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Social interaction of preschool children

by

Irma Galejs

A Dissertation Submitted to the Graduate Faculty in Partial Fulfillment of The Requirements for the Degree of DOCTOR OF PHILOSOPHY

Major: Child Development

Approved:

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In Charge of Major Work

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INTRODUCTION

Significance of the Problem

In our society man's achievements in the physical sciences and technologies have exceeded his social power to control them. The most pressing social problems are concerned with breakdowns of communication, and interaction and cooperation between races, classes or other groups of people. Recently researchers have focused their attention on social interaction as society's tool for transferring and attaining common goals (Argyle, 1969). Human society is dependent on consensus among its members. Consensus emerges through communication. The requirements of social life are not the same for all ages, nor for all parts of the social organization. However, the socialization process appears to be continuous throughout the life cycle of the individual (Clausen, 1968).

The term socialization refers to a continuous process of interaction between the individual and the members of society. During this process the individual develops a wide range of behavior which is acceptable for him in accordance with the standards of his society. The society defines and influences the individual's learning of the appropriate social behavior (Clausen, 1968).

The first significant socialization agent is the parent or parent substitute. As the child grows his social horizon expands. By three years of age the child's social environment
encompasses the neighborhood, the preschool, the peers and the society in general. His peers and their judgments become influential socialization agents while the influence of his parents' reward values tends to decrease (McCandless, 1967; Smart & Smart, 1972; Hartup, 1963).

Peer influence in social development also is stressed by Clausen (1968) who states that early contacts with peers force the child to learn rudimentary social skills, to be aware of and to communicate with others, and in general to experience a complex network of interpersonal relations.

Appropriateness of social behavior is judged mostly by the feedback that the child receives from others. Feedback is received through the process of interaction. Interaction involves reciprocal evaluation of and response to another person (Masters, 1972).

Social participation or social cooperation increases with age during the preschool years, as indicated by numerous research studies (Parten, 1932; Hartup, 1970; Feitelson, Weintraub, & Michaeli, 1972). However, Wimberger and Kogan (1968) point out that knowledge about social interaction is relatively limited. They postulate that researchers confine themselves to specific aspects of behavior such as verbalizations or kinetic qualities, or arrive at conclusions from global impressions of interactions.

Hartup (1970) in summarizing research on social interaction and social organization notes that most research inves-
tigations concerning social development of preschool children have been conducted between the years 1930 and 1945. In his review the research on peer influences involving infancy, preschool, elementary school and adolescence are grouped under seven large categories: popularity, situational factors, leadership, friendships, peer influences on the individual, and peer versus adult influences. Each of these categories has several subcategories. Within these categories, age and sex occupy important roles as factors influencing the particular variable under investigation.

In our society the child becomes aware of the expectation of sex differences in behavior at a very early age. However, during the preschool years there is much crossover of various sex-typed activities (McCandless, 1967).

Koch (1944) in a study on social distance between sexes found that children as young as two and three years of age were inclined to favor nursery school classmates of their own sex. The social distance for the 2- and 3-year-old children was measured by counting the number of contacts of each child with every other child. Measurement of social distance for the 4-year-old children was accomplished by employing a sociometric technique. Koch concludes that own-sex preference increases in strength during the nursery school years.

A masculinity and femininity study conducted by Brown (1957) reveals that girls at the kindergarten level show equal preference for masculine and feminine traits. In his study,
girls (2-11 years of age) vary significantly more than boys in their sex-role preferences. McCandless and Hoyt's (1961) investigation of Oriental and Caucasian preschool children's preferences of play companions indicates that within a specific ethnic group children display a pronounced tendency to choose own-sex playmates.

In reviewing the literature of sex differences in behavior Mischel (1966) concludes that the appropriate sex-typed behavior for either sex changes with age and with situation.

Peer acceptance or popularity has received a great deal of attention in studies dealing with social behavior. This concept includes the study of positive responses a child elicits from other children as well as measuring the desire of the other child to associate with him (Hartup, 1970).

McCandless and Marshall (1957b) explored, among other variables, sex differences in social acceptance and participation in preschool groups. The results of their investigation indicate higher sociometric scores for girls with no observed sex differences for social acceptance or degree of social interaction with peers. In general, peer interaction and participation did not appear to be affected by sex differences.

Employing the same systematic time-sampling technique as in the McCandless study, Moore and Updegraaff (1964) used separate measures for adult-oriented, peer-oriented dependency, and popularity. When peer-oriented dependency was correlated with popularity the results indicated that peer-dependency
facilitated high sociometric status. In other words, a child who seeks help and affection from his peers is more likely to give help and affection.

In reviewing the research on peer acceptance Moore (1967) concludes that the typical popular preschool child displays social characteristics of easy-going good will and cooperation and is prone to positive behavior although he has a tendency to use his social power over his peers.

Somewhat contradictory to Moore's point of view is a study reported by Hunt and Synnerdale (1959) on conformity with kindergarten children. In this study preschool children are found to be impervious to pressure from peers. Starkweather's (1964) research verifies the work of Hunt and Synnerdale. He found preschool children to be egocentric, presocial, and nonresponsive to peer influences. Leuba (1933) compared children's performance on a peg-inserting task. The number of pegs inserted by two-year-old children was not affected by peer pressure. The 3- and 4-year-old children appeared to be distracted from the task by the presence of peers while the task output of the 5-year-old children tended to increase with peer pressure.

There is very little opportunity to study children's socialization occurring solely in the peer group. In order to do this an attempt has to be made to isolate this information from organismic factors, from the nonsocial environment and from adults (Hartup, 1970). However, in reviewing the
literature concerning peer relations, Campbell (1964) states that age and sex are the main differentiating factors in social interactions among children.

From preschool to adolescence, sex homogeneity is a prime element in friendships and clique memberships, and next to sex, age carries the most weight in peer group formation (Campbell, 1964, p. 299).

Thus, the importance of appropriate sex-linked behavior is recognized by researchers as a vital aspect of peer group formation. It also is evident that social interaction is an essential part of social development during preschool years.

The study of the social interaction experienced by pairs of preschool-age children during a structured play situation might provide additional information relative to the development of social behavior. The child's behavior is to some extent determined by his social interaction with his peers. It would appear that peers are very influential socializing agents. It is hoped that the present investigation will add to the understanding of factors involved in social development during the early years of life.

Theoretical Framework

Within the theories of child development the socialization process is given considerable attention. McCandless (1967) in evaluating the existing theories on social development concludes that there are two broad theoretical orientations. The first encompasses social learning and psychoanalytic theory
as represented by Sears (1951) and Erikson (1956). According to this orientation the child becomes socialized through teaching and environmental forces. The second socialization theory, represented by Maslow (1954) and Gesell (1954), emphasizes the forces of growth and development within the child. Both orientations recognize the importance of the environmental aspects and of the early years of life to the socialization process.

Theories concerned with development of relationships in the early years have relevance for social behavior. Social behavior includes norms and values as prescribed by society. The most central norms are those that define and regulate sex-typed behaviors (Clausen, 1968). Levitin and Chananie (1972) offer a definition for sex-typed behaviors:

Sex-typed behaviors are those behaviors considered desirable and appropriate when emitted by one sex, undesirable and inappropriate when emitted by the other sex (Levitin & Chananie, 1972, p. 1309).

Sex-role behavior is important during preschool years through later childhood. The child needs to learn the appropriate behavior in order to function adequately within the society.

The theories on sex-role learning propose a different learning process for boys and for girls and suggest that this differential learning has relevance for peer interaction during the early childhood. Lynn (1964) and Hartley (1959, 1964) agree that demands for girls to exhibit proper sex-role behavior are more gradual, and less discontinuous than for boys.
Girls are allowed more time to define the sex-role and they do not receive punishment for engaging in masculine-type activities. Boys, on the other hand, learn their sex-role by divergent feedback. That is, the boy receives the information that he is not to engage in girl-like activities. By the time boys reach kindergarten they are well aware of masculine behavior and of what is expected of them. Girls, on the other hand, take much longer to define their feminine patterns of behavior.

Middle class mothers rarely feel strongly about limiting their young daughters to 'feminine' toys or about inhibiting 'boyish' motor behavior. . . . While there seems to be a tendency to discourage girls from fisticuffs, most other interests and behaviors are viewed tolerantly during the preschool years (Hartley, 1964, p. 8).

The interactions of like-sex and opposite-sex pairs of children during preschool years are likely to be influenced by their learning of sex-roles and by the resulting attitudes.

The influence of the peer group in the process of socialization is generally recognized as an important factor, but there is little integrative theorizing in the area of peer relations.

Hartup (1970), in summarizing the research evidence on peer interaction and social organization, states that scientific interest in children's peers developed within the context of general interest in social groups and human behavior. Nevertheless, there has been and continues to be relatively little developmental research concerning peer relations (Hartup, 1970).
He concludes that there may never be a comprehensive theory concerning the development of peer relations, but rather a theory composed of general and basic principles of development of behavior.

There is a desperate need for integrative theorizing in this area. At the same time, a general theory concerning the development of peer relations may never emerge. Peers are merely a subset among the various social influences to which children are exposed. Peers constitute a special category of socializing agent only because of their chronological age in relation to the chronological age of the child (Hartup, 1970, p. 364).

Clausen (1968) postulates that although groupings of young children are systematically studied in nursery school settings, very little is known about the direct influence of individual children on peer relations.

Wimberger and Kogan (1968) in discussing the methodology involved in the analysis of interaction attempt to define interaction. They recognize a need to develop a system that does not focus primarily on individual behavior, but rather on the reciprocal behavior engaged in when two or more individuals interact. The reciprocal effects on the interchange between two people may be quite independent of their intention to elicit a specific response. Also knowledge of the individual's behavior will not necessarily explain a phenomenon that occurs between them. In short, interaction is viewed as an entity or organization that has certain systematic attributes beyond the contribution which each individual brings to the situation.
The theoretical approach was tested by Kogan and Wimberger (1969) in a study of relationships between disadvantaged preschool children and their mothers. They found repetitive patterns which characterized the unique interaction of each mother-child pair. However, in a subsequent study (Olpin & Kogan, 1969) where the interaction of 8-year-old pairs of boys (previously unknown to each other) was investigated, relatively little contingent patterning took place. Because of the small sample size (5 boys paired in every possible combination), not many generalizations could be made. The study, however, suggested that a child's partner has some effect on the interaction. The dominant boys, for example, displayed their greatest frequency of dominance when paired with each other and the least dominant behavior when paired with the submissive boys.

Kohn (1966) in his study of 11 children in a preschool setting reports somewhat similar results. His general conclusion, based on lengthy observations during a free-play situation, is that a child determines his peers' approach to him. The active child received somewhat negative contacts from others. Positive behavior initiated positive behavior from others.

It may be that there is an overall interaction style, or a reservoir of interaction patterns, which the child employs in every situation. But it also is possible that the child's behavior is determined by the situational factors, the part-
ner's sex, and the behavior exhibited by the partner.

It seems that it is important to consider the nature of interaction of preschool children. A comparison of aspects of same-sex peer interactions with opposite-sex peer interactions would add to the understanding of social interaction patterns displayed by children during the preschool years. Developmental changes in social interaction during the preschool years may effect social relationships.

Statement of Purpose

The purpose of the present research is to investigate the social interaction occurring among peers in early childhood as a function of membership in same-sex and opposite-sex groups. The interaction will be analyzed according to judged differences of behavioral characteristics of nonverbal responses using a behavior profile. Social interaction is considered the dependent variable while age, subject's sex, and partner's sex are considered independent variables.

The specific null hypotheses tested are:

1. Social interaction within pairs of children is not a function of age.
2. Social interaction within pairs of children is not a function of sex.
3. Social interaction within pairs of children is not a function of partner's sex.
4. There is no interaction between the independent variables (age, sex of the child, and sex of the partner) and the dependent variables of social interaction.
REVIEW OF LITERATURE

The literature on social behavior, peer interactions, peer acceptance, and social organization during early childhood has been reviewed extensively by numerous authorities in the field of child development. The major contributions to the study of peer relations were made before 1950 (Hartup, 1970).

In the area of social behavior and peer relations there are several comprehensive literature reviews all of which contain considerable overlap and duplication. The literature reviews most relevant to the present study are: Campbell (1964), Maccoby (1966), Mischel (1966, 1970), Hartup (1967, 1970), and Moore (1967). The most pertinent reviews for the current study are those compiled by Hartup (1970) and Mischel (1970).

Even though considerable data have been accumulated concerning social behavior of children in nursery school settings, literature related directly to the current study has been difficult to locate. In general, studies dealing with actual behavior in interaction settings with peers have employed mostly adult subjects. Pairs of children have been used primarily to study specific subsets of social behavior such as aggression, compliance, sharing, and dependency.

The literature review presented herein focuses on research that provides background information for the present investiga-
tion and includes data about children from 3 to 5 years of age. The areas of literature to be reviewed are: (1) observation of social interaction, (2) social interaction studies of pairs of children, and (3) characteristic traits of social behaviors in early childhood.

Observation of Social Interaction

Interaction basically subsumes behavior between two or more persons. The behavior displayed by one person is to some degree determined by the presence of the other person(s). Social interaction is defined as the reciprocal exchange between two or more persons in a specific situation and the subsequent behavior of each person involved (Dalton, 1961).

McGrew (1972) supplies a somewhat similar definition:

Theoretically, a social interaction may be defined as the performance by two or more children of behavior patterns which mutually influence each other's behavior (McGrew, 1972, p. 114).

According to McGrew, the term "influence" involves an inference by the observer and, therefore, the observed behavior must be defined in a relatively fixed form within close spatial and temporal proximity. He also maintains that in the last 30 years studies of social behavior have explored selected aspects or subsets of social behavior (ascendance-submission, peer acceptance, aggression) but that the actual patterns of social behavior have remained largely neglected.

According to Wimberger and Kogan (1968), relatively little
is known about social interaction. They suggest that research in this area usually is confined to aspects such as verbalization or retrospective impressions. They postulate that even autistic behaviors have specific messages and therefore, the focus in studying social interaction should not be on individual behavior but on behavior of the person in relationship to another person.

Social interaction process analysis has been used primarily in the study of adult behavior where linguistic exchanges are the most frequently observed and categorized behavioral acts (Weick, 1968). The emphasis on vocal performance in our society has probably influenced researchers to concentrate on the spoken and written words. Only recently has the analysis of nonverbal behavior become an active area for research (Weick, 1968).

Bodily movements and other nonverbal expressions are important elements of behavior. Although nonverbal expressions assume a variety of forms, they also tend to be patterned and repeated by the individual and can be observed and interpreted (Weick, 1968; McGrew, 1972). Regardless of the fact that a great deal is known about many isolated aspects of social behavior, the young child's social interaction with playmates and others who enter his immediate environment has been neglected. Clausen (1968) maintains that there is an abundance of information about approximations and differentiations by which the meanings of words are learned while only little
is known about the ways children learn to interpret facial expressions and body movements of those with whom they interact (Clausen, 1968).

Closely related to observation and to the importance of studying nonverbal social behavior is the concern for the consistency of observed behavior. In other words, if there is consistency in the child's behavior from one interaction to another then behavior can be predicted and subsequent changes studied. In general, the studies of constitutional determinants, maturation rate, and early experiences support the case for stability of individual personality and behavior (Martin, 1964).

