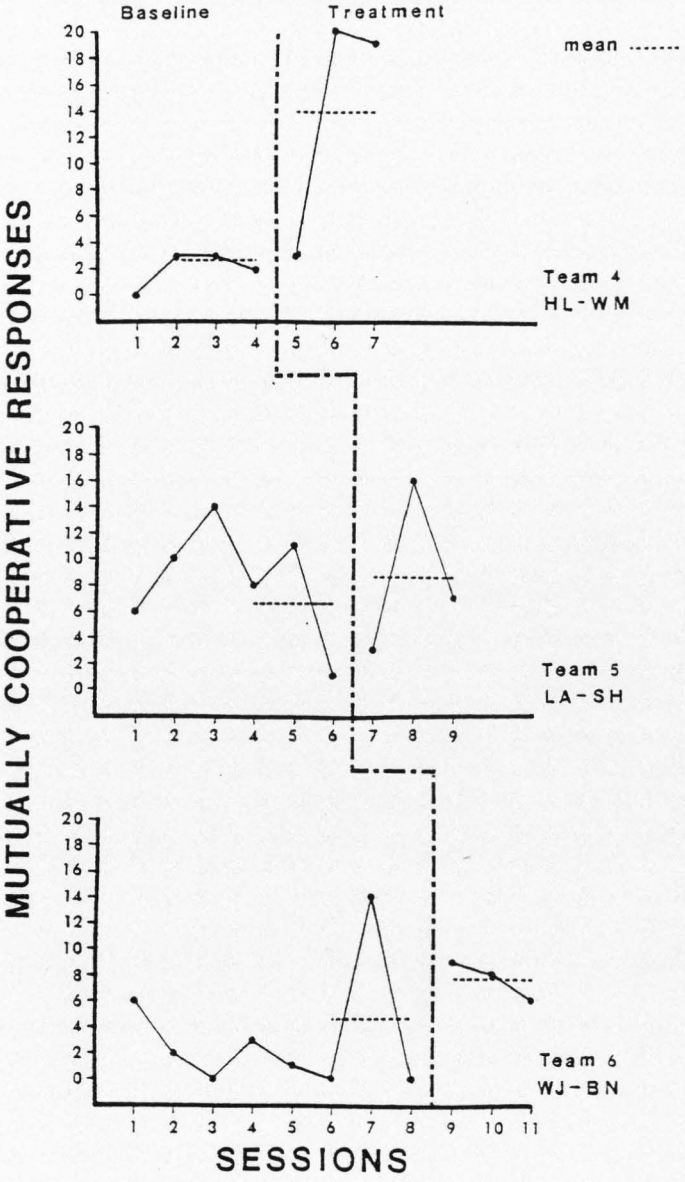

Baseline
Treatment
Team 1
A B
S Y
Team 2
O K
B A
Team 3
R N
T W
COOPERATIVE RESPONSES
SESSIONS

3 days of baseline to a mean of 13.33 during treatment. RN of Team 3 increased from a mean of 7.33 (during the last three days of baseline) to 20 during treatment. TW, also from Team 3, showed an increase from 14 to 20.

Analysis of the verbal interactions between the children in both Teams 1 and 3 indicated that one team member encouraged the other to put his/her block on the tall tower. In Team 1 AB said, "He should put his here, too (and pointed to the tall tower)," on the first trial following the presentation of the tape on the first 2 days of treatment. Note in Figure 4 that AB, himself, increased cooperative responses; however, there was little change in the pattern of SY's responses. TW of Team 3 encouraged RN to place her block on the tall tower at least once in 3 days during the baseline procedure. When this occurred RN would cooperate for some number of trials (on one day, one trial; on another, four; and another, five) and then switch to independent responding. As is obvious from the graph, once the tape was implemented RN responded cooperatively on every trial. In Team 2 individual team members did not change their pattern of responding significantly from baseline to the treatment phase. OK went from a mean of 1.33 during the last 3 days of baseline to a mean of 2.67 during treatment; BA's mean was 20 during baseline and 20 during treatment. In this team neither team member encouraged the other to cooperate.

Cooperative behavior plus verbalizations. Figure 5 shows the number of mutually cooperative trials for the teams of children exposed to the cooperative behavior plus verbalizations condition across experimental sessions. The dashed lines on the graph indicates the

Figure 5. Number of mutually cooperative responses by teams exposed to the cooperative behavior plus verbalizations modeling condition across experimental sessions.


Baseline
Treatment
mean
MUTUALLY COOPERATIVE RESPONSES
Team 4
HL-WM
Team 5
LA-SH
Team 6
WJ-BN
SESSIONS

mean number of mutually cooperative responses observed during the last three days and during the treatment phase for each team.

Of the three teams in this modeling condition only one showed a significant increase (4 or more) in the mean number of mutually cooperative responses from baseline to treatment. Team 4 increased mutually cooperative responding from a mean of 2.6 during the last 3 days of baseline to a mean of 14 during the treatment phase. Note on the graph, however, that the increase was not evident until the second day of treatment. Team 5 increased in mutually cooperative responses from a mean of 6.67 during baseline to 8.67 during treatment. Team 6 showed an increase in mutually cooperative responding from a mean of 4.6 during the last 3 days of baseline to a mean of 7.6 during treatment. Team 6 sustained a higher level of responding over the 3 days of treatment than they did in baseline, although the number of mutually cooperative trials on day 7 of baseline exceeded the number on any day during treatment.

Although there was only a slight increase in mutually cooperative responding from baseline to treatment for Team 5, the verbal data of the children suggests that the film did affect their behavior. Note on Figure 5 that the team showed a gradual increase in cooperative responding during the first 3 sessions of baseline, then mutually cooperative responding began to decrease. On day 8, the second day of viewing the videotape, the team showed an increase in cooperative responding--from 3 responses on day 7 to 16 on day 8. This increase in cooperative responding was accompanied by one subject's imitating the words of the model on the tape. On trial 7 of the second day of

treatment SH said, "It's 'funnest' to always put it on the tall tower," and began putting her block on the tower signifying cooperation. LA followed her response and both team members responded cooperatively throughout the next 14 trials. However, as is obvious from the graph, the mutually cooperative responding decreased the next day (session 9).

Similar verbal behavior was observed in Team 4. Following the second viewing of the tape as they began working in the laboratory situation, HL said to his partner, "It's more fun to play when we both put it on the tall tower." WJ and BN of Team 6 did not make statements to each other regarding placement of the blocks on the towers.

Figure 6 shows the number of cooperative trials made by each individual subject exposed to the cooperative behavior plus verbalizations condition for all experimental sessions. Of the six subjects in this condition, only three showed a significant gain (4 or more) in the mean number of cooperative responses from the last 3 days of baseline to treatment. HL and WM of Team 4 increased from a mean of 2.67 to a mean of 14 and from a mean of 11.33 to a mean of 16, respectively. WJ (of Team 6) increased from a mean of 4.67 during baseline to a mean of 9.33 during treatment. Team 5's data is of interest because LA and SH responded exactly the same way on each trial except for the last session. On each trial SH responded first, and then LA imitated her response.

Cooperative behavior, verbalizations, and differential reinforcement. Figure 7 shows the number of mutually cooperative responses by teams of subjects exposed to the cooperative behavior, verbalizations, and differential reinforcement modeling condition for all sessions. The

Figure 6. Number of cooperative responses by individual subjects exposed to the cooperative behavior plus verbalizations modeling condition across experimental sessions.

