SEX DIFFERENCES IN PROXEMIC BEHAVIOR AMONG PRESCHOOL CHILDREN

A Dissertation
for the Degree of Ph. D.
MICHIGAN STATE UNIVERSITY

Gail Freedman Melson

1974

This is to certify that the

thesis entitled

Sex Differences in Proxemic Behavior among Preschool Children

presented by

Gail Freedman Melson

has been accepted towards fulfillment
of the requirements for

Ph.D degree in psychology

Lucy R. Ferguson
Major professor

Date Feb. 19, 1974

O-7639

ABSTRACT

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By

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The present study investigated sex differences in dyadic proximity among same-sex preschool pairs at two age levels, comparing personal space schemata with videotaped proximity behavior. Previous studies with older children (Meisels & Guardo, 1969; Guardo, 1969; Guardo & Meisels, 1971) using manipulable paper figures to ascertain personal space schemata, reported significant sex differences in preferred interpersonal distance. Males adopted greater same-sex distance than females in neutral and positive affect situations.

The present study hypothesized that such sex differences in personal space schemata would be related to sex-role identification strength among preschool children. Older preschool Ss (4-5 years) should exhibit stronger sex-role identification than younger Ss (3 years); hence, older males should place same-sex figures farther apart than older females, while no sex difference among 3 year olds was expected.

A second purpose of the study was to investigate the relation between personal space schemata and observed proxemic behavior during same-sex dyadic play. A sex x age interaction in observed proxemic behavior was also predicted; older male dyads would maintain larger inter-personal distances than older females, while no differences among younger dyads were predicted.

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Forty same-sex preschool dyads -- 11 3 year old females, 11 4-5 year old females, 8 3 year old males, 10 4-5 year old males -- were constituted from several nursery school populations. Each dyad was videotaped during a 10 minute structured play interaction and dyadic frequency in three proximity zones ("close," "moderate," and "far"), as well as individual movement patterns, were determined.

Personal space schemata were measured by responses to a felt board test on which Ss, working individually, placed same and opposite sex peer figures at preferred distances. Sex-role identification was measured by the Fauls & Smith Picture Test (1956) and Rabban Toy Choice Test (1950).

Results of both felt board responses and dyadic proximity behavior indicated that all subjects showed a significantly greater preference for moderate, as compared with "close" or "far" interpersonal distances. No group differences in same-sex personal space schemata were obtained; however older males placed significantly more distance between female figures than younger males or females of both ages. when proximity behavior was analyzed, a significant sex by proximity zone interaction was obtained. Female pairs at both age levels spent significantly more time at moderate proximity than males. Further analysis of individual movement patterns indicated a significant sex x initial position x zone interaction; the female initially on the left tended to remain there significantly more than the corresponding male, while the female on the right tended to move toward the dyadic partner significantly more than the corresponding male.

Sex-role identification strength did not differ by age and was not related to observed individual movements during dyadic play.

However, sex-role strength, as measured by the Toy Choice Test, was related to tendency to choose moderate same-sex interpersonal distance on the felt board test. Strongly identified females were more likely to place the same-sex pair at a moderate distance than low identified females, while the opposite was true of males.

The relation between personal space schemata and sex-role identification strength supported the view that proxemic norms are sex-typed. However, results based on sex-role measures were interpreted cautiously since the two tests used did not significantly inter-correlate.

The effects of situational constraints, handedness, and toy materials were discussed in contrasting results based on personal space schemata with observed dyadic proximity.

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A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Psychology

1974

ACKNOWLEDGMENTS

I would like to thank the members of my doctoral dissertation committee, Drs. John McKinney, Lucy Rau Ferguson, Lawrence Messé, and Gary Stollak for their guidance. Ms. Marsha Ory and Ms. Diane Cook spent many hours observing and coding videotape material. Finally, I would like to express appreciation to the staff, parents and children of Associated Parents Nursery School and Burgett Day Care Center, West Lafayette, Indiana for their patience and cheerful cooperation.

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INTRODUCTION

The present study investigates age and sex differences in preferred proxemic distance during play interactions between same-sex preschool dyads. The effects of sex-role identification and situational variables on the patterning of movement are also assessed. Finally, projective data on preferred proximity are compared with direct observation results.

Researchers in adult non-verbal communication have called attention to the use of eye gaze, proximity, and body orientation to monitor, maintain, and communicate affect in a dyadic communication (Kendon, 1967; Von Cranach, 1971; Exline, 1963; Argyle and Kendon, 1967; Hinde, 1972). Although largely unconscious, it is assumed that both sender and receiver behavior are somehow modified through social experience to function effectively. The remarkable amount of coordination and implicit understanding about the meaning of signals is evident when disturbances of normal functioning are examined (Hutt and Ounsted, 1966).

A number of studies have shown how non-verbal behaviors such as eye contact, proximity, and body orientation coordinate to establish an equilibrium point of desired intimacy. Argyle and Dean (1965), for example, found that both adults and children would approach closer to someone with eyes shut than eyes open. Hall (1955) showed that American strangers of the same sex will approach no closer than 18-20 inches, while Sommer (1962) found that when distance exceeds 5 feet, dyads move together.

The notions of "body-buffers" (Horowitz, et al, 1964) and "personal space" (Little, 1965) have been invoked to describe the tendency of both adults and children to avoid either extreme intimacy or distance during interactions. Supporting evidence for such an equilibrium in proxemic distance comes also from studies of how interaction rates decline under conditions of crowding (McGrew, P.; McGrew, and McGrew, 1962; Slosnerick, 1973).

Adult Sex Differences in Non-Verbal Behavior

A number of adult studies have found significant sex differences in non-verbal behavior. Jourard (1966) reported that, in response to a questionnaire, college girls stated they allowed themselves to be touched more and by more relevant persons in their lives than college men did. Similarly, Exline, Gray and Schuette (1965) found that females both looked at an interviewer of either sex more than males and also scored on Shutz's FIRO measure as more affectionate and inclusive. In another study, Exline (1963) found that women engaged in more mutual looking than men, with high affiliative women looking significantly more than low affiliative women. Similarly, Argyle and Dean (1965) reported less eye-contact in mixed-sex pairs as compared with same-sex pairs, with female pairs showing more eye contact than male pairs at both close and far distances.

The role of situational factors in affecting sex differences has also been investigated. Exline (1963) found that the competitiveness of a situation interacted with need affiliation in determining amount of eye contact. High affiliative *Ss* decreased while low affiliative *Ss* increased eye-contact while competing. Exline, *et al* (1961) found that after cheating, *Ss* engage in less eye contact during a post-cheating interview. Finally, Mehrabian (1968) showed that degree of liking for the interactant affected the non-verbal behavior of each sex differently. A disliked male elicited tense body and increased eye contact from undergraduate males, while a disliked female elicited relaxed body position. Undergraduate females, however, exhibited relaxed body whether interacting with a liked or disliked member of either sex.

Taken together, the above studies support the following conclusion: Women engage in more looking, eye contact (e.g., mutual gaze), physical contact, and close proximity than men in both same and mixed sex dyads. Personality and situational variables qualify but do not reverse the direction of this sex difference.

