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IMITATION BY CHILDREN OF MODEL-PERFORMED
BEHAVIOR UNDER A VARIETY OF STIMULUS
CONDITIONS.**

**The University of North Carolina at Greensboro,
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IMITATION BY CHILDREN OF MODEL-PERFORMED
BEHAVIOR UNDER A VARIETY OF
STIMULUS CONDITIONS

by

Betty Sue Johnson

A Dissertation Submitted to
the Faculty of the Graduate School at
The University of North Carolina at Greensboro
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1974

Approved by

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This dissertation has been approved by the following committee of the Faculty of the Graduate School at The University of North Carolina at Greensboro.

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BETTY SUE JOHNSON. Imitation by Children of Model-Performed Behavior Under a Variety of Stimulus Conditions. (1975) Directed by: Dr. Mary Elizabeth Keister, Pp. 171.

One hundred and thirty two black children, involved in seven Head Start centers, comprised the sample for the study. Ranging from thirty seven to eighty one months of age, the subjects were understood to be within the normal range in intelligence, vision, hearing and emotional stability. Children in the sample were divided into equal cells based on sex and age (younger or older determined by the population median).

Four stimulus films, each depicting visually a black model performing the same novel non-verbal behaviors, were developed. The models were an adult male, an adult female, a child male, and a child female. Subjects in the sample were randomly assigned to view one of the four films. This assignment resulted in eight or more subjects being placed into each of sixteen cells on the basis of age and sex of the subject and age and sex of the model.

The subjects, who were tested individually, were given an opportunity to free play in a setting similar

to that depicted in the stimulus film, following their viewing of the film. No known extrinsic reward or punishment was provided to either the models or the subjects. While in the free play session, the subjects were filmed on videotape.

The videotapes were rated to determine the two dependent variables: (1) the total number of seconds that the subject engaged in imitative behavior, and (2) the number of model-performed acts in which the subject became engaged. Inter-rater agreement on rating of imitative behavior was 95.1 per cent.

A multivariate test of regression (for subjects within each of the seven Head Start centers), showed that within each center the ages, in months, of subject was positively related to the dependent variables ($p < .001$). Equality of this regression could not be disproven. Using a multivariate analysis of covariance, with age of subject as a covariate, no significant difference was found among the children in the various centers in rate of imitation ($p > .05$). Thus, children from all centers were considered as one sample.

The two dependent variables were subjected to a partialled correlation, and were found to be positively correlated (.764).

In order to test the relationship between age of the subjects and the dependent variables, a test of within cell regression was performed. The strength of the positive relationship was shown by a multiple R of 0.314 ($p < .003$). A test of the equality of regression within all cells was performed, and the hypothesis of differential within cell regression was not supported. Therefore analysis of all hypotheses was performed with age as a covariate.

Data related to the following main effect hypotheses were analyzed, using a multivariate analysis of variance.

Hypothesis 1: There will be no difference in rate of imitation between male and female subjects.

Hypothesis 2: There will be no difference in rate of imitation between older subjects and younger subjects.

Hypothesis 3: There will be no difference in rate of imitation between subjects who viewed adult models and subjects who viewed child models.

Hypothesis 4: There will be no difference in rate of imitation between subjects who viewed male models and subjects who viewed female models.

None of the hypotheses were disproven except Hypothesis 3. Subjects who viewed peer models had significantly ($p < .003$) higher rates of imitation than those subjects who viewed adult models.

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CHAPTER I

INTRODUCTION

The focus of this study was one type of learning, that of imitation. Teachers, parents and students of child development generally agree that imitation, or modeling, plays a very important role, as a type of learning, in the overall development of the child. However, until more recent years, serious research in imitation has been limited. For many and diverse reasons, research contributing to our understanding of imitation had been increasingly prolific since the nineteen sixties.

Relevance of studies of imitation

One of the central goals of the study of child development is an increased understanding of the conditions under which children learn. Further, this understanding is often applied to investigations of conditions antecedent to the status of adult behavior.

Theories of learning abound, yet many have only the most rudimentary documentation through evidence produced by research. In conjunction with this, a solid norm in this country has always had to do with the production of an ideal adult character structure. Therefore, parents and teachers have generally eagerly accepted new theories of child rearing, with an eye to molding the child in ways that they hope will create this ideal adult. Of equally serious concern to many citizens, professional and non-professional, is the issue of "what went wrong?", when a child or an adult involves himself in behavior that is dangerous to others, dangerous to himself or without the boundaries of social norms.

At this point in the development of our nation, we seem to have an increased pressure toward enlightenment, through research, about the basis for behavior. An heightened interest in the civil rights of all people has led concerned citizens to become much more informed about the plight of certain segments of our society, who previously had simply been labeled "unfit" or underprivileged. Our increased leisure and affluence

have seemed to stimulate more focus on the worth and rights of every individual. The "great society" and the "new society" have provided ample funds for investigations into living conditions which tend either to aid or to hinder the development of satisfied and productive citizens. Crime and other forms of deviant behavior have appeared to be on the upsurge. Thus, many elements of society are turning to the academicians and researchers for the answer to the question of how to provide a better life for all.

It could be said that investigations of all aspects of how humans learn to become successful adults is now vogue. Relatively new to the study of learning is the sub-class of imitation. Using a logical frame of reference, it appears that we are all aware that a great facilitator in the process of socialization of children is imitation. From the negative side, parents have often been concerned about the type of friends their children establish or the type of movies they see, for fear that the children will "pick up" some undesirable forms of behaviors. From the positive point of view, we have encouraged children to make

heroes of such ideals as Madam Curie, the astronauts, Mister Rogers, or J. Edgar Hoover.

Controlled scientific investigation into the specific variables relating to the process of imitation have now come under scrutiny. This investigation was initiated when imitation was separated from the umbrella of operant conditioning and given a status of its own. Since this independent status has been achieved, many areas of relevance have been posited. Perhaps the old adage of "do as I say and not as I do," has come under the most serious scrutiny. For many parents and teachers the obligation of telling a child how to behave, or the rewarding and punishing of certain behaviors, has seemed to suffice as the standard method of socializing the child. What would be the consequence if it were demonstrated that the non-verbal or incidental behaviors of parents or teachers were learned by the child as much or more than those behaviors presented through admonishment or sanction?

Similarly, it has long been held that children often become like their parents, the implication being that the parents are the main source of a child's

learning. What would occur if it turned out that through imitation, peers and siblings had as much power to influence the learning of children as adults do?

In conclusion, an increased understanding of the relative importance of imitative learning for the development of the child seems crucial for the sake of structuring child rearing practices. Furthermore, the variables producing imitation and the durability of imitative learning need to be understood in order to predict outcomes in learning from any one or combination of social settings.

Purpose

It was the purpose of this study to investigate the relative importance of certain variables, when a child was given an opportunity to imitate under conditions where neither reward nor punishment was given to either the child or the model for behavior performed. The variables under consideration were age and sex of the subject and age and sex of the model.

Design overview

One hundred and thirty-two boys and girls enrolled in a summer (1970) Head Start program were the subjects for the study. These children, whose age ranged from thirty-seven to eighty-one months, were subdivided into groups defined as "younger" (thirty-seven to fifty-three months of age) and "older" (fifty-four to eighty-one months of age). Each child was randomly assigned to be exposed to a film stimulus depicting behavior of one of four models: a younger male, a younger female, an adult male or an adult female. Following this stimulus, each child was placed in a non-structured setting where opportunities for imitative behavior were possible. The behavior of the children in this setting was rated to determine the amount of imitative behavior. Table 1 depicts the study design.

Independent, or main effect, variables for the study were:

- age of child (younger or older)
- sex of child
- age of model (child or adult)
- sex of model.

Table 1
Assignment of Subjects to Cells

<u>Subjects</u>	Film Viewed								
	Adult Male		Adult Female		Male Child		Female Child		
	M	F	M	F	M	F	M	F	
Younger	8	8	8	8	8	8	8	8	8
Older	8	8	9	9	8	9	8	9	
Subtotal	16	16	17	17	16	17	16	17	
Total	32		34		33		33		

The dependent variable was "rate of imitation." Rate of imitation was determined by the number of imitative "acts" that each subject performed and by the amount of "time" in seconds, the subject took to perform those acts.

Hypotheses

The following hypotheses were tested in the course of the present study.

1. There will be no difference in rate of imitation between male and female subjects.
2. There will be no difference in rate of imitation between old subjects and young subjects.
3. There will be no difference in rate of imitation between subjects who viewed adult models and subjects who viewed child models.
4. There will be no difference in rate of imitation between subjects who viewed male models and subjects who viewed female models.
5. There will be no interaction between age of subjects and sex of subjects on the dependent variables.
6. There will be no interaction between sex of subjects and age of models on the dependent variables.
7. There will be no interaction between sex of subjects and sex of models on the dependent variables.
8. There will be no interaction between age of subjects and age of models on the dependent variables.
9. There will be no interaction between age of subjects and sex of models on the dependent variables.
10. There will be no interaction between age of models and sex of models on the dependent variables.

11. There will be no interaction between sex of subjects and age of models on the dependent variables.

12. There will be no interaction among sex of subjects, age of subjects, and sex of models on the dependent variables.

13. There will be no interaction among sex of subjects, age of models, and sex of models on the dependent variables.

14. There will be no interaction among age of models, age of subjects, and sex of models on the dependent variables.

15. There will be no interaction among sex of subjects, age of subjects, age of models and sex of models on the dependent variables.

Definitions

Older males - male subjects between the ages
of fifty-four and eighty-one months

Older females - female subjects between the ages
of fifty-four and eighty-one months

Younger males - male subjects between the ages of
thirty-seven and fifty-three months

Younger females - female subjects between the ages
of thirty-seven and fifty-three months

Acts - number of acts performed by the subject
that were rated as imitative

Time - the total number of seconds that a subject
was rated as having spent performing
an imitative act

Rate of imitation - a term used to refer to both
the dependent variables of acts and
time, as if they were one variable

Limitations

Limitations of the present study were mainly related to methods used, and these are presented at the conclusion of Chapter III (see page 68). Major limitations related to the sample selection were that only one Head Start Program provided the population. Further, the subjects were tested during a summer session, which might have effected the composition of the population and thus the sample. The sample was comprised only of black subjects.

CHAPTER II

REVIEW OF THE LITERATURE

The research which has been done in the area of imitation is extensive, involving a wide range of variables. The results of some of the studies might well be interpreted on the basis of more than one of the various theories of imitation. Therefore, in the present review, findings will be reported with regard to the independent variables under consideration.

Following a brief overview of the main theories of imitation, research most directly related to this study will be presented. The research reviewed will primarily focus on children three to six years of age, adult and peer models, and incidence of imitation without direct extrinsic reinforcement to the subject. Extensive reviews of multiple independent variables and their assumed relationship to imitative behavior have been presented by Wodtke and Brown (1967) and Flanders (1968).

Overview of Major Theoretical Positions

Theories of imitative learning can be arranged along a continuum between those emphasizing internal mediation, the psychoanalytic theorists, and those emphasizing external influence, the classical learning theorists. The social learning theorists, on the other hand, incorporate consideration of both internal and external variables into their explanations of imitation, although the explanation of the process by which the internal mediation takes place varies as does the emphasis on different social variables.

Theories of imitation propounded in the early 1900's focused on constitutional or biological factors. McDougall, (1903) for instance, considered imitation innate, though not a delineated instinct. Some years later the idea that imitative acts or emotional responses were classically conditioned was fostered (Bandura and Walters, 1964).

Psychoanalytic theory provided one of the earliest of the more complex conceptualizations of imitation. Freud (1925) viewed imitation as a by-product of the

process of identification which involved two conditions: (1) anaclitic identification, which resulted when the child feared loss of the nurturant figure, usually the mother, so that he incorporated her behavior and qualities to prevent the loss, and (2) defensive identification, present only in males, when the boy took on the qualities of the father to reduce his anxiety over fear of punishment, and to gratify his need for affection.

Different aspects of the analytic framework have been emphasized by others. Sears (1957) focused on anaclitic identification and regarded a nurturant relationship as an essential condition and one which produced a dependency drive in the young child. When the drive was frustrated, the child's imitation of the parent's behavior would evoke parental approval. Thus imitation would also eventually become an acquired drive.

Prominent among the cognitive, developmental theorists, Piaget viewed the act of imitation as one of many processes of adaptation to the environment. Piaget posited two functional invariants which provide a modus operandi for the development of cognitive

structures, organization and adaptation. The invariate adaptation, has two subproperties, assimilation and accommodation. Generally, Piaget saw a balance between the processes of assimilation and accommodation. However, with the cognitive activities of play and imitation, this balance was not seen as being maintained. In imitation the process of accommodation outweighs that of assimilation, i.e. the structures of reality are given most careful attention without perhaps equal amount of thought given to how these structures can be incorporated into the organism. However, the cognitive activity of imitation may be classed as developmental (Flavell, 1963).

Among the social learning theorists, Kagan (1958) has denoted imitation as one of the classes of behavior related to the process of identification, which he defined as an "acquired cognitive response within a person," though one that is not necessarily conscious. If a model possessed goals and satisfactions which the observer desired, the observer would believe that he could also attain these if he possessed characteristics similar to the model's. Thus, goal states attained by

the model would be vicariously shared by the observer as well as the positive affect related to these, which in turn would maintain the identification.

Bandura and Walters (1964), also social learning theorists, proposed a stimulus contiguity and mediational theory. Their studies have supported their contention that learning of responses could take place by observing a model without either overt rehearsal by the observer or external reinforcement. Performance of a learned imitative response, however, could be altered by reinforcement. Within the observer the images aroused by the model's behavior would be structured perceptually into symbolic imaginal and verbal representations through temporal association. In addition, recall of the learned imitative behavior would take place on the basis of these symbolic representations.

More recently, generalized imitation has gained prominence. Relying on the proposition of response class, the concept of generalized imitation is being used to help explain the presence of imitative responses that do not appear to be in response to some extrinsic reinforcement. The specific response class could be

wide or narrow, but might involve, for example, imitation itself, rather than a specific topographical behavior. Thus if a child had received reinforcement for the response of imitation per se, he might imitate any one specific set of behaviors in the absence of contiguous extrinsic reinforcement (Gerwirtz and Stingle, 1968).

General Studies Focusing on Variables Related to the Response of Imitation

Prior to the presentation of research that is specifically pertinent to the present study, a brief section is devoted to examples of other studies which provide illustrations of earlier areas of focus. Typically, previous studies on imitation have been directed toward the various types of reinforcement provided, variables affecting the subject's responsiveness to reinforcement, and the nature of the relationship between the subject and the model.

The effect of various types of reinforcement on the accuracy of imitative behavior was studied by Kanfer and Marston (1963). Using college students as subjects, they compared the effectiveness of vicarious reinforcement,

direct reinforcement, combined direct and vicarious reinforcement, and nonreinforcement on the learning of a verbal task. They found a main effect for vicarious reinforcement in increasing learning, while direct reinforcement showed no additional effects. In the nonreinforcement conditions, learning did not take place.

Clark (1965) exposed nine- to eleven-year-olds either to a peer model who was continuously reinforced or one who was not reinforced. In addition, the subject was reinforced for imitative responses. In subsequent test trials in which neither the model nor the subject was reinforced, the subjects who had observed a peer reinforced imitative significantly more than those in the nonreinforced condition, who tended instead to counterimitate.

Lanzetta and Kanareff (1961), using college students, compared direct social reinforcement with direct task reinforcement. They found that social reinforcement, either congruent with or conflicting with task reinforcement, was not effective in altering behavior, unless it was related to other remote goals, such as getting

money for being compatible with a partner. Even under these conditions, however, task reinforcement, which gave an objective indication of correctiveness, remained superior in producing imitation.

Other studies have indicated additional variables that may affect a subject's responsiveness to reinforcement.

Bandura and Rosenthal (1966) studied the effect of varying levels of psychological and physiological arousal on negative vicarious conditioning. In their college student subjects, increasing levels of psychological arousal were generally found to enhance vicarious conditioning. However, an extremely high level of physiological arousal interfered with conditioning. Post-experiment questionnaires indicated that the subjects who had experienced the extreme level of physiological arousal made the most conscious effort to distract themselves from the aversive situation.

Epstein (1968) studied the effect of social isolation on third and fourth graders' responsiveness to reinforcement of imitative behavior. He found that following a period of social isolation, the children who

chose to continue further isolation were less responsive to social reinforcement than those who were given no choice. However, subjects rated high in need for approval did not differ in their responsiveness from those with low need for approval.

Baron (1966) formulated an experimental model to test his hypothesis that a subject's responsiveness to social reinforcement is determined by his past history of social reinforcement. If social reinforcement is given which is discrepant to the rate, direction, or type to which the subject is accustomed, he experiences negative affect and changes his performance to produce a change in the reinforcement being given. Thus social reinforcement could be viewed in terms of an interaction between the subject and the reinforcer, each seeking to influence the other.

Differing relationships between the model and the subject may also affect imitation.

In comparing reinforced finger-lift reaction times in normals and schizophrenics, Berkowitz (1964) found that both normals' and schizophrenics' reaction time was slowest after a warm contact with the E than

after an aloof contact or no contact. However, the normals' reaction time was again increased after reinforcement, while the schizophrenics' was not. Berkowitz explained his results in terms of drive-reduction theory; i.e., that the schizophrenic's need for approval had been met by the warm contact so that he had less need to perform. Another interpretation of the study has been made by Baron in terms of the social reinforcement history of the subject. He pointed out that schizophrenics were more accustomed to a low amount of reinforcement and after the warm contact (or high reinforcement), they may have adjusted their performance downward to produce the lower reinforcement they were accustomed to.

Mischel and Liebert (1966) found that, following a condition in which the adult model imposed on herself and on the fourth-grade observer the same stringent criteria, imitation of self-reward criteria was greater than following two discrepant conditions in reward criteria. In the discrepant conditions, the subject displayed more leniency in self-reward when the model was more stringent with herself than with the subject as compared with the model's being more stringent with

the subject than she was with herself. In other words, the subject adopted the criteria imposed more closely than the criteria of the model. In imposing criteria on another child, subjects usually used the same standards they had imposed upon themselves. These findings seemed to suggest that the child's self-rewarding behavior was more influenced by his experience than by his concept of the expectations of a particular role.

Bandura and others (1967), in a study with seven- to eleven-year-olds, considered several variables which might affect the adoption of stringent self-reward patterns. They found that vicarious reinforcement to an adult model who adopted high standards increased the subjects' adoption of these standards while high nurturance from the model and exposure to a peer who adopted lower standards reduced the subjects' receptivity of the model's standards. Subjects who had had low nurturance, vicarious positive reinforcement, and no exposure to a peer, adopted the most stringent standard of self reward.

In a study involving peer reinforcement in second-, third-, and fourth-graders, Patterson and Anderson (1965)

found that reinforcement by peers was increasingly effective in producing imitation with the increasing age of the subject. With second- and third-graders a friend was more effective while with fourth-graders a nonpreferred peer was more effective.

The influence of private and public settings has been studied by Argyle (1957). He found that the opinions of another person were more influential on a subject's judgment of a painting when the subject gave his final opinion to the other person face-to-face than when he gave it via a questionnaire. Whether the confederate's own opposing opinions prior to the final opinion were given in an accepting or a rejecting manner had no effect on the influence.