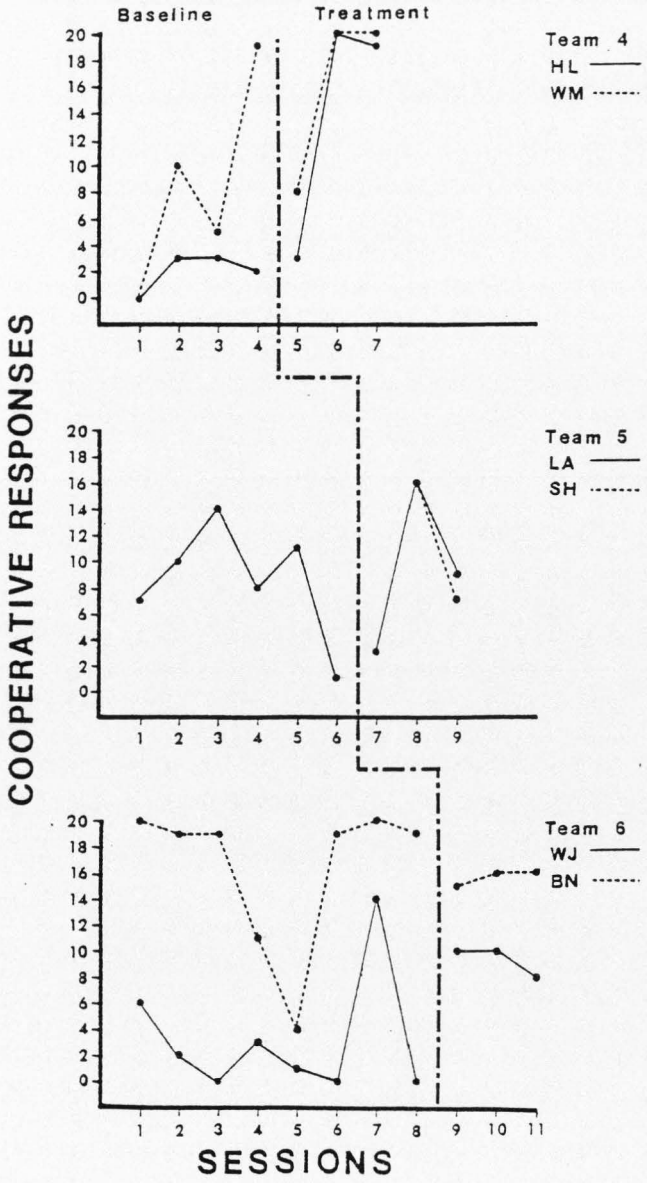
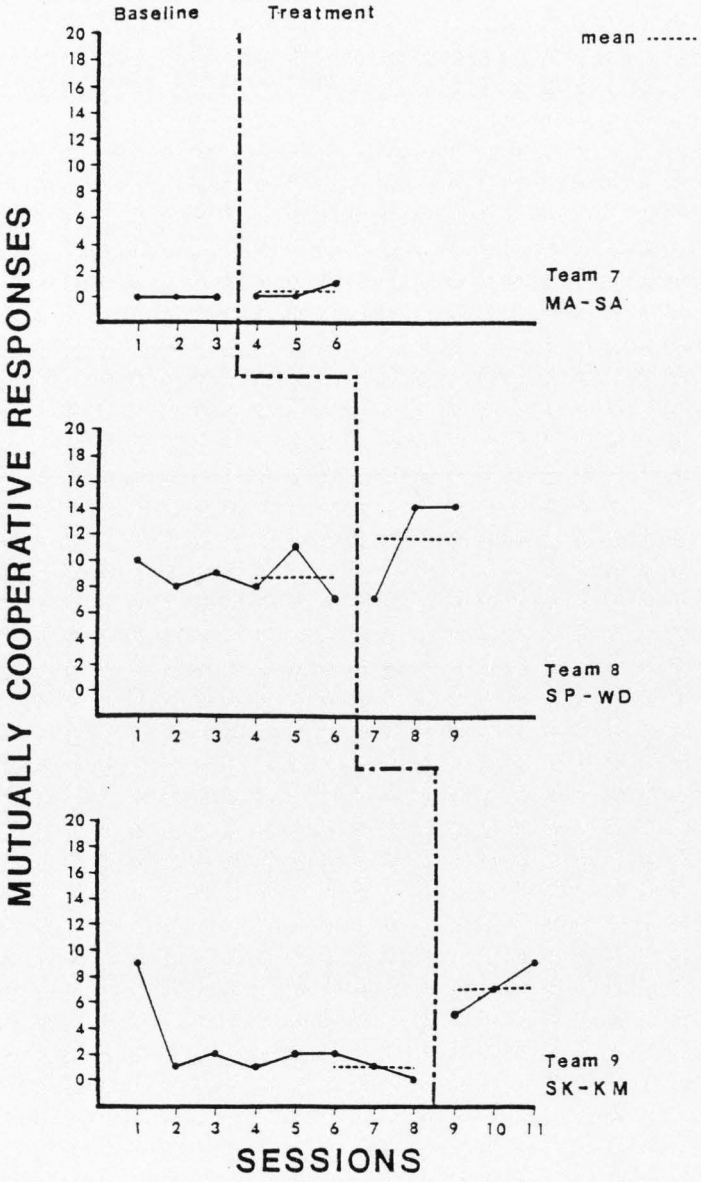

Baseline
Treatment
Team 4
HL
WM
Team 5
LA
SH
Team 6
WJ
BN
COOPERATIVE RESPONSES
SESSIONS

Figure 7. Number of mutually cooperative responses by teams exposed to the cooperative behavior, verbalizations, and differential reinforcement modeling condition across experimental sessions.


Baseline
Treatment
mean
MUTUALLY COOPERATIVE RESPONSES
Team 7
MA-SA
Team 8
SP-WD
Team 9
SK-KM
SESSIONS

dashed lines on the graph indicate the mean number of mutually cooperative responses observed during the last three days of baseline and during the treatment phase for each team. Team 8 had an ascending baseline after 5 days in the baseline phase, therefore, baseline was continued for another session. Team 9's baseline was extended by one day, accordingly.

As the graph indicates, Team 7 showed little increase in mutually cooperative responding from baseline to treatment. The mean number of mutually cooperative responses during baseline was 0, and this increased only to .33 during the treatment phase. Team 8's cooperative responding increased from 8.67 during baseline to 11.6 during treatment. Team 9 was the only team in this condition that showed a significant increase in mutually cooperative responding from baseline to treatment. For this team mutually cooperative responding increased from a mean of 1 during the last 3 days of baseline to a mean of 7 during treatment phase.

Although the graph does not show a significant increase in the number of mutually cooperative responses made by Team 7 following treatment, the verbal behavior of MA suggests that he was influenced by the tape. Neither subject made any attempt to influence the other's behavior until the final day of treatment. On this day MA said, "I'm going to put it on the tall tower." After placing his own block on the tall tower, he took SA's hand and "helped" him put his on the middle tower, also (thus, the one mutually cooperative response noted on Figure 7 on the final day of treatment). It should be noted that SA was the one Oriental child who appeared to speak or comprehend

very little English. MA continued cooperative responding for the next five trials; however, SA failed to cooperate past the first trial where he received assistance from MA (SA placed his block on the tower signifying cooperation one other time later in the session; however, MA had stopped playing cooperatively by that point). Analysis of the verbal behavior of Teams 8 and 9 revealed that in both cases one or both team members made statements either suggesting or agreeing to mutually cooperative responding after they viewed the tape.

Figure 8 shows the number of cooperative trials made by each individual subject exposed to the cooperative behavior, verbalizations, and differential reinforcement modeling condition for all experimental sessions. Three children showed a significant increase in the mean number of cooperative trials from the last 3 days of baseline to the treatment condition. WD of Team 8 increased from a mean of 9 during the last three days of baseline to a mean of 17 during treatment. SK and KM both of Team 9 increased from a mean of 4.33 to a mean of 11.67 and from a mean of 1.33 to 12.67, respectively.

Comparisons between conditions. Table 1 summarizes the performance of the teams in the various modeling conditions by showing the difference in the mean number of mutually cooperative responses displayed by each team from the last three days of baseline to the treatment period. All teams showed at least a slight increase in mutually cooperative responding from baseline to treatment. From the data it appears that no one treatment condition was any more effective than the others; i.e., one team in each condition showed a significant increase in mutually cooperative responding.