The stability of profiles of social behavior of preschool children was studied by Martin (1964) in a free-play situation. This short-term longitudinal investigation was continued for a period of five years. Each year a group of 16 children was selected to be studied for two years. Thus, four groups were formed with a total of 53 subjects. The age range at the time subjects entered the study was from two years, seven months to three years, six months. A time-sampling observation technique was used. Each child was observed for 12 five-minute periods during each of the four semesters he attended nursery school.

Seven response categories were defined: control-dominance, autonomous achievement, dependency, nurturance, aggression, avoidance-withdrawal, and friendship-affiliation. Analyses of variance were computed for behavioral categories within
groups and between groups. Significant changes in the behavioral profile were observed for only 9 of the 53 children over the two-year period. The 80 per cent stability of the behavioral profile was impressive, since during this two-year period the child's behavior undergoes many changes. Frequency of behavior generally changed with age but in such a manner that the children tended to maintain their relative positions within the group.

The longitudinal research of Kagan and Moss (1962) also demonstrates the long-term stability of childhood behavior patterns. Comprehensive assessment of 54 subjects, predominantly middle class, was accumulated during the 3- to 6-year-age period, 6- to 10-year-age span, and at age 29. These records consisted of observations at home, nursery school, camp settings, classrooms and tests. The evaluations of these materials for any one subject were made by raters who had no direct contact with the subjects. Four variables, related to passive and dependent behavior were rated (passivity, general dependence, emotional dependence, and instrumental dependence). The product-moment correlations among the passive and dependency variables were more consistent for girls than for boys. The results suggest that for school-age boys, affection and instrumental aid is disapproved in young males but accepted in females. Although passive and dependent behaviors were stable for boys during childhood, the researchers conclude that the social pressures and expectations in our society are
forcing the adult males to comply to the existing norms. Therefore, the behaviors are quite stable for females but only minimally stable for males (Kagan & Moss, 1962).

Hartup, Glazer, and Charlesworth (1967) investigated social acceptance among preschool children over a period of one school year. The 32 subjects ranged from four years, one month to four years, nine months of age at the beginning of the study. The children were observed for 12 three-minute segments. A running account of the child's behavior was recorded. These records were rated by two judges and coded in eight categories.

The positive social reinforcers were: giving positive attention, giving affection and personal acceptance, submission, and token giving. The tabulated negative reinforcers were noncompliance, interference, derogation, and attack. Correlation between fall and spring observational scores on frequency of positive social reinforcement given to peers was $r = .51 \ (p < .05)$; on acceptance $r = .68 \ (p < .01)$; on rejection $r = .29$. In general, the stability coefficient for the various reinforcement and sociometric scores formed a straightforward pattern. The authors suggest that children's interactions are relatively consistent over time; that usually child's positive overtures are met with positive responses; and that interactions with nonfriends do not produce more negative encounters than with friends.

A study was conducted by Charlesworth and Hartup (1967) to obtain normative information on the amount and kinds of
social interactions among preschool children. The sample consisted of children aged three years, four months to four years, nine months. These children were divided into four preschool classes of 16, 17, 18, and 19 children each. During a period of five weeks, 12 three-minute segments were recorded for each child by two observers. The observation protocols were coded using four categories: giving positive attention and approval, giving affection and personal acceptance, submission, and token giving. A two-way analysis of variance for unequal cell frequencies was used to determine age, sex, and classroom differences in frequency of giving positive social reinforcement.

The results revealed that preschool-age children manifest a variety of positive behaviors. The 4-year-old children display positive behavior at a significantly higher rate than the 3-year-old children. Boys tended to reinforce boys and girls to reinforce girls. Situational influences also were evident in that reinforcement rates varied from classroom to classroom and from activity to activity.

In summarizing the status of current research on social interaction among young children, it can be said that, granting stability of certain elements (e.g., the situation, the size of the group, the age range of the group), it is reasonable to expect a certain degree of stability and consistency in the social interaction pattern of young children. The field of nonverbal behavior has been a relatively neglected area for studying social interaction between young children.
Social Interaction Studies of Pairs of Children

Research dealing with the social interaction of pairs of preschool children is limited, judging from the small number of studies to be found in the literature. One of the earliest studies was conducted by Mengert (1931) using 10 two-year-old children in a semi-controlled play situation. Pairing each child with each of the other nine children constituted a total of 45 pairs. The behavior of each child was recorded in running notes, minute by minute, during a 20-minute play period. The observations were tabulated and each child's friendliness score was determined. Behaviors such as talks friendly to partner and gives toys to partner were included in overt friendly behavior. Threatens, pushes, hits, and snatches constituted unfriendly behavior. Fisher's formula was applied to the means of each child's behavior score. Results revealed that all subjects had relatively high friendliness scores in comparison with unfriendliness scores. The total mean score for the group's overt friendliness was $x = 89.5$ as opposed to $x = 20.5$ for overt unfriendly behavior. Mengert concludes that these results are useful as an educational aid in modifying the behavior of young children.

Individual constancy in social interaction was explored by Gellert (1961) for 16 boys and 16 girls, ranging in age from 46 months to 62 months. The subjects were observed in pairs interacting with the same-sex partner. Dominant, sub-
missive, and resistant acts were recorded for each child of the 16 pairs for three 20-minute sessions in a semi-controlled play situation.

On the average, girls tallied more unit acts than boys, although the data do not approach statistical significance. When data for both sexes were combined some individuals varied considerably in terms of their behavior whereas others demonstrated remarkable intersession stability. When Kendall's coefficient of concordance was applied to the data the results showed that significant coefficients of concordance were found for dominance and submission but not for resistance. Also, inspection of the data revealed that most children maintained their position with regard to submission and dominance but did not demonstrate such stable behaviors with respect to expression of resistance.

In general, Mengert (1931) and Gellert (1961), using somewhat similar research methods, agree that children display observable and relatively stable behavior patterns when interacting with another child in semi-controlled situations.

Brotsky and Thomas (1967) used 27 pairs of children between ages 3 and 5 years to investigate learning of cooperative behavior. The pairs were chosen randomly within sexes, within preschool classrooms, and within sociometric groups.

A knob-pressing apparatus consisting of two identical sets of three knobs was used as stimulus with M&M's candy as reinforcement. The responses were defined as cooperative if
both children pressed knobs of the same color. The parents' questionnaires and teachers' ratings were used to order the children in terms of previous level of cooperative behavior.

It was hypothesized that children who were rated as more cooperative would emit more cooperative responses than other children. The children's verbal responses were recorded during a 10-minute knob pressing game, and subjected to evaluation by two raters. A two-by-two factorial analysis of variance was performed. Results indicated that although significant increase in cooperative responding occurred during the 10-minute period, noncooperative behavior also increased. Thus, it was concluded that these preschool children were learning how to press knobs rather than learning to cooperate with each other.

A somewhat similar study was conducted by Masters (1973) using a game-playing situation to investigate social comparison and self-reinforcement in same-sex pairs. A matching figure game, involving difficult discriminations of nine sets of drawings was used as an experimental setting. The subjects (N = 160) were 4-year-old (40 boys, 40 girls) and 7-year-old (40 boys, 40 girls) children assigned to four different experimental conditions; low condition (subject received nine tokens, partner received three tokens), and general condition (subject received nine tokens, and 54 tokens were for "all other children"). Furthermore, for half of the children in each condition any discrepancy of rewards dispensed was noncontingent.
In other words, each child was told that both of them had selected the correct match.

The data were subjected to a four-way analysis of variance in which the main factors were age, sex, contingency of reward dispensation during social comparison, and experimental conditions of social comparison. There was a significant age effect relative to children's self-reinforcement (df 1/128, \( F = 5.61, p < .01 \)) but no effect relative to a child's sex. The younger children (4-year-olds) were considerably more generous in their self-dispensation of rewards than the older children (7-year-olds). There was no age-by-contingency-by-conditions interactions.

In general, the number of rewards given affected the younger children. They also rewarded themselves more generously. Girls tended to value the rewards less than boys. The older children's performance was not affected by receiving fewer rewards in the game-playing situation. Masters postulates that self-reinforcement is a highly socialized behavior, which the older children had learned to inhibit. He also hypothesizes that 7-year-old children have already learned to discriminate between isolated instances of failure (less reward) and the more general experience of failure where performance is compared with the performance of a large number of peers.

In general, studies by Brotsky and Thomas (1967) and Masters (1973) support the finding that young children have
not yet mastered highly socialized behavior.

There are several social interaction studies in which only same-sex pairs are used as subjects. Effect of activity level on social interaction was investigated by Kaspar and Lowenstein (1971) in which 36 boys ages six to eight years were studied. The activity level was determined by actometers and boys were paired on the basis of high and low activity levels disregarding age or maturity. Two 20-minute semi-structured play sessions were used to observe social interaction of each pair.

An analysis of variance showed that the mean difference across the sessions was significant beyond the .001 level (F = 18.3, df 1/26). All subjects were more active during the second session than the first and there also was a significant interaction between conditions and sessions (F = 4.80, df 2/36) indicating that change in activity level differed between groups.

It also was found that the low activity level children displayed the most increase in activity. Seemingly, the less active boy increased his activity level to approach the activity level of his more active partner. The authors theorize that the manner in which the children were paired as well as the disregard for age and maturity levels might have produced some significant interactions which were difficult to interpret in terms of the purpose of the research.

Kohn (1966) investigated 11 children with the median age
of 5 years, 11 months. The purpose of the study was to obtain a complete picture of a child, his activity rate and quality of his behavior in relation to the rate and quality of acts he initiated toward others. Each child was observed for one half-hour during four different periods in a school year. A set of five categories were used: structuring, assisting, evaluating, stimulating, and participation. Only acts initiated by the child were considered for analysis. These acts were divided into two groups: positive actions and negative actions. Two types of measures were calculated for each child: rate of initiated acts toward others and per cent of positive acts initiated toward others. The correlation between behavioral acts initiated and the frequency of acts received for each child was high \( r = .77, p < .01 \).

Findings by Kaspar and Lowenstein (1971) and Kohn (1966) suggest that a child manages to evoke responses in others which will permit him to maintain his mode of behavior.

In agreement with Kohn's study are results obtained by Olpin and Kogan (1969). A block-building situation involving the first meeting of two 8-year-old boys was provided to explore interaction variables of dominance, submission, friendliness, hostility and involvement. Five boys were paired in all possible combinations and each boy's stimulus characteristics and generalized responses were analyzed for the resulting four interaction sessions.

Analyses revealed that hostility and submission had much
lower rates of occurrence than did dominance, friendliness, and involvement. Also, boys who ranked highest in dominance when paired with each other, displayed a lower amount of dominance when paired with the child of low dominance. No systematically patterned ways of responding to each other was developed in the course of a single play session.

Thus, studies by Kaspar and Lowenstein (1971), Kohn (1966), and Olpin and Kogan (1969) agree in their findings that children tend to determine the type of approach that other children make to them.

Modifiability of peer preference of 53 pairs of first-grade children was studied by Haskett (1971). The experiment involved six treatment conditions: different combinations of the two pairing factors (same or opposite sex) and three treatment factors (cooperation, spatial contiguity, and normal classroom). To derive measures of peer-preference change, peer rankings were obtained from each subject prior to and after the experiment. In the pretest of peer rankings, 95 per cent of the children chose the same-sex child as best friend. The preference change scores were analyzed by analysis of covariance. The adjusted preference change scores indicated that children in the cooperative interaction situation increased significantly their preference for opposite-sex pairs but not for the same-sex pairs. The other two conditions did not produce any significant effects. More specifically, the results of the analysis showed that the only significant
increase in peer preference was in the opposite-sex cooperation (q = 4.79, df = 46, p < .01, Tukey's HSD test), with no significant sex differences.

Three hypotheses are presented by the author to account for the results. Children might have chosen the opposite-sex peer as a friend because: (1) in a cooperative situation, children have had opportunities to learn about the opposite-sex thus increasing predictability of interaction, (2) the situation was perceived as novel or unique, and (3) the task increased interaction and made boys appear less aggressive to girls.

Saltzstein and Diamond (1967) in a study similar to Haskett's (1971) also have investigated social influence exerted by the opposite sex. They hypothesized that females are more subject to influence than males. This study involved 30 girls and 15 boys ranging from 7 to 12 years of age. However, only the girls are considered subjects in the study.

The task consisted of making an independent estimate of number of dots displayed on a screen, and then re-estimating the judgment when confronted with discrepant judgments ostensibly made by either a boy or girl. The Mann-Whitney test was used to estimate the differences. The results suggest that girls who are paired with boys make significantly greater transfers of judgments than girls who are paired with other girls (p < .002, two-tailed).

The studies by Haskett (1971) and Saltzstein and Diamond
(1967) seem to illustrate that the presence of opposite-sex partner (mostly boys) is somewhat responsible for modifying the subject's opinion.

An illustration of studying young children in pairs in a modeling situation is provided by Nelson, Gelfand, and Hartman (1969). The subjects (N = 96) were five- and six-year-old children arranged in matched-sex pairs. A 2-by-2-by-3 (model x sex x games) factorial design was used with two model conditions (aggressive and nonaggressive) and three game conditions (success, failure, and no competition) yielding 12 randomly assigned experimental groups. Subsequent to viewing either the aggressive or nonaggressive model the children were exposed to a competitive game in which they either failed or succeeded. Observation data were collected during a free-play period which followed shortly after participation in the competitive game. Selected t-test comparisons were used to analyze the data. Participation in competitive games generally increased aggression.

Aggressive behavior of girls increased after witnessing an aggressive model (t = 2.01, p < .05). Boys were significantly more aggressive than girls but only after witnessing the nonaggressive model (t = 3.23, p < .01). The authors explained this unexpected finding in two ways. Perhaps girls expressed more aggressiveness because they witnessed the same-sex model and because they felt privacy in a free-play situation and, therefore, could afford to violate the norms of social conduct.
Perhaps, contradictory to many theories, competition elicited aggression rather than reduced it due to a permissive setting with the presence of aggressive stimulation.

Results obtained by Hicks (1965) using aggressive models and by Donald and Adelberg (1967) using confederate models for teaching sharing behavior verify that the assistance of a model produces significant changes in behavior.

A role playing situation provided the setting for an investigation of children's learning of helping and sharing behavior (Staub, 1971). Seventy-five kindergarten children were randomly selected to participate in pairs in four different treatment sessions: role playing, induction, role playing with induction, and control. Each child participated twice, once with the same-sex partner and two days later with the opposite-sex partner, in an identical session. A posttest followed the session.

The independent variables were: role playing, induction, sex, and time of posttest. The dependent variables were: helping a distressed child, sharing material possessions, and helping an adult. A four-way analysis of variance was used to examine the data.

Following role playing, girls helped a distressed child more (t = 3.04, df = 63, p < .01) than boys whereas boys shared with a needy person more (t = 3.21, df = 63, p < .01) than girls. There were no sex differences for the control group. Staub concludes that role playing affected girls and boys
differently due to the sex of the child in need (girl in the case of helping, boy in the case of sharing), or to the differential sex-role behavior expectations which assign the nurturance and helping roles more to girls than to boys.

Two recent studies (Stockdale, 1972; Crase, 1972) also employed an interaction analysis of pairs of children. These studies are pertinent to the present review because of the involvement of pairs of children and the analysis of social interaction rather than because of the results obtained. The subjects are representatives of an older population (6- to 12-year-old children) and the results, therefore, are not applicable for the current investigation.

An analysis of variance method was used in both studies to determine significance of data. Stockdale employed Borgatta's Behavior Scores System for categorizing units of verbal interaction of pairs of children while Crase used number of items or amount of time shared by pairs of children in a standardized game playing situation.