Some research has been directed to the question of whether observing a model might not vicariously expiate a drive within the observer. Feshbach (1925) compared the aggressive behavior of insulted subjects who had an opportunity for fantasy involvement with those who did not and with controls who were not aroused. The insulted subjects were more aggressive than the noninsulted subjects. However, those insulted subjects who expressed

aggression in fantasy expressed less aggression in actual behavior than those without the fantasy experience. These findings led the researcher to conclude that the strength of a drive could be reduced by symbolic satisfaction.

Research Involving Reinforcement of Imitative Behavior

Since the lack of reinforcement is a crucial issue in the present study, the research most pertinent to this study will be discussed in two major sections: those which involve reinforcement of imitative behavior and those which do not. With the exception of a few reinforcement studies, subjects in the studies in this section fall within the age group three to six years.

Type, timing, and schedule of reinforcement

The effects of various types of reinforcement, the timing of reinforcement, and the percentage of reinforcement have been the focus of studies of imitative behavior in young children.

Liebard and Fernandez (1970) found both vicarious reinforcement and direct reinforcement were effective in

producing imitation. However, the combination of the two types of reinforcement were additive in their effects on imitation, producing almost perfect matching of a model's choices of unpopular commodity items. Vicarious reinforcement seemed to enhance direct reinforcement by directing the subject's attention on complex or "uninteresting" items.

Hicks (1968) studied imitative aggressiveness displayed after a film portraying aggression. A male experimenter in the room made negative, positive, or no comments about the model's behavior in the film as the subjects watched. When the male experimenter was also in the room during the post-film testing, only boys, who had heard positive comments imitated more than controls, while children who had heard negative comments imitated less than the controls. However, the disinhibiting and inhibiting effects did not remain for those subjects who did not have the experimenter in the room during the testing. In general, boys imitated more than girls, a finding common to many studies on imitative aggression.

Walters and Parke (1964) found resistance to temptation was greater after a film depicting the child model being punished for deviation or when no film was seen than after a film in which the model was rewarded or received no consequences. The authors postulated that the model's receiving no consequences brought a sense of relief in the subject and was experienced as a reward. Children who saw the film also imitated specific behaviors of the model. In addition, once the prohibition was removed, the children who saw the model punished imitated as much as other subjects, indicating that consequences to the model inhibited the performance but not the learning of the behavior.

Benton (1966) studied the timing of vicarious negative consequences on resistance to temptation. He compared the effect of issuing a verbal prohibition, either corrective or noncorrective, as the child was picking up a toy with prohibition after he had held the toy several seconds. Immediate prohibition proved more effective than noncorrective in both direct and vicarious training conditions.

Walters and others (1965) punished subjects directly either as deviation was initiated or after the act was completed. Then the subjects viewed a film in which a peer was either punished, rewarded, or received no consequences or they saw no film. Early punishment was again the most effective and seeing a model punished had the greatest vicarious effect. A combination of these conditions produced the greatest resistance to temptation. In addition, observing the solution of a problem in the film resulted in better performance on the same task afterwards by subjects who saw the model rewarded or receive no consequence. However, subjects who saw the model punished did not perform better than subjects who had not seen the film, which raised the question as to whether learning or recall may be influenced by observation of punishment.

Kass (1962) studied four-, six-, eight-, and eleven-year-olds in terms of their response to extinction on six different schedules of percentage of reinforcement. The youngest children differed from the others in extinguishing the most rapidly, perhaps because of their short attention span. Otherwise, age

had no effect. However, the higher the percentage of reinforcement, the more rapidly extinction took place.

In summary then, the above studies demonstrate that imitative learning seems to generally follow principles of operant conditioning in that direct and vicarious positive reinforcement increases imitative responses, whereas negative reinforcement decreases imitative responses. Absence of the experimenter tends to decrease the effect of negative reinforcement on the production of imitative behavior. Further, modeled behavior which was negatively reinforced or the subjects were told not to perform, and didn't, can be imitative at a later time if positive reinforcement is offered. Reinforcement schedules may be related to extinction curves.

Characteristics of Models

Differing characteristics of both adult and peer models as well as model-subject relationships have also been studied with regard to their effect on imitation in young children.

Stevenson (1961) found that an adult female was more effective as a reinforcer than an adult male in

children three to four years old; that an adult female was more effective with boys at six to seven; and that the experimenter-subject sex differences at nine to ten were not significant. He also found that different individual experimenters were differentially effective regardless of sex, which suggested the operation of other, more subtle individual variables.

Parents were effective in changing their own children's preference in a marble dropping game in a study by Patterson and others (1964). Fathers were more effective reinforcers with their daughters, mothers with their sons. In addition, teachers found girls who were more responsive to parents also more likely to show socially acceptable behavior in the classroom.

Model attractiveness had no effect on imitation in a study by Thelen and Saltz (1969). They found, however, that nonreinforcement to a white adult male model produced more imitation of aggression than continuous reinforcement or intermittent reinforcement with low socioeconomic class Negroes. In a second experiment with a white middle-class population, continuous reinforcement produced more imitative aggression

than reinforcement at the end of the model's behavior, but not significantly more than nonreinforcement. However, comparison of the two socioeconomic groups showed differences in their performances to be related to the continuous reinforcement variable. The authors suggested that black children may have been negatively reinforced for imitating white adults or that praise may have little reinforcement value to lower socioeconomic class children.

Grusec and Mischel (1966), exposed subjects to differing conditions with regard to model attractiveness and model's future control over the subject before exposure to aversive and neutral behaviors of the model during a game. Subjects were rewarded for recalling model's behavior. High reward and high future control brought more recall of modeled behaviors than low rewardingness and low future control.

Stein and Wright (1964) studied the effect of continuous nurturance and nurturance withdrawal on imitative behavior of both upper middle class and lower class children. The subjects were also positively reinforced for task-oriented imitation, but not for incidental imitation. Reinforced imitation increased

over the twelve trials and incidental imitation did occur, but no main effects of the conditions emerged. However, when comparing all subjects with regard to the effect of nurturance or nurturance withdrawal on their dependency scores, subjects who showed more dependency after withdrawal of nurturance imitated more than those whose dependency scores decreased. Subjects who responded to nurturance with a decrease in dependency imitated more than those whose dependency increased after nurturance. The authors suggested that if isolation aroused the subjects dependency anxiety, he paid more heed to the model's cues for imitation. Whereas his dependency needs were temporarily met, he paid more attention to the task itself and thus imitated less.

Aspects of the adult reinforcer or models, seen as influential toward effecting rate of imitation, are varied. Sex of the model may have a differing relationship depending on the age of the child. Nurturant behavior of the model toward the child may produce varying effects, depending on the condition of the subject. Race of the reinforcing agent may have

differential effects on rate of imitation possibly due to previous experience of the subject. Knowledge by the subject of the model's future control over him may increase imitation of the model.

Variables within the subject himself have also been studied to determine their effect on the learning of imitative behavior.

Hartup (1964) found subjects response rates were reinforced verbally by a disliked peer than by a liked peer. Among possible explanations given was the distraction provided by a liked peer for a young child.

In a study of altruistic responses Hartup and Coates (1969) found that subjects with a history of frequent reinforcement from peers imitated a rewarding peer model more than a nonrewarding peer model while subjects with a history of infrequent reinforcement from peers imitated a nonrewarding model more often. In addition, a rewarding model evoked equal amounts of imitation from both groups, while the nonrewarding model evoked more imitation from subjects with histories of infrequent peer reinforcement.

McDavid (1959) focused on both biological and social variables in a series of experiments directed at identifying potential sources of individual differences in the learning of imitative behavior. Subjects were reinforced directly for imitation of model's choices, but no vicarious reinforcement was used. McDavid found that in general the initial tendency was not to imitate on the first trial. Total imitation scores showed that imitation did increase over the trials. However, the age or sex of the subject or the sex of the model had no main effect, although several interaction scores were significant: younger boys imitated more than older boys; older girls imitated more than younger girls; older girls imitated more than older boys. IQ and imitation were not correlated. McDavid also measured parental attitudes and maternal practices to test the effect of child rearing practices on a child's predisposition to imitate. Correlations with total imitation were found for girls whose mothers discouraged aggression and whose father avoided communication and discouraged autonomy while the only significant score for boys was paternal strictness. There was no correlation for boys

with maternal practices, but girls whose mothers punished them for aggression imitated more. Scores which indicated the extent to which model's behavior served to determine the subject's behavior were correlated for girls with maternal suppression of sexuality and, negatively, with suppression of aggression as well as with paternal strictness and discouragement of autonomy. Boys imitated more when fathers were intrusive and less when mothers tried to "break their will." In the child's tendency to imitate the model directly, parental strictness and control over the child's independence (seen as affectionate interaction with the mother) affected the subject's tendency to use the model's behavior as cues. In general, the results for girls were more simple and direct than for boys. McDavid found no significant effect of sex or ordinal position on imitation nor any correlation between dependency behavior in school and imitation.

In a study by Ross (1966), subjects were verbally reinforced for intentional learning and not reinforced for incidental learning. Ross found that less dependent subjects showed more intentional learning

in a post office game while more dependent children imitated more incidental behavior. Highly dependent boys also produced more of the model's total behavior, while boys with low dependency scores showed more general independence in the experimental situation. Interviews with mothers revealed that mothers of low dependency children were more interested in achievement skills while mothers of more highly dependent children put more emphasis on social skills.

In summary, age of the child may have a differential effect on reinforced imitative behavior for boys and girls. Intellectual ability may not be directly correlated with imitation. With peer reinforcers not only the previous relationship with the specific peer but also experience in general with peers as reinforcers, may effect their ability to provide reinforcement for imitative behavior. Child rearing practices, specifically interpersonal themes between the child and his parents, may influence rate of imitation. The degree of general dependency of the child may correlate positively with the amount of imitative behavior exhibited.

Research That Does Not Involve Extrinsic Reinforcement of Imitative Behavior

In studies in which subjects were not directly reinforced for imitative responses, considerable attention has been paid to the characteristics of the model and to model-subject relationships.

Sex of the adult model

Adult models have been used for a number of studies with the sex of the model producing varying effects on imitation.

Fryrear and Thelen (1969), in studying imitation of affectionate behavior, found that nursery school subjects who had observed a model imitated more than controls and that girls imitated more than boys. Girls also imitated the female model more frequently than the male model, while the sex of the model had no effect on the boys' imitative behavior.

Bandura and others (1961) found that mildly frustrated subjects who were exposed to an aggressive adult model as compared to subjects who watched an inhibited nonaggressive model and to controls differed both in imitating specific aggressive acts of the models

and in showing more nonimitative aggression. Boys were more aggressive than girls. Subjects imitated physical aggression of the male model more than the female model, while imitation of verbal aggression was related to the model of the same sex.

Non-human models

Cartoon models have also been used in nonreinforced studies of imitation. Siegel (1956) compared the behavior of children who had watched a cartoon model displaying aggression with those who had not and found no difference in actual aggressive behavior.

However, Mussen and Rutherford (1961) found children who had watched an aggressive cartoon model more willing to express aggression in a permissive play situation than those who had seen a nonaggressive cartoon model or no model. There was no difference between subjects who had been frustrated prior to the film condition and those who had not nor between girls and boys.

Dubanoski and Parton (1967) demonstrated that pre-school children will exhibit matching behavior when viewing filmed stimulus material that was manipulated by threads. They postulated that the act of producing the

matching behavior in and of itself may provide a reward for the subject, or that children have been so frequently rewarded for the act of imitating, that matching behavior may illustrate a case of minimal extinctions for an intermittently reinforced class of behavior.

Similarly Fouts and Parton (1967) using first grade children as subjects, attempted to separate out mocking behavior from movement behavior and copying behavior. The results of their studies indicated that perhaps a human model is imitated as much for the reason that he offers information about how the environment can be manipulated as for other characteristics of the model.

Success of the model

Model success has been studied by Beach (1968), who found the success of a model to have no effect on the actual performance of a game. However, male subjects showed more imitation of the incidental behavior of a successful model than that of an unsuccessful model.

Nurturance and attention by adult model

The effect of nurturance and attention by an adult model has been the focus of several studies.

Marschak (1967) found the parents of normal children were warmer and more open in their expression of affection than parents of disturbed children, who tended to focus on strict control of their children. The normal children displayed more spontaneous as well as more requested imitation than the disturbed children, who paid less attention to their parents and tended to focus on themselves in a fixed way.

Mussen and Parker (1965) found high maternal nurturance (versus low) positively affected imitation of incidental behavior in five- to six-year-old girls, even though task performance was not affected. They also noted that highly nurturant mothers tended to encourage independence rather than dependence in their daughters.

However, neither nurturance nor nonnurturance affected imitation of aggression in a study by Madsen (1968). Boys imitated a familiar model more than an unfamiliar model and showed much more imitative aggression than girls. Children spent less time with a toy which had been devalued by the model, although neither nurturance, familiarity of the model, nor sex of the subject had a direct effect on this.

Rosenblith (1968) studied the effect of attention and withdrawal of attention on task-oriented and incidental imitation. She found that boys were more likely to imitate task-oriented behavior while girls matched incidental behavior more often. Girls produced more of both types of imitation when the model was attentive, whereas boys imitated more in both ways when the female model was attentive or when the male model withdrew his attention.

Bandura and Houston (1961) studied the effect of a nurturant relationship on imitation which was incidental to the performance of a task. Both experimental and control subjects imitated specific behaviors of the model whom they observed. A nurturant relationship enhanced imitation of the model's behaviors with the exception of aggression, which subjects imitated regardless of their prior relationship with the model. Dependency scores for the subjects were not shown to be significantly related to imitative behavior.

Thus, the effect of nurturance by a model on the imitation of aggressive behavior by children appears negligible. Nurturant or attentive behavior by a model

tends to increase incidental imitation, except possibly under the conditions where the model is an adult male and the subject is male.

Control of resources by model

Several studies have focused on the model as controller of resources.

In a study comparing four- to five-year-olds, seven- to eight-year-olds, and nine- to eleven-year-olds, Heterington (1965) found that children of all age groups and both sexes imitated the dominant parent, regardless of the sex of the parent. Girls also imitated more than boys.

Mischel and Grusec (1966) studied the effect of model rewardingness and future control on rehearsal and transmission of aversive and neutral behaviors. Half the subjects neither rehearsed nor transmitted the model's behaviors. Subjects exposed to high rewardingness rehearsed more neutral, but not more aversive behaviors than subjects exposed to low rewardingness. High future control subjects rehearsed both behaviors more than low future control. High reward-high future control subjects rehearsed both behaviors more than low reward-low future

control and more than high reward-low future control subjects. High reward subjects transmitted more aversive, but not more neutral behaviors to a clown. Future control had no effect on transmission. Subjects learned more behaviors than they performed, especially in the low reward-high future control group.

Bandura and others (1963) set up two conditions: one in which an adult model was controller of rewards with another adult as consumer and the child was ignored; another in which an adult model dispensed the rewards to the child with the other adult being ignored. In half of each condition, the controller was male; in the other half, female; with the alternate model of the opposite sex. The controls had no prior social interaction with the model, but were exposed to the same model behavior in the imitation task. They found that children showed more imitation of the model controlling the rewards than of the subordinate model. Imitation was greatest when the controller was the same sex as the subject, particularly for boys. For controls, both models were equally effective in producing imitation. In addition, when the child was rewarded, total imitation was greater than when the adult was consumer or when no prior social

interaction with the model had taken place. Rewarding models were described by subjects as generally more attractive.

Peer models

Peers have also been shown to be effective in producing imitation in nonreinforced studies.

In a study by Horowitz (1962) subjects remained longer at a lever-pulling task when the picture of a best friend was revealed than when a neutral picture or a blue light was revealed.

Bandura and others (1967) studied the effect of peer modeling on avoidance behavior. Children who had shown fearful behavior toward dogs were exposed either to a fearless peer model in a positive setting (a party); a fearless peer model in a neutral setting; a dog in a positive setting with no model; or a positive setting without a dog or a model. The subject's avoidance behavior was significantly equally reduced in the first two conditions. The positive setting did not enhance the modeling effect.

Hicks (1965) compared the effectiveness of peer and adult models on aggressive imitation. He matched

subjects on age (all preschool) and pre-experimental aggressiveness and exposed them to an aggressive peer or adult model of the same or opposite sex or to no model. Before the test for imitation, all subjects were mildly frustrated. Subjects exposed to models were more aggressive than those who saw no model. Boys imitated more than girls. The male peer model produced more immediate imitation while children who originally observed the adult male model produced more imitation in the six-month retesting. Subjects learned more of the model's behavior than they performed.

In a study by Bandura and Kupers (1964), children, who were exposed to peer and adult models who adopted either high or low criteria for self-reward, rewarded themselves according to the pattern of the model whom they observed. Adult models were imitated to a greater extent than peer models. Subjects also imitated model's verbal responses, although there was no difference between groups. Sex of the model and sex of the subject had no influence on self-rewarding behavior.

Thus it seems that peer models are successful reinforcers under certain circumstances. The nature of the behavior to be modeled assumes importance as a

variable, before generalizations about imitation of peers can be made.

Generalized imitation

Considerable controversy has surrounded the definition of causal aspects of generalized imitation. Generalized imitative responses appear to follow learning theory principles in relation to extinction curves. For instance Waxler and Yarrow (1970) found that not only did children readily imitate non-reinforced behavior of a model, when it was interspersed among reinforced behaviors, but also that the non-reinforced imitative responses were no more readily extinguished than the reinforced ones.

Baer and Sherman (1964) found that their subjects imitated a model's barpressing behavior, which was not reinforced, when other model-performed behavior, such as head nodding was reinforced when imitated. Metz (1965) has been able to demonstrate generalized imitation in autistic children,

In Steinman's (1970) study, children were exposed to two experimenters. One experimenter modeled only behaviors that if imitated were reinforced, whereas the

other modeled only behaviors that were not reinforced. The subjects imitated all responses.

Burgess and others (1970) and Brigham and Sherman (1968) conducted studies where subjects were rewarded for imitating English words and were not rewarded when they imitated interspersed foreign language words. These experiments further illustrated that it was possible to maintain imitative responses which were never reinforced, as long as some of the other imitative responses of the subject were reinforced.

Implication for the Present Study

The present study examined the effects of sex and age of the model and sex and age of the child on rate of imitation by the child. No extrinsic award was offered to either the model or the child. Many previous studies combine various characteristics of the model with some form of reward, and no studies have focused simply on the independent variables in the present study. Thus the main thrust of the present study was to initiate the development of norms in relation to the effect of the independent variables on the rate of imitation by children.

CHAPTER III

METHODS

Setting and Population

Setting

The setting for this study was an industrial city of about 100,000 population in the central Piedmont area of North Carolina. The major industries include tobacco and fabrics. Insurance companies, universities and hospitals are also major employers.

A 1970 survey (University of North Carolina Division of Health Affairs, 1972) of the county in which this city is located reported a total population of 132,68. The percentage of white population was seventy-seven, while the percentage of non-white was thirty-three. The county divorce rate was four per 1,000 population, and 32.67 percent of the black families with children under eighteen years of age were headed by women. Further, 46.6 percent of all black children under eighteen years of age were not living with both

parents. The county rate of unemployment was 3.4 percent and the per capita income was \$3,544.

Population

The population under study consisted of 221 children enrolled in seven Head Start centers during the summer of 1970. The age range of the children was thirty-seven to eighty-four months, the median age being fifty-three months. Ninety percent of the population was black. In order to qualify to become a pupil at a Head Start center, a child had to be from a family whose annual income was not more than \$3,000.