Table 1

Differences in Mean Number of Cooperative Responses between Baseline and Treatment Periods for Teams

Teams[a]	Difference[b]
Modeling Condition 1	
1. AB & SY	+2.67
2. OK & BA	+1.00
3. RN & TW	+11.60
Modeling Condition 2	
4. HL & WM	+11.40
5. LA & SH	+2.00
6. WJ & BN	+3.00
Modeling Condition 3	
7. MA & SA	+ .33
8. SP & WD	+2.93
9. SK & KM	+6.00

[a]Modeling Condition 1 = Cooperative behavior only
Modeling Condition 2 = Cooperative behavior plus verbalizations
Modeling Condition 3 = Cooperative behavior, verbalizations, and differential reinforcement

[b]Plus (+) signs indicate an increase from baseline to treatment period.

Table 2 shows the difference in the mean number of cooperative responses displayed by each individual subject from the last three days of baseline to the treatment period. The data from individual subjects does not show any one modeling condition to be superior to the other two. Three children in each condition showed a significant increase (4 or more) in cooperative responding from baseline to the treatment condition.

Verbal behavior. As has been described earlier, one child in a team often attempted to verbally influence the other's responses. Table 3 shows the number of times each subject suggested or agreed to cooperative responding during the last 3 days of baseline (data from the total baseline period is similar) and during the treatment phase. Nonparametric statistics (sign test for correlated samples) were used to determine whether a statistically significant number of subjects showed an increase in cooperative verbalizations from the baseline to the treatment period. Results were not statistically significant.

A record was also kept of the number of times subjects suggested or agreed to independent responding throughout the laboratory sessions. The data revealed that such verbalizations were made by only two subjects, only during the baseline period.

Demographic data. Non-parametric statistics were used to determine whether increases in cooperative responses in the laboratory were related to a number of subject variables. First, the subjects were classified as: (a) male or female, (b) being of white or non-white racial origin, (c) coming from a single-child or a multiple-child family, and (d) having professionally or non-professionally employed

Table 2

Difference in Mean Number of Cooperative Responses

Between Baseline and Treatment Periods

For Individual Subjects

Subjects[a]	Difference[b]
Modeling Condition 1[b]	
AB	+ 8.66
SY	+ 2.34
OK	+ 1.34
BA	0.00
RN	+12.67
TW	+ 5.33
Modeling Condition 2	
HL	+11.33
WM	+ 4.67
LA	+ 2.66
SH	+ 2.00
WH	+ 4.66
BN	- 3.66
Modeling Condition 3	
MA	- 3.34
SA	- 5.33
SP	+ 2.67
WD	+ 8.00
SK	+ 7.34
KM	+11.34

[a]Plus (+) signs indicate an increase from baseline to treatment; minus (-) signs, a decrease.

[b]Modeling Condition 1 = Cooperative behavior only
Modeling Condition 2 = Cooperative behavior plus verbalizations
Modeling Condition 3 = Cooperative behavior, verbalizations, and differential reinforcement

Table 3

Frequency of Pro-Cooperative Verbalizations

in the Laboratory

Subjects[a]	Baseline Period	Treatment Period
Modeling Condition 1		
AB	0	2
SY	0	0
OK	0	0
BA	0	0
RN	1	0
TW	3	0
Modeling Condition 2		
HL	0	3
WM	3	4
LA	0	0
SH	0	2
WJ	1	0
BN	0	0
Modeling Condition 3		
MA	0	1
SA	0	0
SP	1	1
WD	0	3
SK	0	1
KM	0	1

[a]Modeling Condition 1 = Cooperative behavior only
Modeling Condition 2 = Cooperative behavior plus verbalizations
Modeling Condition 3 = Cooperative behavior, verbalizations and differential reinforcement

parents. Then, coefficients of rank correlation (Kendall's) were computed to determine whether increases in cooperative responding following treatment were related to the subjects' classifications on the variables described above. The data of one child (BA) was excluded from this analysis because she cooperated on every trial during baseline (as well as treatment). Thus, it was not possible for her to increase cooperative responding as a result of viewing the videotape. Only racial origin was found to be significantly correlated with increased cooperative responding following treatment. White children showed greater increases in cooperative responding following treatment than did non-white children, $\tau_{(tau)} = .43$, $Z = 2.00$, $p \leq .05$.

A Spearman coefficient of rank correlation computed to determine whether age of the subjects was related to increases in cooperation was not statistically significant.

Responses to questions. At the end of their final day in the laboratory situation, all children were asked the following question: "How did the two people on the TV play the game?" One child (SA) did not understand the question due to language difficulties. Of the remaining 17 subjects, 12 (or 71%) stated correctly how the models had performed the task. Of the 12 subjects, four were in the cooperative behavior only group, 5 were in the cooperation behavior plus verbalization group, and three were in the differential reinforcement group. Two other subjects, in the modeling condition where filmed models received differential reinforcement for cooperative responses, stated correctly that the models placed the blocks on both the tall and the short towers, but they did not state for which response the

models received most chips. Three of the 17 subjects (or 18%) answered the question incorrectly; for example, stating that the models placed their blocks on all three towers when, in fact, they had seen models that consistently placed their blocks on the taller tower. Two of the children who answered incorrectly were in the cooperative behavior only group. The other child was in the cooperative behavior plus verbalization group. Interestingly though, 2 or the 3 children who responded incorrectly significantly increased cooperative responding following the videotape presentations.

Children were also asked to state two playmate preferences before and after the laboratory experience. Of the 17 children who responded to the question (again, SA did not understand the question), only one chose his partner to be a favored playmate initially. The probability of this occurring by chance was .12 (a child had two opportunities to choose his partner from the group of 17 classmates; 2/17 = .1176). At the end of the laboratory sessions four subjects chose their partners as preferred playmates. The probability of four children choosing their partners as preferred playmates was .0002 (2/17 x 2/17 x 2/17 x 2/17 = 16/83,521 or .0002).

Observational Data

Observational data were collected on four categories of the subjects' behavior: positive/neutral verbalizations, negative verbalizations, parallel play, and cooperative play. Negative verbalizations occurred very infrequently in the classroom setting; in fact, negative verbalizations were recorded in only 26 intervals

throughout the entire study. These 26 incidents of negative verbalizations were spread across 11 subjects across all experimental and treatment conditions. Because they occurred so infrequently, they will not be used as data in the study.

Individual subject's data. Consistent changes in subjects' positive verbal behavior were not observed as a function of the experimental manipulations. Figure 9 shows the verbal behavior of a sample child (OK) throughout the following phases of the experiment; the pre-observation period, the last three days of baseline, the treatment period, the five-day follow-up period, and the six-week follow-up. Likewise, the amount of time subjects spent in parallel and cooperative play did not change as a function of the experimental manipulations. Figure 10 shows the percentage of intervals daily in which parallel play occurred for a sample child (AB), and Figure 11 shows the cooperative play of a sample child (WM) across the phases of the experiment. Appendix E contains tables showing the mean percentage of intervals in which positive verbalizations, parallel play, and cooperative play occurred for all subjects in each modeling condition across the experimental manipulations.

Interactions between laboratory partners. Observers of the children's play in the classroom environment recorded the frequency of positive verbalizations, parallel play, and cooperative play between subjects who served as partners in the laboratory situation. Table 4 shows the mean percentage of intervals in which partners verbalized to each other across the following experimental conditions: pre-observation period, the first three days of baseline, the last

Figure 9. Percentage of intervals in which positive/neutral verbalizations were observed for one subject (OK--behavior only condition).