Specifically, Crase (1972) found that in a paired situation older children shared more than younger ones ($F = 3.72$, df $1/24$, $p < .07$). Stockdale (1972) found a decreasing trend with increase in age relative to the amount of antagonism displayed and use of task determining acts. Her results also reveal more assertive behavior when children were interacting with an opposite-sex partner as opposed to interaction with the same-sex partner. Thus, both studies agree that behavior
involving relationships with peers changes with age.

In summarizing the current research in the field it can be said that pairs of young children are used in a variety of ways to determine the social interaction process between two children involving various specific components: friendly behavior (Mengert, 1931); dominance and submission (Gellert, 1961); modification of behavior (Haskett, 1971; Saltzstein & Diamond, 1967); influence of the partner (Olpin & Kogan, 1969; Kaspar & Lowenstein, 1971; Stockdale, 1972; Staub, 1971); sharing (Crase, 1972) and modeling (Nelson et al., 1969). In all instances the sex of the partner has an effect. However, no single generalization can be applied to all these studies.

The results of research reported on social interaction of pairs of children are diverse and sometimes in direct opposition to each other. A wide range of specific behaviors is studied and a wide range of research methods is used. In general there appears to be relative agreement that children prefer same-sex partners as playmates. Opposite-sex partners are chosen in cooperative situations and there appears to be more interactions within opposite-sex pairs than within same-sex pairs. Children usually maintain their mode of behavior but modifications are related to the partner and his specific mode of behavior. Regardless of similarities, however, boys and girls behave differently in interaction situations.
Characteristic Traits and Behavior in Early Childhood

There is a large body of research pertaining to social development that focuses on specific subsets of social behavior of the young child. Selected illustrations will be reported to provide some background information for the current investigation.

A series of studies were conducted by McCandless and Marshall (McCandless & Marshall, 1957a,b; Marshall & McCandless, 1957a,b; McCandless & Hoyt, 1961) concerning peer preference as determined by sociometric tests and social acceptance in preschool settings at University of Iowa Laboratory Schools. In general, the measures of social acceptance and participation used were: sociometric scores, obtained from verbal choices with the aid of a picture-board; teachers' listing of best friends; observed social acceptance score; peer's interaction score; and adult dependency score. Since these studies are cited frequently in literature reviews, only the significant aspects pertaining to the current investigation are noted.

Summarizing the general outcome of these studies it can be said that: (1) the socially accepted child had more friendly interactions with his peers and was less dependent on adults; (2) peer acceptance and participation was not affected by child's sex; (3) girls, generally, had higher sociometric scores than boys, but these differences were not significant; and (4) popularity was significantly related with friendly
approval and associative play, but not with the amount of conversation or hostility during free play.

Dunnington (1957) offers some additional information with regard to behavioral differences of sociometric status groups in a preschool setting. In her study of fifteen 4- and 5-year-old children sociometric status was derived by the interview method to secure three choices and three rejections from each child. The subjects were rank-ordered and divided into three status groups. A semi-controlled play situation was used as a setting for recording verbal behavior in two 20-minute play sessions. Observations were transferred onto score sheets with predetermined categories including all of the subjects' actions, verbalizations and physical use of materials. Results revealed that the high status groups exhibited significantly more aggressive behavior but also a greater proportion of positive expression than lower status groups. No significance levels were given. Her findings differ from McCandless and Marshall series (1957a) stating that the popular child is also excelling in his verbal interactions.

Stott and Ball (1957) investigated specific behavioral variables in interaction situations. A 30-item ascendance-submission check list was periodically filled out for 60 subjects from the time each subject was two or three years old until he was about 13 years old. The children were attending Merrill-Palmer Nursery School and Recreational Clubs during this longitudinal study. The subjects were studied over a
10-year period on six groupings of ascendance-submission dimension: domination, natural leadership, timidity, conforming behavior, dependent submissiveness, and individual (isolate) tendency.

In general, frequency of interaction increased significantly for children from three to five years of age. The ascendant behavior was less frequent after the children changed from nursery school to kindergarten. Individual patterns of behavior also were noted with some children being very consistent while others displayed fluctuating behavior patterns. Although percentages were used and no significance levels were stated, the authors conclude that the readiness of the organism is a prerequisite but beyond that the environment determines the quality and quantity of social behavior the children develop.

Results identical to Stott and Ball (1957) were obtained by Hattwick and Sanders (1938).

Studies during the 1950's seem to indicate that the popular preschool child is friendly (McCandless & Marshall, 1957a), and is displaying considerable interaction with peers (McCandless & Marshall, 1957a; Stott & Ball, 1957; Hattwick & Sanders, 1938) and also is more verbal (Dunnington, 1957) than his less liked peer.

Another series of research studies, frequently cited in the literature, was conducted by Hartup and his associates (Hartup, Glazer, & Charlesworth, 1967; Hartup & Coates, 1967;
Charlesworth & Hartup, 1967). The main concern of these studies was peers as agents of social reinforcement in preschool groups. The subjects in these studies ranged from 3 years and 4 months to 4 years and 9 months. The total sample consisted of 35 boys and 35 girls.

Hartup and his colleagues used four types of positive social reinforcers: attention and approval, affection and personal acceptance, submission, and tokens. Statistical significances were arrived at generally by means of correlation coefficients. The exception to this occurred relative to determining the significance levels for positive social reinforcement for the 3-year-old group at which instance analysis of variance was computed.

Three major results emerged from this group of studies. (1) Children in the oldest groups dispensed significantly higher amounts of positive social reinforcement. The highest ratings of reinforcement were evident in dramatic play situations. About half of the reinforcements were given in response to overtures from the recipients. Boys gave more reinforcements to boys than to girls and girls gave more reinforcements to girls than to boys. (2) Children who were interacting with a rewarding peer displayed significantly more altruism. Also, children who had a history of frequent reinforcement by peers, exhibited significantly more social reinforcers than children who received infrequent reinforcement. (3) Social acceptance (measured in terms of positive choices) was sig-
nificantly correlated with frequency of positive reinforcement. Children received more positive reinforcement from liked peers than from disliked peers.

A study of lever-pulling rates reported by Horowitz (1962) provided similar results. The presence of a best friend's picture served as a reinforcer producing the highest rates of performance for 3-year-old children.

A similar study was conducted by Moore and Updegraff (1964) who also observed nursery school children during free play for instances of attention, reassurance, or protection. Scores on these measures correlated with sociometric scores $r = .20$, $r = .49$, and $r = .29$ indicating consistency with the results from Hartup et al. (1967).

Moore (1967) in reviewing literature about correlates of peer acceptance cautions the reader that correlation studies do not allow for interpretation of cause and effect. However, according to her, the general outcomes of research in the area indicate that the popular preschooler, presenting a picture of easy-going and good-nature, is friendly, cooperative and an active participant who often exercises his influence on other children.

Social conformity and compliance also are relevant to social behavior of young children. Children ($N = 58$) of Fels Experimental Nursery School and Fels Day Camp served as subjects in an investigation of social compliance (Crandall, Orleans, Preston, & Rabson, 1958). Only the results from the
nursery school group, (30 children ages 3, 4, and 5 years) will be discussed. Daily time-sample observations were conducted by two independent observers who rated the children with respect to social behavior variables. The format was patterned after Pels Parent Rating Scales. The variables under investigation were: compliance with commands and suggestions for others; help-seeking; emotional support-seeking; approval-seeking; hostile-aggressive behavior; attempts to direct and influence others; independent achievement efforts; readiness to withdraw from threatening situations.

Ratings indicated that sex and intelligence were unrelated to the degree of social compliance. For the nursery-school children peer compliance correlated .51 with adult compliance (significant at .01 level) indicating that a certain number of children behaved similarly with peers and adults. Compliance and hostility had inverse relationships (Rho = -.31, p < .05). Inverse relationships also existed between compliance and dominance (Rho = -.23).

The Fisher's exact test using a two-tailed test of significance was applied to the data to determine discrimination between peer-compliant and peer noncompliant nursery-school children. Results revealed that children who comply readily with peers are friendly, outgoing, more relaxed, flexible, and able to accept their own mistakes. Thus, at nursery-school age peer compliance was not associated with social inadequacy.

Similar studies were conducted by Orcutt (1968) and Ford
and Rubin (1970). Orcutt used the Starkweather Form-board Test with 38 3-year-old, 58 4-year-old, and 101 5-year-old children. This test has four puzzle-like form boards, in each of which there are five holes to be filled by choice pieces. If the child chooses the piece which corresponds to the underlying stimulus, his choice is marked as conforming; if it is different, the choice is scored as nonconforming.

A one-way analysis of variance did not produce any sex differences for the three age levels combined. Further analysis indicated that only the 5-year-old girls were significantly more conforming than the 5-year-old boys. Orcutt (1968) attributes his findings to an impersonal task and concludes that at least there is support for emergence of conforming behavior at about the fifth year of life.

Ford and Rubin (1970) used a 28-item forced-choice questionnaire to determine social desirability of nursery-school children (N = 437) ages 3, 4, and 5 years. The questionnaire was administered individually to each child. A high score was obtained if subjects claimed culturally approved characteristics such as always listen to parents and never act naughty.

The subjects were retested between a period of five weeks and three months. The results for the younger children suggest that there is little stability to describe oneself in socially desirable terms while the results for the older children (boys, t = 2.08, p < .05; girls, t = 1.88, p < .10) indicate moderate stability in social desirability responses. Social desirability
increased with age but was not related to sex. In general, children with higher social desirability scores were more positive, more motivated, and more outgoing than children with low scores.

Thus, by three different research techniques, three different groups of investigators arrived at almost identical conclusions about conformity (Orcutt, 1968), social desirability (Ford & Rubin, 1968), and social compliance (Crandall et al., 1958). The outgoing, friendly, motivated, and flexible child scored high on all the above behavioral components and also was the child whom his peers would choose for a friend (Moore & Updegraff, 1964; McCandless & Marshall, 1957a; Hartup et al., 1967).

Somewhat different aspects of social interaction are pursued by Feitelson, Weintraub, and Michaeli (1972). As a part of an International Research Program (Feitelson et al., 1972) to determine differences in social interaction among disadvantaged and privileged children, heterogeneous and homogeneous groups of 3-year-old children were observed in Israel. Family background, parents' education, and income level of parents were used to assign 96 children to four preschool groups. One preschool consisted of all disadvantaged children and was considered the homogeneous group. The remaining three preschool groups consisted of both disadvantaged and privileged children and were considered the heterogeneous groups.

Children in each group were rated on seven variables:
cooperation, contact, sibling vicinity, looking or listening, ignoring, rejection, and display of aggression. Each child was observed twice for two hours with 16 to 18 calendar months elapsing between the two observations. Two-way analysis of variance with repeated measurements of observations showed that there were significant differences among the four preschool groups (df 2/48, F = 34.9, p < .01), and between the two observations (df 2/47, F = 10.14, p < .01). The heterogeneous groups experienced a greater amount of interaction than the homogeneous group. However, the children in the heterogeneous groups tended to interact mainly with their own social group representatives and remained dependent on adults.

Feitelson et al. (1972) report that members in the subgroups (disadvantaged, privileged) preserved their own friendships which prevented them from forming new associations, and even though no visible interactions were evident, it cannot be assumed that no learning was taking place.

In a study of social distance between the two sexes, Koch (1944) used two different approaches to obtain preference choices with children in nursery school, second-, fourth-, sixth-, and eighth-grade classes as well as those in sophomore and senior classes in high school. There were 20 groups ranging in class size from 17 to 42 members and involving several socio-economic levels of mixed racial and nationality composition. Preference choices were determined by questionnaires and interviews for the older age sample whereas the
approach for the 178 nursery school children (2- to 4-year-olds) was counting the number of contacts each child had with every other child in a free-play situation. Only the results of the nursery school group will be discussed.

The children were observed during their free-play periods by eight trained observers. Samples were recorded of each child whether or not he was actively interacting with other children. One hundred samples of each child's behavior were described over a period of three months. On the basis of these descriptions, the degree of association was computed for each child with every classmate. A friendship index also was computed based on the number of contacts a given child had and the total number of possible opportunities for contact. The largest part of measures of associations, however, was a simple count of the number of contacts each child had with every other child. Results demonstrated the distance between the two sexes in the preschool years. The two sexes did not associate equally frequently with each other and, furthermore, the distance increased with age for this sample. No significance levels were reported.

Sex, ethnicity and play preference of preschool children were tested by McCandless and Hoyt (1961). Thirty-three Oriental and 26 Caucasian children ages 3 years 6 months to 5 years 3 months were observed in a free-play setting. Fifteen 5-minute observations were recorded for each child by three observers over a period of 3.5 months. A tabulation was made
and interactions computed of the total time the subject interacted during the observation periods. Comparisons were made, using a chi square analysis.

Disregarding ethnic groups, boys choose more boys as play companions, and girls choose more girls ($x^2 = 32.9$; for $p = .01, 1 \text{ df}$). The sex cleavage, however, was significantly more extreme for boys than for girls. Disregarding sex, the division of the two ethnic groups was evident. The children did not actively avoid the members of the other ethnic group but they generally approached members of their own group.

McCandless and Hoyt (1961) conclude that the ethnic groups probably had more visiting contacts outside the school setting which contributed to feelings of comfort and compatibility in playing within their own ethnic group. Koch (1944) and McCandless and Hoyt are in agreement that same-sex playmates are preferred during the preschool years.

Levitin and Chananie (1972) based their study on the theory that child's behavior is largely determined by adult expectations. They hypothesize that boys are aggressive and girls dependent because such sex-typed behaviors are transmitted to them by adults. Their investigation involved 40 female primary-school teachers' ratings of behavior characteristics they would approve in young children. Teachers clearly indicated preference and approval for (1) dependent behavior as opposed to aggressive behavior, (2) achievement behavior regardless of sex, and (3) dependent behavior in girls.
Levitin and Chananie (1972) argue that even though this is a small sample of middle-class school teachers the presented evidence supports prediction that certain behaviors are more reinforced than others.

Some general conclusions can be drawn from the results of studies using sociometric techniques, daily observations, and other instruments to determine traits and characteristics of young children. Children prefer the outgoing, cooperative and positive peer as a partner. Girls usually receive higher sociometric ratings. Sex cleavage is somewhat stronger for boys than girls. Boys are perceived to be more aggressive than girls. The appropriate sex-role behavior, used in interaction situations, is reinforced by the society's expectations.

Thus, the presented literature review indicates that non-verbal behavior is a somewhat neglected area in studying social interaction of young children. It also is evident that studies of social interaction of pairs of children have presented diverse results. The vast number of studies related to social development of the young child points out the concern and the importance that researchers have assigned to the process of interaction and social development for this age range.
METHODOLOGY

Research Design

The purpose of the present research is to investigate nonverbal behavior occurring during a standardized play situation among same-sex and opposite-sex pairs of preschool-age children. Specifically, the social interaction of pairs of children is considered to be a dependent variable of major concern in the investigation. The social interaction occurring as a function of group composition is another dependent variable. Each of 12 age-level groups is composed of four children (two boys, two girls) interacting in pairs. The sex composition of the pairs is varied within the different age groups. The age of the children does not exceed a six-months range for each group, although the age of individuals across all groups vary from 3 years, 2 months to 5 years, 3 months. Age and sex serve as independent variables.