Sample Selection

The sample for this study consisted of 132 children. Although all subjects at each center were tested, those used for this study met the following criteria:

1. Negro race
2. adequate vision and hearing as vouched for by the center directors
3. absence of severe emotional or physiological problems as vouched for by the center directors
4. within the normal range of intelligence as vouched for by the center directors

5. agreement by the subject to participate
(six refused)

6. completion by the subject of the research
procedure without misadventure.

All the enrolled children (221) were ranked by
age. The median birth date was May 31, 1965. All
children in the centers born before that date were
classified as "older", and all born after that date,
classified as "younger".

Development and Description of Tools and Experimental Laboratory

Development of stimulus films

Four stimulus films were developed. Models for
each film were black. The films were in color and were
visual only (no sound). The models for the films
were; a male adult, a female adult, a male child and
a female child. The adult models were approximately
thirty-two years old, and the child models approximately
four and a half years old. The films, which were made
by the investigator, were filmed in the experimental
laboratory.

A set of guidelines was followed for the development of the films.

1. All four models were to follow the same non-verbal scripts as closely as possible.

2. The tasks for the model to perform were to be as neutral as possible in terms of the subjects having had previous reward or punishment experiences with them.

3. The tasks for performance were not to be ones that provided a natural curiosity for the subjects or provided some kind of mastery enticement.

4. The tasks could be performed easily by the children in the age range of the sample.

5. The tasks were to be distinct enough to allow raters to determine if imitation was a factor in the subject's behavior.

6. The tasks were to be minimally absurd, i.e. for both the models and the subjects, the tasks were to involve only plausible behavior.

7. The tasks were not to be predominantly ones that either males or females would have a preference for.

8. The models were to be filmed at the same table and seated in the same position as the subjects subsequently would be.

Description of stimulus films

The primary activity of the models took place while they were seated at the table in the experimental laboratory. The equipment on that table was a short length of rope, a kitchen spoon, three blocks of varying length, three tin cans, a stone suspended from a stand so that it could swing, and four small paper cups arranged on a stand. Diagrammatic placement of the objects on the table is shown in Appendix A, and a detailed description of each object is found in Appendix B.

Each model was instructed to maintain a neutral countenance. This was maintained well by the adult models, but there were a few deviations by the child models. The sequence of performance of acts for each model was as follows (except for the first item, all acts were performed at the table):

1. a slow walk from the side of the laboratory, up the steps to the laboratory, turn and face out the laboratory door (twenty seconds);

2. pull stone, let it swing, watch the swinging, and repeat (twenty seconds);

3. bring tin cans over in front of the model, and then stack them, after examining each carefully (twenty seconds);

4. take the top can off of the stack and hit the stone with it, repeat (twenty seconds);

5. return the can to the stack, and push the stack slowly to the left of the blocks (five seconds);

6. pull cup stand to in front of the model, take the cups off of the wires, turning them upside down in front of the model, bang each cup with a closed fist until it is smashed flat (fifty seconds);

7. pull cups into lap and then brush them off of the lap onto the floor (ten seconds);

8. bring spoon over to the right of the model, and place perpendicular to the model with the bowl of the spoon away from the model (three seconds);

9. arrange blocks in a triangle, with the short block away from the model and the vortex close to the model, put the spoon inside of the triangle so that the base is inside the triangle and the handle is resting upon the short block (thirty five seconds).

Following the development of the films, they were edited, spliced, and placed into Technicolor, Super eight, Magi-cartridge film magazines. The actual length of the finished film was:

	<u>leader</u>	<u>at table</u>
male adult	16"	2'9"
female adult	14"	1'35"
male child	6.5"	1'55"
female child	21 "	2'53"

Later analysis showed no orderly preference for films when the rate of imitation of each film was compared to the length of time of each film.

Description of experimental laboratory

A travel-trailer (Norris, Smokey) was used as the experimental laboratory. The decision to use this was based on the belief that the laboratory needed to be the same for each of the seven centers. Therefore, before the testing sessions began each day, the trailer was brought to the center, parked where there would be no traffic hazard to children coming from the center to the laboratory, and then the gasoline generator was

started and equipment tested. The placement of various objects within the laboratory is depicted in Figure 1.

Equipment used in connection with the laboratory included:

Stop watch - Apollo #14½

Movie screen - Technicolor Portable Rear Projection Screen, size 10" x 8"

Projector - Technicolor, Super eight, instant movie projector, Model 810

Video tape recorder - Concord VTR-620

Monitor - Concord VTR Monitor/Receiver, Model MR-900

Camera - Concord Solid State Television Camera, Model MTC-18

Videotapes - Sony Video Tape, V-32

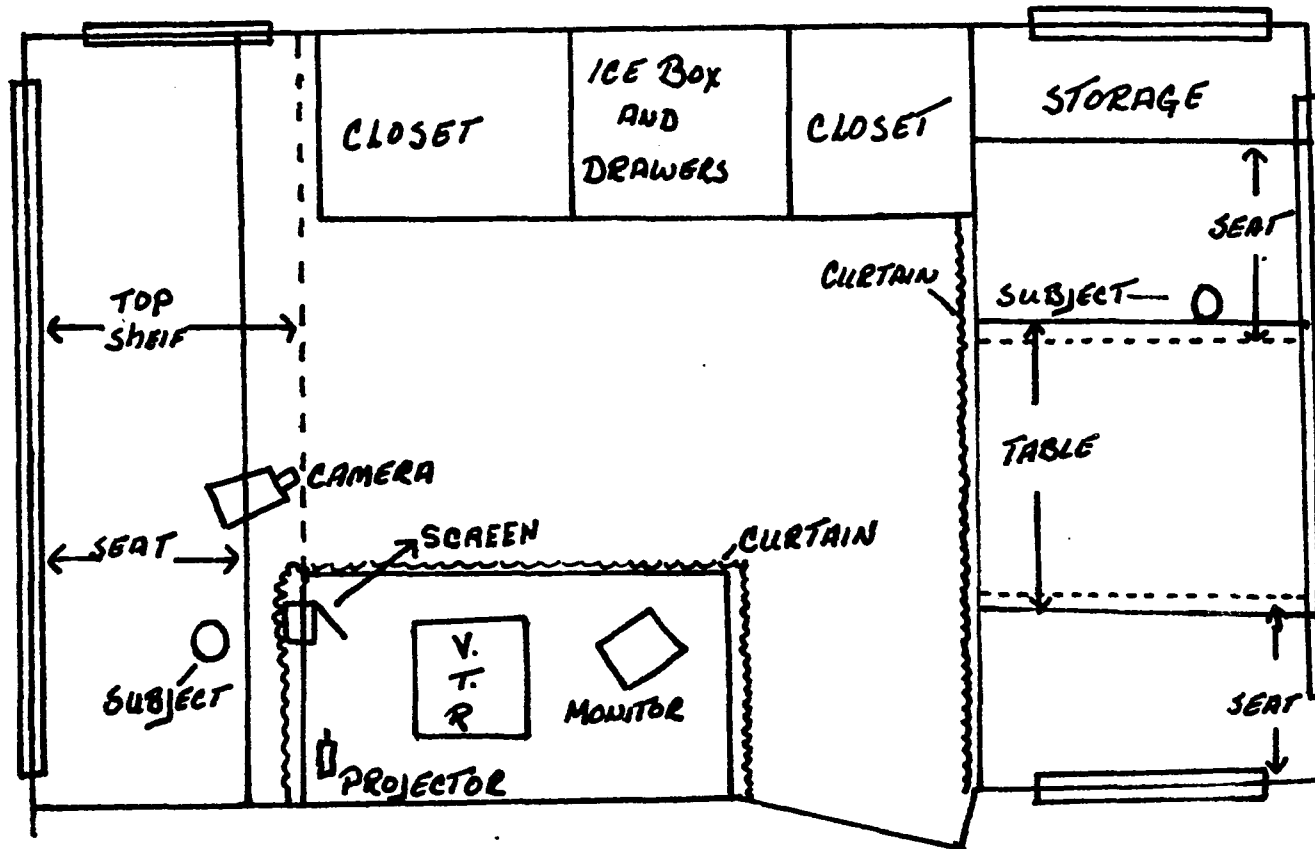
Electricity generator - a Honda portable generator was used to provide the electrical power for the laboratory. This was set up outside of the trailer, but where it was visible to the children.

Entry Procedure

The director of the city wide Head Start program was contacted. She provided approval for the children in Head Start to serve as subjects, pending approval by the director of each of the seven Head Start centers.

Figure 1

Placement of Various Objects Within the Laboratory



$\frac{1}{2}'' = 1 \text{ FOOT}$

The educational director of Head Start informed each center director that the investigator would be contacting them. Both the Head Start director and the educational director shared with the center directors their interest and enthusiasm about the research.

The investigator then visited each center director. An outline of the procedure of the research as well as the general questions to be answered (under what conditions do children imitate) was shared. The investigator also shared her ignorance and curiosity as to the outcome of the study. A report of findings was promised the center directors.

After a two week lapse of time, each center director was recontacted to determine if she had agreed for her students to participate in the study. All had. Another appointment was then made with her in order to discuss details of the research requirements.

At this second meeting, each center director provided a roster of all of the children in her center, their sex, and their date of birth. The directors also were asked to indicate the names of the children who were hard of hearing, had visual problems, or who had other physical or emotional handicaps. It was agreed

that all children in each center would be tested, whether or not they would eventually constitute the sample for the study. It was determined at this time that the vast majority of the children in the centers were black.

The center directors were asked to assist the investigator in the management of the problem of feedback of information about the testing by children who had been tested to those who had not. It was believed that any feedback of a nature specific to the testing procedure would bias subsequent subjects.

After this contact with the center directors, a letter went out to all the centers. This was to provide specific information to the center directors as to what might usefully be shared with the teachers in the center (see Appendix C).

When the dates for testing the children were determined, each center director was notified to see if it was a convenient time. The order of sequence of testing from one center to another was based primarily on the predicted ease of moving the laboratory onto the center grounds (easiest to hardest).

Procedure for Each Subject

Each morning, the center director, based on her knowledge of the children and the routine of the center, prepared the sequence for running the subjects. The director was also asked to schedule the best times for running subjects. Her advice was always sought when any changes in the determined sequence or schedule were necessary. Frequently the directors would have those children tested first who were most gregarious and least timid. Most directors were opposed to the children being tested during breakfast or lunch. However they frequently would schedule a child, who was known not to nap long, at the beginning of the nap period. Also, if a child awoke from nap, and showed no signs of returning to sleep, she would suggest that he be tested during that time.

Each subject required approximately twenty minutes. This included getting him from the center to the laboratory, the testing procedure itself, and the return to the center. The usual number of children who could be tested in one day was eighteen. Nearly all of the children were tested between July 22, 1970 and August 4, 1970.

Each child was individually escorted to the laboratory and returned individually before the next child was sought. The child was free to ask questions about the trailer and the generator. Usually it took about five minutes for the research assistant to get the child to the trailer. During this time questions about what would happen in the laboratory were answered with "see a movie" and "play with some toys." Other questions were answered with, "Let's wait and see." The research assistant, who was responsible for moving the children to and from the center, would then sit where the child could see her, but outside of the laboratory. This was done because it became evident that those children who were nervous about the trailer had established some degree of trust in the research assistant, had seen the assistant talking with his teachers, and knew that the assistant was to take him back to a familiar place. The research assistant and the investigator were both white.

As the research assistant came to the trailer door, she called the investigator's first name, and said, "X (the child's first and last name) is here." The

investigator would then say to the child, "Come in, X (child's first name)." When the child was inside the laboratory, he was given a few seconds to look around. Then he was told, "I want you to sit right over here." As she said this, the investigator moved over to the seat and pointed to where the child was to sit. Once the child was seated, the investigator then said, "I'm going to show you a short movie, and I want you to watch it very carefully," and pointed to the movie screen. The investigator then turned on the movie, and sat down next to the child. If the child asked the investigator questions at this time, the investigator's response was "Let's watch the movie."

As the movie ended, the investigator stood up, turned off the movie, and then said, "Now I have one more thing for you to do. Come over here.", pointing to the curtains by the table. The investigator pulled aside the curtains, revealing the table and the equipment. The child was then told, after he seated himself, "Now you can play with these things any way that you want to."

The investigator then stepped back, reached through the other curtain (all the materials on the other table, VTR, projector, etc. were curtained) turned on the VTR and punched a stop watch. The investigator then returned to the seat near the movie screen, and sat looking out of the window or down at a pad and stop watch. The investigator did not look at the child while he was at the table. Questions that the children asked during this time were answered by "You play for a while now, any way that you want to." No child was observed looking at the camera, so it was believed that the children were unaware that they were being filmed.

At the end of four minutes, the investigator stood up, stopped the stop watch and VTR, and said to the child, "O.K. That's all. Thank you very much for coming to the trailer." At this point, the research assistant stood up at the outside of the door and said, "Let's go back now, and see who else is to come out." On the way back into the center, the research assistant would generally divert any conversation by the child back to his school activities. Often she would solicit the child's assistance in finding the next child who was to come to the trailer.

Following his return to the center, the subject was managed so that his opportunity to give feedback about the testing procedure to other children would be minimal. The center directors had formulated the following methods for the management of feedback:

1. the returning children would return to a milieu where communications among the children were structured, i.e. story telling, watching T.V., active group games, or nap time;

2. when possible returning subjects would be placed into a different group from those subjects who had not been tested.

Pilot subjects were treated exactly the same as the experimental subjects except that they viewed a silent color film of Yogi Bear.

While the research assistant was away, the investigator arranged the table in preparation for the next subject. Light pencil markings indicated the standard position of the objects on the table. Smashed cups were replaced with new ones.

Assignment of Subjects to Films

On the evening before a center was to be visited, the list of children for that center, their sex and their age were reviewed. Children were classified first by age and then by sex.

A group of pilot subjects was randomly pulled from those children at the first three centers visited. Thus, for these first three centers, an additional classification was determined. The pilot group of twenty-one children was all black. Further, all pilot subjects were determined to have been students in Head Start for at least six months. This criterion was set to attempt to insure that these children were comfortable with exploration of the unfamiliar. Using a table of random numbers, children were selected from the cell pools (age and sex) to be in the pilot group. Twenty-one children were thus selected; five younger males, six younger females, five older males, and five older females.

For the first three centers, assignment of stimulus films to subjects was made to those subjects remaining after the pilot group was determined.

Assignment to stimulus films was random, within the age-sex cells. Initially, random placement of subjects into one of the available sixteen cells was maintained. However, during the latter half of the testing, certain cells had become filled, and thus random placement was limited to those cells still unfilled.

Rating of Films of Subjects

Use of films of pilot subjects

The films of the pilot subjects were reviewed before those of the experimental subjects. The purpose of this was to be sure that children who had not viewed the stimulus films, did not perform acts that would later be rated as imitative. Although none of the pilot subjects performed acts that were later classified as imitative, there were two behaviors that led the researcher to more stringent guidelines. Three pilot subjects pulled cups off of the stand and set them upright on the table. Four pilot subjects pulled once, at the suspended stone.

Guidelines for rating filmed behavior as imitative

Clearly, all model performed behaviors could not be tabulated for further investigation of subject's filmed behavior. Such things as body posture, head movements, facial expressions, etc. were too difficult to compare accurately. Therefore, only the following group of model performed acts was decided upon for possible matching behavior on the part of the subjects, because these acts could clearly be observed by the raters. (More specific guidelines for rating these acts is to be found in Appendix D.)

Behavioral items that could be rated as imitative acts:

1. stone - pulls stone twice in succession
2. cans - stack one or more cans upside down
3. hit stone - hit the stone with the can
4. cups - take cup(s) off of the wire and put upside down on table
5. cups and smash - take off cups, put upside down, and smash them
6. smash cups - after an interval from taking cups off stand, returns to them and smashes them

7. cups to lap - after smashing, there is an interval, and the child returns later to pull cups into lap
8. cups to lap to floor - after an interval from smashing, pulls cups to lap and then pushes them to the floor
9. cups, smash, lap - all three in a continuous sequence
10. spoon - brings spoon over and places it perpendicular to subject
11. triangle and spoon - builds triangle, and in continuous sequence, puts spoon into triangle
12. blocks and spoon - puts spoon in a block enclosure around the spoon
13. triangle - builds a triangle
14. blocks - made blocks into an enclosure, into which later the spoon is placed
15. spoon in triangle or blocks - following an interval after making the triangle or enclosure, puts spoon in it.

Procedure for rating each subject's film

Each film was observed by two raters. One rater used the stop watch, while the other called out when to start and stop timing.

The first viewing of the film was to determine the length of the film, as well as to note possible acts to be rated as imitative, if any. On the second viewing of the film, the two raters had to agree as to whether or not an item of behavior would be rated as imitation. Once this agreement was reached, the imitative act was then timed, from its inception to its completion. Needless to say, this part of the rating was the most time consuming and tedious, in that it necessitated going over and over sections of the film. On the third viewing of the film, one rater called out when an inception of an imitative act appeared, and the other noted the time on the stop watch. In this way, the time, that the act started, in the whole sequence of the film was noted. Two or three of the four minute films could thus be rated in an hour. Approximately every fourth film, the raters traded the stop watch. Approximately every two hours, the raters took a break from the rating task.

Inter-rater Reliability

Three months following the initial rating of the films, the two raters performed a reliability study.

Fifty-two films were randomly selected for this study. The same rating procedure was followed for the reliability study as was done for the initial rating.

Identification of imitative acts

As mentioned on page sixty-four, there were fifteen behavioral items that could be rated as imitative acts. Also a "no imitation" score could be assigned to a subject. Thus, there were sixteen possible ways to rate subject behavior. It needs to be clarified further that with those subjects who did perform imitative acts, the behavior in between those performances was not rated, but nevertheless had to be agreed upon as non-imitative. Similarly, agreement had to be obtained when a subject was rated as performing no imitative acts. These latter types of agreements do not show up in this analysis.

In the original rating of the films, 174 items were rated as imitative acts. On the reliability study 165 of these same items were again rated similarly, for a percentage agreement of 95.05.

Using the formula:

$$\frac{\text{percent of actual agreement (95.05)} - \text{expected agreement (6.25)}}{100 - \text{expected agreement (6.25)}}$$

the corrected percent agreement between the two raters was found to be 95.1.

Identification of time spent in imitative acts

Comparing the time, in seconds, given to each of the agreed upon acts, between the first rating and the second rating, there was a 2.59 second mean difference. Considering that variation in timing is related to speed of engaging the stop watch from first a visual cue and then to an oral command, some inconsistency was expected.

However, visual inspection of this pre-post data showed that some few ratings were considerably discrepant, while others were very similar. Thus a correlation between the two sets of data was performed. The correlation was 0.961 (for the first set of scores, $M = 19.59$ and $S.D. = 18.73$; and for the second set of scores, $M = 19.86$ and $S.D. = 17.58$). It is assumed that this high agreement is somewhat reflective of the degree of objectification that was possible when rating the actual films.

Limitations Due to Methods

1. No description of the population was obtained, therefore limiting generalizability.

2. The advice of center directors was sought in order to exclude certain children from the sample. This advice was not verified, thus possibly children got into the sample who were not able to deal with the requirements of the methods.

3. The sample constraints of age, sex, race, and socioeconomic level limit generalization to a wider population.

4. Family structure was not obtained on the subjects. This was possibly an uncontrolled variable affecting particularly imitation of the adult films.

5. The four stimulus films were not rated by a comparable group of children for relative attractiveness, nor were the model behaviors tested for attractiveness or ease of manual performance.

6. The possible differential effects on the younger versus the older children in terms of distraction or anxiety caused by the novelty of the experimental laboratory was not tested.