Non-Verbal Sex Differences Among Children

Studies of sex differences in non-verbal behavior among children have been largely confined to paper and pencil measures of proximity, but they too are in general agreement with the adult literature. Using silhouette figure drawings, Meisels and Guardo (1969) and Guardo (1969) found, among 3rd-10th graders, greater male distance in positive and neutral peer relations, but less distance in negative affect situations. These sex differences interacted with sex of other, males adopting greater distances from same sex peers than females.

Meisels and Guardo (1969) also found that use of space decreased with age. Further, until adolescence, males are more likely to be influenced by sex of other, females by emotional tone of the interaction in adopting preferred proximity (Guardo and Meisels, 1971).

In their work, Meisels and Guardo have speculated on the relation between these sex differences and the learning of appropriate sex-role behaviors. Greater male distance in positive interactions may be seen as consonant with masculine fear of dependency, while greater female distance in negative interactions may be taken as evidence of feminine fear of aggression.

The ontogeny of sex differences in preferred proximity and their relation to sex-role learning is unclear at present. One direct observation study of preschool approach tendencies (King, 1966) found no sex differences in average approach distance in a sandbox. However, the ratio of friendly acts during free play was positively related to approach distance.

Because the relationship between projective measures and direct observation data is often ambiguous, one cannot conclude from King's study that sex differences in proxemic behavior do not exist among preschoolers. Since preschool sex differences in activity level and aggression are so widely documented (Parten, 1933; Jersild and Markey, 1935; Bott, 1928; MacNeil, 1962; Smith and Connally, 1972; McGrew, 1972), it is plausible to hypothesize that concomitant differences may exist in the use of space by same-sex dyads during free play. Such differences may become more pronounced over the preschool years as children learn that different patterns of spatial use are also sex-appropriate.

Sex-Role Identification

Before discussing the hypothesized relation between sex-role identification and non-verbal behavior, some definitions are in order. The concept of "sex-role identification," derived from psychoanalysis, generally refers to the process by which the child gradually adopts as his own the behaviors, values, and attitudes considered by his culture to be characteristic of a male or a female and simultaneously rejects those considered to be inappropriate. "Sex-typing" refers to the process by which certain objects, behaviors, values, and attitudes are differentially associated with one sex. Similarly, "sex-linked" behaviors refer to those whose frequency or quality differ by gender.

As Kohlberg (1966) points out, awareness of sex-typed behaviors and objects, together with the ability to make choices based on them, presupposes the ability to classify objects with common characteristics into meaningful categories. The categories of male versus female appropriateness are so salient that most 3-4 year olds, when presented with sex-typed objects and activities, will choose predominantly those appropriate to their sex (Fauls and Smith, 1956; Brown, 1956; Rabban, 1950; Hartup and Zook, 1960). By age 5, the criterion of sex-appropriateness upon which these choices are based can usually be given explicitly (Rabban, 1950). This increased ability to both classify sex-typed behaviors appropriately and give the criterion of classification is accompanied by sex differences in observed behaviors, particularly aggression and dependency behaviors, and in the prevalence of sex-segregated play (McGrew, 1972; Koch, 1944; Abel and Sahlnkaya, 1962; McCandless and Hoyt, 1962).

Peers and Sex-Role Identification

Besides Kohlberg's emphasis on the child's increased ability to "cognitively organize his social world along sex-role dimensions" (1966, p. 82), most theorists have emphasized the parental role, either through identification with the same-sex parent (Bronfenbrenner, 1960; Lynn, 1971) or through parental reinforcement by both parents of sex-appropriate responses (Kagan and Moss, 1962; Sears, Rau and Alpert, 1965) or finally, through the child's perception of his like-sex parent as nurturant and powerful (Mussen and Distler, 1959, 1960; Mussen and Parker, 1965; Mussen and Rutherford, 1963). Relatively little attention has been paid the peer group as effective socializer and maintainer of sex-roles.

However, the importance of preschool peer group influence has been documented by several lines of research. Preschool children reinforce like-sex playmates more often than opposite-sex ones (Moore and Updegraff, 1964; Fagot and Patterson, 1969), older children reinforce more frequently and widely than younger children, and girls distribute play interactions more widely than boys (Clark, Wyon, and Richards, 1969) and are more popular (McCandless and Marshall, 1957).

Similarly, research using peers as models for both aggressive (Hicks, 1965) and altruistic behaviors (Hartup and Coates, 1967) indicate they are imitated even more often than adult models.

Although nuclear family influence in determining behavior with peers undoubtedly remains strong throughout the preschool years (Baumrind, 1967; Baldwin, 1949), McGrew's observational study of nursery school (1972) documents the ability of the social environment to modify initial predispositions. In the two schools he studied, over 80% of all interactions were dyadic. Same sex interactions occurred more frequently than mixed sex ones. Male interactions tended to be more aggressive than female and finally, mixed sex interactions ended in separation of the participants more often than all other endings. His work, together with that on peer group modelling and reinforcement, as well as preschool sex differences in aggression, attention-seeking and activity level suggest that peer group play would further reinforce and maintain sex differences in non-verbal behaviors, such as proximity, eye gaze, and body orientation.

The present study is restricted to one dimension of non-verbal interaction-proximity and patterns of gross body movement during play, While it does not test hypotheses relating to peer influences on non-verbal behavior, it does seek to establish age and sex differences in those behaviors during directly observed spontaneous peer play and to relate such differences, if found, to projective indices of proximity and to scores on selected sex-role identification measures.

Since most previous work on sex differences in proximity among children (Guardo, 1969; Meisels and Guardo, 1969; Guardo and Meisels, 1971) has utilized projective measures, a second purpose of the present study is to compare direct observation with the former. Early direct observation studies of children's play (Hattwick, 1932; Jersild, 1933; Parten, 1932; Beaver, 1932; Bott, 1928) fell into disrepute from their 1930's heyday. They employed category definitions based on interpretive, motivational constructs, often uniquely defined in each study, and not suitable for statistical analysis. Sex differences in aggression, for example, became a truism without researchers being able to answer in replicable terms this basic question: Just what behaviors are children emitting that allow the observer to apply the term "aggressive?"

Further, the use of more controlled but indirect measures such as doll-play (P. Sears, 1951), judges' ratings (Davitz, 1952), sociometric (Marshall and McCandless, 1957) or paired-comparison choice techniques (Koch, 1944) leave unanswered the relation between results based on them and the directly observable behaviors to which they are theoretically related. For example, Biller (1969) found no differences in aggression between father-absent and father-present boys on direct observation ratings, but significant differences on two projective measures. In addition, indirect measures are necessarily reflective of wide variations in cognitive and verbal abilities characteristic of preschoolers and themselves affected by sex. Since, as Biller's study suggests, directly observed six differences in behavior and projective test scores may refer to different phenomena, this study includes both types of measures to determine if sex differences in non-verbal behavior will be obtained in both.

The direct observation technique chosen for the present study employs videotape recording of a structured dyadic play interaction within the nursery school. From the resulting tapes, frequency of dyadic proximity in four zones is measured. In addition, rates of movement are computed for each dyad member individually. Paulson (1972) found ratings of preschool interaction from videotape comparable to those obtained with a live observer. Moreover, videotape recording has the advantage of a permanent, replayable record with which inter-observer reliability may be obtained. Finally, in the present study, no facilities for hidden observers existed; hence, the videotape recording provided a means of studying social interactions without the obtrusive presence of an observer.