A repeated measures design is employed to study the social interaction of the children. The setting for interaction involves a standardized arrangement of play materials: small wooden blocks, doll house, doll furniture, wooden dolls (scaled to size) and wheel toys. Each child participating in the standardized play setting interacts twice, once with a same-sex partner and once with an opposite-sex partner within his age group. In half of the groups the subject's first interaction is with the same-sex partner and in the other half of the
groups the subject's first interaction is with the opposite-sex partner. The first male child to be chosen in an age group is designated A and the second, B. The first female child chosen in the age group is designated C and the second, D (Figure 1).

The children's behavior in the standardized play situation is recorded in a series of motion picture episodes, for later analysis, with the Preschool Behavior Profile of Social Interaction. The behavior profile contains 44 behavioral categories describing social interaction in adjectives or adjectival phrases. A four-way analysis of variance procedure is employed for the analysis of the 44 behavioral categories.

Subjects

The subjects for this investigation are 48 children, 24 boys and 24 girls, selected from the Child Development Laboratories, Iowa State University, during fall quarter, 1972. The children are predominantly from upper middle-class homes with the majority of parents being college graduates.

All children (N = 90), regardless of racial origin, enrolled in the five laboratories (four nursery schools; one kindergarten) were considered potential subjects for this study. One child known to have clinical history of physical problems was eliminated from the sample. An additional 15 children also were eliminated due to failure to meet the criteria of sex and age for a group within a laboratory.

Of the 74 children who fell into the appropriate age
### Identification Information

**Groups:** 12 groups each composed of four children (A,B = males; C,D = females)

**Order S:** same-sex pairs interact first (AB, CD)

**Order 0:** opposite-sex pairs interact first (AC, BD)

**Trials 1 and 2:** interaction experiences

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**Figure 1.** Order of participation with respect to sex composition
groups, six children were eliminated through random selection in the instances where more than one child met the criteria for the same age group. Thus there were 17 age groups of four children each. During the data collection one child refused to participate in the study eliminating 4 pairs of children, and the records of six pairs of children were destroyed due to filming failure. Therefore, the total number of subjects participating in the 12 remaining intact groups was 48, ranging in age from 38.0 - 63.0 months. The age and the sex distribution can be seen in Table 1.

It is assumed that each subject in the investigation had an equal opportunity for social participation with every other subject within his laboratory group. Support for this assumption exists in the fact that all children had been attending the laboratories (which meet daily) for no less than nine weeks and were selected from a relatively narrow age range within a specific laboratory.

Exploratory Experimental Social Interaction Situation

In order to facilitate interaction between a pair of children, an experimental play situation which was familiar and hence nonthreatening to the children was designed. The situation needed to appeal to the interests of children and to hold their attention regardless of age. In addition, the situation needed to encourage interaction and to provide for differences in sex-role orientation.
Table 1. Age and sex distribution of subjects for the 12 groups

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<tr>
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<td>24</td>
<td>38-63</td>
<td>41-61</td>
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</table>
An eight-minute play situation involving blocks, cars, and small dolls was constructed to meet these criteria. All play materials were suitable for children ranging from 3 to 5 years of age. Children could use the toys without adult supervision. The setting was natural and interesting but not stress provoking or achievement oriented. Also a balance of male and female oriented toys was provided. No equipment or furniture other than the table on which the toys were placed was in the room. The play materials were always arranged in the same order for each pair of children.

To aid in the standardization of the experimental interaction situation, the following instructions were given:

We are interested to see how children play with these toys. You may make whatever you like. You must keep all the toys on the table. Use as many pieces as you need. I will be back in eight minutes.

After the instructions were given to the pair of children the investigator left the room. At the end of eight minutes the investigator entered the room, thanked the children and escorted them back to their laboratory.

Recording Behavior in Exploratory Experimental Interaction Situation

To provide a permanent record of the subjects' interactions and to allow for flexibility of scheduling observations of behavior, the interaction of each pair of subjects was recorded by the use of Bolex H16 Reflex 5 camera placed in an observation booth adjacent to the testing room. The
film was exposed at eight to ten frames per second. Filming of the interaction began immediately upon completion of instructions and continued for the next eight minutes of interaction. The children's behavior was recorded at one-minute intervals alternated with one minute of nonfilming intervals (Appendix A).

This filming pattern was followed for all of the film episodes and timed independently by two observers equipped with stop watches. Thus, during the eight-minute play period, a four-minute film strip was obtained for each pair of children.

Pilot Study

A pilot study was conducted in order to determine whether or not the play situation would hold interest and bring out interaction between two children. Six pairs of children ranging from 3 to 5 years of age were exposed to the experimental setting and were instructed to use the play equipment. Their performance was filmed, recorded on tape, and observed by the investigator and major advisor.

During this pilot study it was apparent that the materials did not hold the interest of some of the children. It also was observed that the children needed some time to familiarize themselves with the play situation and that some children explored the play materials sooner than others. To correct for individual differences in the initial activity, a three-minute
"warm-up" period was initiated. In an attempt to offer the greatest opportunity for sustained interest in the activity, additional wheel toys and wooden people were introduced into the situation at the end of the warm-up period (Appendix B).

The amount of time the children were exposed to the experimental setting was varied to determine the tolerance limits for the activity. It appeared that a period between 8-10 minutes produced the most productive behavior in terms of interest and interaction. The total time for the experimental social interaction situation became eight minutes: one minute for entrance into the room and instructions; three minutes for an initial warm-up period and four minutes of play after the additional toys were brought into the room.

Little empirical evidence is available to give direction to determining the optimum length of a film record. Since the sampling technique for taking a film record could be standardized for all interactions it was decided to allow financial considerations to influence the situation. The total recording of behavior was changed from four one-minute episodes to four one-half minute episodes.

 Modified Experimental Interaction Situation

The experimental social interaction was modified in two ways.

1) After the three-minute warm-up period the experimenter entered the room with a small box containing additional toys. The box was placed on the table with the following instructions:
Here are some more toys to play with. You can play with these toys any way you want to.

After the instructions were given the experimenter left the room and filming began.

2) The filming time was changed from one-minute intervals to 30-second filming intervals alternated with 30-second non-filming intervals. A two-minute film strip was obtained for each pair of children (Appendix C).

The modified experimental situation was tested with three pairs of children and found to meet the criteria devised for the experimental interaction situation.

Development of the Preschool Behavior Profile of Social Interaction

During the Summer Session I, 1972, the social interaction behavior of eight children (4 boys, 4 girls) in an experimental play situation was observed, judged and analyzed to develop an instrument to measure the nonverbal social interaction of pairs of children.

Subjects

The subjects were children from a summer group of the Child Development Laboratory Nursery School. There were 17 children in this group. Five children were eliminated from the sample since they were potential subjects for the subsequent study. One child was excluded due to known clinical history of physical problems. Four pairs of children, matched
as closely as possible by age and sex, were selected from the remaining 11 children. The eight subjects ranged in age from 59 months to 69 months with the mean age of 63 months (64 for girls, 62 for boys).

**Procedure**

Each child interacted with four children in four separate trials in the experimental situation which was similar to the one used in the pilot study. A particular order in which the child participated in the four trials was established on the basis of the number of times the child participated in the situation. No child participated more than once a day and each child had the same amount of experimental situation experience as his partner on each of the trials. Each child interacted twice with the same-sex partner, and twice with the opposite-sex partner (Figure 2).

**Task setting and filming procedure**

The children, once assigned to the appropriate pair, were taken in pairs by the investigator to the testing room.

The room was set up for the social interaction in essentially the same manner as for the experimental social interaction situation. The selection of play materials was based on the same criteria, the length of the play session was the same, and the social interaction was recorded by way of filming from the observation booth. The only differences to be noted are that no additional toys were brought in during the play
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<th>A</th>
<th>B</th>
<th>C</th>
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<td>EH</td>
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<td>GH</td>
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Identification Information

Males: A, B, C, D; females: E, F, G, H

Pairs of children

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Participation order

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<th>Trial 2</th>
<th>Trial 3</th>
<th>Trial 4</th>
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<td>GH</td>
<td>FG</td>
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<td>EH</td>
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Figure 2. Sequence of interaction for Preschool Behavior Profile of Social Interaction
session and that a filming procedure of 60-second filming intervals alternated with 60-second nonfilming intervals was followed for the total duration of eight minutes.

Thus, from the eight-minute play period, a four-minute film episode was obtained for each pair, resulting in 16 four-minute film episodes.

Constructing word similarity groups

The 16 four-minute film episodes were randomized and put on four film reels. Eight child development staff members and graduate students were asked to view the film episodes and react by listing adjective or adjectival phrases, describing the children's behavior in relation to their social interaction. An adjective was defined as a word used (with a noun) to denote a quality of behavior named or something attributed to it (Appendix D).

Each of the eight child development experts were randomly assigned to view one reel on which there were four film episodes. Thus, each film reel was viewed by two experts. The projector, screen, and the viewing positions always were kept at the same distance to insure that each person saw the films from the same position. Each expert viewed one episode at a time and immediately recorded his reactions.

These eight experts produced eight word lists with a total of 270 adjectives or adjectival phrases. Since the experts were not asked to avoid duplication of words it was necessary
to remove 85 duplicate words from the original list. The remaining words (185) were typed on separate cards. Five sets of cards were prepared and distributed to five child developmentalists who acted as judges and individually sorted the cards into groups of words which they judged to have similar meanings (Appendix E). Thus a preliminary grouping for the final set of words was developed.

Of the five judges who grouped the words, three were available to participate in the final categorization of the verbal descriptions. All three judges had considerable experience with and knowledge of children and were considered professional child developmentalists by training and experience. During a group meeting of the judges and the investigator, disagreements relative to the inclusion of words in a group were discussed and arbitrary decisions were arrived at by exchanging reasons and implications for including a word in a particular group. Examples of behavior were used as illustrations of behavior that would fit under particular word groupings.

It was jointly decided that 55 words would be removed from the word groups since they were too general, could not be classified as adjectives, or were already represented by a similar word. It also was agreed that too many words with similar meanings in one group would not facilitate the specific judging of the social interaction but might result in describing behavior in general. The remaining 132 words were grouped
into 44 categories. These categories were prepared with a certainty scale\(^1\) and entitled Preschool Behavior Profile of Social Interaction (Appendix F).

Scoring procedure

For the purpose of scoring interaction of pairs it is necessary to observe both children of the pair simultaneously, although each child is rated separately on the behavior profile.

Each item on the behavior profile is scored as present or absent in the observed behavior. In addition, the rater is expected to score the degree of certainty he feels that the behavior under consideration was or was not present. The feeling of certainty is ranked from 50 to 90. The lowest end of the scale (50) represents a low degree of certainty while 90 indicates a high degree of certainty. Inability to judge the degree of certainty is represented by circling both "P" and "A". The degrees of certainty 50, 60, 70, 80, and 90 are weighted 1, 2, 3, 5, and 8 respectively. Absence of a category receives a negative value, while presence of a category receives a positive value.

The certainty scale technique was used by Tilford (1966) and Patel (1972) to observe the behavior of one child, but not the interaction of a pair of children.

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\(^1\)This scale was designed by Dr. Leroy Wolins of Iowa State University, Department of Statistics.
Data Collection

Prior to initiating the collection of the data a letter was sent to parents of all children in the five laboratories explaining the general purpose of the study (Appendix G). Also the investigator spent several days as an observer in the laboratories to allow the children to become familiar with her presence.

Once the sample was selected the general purpose of the investigation was explained to the teachers and a list of pairs of children to be tested from each laboratory was distributed. The order of testing of children in each group of four was indicated on this list. A testing schedule also was distributed among the teachers to ensure coordination of the school's activities, field trips, and testing program.

The children were brought to the testing room in pairs. The test order of pairs was determined by the design of the study. In the case of absence of one child of a pair the next pair within the design was taken and the unavailable pair was tested at a later date. No child was tested twice in one day.

In most instances the teacher accompanied the pair of children and the investigator to the testing room door, remained in the observation booth during the testing and took the children back to the laboratory after the testing was completed.

The investigator took the children into the testing room,
gave the standardized instructions, tied a scarf around one child's arm for ease of identification on the film record, and left the room. Three minutes later the investigator brought the additional toys into the testing room.

The filming of behavior began at the exact moment the investigator placed the box of additional toys on the table and left the room. Four 30-second film episodes (alternated with four 30-second nonfilming periods) were taken. Upon the completion of filming (four minutes) the investigator entered the testing room, thanked the children for their cooperation and the teachers took them back to the laboratory.

Each film episode, once developed, was given a case number randomized with the other films and placed on separate reels. A case number and identification numbers of the two children were recorded on the reel can. No child appeared on two consecutive reels.

Training Judges

Two child developmentalists who were involved with the original development of the Preschool Behavior Profile of Social Interaction were asked to judge the filmed behavior. Since they had already participated in developing the instrument no additional training was needed to explain the purpose of the behavior profile, the justification for the word groups, or the scoring procedure.

At the first training session a time schedule for prac-
ticing and for the actual judging was established. It was
decided jointly that both judges would view the films at the
same time. Practice films previously prepared with pairs of
children not participating in the study were used for train­
ing. The two judges viewed the film and rated the behavior
on the certainty scale of the behavior profile. Both children
were observed simultaneously and recorded on individual be­
behavior profile sheets. At the end of every practice film the
amount of agreement with the judges was calculated. Whenever
there was disagreement about a category, a discussion was held
until consensus was reached.

After completion of seven hours of training and the sub­
sequent discussions it was decided that each film episode would
be viewed twice to provide adequate opportunity to judge the
behavior of both subjects. A 15-minute break period after
every three film episodes was instigated to avoid undue fa­
tigue. The first viewing provided a general screening of the
behavior while the second viewing allowed for verification of
the judgment.

Modification of the Preschool Behavior
Profile of Social Interaction

During the training session it became evident that the
judges had difficulties with Categories 13 and 32. Category
13 consisted of two words "distracting" and "distracted". The
judges felt that each child's behavior could be more precisely
described if two separate categories for the words "distracting" and "distracted" were constructed. They also felt that Category 32 ("messing, dawdling, doodling") should be omitted, since it was impossible to distinguish between Categories 32 and 26 (nongoal-oriented, undirected play, unconstructive play). They were unable to find behavior examples in the behavior of preschool children that would fit Category 32 and not Category 26. Thus, Category 32 was omitted and Category 13 was made into two categories (Categories 13, 14) resulting in the same total number (44) of categories.

After these changes were made more training films were viewed and judgments discussed until the judges felt confident that they applied similar criteria for scoring the films.

Judging the Behavior

As previously agreed, the judges picked the most suitable time when they could view the films simultaneously. A tentative judging schedule was set up.

The distance (2 meters and 50 centimeters) between the screen and judges' chairs were measured to ensure that all films were seen in the same manner. Prior to each judging session the judges reviewed the directions for judging the film episodes. The investigator operated the projector from 50 centimeters behind the judges' chairs and identified the subjects for each episode.

Scoring of each child's interaction with his partner was
executed immediately after viewing the film. Both children of each pair were observed simultaneously and rated on the behavior profile. Each film episode was viewed twice. No time limit was placed on judging time. The judges were asked not to discuss the films until they had rated the subjects they had just seen. They also were asked to check their ratings for possible omission before starting to observe the next pair of children. In this manner, rating on the behavior profile was obtained for 48 films resulting in 96 single child ratings by each judge.