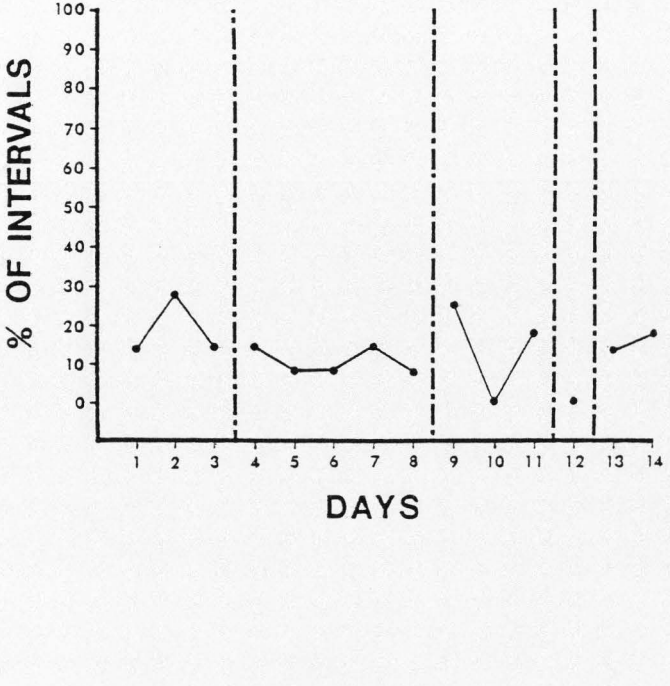

Pre-
Observation
Baseline
Treatment
Follow-ups
1
2
% OF INTERVALS
100
90
80
70
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
DAYS

Figure 10. Percentage of intervals in which parallel play was observed for one subject (AB--behavior only condition).

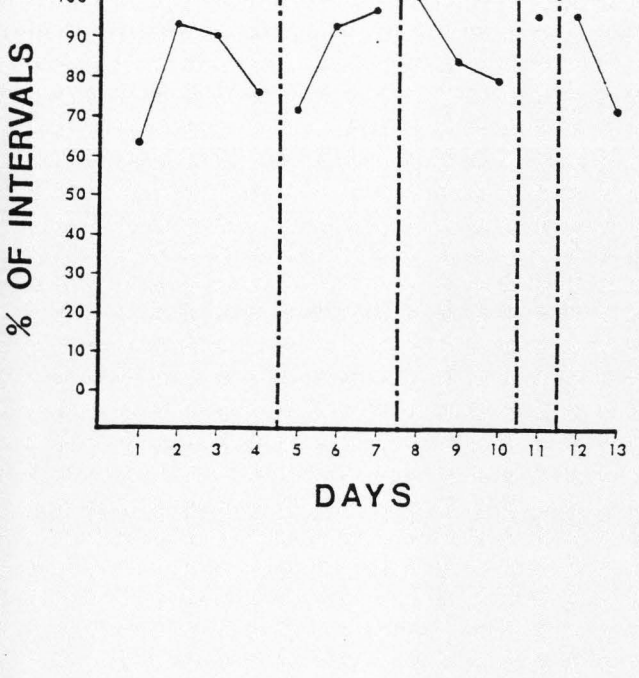

Pre-
Observation
Baseline
Treatment
Follow ups
1
2
% OF INTERVALS
100
90
80
70
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
9
10
11
12
13
DAYS

Figure 11. Percentage of intervals in which cooperative play was observed for one subject (WM--behavior plus verbalization condition).

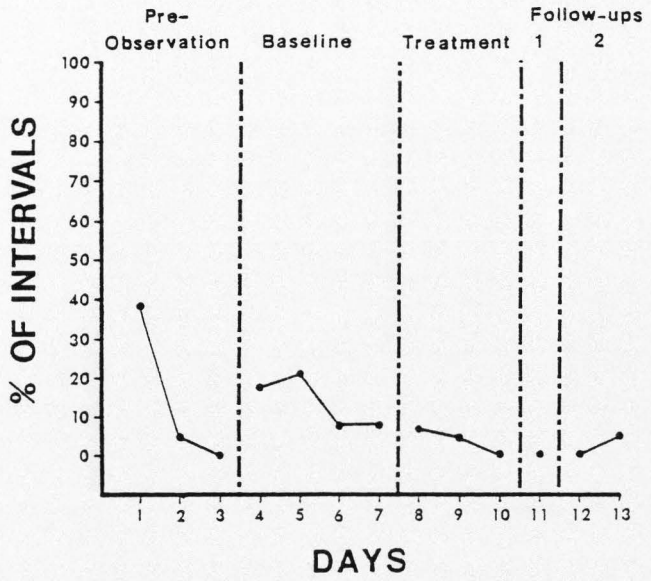

Pre-
Observation
Baseline
Treatment
Follow-ups
1
2
% OF INTERVALS
100
90
80
70
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
9
10
11
12
13
DAYS

Table 4

Mean Percentage of Positive Verbalizations

Between Laboratory Partners

Teams[b]	Experimental Conditions[a] A	B	C	D	E	F
Modeling Condition 1						
1. AB & SY	0	0	(0)[c]	0	0	0
2. OK & BA	0	0	0	0	0	0
3. RN & TW	0	0	.01	.01	-[d]	0
Modeling Condition 2						
4. HL & WM	.03	0	0	0	0	0
5. LA & SH	0	0	0	0	0	0
6. WJ & BN	0	0	0	0	0	.01
Modeling Condition 3						
7. MA & SA	.01	.01	(.01)	.01	0	-
8. SP & WD	0	0	.01	.03	0	0
9 SK & KM	0	.04	.01	.05	.25	0

[a]A = Pre-observations
B = First 3 Days of Baseline
C = Last 3 Days of Baseline
D = Treatment
E = 5-day Follow-up
F = 6-week Follow-up

[b]Modeling Condition 1 = Cooperative behavior only
Modeling Condition 2 = Cooperative behavior plus verbalizations
Modeling Condition 3 = Cooperative behavior, verbalizations, and differential reinforcement

[c]Parentheses indicate teams with 3-day baselines.

[d]Dash indicates that observational data was not collected.

three days of baseline, the treatment period, the five-day follow-up period, and the six-week follow-up. In the case of teams whose baseline lasted for only 3 days, the same figure appears in both baseline columns. Note that positive verbalizations between partners occurred only infrequently throughout the course of the study, and there were no consistent changes in verbalizations across the various phases of the experiment.

Likewise, cooperative play between partners in the laboratory situation occurred very infrequently. Table 5 shows the mean percentage of intervals in which partners played cooperatively across the various experimental phases. Consistent changes as a function of the various experimental manipulations are not obvious.

Parallel play between partners in the laboratory situation occurred more frequently than positive verbalizations or cooperative play. Table 6 shows the mean percentage of intervals in which partners engaged in parallel play across the various experimental conditions. There was a significant increase in the amount of time partners engaged in parallel play from the last three days of baseline to the treatment period, $Z = 2.47$, $p < .05$ (sign test for two correlated samples). In comparing the last three days of baseline to the treatment period (Column C to Column D), all teams except one (Team 4) increased the proportion of time they engaged in parallel play. To determine whether this difference was maintained over time, the percentage of intervals in which partners engaged in parallel play during the last three days of baseline was compared to the percentage of intervals in which partners engaged in parallel play at the 5-day follow-up

Table 5

Mean Percentage of Cooperative Play

Between Laboratory Partners

Teams[b]	Experimental Conditions[a]					
	A	B	C	D	E	F
Modeling Condition 1						
1. AB & SY	0	0	(0)[c]	0	0	0
2. OK & BA	0	0	0	.01	0	0
3. RN & TW	0	0	0	0	-[d]	0
Modeling Condition 2						
4. HL & WM	.10	.08	.07	.02	0	0
5. LA & SH	0	0	0	0	0	0
6. WJ & BN	0	0	.01	0	0	0
Modeling Condition 3						
7. MA & SA	0	0	(0)	.01	0	-
8. SP & WD	0	0	.01	.02	.04	.02
9. SK & KM	0	0	0	.03	.19	.02

[a] A = Pre-observations
B = First 3 Days of Baseline
C = Last 3 Days of Baseline
D = Treatment
E = 5-day Follow-up
F = 6-week Follow-up

[b] Modeling Condition 1 = Cooperative behavior only
Modeling Condition 2 = Cooperative behavior plus verbalizations
Modeling Condition 3 = Cooperative behavior, verbalizations, and differential reinforcement

[c] Parentheses indicate teams with 3-day baselines.