Hypotheses

The present study seeks to test the following hypotheses:

(1) When same-sex dyadic interactions are directly observed among children of two preschool ages, 3 years and 4-5 years, sex differences in preferred proximity will be found only among older dyads. Four-five year old female dyads will engage in greater frequencies of "close" and "moderate" proximity and lower frequencies of "far"

proximity (as defined in the present study) than older male dyads. No significant sex differences among younger dyads is expected.

(2) When individual rates of movement are compared, it is hypothesized that older females will move more frequently than older males toward the middle area of the playtable, while older males will spend more time at the extreme ends, in front of the table and off camera.

(3) Ss scoring high on two measures of sex-role identification, the Fauls and Smith Picture Test and Rabban Toy Choice Test, will show greater sex-appropriate proximity preference than low scoring Ss. Thus, at both age levels, for females, sex-role identification strength and average frequency close and moderate proximity should positively correlate. For males, a corresponding negative correlation with sex-role measures is expected.

The measure of proximity preference used for individual, rather than dyadic comparisons, will be that of individual movement frequency in seven zones (see Appendix). Frequency of movement in zone 3 will be taken as a measure of close proximity preference.

(4) On an individually administered projective measure of preferred dyadic proximity among same and opposite-sex pairs, similar predictions are made. Thus, older females will place less distance between both same and opposite sex pairs than older males, while no significant difference is expected among younger Ss. For all females, high sex-role identification should be negatively correlated with number of inches proxemic distance between same and opposite sex pairs; for males, a positive correlation is expected.

Since Meisels and Guardo (1969, 1971) Guardo (1969) and King (1966) have stressed the importance of affect relationships in influencing preferred proxemic distance, both direct observation of dyadic play and individual projective preferences are determined under neutral to friendly peer play.

In order to test the above hypotheses, 22 female and 18 male dyads at two preschool age levels, three and 4-5 years, were randomly constituted from several nursery school populations, to form a 2 x 2 design with age and sex as main effects. Each dyad is videotaped during one 10-minute play session, using appropriate or inappropriate sex-typed materials the dyad had previously chosen. Dependent measures of frequency "close," "moderate," "far," "front-table" and "off camera" proximity, in these areas, as well as rates of individual movement were scored from the videotapes.

Also, the following measures were administered to each S individually on a separate occasion: (1) The Fauls and Smith Picture test of sex-role identification, (2) The Rabban Toy Choice test of sex-role identification, and (3) A felt-board projective test of preferred proxemic distance between same and opposite sex peers.

METHODS

Subjects

Eighty Ss, 44 F and 36 M, were obtained from two nursery school classes and one private kindergarten in Lafayette, Indiana. Table 1 indicates the composition of the sample. All Ss were from intact, middle-class families most of whose parents were university-affiliated. Finally, all Ss except two native-born Japanese-American children were Euro-American.

Ss were measured by the same female E for short intervals during the free play periods of their regular nursery school sessions. Approximately three-fourths of the data collection took place during the first hour of a daily 2½ hour session, a time generally devoted to free play. The remaining observations were obtained from the last half hour free play period. Younger Ss attended school during the morning, while older Ss were in school during the early afternoon. This unavoidable difference in nursery school session should be kept in mind in view of McGrew's findings (1972) of daily periodicities in behavior.

Except for the first and last four weeks of the school year during which no testing took place, measurements were taken from each group throughout the school year. Since it is assumed that peer relationships undergo changes throughout the year, time of year when measurements are taken will undoubtedly influence results on dyadic behavior.

For example, Marshall and McCandless (1957) found no relationship between dependence on adults and social acceptance by peers at the beginning of the school year, but a significant negative correlation later in the year. In addition, McGrew's observational study of nursery school children's behavior in two schools over an academic year (1972) found weekly periodicities in movement, although no longer-range changes. Specifically, gross body and locomotor movements increased significantly for all Ss over the week (p. 211).

In order to minimize these time effects, with each age-sex group of Ss (F3, M3, F4-5, M4-5) data collection times were distributed evenly over the week and over each month of the school year (excluding first and last). The Ss to be measured on each occasion were chosen randomly from the total attendance in school on that day.

Degree of previous acquaintance among Ss is another factor potentially affecting results. Guardo (1969) found an inverse relation between figure distance and degree of acquaintance on a projective measure administered to 6th graders. Meisels and Guardo (1969) found that among 3rd graders, females placed figures of either sex closer with increased acquaintance, while males placed only same-sex figures closer. While some Ss were initially strangers, others had prior acquaintance outside school and still others, among the older Ss, had attended school together the previous year. Hence, degree of initial acquaintance varied considerably and could not be adequately controlled in a small community where most parents of small children have already established social relations. It was hoped that by randomly constituting dyads within groups, age-sex groups would be equally affected by degree of initial acquaintance and dyad liking.

Measures

Sex-Role Identification

Two measures of sex-role identification were administered to each S individually. In each case, the S was seated at a playtable with the E in an unoccupied room of the nursery school. Test materials were placed on the table in front of the S. E and S position in the left and right chairs at the table were rotated, since preliminary testing indicated that S position, vis-a-vis the E appeared to influence position effects in the S's responses.

The first measure, the Fauls and Smith Picture test, consisted of six 8½" x 11" black and white line drawings presented in pairs. Each pair depicts a child of the same sex as the S engaged in either a sex-appropriate or inappropriate activity. Pair #1 contrasts baseball with doll play; Pair #2, trucks with play cooking, and Pair #3, raking the yard with sweeping the house. Pairs for male versus female Ss differ only in the sex of child depicted. The S is shown each pair with a short appropriate verbal description (e.g. "Here is a little boy. He is playing with dolls. See the doll in his hand? And here is a little boy playing baseball. See the ball and bat in his hand?" and then asked: "Which one do you do? Which one do you like to do?") The number of sex-appropriate choices constitutes the S's sex-role identification score on this measure (total possible score = 3). Order of pair presentation and left-right position within pairs are rotated.

The second measure, the Rabban (1950) Toy Choice test, presents each S with 14 small toys standardized with respect to size, color, and manipulative interest, as shown in Table 2. Half the toys are sex-appropriate for males, half for females. Toys are presented under the same conditions as the Picture test, and each S is told:

> "I would like to find out what toys you like to play with. Show me the toy you like best and I will put it here (indicating the floor). Show me the next toy you like best (etc.)."

This continues until 6 choices have been made. Then each S is shown four small pliable rubber dolls of pinkish skin color: a 6" adult male dressed in dark blue suit and tie, a 6" adult female in a red and yellow dress, a 3½" male child in red and yellow shorts and shirt, and a 3½" female child in red and yellow dress. Upon completion of the toy choices, each S is asked the following three questions in constant order:

> "Which one looks like you? What do you want to be when you grow up? Are you a boy or a girl?"

In each group, "boy" preceded "girl" in the last question for half the Ss.

The last three questions were adapted from Rabban (1950) and were designed to tap awareness of sex differences and sex-role identification as distinct from choices based on sex-typing. Each sex-appropriate toy choice was given the score of "1" as was each appropriate response to the doll figure questions, making the total possible score on the Rabban measure "9."