Statistical Treatment

The judges' ratings of each item (44) on the certainty scale were coded according to interaction with same-sex or opposite-sex partner, first or second confrontation, and judge. Thus, there were a total of 192 behavioral inventories rated by judges (2) for 48 pairs of subjects on 96 behavioral episodes. A four-way analysis of variance was computed controlling for sex of the subject, sex of a partner, and judge effect.
RESULTS

The main concern of the present study was to investigate social interaction among pairs of preschool children interacting with either the same-sex or opposite-sex partner. The following null hypotheses were formulated:

1. Social interaction within pairs of children is not a function of age.
2. Social interaction within pairs of children is not a function of sex.
3. Social interaction within pairs of children is not a function of partner's sex.
4. There is no interaction between independent variables (age, sex of the child, and sex of the partner) and the dependent variables of social interaction.

The data were analyzed with a four-way analysis of variance. Age, sex of the subjects, sex of the partner, and judges were considered the main effects. The other variables studied were the interactions involving: age and partner's sex; sex of the subject and partner's sex; age and judge; sex and judge; age and sex and judge; and judges.

Forty-four categories of the Preschool Behavior Profile of Social Interaction comprise the independent variables. The analysis of variance structure for each category of the social behavior is presented in Table 2. The table is divided into four blocks according to sources of variation. The last term
Table 2. Analysis of variance structure for each category of the Preschool Behavior Profile of Social Interaction

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<tr>
<th>Source of variation</th>
<th>Degrees of freedom</th>
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<tr>
<td>Sex (S)</td>
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</tr>
<tr>
<td>Age by Sex (error a) (AS)</td>
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</tr>
<tr>
<td>Partner's Sex (P)</td>
<td>1</td>
</tr>
<tr>
<td>Age by Partner's Sex (AP)</td>
<td>11</td>
</tr>
<tr>
<td>Sex by Partner's Sex (SP)</td>
<td>1</td>
</tr>
<tr>
<td>Age by Sex by Partner's Sex (error b) (ASP)</td>
<td>11</td>
</tr>
<tr>
<td>Judge (J)</td>
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</tr>
<tr>
<td>Age by Judge (AJ)</td>
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<tr>
<td>Sex by Judge (SJ)</td>
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<tr>
<td>Age by Sex by Judge (error c) (ASJ)</td>
<td>11</td>
</tr>
<tr>
<td>Partner's Sex by Judge (PJ)</td>
<td>1</td>
</tr>
<tr>
<td>Age by Partner's Sex by Judge (APJ)</td>
<td>11</td>
</tr>
<tr>
<td>Sex by Partner's Sex by Judge (SPJ)</td>
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</tr>
<tr>
<td>Age by Sex by Partner's Sex by Judge (error d) (ASPJ)</td>
<td>11</td>
</tr>
</tbody>
</table>
in each block serves as an error term for the entries in that block. Each F-ratio is calculated by using the error term in each block as the denominator for the other entries in that particular block. The error term of the next block is used to test the significance of the preceding error term with the exception of age-by-sex interaction, which has no appropriate error term for this analysis structure. Thus, the F-ratios derived from the comparisons are not interpretable since it would be incorrect to assume that there is no child-child interaction within groups.

Age Effect

Chronological age appears to have an effect on social behavior of subjects in the judged behavior on the Preschool Behavior Profile of Social Interaction. However, no specific age-related trends can be identified for these data. In general, the amount of observed behavior fluctuates with age with a few partially identifiable age-related trends for some of the 12 groups. Of the 44 behavioral categories on the behavior profile, seven categories relate significantly with age.

For Category 7 (Social, friendly, gregarious) (df 11/11, F = 3.35, p < .05) the largest mean scores obtained for age groups are: $\bar{x}_5 = 6.63$, $\bar{x}_6 = 5.13$, $\bar{x}_1 = 3.88$, and $\bar{x}_1 = 3.75$ whereas the smallest mean scores obtained are: $\bar{x}_2 = -3.88$, $\bar{x}_3 = -1.50$, and $\bar{x}_8 = -.13$. Thus, the youngest and one of the oldest groups display almost equal amounts of friendliness
while the two middle age groups reach the highest amount of social and friendly behavior. The largest mean score increase ($\overline{x} = 3.88$ to 6.63) is evident for Groups 2 through 5, indicating that friendliness increases with age for children 42 to 50 months of age. Thus, the interactions between Category 7 and age of groups are ambiguous. The only other significant interaction for this category is that of age-by-sex-by-judge (df 11/11, $F = 4.59$, $p < .01$). Inspection of the means reveals that judges did not judge the behavior consistently for the various age groups providing further evidence of ambiguous relationships for this category, e.g., Figure 3 (Appendix H).

Similar results are obtained for Category 10 (Happy, playful, laughing, delighted, joking, smiling, humorous) (df 11/11, $F = 7.97$, $p < .01$). The largest mean scores for this category are found for Groups 6, 5, 1, and 12 ($\overline{x}_6 = 7.00$, $\overline{x}_5 = 5.88$, and $\overline{x}_{12} = 5.00$). Similar amounts of happy and playful behavior are displayed by the youngest group, and the oldest group while the two middle age groups receive the largest mean scores. The only age trend related behavior for this category is evident for Groups 2, 3, 4, 5, and 6 (children 42-50 months of age). The mean scores increase with age from $\overline{x} = -3.5$ to 7.00 for these five age groups. Age-by-sex-by-judge interaction also is significant for this category (df 11/11, $F = 3.47$, $p < .05$). Inspection of means reveals the inconsistency of the judges in scoring the social behavior. Therefore, the strength of the relationship for the category
involving behavior such as happy or playful is lessened. Interactions relative to sex of partner for this category will be discussed later under Partner's Sex Effects.

In general, for Categories 7 (Friendliness) and 10 (Playfulness) there are age-related trends for Groups 2, 3, 4, and 5. Friendliness and playfulness tend to increase with age for these four groups but interpretation fails to be supported by the results from the remaining age groups.

Category 19 (Inactive, passive, nonparticipating, withdrawn) also shows significant interaction for age (df 11/11, F = 4.79, p < .01). Closer inspection of the means (Table 3) reveals that the largest differences are between the two youngest groups (x̄₁ = -5.38, x̄₂ = .25) and between two of the older groups (x̄₇ = -6.88, x̄₈ = .25).

Age-by-partner's sex interaction (df 11/11, F = 3.58, p < .05) shows that for Groups 1, 2, 7 and 8 inactive and passive behavior (Category 19) are almost the same for same-sex and opposite-sex pairs. The largest mean differences between same-sex and opposite-sex pairs for inactive behavior are evident for Groups 5 and 9, indicating that opposite-sex pairs were judged to be more passive than same-sex pairs for these two groups. The reverse is true for Group 10. Since no other significant interactions for this category are found it can be concluded that although there are differences between and within some groups relative to the amount of inactive behavior displayed no age-related trends nor partner's sex-related
Table 3. Mean scores for the behavioral categories significantly related to age

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<tbody>
<tr>
<td>7. Social, friendly, gregarious</td>
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<td>3.75</td>
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<td>-1.50</td>
<td>.25</td>
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<td>10. Happy, playful, laughing, delighted, joking, smiling, humorous</td>
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<td></td>
<td>5.88</td>
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<td>2.75</td>
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<td>19. Inactive, passive, non-participating, withdrawn</td>
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<td>-5.38</td>
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<td>32. Running, chasing</td>
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<td>3.38</td>
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<td>-6.88</td>
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<td>33. Anxious, apprehensive</td>
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<td>35. Active, excited, vigorous</td>
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<td>36. Hiding, nonappearing, lost</td>
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<td></td>
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<td>-0.80</td>
<td>-4.00</td>
<td>-5.88</td>
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*F_{11,111} = 2.82, p < .05

**F_{11,11} = 4.46, p < .01
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<th>Groups</th>
<th>5</th>
<th>6</th>
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<td>5.13</td>
<td>0.50</td>
<td>-0.13</td>
<td>1.38</td>
<td>1.38</td>
<td>3.88</td>
<td>1.63</td>
<td>3.35*</td>
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</tr>
<tr>
<td>6.13</td>
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<td>-0.75</td>
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<td>3.75</td>
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<td>7.97**</td>
<td></td>
</tr>
<tr>
<td>-3.50</td>
<td>-2.13</td>
<td>-6.88</td>
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<td>-5.38</td>
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<tr>
<td>-8.00</td>
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<td>-7.25</td>
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<td>-8.00</td>
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<td>5.20**</td>
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<tr>
<td>-5.13</td>
<td>-6.50</td>
<td>-5.38</td>
<td>-1.75</td>
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<td>-4.13</td>
<td>-5.38</td>
<td>-5.13</td>
<td>7.28**</td>
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<tr>
<td>-2.50</td>
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<td>-5.75</td>
<td>-0.88</td>
<td>1.25</td>
<td>-2.63</td>
<td>-2.63</td>
<td>4.65**</td>
<td></td>
</tr>
<tr>
<td>-7.63</td>
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<td>-8.00</td>
<td>-8.00</td>
<td>-7.25</td>
<td>-7.25</td>
<td>-7.25</td>
<td>-8.00</td>
<td>3.61*</td>
<td></td>
</tr>
</tbody>
</table>
trends can be identified.

Category 32 (Running, chasing) also is significant for age effect (df 11/11, F = 5.20, p < .01). The largest amount of running and chasing behavior is evident for Groups 1 and 3 ($\bar{x}_1 = 3.38$, $\bar{x}_3 = -2.88$). For the remaining groups this behavior either decreased with age or remained the same ($\bar{x} = -6.88$ to -8.00). There was a significant age-by-judge interaction for this category (df 11/11, F = 3.44, p < .05). An inspection of the means reveals that the judges differed in judging the amount of running behavior for Groups 1 and 3. Apparently one judge attributed more running behavior to these two groups than did the other judge. Age-by-sex-by-judge interaction (df 11/11, F = 12.61, p < .01) further lessens the significance of the interaction between age and Category 32. Thus, even though age appears to have a significant relationship for this category, results are ambiguous and difficult to interpret.

Category 35 (Active, excited, vigorous) (df 11/11, F = 4.65, p < .01) shows results somewhat similar to Category 32 (Running, chasing). Groups 1, 3, and 10 ($\bar{x}_1 = 5.38$, $\bar{x}_3 = 1.13$, and $\bar{x}_{10} = 1.25$) display more active and excited behavior than other age groups. The significant age-by-judge interactions (df 11/11, F = 3.68, p < .05) reveal judge disagreement similar to Category 32. Further evidence of judge's inconsistency for this category is presented through age-by-sex-by-judge interaction (df 11/11, F = 3.70, p < .05).
In general, judges agree that Groups 1 and 3 display more running (Category 32) and more active behavior (Category 35) than other age groups. The judges disagree only in how much behavior is present. Thus, results for running and active behavior are significant for age effect but are weakened by significant age-by-sex-by-judge interactions and appear to be ambiguous. The significant partner's sex interaction for Category 35 is discussed with other partner's sex effects for the behavioral categories.

Anxious and apprehensive behavior (Category 33) (df 11/11, $F = 7.28$, $p < .01$) increases with age for children 42-52 months of age (Groups 2, 3, 4, 5, 6). The means for other age groups reveal fluctuating behavior patterns and do not appear to provide any interpretable age trends. Judge differences relative to the amount of anxious behavior scored (df 11/11, $F = 7.21$, $p < .05$) exist in relation to age.

Category 36 (Hiding, nonappearing, lost) also shows significant relationships (df 11/11, $F = 3.61$, $p < .05$) with age. The greatest amount of hiding behavior is displayed by the youngest group (Group 1, $\bar{x} = 4.00$). All other groups display a fluctuating pattern with means ranging from $x = -4.00$ to $-8.00$. A large $F$-ratio for age-by-sex-by-judge interaction (df 11/11, $F = 32.38$, $p < .01$) and a significant partner's-sex-by-judge interaction (df 11/11, $F = 7.06$, $p < .05$) lessens the already weak relationship with age for this category. These interactions indicate that judges judged the hiding behavior
differently (mostly for the same-sex pairs). The largest disagreement among the judges occurred for age groups 4, 9, and 12.

The unique composition of the 12 groups accounts for the significant variations but does not allow for identification of age-related trends in the judged behavior on the Preschool Behavior Profile of Social Interaction. Additional information on the main effects of age can be seen in Table 3.

None of the remaining 37 categories on the behavior profile shows significant main effects for age. A significant relationship for seven of the 44 behavioral categories is outside the range of chance (two categories at .05 significance level) but these findings are not considered strong enough to reject the null hypothesis stating that social interaction within pairs of children is not a function of age.

The seven significant categories seem to indicate that age does play a role in social interaction but the relationship with age is sporadic or inconsistent. This evidence is not strong enough to indicate that the judges' responses to the children's behavior is dependent on age. Thus, the null hypothesis fails to be rejected.

Sex Differences

Sex of subjects does not seem to effect the overall social interacting behavior of children as observed by the judges' responses to the categories of the Preschool Behavior Profile.
Analyses of variance for the categories yields two categories with significant results for the main effect of sex and sex-by-age interaction. The categories are: 25 (Showing off, big-shotish) and 29 (Pulling and shoving). The respective F values are: df 1/11, F = 5.36, p < .05; df 1/11, F = 8.12, p < .05. Since the likelihood of two significant categories occurring in a total of 44 is within the range of chance, the null hypothesis that social interaction within pairs of children is not a function of sex, fails to be rejected. Apparently, boys and girls do not differ in their judged behavior on the 44 categories.

The F ratios derived from comparisons of the sex-by-age (nominator) interactions with sex-by-age-by-partner's sex (denominator) are not interpretable since sex-by-age relates to interaction between groups and sex-by-age-by-partner's sex represents interactions within groups. For these data it would be incorrect, therefore, to assume that no child-child interaction within groups exists. Thus, the null hypothesis that there is no interaction between the independent variables of age and sex of the child fails to be rejected. Sex-by-age-by-partner's sex interactions did not show any significant F value.
Partner's Sex Effects

Inspection of Table 4 reveals that 19 categories show significant relationships where interactions with the same-sex or opposite-sex partner are concerned. Eight of these relationships are beyond the .05 significance level and 11 categories exceed the .01 significance level.