[d] Dash indicates that observational data was not collected.

Table 6

Mean Percentage of Parallel Play

Between Laboratory Partners

Teams[b]	Experimental Conditions[a] A	B	C	D	E	F
Modeling Condition 1						
1. AB & SY	3	22	(22)[c]	28	27	13
2. OK & BA	1	16	4	11	29	9
3. RN & TW	6	27	9	16	-[d]	0
Modeling Condition 2						
4. HL & WM	13	26	14	14	0	13
5. LA & SH	8	17	7	14	25	17
6. WJ & BN	5	3	0	17	0	3
Modeling Condition 3						
7. MA & SA	20	3	(3)	13	0	-
8. SP & WD	19	32	13	53	13	0
9. SK & KM	8	8	24	37	46	9

[a]A = Pre-observations
B = First 3 Days of Baseline
C = Last 3 Days of Baseline
D = Treatment
E = 5-day Follow-up
F = 6-week Follow-up

[b]Modeling Condition 1 = Cooperative behavior only
Modeling Condition 2 = Cooperative behavior plus verbalizations
Modeling Condition 3 = Cooperative behavior, verbalizations, and differential reinforcement

[c]Parentheses indicate teams with 3-day baselines.

[d]Dash indicates that observational data was not collected.

(Column B compared to Column E). Only 4 of 8 sets of partners were engaging in more parallel play at follow-up than they were at baseline. (Five-day follow-up data on one team, Team 3, was unavailable due to absenteeism.) Three of eight teams were engaged in more parallel play at the second follow-up than at baseline. (Team 7, could not be observed at the second follow-up because one member of the team terminated participation in the program, and the other was absent due to illness).

To determine whether simply bringing children together to work on a task in the laboratory situation brought about a change in parallel play (i.e., to determine whether the treatment procedures were necessary for a change in parallel play behavior), the percentage of time the teams spent in parallel play during the pre-observation period was compared to the time spent in parallel play during baseline. Comparing Column A to Column B, 6 of the 9 teams showed an increase in the amount of time they engaged in parallel play (with each other) from pre-observation to baseline. This was not a statistically significant change, however (sign test for two correlated samples).

Reliability

Reliability was checked in the laboratory setting on 7 days on a total of 520 responses by subjects (260 total trials). Reliability, computed by dividing the number of agreements between the experimenter's data sheet and the observer's data by the total number of agreements and disagreements, was 99%. This included at least one reliability check on all teams' data except one (AB & SY). A reliability check was not done on this team because, due to absenteeism on the part of one

of the team members, the team did not work in the laboratory on any of the days when reliability checkers were present.

Reliability checks were made on 17 days for a total of 1,512 intervals on the data from the free-play setting. Reliability was computed for each category of behavior (i.e., positive verbalizations, negative verbalizations, parallel play, and cooperative play) separately by dividing the sum of agreement between the two observers by the total number of agreements and disagreements. Only intervals in which one or both observers recorded that a behavior occurred were used in calculations (i.e., intervals in which neither observer recorded a behavior were not counted as agreements). The percentages of agreement between observers for the four categories of behavior were as follows: positive/neutral verbalizations, 79%; negative verbalizations, 100%; parallel play, 94.4%; and cooperative play, 78%. On the second session that reliability was checked, the percentage of agreement between the observers was quite low (positive/neutral verbalizations, 33%; negative verbalizations, no incidents occurred; parallel play, 87%; and cooperative play, 39%). A discussion with the observers revealed that the reliability checker needed further interpretation of some of the definitions of categories. After these questions were clarified, reliability improved. If the reliability figures from this particular session are omitted, reliability coefficients for the four categories were as follows: positive/neutral verbalizations, 83%; negative verbalizations, 100%; parallel play, 96%; and cooperative play, 86.5%.

DISCUSSION

In the present study 3 of 9 teams (one from each of the three conditions) showed a significant increase in mutually cooperative responding following the presentation of videotapes of cooperative models. There are a number of possible reasons for the other teams' failure to learn to cooperate. In some cases the lack of differential reinforcement for cooperation seemed to be a factor. Often children's verbal behavior would indicate that they were influenced by the models, and they would increase cooperative responding for a number of trials following the presentation of the videotape. However, shortly they would revert to independent responding (this was seen particularly in the data of Team 5). In the present study mutually cooperative responding, per se, was apparently not inherently reinforcing, and the effect of the models was not great enough to overcome the antecedent variables which influenced children to respond independently. This finding is consistent with past research findings. Mithaug (1969) found that children chose to cooperate only if the rewards for cooperation were greater than the rewards for independent responding.

Another explanation for the subjects' failure to respond discriminatively (i.e., to make a cooperation response versus an independent response), may have been that chips were not functional reinforcers for the subjects used in the study. The subjects may have continued to respond in the laboratory setting due to the presence of the adult

experimenter. Several studies (Peterson & Whitehurst, 1971; Steinman, 1970; Steinman and Boyce, 1971) suggest that generalized imitation in children is the result of the social control exerted by adults; i.e., children do what they are told to do by adults. Future research might determine the reinforcing value of chips for the subjects by first, making chips contingent upon cooperation responding, and then, changing the contingency so that chips are available only for independent responding.

One factor which was found to be correlated with learning to cooperate was racial origin. Children of non-white racial origin were less likely to increase cooperative responding following the taped presentation than were white children. The non-white children's level of language ability may have been related to their failure to cooperate. As was described earlier, in the case of two of the Japanese children, English was not the primary language spoken in the home situation. Perhaps the children did not understand the language of the models. Or, they may not have understood their partner's verbal encouragements to cooperate. This clearly seemed to be the case with Team 7 (MA and SA). When verbalizations were not effective, MA took the hand of SA, a Japanese child, and attempted to get him to place his block on the tower signifying cooperation.

A couple of individual graphs require further discussion. Note on Figure 3 that Team 3 showed an increase in mutually cooperative responding on session 4 of baseline, the same session that Team 1 saw the treatment videotape for the first time. Since it would have been almost impossible in the current laboratory setting for Team 3

to have learned about the treatment that Team 1 received, it raises the questions: (a) did some uncontrolled variable cause the change in Team 3's performance or (b) did the change in both Team 1 and Team 3 result from some other variable besides the videotape model. The latter possibility seems rather unlikely because the change in responding was not seen in Team 2's data. Neither child in Team 3 had ever responded cooperatively (i.e., put their block on the tall tower) prior to session 4. One might speculate that on that day, out of boredom, one child switched responses and the other imitated. No "spilling over" of effect was seen in teams in the other two modeling treatment conditions when the treatment was applied to one team within a condition.

Team 3 showed a significant increase in mutually cooperative responses after exposure to the cooperative models. There might be some question as to whether this was due to the experimental variable, since the team had shown a rather dramatic increase in cooperative responding in session 4, prior to exposure to the model. Since strict multiple baseline control was not demonstrated in the study, one cannot definitively state that this team's significant increase in cooperative responding was due to the effect of the model.

The children were questioned regarding their understanding of the tapes at the end of the laboratory sessions. There seemed to be no relationship between the children's verbal explanations of what occurred on the videotapes and their behavior in the laboratory situation. Children who correctly stated that the models played cooperatively (i.e., that the models put their blocks on the tall tower) frequently

did not increase cooperative responding; conversely, two children who answered the question incorrectly significantly increased cooperative responding following the presentation of the tape.

In demonstrating the laboratory procedures to the children the experimenter showed four pairs of subjects the independent laboratory response first. For the remaining five pairs of subjects the cooperative response was demonstrated first. There appeared to be no significant effects due to the ordering of these procedures: Of the three teams who showed significant increases in cooperative responding, two saw the cooperative response demonstrated first, and one saw a demonstration of the independent responses first.

Three different videotaped modeling sequences were used in the present study, and no one sequence seemed to be more effective than the others. This finding must be accepted with caution, however, since there was a very limited number (three) of teams in each condition.