Projective Proximity.

A projective measure of preferred proximity between same, mixed, and opposite-sex pairs was also administered to each S individually. A 19" x 12" red felt board with measuring tape along both 19" sides was shown to the S. Four 6½" green construction paper figures with red felt backing were given the S in pairs, as follows: (1) M-M pair. Each figure consists of a line drawing of a boy facing front, dressed in shirt and trousers, with both arms parallel to the torso. The two figures differ only in small details of dress. (2) F-F pair. Both figures depict girls in blouses and full skirts with arms parallel to the torso, also differing in dress detail. All faces are pictured as smiling. (3) M-F pair. One of the above male and female figures are paired. Order of pair presentation and right-left position in the M-F pair are randomized.

Instructions to the S were:

> "This is a felt board. Let's pretend that this is a playroom at school and this (pointing to measuring tape sides) is the floor and this is the ceiling. Here are some children who are going to play at school (putting a figure in each hand). This is a boy and this is a girl (e.g. in the M-F pair). Will you put them down in the playroom and show me where you want them to play? You can put them anywhere you want."

The distance between the midpoints of the two figures is recorded as the preferred projective proximity for that pair.

Observed Proximity

Within each nursery school, Ss of the same sex, differing less than 12 months in age and attending class on at least two days together were constituted into pairs for videotaping proximity behavior during play, as indicated in Table 3. Approximately one-half the pairs in each cell had taken sex-role identification and projective proximity measures during the three months prior to videotaping; data from the remaining pairs were obtained during a 3-month period after videotaping. After a period of familiarization with the equipment, all pairs were filmed in an unoccupied room of their nursery school during regular free play sessions.

Physical arrangements for the videotape session are depicted in Figure 1. Two sets of play materials -- a set of doll house furniture with four pliable rubber dolls and a set of train tracks with interlocking cars -- were shown in two boxes next to the playtable. The pair was invited to "choose one box together and play with it while the camera is taking your picture." These objects were chosen because of previous findings concerning their sex-typing and their approximately equal appeal during pretesting. Also, they each contained 40 similar size (3½-6") natural wood pieces. The doll house furniture box also contained two adult and two child dolls, similar to those described in the Rabban Toy Choice measure.

The E assisted the children in arraying the toys over the playtable and indicated a seat for each one. Two chairs were positioned initially against the back legs of the playtable. No other instructions concerning movement were given. The E then left the room, explaining that she would return when play time was over. For the next 10 minutes, dyadic play was videotaped (when within camera range). Upon E's return, a short portion of the film was played back for the dyad to view.

Observed Proximity Analysis

Perhaps the most critical methodological problem in research on non-verbal behavior lies in the choice of units for analysis and the method of recording (Ekman, 1957). These problems do not diminish in difficulty because interactions are videotaped rather than observed in progress. In the present study, a Sony AV3600 videotape recorder with 25 mm Sony TV lens No. 44977, maximum lens opening 1:1.8 with 19" GE monitor was used. No attempt was made to conceal the equipment, although they were placed out of reach. The camera was mounted on a stationary tripod with lens focussed to exactly subtend the width of the playtable. The monitor was used only to assure good reception and was subsequently turned off.

Two behavior categories were observed from the videotape. The first, individual movement, is defined thus: The 19" monitor is divided by two parallel lines of ½" tape at 6½" and 13" into five movement zones, a procedure adapted from Schmidt and Hore (1970). Figure 2 depicts this method of measurement. Watching a single S at a time, the observer calls out the movement of that S's head through the movement zones while a second coder, watching the frame counter on the VTR, immediately records S zone position beside the appropriate frame number on the code sheet. Particularly during periods of rapid movement, the tape is stopped and replayed frequently to ensure accuracy. Thus, a record of both position and duration of head movement is obtained for each S individually.

"Dyadic proximity," the second behavior category, is measured by a somewhat different procedure. Using the monitor, taped as above, one observer calls out the joint head position of the pair. When both heads are completely in the same movement zone, "close" proximity is recorded by the coder beside the appropriate frame numbers. When one movement zone separates the pair, "moderate" proximity is noted and when two areas intervene, "far" proximity is defined. A fourth category, "front table" designated those instances, in both individual movement and dyadic proximity, when one member of the dyad (but not both) goes to the side or front of the table to play. A fifth category, "off-camera" indicates when one or both Ss are out of camera range. The appendix lists in greater detail decision rules for coding each category.

The above method of measuring individual movement and dyadic proximity was chosen as the most accurate after pretesting with a grid type division of the playroom resulted in an unacceptably high loss of data. Ss moving quickly over a wide area obscure measurement lines, parts of the body straddle several measurement areas, and one S of ten hides the position of the other by moving to obscure camera view of him. Furthermore, following wide ranging Ss with a camera would necessitate the continual presence of an E since facilities for hidden recording were unavailable for the present study. Pretesting indicated that the presence of an E with moving camera constituted stimulation which competed successfully with that involved in dyadic play.

The use of a structured, seated playtable interaction, while restricting the range of movement, still reflects a common play interaction in nursery school and allows for almost complete recording of movements. When one S moves in front of the other, the playtable intervenes and allows clear view of both. Similarly, by using dividing lines to indicate zones of movement on the monitor, Ss cannot obscure their position by their own movements. By using a camera lens setting that exactly subtends the playtable width, proximity lines are standard for all Ss photographed at the same lens setting and at the same playtable. Finally, E presence is no longer required.

In summary, each S received the following scores from observation of his videotape record:

(1) Number of frames at
 (a) close
 (b) moderate
 (c) far
 (d) front table
 (e) off

(2) Individual movement: number of frames each individual spent in zones (1) through (5), front table and "off."

To establish inter-observer reliability for these categories, two coder-observer teams independently observed and recorded both dyadic proximity and individual movement in six randomly chosen 10-minute dyadic interactions. Pearson product-moment coefficients of correlation were computed between the two sets of records, and the results, as shown in Table 4 indicate rather high inter-observer agreement.

RESULTS

Observed Proximity

In order to analyze group differences in observed dyadic proximity, frequency of play at "close," "moderate" and "far" proximity was computed for each dyad as the total number of frames spent in that zone. Because "front table" appeared to be an alternative form of "far" proximity used by a few dyads, "far" and "front table" categories were combined for analysis. Table 5 presents individual dyadic scores and group means for the three proximity zones.

A 2 x 2 x 3 analysis of variance (ANOVA) with zones as a repeated measure was performed on these dyadic scores, using the unweighted mean correction for unequal cell frequencies (Winer, 1969). As Table 6 indicates, a significant main effect for zones ($F = 40.11$, $p < .001$) was obtained. In addition, the sex x zone interaction ($F = 2.15$), while non-significant, merited further analysis to determine if a significant sex-zone interaction occurred at a particular zone.

Table 7 presents tests for simple effects based on the above ANOVA. It indicates a significant sex difference in frequency of play at moderate proximity only ($F = 3.4$, $p < .05$). The test for zones within sex simple effect indicates that both male ($F = 12.6$, $p < .01$) and female ($F = 29.92$, $p < .01$) dyadic play significantly differed in proximity zone frequency.