The same-sex pairs had a lower mean score ($\bar{x} = -3.17$) for Category 5 (Leads, directed, leading) as compared to the mean score ($\bar{x} = -1.85$) for the opposite-sex pairs (df 11/11, $F = 9.13, p < .05$) indicating that children display more leading behavior when they are paired with opposite-sex partners. However, the significant age-by-sex-by-judge interactions (df 11/11, $F = 7.13, p < .01$) and sex-by-partner's sex-by-judge interactions (df 1/11, $F = 5.20, p < .05$) weaken this relationship. Inspection of means for these interactions indicate that Judge 2 consistently judged the leading behavior higher than Judge 1 for the 12 age groups. Also, Judge 2 seemed to see more leading behavior displayed by opposite-sex pairs than did Judge 1. Contrary to this, the same-sex pairs were scored higher ($\bar{x} = 5.69$) on Category 9 (Giggly, silly) than opposite-sex pairs ($\bar{x} = -7.44$, df 1/11, $F = 93.04, p < .01$). Category 9 provides evidence that children giggle more when interacting with the same-sex partners. More detailed explanation for this finding is found in a significant sex-by-partner's sex interaction. This finding is analyzed with other sex-by-
Table 4. Mean scores for the Preschool Behavior Profile of Social Interaction categories significantly related to partner's sex

<table>
<thead>
<tr>
<th>Category description, df 1, 11</th>
<th>Mean scores</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Same sex</td>
<td>Opposite sex</td>
<td>F values</td>
<td></td>
</tr>
<tr>
<td>5. Leads, directed, leading</td>
<td>-3.17</td>
<td>-1.85</td>
<td>9.13*</td>
<td></td>
</tr>
<tr>
<td>9. Giggly, silly</td>
<td>-5.69</td>
<td>-7.44</td>
<td>93.04**</td>
<td></td>
</tr>
<tr>
<td>10. Happy, playful, laughing</td>
<td>4.13</td>
<td>2.15</td>
<td>18.36**</td>
<td></td>
</tr>
<tr>
<td>delighted, joking, smiling, humorous</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Attention-seeking, teasing, coquettish</td>
<td>-3.50</td>
<td>-4.63</td>
<td>15.11**</td>
<td></td>
</tr>
<tr>
<td>12. Independent, individualistic,</td>
<td>5.42</td>
<td>1.17</td>
<td>29.67**</td>
<td></td>
</tr>
<tr>
<td>self-directed, initiative, self-centered,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>assertive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Sharing, cooperative</td>
<td>-0.10</td>
<td>1.17</td>
<td>8.91*</td>
<td></td>
</tr>
<tr>
<td>18. Assisting, helpful, helping</td>
<td>-2.96</td>
<td>-1.19</td>
<td>11.93**</td>
<td></td>
</tr>
<tr>
<td>20. Gestural, demonstrating, pointing</td>
<td>-1.83</td>
<td>0.42</td>
<td>4.90*</td>
<td></td>
</tr>
<tr>
<td>23. Dominating, directive, bossy, demanding,</td>
<td>-3.04</td>
<td>-3.94</td>
<td>9.49*</td>
<td></td>
</tr>
<tr>
<td>controls, ordering, dictatorial</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

*F_{1,11} = 4.84, p < .05

**F_{1,11} = 9.65, p < .01
<table>
<thead>
<tr>
<th>Category description, df 1, 11</th>
<th>Mean scores</th>
<th>( F ) values</th>
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</thead>
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<tr>
<td></td>
<td>Same sex</td>
<td>Opposite sex</td>
</tr>
<tr>
<td>24. Uncooperative, taking hoggish, unsharing, possessive, grabby, greedy</td>
<td>-3.98</td>
<td>-5.85</td>
</tr>
<tr>
<td>27. Nongoal-oriented, undirected play, unconstructive play</td>
<td>-4.63</td>
<td>-3.00</td>
</tr>
<tr>
<td>29. Pulling, shoving</td>
<td>-6.13</td>
<td>-7.27</td>
</tr>
<tr>
<td>31. Suggesting, gives information</td>
<td>-0.83</td>
<td>0.92</td>
</tr>
<tr>
<td>34. Dependent</td>
<td>-2.83</td>
<td>-1.29</td>
</tr>
<tr>
<td>35. Active, excited, vigorous</td>
<td>-2.71</td>
<td>0.83</td>
</tr>
<tr>
<td>37. Interested, seeks information, asking, inquisitive, curious</td>
<td>-0.67</td>
<td>1.40</td>
</tr>
<tr>
<td>38. Follows, following</td>
<td>0.13</td>
<td>2.42</td>
</tr>
<tr>
<td>41. Verbally, interacting, talking together, conversing</td>
<td>4.31</td>
<td>2.73</td>
</tr>
<tr>
<td>42. Unfriendly, intolerant</td>
<td>-4.58</td>
<td>-5.50</td>
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partner's sex interaction. Category 10 (Happy, playful, laughing, delighted, joking, smiling, humorous) supports the significant interaction found for Category 9 since the same-sex pairs score higher (mean score = 4.13) than opposite-sex pairs (mean score 2.15; df 1/11, F = 18.36, p < .01) on happy and playful behavior.

Attention-seeking, teasing, coquettish (Category 11) also follow the trend found for Categories 9 and 10. The same-sex pairs show significantly more attention seeking and coquettish behavior (df 1/11, F = 15.11, p < .01) than opposite-sex pairs. There also is a significant age-by-sex-by-judge interaction for the attention-seeking behavior (df 11/11, F = 4.85, p < .01). Inspection of means reveals judges' disagreements on the behavior displayed by the different age groups. Category 17 (Sharing, cooperative) (df 1/11, F = 8.91, p < .05) shows that opposite-sex pairs are more sharing and cooperative than same-sex pairs. The importance of this result is weakened by a significant sex-by-partner's sex interaction (df 1/11, F = 12.76, p < .01) and also by partner's sex-by-judge interaction (df 1/11, F = 5.97, p < .05). Assisting and helping behavior (Category 18) is also significantly more evident when children are paired with opposite-sex partners (df 1/11, F = 11.93, p < .01). Thus, there is more teasing, joking, and giggling when children play with same-sex partners but more leading, cooperation and helping when they play with opposite-sex partners.
There are more gestural, demonstrating and pointing behavior (Category 20, df 1/11, F = 4.90, p < .05) and also more dominating behavior (Category 23 - Dominating, directive, bossy, demanding, controls, ordering, dictatorial) when children interact with opposite-sex partners than when the partner is of the same-sex (df 1/11, F = 9.49, p < .05). Significant results for Category 12 (Independent, individualistic, self-directed, initiative, self-centered, assertive) support the above findings (df 1/11, F = 29.67, p < .01). Children are rated significantly more independent when interacting with the same-sex partner than when interacting with a partner of the opposite sex. There also is a significant age-by-judge interaction for this category (df 11/11, F = 3.08, p < .05). Inspection of the means reveals that Judge 2 had the tendency to rate boys higher on independent behavior than did Judge 1. Significant differences in judge ratings weakens the interpretation of independent behavior in pairs of children for this study. However, the trend seems to be that there is more demonstrating and dominating behavior when children are interacting with an opposite-sex partner but more independent behavior when the partner is of the same sex.

A statistically significant difference (df 1/11, F = 17.76, p < .01) for same-sex and opposite-sex pair interactions is found for Category 24 (Uncooperative, taking, hoggish, un-sharing, possessive, grabby, greedy). The same-sex pairs display more of the uncooperative behavior ($\bar{x} = -3.98$) than
opposite-sex pairs ($\bar{x} = -5.85$). For Category 27 (Nongoal-oriented, undirected play, unconstructive play) the opposite-sex pairs show less goal-oriented behavior than same-sex pairs (df 1/11, $F = 13.23$, $p < .01$). There also are significant judge differences (df 1/11, $F = 11.52$, $p < .01$) and judge-by-age interactions (df 11/11, $F = 5.84$, $p < .01$). Inspection of means reveals that Judge 1 scored three age groups higher on nongoal-oriented behavior than did Judge 2. These differences and interactions weaken the significance for this category. Same-sex pairs display significantly more pulling and shoving behavior (Category 29, df 1/11, $F = 5.97$, $p < .05$) than opposite-sex pairs.

More information and suggestions are exchanged by opposite-sex pairs than by same-sex pairs (Category 31 - Suggesting, gives information; df 1/11, $F = 16.05$, $p < .01$). Category 34 (Dependent) produces significant differences indicating that more dependent behavior is displayed by opposite-sex pairs than by same-sex pairs (df 1/11, $F = 14.44$, $p < .01$). Significant judge interaction for this category, however, minimizes the relationship. More active and vigorous behavior is displayed by opposite-sex pairs as shown in Category 35 (Active, excited, vigorous) (df 1/11, $F = 13.23$, $p < .01$) than by same-sex pairs. Category 37 (Interested, seeks information, asking, inquisitive, curious) indicates significant relationships (df 1/11, $F = 8.68$, $p < .05$) with more interested and curious behavior being attributed to opposite-sex pairs than same-sex pairs.
Opposite-sex pairs also display more following behavior (Category 38 - Follows, following) than same-sex pairs (df 1/11, F = 9.58, p < .05).

A weak support is evident for more verbal interaction for the same-sex pairs than opposite-sex pairs for Category 41 (Verbally interacting, talking together, conversing) (df 1/11, F = 6.18, p < .05). Category 42 (Unfriendly, intolerant) shows significant relationship (df 1/11, F = 10.50, p < .01) indicating that the same-sex pairs are less friendly and less tolerant than opposite-sex pairs. This result is weakened by a significant age-by-sex-by-judge interaction (df 11/11, F = 3.69, p < .05).

The remaining 25 categories on the Preschool Behavior Profile of Social Interaction did not show significant interactions for same-sex and opposite-sex pairs. In summary, the data relative to partner's sex effects produced significant relationships for 19 categories allowing the rejection of the null hypothesis stating that social interaction within pairs of children is not a function of partner's sex.

In general, opposite-sex pairs appear to display more leading, dominating, and demonstrating behavior, as well as more assisting, sharing, and following behavior than same-sex pairs. Contrary to the opposite-sex pairs the same-sex pairs are more giggly, happy, and attention seeking as well as grabby, unfriendly, unconstructive, and pulling and shoving.
Of the 44 categories on the behavior profile only Category 19 (Inactive, passive, nonparticipating, withdrawn) shows a significant relationship where age-by-partner's sex is concerned (df 11/11, F = 3.58, p < .05). This finding is not outside the range of chance and, therefore, is not considered for interpretation.

Sex-by-partner's sex yields some significant results (Table 5). Category 3 (Quiet) indicates that boys as well as girls are quieter when interacting with boys. In other words, boys display more quiet behavior when interacting with boys and girls also display more quiet behavior when interacting with boys than when either sex interacts with girls (df 1/11, F = 8.44, p < .05). This tenuous finding is further weakened by a significant age-by-sex-by-judge interaction (df 11/11, F = 6.07, p < .01) revealing that judges disagreed in the judged amount of quiet behavior for the various age groups. Contrary to this, boys are more giggly with boys and girls are more giggly with girls (Category 9 - Giggly, silly) (df 1/11, F = 19.44, p < .01). Closer inspection of the means reveals that the difference between the means for partner's sex are less for boys than for girls (boys $\bar{x} = -6.29, -7.25$; girls $\bar{x} = -5.08, -7.63$). Girl-girl pairs giggled more than boy-boy pairs. Category 16 (Patient, tolerant) indicates that boys and girls show almost the same amount of tolerance when
<table>
<thead>
<tr>
<th>Category description</th>
<th>df</th>
<th>Boys</th>
<th>Girls</th>
<th>Girls</th>
<th>Boys</th>
<th>F value</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Quiet</td>
<td>1/11</td>
<td>-1.71</td>
<td>-2.46</td>
<td>-1.67</td>
<td>-0.83</td>
<td>8.44*</td>
</tr>
<tr>
<td>9. Giggly, silly</td>
<td>1/11</td>
<td>-6.29</td>
<td>-7.25</td>
<td>-5.08</td>
<td>-7.63</td>
<td>19.44**</td>
</tr>
<tr>
<td>16. Patient, tolerant</td>
<td>1/11</td>
<td>4.08</td>
<td>3.67</td>
<td>2.88</td>
<td>3.58</td>
<td>5.84*</td>
</tr>
<tr>
<td>17. Sharing, cooperative</td>
<td>1/11</td>
<td>0.58</td>
<td>0.33</td>
<td>-0.79</td>
<td>2.00</td>
<td>12.76**</td>
</tr>
<tr>
<td>22. Interacting, exchanging, giving, guiding each other</td>
<td>1/11</td>
<td>1.50</td>
<td>0.42</td>
<td>-1.00</td>
<td>2.25</td>
<td>11.94**</td>
</tr>
<tr>
<td>29. Pulling, shoving</td>
<td>1/11</td>
<td>-7.88</td>
<td>-7.75</td>
<td>-4.38</td>
<td>-6.79</td>
<td>7.34*</td>
</tr>
</tbody>
</table>

* $F_{1,11} = 4.84$, $p < .05$
** $F_{1,11} = 9.65$, $p < .01$
interacting with boys (df 1/11, F = 5.84, p < .05). This is a weak support for Category 17 (Sharing, cooperative). For Category 17 (df 1/11, F = 12.76, p < .01), although boys share more with boys, the mean difference is small. Girls share significantly more with the opposite-sex partner than with the same-sex partner. There is also a significant partner's sex-by-judge interaction for sharing (df 1/11, F = 5.97, p < .05). Thus, even though boys and girls appear to be more patient and sharing with boys the results pertaining to Categories 16 and 17 are not clear.

Interacting and exchanging (Category 22) (df 1/11, F = 11.94, p < .01) behavior follows the same pattern as Categories 16 and 17. Boys interact more with boys than with girls. Girls also interact more with boys than with girls. However, the difference between girl-girl interactions and girl-boy interactions is much greater than for boy-boy interactions and boy-girl interactions (Table 5). Thus, it seems to matter less for boys whether the partner is a boy or a girl. For girls, however, the amount of interaction and exchange increases considerably when the partner is of the opposite sex. Sex-by-judge interaction is significant for this category (df 11/11, F = 3.30, p < .05). This interaction adds ambiguity to the results for Category 22 and no consistent judge disagreement pattern can be identified.

Category 29 (Pulling, shoving) (df 1/11, F = 7.34, p < .05) exhibits a somewhat different trend. Boys seem to do more
pulling and shoving when paired with girls than when paired with boys. However, the difference is small. Girls also exhibit more pulling and shoving behavior when paired with girls ($\bar{x} = -4.38$) than when paired with boys ($\bar{x} = -6.79$).

Taken as a whole, girls exhibit more pronounced behaviors than boys. Girls appear to be more quiet, to share more, to be more tolerant, and to exchange more information when paired with boys as opposed to when paired with girls. There are two exceptions: girls definitely giggle and do more pulling and shoving when paired with girls than when paired with boys. Boys seem to show less pronounced differences in behavior regardless of the partner's sex.

These findings allow the rejection of the null hypothesis stating that there is no interaction between independent variables (sex of the child and sex of the partner) and the dependent variable of social interaction. Table 5 provides a clearer picture of these interactions.

Judge Effect

In general, judges were consistent in terms of judging the 44 behavioral categories. Where judge differences or interaction of judges with other factors might have had an effect on other significant findings, these differences were reported at the same time.

Three categories (27, 33, 34) show significant judge differences. The significance of these categories is inter-
interpreted with discussion of main effects.

The analysis of five categories (27, 17, 32, 35, 36) results in significant interactions with judges, indicating reliable disagreement between judges. Certain categories (1, 8, 15, 30, 40, 43, 44) produce judge interactions where there are no main effects, indicating that judges are using the behavior profile differently. None of these interactions interfere with the interpretation of the substantial main effects.

Summary of Results

The results of the present investigation indicate that social responses of children as observed by the Preschool Behavior Profile of Social Interaction are somewhat ambiguous. Evidence for behavioral discrimination in relation to partner's sex is strong. Chronological age seems to have effect on social interaction of the subjects but with no identifiable age trend for the age groups (41 months to 61 months of age) under investigation. Behavioral discrimination in relation to age and age-by-sex of the partner is very meager. The overall findings can be summarized as follows:

1. The evidence against the null hypothesis that social interaction of children is a function of age is weak and difficult to interpret due to the unique composition of the various groups.
2. Sex of subjects does not seem to affect overall social behavior as observed by judge response to the categories.

3. The evidence against the null hypothesis that social interaction of children is a function of sex of the partner is strong and suggests distinguishable patterns of behavior for children interacting with the same-sex versus opposite-sex partner.

4. Sex-by-partner's sex interaction results in statistically significant interaction; is interpretable; and does indicate that in general girls display more pronounced behaviors than boys as observed by the judges' responses to the behavior profile.