Rushton (1975, 1976) and Midlarsky and Bryan (1972) found contiguous positive affect on the part of a model to be effective in inducing children to imitate a model. In the present study the models who displayed contiguous positive affect were not consistently effective in inducing cooperation. The children who served as subjects in the above cited studies were at least seven years old--older than the subjects in the present study. This factor may account for differences in the effectiveness of the procedure in the current study.

Although there was no statistically significant increase in cooperative verbalizations from baseline to the treatment period, children obviously did try to verbally influence the behavior of their

partners; and in some cases, partners responded to the suggestions of their partners. Verbal prompting was not controlled in the present study; e.g., in some teams prompts occurred several times; in others not at all. Further research would be necessary to determine the effects of systematic peer-prompting in increasing cooperative behavior. In conducting such research, it would be useful to look, not only at the number of prompts given or received, but also, at the relationship between partners in a cooperation setting. It is likely that children respond differently to prompting from friends versus strangers (see Cohen, 1962).

According to the criterion established for significance in the current study, three teams, one in each modeling condition significantly increased cooperative responding. As was described earlier, Altman (1971) used a different criterion for significance (i.e., 10 consecutive mutually cooperative responses). Using Altman's criterion, four teams in the current study significantly increased cooperative responding. Two of the teams which showed a significant change using Altman's criterion were also judged to have shown a significant increase in cooperative responding using the criterion established for the current study. Three of the four teams who significantly increased cooperation according to Altman's criterion were in one modeling condition. Interestingly, there were no non-English speaking children in the cooperative model plus positive verbalizations condition. The children who spoke English as a second language were distributed between the other two conditions. Again, the language factor may account for the apparent superiority of this one modeling condition

that is seen when the data is examined using Altman's criterion for significance.

Altman (1971) found that subjects who learned to cooperate in the laboratory (i.e., cooperated for 10 consecutive trials) increased in "friendly approach" responses and in "association" responses ("when children seem aware of a common interest," Altman, 1971, p. 390) in the free-play setting. Altman's category of friendly approach is approximately equal to the category of positive verbalizations in the present study. His definition of the "association" response would seem to incorporate both the categories of parallel play and cooperative play used in the present study. This finding of Altman was not supported by the present research. The level of positive verbalizations, parallel play, and cooperative play displayed by the children in the natural environment remained approximately the same throughout the study.

The present study did, however reveal a significant increase in parallel play in the free-play setting between laboratory partners as a function of the treatment procedures. It is not clear what aspects of the procedures brought about this change. It may have resulted from the children's joint participation in a play activity in the laboratory, from their exposure to the videotape models, from the experience of being singled out to leave the classroom, or from a combination of these and other factors. This finding supports Altman's finding that "association" responses between laboratory partners increased as a function of working at a cooperative task. Altman, also, noted an increase in "friendly approach" (positive

verbalizations) responses between laboratory partners that was not substantiated by the present research. One explanation for why an increase in positive verbalizations between partners was not seen in the current research might have been the restrictions that were placed upon observers in recording verbalizations. Observers were allowed to record a verbalization only if they saw the child's lips move. This restriction was necessary because observers were watching the classroom activities from behind a screen. If a group of children was engaged in conversation with their backs to the observers, it was often difficult to distinguish voices, which would have been necessary for reliable data. Because of this restriction, the number of verbalizations recorded by the observers was substantially lower than the actual number of verbalizations that occurred. It seems possible that changes across experimental conditions were difficult to discriminate because of the limited sample of behavior recorded.

One of the purposes of the research was to determine the long-term effects of any changes that might occur in the children's behavior in the natural environment. Follow-up observations completed 5 days, and again 6 weeks, after the termination of the laboratory sessions suggest that the increase in parallel play between partners observed immediately following their laboratory experience was not maintained.

Children chose their partners as preferred playmates significantly more often following the laboratory experience. Blau and Rafferty (1970) reported similar findings. Again, it was not clear from the present research, what aspects (i.e., the joint participation in play activities, the exposure to models, etc.) of the laboratory experience were necessary to bring about the changes in playmate preferences.

One factor which may have influenced the results of the present study is the possibility of children showing position preference, i.e., responding "to a stimulus on the basis of its location without regard for the differential characteristics of the stimuli" (Gerjouy & Winters, 1968, p. 32). Studying children's responses on binary-choice tasks, Gerjouy and Winters (1968) found that perseveration is very common in children 3 1/2 to 5 years of age.

The location of the cooperative response post in the middle of the table made it necessary for a right-handed child sitting on the right of his partner (facing the experimental apparatus) to cross over his body to respond cooperatively. An easier response was to place the block on the post directly in front of him/her. The present study did not control for this factor. To control for this factor, or at least determine if it is a relevant factor, future researchers might have the children alternate positions at the table across sessions.

The time between one trial and another was not held constant in the present research. Trials in which both children responded independently were probably shorter than those in which one or both children cooperated. It may have been differentially reinforcing to respond independently in that an independent response more quickly brought about reinforcement. Future research might control for this factor by holding the interval time between responses and reinforcement constant across trials and trials times constant.

To summarize in three of the nine teams cooperative behavior in the laboratory situation increased significantly after subjects viewed a videotape of cooperative models. Since consistent multiple baseline

control was not demonstrated, it cannot be definitively stated that the changes were due to the experimenter's manipulations. The laboratory cooperation response was apparently not sufficiently reinforcing to maintain consistent cooperative responding. This finding supports the research of Mithaug (1969). Several researchers (e.g., Azrin & Lindsley, 1956; Brotsky & Thomas, 1967; Mithaug & Burgess, 1967, 1968) have shown that differential reinforcement increases cooperative behavior in children. Future research might focus upon the effectiveness of cooperative models in increasing cooperative play in a more naturalistic setting where, in fact, a cooperative response may be reinforcing (i.e., socially reinforcing) to the participants.

It is speculated that the effectiveness of the videotape models may have been diminished by language difficulties and cultural differences among the subjects. The nature of the relationship that existed between partners prior to their entering the experimental setting may also have influenced whether or not they cooperated (Cohen, 1962). Subject selection should be given careful consideration in future research of this nature.

Parallel play between laboratory partners was observed to increase as a function of the experimental procedures. This increase was observed during free-play periods immediately following the laboratory sessions; however, the effect was not obvious when follow-up data was collected 5 days, and again, 6 weeks, following the termination of laboratory sessions.

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APPENDIXES

Appendix A

Parental Consent Form

CENTER FOR YOUNG CHILDREN
UNIVERSITY OF MARYLAND

RESEARCH CONSENT FOR 1977-78 ACADEMIC YEAR

Since the Center for Young Children is a research unit of the University, the children enrolled and their parents become involved in the different studies conducted in the Center. Research studies include observational ones and those in which children are asked to respond to certain stimuli such as questions or materials. During the time research activities are in process, every effort is made to provide a good program for young children.

In line with our priorities for a good program for young children, the Center staff and (in studies involving extensive intervention) its Advisory Council review proposals. Only those proposals with potential benefit to the child and the profession are accepted.

Studies conducted in the Center take into account accepted guidelines for research involving human subjects. Accordingly, no child's name is used in a study; no child is subject to any risk; a child can refuse to participate in a study; and a child is free to withdraw from a study at any time. At times, parents are asked to participate in a study conducted in the Center. The conditions delineated above for children also apply to parents.

Research conducted in the Center is ordinarily written up by the researcher(s) and copies are retained in the Center files. Parents may read the write-ups if they desire. Often reports are published in research journals. Frequently a summary is not sent to the Center for two or three years following data gathering. A parent is free to contact an individual researcher if he knows that his/her child has been involved in a specific study and wishes information prior to the submission of research reports.

I (we) have read the above statements relative to research conducted in the Center for Young Children and I (we) consent to our child _____ who is or has been accepted for enrollment in the Center for Young Children, being involved in research projects as determined by the Center staff. I (we) also understand that any articles growing out of the research studies may be published without additional clearance from me (us).