To determine which mean differences in proximity zone frequency were significant, a Newman-Keuls Test for differences among means (Winer, 1969) was performed next on male and female (age groups combined) mean frequencies at "close," "moderate," and "far" proximity, as shown in Table 8. The results of that test, indicated that for both sexes, all three means differed significantly. Both males and females spent more time at moderate proximity than they did at either close or far, and more time at far proximity as compared with close.

The videotaped play interactions may be viewed also in terms of the movement patterns of each member of a dyad. Here the three zones correspond to the right, middle, and left areas of the 19" monitor ("1," "3" and "5") in the appendix. Each dyad member may be designated by his initial seat position. (Areas 2 and 4, the taped sections of the monitor, were eliminated in the analysis.) Mean frequencies in the three zones are presented by seat position in Table 9.

A 2 x 2 x 2 x 3 ANOVA with initial seat position and individual movement zone as repeated measures was performed, with unequal cell frequencies corrected by the unweighted means solution. The results are presented in Table 10. A significant zone main effect ($F = 9.85$, $p < .01$), seat position x zone interaction ($F = 137.75$, $p < .001$) and sex x seat position x zone interaction ($F = 3.57$, $p < .05$) were obtained. Tests for simple effects, in Table 11, indicated a significant zone main effect at both seat positions (left seat, $F = 133.93$; right seat, $F = 85.37$). A significant sex by zone interaction was obtained for seat position left only ($F = 5.59$, $p < .01$). Further a test for sex within zones simple effect revealed that a significant sex difference in zone frequency occurred for left position subjects in the left area of the monitor (zone "5") only. Lastly, Table 11 indicates that for both sexes at both seat positions, significant zones within sex simple effects were obtained.

To determine the significance of mean differences in individual movement frequency, a Newman-Keuls test on the differences among means was performed for subjects at each seat position separately. Mean individual movement frequencies by seat position are presented in Table 12. At both seat positions, within each sex (ages combined), frequency of play differed significantly by zone. Both males and females initially on the left spent most time playing there, while males and females initially on the right spent most time playing in the middle zone. For both sexes, least time was spent in the zone occupied by the other interactant.

In summary, the preceding analysis of dyadic proximity behavior and the individual movements comprising it, indicates that all pairs tend to spend most time at a moderate interpersonal distance, but that female pairs are more likely to concentrate play time there than male pairs, at both age levels studied. In terms of the individual movements comprising joint proximity, the situational constraint of initial seat position limited the range of movement for all *S*s. However, female *S*s on the left tended to remain there more than males, while females on the right spent more time in the middle area than corresponding males. This relatively greater stability of movement by females in both seat positions underlay the significant sex difference in moderate dyadic proximity.

Dyadic Toy Selection and Observed Proximity

As stated earlier, at the beginning of the videotape session, each dyad was invited to choose together either a box of doll house furniture with dolls or a box of train tracks with interlocking cars. Although the pair was encouraged to make a joint choice, when choices differed, each pair member was allowed to retain his toy choice and the items were mixed on the playtable. The distribution of toy choices for each group is given in Table 13. It is evident that toy selection differed by group composition $\chi^2 = 24.56$, df = 4, $p < .01$). As expected, females of both ages show strong preference for the doll set, while older males prefer trains. Surprisingly, the M3 group, showed slightly greater preference for the doll set also.

To what extent can group preferences for different play materials account for significant sex differences in frequency of "moderate" proximity? It is plausible that the train set elicited greater mobility and inter-personal distance. This, in turn, might be evidenced in lower frequency of "moderate" proximity for male dyads. It is useful, therefore, to compare average proximity frequencies for M3 and M4-5 dyads on the basis of dyadic toy selection (Table 14).

Because of small cell size, no significant differences among means were obtained. However, the pattern of results suggests that play materials may have some limited effect on average frequency proximity. Among M3 male dyads those playing with dolls scored 11% points and 9% points above their group means on "close" and "moderate" proximity respectively, while M3 dyads choosing trains scored 7% points and 6% points below those same means.

Among older male dyads, however, those choosing dolls scored on the average at their group mean for "close" proximity frequency and only 2% points above the group mean at "moderate" proximity. Similarly, those choosing trains scored 2% points below the group mean on "close" proximity frequency and 7% points below the "moderate" proximity frequency mean. For male dyads at both ages, those engaged in train play had higher average frequencies of "far" and "front table" proximity when compared with doll play.

Because of small cell n's, this pattern of results does not allow one to reject the null hypothesis of no relationship between toy selection and average proximity frequency, but it does indicate the usefulness of an experiment on proxemic behavior employing toy choice as an independent variable.

<u>Dyadic Toy Selection and Individual Movement</u>

If train play is related to lower rates of "close" and "moderate" proximity and higher rates of "far" and "front table" proximity, it is plausible that when individual movements comprising dyadic proximity are examined, these Ss playing with trains will range more widely in movement than those playing with dolls; that is, the former will distribute their movements more evenly over the individual movement zones than the latter.

It is also plausible that train play would be related to lower frequencies of zone 3 movement than doll house play, since movement here is generally toward the other interactant.

Table 15 presents average individual movements for Ss during the videotape session by toy selection. As shown in Table 15, those engaged in train play scored lower in average zone 3 movement than those playing with dolls in each group, although small cell size and large variances account for the non-significance of these differences. Similarly, those playing with dolls scored lower in each case than those playing with trains in zone 1 movement and higher in zone 5 movement (except for M3 group).

Again, these findings do not permit one to establish any relationship between the pattern of movements during dyadic peer play and the toy played with, but they do suggest that such a relationship might be fruitful to explore in a larger study.

Projective Proximity

As stated earlier, each S individually received 3 scores for projective proximity: preferred proximity for a M-M pair, a M-F pair, and a F-F pair (in inches). Group means are presented in Table 16. While no significant group differences in same-sex pair projective proximity were obtained, older males placed the F-F pair significantly further apart than younger males ($t = 2.34$, $df = 34$, $p < .05$). Keeping in mind that the projective measure scores individuals, while observed proximity is a dyadic score, one may compare preferred proximity on these two measures. To repeat the pattern found for observed proximity, females, at both ages, should choose moderate same-sex interpersonal distance more often than males. However, when projective proximity choices are categorized as "close" (1-2"), "moderate" (3-4") and "far" (5+"), as in Table 17, the distributions of same-sex choices by males and females (ages combined) do not differ significantly.

To what degree do Ss discriminate between M-M and F-F preferred proximity? Correlation coefficients between M-M and F-F scores are computed for each group in Table 18. A significant positive correlation between M-M and F-F projective proximity scores is obtained for

F3 only and low non-significant positive correlations for the other cells.

In summary, it appears that the particular projective measure of proximity used in this study does not reflect group differences in preferred proximity as observed by videotape. Older males place significantly greater distance than three-year-old males between F-F pairs, but no other significant age or sex differences were found. Finally, only the F3 group showed significant consistency in their preferred proximity for M-M and F-F pairs.