These results allow the rejection of the hypothesis stating that social interaction within pairs of children is not a function of partner's sex and partial rejection of the hypothesis stating that there is no interaction between independent variables, sex of the child, and sex of the partner and the dependent variables of social interaction.
DISCUSSION

Age Effects

The evidence against the null hypothesis that social interaction is not a function of age was sporadic, difficult to interpret and contained no specific identifiable age trends. The effect of age on performance fluctuated among the various age groups. This fact is well supported by previous research (Kohn, 1966; Charlesworth & Hartup, 1967; Hartup, Glazer, & Charlesworth, 1967; Moore, 1967; Kogan & Wimberger, 1969; Hasket, 1971). In general, the cited research studies report that performance of an individual is to some extent determined not only by his unique make-up but also by his partner and by the situational factors. The present study, at least in part, yields similar results.

Categories 7 (Social, friendly, gregarious) and 10 (Happy, playful, laughing, delighted, joking, smiling, humorous) were significant for age effect. The other categories on the behavior profile showing a significant age effect were: 19 (Inactive, passive, nonparticipating, withdrawn), 33 (Anxious, apprehensive), and 36 (Hiding, nonappearing, lost). Categories 7 and 10 appear to be in opposition to the Categories 19, 33, and 36 in their behavioral characteristics. Even though no age trend was evident data indicated that children who displayed the most friendliness and humor (groups 5 and 6) were not the same children who displayed the most anxiety and with-
drawal (groups 2 and 8). These results are not surprising and are in agreement with previous studies on friendliness, sociability, and other correlates of peer acceptance in the preschool years.

Trends similar to those found in the present investigation have been observed by Charlesworth and Hartup, 1967; Hartup, Glazer, and Charlesworth, 1967; Moore, 1967; Olpin and Kogan, 1969. Children whose behavior is socially desirable usually receive pleasant treatment from their group members. Inactive, anxious, apprehensive or otherwise socially unpleasant behavior produces similar, reciprocal treatment from the groups. Friendly approach and associative play were significantly correlated with popularity in a study conducted by McCandless and Marshall (1957a). The friendly and happy child was less likely to be engaged in withdrawal or passive behavior.

In general, studies of preschool children indicate that social interaction and participation is correlated with chronological age (Parten, 1932; Hattwick & Sanders, 1938; Martin, 1964). However, Kohn (1966) and Charlesworth and Hartup (1967) in studying social interaction and generalized positive reinforcement found that even if such behaviors are age related reciprocity appears to characterize the young child's interactions with his peers.

Somewhat contradictory results on social interaction, peer influence, and age were reported by Leuba (1933) and Horowitz (1962). In essence, the results of Leuba's investi-
gation indicated that 5-year-old children did better on task performance when another child was present. Opposing these results are those presented by Horowitz (1962) who showed that 3-year-old children were more persistent in a lever-pulling task when a friend was present but 4- and 5-year-old children demonstrated no reliable performance differences associated with incentive conditions.

These studies convincingly demonstrate that peers have extremely complex effects on children's behavior and that age trends cannot always be easily identified.

Categories 34 (Running, chasing) and 35 (Active, excited, vigorous) also reach a significant level with age. This behavior was displayed mostly by the younger group (41 months of age). Little running and excited behavior was evident for the other 11 age groups, with no accompanying age-related trend. Studies by Parten (1932) and Smart and Smart (1972) offer evidence that young children tend to be more active and are less peer oriented.

The data showing relatively little running and chasing behavior among the older children also receive support from studies on situational factors. Children usually observe and follow clues from the environment as evidenced by the results of modeling and reinforcement studies (Nelson, Gelfand, & Hartmann, 1969; Hicks, 1965; Hartup & Coates, 1967). Hartup (1970) stated that the immediate situation influences children's behavior in a group. Paigin's (1958) study on Israeli
nurseries also indicated that somewhat more passive behavior is evident in a structured situation than in a less organized nursery. Todd and Nakamura (1970) conclude their investigation of social and nonsocial reinforcement with first-grade children stating that the context of the situation and order of events determine children's performance in a given situation. For the present study there was no equipment which would initiate any active physical movement, such as running or other vigorous behavior. Thus, the situation, and the unique make-up of the children in a group may have determined the behavior of the children. Also, the age range under investigation was limited to a 2-year span of time during the preschool years. In many studies this age group is broadly defined as nursery school children without any further attempt to differentiate the subjects according to chronological age. Age-by-partner's sex was significant only for one category and did not add information for any apparent age trends. The age-by-sex-by-judge interactions offer evidence that significant variations with age are due to the particular judges used in this study rather than age per se. Sex Differences Sex of the subject was significant for only two categories: 25 (showing-off, big-shotish) and 29 (pulling and shoving). These findings were considered uninterpretable since significance for two out of 44 categories is well within the
range of choice. Failure to identify sex differentiation was somewhat unexpected since most research attributes different sex-typed behavior for boys and girls at a very early age (Mischel, 1966; Hartup, 1970; Levitin & Chananie, 1972).

However, studies dealing specifically with same-sex and opposite-sex pair interactions have comparable results to report. Staub (1971) in a study of 75 kindergarten children found sex differences for the experimental (stress producing) groups but not for the control groups. Haskett (1971) did not find any sex differences among first-grade children. His study entailed modification of peer preferences in same-sex and opposite-sex pairs.

Similarly, McCandless and Marshall (1957b) did not find sex differences in preschool children's social interaction with peers as judged by peer interaction score for single and combined categories of observed interaction.

Bronfenbrenner (1970) postulates that differential treatment of the sexes in order to prepare boys and girls for specific sex-role behavior is pronounced at the lower socio-economic levels and decreases in emphasis as the socio-economic scale increases. He sees the parental treatment of the two sexes converging in the middle-class families. The children in the current study were from middle-class families and it is possible that changing child rearing practices are reflected in the results.
The greatest number of significant and the most readily interpretable differences were found between children interacting with either the same-sex or opposite-sex partner. Of the 19 categories significantly related to sex of partner 11 were significant at .01 level or beyond. With some exceptions (Brown, 1957; McCandless, 1967), most research on sex differences indicate that children prefer same-sex playmates at an early age (Koch, 1944; McCandless & Hoyt, 1961; Hartup, 1970; Mischel, 1966; Campbell, 1964). Because children choose to spend more time with children of the same sex, it seems logical that they have more experience in interacting and communicating with children of the same-sex. Therefore, more free and less inhibited behavior would be displayed by same-sex pairs than opposite-sex pairs.

The results of the present investigation seem to follow this pattern, at least partially. Same-sex pairs displayed more happy and playful behavior (Category 10), giggled (Category 9), and talked more (Category 41) as well as showed more attention seeking and teasing (Category 11). They also engaged in pulling and shoving (Category 29), were less friendly (Category 42), less cooperative (Category 24), and less goal-oriented (Category 27) than opposite-sex pairs. The fact that these categories are significant would seem to indicate that children placed in same-sex pairs are more likely to display
the extremes of both negative and positive interaction behavior. Thus, it may be that same-sex pairs are more free to act, regardless of the behavior, than opposite-sex pairs.

Leading (Category 5), following (Category 38), sharing (Category 17), assisting (Category 18), dominating (Category 23), and demonstrating (Category 20) were observed significantly more for opposite-sex pairs than for same-sex pairs. Curiosity (37), exchange of information (31), and depending (34), also were displayed significantly more by opposite-sex pairs than by same-sex pairs. Closer examination of the categories suggests that these categories describe behavior which implies initiative by one member of the pair and response or following by the other member. It, therefore, appears that children were more cognizant of the behavior of the partner if he was of the opposite sex and they also were more willing to participate and pay attention to what the partner was doing.

Research on peer performance, in general, almost consistently reports that young children prefer same-sex peers as playmates. However, explanations for these results have been rather inconsistent. Campbell (1939) attributed same-sex preference to different maturity rates of boys and girls. Koch (1944) from studying social distances, postulated that the female role has an inferiority attribute which influences the choices of playmates of both sexes. Findings of later studies (Charlesworth & Hartup, 1967; Moore & Updegraff, 1964) reinforce the position that young children have a tendency to
choose the same-sex partners. Most studies on peer inter-
actions are correlational studies making the causal variables
difficult to identify (Hartup, 1970).

The only study found in the literature providing partial
explanation for more interaction of opposite-sex than same-sex
pairs was conducted by Haskett (1971) with first-grade chil-
dren. The children were matched in pairs in such a way that
neither was extremely liked or disliked by the other; thus
allowing for maximum potential change in peer preference and
interaction. The posttreatment test revealed that cooperative
interaction increased for opposite-sex pairs but did not change
for same-sex pairs. Haskett postulates that in a one-to-one
relationship, children learn about each other if the encounter
is new. He further suggests that girls probably found boys
not as aggressive as they usually are in a normal school set-
ting. Both conditions allow for more interaction and better
communication for both children in a pair.

Crase's (1972) results partially support the present in-
vestigation, namely, that within each sex there was a trend
for more interaction by both sexes with the member of the
opposite sex. Her results, however, are confined to one
specific variable (sharing) and to older age groups and,
therefore, difficult to apply to general interaction patterns
of the preschool child.

Stockdale's (1972) research also is partially applicable.
Her results indicate that boys and girls were more assertive
when paired with an opposite-sex peer than when paired with the same-sex peer. However, her sample also consisted of elementary school age children and assertiveness was only one of the various behavioral acts under investigation.

Significant sex-by-partner's sex interaction in the current investigation provides further information for this phenomenon. In general, girls were more pronounced (expressive) in their behavior than boys. Girls did more talking, more giggling, more sharing and were more tolerant. These behaviors also were more observable when girls were interacting with boys than when they were interacting with girls. The two previously noted exceptions of behavior were giggling and pulling. These behaviors were scored higher for girl-girl pairs than for boy-boy pairs.

Crase (1972) found that girls 5 to 12 years of age shared more than boys of the same age. Aronfreed (1961) and Donald and Adelberg (1967) speculated that girls are more externally oriented and sensitive to norms whereas boys have more internal orientation. Staub (1971) reports a role-playing study of kindergarten children stating that after a stress situation, girls showed more helping and nurturant behavior while boys displayed more sharing. He hypothesizes that these findings might be related to early sex-role learning.

Thus, reports of past research are not clear regarding the influence of partner's sex in social interaction. It is possible that boys and girls perceived the controlled play
situation for the current investigation as unique or novel and, therefore, tried to be compliant with each other, resulting in more interaction. Similarly, it is possible that girls, in general, felt relaxed but felt more relaxed with girls and, therefore, giggled more and felt free to pull equipment away from each other. Because there are wide individual differences in the responses of boys and girls toward their partners of either sex, it might be speculated that different social learning experiences may account for these differences.

Implications of the Investigation

From the findings of this investigation, it can be concluded that behavioral differences do exist as a function of the sex of a subject and the sex of that subject's partner in a controlled interaction setting.

The fact that the largest significant differences in behavior were evident with partner's sex were of the greatest interest. The same-sex pairs were more happy, joking, teasing, and also displayed more physical interaction, such as grabbing, pulling and shoving. Interaction with opposite-sex pairs produced more cooperation, leading, following, suggestion, sharing, and dependent behavior.

Another interesting result was that, in general, girls were more expressive when interacting with boys than with girls but this difference was less pronounced when boys interacted either with boys or with girls.
There are many studies that deal with specific aspects of behavior, such as aggression, dependency, compliance, cooperation, and sharing. There are also many studies that are investigating play-mate preferences, usually determined by means of sociometric tests. Also, most observations of preschool children are conducted in natural play situations either by observing distances between children or by counting the number of contacts made. However, there are very few research studies that have investigated social interaction of preschool children encompassing an overall social behavior of same-sex and opposite-sex pairs in a standardized play situation.

The present study involved a standardized, life-like situation which was neither competitive nor stress producing. Generalizations that can be made from the current investigation are limited by a number of factors. The population from which the subjects were selected is from a middle class in a university community. Children were asked to interact in pairs. They participated willingly but this does not imply that they would have chosen either the activity or the partner. Therefore, the exhibited behavior, at least in part, is a function of the situation in which they were placed. Even though pairs of children were selected from a common laboratory after a nine-week period of exposure to group experiences it is possible that some children were better acquainted than others. Perhaps more controls could have been instituted by using a
sociometric technique to order children on peer preferences. Dependency ratings of children would provide another interesting dimension since the young child's social interactions are greatly determined by his ability to function independently.

The relative narrowness of the age range might have contributed to the problem of detecting age differences. Inclusion of two-year-old children might have provided more information on age trends of social interaction of preschool children. Increase of sample size also might have produced more significant results. It is also possible that a sample from a different population would add information on social interaction during the preschool years.

Of the 44 categories on the Preschool Behavior Profile of Social Interaction 19 categories showed considerable degree of significance; further research on these 19 behavior characteristics may be interesting and revealing work. Another exploratory dimension is grouping of the 44 categories with regard to common behaviors described. The resulting behavior clusters would produce more general information about social behavior displayed during the early years. Although the judges employed were sophisticated, professionally trained and did satisfactory work, the human element involved is not scientifically controllable, nor can it be duplicated.

Much of the literature in the area of social development is devoted to the results of the use of sociometric picture techniques, mother-child separation, child-adult dependency,
and actual physical distance measures between children in a natural play situation. Actual interaction studies with pairs of children in a controlled situation have been conducted primarily with older children and adults and there is a real need to study social behavior of pairs of children during the preschool years.

Implications for Further Research

In the current investigation, an attempt was made to study only nonverbal interaction between children. Much of the richness of the data was lost because other types of behaviors were not recorded. For future research of social interaction among children, physical proximity, contents of verbal exchange, and emotional tone of speech are other types of behavior that might be observed.

Even though the behavior profile used for this particular study proved to be satisfactory, other instruments which categorize children's interaction should be considered. Also the behavior profile was designed and used only for this study. A study repeating the use of the behavior profile might prove the effectiveness and the reliability of the categories.

For future research with pairs of children as a social unit, considerations might be given to other variables. Dependency, intelligence, body types, best-liked peers are variables that offer possibilities for ordering children to study social interaction processes. Even though the observation of pairs
of children offers an interesting combination for the study of interaction, triads of children might also be studied. Triads in relation to coalitions that form under various types of group settings have been extensively studied with adults and older children.

Social interaction studies will lead to further understanding of the social behavior and development of young children. The interaction between children of same-sex and opposite-sex pairs needs to be explored to provide better understanding of children in the area of interpersonal relationships.
The purpose of the current investigation was to study social interaction among peers in early childhood as a function of membership in same-sex and opposite-sex pairs. Of particular interest in the study was whether there were behavioral differences manifested in interaction with same-sex as compared to opposite-sex peers. Behavioral characteristics for the different age groups and developmental trends in social behavior also were of concern. Four specific null hypotheses were proposed:

1. Social interaction within pairs of children is not a function of age.
2. Social interaction within pairs of children is not a function of sex.
3. Social interaction within pairs of children is not a function of partner's sex.
4. There is no interaction between independent variables (age, sex of the partner, and sex of the child) and the dependent variables of social interaction.

To investigate behavior in an interaction setting a standardized play situation was designed in which interaction of pairs of children could be observed. Forty-eight children, 24 boys and 24 girls, were selected from the five Child Development Laboratories. The 12 age-level groups were composed of four
children (two boys, two girls) interacting in pairs. The age of the children did not exceed a six-month range within any one group, although the age range for the total sample was from three years, two months to five years, three months.

The setting for interaction involved a standardized arrangement of play materials. Each child participating in the standardized play setting interacted with two different peers from his age group. Each subject thus interacted once with the same-sex peer and once with the opposite-sex peer.