7. The effects of white investigators upon performance of black subjects was assumed to be a constant, but influence on overall performance could not be determined.

8. Pilot subjects may not have been as free to experiment with the articles on the laboratory table due to the possible influence of having just viewed a Yogi Bear film. Thus, under more free circumstances, they might have demonstrated that some of the subject behavior that came to be rated as imitative, might have happened without ever having seen the model film stimulus.

9. Only non-verbal behavior was studied, thus limiting generalization of findings to this class of behavior.

10. Only two raters were used to rate the films, rather than having a consensus of a larger group of raters. Thus, there was the increased possibility of a high agreement on erroneous items.

11. Children who began to perform imitative acts, but who did not complete them correctly, were scored as not having performed those acts. This is just one of the

many ways in which the stringent rules for rating imitative behavior may have caused distortion.

12. The small number of subjects in each cell limits generalizability of findings from the second and highest order interaction hypotheses.

13. No control was developed for those children who were highly distracted during the time that they were supposed to be viewing the film. They had perhaps a lower level of memory for what had been performed by the model.

14. Although the design was set up in an attempt not to have external reward or punishment as a feature, there was no way to insure that the subjects viewed the various features of the experimental procedure in that way.

15. An attempt was made to have the model performed behaviors be those for which the child had not previously received reinforcement, however this was not verified.

16. Some of the subjects may have received reinforcement in previous situations for the very act of imitation and this was not determined.

17. This study could have been one concerned with "visual memory under stress," and this was not verified.

18. Length of matriculation of each child in the Head Start program was not determined. If the program had a reinforcement ethic for imitation, this could have biased the results of the study in an undetermined way.

19. Since the models were filmed, rather than real, generalization to actual life situation must be guarded.

20. If a mastery drive does exist, this study, particularly since many of the model performed behaviors were novel, might simply have tested which children were more oriented toward the fulfillment of this drive at that time. Caution for generalization of the findings from this study to behaviors other than novel ones, should be exercised.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

The data were analyzed to test the hypotheses. However, some preliminary analyses were necessary to answer questions bearing on the validity of later analysis.

Preliminary Analyses

Attractiveness of films

It would have been desirable to be able to make the statement that each of the four films were equally attractive or nonattractive to the subjects. However the very nature of the study ruled out this determination in that sex and age of film model are confounded with film attractiveness. The study demonstrated that certain films were imitated more often than others. Whether or not this indicated preference based on attractiveness, cannot be stated.

Inter-center differences

The subjects came from seven different Head Start centers. It was possible to raise the question of whether some center milieus reinforced imitative behavior differently from others, thus rendering some of the population different in a way that might have heavily influenced the dependent variables. To test such a possibility, each center's subjects were investigated as a group, to see if they differed in any way from each other in terms of time spent in imitation or number of imitative acts. Table 2 presents raw mean scores for time, acts, and age of subjects within each center.

A multivariate test of within cell (center) regression showed that age in months was positively related to time and acts. ($F = 13.52$; $df = 2,123$; $p < .001$). Univariate tests for regression of age on time and acts individually were also significant ($p < .001$). Further, a test for equality of within cell regression showed no statistically significant difference in regression at the various centers. Thus subjects from the centers did not differ in regard to the

Table 2
Mean and Standard Deviations for Subjects
by Center of Testing

Center	Number of Subjects	Time*	S.D.*	Acts*	S.D.	Age in Months	S.D.
1	11	68.82	47.71	3.64	2.46	68.73	13.63
2	12	38.83	49.81	1.67	1.92	53.75	7.92
3	28	52.63	52.55	2.61	2.41	67.71	10.71
4	27	27.00	27.73	1.81	1.82	64.37	11.72
5	25	58.16	45.05	3.24	2.39	61.68	11.62
6	12	57.50	39.20	2.17	1.85	65.42	7.73
7	17	48.62	44.95	2.41	2.06	62.53	10.45

Note: Time = total amount of time, in seconds, spent in imitative behavior
 Acts = number of imitative acts performed
 S.D. = Standard deviation

relationship between age of subjects and the rate of imitation performed, and age was found to be significantly related to imitation rate.

A multivariate analysis of covariance was then performed, with the age of subject as a covariate, using a one-way design with a single factor being the center of testing and the two criterion variables being number of imitative acts and time. No significant difference was found between the centers ($F = 1.66$; $df = 6,123$; $p > .05$). Thus, with age covaried, the subjects from the seven centers showed no significant difference in rate of imitation.

Relationship between the two dependent variables

Each subject was scored for both the number of imitative acts he performed (acts) as well as for the total number of seconds he spent imitating (time). The rationale behind this originally was that the younger children might perform fewer imitative acts, either due to "centering" or due to being somewhat less deft manually. If this had turned out to be the case, seconds spent in imitative behavior would have been a helpful figure to report, particularly for the younger

children. Throughout all data analysis, seconds of imitation as well as number of imitative acts performed are reported.

A preliminary analysis was conducted to determine the relationship in this study between time and acts. A within cell partialled correlation between the two dependent variables was .764. This correlation was performed partialling age. The cells used were those of the main design of the study, determined by age and sex of subject and age and sex of the models. Henceforth "cell" will refer to this distribution of subjects.

As a result of this analysis, it was determined that time and acts were highly positively related. If a child performed more acts, uniformly he took, in ratio, more time. The concern about "centering" or slower manual ability was not thus far substantiated.

Relationship between age of the subjects and the dependent variables

A similar and related initial concern had to do with the issue of the age of the subjects. Many factors could influence subjects in such a way that the younger ones might not present a true picture of imitative propensity. The factors mentioned of "centering" and

manual skill were of concern here. Further though, were issues of adaptability to the research laboratory, and the elements of the testing procedure. It is possible to conjecture that the younger children might have been more shy, and perhaps more easily distracted by the requirements of the research procedure.

A test of within cell regression was performed. The independent variable was age in months and the dependent variables were acts and time. The strength of the relationship between age and a combination of the two dependent variables was shown by a multiple R of 0.314. ($F = 6.22$; $df = 2,114$; $p < .003$). Further, univariate F tests were performed to determine the relationship (within cell) of each dependent variable to the independent variable. The relationship between time and age in months was positive ($F = 7.87$; $df = 1,115$; $p < .006$). The relationship between acts and age in months was also positive ($F = 12.52$; $df = 1,115$; $p < .001$). Within the design cells then, the older the child, the more he was scored as performing imitative behavior.

A test of the equality of regression within all cells was performed, and the hypothesis of differential within cell regression was not supported ($F = .62$;

df = 30; $p > .5$). Univariate F tests for equality of regression were also not significant: for time ($F = .674$; $df = 15,100$; $p > .5$) and for acts ($F = .634$; $df = 15,100$; $p > .5$).

Due to the strong positive relationship found between age in months and the dependent variables, all of the data relating to the hypotheses of this study were analyzed with age as a covariate. Without this covariance, it would have been impossible to determine the actual propensity of the child to imitate, as age was not controlled within the cells of the design. Since equality of regression scores within each cell could be assumed, the standard model for covarying age could be used.

Descriptive Data

One hundred and thirty-two subjects qualified from the population of 221. All the subjects were black. They varied in age from thirty-seven months to eighty-one months of age. The population median age was sixty-three months. This age was used as the dividing age for classification of subjects into a

"younger" and an "older" group. Thus all subjects sixty-three months or older were classified as "older" and all subjects sixty-two months or younger were classified as "younger." Table 3 shows classification of subjects by age and sex.

Table 3

Assignment of Subjects To
Age Classifications

	Male	Female	Total
Younger	32	32	64
Older	33	35	68
Total	65	67	132

Assignment of subjects to stimulus films

Four stimulus films were available, one each of: a female child, a male child, a female adult, and a male adult. Each subject was randomly assigned to view one of these films. Table 4 shows the basic study design as a reflection of film assignment.

Table 4
Classification of Subjects According
To Film Viewed

<u>Subjects</u>	Film Viewed							
	Adult		Adult		Male		Female	
	Male	Female	Male	Female	Child	Child	Child	Child
	M	F	M	F	M	F	M	F
Younger	8	8	8	8	8	8	8	8
Older	8	8	9	9	8	9	8	9
Subtotal	16	16	17	17	16	17	16	17
Total	32		34		33		33	

The mean and standard deviations of the ages in months of these subjects within each of the cells is presented in Table 5.

The mean age difference between the younger and the older subjects was 18.87 months. Because of age limits previously established, no standard deviations were excessively high. The oldest subjects were the older females and the youngest, the younger males.

Table 5
Mean Age (Months) of Subjects
Within Cells

<u>Subjects</u>	Model							
	Male				Female			
	Adult		Child		Adult		Child	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Male								
Older	70.50	4.44	70.25	7.48	71.33	6.21	71.88	4.97
Younger	51.88	7.16	54.13	9.58	48.75	3.81	57.75	3.81
Female								
Older	72.13	5.11	71.44	3.71	71.22	4.71	76.44	3.61
Younger	50.25	7.05	54.63	6.78	55.38	5.37	51.38	5.58

Description of variables

Dependent variables: the study had two dependent variables.

1. The number of "acts" (number of imitative acts) that each subject performed. There were fifteen possible types of behavior that could be rated as imitative. Subjects could be rated two or more times for the same act. If the subject was rated as performing no imitative acts, he was given a score of zero.

2. The amount of "time" (time, in seconds, spent in imitative behavior) that each subject performed. If a subject was rated as performing an imitative act (or acts) he was given a score (in seconds) of the total amount of time involved in performing that imitative act. If two or more acts were performed, seconds were cumulatively reported, excluding those seconds in between the rated acts.

Independent variables: the study had four independent variables considered to be main effects.

1. sex of subject
2. age of subject (in categories of younger and older)
3. age of model (adult or child)
4. sex of model

First order interactions for these variables were:

1. sex of subject and age of subject
2. sex of subject and age of model
3. sex of subject and sex of model
4. age of subject and age of model
5. age of subject and sex of model
6. age of model and sex of model

Second order interactions for these variables were:

1. sex of subject, age of subject and age of model
2. sex of subject, age of subject and sex of model
3. sex of subject, age of model and sex of model
4. age of subject, age of model and sex of model

The highest order interaction was sex of subject, age of subject, age of model, and sex of model.

A presentation of the raw mean scores and standard deviations for the dependent variables for each of the sixteen cells appears in Appendices E and F.

Raw mean scores for the dependent variables

Raw mean scores for the dependent variable of time appears in Appendix F. Each subject sat at the laboratory table and was filmed for approximately 4 minutes (240 seconds). Inspection of the raw mean scores for each cell showed that no cell group of children imitated for more than 73.94 seconds, and the lowest cell mean score was 13.13 seconds.

Younger subjects imitating the adult models rated lowest (26.19, 18.50, 22.38, and 13.13), whereas older subjects imitating the child models rated highest (73.25, 73.94, 72.00, and 66.33). Consistently older subjects imitated more than younger subjects. Older males and older females imitated about the same amount, and both were somewhat lower when imitating the same

sex adult model. In all cells, the child models drew more imitative behavior than their adult models of the same sex.

Raw mean scores for the dependent variable of acts appear in Appendix E.

There were 15 separate acts that could be rated as imitative. However, a subject would receive a score of two, three, etc. even though he imitated only one act. This could be obtained when he performed the act, and then at a later time during the experimental period performed it again. The highest mean number of acts performed by cell was 4.00 and the lowest was .50.

As previously mentioned, time spent in imitative behavior and number of acts performed correlated highly. As with "time," younger subjects imitating adult models also scored lowest in mean number of acts performed (1.125, 1.375, 0.500, and 0.875), and similarly older subjects imitating child models rated highest (3.375, 4.00, 3.500, and 3.444). With only one exception, older subjects performed more imitative acts than did younger subjects. As mentioned previously a high correlation existed between age and time and acts. Although in

The preceding inspection of "time," older males and older females imitated about the same, in this analysis older females imitating male models were the highest. Further, in all cells again, the child models drew more imitative behavior than their adult models of the same sex.

Comparison of raw mean scores and covaried mean scores

When age was covaried within each cell, rates of imitation changed markedly (see Table 6 and Appendix F). The purpose of the covarying was to make the subjects in each cell as similar as possible to each other in relation to the effect of age on the rate of imitation. The covarying had the general effect of increasing the rate of imitation for the younger subjects and decreasing it for older subjects. However one relationship still obviously persevered. The rate of imitation of the child model was still consistently higher than of the adult model of the same sex. Other relationships mentioned to exist among the raw mean scores did not persevere once the scores were covaried.

Characteristics of subjects who did not imitate

Thirty-three of the 132 subjects were rated as performing no imitative behavior.

Table 6

Distribution of Subjects Who
Did Not Imitate

<u>Subjects</u>	Model			
	Male		Female	
	Adult	Child	Adult	Child
Male				
Older	1	2	2	0
Younger	4	2	6	2
Female				
Older	0	0	3	1
Younger	4	0	3	3

Of these subjects, nineteen were male and fourteen female. Nine were classified as older, whereas the majority, twenty-four were classified as younger.

Of the younger subjects fourteen were male and ten female. The adult female model pulled fourteen of these subjects and the adult male model nine, for a total of twenty-three. Whereas the child model films pulled only ten. A comparison of the mean ages (within cells) of these subjects with the total sample showed no systematic differences.

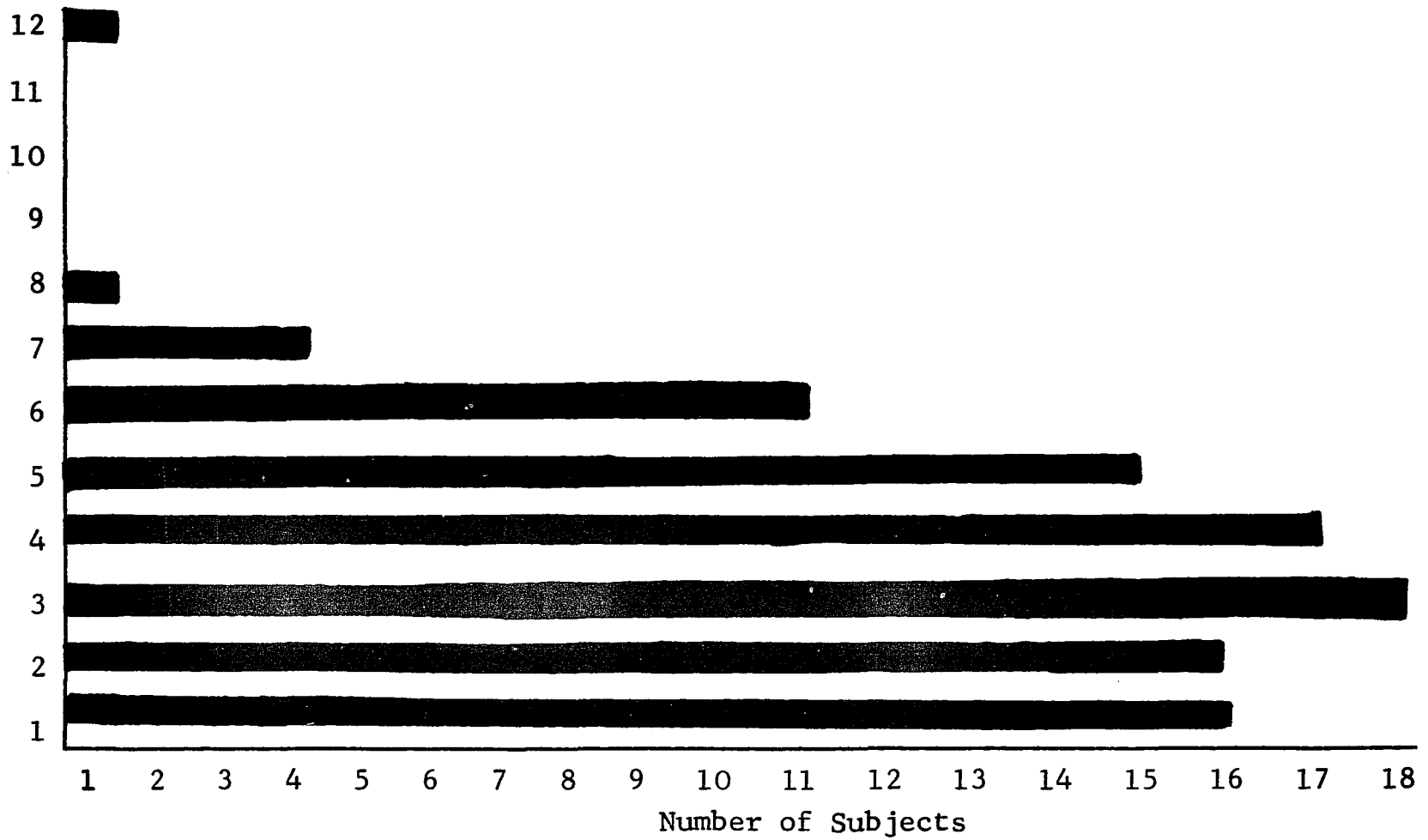
Characteristics of subjects who did imitate

Ninety-nine of the 132 subjects were rated as performing imitative acts. The range in number of acts performed was one through twelve. The mean number of acts performed was 3.63. (See Figure 2.)

Sixty-two of these subjects, or approximately two-thirds performed only one, two, or three imitative acts. In specific response to the earlier question of "centering," subjects who performed only one type of imitative act were grouped together and investigated (N = 27). Sixteen were younger and eleven were older. Thirteen were males and fourteen females. No model preference was shown.

Figure 2

Distribution of Subjects According To
Number of Acts Performed



The sixteen subjects who performed only one imitative act and the seventeen subjects who performed six or more imitative acts were compared (Table 7).

Table 7
Characteristics of High and Low Imitators

Source	High Imitators	Low Imitators
Male	10	6
Female	7	10
Older	12	6
Younger	5	10
Film	High Imitators	Low Imitators
Adult male	3	4
Adult female	5	4
Male child	2	4
Female child	7	4

Film preference was not notable. However, there was a reverse effect in terms of sex and age in that the high imitators tended to be older males and the low imitators were younger females.

Analysis of Data Related to the Hypotheses

The data were then analyzed to test the research hypotheses. For this purpose, as previously mentioned, age, within cells, was a covariate throughout all analyses. Due to multiple dependent variables, a multivariate analysis was used throughout. Univariate analyses, of each dependent variable separately, was conducted. Because the number of subjects in each cell varied from eight to nine, a non-orthogonal design, a least squares approach was used for the statistical analysis of the data.

In order to focus on data pertinent to the testing of the hypotheses, Table 8 presents the cell means for the covaried dependent variables.

The complete table of multivariate analysis of variance and univariate tests for all hypotheses appears in Appendix G.

Table 8

Covaried Cell Means of
Dependent Variables

<u>Subjects</u>	Model			
	Male		Female	
	Adult	Child	Adult	Child
Male				
Older	(1) 24.15	59.48	35.08	55.25
	(2) 1.27	2.55	1.61	2.50
Younger	46.22	61.51	48.15	50.54
	2.33	3.33	2.05	2.80
Female				
Older	55.41	57.98	11.67	41.18
	3.22	3.04	1.18	1.94
Younger	41.52	85.66	26.72	80.76
	2.76	3.27	1.69	4.76

(1) seconds of imitative behavior performed

(2) number of imitative acts performed

Main effect hypotheses :

1. There will be no difference in rate of imitation between male and female subjects.
2. There will be no difference in rate of imitation between older subjects and younger subjects.
3. There will be no difference in rate of imitation between subjects who viewed adult models and subjects who viewed child models.
4. There will be no difference in rate of imitation between subjects who viewed male models and subjects who viewed female models.