What is the relation between Ss' projective proximity scores and their frequency of individual movement during the videotaped sessions? A positive relation would be indicated if per cent of time in the extreme right or left zone (depending upon S's initial position, of course) were positively correlated with number of inches between same-sex pair on projective proximity. The reasoning is this: Ss who place greater distance between the same-sex pair in the projective measure would be most likely to maintain maximal distance during observed dyadic play. The correlation matrix shown in Table 19 responds to this question. None of these coefficients is significant. They do not permit one to determine any relation between projective preferred proximity and observed movement in zones 1 and 5.

Similarly, if individual projective proximity and observed dyadic proximity are related, the former ought to be positively correlated with frequency of "far" dyadic proximity and negatively correlated with frequency of "close" dyadic proximity. For each dyad, the mean of each member's projective same-sex pair score is taken as the dyad's projective proximity preference and correlations are computed between the latter and average relative frequency of "far" and "close" observed proximity, as shown in Table 20. All correlations are non-significant.

In sum, same-sex projective proximity preferences were compared with "far" individual movement (zones 1 and 5) and with both "close" and "far" observed dyadic proximity frequencies. Scores on the projective measure used in this study did not relate significantly to observed indices of preferred proximity.

Sex-Role Identification

Table 21 presents group means for two projective measures of sex-role identification, namely the Fauls and Smith Pictures Test and the Rabban Toy Choice Measure. Correlation coefficients for the two measures are presented in Table 22. None of these coefficients is significant.

Considering each test separately, a two-way AOV fixed effects was performed for Picture Test scores in Table 23.

The significant age effect ($F = 5.75$, $p < .01$) indicates that older Ss of both sexes scored significantly higher on the average than younger Ss, a finding supported by virtually all research on sex-role identification among young children.

Turning to the Toy Choice Measure, the results of a two-way AOV, fixed effects, are shown in Table 24. In addition to an age main effect ($F = 65.69$, $p < .01$) similar to that found in the Picture Test, a significant sex x age interaction ($F = 13.33$, $p < .01$) was also obtained. Here, while older Ss of both sexes score significantly higher than younger Ss, the increase is significantly greater for males than females. Note that the same pattern appeared in the Picture Test scores, although a significant sex x age interaction was not obtained there ($F = 2.4$).

Sex-Role Identification and Observed Proximity

Bedause of their low inter-correlation, we will consider Picture Test and Toy Choice Measures separately in determining the relation between scores on sex-role identification measures and observed proximity. Data on observed proximity indicated that females at both ages spend significantly more time at "moderate" proximity.

If sex-role identification strength bears some relation to these sex differences, then highly identified females, for example, should show more "moderate" proximity than low identified females. Since observed proximity, as a dyadic measure, cannot be readily compared with sex-role identification strength, correlation coefficients between individual movement and sex-role identification were computed, for each seat position zone separately (see Table 25). It was hypothesized that highly identified females, on either the Picture Test or Toy Choice Measure, would spend more time in zone 5, seat left and zone 3, seat right than low identified females. In other words, the component individual movement patterns found to underlie the sex difference in moderate proximity would be most characteristic of those females relatively high in sex-role identification, as measured by their test scores. Similarly, "cross-over" individual movements should be negatively correlated with sex-role identification score in females, but positively correlated in males. A "cross-over" movement is considered one in which a child initially in the right chair spends sometime on the left side of the playtable, and vice versa.

Inspection of Table 25 indicates that correlations between individual movement frequency and sex-role identification score do not fit a meaningful pattern. Among older females initially on the left, Toy Choice score and movement on the right, a "cross-over" situation, are negatively correlated ($r = -.77$, $z = 2.46$, $p < .05$), but, in a large correlation matrix, this result could be due to chance.

In conclusion, sex-role identification strength, as measured by either the Picture Test or Toy Choice Measure, is not clearly related to patterns of individual movement during dyadic play. Further, the rather low positive inter-correlations between sex-role identification measures may indicate lack of sex-role identification stability or low reliability or discrimination of the measures used.

Sex-Role Identification and Projective Proximity

The relation between scores on the Picture Test and Toy Choice Measure, on the one hand, and preferred projective proximity for same versus opposite sex pairs, on the other hand, will now be examined.

Based on the observed sex difference in moderate proximity, highly identified females should place the same-sex projective proximity pair at a moderate interpersonal distance (3-4") more frequently than low identified females. Highly identified males, on the other hand, may show an increased preference for close and far zones. Table 26 indicates the distribution of choices for same-sex pair interpersonal distance by high versus low scoring subjects on the Picture Test and Toy Choice Measure, respectively. While the distribution of moderate proximity choices by high versus low Picture Test scorers does not differ significantly, when Toy Choice scores are used a significant $X^2(7.47, df = 1, p < .01)$ is obtained. More high scoring females on the Toy Choice Test do tend to place the same-sex pair at moderate proximity than low scoring females, while the opposite is true of males.

In summary, the hypothesis that the observed sex difference in frequency of moderate proximity would be related to strength of sex-role identification was not supported when measures of the latter were correlated with individual movement frequencies.

However, when projective proximity choices were related to sex-role identification scores, highly identified females (based on Toy Choice Test scores) were more likely than low identified females to choose moderate same-sex interpersonal distance. Highly identified males, on the other hand, were less likely to choose moderate same-sex interpersonal distance as compared with low identified males.

DISCUSSION

Observed Dyadic Proximity

Hypothesis 1 predicted a sex x age interaction in frequency of "close" and "moderate" proximity. Lower male frequencies at these interpersonal distances were predicted only for older dyads, with no significant differences expected among younger pairs. Analysis of dyadic proximity behavior in the present study found a significant sex-zone interaction at moderate proximity; female dyads at both age levels engaged in greater frequencies of "moderate" proximity than male dyads. Moreover, a significant zone main effect was obtained for both sexes.

To restate the findings of the present study on proximity, all dyads tended to establish an equilibrium at an intermediate distance from another. That equilibrium point was more stable for female pairs than male pairs, at both age levels. The tendency for even young interactants to establish an equilibrium point for interpersonal distance fits in well with findings based on older children and adults. Experiments based on Argyle and Dean's equilibrium theory (1965) confirmed that intermediate ranges of proxemic distance, most conducive to eye contact would be more preferred by adult dyads than very close or far distances. In the videotaped situation of the present study, dyadic play at "close" distance, i.e. within the same proximity zone, would have made eye contact extremely difficult. Similarly, play at the "far" and "front table" proximity zones, in the present study, represented maximal interpersonal distance permissible by the situation and undoubtedly less conducive than moderate distance for the monitoring of eye and other facial cues. Hence, female dyads spent more time than male dyads at optimal interpersonal distances for social interaction.

It is plausible to assume that the obtained sex difference in moderate proximity reflects the general superiority of young girls in social and verbal skills when compared with young boys in a situation which would elicit such skills. In addition, dyadic play among young boys may more often assume a character less conducive to moderate distances than female dyadic play. For example, Smith and Connally's (1972) observational study of preschoolers found that masculine "rough and tumble" play increased with age, while female's decreased with age. At both ages, the authors found boys engaging in significantly more physical activity than girls, findings which imply increased masculine spatial usage with age, together with some frequency of close, interpersonal distance, usually involving physical contact.