_____
Signature of parent or guardian

_____
Date

Appendix B

Scripts for Cooperative Models

Script 1

Cooperative Behavior Only

Models are shown sitting side by side at a table with the experimental apparatus in front of them on the table. Experimenter is seated across the table, facing them.

The experimenter gives the following instructions to the two models:

"In this game you earn chips by putting your blocks on one of these towers. We will start when I ring the bell."

The experimenter hands a block to each model and then rings a bell to start the trial. On each trial both models demonstrate the cooperative response. Experimenter drops a chip into the paper cup of each model, then removes blocks from the towers and hands them to the Ss. This sequence is repeated for 15 trials. On each trial the cooperative response is demonstrated.

The film ends with the experimenter saying, "That's all the time we have to play today. Let's go spend the chips that you've earned."

Script 2

Cooperative Behavior and Verbalizations

Models are shown sitting side by side at a table with the experimental apparatus in front of them on the table. The experimenter is seated across the table, facing them. The experimenter gives the following instructions to the models: "In this game you earn chips by putting your blocks on one of these towers. We will start when I ring the bell."

The experimenter hands a block to each model and then rings a bell to start each trial. On each trial both models put their blocks on the middle (cooperative) tower.

As the models cooperate on the task, they make statements as follows: (Model 1 is male; Model 2, female)

Trial 1. Model 1--"Let's both put our blocks on the middle tower." Model 2--"Okay! That's the best way to play this game!"

Trial 2. Cooperate.

Trial 3. Cooperate.

Trial 4. Model 1--"It's fun to play this game when we both put our blocks on the tall tower."

Trial 5. Cooperate.

Trial 6. Cooperate.

Trial 7. Model 2--"I like it best when we both put our blocks on this tall tower!"

Trial 8. Cooperate.

Trial 9. Cooperate.

Trial 10. Model 1--"Let's both keep putting our blocks on the tall tower." Model 2--"Yes, it's fun to work together."

Trial 11. Cooperate.

Trial 12. Model 2--"I'm having fun playing this game because we're both putting our blocks on the middle tower."

Trial 13. Cooperate.

Trial 14. Cooperate.

Trial 15. Model 2--"I'm glad we're both putting our blocks on this tall tower." Model 1--"It's best to work together."

After the models respond on each trial, the experimenter drops a chip into the cup of each model, removes blocks from the towers, and places them on the table in front of the models.

The film ends with the experimenter saying, "That's all the time we have to play today. Let's go spend the chips that you've earned."

Script 3

Cooperative Behavior, Verbalizations,

and Differential Reinforcement

Models are shown sitting side by side at a table with the experimental apparatus in front of them on the table. The experimenter is seated across the table, facing them. The experimenter gives the following instructions to the models: "In this game you earn chips by putting your blocks on one of these towers. We will start when I ring the bell."

The experimenter hands a block to each model and then rings a bell to start the trial. Models put their blocks on various towers depending on the trial. (Model 1 is male; Model 2, female)

Trial 1. Model 1--"Let's both put our blocks on the middle tower. Model 2--"Okay, that's the best way to play this game!" Both models place their blocks on the middle tower. The experimenter says, "I like it when you both put your blocks on the tall tower. I'm going to give you five chips for that!" Experimenter counts out "1, 2, 3, 4, 5" and drops chips individually into the models' cups.

Trials 2,3. Models place blocks on short towers. Experimenter delivers one chip and says, "You only get one chip for doing that," following trial 2.

Trial 4. Both models put blocks on the middle tower. Model 2--"I like it best when we both put our blocks on the tall tower." Experimenter says, "Good! I'm glad you both put your blocks on the tall tower. Here are five chips."

Trials 5,6. Models put blocks on short tower. Experimenter delivers one chip to each.

Trial 7. Model 1--"It's fun to play this game when we both put out blocks on the tall tower." Experimenter says, "You both put your blocks on the tall tower, so you will get five chips again."

Trials 8,9. Models put blocks on the short towers. Experimenter delivers one chip to each.

Trial 10. Both models place blocks on the tall tower. Model 1--"Let's put our blocks on the tall tower again." Model 2--"Okay." Experimenter says, "I like the way you both put your blocks on the tall tower again. Here are five chips for each of you."

Trial 11. Models choose short tower. Experimenter delivers one chip to each.

Trial 12. Model 2--"It's fun to play this game when we both put our blocks on this tall tower." Experimenter says, "I'm glad you're working together and putting your blocks on the tall tower. Here are five chips for each of you."

Trial 13, 14. Both models put blocks on short tower.

Trial 15. Model 2--"I'm glad we're both putting our blocks on this tall tower." Model 1--"It's best to work together." Experimenter says, "I like it when you both put your blocks on the tall tower. Here are five chips for each of you."

The film ends with the experimenter saying, "That's all the time we have today. Now let's go spend your chips."

Appendix C

Definitions of Behaviors

Sections of definitions two and three are taken from Bijou et al., 1969 (p. 186).

1. Verbalizations. Subject verbalizes to another child. Verbalizations to teachers and other adults are not recorded. Verbalizations which are clearly self-stimulation, i.e., where a child is clearly talking to him/herself, are not recorded. Crying, laughing, groaning, or other "sound effects" are not recorded. Observers should classify verbalizations as either positive/neutral or negative. Negative verbalizations are those which are judged by observers to be aggressive, angry, critical, punitive, or rejecting (e.g., "Get out. I don't want to play with you!"). Verbalizations which express negation, but do not express negative affect are rated positive/neutral. For example, if a child simply responds "no" to a question asked of him, the verbalization is rated as positive/neutral. All verbalizations which are not rated as negative are rated as positive/neutral.

2. Parallel play. Subject is engaged in an activity with another child in which their staying together can be attributed primarily to the reinforcing properties of the play material.

A. An activity taking place in a predetermined location. For example: easel painting, swings, trees, tunnels, doll corner, or sand box.

B. An activity involving identical or related material, in which the subject and another child are playing relatively independently of one another. For example:

a. Subject and another child digging with separate

shovels in the same general location.

b. Subject and another child building separate block structures in the same general location.

C. Children's attention around focal objects--e.g., thermometer, pets, etc.

3. Cooperative play. Subject and another child engaged in a "shared play" activity, in which reinforcement is derived largely from the mutual use of materials or from the presence of the other child.

A. An activity involving a common object. For example:

a. Any movable item (single toy, rope) or items (children adding blocks to same structure)

b. A particular part of a nonmovable item which is the direct object of play for both subjects (children filling the same hole; jumping on a board together).

B. An activity involving an exchange of objects (children throwing leaves at each other; one child hands a rolling pin to another).

C. A cooperative activity--e.g., children tettering; children pulling one another in a wagon.

D. A "unified" or "organized" activity--e.g., "cowboys"; a parade.

E. A sustained physical encounter. (children wrestling)

F. A shared-play activity identified as such through verbal agreement between two or more children. For example: "Let's build a house." "Okay." Children begin building.

Appendix D

Guidelines for Observations

1. Do not record a verbalization unless you see a child's mouth move.

2. If a verbalization is not clearly negative (see definition of a negative verbalization), record it as neutral/positive.

3. When the teacher and one child are working together, rate the behavior in the independent-other category. When the teacher and two or more children are working at an activity, rate the behavior as parallel.

4. If the teacher intervenes by making suggestions or giving physical assistance when two children are displaying cooperative behavior, rate it as parallel. Example: Two children are working at the same puzzle (cooperation). A teacher walks up and begins making suggestions, etc. Rate the behavior as parallel for as many intervals as she is working with the children. If a teacher is merely observing two children cooperating or reinforcing cooperation (e.g., "You two are doing a good job."), continue to rate the behavior as cooperation.

5. When you observe an incident of hostile or aggressive play (for example, one child hitting another or a child pulling a toy away from another), rate the behavior as independent-other. Record a negative verbalization if one occurred.