Table 9 presents the statistical analysis of the data pertinent to these hypotheses.

Table 9

Statistical Analysis* of Main Effect Hypotheses

Hypothesis	Source	df	F	p
1	Sex of Subject	2/114	1.770	0.142
2	Age of Subject	2/114	0.569	0.567
3	Age of Model	2/114	6.110	0.003
4	Sex of Model	2/114	1.075	0.345

* Multiple analysis of covariance

In this study male and female subjects did not significantly differ in rate of imitation (Table 10). Further, with age covaried, there was no difference in rate of imitation between younger and older subjects. Sex of the model viewed by the subjects also had no influence on rate of imitation. Thus, hypotheses one, two, and four were not disproved.

Table 10
Covaried Main Effect for Dependent
Variables

Source		"Time"	"Acts"
Sex of Subject	Male	47.73	2.31
	Female	49.69	2.71
Age of Subject	Older	42.29	2.15
	Younger	55.13	2.87
Age of Model	Adult	36.08	2.01
	Child	61.35	3.01
Sex of Model	Male	53.94	2.72
	Female	43.49	2.30

However, subjects who viewed adult models had significantly lower rates of imitation than those who viewed child models. The univariate F test relating age of model to amount of time spent in imitation was significant ($F = 12.187$; $df = 1,115$; $p < 0.001$). The same test relating age of model to number of imitative acts was also significant ($F = 8.462$; $df = 1,115$; $p < 0.005$). Thus, hypothesis three was disproved.

First order interaction hypotheses

5. There will be no interaction between age of subjects and sex of subjects on the dependent variables.

6. There will be no interaction between sex of subjects and age of models on the dependent variables.

7. There will be no interaction between sex of subjects and sex of models on the dependent variables.

8. There will be no interaction between age of subjects and age of models on the dependent variables.

9. There will be no interaction between age of subjects and sex of models on the dependent variables.

10. There will be no interaction between age of models and sex of models on the dependent variables.

Table 11 presents the statistical analysis of the first order interaction hypotheses.

Table 11
Statistical Analysis* of First
 Order Interaction Hypotheses

Hypothesis	Source	df	F	p
5	Sex of Subject and Age of Subject	2/114	.309	0.735
6	Sex of Subject and Age of Model	2/114	.997	0.372
7	Sex of Subject and Sex of Model	2/114	.967	0.383
8	Age of Subject and Age of Model	2/114	.546	0.581
9	Age of Subject and Sex of Model	2/114	.512	0.601
10	Age of Model and Sex of Model	2/114	.959	0.386

* Multivariate analysis of
Covariance

All univariate F
tests of time and
acts were not sig-
nificant

On the basis of statistical analysis, hypotheses five through ten could not be rejected. First order covaried scores for mean rates for the two dependent variables related to these hypotheses appear in Appendix H.

Second order interaction hypotheses

11. There will be no interaction among sex of subjects, age of subjects, and age of models on the dependent variables.

12. There will be no interaction among sex of subjects, age of subjects, and sex of models on the dependent variables.

13. There will be no interaction among sex of subjects, age of models, and sex of models on the dependent variables.

14. There will be no interaction among age of models, age of subjects, and sex of models on the dependent variables.

Table 12 presents the statistical analyses of these hypotheses.

Table 12
Statistical Analysis* of Second
Order Interaction Hypotheses

Hypothesis	Source	df	F	p
11	Sex of Subject, Age of Subject, Age of Model	2/114	1.612	0.204
12	Sex of Subject, Age of Subject, Sex of Model	2/114	1.587	0.209
13	Sex of Subject, Age of Model, Sex of Model	2/114	1.112	0.332
14	Age of Subject, Age of Model, Sex of Model	2/114	.911	0.405

* Multiple analysis of covariance

All univariate F tests of time and acts were not significant

Through statistical analyses the hypotheses were not rejected. However, univariate analysis of hypothesis eleven showed that time approached a significant relationship to the interaction of the variables in that

hypothesis: ($F = 3.215$; $df = 1,115$; $p < .076$). Further, univariate analysis of hypothesis twelve showed that acts approached a significant relationship to the interaction of the variables in that hypothesis: ($F = 2.957$; $df = 1,115$; $p < .088$). The covaried mean scores for time and acts for hypotheses 11, 12, 13, and 14 are found in Appendix I.

Highest order interaction hypothesis

15. There will be no interaction among sex of subjects, age of subjects, age of models, and sex of models on the dependent variables.

Statistical analysis of this hypothesis, using a multivariate analysis of covariance was not significant ($F = .779$; $df = 2,114$; $p > .1$).

Following the data analysis relating to the hypotheses, a second analysis was performed. This analysis tested the main effects against a pooled within cell and residual mean squares. Results of this second analysis showed little change from the first, so it is not presented.

Chapter V

DISCUSSION

Pertinent Incidental Findings

Inter-center differences

When age differences were corrected statistically, the subjects from the seven Head Start centers showed no significant difference in rate of imitation. Thus, for the purpose of this study the center factor could be collapsed and children from the different centers could be considered as one sample. It is possible to consider at least three explanations for this. One is that the reinforcement for imitative behavior by the teachers in each center was similar. This explanation would also be compatible with the finding that rate of imitation increased with age, and since most of the older children had been in the center longer than the younger children, a uniformity in increase of imitative behavior might be expected. Another explanation might simply be a developmental one, where children of similar

ages, and with the assumed similarity in background, will tend uniformly to evidence similar rates of imitation in response to a standard stimulus. A further explanation might lie in the assumption of similarity among the children in social reinforcement of imitative behavior in their home environments.

Relationship between the two dependent variables

Initially there was concern that some children might focus for a prolonged period of time on the completion of one of the modeled tasks. Thus, if imitation rate were scored by counting the number of model-performed behaviors imitated by the subject, those children would be rated low. As a consequence, the decision was made to tabulate for each subject two dependent variables; the number of model-performed acts that were imitated, as well as the total number of seconds spent by the subject in imitative behavior. As it turned out, the correlation between the two dependent variables, partialling age, was high and positive. In other words, it was generally the case that children performing fewer acts took less time and children performing more acts took more time. This implies that in general the

subject did not "dawdle" in going about the imitative tasks. Indeed it is easy to understand that the more one does, the more time it may take. What is interesting is that the subjects did not dawdle. One possible explanation for this may be that the subjects were curious to try out the novel behaviors presented by the model, or to manipulate in their own way the material provided on the table and therefore, moved through various acts with dispatch.

Relationship between age of subject and the dependent variables

Within each cell of the design, the relationship between age and rate of imitation was highly positive. Further, equality of the regression among the cells could not be disputed statistically. This latter finding was useful in that it allowed for the correction of age by a simple covariance model, throughout statistical tests of the hypothesis. This elimination of the effect of age as a variable in itself, possibly left a more sound analysis of the propensity of the individual child to imitate the model by the attendant reduction of error variance and correction for minor cell difference in age. Although Head Start children do provide a

unique sample, it seems reasonable to assume that age, in itself, might be a sufficiently strong independent variable in relation to rate of imitation in children, and that study designs should take this into account.

Reasons for this finding are probably complexly related and multiple. One reason might simply be that the older the child, the less anxious he was about the novelty of the research setting and therefore the more able he was to attend to what he perceived as the tasks at hand. It is also possible that the older the child the more motivated he may be to master some of the novel tasks performed by the model. The reward for this would be intrinsic and possibly through proprioceptive cues. Further, the older the child, the more he has perhaps been reinforced for imitative behavior, his performance in the current study then, falling into the class of generalized imitation. Older children may have been aided considerably by having developed manual skills and by having a more highly developed memory and better developed perceptual equipment.

Since the experimenters were adult, white, females, two other explanations of this finding might be offered.

It is possible that the older children, due to greater socialization experience, saw the experimenters as potential sources of reward. Stevenson (1961) has found that adult females may be seen as effective sources of reinforcement for young children. Further it is possible that the older children perceive the experimenters as potentially having some future control over them. Mischel and Grusec have pointed out that rate of imitative behavior is increased when the model is known to be a source of future control over the subject (1966).

To the extent that imitation is viewed as a major part of the phenomenon of identification, some questions are raised by this finding vis-a-vis the analytic literature. If one postulates an Oedipal period of growth and development occurring predominantly during the ages of three to five years, and if one would believe that an imitative propensity would be highest during these years, then one would have to question the finding in light of the fact that the mean age of the older children in this study's sample was near six years. There is the possibility, however, that the sample for this study is different from samples on which such

analytic theory has been based. A conjecture is then raised as to whether children from lower socioeconomic brackets (and/or minority sub-cultures) may move more slowly through the Oedipal phase, possibly due to diminished interpersonal contact with parents or parent surrogates.

General parameters related to the dependent variables

Each subject was allowed 240 seconds during which time he sat at the table with only the instruction that he could do as he wished with the materials on the table. No extrinsic reward or punishment was provided in response to his behavior at the table. The highest (by cell) raw mean score for amount of time spent by the subject in imitative behavior was 73.94 seconds, and the lowest was 13.13 seconds. Except for some of the younger male subjects, all subjects involved themselves in some way with the materials on the table. Clearly most of the time was not spent in imitative behavior, but rather other explorative or creative ways of manipulating the objects on the table. Most frequently the child would perform initially some of the model-performed acts and then go on to do what seemingly

he himself wanted to do with the object. One child, very deliberately went through the behaviors presented by the model, then looked over at the experimenter, and then with a noticeable increase in interest went on to play in her own fashion with the materials. These types of observations again raise the question of how the subject saw the intent of the observer-experimenter in relation to his doing what the model did. Many of the children produced very creative and skillfully constructed structures with the blocks and the cans.

Thirty-three of the 132 subjects were rated as performing no imitative behavior. The majority of these were younger subjects; however, no systematic or statistical difference was found between these subjects and the total sample. Speculation about the cause of this is in order.

Some of the younger children manually manipulated the materials on the table in such a way that it could be inferred that they were attempting to imitate, but were not able to do so. The criteria developed for this study did not permit scoring of these children as imitating, although some of the musculoskeletal movements

were similar to those of the model. This raises the question of what behavior should be adjudged as imitative. In this study only tasks performed and not incidental movements were classified as imitative. It was impossible, given the filming conditions and difficulty in rating non-verbal behavior, to rate with any assurance, more types of imitative behavior than were rated. However the question remains as to whether other subject-performed behavior was indeed imitative, even though it was not rated as such.

Other considerations raised by the number of children who did not perform imitative behavior and those who performed only minimally follow. The first has to do with the degree to which children were distracted by and/or fearful of the laboratory and the experimenter. Obviously, children who were less frightened or distracted would be able to pay more attention to the film and to the table objects. Clearly if the subjects did not see much of the film or remember much of it even if seen, they would not be able to imitate. Thus, this entire research might actually be greatly related to variables that were not controlled,

i.e. the ability of the subject to remain task-oriented and memorize well when distracted or under stress.

Again, the older children may well have received more reinforcement for imitative behavior, both at home and in Head Start, than the younger children. Another possibility is also raised. Perhaps some of the children, due to certain child rearing practices, were unwilling, particularly in a strange environment, to perform unless positive and negative reinforcements were provided to guide their responses. Here again, this was an uncontrolled variable. In contrast, some children, having just witnessed a particular behavior, may have decided to perform only acts that were not performed by the model.

In comparing those subjects who imitated only one model-performed act and those who performed six or more acts, some interesting findings were noted. Consistent with other findings, the high imitators were more often the older children. More males were high imitators and more females were low imitators. This finding is different from other studies. The low imitators showed no film preference whereas the high

imitators preferred female models (twelve) more than male models (five). This latter might be related to the fact that Head Start teachers are often female and that many of the children were from father-absent homes.

Review and Discussion of Findings From Testing the Main Effect Hypotheses

No difference was found in rate of imitation between male and female subjects. There are no studies that would lead one to believe that imitation is a sex-differentially-related behavior. Certain studies do point out that specific acts, such as aggressive or nurturant behavior, may be imitated differently by boys and girls. However in this study an effort was made not only to have the model-performed behaviors viewed as novel, but also to have them be ones that were not known to be preferred by boys or girls. One model-performed act could have been viewed as aggressive, that of the cup smashing. In general this finding is seen as related to how the models' tasks were chosen, and confirmation of the idea that they indeed did not pull more imitative behavior from either boys or girls.

No difference was found in rate of imitation between subjects who viewed male models and subjects who viewed female models. Care was taken initially to insure, as much as possible, that the four stimulus films were comparable in terms of model-performed behavior. Perhaps findings from this hypothesis illustrate that comparability was achieved to some extent. For this hypothesis male and female subjects were grouped so that sex of subject vis-a-vis sex of model was not examined. It would be reasonable to assume that groups made up of equal numbers of boys and girls would not show preference for either male or female models unless the filmed stimuli were different in attractiveness to the children. Subjects who saw the male models did evidence a higher rate of imitation, but at a level that was not significant.

A statistically significant difference was found in rate of imitation between subjects who viewed the peer models. The subjects who saw the peer models had a significantly higher rate of imitation. This was true for both of the dependent variables, being somewhat more marked for number of acts performed. Further, neither the sex of the model nor the sex of the child

proved to make a difference. In other words, both male and female subjects preferred to imitate peer models regardless of the sex of the model.

Unfortunately the family structure of the subjects in this study was not obtained. However, at about the time of this study it was reported that 46.6 percent of all black children under 18 years of age were not living with both parents, and 32.67 percent of black families were headed by women. Thus a compelling explanation of this finding might be in relation to presumed family composition. If both parents were not living at home, or if one or both parents were often absent due to work, or if the large number of children present in the home decreased individual attention possible from the parents, it might be assumed that the subjects' main reference group was peers. Hartup and Coates (1967) have discussed the idea that children with a history of having peers as reinforcers are more likely to imitate when there is a peer model. Consistent with the idea of experience with peers as reinforcers, would be the presence of these subjects in Head Start, where peer contact is higher than adult contact.

A further consideration has to do with the socio-economic level of the families of the subjects in this study. Families with incomes below \$3,000 can be assumed to have parents or parent surrogates who must devote a great deal of their energies to combating frustration and providing for simply the basics of daily living. Speculation might lead one to question then, whether peers or older children in the neighborhood or family might have consistently provided more rewarding or attractive models. Keeping in mind that the tasks involved in this study were non-verbal in nature in addition to being novel, a comment by Erickson appears applicable. When discussing his stage four, industry versus inferiority, he relates

In preliterate people and in nonliterate pursuits much is learned from adults who become teachers by dint of gift and inclination rather than by appointment, and perhaps the greatest amount is learned from older children (1963, p. 259).

As previously mentioned the older children in this study had rather uniformly been students in Head Start for a number of years. The findings indicated that there was also no relationship between the age of the subject and the age of the model viewed in terms

of rate of imitative behavior. Therefore this finding is particularly surprising in view of the emphasis placed by Head Start on the use of adult role models. Due to this emphasis, one might have predicted that the longer a child has been attending Head Start, the more he would be inclined to imitate adult models.

In contrast to this position, adherents of the analytic theories might have predicted that the younger, or Oedipal stage, children would be more likely to imitate adult models, whereas the older, or latency stage children, would be more likely to imitate peer models. However, with the possibility of parent-absence or low parent-child interaction level in families being proponent in this sample, it is possible to see parallels with other studies. Freud and Dann (1951) studied six German-Jewish children who had been in close contact with each other since infancy, their parents having been killed in a concentration camp. When these children were between three and four years old they were taken to England. Their behavior towards adults was indifferent and/or hostile. However, their attachment to each other was high.

The children's positive feelings were centered exclusively in their own group. It was evident that they cared greatly for each other and not at all for anybody or anything else (p. 131).

Although caution needs to be exercised when moving from ethological studies to speculation about human behavior, Harlow's (1962) study points out that laboratory-reared infant monkeys, whose physical contact during infancy was limited only to peers, appear in adulthood similar to ferally reared animals. Hartup believes that one implication of this finding is that "... contact with peers seems to have important compensatory affects when mothering is inadequate." In his book Manchild in the Promised Land Brown poses compelling reasons why peers were his main reinforcers and reference group; that is, that the parents were unable, inadequate, or unwilling to teach the children how to live in the world in which they found themselves (1965).

Perhaps the most interesting of the findings of the present study is that children tended to reject imitating the adult model. Keeping in mind that each subject saw only one model, it is not that they rejected the adult model for another choice, i.e. the peer model,

but rather that they simply were not as inclined to imitate adult models. Speculation on this finding must be tempered by two issues. The first is that this finding may have resulted only from the fact that perhaps the child models were more attractive to the children than the adult models. The films were not pre-tested for attractiveness and indeed it is difficult to see how this would have been possible. Secondly, although studies and theories about imitation have most often been developed using Caucasian middle-class children as subjects, this is no reason to assume that the results of this study typify lower-class or black children. The design of this study has not been replicated with either middle-class subjects or Caucasian lower-class subjects. In fact, the whole area of the relationship between ethnic group, socioeconomic level and/or family structure and imitation in children has received only minimal exploration.

Main Effect and First Order Hypothesis
With Age As An Interactant

Rate of imitation and age of subject

As discussed, once actual age within age category had been partialled, there was no significant difference found in the rate of imitation between younger and older subjects. Since age was used both as a covariate and a blocking agent, all subsequent analyses involving age was effectively testing only residual age effects. The regression analysis was performed using raw scores. Under a normal pattern of regression, it would not be expected that the residual would figure prominently in any analysis.

Therefore, a discussion of hypotheses involving age are considered separately here, using raw scores or raw mean scores for illustration. The findings indicated (page 77) a strong positive relationship between age in months within cells and the dependent variables.

The univariate F test performed to determine the relationship (within cell) of time spent in imitation

and age in months was positive ($F = 7.87$; $df = 1,115$; $p < .006$). Thus, although the analysis of variance with age as a covariate did not show a significant relationship between age and rate of imitation the relationship does exist and was simply confounded and obscured. Further, analysis of all hypotheses with age as an interactant is similarly confounded.

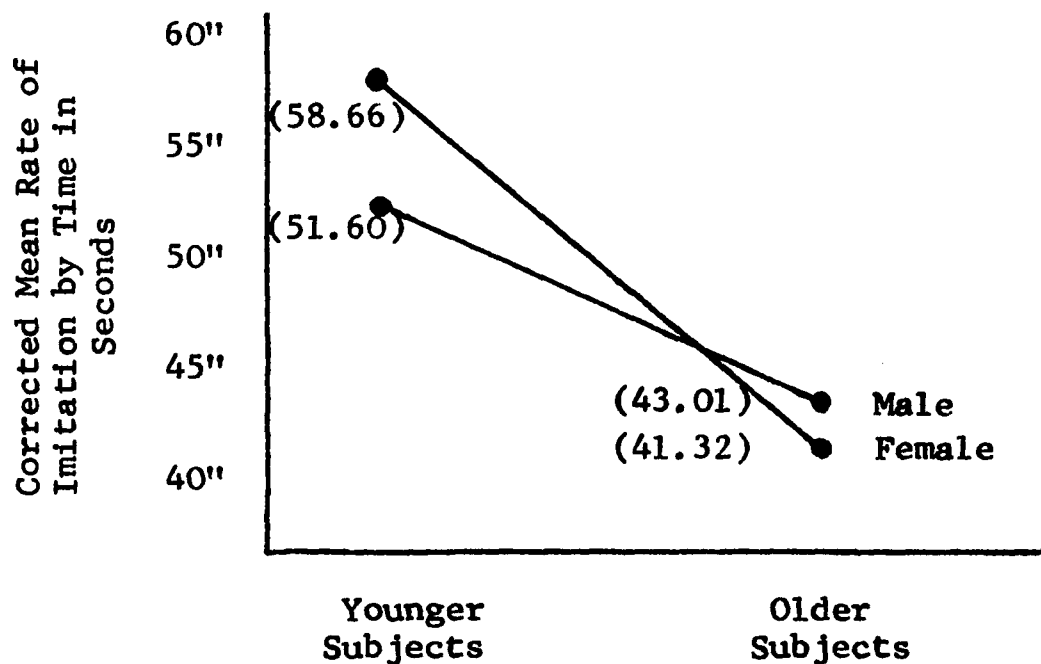
Interaction between age and sex of subject

With age as a covariate, there was no interaction found between age of subjects and sex of subjects in the dependent variables. Figure 3 depicts this.