Data on the social behavior of children were recorded in a series of 2-minute motion picture episodes. A behavior profile consisting of adjectival descriptive phrases of the filmed behavior was developed. Two judges trained in the use of the behavior profile rated the film episodes for possible behavior differences between the children's performance in the standardized play situation. Both children of each pair were judged simultaneously and rated on the behavior profile. Each film episode was viewed twice.

The Preschool Behavior Profile of Social Interaction consisted of 44 adjectival phrases comprising the dependent variables. Age, subject's sex and partner's sex served as independent variables.

The statistical treatment used to analyze the data was a four-way analysis of variance. The .01 level of significance or less was selected to determine if differences in behavior existed as a function of age, sex, and partner's sex.
Significant differences for sex of partner were found which suggest distinguishable patterns of behavior for children interacting with same-sex versus opposite-sex partner. Opposite-sex pairs displayed more leading, dominating, demonstrating, assisting, sharing, and following behavior than same-sex pairs. The same-sex pairs were more giggly, happy, attention seeking as well as grabby, unfriendly, unconstructive, and pulling and shoving. This finding allowed for rejection of the null hypothesis that social interaction within pairs of children is not a function of partner's sex.

Sex-by-partner's sex also produced significant differences indicating that in general girls displayed more pronounced behaviors than boys. Girls also seemed to be more quiet, shared more, were more tolerant and exchanged more information when paired with boys than when paired with girls. There were two exceptions: girls definitely giggled more and did more pulling and shoving with girls than with boys. Boys seemed to show less pronounced differences regardless of partner's sex. This fact allowed partial rejection of the null hypothesis stating that there is no interaction between dependent variables (sex of the child, sex of the partner), and the variables of social interaction. However, the failure to establish interaction between age and the dependent variables of social interaction will not allow the total rejection of the null hypothesis.

Chronological age seemed to have effect on social inter-
action of the subjects but with no identifiable age trend for the age groups under investigation. The results were sporadic due to the unique composition of the 12 age groups. Therefore, the null hypothesis that social interaction within pairs of children is a function of age fails to be rejected.

There were no other significant findings related to behavioral categories for sex, sex-by-age, partner's sex-by-age or sex-by-partner's sex-by-age interactions. Therefore, the null hypothesis stating that social interaction within pairs of children is not a function of sex fails to be rejected. Judge disagreements were minor and infrequent.

It was concluded by the investigator that the behavior profile is an acceptable tool to measure the nonverbal social behavior of children and that social behavior of children can be studied in a standardized life-like situation. Additional analysis of the categories which showed significance on the behavior profile may prove to be worthy of further study.


ACKNOWLEDGEMENTS

Special gratitude is expressed to Dr. Damaris Pease for the assistance and guidance she provided throughout the planning of the study and the preparation of the thesis. Her thoughtful suggestions have been deeply appreciated.

To Dr. Leroy Wolins sincere thanks are extended for assistance in planning the research design and in analyzing the statistics. His continuing support, patience, and interest in the study have been a source of great encouragement.

The generous cooperation and support of Dr. Samuel Clark, Dr. Marguerite Scruggs, and Dr. Eleanore Kohlman as committee members are gratefully acknowledged. Sincere appreciation is extended to the head teachers of the five laboratories: Mrs. Linda Byler, Mrs. Nancy DeWitt, Mrs. Joan Herwig, Mrs. Ruth Jones, and Mr. Albert King. Their understanding and cooperation helped tremendously in the collection of data. Thanks are expressed also to the children of the five laboratories and to their parents. Without the cooperation of the children this study would not have been possible.

Unfailing support was given by the judges: Mrs. Melba Christy, Mrs. Lynn Graham, and Miss Donna Nelson. Without their skills, devotion, and professional attitude it would have been impossible to analyze the data. Their contributions to the study are great and much appreciated.

Recognition is expressed to the Home Economics Research
Institute for the financial support which made it possible to acquire the materials needed for the research project and the skilled personnel necessary to complete the study. An infinite gratitude is due to my family for supporting me during the entire project. My deep appreciation goes to my husband, John, and to my children, Inta, Anda, and Laris.
APPENDIX A.

FILMING LOG: BEHAVIORAL PROFILE

DATE

TIME: AM

PM

SUBJECTS | CODE LETTER
----------|------------------

FILMING SEQUENCE

<table>
<thead>
<tr>
<th></th>
<th>1 minute off</th>
<th>1 minute off</th>
<th>1 minute off</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
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<td></td>
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<td>3</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total 8 minute

COMMENTS:

Camera Operator_________________
Examiner_______________________
Assistant_______________________
APPENDIX B.

PLAY MATERIALS USED FOR THE EXPERIMENTAL
SOCIAL INTERACTION SITUATION

1----------doll house without roof
3----------2 4\" oblong blocks
5----------12\" oblong blocks
2----------large cylinder blocks
1----------small cylinder
5----------4\" cubes
2----------small triangles
1----------wagon filled with plastic house furniture (piano,
           2 chairs, store, sink, toilet, and bathtub)
1----------plastic bed
1----------2 piece davenport
1----------wooden chair and wooden table
1----------play pen with a baby doll in it
2----------wooden people
4----------small cars

Equipment Added

1----------ice cream truck
1----------small sports car
1----------snow sled
7----------small table blocks (cubes)
2----------rubber finger puppets
4----------wooden people
1----------wooden dog

All furniture, dolls, wooden people, and wheel toys are scaled
to size.
APPENDIX C. FILMING LOG

GROUP #__________________________  LAB:__________________________

CASE #'s__________________________  DATE:_________________________

PAIR  (Code letters)  TIME:  AM__________________________
                   PM__________________________

SUBJECTS

CODE LETTER  NAME  SEX

FILMING SEQUENCE

1.  30 sec. off
2.  30 sec. film
3.  30 sec. off
4.  30 sec. film
5.  30 sec. off
6.  30 sec. film
7.  30 sec. off
8.  30 sec. film

COMMENTS:
APPENDIX D. FILM WORD LISTS

NAME_____________________
DATE_____________________
REEL NO.__________________

DIRECTIONS:

You will view four short films involving pairs of preschool-age children in a play situation. The play situation is a setting provided for observing social interaction. For each film segment of behavior list as many adjectives or adjectival phrases describing the child's behavior in relation to the other child as you can. Do not be concerned with the finished product of their buildings. Concentrate on the interaction of the children using the provided materials.

(Adjective: A word used, often with a noun, to denote a quality of the thing named or something attributed to it.)
APPENDIX E.
DIRECTIONS FOR CONSTRUCTING WORD SIMILARITY GROUPS

You will be given a number of cards on which appear a word or phrase, describing behavior of preschool-age children. Your task is to sort the words into groups which appear in your judgment to have similar meanings. Not all words will necessarily fall into groups, do not be disturbed if you cannot place all words into similarity groups.

Once you are satisfied with your decisions, place a rubber band around cards with similar words. Put the words that you are unable to place in similarity groups into a separate stack, place a rubber band around them and label "miscellaneous". Return the word groups to Irma Galejs.
APPENDIX F.

PRESCHOOL BEHAVIOR PROFILE OF SOCIAL INTERACTION
(PBPSI-10-72)

Department of Child Development
Iowa State University
Ames, Iowa

Directions

Following these directions are adjectives or adjectival phrases describing preschool behavior. We are interested in your judgment concerning the presence or absence of the described behavior in the films viewed. You are to indicate your judgment by circling either "P" (present) or "A" (absent).

After you have made this decision, please indicate the degree of certainty you have about the decision. If you made a decision you must have been at least 50% certain of whether the described behavior was present or absent. If you are not very confident about your judgment, circle 50%. If you are very confident about your judgment, circle 90%. In general:

circle 50% if at least 50% certain but not as certain as 60%
circle 60% if at least 60% certain but not as certain as 70%
circle 70% if at least 70% certain but not as certain as 80%
circle 80% if at least 80% certain but not as certain as 90%
circle 90% if at least 90% certain.

Please be sure to respond twice to every statement, unless you are completely uncertain about your answer. In that case circle both "P" and "A" but do not circle a degree of certainty. This response indicates you have read the adjective or adjectival phrase but could not decide if it is present or absent in the child's behavior.
<table>
<thead>
<tr>
<th>ADJECTIVE</th>
<th>PRESENT</th>
<th>ABSENT</th>
<th>PERCENT OF CERTAINTY</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. hesitant, timid</td>
<td>P</td>
<td>A</td>
<td>50 60 70 80 90</td>
<td></td>
</tr>
<tr>
<td>2. negative, critical, disagreed</td>
<td>P</td>
<td>A</td>
<td>50 60 70 80 90</td>
<td></td>
</tr>
<tr>
<td>3. quiet</td>
<td>P</td>
<td>A</td>
<td>50 60 70 80 90</td>
<td></td>
</tr>
<tr>
<td>4. restless, tired</td>
<td>P</td>
<td>A</td>
<td>50 60 70 80 90</td>
<td></td>
</tr>
<tr>
<td>5. leads, directed, leading</td>
<td>P</td>
<td>A</td>
<td>50 60 70 80 90</td>
<td></td>
</tr>
<tr>
<td>6. fighting, scuffling</td>
<td>P</td>
<td>A</td>
<td>50 60 70 80 90</td>
<td></td>
</tr>
<tr>
<td>7. social, friendly, gregarious</td>
<td>P</td>
<td>A</td>
<td>50 60 70 80 90</td>
<td></td>
</tr>
<tr>
<td>8. observing, watching</td>
<td>P</td>
<td>A</td>
<td>50 60 70 80 90</td>
<td></td>
</tr>
<tr>
<td>9. giggly, silly</td>
<td>P</td>
<td>A</td>
<td>50 60 70 80 90</td>
<td></td>
</tr>
<tr>
<td>10. happy, playful, laughing, delighted, joking, smiling, humorous</td>
<td>P</td>
<td>A</td>
<td>50 60 70 80 90</td>
<td></td>
</tr>
<tr>
<td>11. attention-seeking, teasing, coquettish</td>
<td>P</td>
<td>A</td>
<td>50 60 70 80 90</td>
<td></td>
</tr>
<tr>
<td>12. independent, individualistic, self-directed, initiative, self-centered, assertive</td>
<td>P</td>
<td>A</td>
<td>50 60 70 80 90</td>
<td></td>
</tr>
<tr>
<td>13. distracting</td>
<td>P</td>
<td>A</td>
<td>50 60 70 80 90</td>
<td></td>
</tr>
<tr>
<td>ADJECTIVE</td>
<td>PRESENT ABSENT</td>
<td>PERCENT OF CERTAINTY</td>
<td>SCORE</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>----------------</td>
<td>----------------------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>14. distracted</td>
<td>P</td>
<td>50 60 70 80 90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. togetherness, &quot;coming together&quot;, joins other, plays together, walks together</td>
<td>P</td>
<td>50 60 70 80 90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. patient, tolerant</td>
<td>P</td>
<td>50 60 70 80 90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. sharing, cooperative</td>
<td>P</td>
<td>50 60 70 80 90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. assisting, helpful, helping</td>
<td>P</td>
<td>50 60 70 80 90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. inactive, passive, nonparticipating, withdrawn</td>
<td>P</td>
<td>50 60 70 80 90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. gestural, demonstrating, pointing</td>
<td>P</td>
<td>50 60 70 80 90</td>
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<tr>
<td>21. imitating, mimicking, copying, modeling</td>
<td>P</td>
<td>50 60 70 80 90</td>
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<tr>
<td>22. interacting, exchanging, giving, guiding each other</td>
<td>P</td>
<td>50 60 70 80 90</td>
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<tr>
<td>23. dominating, directive, bossy, demanding, controls, ordering, dictatorial</td>
<td>P</td>
<td>50 60 70 80 90</td>
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</tr>
<tr>
<td>24. uncooperative, taking, hoggish, unsharing, possessive, grabby, greedy</td>
<td>P</td>
<td>50 60 70 80 90</td>
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<tr>
<td>25. showing off, big-shotish</td>
<td>P</td>
<td>50 60 70 80 90</td>
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<tr>
<td>26. giving directions</td>
<td>P</td>
<td>50 60 70 80 90</td>
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<tr>
<td>ADJECTIVE</td>
<td>PRESENT</td>
<td>PERCENT OF</td>
<td>SCORE</td>
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<td></td>
<td>ABSENT</td>
<td>CERTAINTY</td>
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<td>27. nongoal-oriented, undirected play, unconstructive play</td>
<td>P</td>
<td>50 60 70 80 90</td>
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<tr>
<td>28. challenging, testing limits</td>
<td>P</td>
<td>50 60 70 80 90</td>
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<td>29. pulling, shoving</td>
<td>P</td>
<td>50 60 70 80 90</td>
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<tr>
<td>30. agreeable, approving, accepts suggestions</td>
<td>P</td>
<td>50 60 70 80 90</td>
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<tr>
<td>31. suggesting, gives information</td>
<td>P</td>
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<td>32. running, chasing</td>
<td>P</td>
<td>50 60 70 80 90</td>
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<td></td>
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<td>33. anxious, apprehensive</td>
<td>P</td>
<td>50 60 70 80 90</td>
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<td>34. dependent</td>
<td>P</td>
<td>50 60 70 80 90</td>
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<td>35. active, excited, vigorous</td>
<td>P</td>
<td>50 60 70 80 90</td>
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<td>36. hiding, nonappearing, lost</td>
<td>P</td>
<td>50 60 70 80 90</td>
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<tr>
<td>37. interested, seeks information, asking, inquisitive, curious</td>
<td>P</td>
<td>50 60 70 80 90</td>
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<td>38. follows, following</td>
<td>P</td>
<td>50 60 70 80 90</td>
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<td>39. nonattentive, ignoring</td>
<td>P</td>
<td>50 60 70 80 90</td>
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<tr>
<td>40. uninterested, disinterested, bored</td>
<td>P</td>
<td>50 60 70 80 90</td>
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<td>41. verbally interacting, talking together, conversing</td>
<td>P</td>
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<tr>
<td>ADJECTIVE</td>
<td>PRESENT</td>
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<td>PERCENT OF CERTAINTY</td>
<td>SCORE</td>
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<tr>
<td>42. unfriendly, intolerant</td>
<td>P</td>
<td>A</td>
<td>50  60  70  80  90</td>
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</tr>
<tr>
<td>43. solitary, separateness, alone, isolated</td>
<td>P</td>
<td>A</td>
<td>50  60  70  80  90</td>
<td></td>
</tr>
<tr>
<td>44. punching, hitting</td>
<td>P</td>
<td>A</td>
<td>50  60  70  80  90</td>
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</table>
APPENDIX G. LETTER TO PARENTS
October 2, 1972

Dear Parents:

One of the functions of our Child Development Nursery School-Kindergarten Laboratories is to provide opportunity for students and staff to learn more about children's behavior in a normal life like setting.

As part of an on-going research effort under the supervision of Dr. Damaris Pease, Distinguished Professor, director of graduate program, a study is being conducted to investigate the social interaction of children in a play situation. The results of this study will be used to complete requirements for my doctoral dissertation. No child will be identified as an individual in the study. Approximately one fifth of the children attending the laboratories this fall will participate in the study.

If you have any questions, please call me at my office, 294-2270, or at home, 292-3252. I will be very happy to answer any questions you might have.

Sincerely,

Irma Galejo
Instructor

Dr. Damaris Pease
Distinguished Professor
Director of Graduate Program
APPENDIX H. FIGURE 3
Figure 3. An example of age-by-sex-by-judge interactions
(Category 7 - Social, friendly, gregarious)