6. Behavior will be considered parallel play only if it occurs in the same general area of the classroom. For example, playing with trucks and blocks will be considered parallel play only if two children are playing in the same area with trucks, etc. The behavior of a child who is riding across the room (outside of the block-truck area) on a truck should be rated as independent-other. Exceptions to this rule would be cases where a child is following another on a truck or where two children are moving together across the room on trucks. (They must be clearly attempting to stay together or organized in a game.) In these cases rate the behavior as cooperative.

7. If a child walks out of sight during an interval, record the behavior that occurred during the part of the interval you observed. If he/she is out of sight for an entire interval, record the behavior as "out-of-sight" (OS).

8. Be careful not to record behavior that occurred before an interval began or behavior that occurs after the observation interval ends.

9. Please fill-in all data (names, date, etc.) at the top of recording sheets and number the sheets in the order you used them.

10. Below are some specific examples of parallel and cooperative play that have been observed in our classroom.

Examples of Parallel Play

1. Two children playing in doll-kitchen area; both dressing dolls, but no interaction or sharing between the two.

2. Playing at the table with shaving cream, paints, markers, etc., but no attempt to work with another child's materials.

3. Two children helping a teacher prepare snacks.

4. Children listening to a record-player with individual sets of earphones.

5. Playing with separate toys at the water table.

6. Two children looking at fish in the aquarium.

7. Children playing in the truck area with separate toys, not in an organized game.

Examples of Cooperative Play

1. Two children loading cars onto toy "car carrier."

2. Child pouring water into another child's bottle at water table.

3. Children working together on one puzzle.

4. Two girls dressing dolls. Girls verbalize about a "trip" or "vacation" they are going to take with the dolls.

5. One child invites another to "play house." One says, "I'll be the mother." They begin playing.

6. One child hands paper money to another.

7. Two children work together to catch the bunny in the room.

8. Children sit in cardboard playhouse or build fortress of blocks and sit in it together.

9. Children follow each other around the room--unless being called or led by the teacher.

Appendix E

Observational Data

Table 7

Mean Percentage of Positive Verbalizations

by Subjects across Conditions

Subjects[b]	Experimental Condition[a]				
	A	B	C	D	E
Modeling Condition 1					
AB	1	1	3	4	0
SY	18	0	19	0	11
OK	18	10	14	0	15
BA	14	4	25	0	13
RN	14	22	29	-[c]	46
TW	1	25	14	-	13
Modeling Condition 2					
HL	15	32	13	25	15
WM	7	7	2	8	6
LA	1	3	0	0	0
SH	3	3	6	17	2
WJ	1	0	1	4	25
BN	4	7	14	13	17
Modeling Condition 3					
MA	22	17	22	17	-
SA	18	18	8	17	-
SP	3	8	4	4	4
WD	18	29	8	13	23
SK	8	7	21	37	11
KM	29	21	25	46	4

[a]A = Pre-observations
B = Last 3 days of baseline
C = Treatment
D = 5-day follow-up
E = 6-week follow-up

[b]Modeling Condition 1 = Cooperative behavior only
Modeling Condition 2 = Cooperative behavior plus verbalizations
Modeling Condition 3 = Cooperative behavior, verbalizations, and differential reinforcement

[c]Dash indicates that observational data was not collected.

Table 8

Mean Percentage of Parallel Play by

Subjects across Conditions

Subjects[b]	Experimental Condition[a]				
	A	B	C	D	E
Modeling Condition 1					
AB	80	86	87	96	83
SY	90	99	92	67	96
OK	87	87	78	96	85
BA	78	88	92	100	83
RN	95	81	83	-[c]	71
TW	92	88	90	-	58
Modeling Condition 2					
HL	74	68	81	63	90
WM	74	65	90	87	74
LA	50	85	62	87	87
SH	68	80	85	96	83
WJ	75	88	79	79	77
BN	55	78	77	92	67
Modeling Condition 3					
MA	65	78	75	75	-
SA	75	87	85	67	-
SP	75	78	95	87	46
WD	62	72	87	92	73
SK	81	85	61	67	63
KM	83	80	85	67	77

[a] A = Pre-observations
B = Last 3 days of baseline
C = Treatment
D = 5-day follow-up
E = 6-week follow-up

[b] Modeling Condition 1 = Cooperative behavior only
Modeling Condition 2 = Cooperative behavior plus verbalizations
Modeling Condition 3 = Cooperative behavior, verbalizations, and differential reinforcement

[c] Dash indicates that observational data was not collected.

Table 9

Mean Percentage of Cooperative Play by Children across Conditions

Subjects[b]	Experimental Condition[a] A	B	C	D	E
Modeling Condition 1					
AB	0	2	3	0	2
SY	7	3	13	4	0
OK	3	1	11	0	6
BA	11	1	5	0	2
RN	4	11	11	-[c]	23
TW	1	12	8	-	13
Modeling Condition 2					
HL	28	25	5	25	5
WM	14	12	4	0	3
LA	1	5	0	0	2
SH	4	0	3	4	2
WJ	1	0	0	21	13
BN	28	18	11	8	31
Modeling Condition 3					
MA	28	17	11	13	-
SA	14	3	7	25	-
SP	4	3	5	13	7
WD	14	20	7	4	21
SK	1	1	10	21	7
KM	14	33	4	25	2

[a] A = Pre-observations
B = Last 3 days of baseline
C = Treatment
D = 5-day follow-up
E = 6-week follow-up

[b] Modeling Condition 1 = Cooperative behavior only
Modeling Condition 2 = Cooperative behavior plus verbalizations
Modeling Condition 3 = Cooperative behavior, verbalizations, and differential reinforcement

[c] Dash indicates that observational data was not collected.

VITA

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Name:	Janice Diane Veach Siegel
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Date of birth:	November 4, 1951
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Education

Utah State University, Logan, Utah; Ph.D., June, 1980.

Major: Child Development Psychology

Dissertation: The effect of modeling on cooperation in the laboratory and in the natural environment. (Dr. Sebastian Striefel, Chairman)

Utah State University, Logan, Utah; M.S., June, 1976.

Major: Psychology

Bridgewater College, Bridgewater, Virginia: B.A., Magna Cum Laude, May, 1973.

Major: Psychology

Professional Experience

November, 1977 - Present	School Psychologist, Arlington Public Schools, Arlington, Virginia. Duties include assessing children's educational and behavioral problems through testing, interviewing, and observation; development of behavioral programs; report writing; consultation with

Professional Experience (Continued)

	principles and teachers; parent counseling; assisting with special placement of students; and coordination of activities between schools and community mental health agencies.
August, 1975 - February, 1977	Intern to Schools, Exceptional Child Center, Utah State University. Duties included assessing children's educational and behavioral problems through interviewing, observation, and testing; report writing; designing and implementing treatment plans; and follow-up activities.
August, 1975 - June, 1976	Coordinator for Research and Grants, Bureau of Research Services, Utah State University. Duties included reading various publications to determine funding sources for research and directing such information to appropriate faculty members.
September, 1974 - June, 1975	Graduate Teaching Assistant, General Psychology, Utah State University. Duties included preparation of class materials, supervision of student interviewing and testing, and maintenance of student records for the course, which was taught by programmed instruction.
June, 1972 - August, 1972	Mental Health Fellowship, University of Virginia Hospital. Duties included working from two-four weeks on the various psychiatric services of the Hospital--juvenile and adult psychiatric wards, occupational and recreational therapy, children's and adult clinic, consultation service, and social service.

Professional Affiliations

Student membership in American Psychological Association.

Alpha Chi National Honorary Society

Publications and Presentations

Siegel, J., and Powers, R. B. Learning of a "win-stay, lose-change" rule by children as an aid to cooperation in the minimal social situation. Paper presented at Rocky Mountain Psychological Association, May, 1975.

Veach, J., and Witters, D. Effects of study question placement and incentive conditions on learning prose material. Paper presented at Virginia Academy of Science, May, 1973.

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