However due to the correction for age, this figure is misleading. Inspection of raw mean scores found in Appendices E and F shows that regardless of sex, the older children imitate more than the younger, with younger males imitating the least and the older females the most.

Figure 3

Interaction Between Age and
Sex of Subject



Interaction Between Age of Subjects and Age
of Model

With age as a covariate there was no interaction found between age of subjects and age of models on the dependent variables. Figure 4 illustrates this finding.

the child model. It might be argued that younger subjects would, because of their more dependent status, be more likely to imitate models the age of their parents: however, that was not the case in the present study. Here again inspection of raw mean scores shows that actually the older subjects imitated somewhat more than did the younger subjects, although due to correction for age the opposite is shown above.

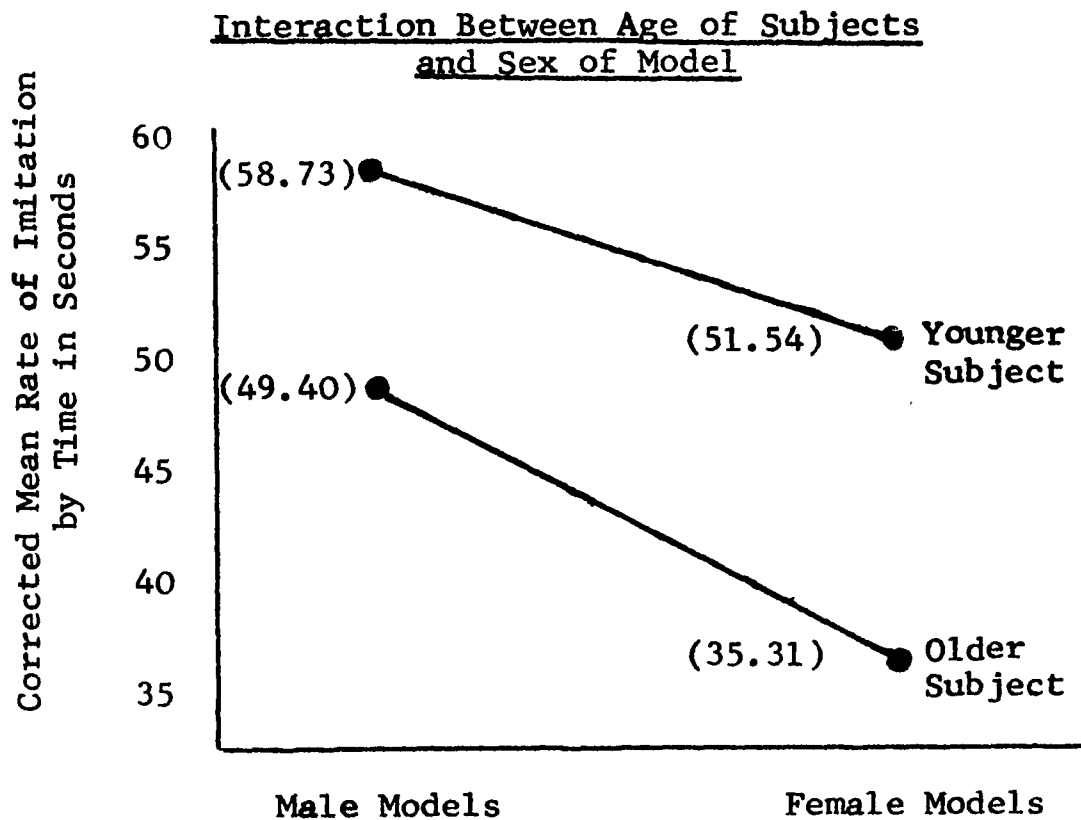
Interaction between age of subjects and sex of models

There was no interaction found between the age of the subjects and the sex of the models on the dependent variables. Neither younger nor older subjects showed a preference for imitating male or female models. Figure 5 illustrates these findings.

Although analysis of data related to Hypothesis 4 (page 93) did not reveal significant differences in rate of imitation by subjects who viewed the male versus the female model, the trend illustrated here is that younger and older children alike preferred to imitate the male models. However, the difference posed by age of the subjects in relation to preference of models was not significant. Because of the correction

for age, it appears here as if younger subjects had a higher rate of imitation, whereas inspection of raw mean scores shows the reverse to be true.

Figure 5



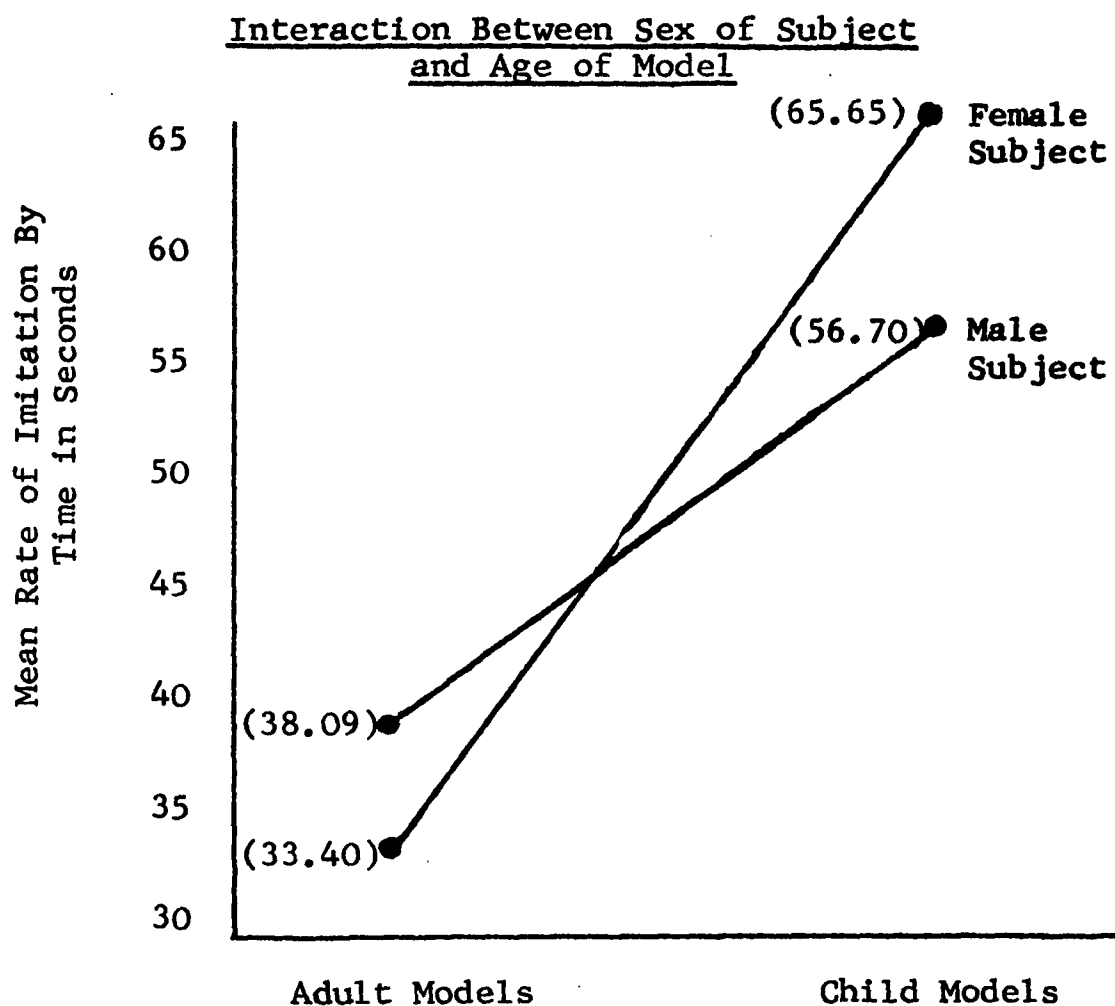
First Order Interaction Hypotheses

Interaction between sex of subject and age of models

There was no interaction between sex of a subject and age of models on the dependent variables. Regardless of the sex of the subject, those subjects

who viewed the child model evidenced a higher rate of imitation. This finding is consistent with Hypothesis 3 (page 95), as depicted in Figure 6, but represents a further refinement.

Figure 6



As mentioned previously, this finding may represent nothing more than a greater attractiveness of the child stimulus film. There is no clear evidence in the literature that male or female children differ in their preference for peer or adult models. This finding then simply points this up more specifically.

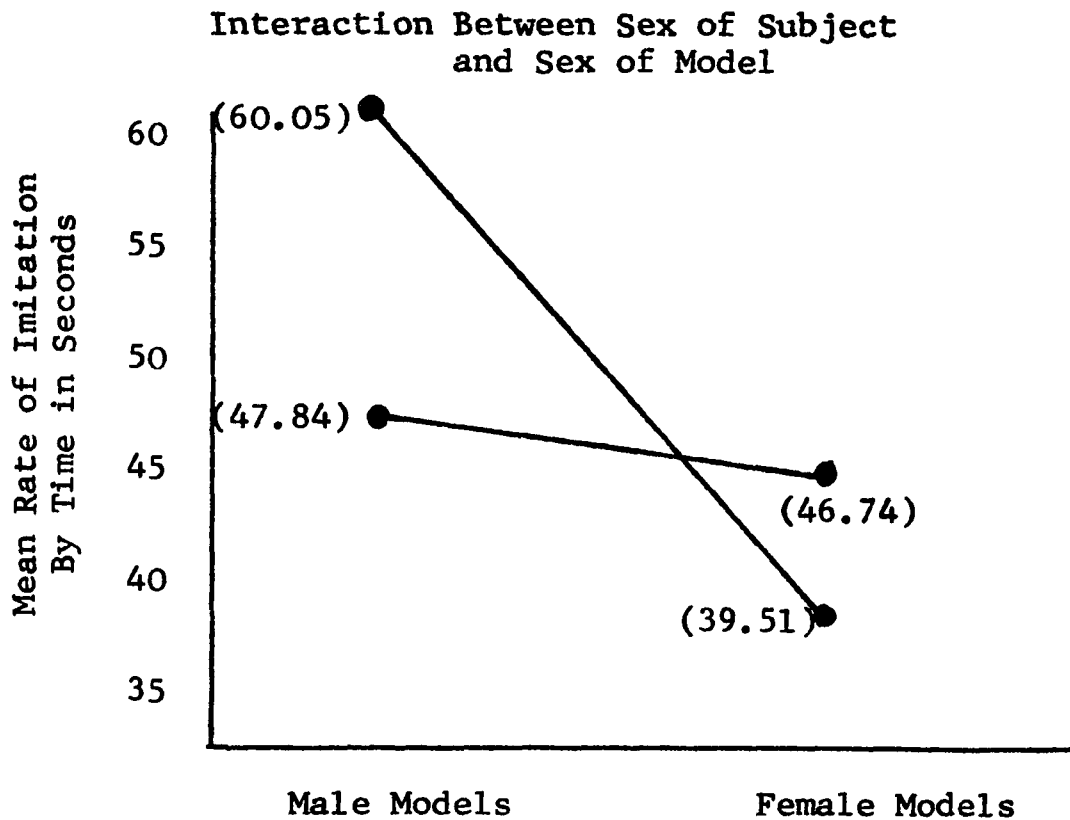
Interaction between sex of subjects and sex of models

There was no interaction between sex of the subjects and the sex of models on the dependent variables. In other words, when the sex of the models was investigated in relation to the sex of the subjects, no significant effect was found on the rate of imitation. Figure 7 illustrates these effects.

Whereas male subjects tended to show no preference between male and female models, female subjects demonstrated a preference for the male models. From the main effect hypothesis it was pointed out that in this study, males did not imitate more than females nor did the subjects imitate significantly more the male or the female models. However this finding in the first order interaction suggests that further study might be in order, due to the depicted trend of female

subjects imitation more than the male models. This finding is further clarified by analysis of data related to Hypothesis 12 (page 98).

Figure 7



No explanation at this point is offered for the lack of male subjects demonstrating a preference for male or female models. However, one might entertain an extension of the Freudian concept of defensive identification in relation to the preference shown by female subjects for imitating the male models. If

these subjects were fearful of male aggression or behavior some of these fears might be allayed by taking on qualities of the male.

Interaction between age of models and sex of models

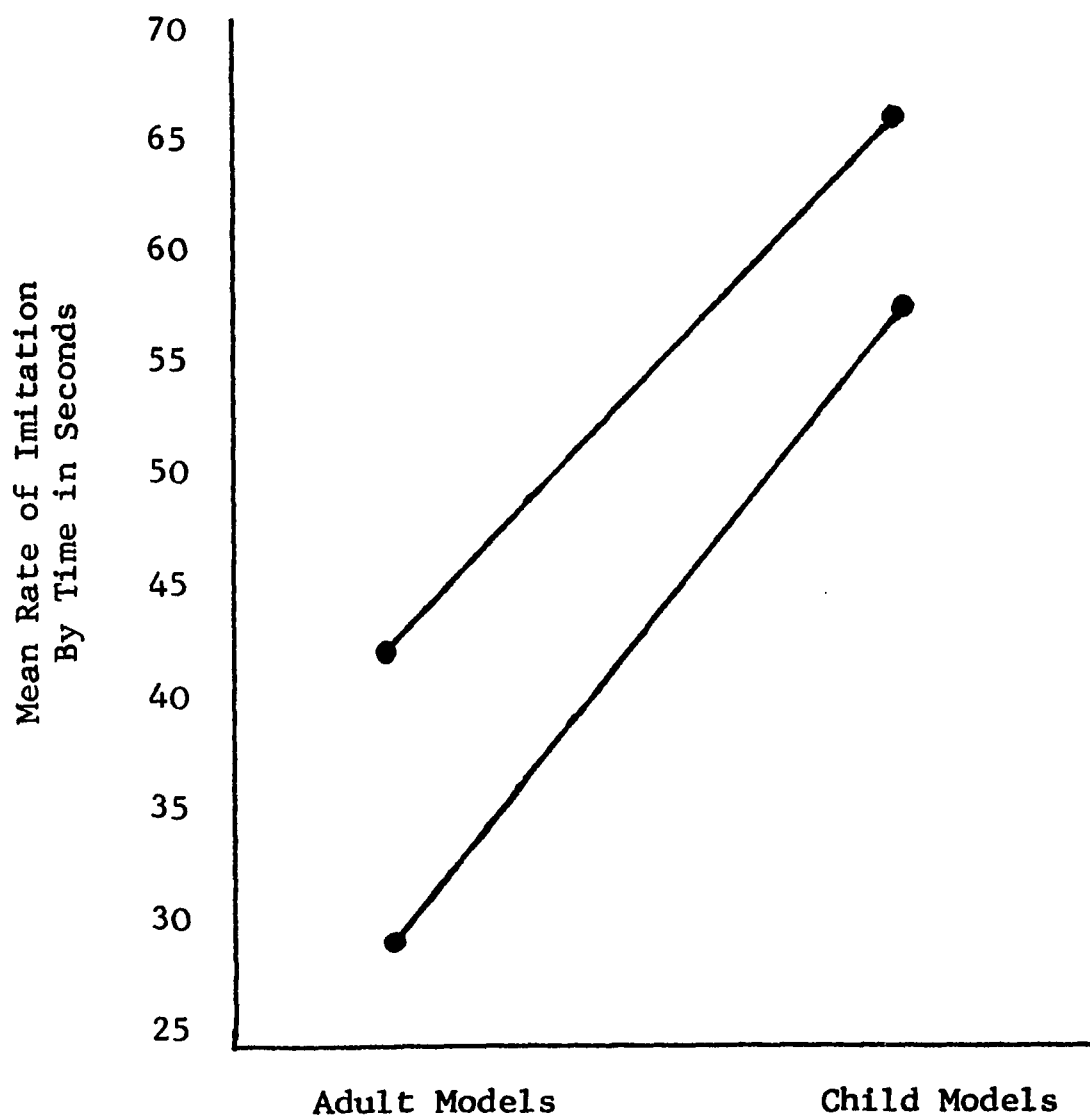
There was no interaction found between age of models and sex of models on the dependent variables. Subjects viewing the adult model showed no significant difference in rate of imitation whether this was a male or female model. Similarly, subjects viewing the child model showed no difference in rate of imitation when this was a male or female model. Figure 8 depicts some interesting trends.

The child models elicited a higher rate of imitation in subjects regardless of the sex of the models. Again, the female models consistently elicited less imitation than the male models. However, the interaction between sex and age of models was a significant factor in terms of imitation produced. There is no compelling indication by either common sense or the literature that the subjects as a group would have shown a significant preference for one of the four models. Thus, this finding is seen as an expected one and one

that may indicate minimal differences in attractiveness between the four films against each other.

Figure 8

Interaction Between Sex of Model and Age of Model



Second Order Interaction Hypothesis

Interaction among sex of subjects, age of subjects, and age of models

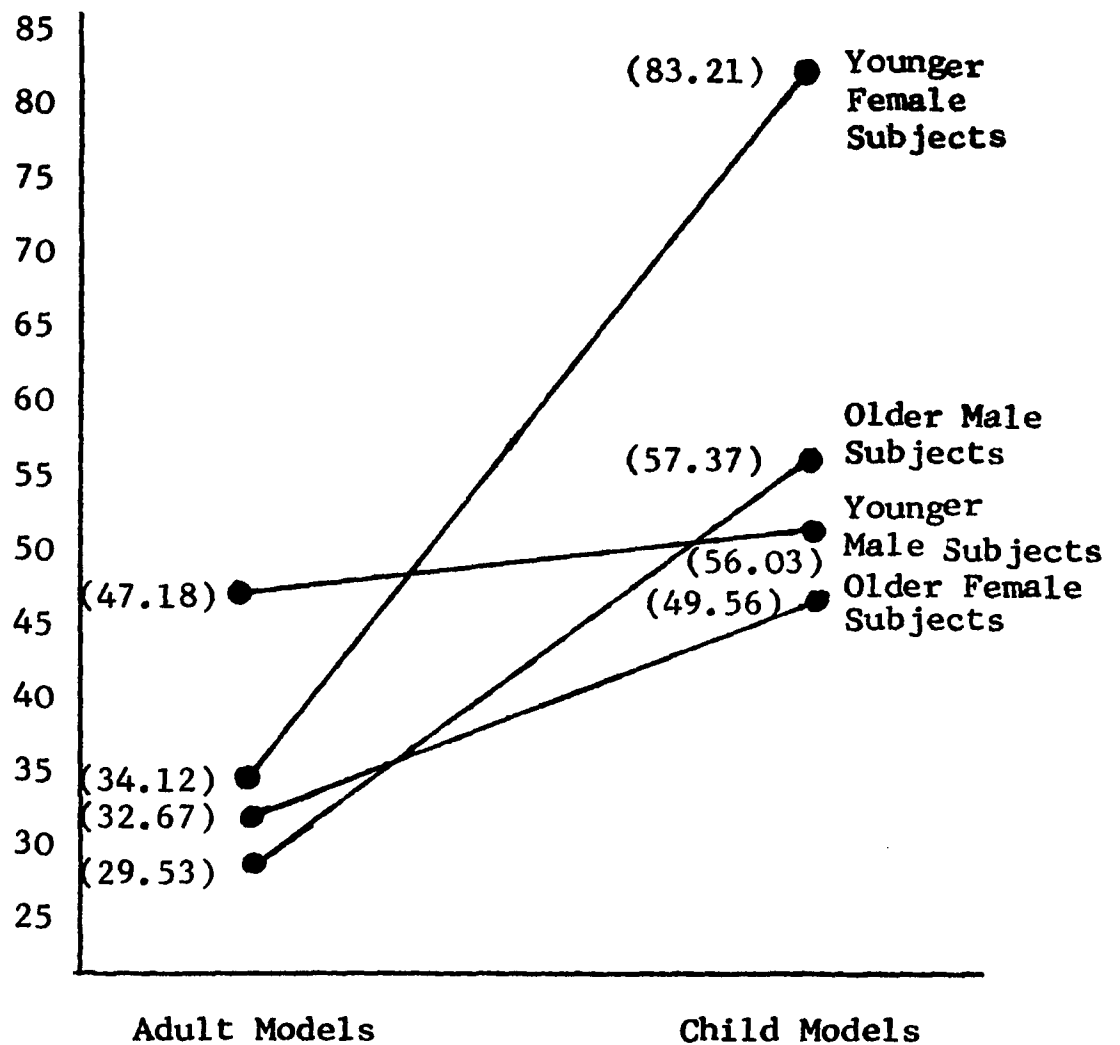
There was no interaction found among sex of subjects, age of subjects, and age of models on the dependent variables. However for both the dependent variables of time and acts, analysis of data pertinent to this Hypothesis showed statistical trends of $p < .076$ and $p < .088$ respectively. Figure 9 presents these findings visually.