Such existing sex differences in play tempo and use of space during play undoubtedly interact with the situational constraints of the play area. This makes it necessary to consider the effects of the experimental situation itself on the obtained sex difference in "moderate" proximity frequency. As Figure 1 indicates, filming took place in a small room with dyadic movement rather curtailed. The study filmed an essentially sedentary play session. The strong effect of initial chair position in restricting the range of individual movement (see Table 10) attests to this fact. As such, female dyads undoubtedly have had more experience and greater preference for this type of situation (McCandless and Hoyt, 1968; Hattwick, 1932; Parten, 1932). For example, Blurton-Jones's observational study of nursery school children (1972) found that boys engaged in more "rough and tumble" activities than girls only when situational factors were taken into account. Thus, when play on large motor equipment was examined, no sex differences in this type of behavior were found; but, when play during the absence of such equipment was analyzed, boys engaged in significantly more rough and tumble than girls.

The present study also presented evidence that the type of toy played with may influence dyadic patterns of movement. Those older male dyads playing with trains had lower rates of "close" and higher rates of "far" proximity than similar pairs engaged in doll house play (see Table 14). Although, because of small cell size, differences were non-significant, the consistent pattern of results suggests that an important situational determinant of proximity behavior may be type of play activity and toy choice. Greater feminine preferences for doll play and sedentary art along with greater masculine preferences for blocks and push toys found by Clark, Wyon and Richards (1969) parallel sex differences in toy choice found in the present study and confirm the informal conclusions of most nursery school observers. Thus, sex differences in preferred play activity may mediate preferences both for same-sex play (McCandless and Hoyt, 1968; McGrew, 1972) and the mutual reinforcement of like-sex peers (Fagot and Patterson, 1969), and these factors in turn may influence sex differences in proximity behavior.

Observed Individual Movement

Hypothesis 2 predicted a significant sex x age interaction in individual zone 3 movement. The finding of the present study indicated that a significant sex main effect in zone 3 movement was found only when initial position of each dyadic member is considered. Female Ss initially in the right chair at the playtable did move significantly more into zone 3 than males, at both ages. However, females on the left tended to remain significantly more in zone 5, the extreme right of the monitor and extreme left of the play situation than males on the left, at both age levels.

Observation of the videotapes suggests a possible explanation for these initial position differences. Most Ss appeared to reach for toys most frequently with their right hand, although the degree to which handedness was established in Ss is unknown. Hence, Ss on the right must reach across their own bodies, turning toward the other and in the process moving head and torso closer, while Ss on the left need only extend their right hand, leaving head and body rather immobile. Thus, in general, movements of taking and giving toys would lead to greater zone 3 movement frequencies by Ss initially on the right as compared with those on the left. Hence, greater interaction and toy sharing among female pairs might well appear as relatively more zone 3 movement among those females on the right. If, under such conditions, moderate proxemic distance is maintained, the female on the left would be most likely to remain on the extreme left. Movement by both females into zone 3 would have resulted in a close proximity which might interfere with eye contact.

The effect of handedness on proximity behavior and body orientation in a sedentary situation involving toy sharing appears to be an area of needed further study. Handedness may be positively related to left-right discrimination ability (Benton and Menefee, 1957). When play involves the spatial arrangement of component parts, as the toys used in the present study did, movement may well be influenced by the differing abilities of Ss to discriminate directionality.

Sex-Role Identification and Observed Movement

The present study predicted a sex x age x zone interaction in dyadic play frequency because it was felt that sex-role identification might underlie sex differences in the use of space. Since the two age groups were expected to differ in strength and stability of sex-role identification, a sex x age interaction would be obtained. However, the present study provides little information concerning the relation between sex-role identification strength and observed movement during dyadic play. First, the two measures used, the Picture Test and Toy Choice Measure, did not significantly inter-correlate, indicating either the absence of stable sex-role identification in the entire sample or the failure of one or both tests to accurately measure it. On both measures, average scores for both sexes did increase significantly with age. Hence, while older Ss on the average tended to give more appropriate responses than younger Ss on both tests, Ss individually were inconsistent in their responses to both measures.

One problem might be the small number of required responses to the Picture Test (i.e., three) and the greater probability that chance would influence a response. For example, the pair of pictures involving a choice between sweeping the house and raking the yard seemed to tap primarily a child's momentary desire to play outdoors (the test was administered in the fall and spring) rather than a stable aspect of sex-role identification. An expected Picture Test involving at least six pair choices should increase the validity of this measure. Further, the presentation of more pairs would make position effects less likely.

When sex-role identification strength, on either the Picture Test or Toy Choice Measure, is correlated with individual movement frequency, for Ss in each seat position separately, no relationship between sex-role identification score and movement pattern is discernible. However, individual movement frequency may be a relatively insensitive measure to employ in relating proximity behavior to sex-role identification. If any relation does exist between interpersonal distance and sex-role strength, it is likely to be evident only when the joint movement sequences of both pair members are considered. Thus, the high scoring female may be more likely than the low scoring female to respond to relatively large interpersonal distances by moving toward the other interactant, so as to establish an equilibrium at a moderate distance. She may also respond to close "toward" movements by backing away to a suitable distance. All this would be evident only when individual movements contingent upon certain dyadic partner movements were examined. A study might be conducted investigating shifts in proxemic distance by high versus low sex-role identified children in response to controlled shifts by a stimulus figure, perhaps a large doll or puppet.

Projective Proximity

Hypothesis 4 stated that a sex x age interaction in same-sex projective proximity preference would also be found. However, no significant group differences in same-sex pair distances were found. However, older males placed their opposite-sex pair significantly further apart than younger males, while females did not differ significantly by age in their opposite-sex pair placement. Similarly, females are more consistent in their proximity preferences; M-M and F-F pair distances correlate +.84 for younger females, +.38 for older females. This is consonant with Guardo and Meisels (1971) findings of earlier female consistency in personal space schemata. Further, the higher female correlations between same and opposite sex proximity indicates that females in expressing personal space preferences tend to be either distant or close to peers in general. This author's observation of the nursery school children suggested that younger girls, particularly, fall into two distinct categories; those who interacted mainly with peers and distributed such interactions widely and those who showed dependence on adults and minimal peer interaction. McCandless and Marshall's 1957 study of sex differences in social acceptance found a similar pattern. Female sociometric scores were, on the average, one-third higher than males and the negative correlation between sociometric scores and adult dependency scores was larger for girls than boys.

Secondly, the tendency for all subjects to place same-sex pairs (and opposite and mixed-sex pairs as well) at a moderate interpersonal distance was evident on the felt board measure of proximity preferences also. Here, however, females and males did not differ in the frequency with which moderate proximity was chosen.

This may reflect the degree to which all subjects, as regular nursery school attenders, sense that a moderate interpersonal distance is a social norm for dyadic play interactions, a norm to which male pairs may be less likely to subscribe when engaging in play. Furthermore, projective proximity did not positively correlate with frequency of observed "far" proximity or frequency of zone 1 or 5 individual movement. This difference between projective data and that based on videotaped play interactions should make one cautious about relating personal space schemata to proxemic behavior. It is possible that among older children, proxemic behavior is more consonant with personal space schemata. However, the differences among males between observed behavior and projective proximity preferences found by the present study raise questions concerning proxemic behavior patterns to be expected among those 3rd-10th graders who, Meisels and Guardo (1969, 1971) showed, exhibited sex differences in personal space schemata.