Although the terms of all the subjects toward inclination to imitate the child models is still present in this analysis, a further refinement is found. Younger males showed less preference for adult or child models, whereas younger female subjects showed greater preference. Fourteen of the subjects in the younger male group ($N = 32$) showed no imitative responses at all, although their scores contributed to the findings above. Ten of the subjects classified as younger females ($N = 32$) also showed no imitative

showed no imitative responses. Clearly, the difference in their rate of imitation between child and adult models was marked indeed.

Figure 9

Interaction Among Sex of Subject, Age of Subject, and Age of Models



Further, younger and older females differed considerably in the extent of their preference for the child models. Younger male subjects showed greater preference for the adult models than did the older male subjects. Older males and younger female subjects accounted for most of the preference showed toward the child models. Thus for purposes of this analysis, combining the age and sex of the subjects merely showed a significant difference in rates of imitation by age of model. No explanation for this can be offered.

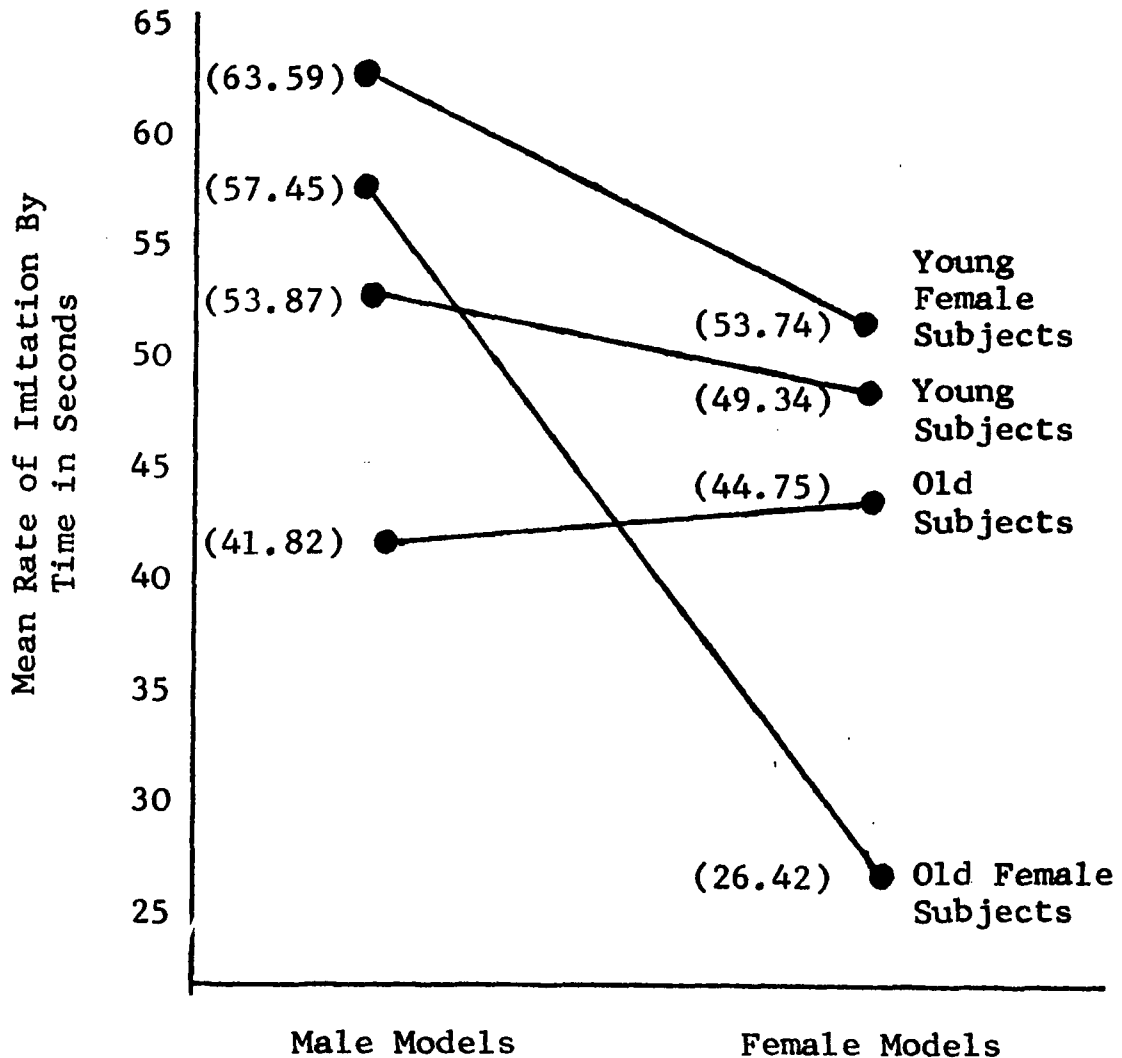
Interactions among sex of subjects, age of subjects, and of models

There were no interactions found among sex of subjects, age of subjects, and sex of model on the dependent variables (Figure 10).

Comparing Figure 10 with Figures 5 and 7 further data are added. It has been shown previously that male subject preference for male or female models was minimal, whereas female subjects showed a marked preference for male models. Further it has been pointed out that some preference was shown by younger and older subjects for the male model.

Figure 10

Interaction Among Sex of Subject, Age
of Subject, and Sex of Model



Male subjects did not evidence great difference in their preference for sex of model. However, subjects classified as older females show a decided preference for male models over female models. Younger females showed the greatest preference for male models, but

they also showed the greatest preference among any of the subjects for female models. In this analysis, the male model was preferred by all groups of subjects except the older males who showed a slight preference for female models. Although younger females showed a decided preference for child models, they did not show preference for the sex of the model. This was in contrast to older females, who as well as preferring the child models also preferred male models.

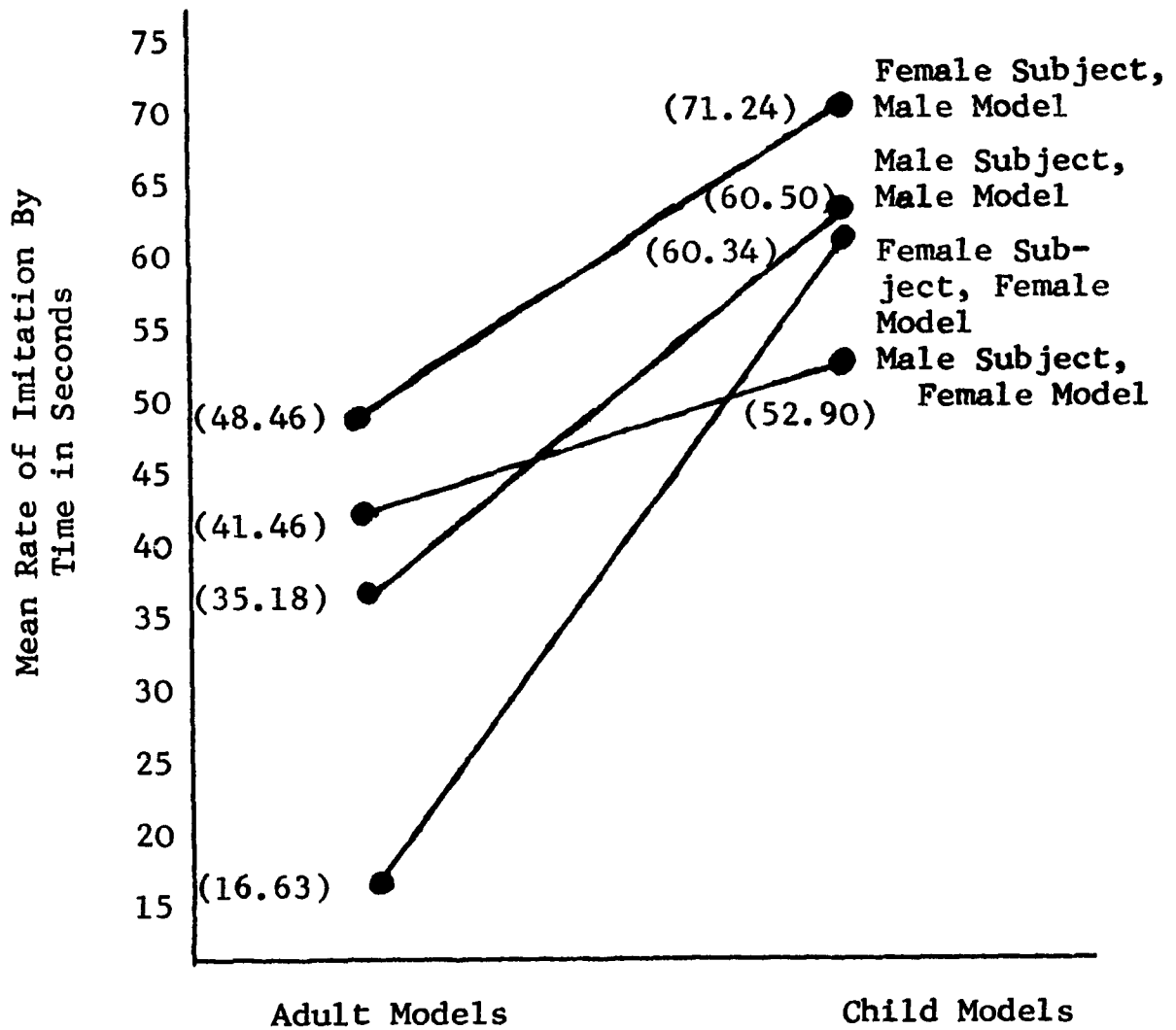
Interaction among age of model, sex of model, and sex of subjects

There were no interactions found among the age of the model, the sex of the model, and the sex of the subjects on the dependent variables (Figure 11).

Rate of imitation by all subjects who saw the child models was clearly higher than those who saw the adult models. Of the male subjects, those viewing the male models not only showed the most marked preference for the child model but also the rate of imitation of the child model was higher. Female subjects showed the greatest differences, in that those viewing male models were highest in rate of

Figure 11

Interaction Among Age of Model, Sex of Model,
and Sex of Subjects



imitation for both the adult and child models. In contrast the female subjects who viewed male models, showed the least preference for the adult model and the greatest preference for the child over the adult model. Subjects viewing female models showed a lower rate of imitation for both child and adult models.

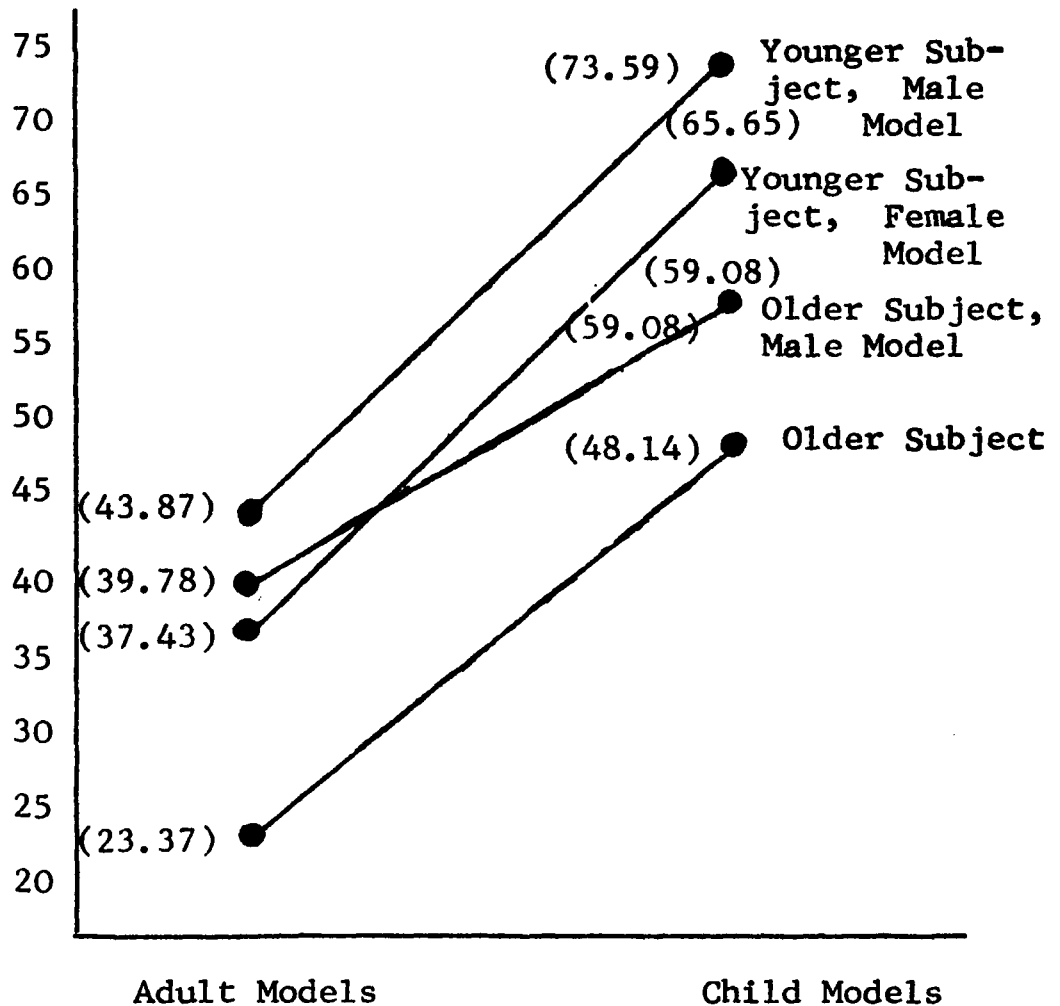
Interaction among age of models, age of subjects, and sex of models

There was no interaction found among age of models, age of subjects, and sex of models on the dependent variable (Figure 12).

All groups again were rated higher in imitation when they viewed child models. The differences caused by age of the subjects and sex of the model were rather uniform between the adult and child model, with the slopes of increase not greatly dissimilar. Again young subjects showed a higher rate of imitation than did old subjects, with the female model being least preferred by the younger and older subjects alike.

Figure 12

Interaction Among Age of Models, Age
of Subjects and Sex of Models



Highest Order Interaction Hypothesis

There was found no interaction among age of subjects, age of models, and sex of models on the dependent variables.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS
FOR FURTHER STUDY

Summary

Method

One hundred and thirty-two children, enrolled in seven Head Start centers, comprised the sample for the study. The children ranged in age from thirty-seven to eighty-one months of age. All subjects were black, and were understood to be within the normal range in intelligence, vision, and hearing ability. The sample was divided into two classifications; male and female, and young and old.

Four stimulus visual films were developed, each showing a male adult, female adult, male child, or female child performing the same non-verbal routine of novel behaviors. The subjects in the sample were each randomly assigned to view one of the four stimulus films. This assignment resulted in eight or more subjects being placed into each of sixteen cells. Each

cell represented subjects classified on the basis of age and sex of the subject and age and sex of the model in the filmed stimulus.

Subjects were tested individually. Particular attention was paid to the control of the subject's behavior following the testing period so as to minimize feedback about the testing procedure to other potential subjects. After a subject viewed a stimulus film, he was then allowed a period of free play in a setting similar to that depicted in the film, where he had available all of the materials that were available to the models as shown in the film. The experimenter provided no known reward or punishment to the subject during the free play session. While in the free play session, the subject was filmed on videotape.

After all subjects were run, the videotapes were each rated. For each subject two scores were obtained as dependent variables: (1) the total amount of time in seconds that he engaged in imitative behavior; and (2) the number of model-performed acts that he engaged in. These two scores comprised the dependent variables of the study. Data related to the hypotheses were

analyzed using a multivariate analysis of variance with age as a covariate.

Main findings

1. When age was covaried, the subjects from the seven Head Start centers showed no significant differences in rate of imitation ($p < .05$).

2. With age partialled, the correlation between the two dependent variables (time and acts) was significant and positive (.764).

3. Within each cell, it was found that the relationship between subject age in months and rate of imitation was significantly positive ($p < .003$).

4. Thirty-three, or approximately one-fourth of the subjects, were rated as performing no imitative behavior.

5. Analysis of data related to the hypotheses revealed that none could be disproven except number three.

Data related to the fifteen hypotheses were analyzed with age used both as a covariate and a blocking agent. Subjects who viewed adult models had significantly

($p < .003$) lower rates of imitation than those who viewed child (or peer) models. Main effect hypotheses are listed below.

Hypothesis 1: There will be no difference in rate of imitation between male and female subjects.

Hypothesis 2: There will be no difference in rate of imitation between older subjects and younger subjects.

Hypothesis 3: There will be no difference in rate of imitation between subjects who viewed adult models and subjects who viewed child models.

Hypothesis 4: There will be no difference in rate of imitation between subjects who viewed male models and subjects who viewed female models.

Conclusions

Conclusions based on this study need to be tentative in light of the fact that it has yet to be replicated. Further, limitations in the method put

constraints on its generalizability. Since the findings were somewhat different from other studies, the primary conclusion must be that replication is in order.

However, a few other speculative conclusions have been drawn.

Children in this sample evidence more behavior rated as imitative when they viewed peer models than when they viewed adult models. Speculations from this finding can be drawn for developmental theory itself. No known experimental study has previously so clearly illustrated this phenomenon. However, it is believed that many parents and teachers would view the finding as one that they have suspected all along. If this study were to replicate, questions need to be asked in terms of cultural differences and family structure and their relationship to the process of imitation and perhaps even identification. Is it possible that peers, throughout life are the most important reinforcers for all humans, or perhaps certain subsets of humans? Or is it possible that peers, in contrast to adults, are more potent reinforcers only during certain age spans, or for those with certain family histories. If

for some or all segments of the population, it is true that peers are more powerful reinforcers at certain periods of life, then educational, social, and political systems could with modification in methods, increase their impact toward behavior change.

Within the age span of thirty-seven to eighty-four months the tendency to imitate increased with age when novel behaviors were the stimulus. This finding is probably the product of many interdependent causes. If it is valid, it has implications for child rearing practices, educational practices and research design. For research, it would mean more careful controlling of age as a factor when other aspects of imitation are under study. For child rearing practices and educational practices it would imply a more planned and conscious use of imitation as a learning stimulus with increasing age. Further, the child's increasing susceptibility to performance of the behavior of peers, could speak to the necessity for closer scrutiny of the milieu in which the child functions. If parents have in mind a certain prototype of behavior expected of their child, then careful investigation and control of his milieu would be indicated.

Three-fourths of the study sample imitated model-performed behavior even though there was no extrinsic reward provided for such behaviors. This would imply that the children found some intrinsic reward for such behavior. Regardless of the nature of such a reward, if this finding is valid, one implication might be that the planned environment of the child may be of less importance in shaping behavior than has previously been thought. If children are simply inclined to imitate novel behaviors, wherever they observe them, parents and educators need concern themselves equally with structured as well as unstructured learning opportunities.

Studies in the literature have focused on the relationship of many reinforcing variables to the production of imitative responses in the child. Most often these variables have been extrinsic. Since this current study was basically a normative one, and presented findings not related to known extrinsic reinforcers, perhaps the results of some of the previous studies need to be reviewed in light of the beginning development of normative standards. For instance prior to the development

of normative standards relating to age standards for a child's ability to draw a triangle, research on what type of reinforcers were most likely to promote a child to draw a triangle, would be overlooking an important variable for which control in the design was later learned to be necessary.

Recommendations for Further Study

1. The methods and design of this study should be replicated with a similar sample. However this turns out, results from subsequent similar subjects can be used to amplify the numbers of subjects now occupying the cells. For some of the statistical analyses, particularly those of the second order interaction hypotheses, eight of nine subjects in a cell represented a base minimum.

2. Data from the present study need further analysis. Initially, it would be desirable to analyze the data using actual age, rather than the grouping of younger and older. Further analysis would investigate the relationship of the independent variables to:

(1) the one model-performed behavior that could be classified as aggressive, that of smashing the cups; (2) each of the other model-performed acts separately; and (3) the performance of the imitative acts in the same sequence as the model performed them.

3. The study needs to be replicated with samples drawn from lower class white populations, middle class black populations, and middle class white populations.

4. In all future studies, as those mentioned above, an attempt should be made to obtain the family structure history of each subject. The present study provoked much conjecture as to the relationship of parent-absent family structure to the propensity of children to prefer a peer as a reinforcer. This speculation needs to be verified or nullified.

5. The model films used in any such study should be pre-tested for general attractiveness. Unfortunately, attractiveness may be confounded in the same phenomenon that provides an intrinsic reward for imitation. However, this needs to be determined.

6. In order to check the effects of experimenter presence, race, age, and sex on the subjects performance

of dependent variables, presence, race, age, and sex of experimenter should be systematically varied.

7. The same design could be applied using a different set of filmed models, i.e. peers, male and female, and older children, male and female. This alteration would help answer the question of whether children are favored as reinforcers over adult models, or whether there is in fact a difference in preference for same age and older age peers.

8. A strong suspicion lingers in reference to the correlation between age and performance of imitative acts by the subjects. Is this finding a valid one or was a function of the younger children feeling more anxious in the laboratory setting? It is highly possible that the younger children, because of unfamiliarity with testing procedures or of difficulty in adapting readily to the laboratory setting were less attentive to the instructions and structure of the research procedure. Therefore, it would be desirable to test out this assumption by maneuvering the testing situation in some fashion that all subjects, regardless of age, experienced the same level of adaptation to the laboratory setting.

The above recommendations for further study in no way embrace the whole realm of questions raised by this study. Rather they are addressed simply to reducing some of the limitations inherent in the study. If these limitations were reduced, and if the findings remained similar, then it would be compelling to recommend application into the realm of educational or day care settings for preschool children. For instance use of peers as teachers or examples of peers performing desired behaviors could be increased whenever practical. Studies comparing achievement levels of students learning under predominantly adult model conditions and those learning under primarily peer model conditions could be performed.

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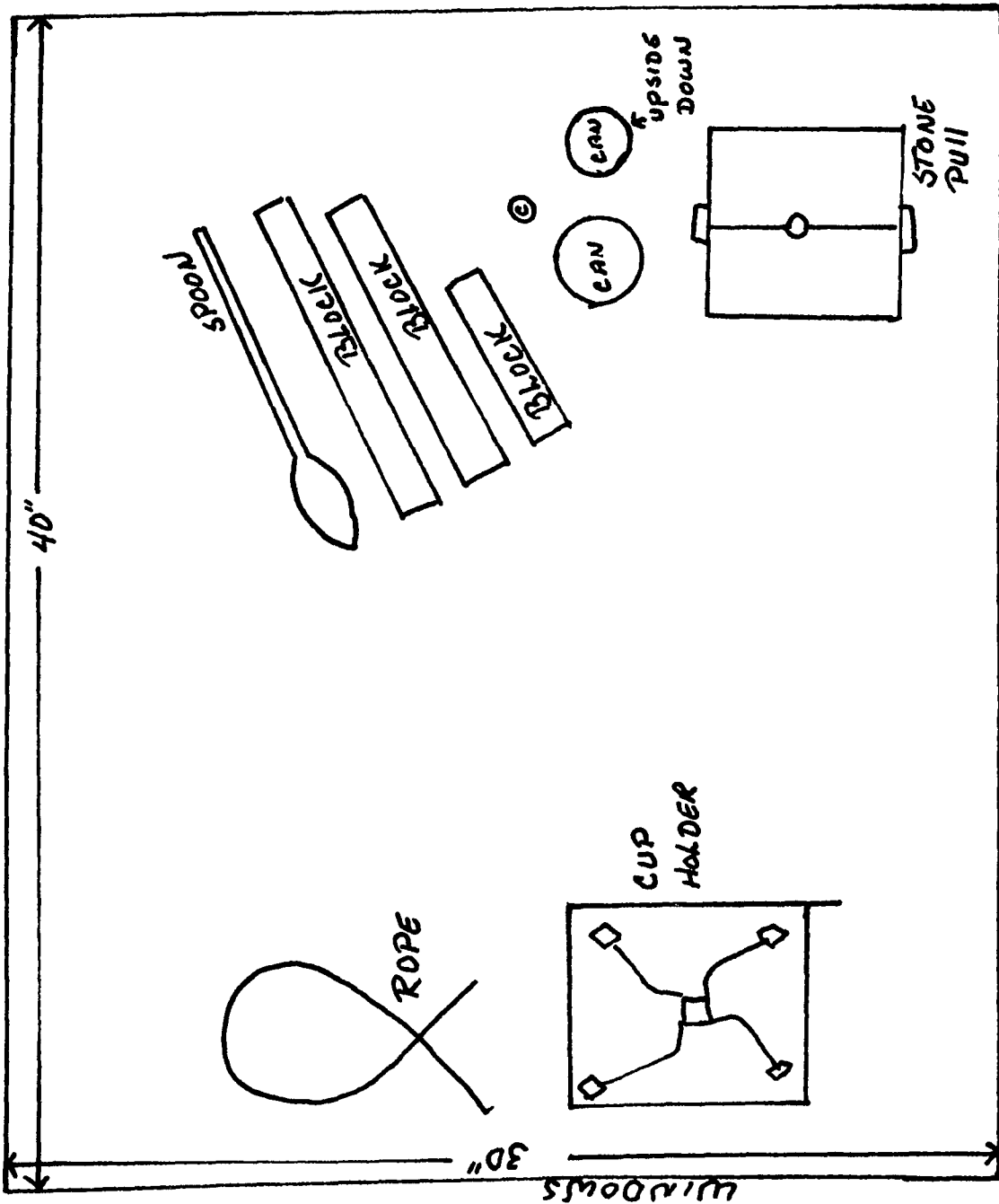
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APPENDIX A

Diagram of Placement of Objects on Table



APPENDIX B

Description of Objects on Table

- Spoon - $11\frac{1}{2}$ in. long
Silver with white handle
- Cans - One $3\frac{1}{2}$ in. wide, $4\frac{1}{2}$ in. high, label removed,
silver in color
One $2\frac{7}{8}$ in. wide, 3 in. high, "Hunts
Tomato Sauce"
One $2\frac{1}{2}$ in. wide, $3\frac{1}{2}$ in. high, "Hunts Tomato
Paste"
- Stone - Base 7 in. x 7 in.
Struts $7\frac{1}{2}$ in. high
Painted blue
Red stone suspended on string
Stone lava-like, with holes in it (beach Naples,
Florida)
- Blocks - One $3\frac{1}{2}$ x $6\frac{1}{2}$ x 1 and $1/8$ - blue
One $2\frac{5}{16}$ x $11\frac{1}{2}$ x $5/8$ - blue
One 2 x 12 and $3/8$ x 1 - red
- Rope - 26 in. long - hemp
- Cups - Dixie Bathroom Cups - stock #1681-1x3
Small hole punched in bottom of cup for wire
- Cup Stand - Base $4\frac{1}{2}$ x 5 x $3/4$ - red
Center post, $4\frac{1}{2}$ x $5/8$ - red
Two, 15 in. lengths of wire, held together
in the center by masking tape
Wire - Primary Wire, Richardson Mfg. Co.,
Philadelphia, Pa.

APPENDIX C

July 17, 1970

To: Personnel in Headstart Centers

From: Betty Sue Johnson and Linda Slaughter

We wish to thank you all for your interest in and help with our study. Linda and I will soon be coming to each of your centers, and spending a day or two with you while we conduct our study. Linda is my research assistant this Summer. This study is part of my work toward a doctoral degree in child development from the University of North Carolina at Greensboro.

We are interested in the way children imitate the behavior of others. We believe that children do use imitation as a way to speed up their learning. However, exactly why and when a child does imitate, has not yet been clearly understood. So, we have taken one aspect of this problem, namely, who is a child most likely to imitate (someone his own age, someone older, someone of his same sex, etc.). We do not know how the results of this study will come out, since we cannot even say who might it be better for a child to imitate. But we will be interested to see what your children can teach us about this.

Specifically what we will be doing is to take each child, one by one, and bring him into our trailer. He will first sit and watch a two minute film of a person playing at a table. The person will manipulate various objects on the table. Then the child himself, will be seated at a table, where those same objects are placed. He will be told to play as he wishes with the objects. During this five minute free play time, the child will be filmed. Then he will leave the trailer. This should take no longer that about ten minutes of each child's time. Later, Linda and I will go over each film of the children, to see whether or not he choose to imitate the person he saw in the film.

Clearly it would be useful to us if you do not share with the children what the purpose of our study is. We want the children to do what they wish during that free play time, and, to hopefully not be influenced by what they think we want them to do. We also have a problem with what a child, who has just returned from the trailer, tells his classmates. It would be best, until all the children have finished the study, to not encourage the child to talk about what went on. Your center directors have been most helpful to us with this problem, by suggesting the best times during the day for scheduling each child so that his discussion with the other children will be minimal.

We will let you know the results of the study just as soon as we figure them out ourselves. Needless to say, the names of the children will not be used. We hope that our results will lead to information that will be of help to people teaching young children.

We look forward to seeing each of you again soon.

APPENDIX D

Guidelines for Rating the Filmed Behavior

The following guidelines were established for the categorization of a behavior as imitative, and for the assessment of the number of seconds that the behavior lasted. No amount of time less than or more precise than .5 second was recorded. These guidelines were developed in an attempt to insure inter-rater reliability, as well as to insure giving the subject credit for imitation when it could clearly be demonstrated. Clearly some behaviors, intended by the child as imitative, were not rated as such, and similarly some behaviors not intended by the child to be imitative, were rated as such. However, these guidelines were developed somewhat rigidly, so that there was less chance of error in the direction of the latter than the former.

1. Stone: must be pulled two times in sequence, with the child letting the stone swing in between; the stone must be brought up from its standing position and away

from the plane of its standing position so that some arc is obtained when the stone is released; not rated when the stone is hit, thrown, or dropped.

2. Cans: must be stacked; may involve two cans only; nesting and a subsequent turnover of cans not to be counted; time not counted when returning can to stack after hitting stone with it; count cans for only the time when the sequence of activity with the can clearly ends in stacking (i.e. time only that part of can-play that leads to stacking); count nesting two cans and then putting the third on top by stacking.

3. Hit stone: taking one of the cans, in hand, with the hand or arm moving, and hit stone or have stone hit the moving can; rate for an attempt even if can and stone do not actually hit; do not rate putting stone into can or attempts to do so.

4. Cups: when cups are removed from the wires, can only be counted if they are turned upside down; time for moving stand over in front of subject is counted (if he subsequently goes on to the rest of the routine); cups may be counted as smashed no matter how the subject smashes them; unsuccessful attempts to smash cups are counted; cups will be counted when taken off right

side up only if they are later smashed; cups accidentally dropped are not counted as if they were deliberately pushed to the floor.

5. Spoon: child reaches for spoon and puts it perpendicular to himself, either to the left or to the right; removes hand from spoon.

6. Triangle and spoon: to be counted as a triangle, the blocks must have ends meeting; only the initial time for building the triangle is counted, not later repairs; spoon counted whether or not handle is resting on one of the blocks; spoon may be enclosed by a structure (all pieces touching the table) and this can be counted; a structure, other than a triangle, is counted if the spoon is put inside; the time for the initial building of this structure is also counted, even though the spoon may not be put in until later; no enclosure, without a spoon is to be counted except the triangle; subject must take hand off spoon and leave it in triangle or enclosure.

7. An activity is watched through to its completion before it is rated; some children may imitate the end product, whereas others may imitate the way that the model got to the end product.

8. A group of behaviors toward a goal are counted even though it may involve trials, while the subject is trying to figure out how to do it; efforts that are broken into by other activities, and then returned to, have the time for the other activity deleted; the first effort must be seen as clearly goal-directed in order to be counted toward the final product (even though it is timed separately).
9. The length of timing is from when the child first touches the object, if it is determined that he will go directly to a ratable sequence.

APPENDIX E

Raw Mean Scores and Standard Deviations for Imitative Acts

<u>Subjects</u>	Model							
	Male				Female			
	Adult		Child		Adult		Child	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Male								
Older	2.125	1.126	3.375	2.504	2.556	2.068	3.500	2.204
Younger	1.125	1.126	2.375	2.326	0.500	1.069	2.250	2.375
Female								
Older	4.250	2.964	4.000	1.871	2.111	2.147	3.444	1.878
Younger	1.375	1.847	2.375	1.302	0.875	0.991	3.500	3.117

S.D. = Standard Deviation

APPENDIX F

Raw Mean Scores and Standard Deviations for Amount of Imitative Time

<u>Subjects</u>	Model							
	Male				Female			
	Adult		Child		Adult		Child	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Male								
Older	38.37	26.35	73.25	55.38	50.83	39.19	72.00	45.44
Younger	26.19	31.73	45.63	49.95	22.38	41.97	41.31	40.80
Female								
Older	72.63	38.25	73.94	38.55	27.22	28.97	66.33	56.40
Younger	18.50	26.62	70.69	55.03	13.13	18.72	59.81	53.87

S.D. = Standard Deviation

APPENDIX G

Manova and Anova Summary (Covarying Age)

		Manova			Anova					
		df	f	p	Time		Acts			
Source	UFT**				df	F	UFT	df	F	
Main Effect Hypo- theses	S*	2/114	1.77	0.142	-	-	-	-	-	-
	C	2/114	.569	0.567	-	-	-	-	-	-
	A	2/114	6.110	0.003	.001	1/115	12.187	.004	1/115	8.462
	G	2/114	1.075	0.345	-	-	-	-	-	-
First Order Hypo- theses	SC	2/114	.309	0.735	-	-	-	-	-	-
	SA	2/114	.998	0.372	-	-	-	-	-	-
	SG	2/114	.967	0.383	-	-	-	-	-	-
	CA	2/114	.546	0.581	-	-	-	-	-	-
	CG	2/114	.512	0.601	-	-	-	-	-	-
	AG	2/114	.959	0.386	-	-	-	-	-	-

APPENDIX G (continued)

		Manova			Anova					
		df	f	p	Time			Acts		
Source	UFT				df	F	UFT	df	F	
Second Order Hypo- theses	SCA	2/114	1.612	0.204	.076	1/115	3.215	.215	1/115	1.553
	SCG	2/114	1.587	0.209	.322	1/115	.988	.088	1/115	2.957
	SAG	2/114	1.112	0.332	-	-	-	-	-	-
	CAG	2/114	.911	0.405	-	-	-	-	-	-
SCAG		2/114	.779	0.461	-	-	-	-	-	-

* S sex of subject
 C age of subject
 A age of model
 G sex of model

** Univariate F test

APPENDIX H

First Order Interactions (Covaried Scores)

<u>Hypothesis 5</u>	Male Subject		Female Subject	
Older Subject	43.01	1.97	41.32	2.34
Younger Subject	51.60	2.63	58.66	3.12

<u>Hypothesis 6</u>	Male Subject		Female Subject	
Adult Model	38.09*	1.81**	33.40	2.19
Child Model	56.70	2.79	65.65	3.22

<u>Hypothesis 7</u>	Male Subject		Female Subject	
Male Model	47.84	2.37	60.05	3.08
Female Model	46.74	2.22	39.51	2.35

<u>Hypothesis 8</u>	Adult Model		Child Model	
Older Subjects	31.23	1.81	53.17	2.51
Younger Subjects	40.65	2.20	69.62	3.54

Hypothesis 9

	Older Subjects		Younger Subjects	
Male Model	49.40	2.54	58.73	2.92
Female Model	35.31	1.80	51.54	2.82

Hypothesis 10

	Adult Model		Child Model	
Male Model	41.82	2.39	65.74	3.05
Female Model	29.98	1.62	56.67	2.98

* = "Time"

** = "Acts"

APPENDIX I

Second Order Interactions (Covaried Scores)

Hypothesis 11

	Older Subjects				Younger Subjects			
	Adult Model		Child Model		Adult Model		Child Model	
Male Subjects	29.53*	1.41**	57.37	2.52	47.18	2.19	56.03	3.07
Female Subjects	32.76	2.16	49.56	2.49	34.12	2.22	83.21	4.02

Hypothesis 12

	Older Subjects				Younger Subjects			
	Male Model		Female Model		Male Model		Female Model	
Male Subjects	41.82	1.91	44.75	2.02	53.87	2.83	49.34	2.42
Female Subjects	57.45	3.15	26.42	1.56	63.59	3.01	53.74	3.22

APPENDIX I (Continued)

Hypothesis 13

	Adult Model				Child Model			
	Male Model		Female Model		Male Model		Female Model	
Male Subjects	35.18	1.80	41.46	1.81	60.50	2.94	52.90	2.65
Female Subjects	48.46	2.99	18.63	1.48	71.24	3.14	60.34	3.30

Hypothesis 14

	Adult Model				Child Model			
	Male Model		Female Model		Male Model		Female Model	
Older Subjects	39.78	2.25	23.37	1.39	59.08	2.82	48.14	2.21
Younger Subjects	43.87	2.54	37.43	1.87	73.59	3.30	65.65	3.78

* = "Time"

** = "Acts"