Sex-Role Identification and Projective Proximity

As measured by the Picture Test, high versus low scorers did not differ in their tendency to choose moderate same-sex interpersonal distances. As measured by the Toy Choice Test, however, the distribution of choices by high versus low scoring males and females did differ significantly. High scoring females were more likely to choose moderate distances, while high scoring males were less likely to. Since the Toy Choice Measure, for reasons stated above, was considered the more reliable of the two sex-role identification tests, these results are suggestive of a relation between sex-role identification and early sex differences in personal space schemata. It is plausible that pre-school subjects showing rather high sex-role identification would be just those children most aware of differing social norms concerning appropriate behavior of the sexes. If interpersonal distance is included among such norms, as Meisels and Guardo's work with older children would suggest, then it is not surprising to see that high scorers on one measure of norm-learning are also high scorers on another.

The fact that high versus low scorers on such measures do not differ systematically in observed dyadic proximity behavior may indicate the weak control such social norms have over young children's play. On the other hand, the low inter-correlation in the present study between the two measures of sex-role identification used, may indicate that no reliable measure of sex-role strength was obtained.

Further, a number of shortcomings in the projective proximity measure itself must be pointed out. Guardo (1969) and Meisels and Guardo (1969) as well as King (1966) have shown the importance of affect relations between a pair in determining preferred distance. It is possible that the instructions to the Ss did not sufficiently establish the same neutral to positive affect conditions for all projective pairs. Differing attitudes about school and peers might be reflected in distance placements. Moreover, comparison between observed movement and projective proximity is difficult because of their differing contexts. In the projective measure, peers are depicted as standing face-front, without toys or situational constraints. In the observed situation, as previously described, Ss are seated, constrained by initial position, toy selection, and possibly handedness. A more acceptable projective measure for use in a similar study would be one in which peer figures might be placed at various positions around a drawing of a playtable on which are pictured specific toys with the affect relations between peer figures clearly stated. Further, all projective peer figures were depicted as face-front. The relation between body orientation and proxemic distance was not explored in this study, yet there are some indications that sex differences may be found in preferred body orientation during peer interactions. For example, Mehrabian (1969) found that adult males tend to adopt head-on body orientation toward same-sex peers, while females prefer oblique angles or side-by-side position. Similarly, Sommers' field studies (1968) indicate that right-angle orientation is generally preferred for dyadic conversation. The present study whose situational constraints favor side by side interaction may have tapped an area of greater female preference in both direct observation and projective measures. Hence, it would be useful to further investigate early sex and age differences in body orientation during dyadic play.

Similarly, a number of investigators have called attention to the positive relation between eye contact, looking, and social approach among young children (Robson, et al, 1969; Castell, 1970; Webb, et al, 1963). Since sex differences in eye-contact among adults are well-documented (Exline, 1963; Exline, Gray and Schuette, 1965; Argyle and Dean, 1965), the ontogeny of such sex differences in early childhood and their relation to preferred distance is a natural subject for further investigation.

Another obvious extension of the present study involves investigation of mixed-sex dyadic play. Guardo (1969) and Meisels and Guardo's (1969) work suggests that females would place less distance in neutral situations between mixed-sex, as well as same-sex pairs, as compared with males. The projective measure in the present study included an M-F pair. Older females placed 1.12 inches less distance between the M-F pair than older males did ($t = 1.68$, $df = 40$, $p = .1$) while no sex difference in younger Ss' placement of the opposite sex pair was found. This may reflect the increasing tendency of males to maintain greater distance with increasing age in the M-F pair ($t = 1.80$, $df = 34$, $p < .1$)

rather than age changes in female placement of mixed-sex pairs. These findings suggest that sex differences in mixed-sex interactions should be investigated when directly observed by proximity behavior.

The degree to which sex-role identification affects sex-differences in non-verbal behavior needs further study. As mentioned earlier, projective measures of sex-role strength need further refinement, but in addition, direct observation of sex-segregated play would provide a behavioral measure, perhaps more closely related to directly observed proximity behavior. The degree to which same versus opposite sex interactions are familiar to a child may be related to his attitude toward such interactions and this in turn would influence his preferred proximity. For example, Haskett (1971) reported that a cooperative task increased liking for opposite sex preschool children but not same sex peers, attributing this increase to satiation effects with same sex peers. Based on Guardo and Meisels' work, one would expect increased liking for opposite sex peers to produce closer distances by females in mixed-sex interactions, but not males.

Finally, because of the exploratory nature of the present study, rather crude age divisions were employed. A larger cross-sectional study covering a wider age range would place the obtained sex differences in a broader context and indicate points at which developmental shifts in proximity preferences take place. On the basis of such findings, less arbitrary age divisions could be constructed. Furthermore, obtaining significant age differences provides little explanatory power. For example, do increases in preferred distance with age by males occur because such personal space schema are associated with appropriate masculinity? Do they occur largely because of increased preferences for sex-typed toys and play activities? Are larger spatial distances "modelled" for boys in their interactions with adults, particularly parents and teachers? Fagot and Patterson (1969) found that preschool teachers reinforce appropriate sex-typed behaviors; perhaps proxemic distance preferences are reinforced by distance-maintaining teacher-child interactions. A study of sex and age differences in proxemic distance during teacher-child interactions would be an interesting area of further study.

Similarly, parental reinforcement of appropriate sex-typed behavior may involve changes in the frequency or patterning of eye-contact, distance, and body orientation during parent-child interactions. The larger question posed by these unexplored areas is this: What are the behavioral correlates of such concepts as, "maternal reinforcement of dependency" or "maternal encouragement of independence?" The present study constitutes a beginning in the exploration of proxemic behavior preferences among peers. Its findings of significant sex differences and indications that personal space schemata and observed behavior may be inconsistent provide useful direction for further study.

TABLES

TABLE 1

Sample Composition

Group	Range of Birthdates	School		Days of School Attendance			Siblings		
		A	B	3	4	5	0	1	2+
3 yr. F (n=22)	1/69 - 2/70	12	10	9	1	12	9	11	2
3 yr. M (n=16)	1/69 - 4/70	10	6	6	2	8	8	6	2
4-5 yr. F (n=22)	1/67 - 10/68	12	10	8	3	11	5	14	2
4-5 yr. M (n=20)	12/66 - 12/68	8	12	5	0	15	6	12	2

TABLE 2

Materials Used in Rabban Toy Choice Measure

Toy	Color	Size	Manipulative Interest
gun	black	$5\frac{1}{2}$"	trigger
tow truck*	green,yellow,blue	$4\frac{1}{2}$"	wheels, hook on back
dump truck	blue, red	$5\frac{1}{2}$"	wheels, dump
auto racer	red	8"	wheels
fire truck	red	7"	wheels, ladder
cement mixer	red, yellow	$6\frac{1}{2}$"	wheels, mixer turns
soldiers	khaki, brown	$3\frac{1}{2}$"	3 stand, 3 lean on rifle
dishes (2 cups, 2 saucers, 2 spoons, 1 tray)	red, green	5"(tray)	dishes stack
high chair	white, pink	$5\frac{1}{2}$"	tray removes
buggy	blue	$4\frac{1}{2}$"	wheels, hood moves
bathinette	blue,white,red	$5\frac{1}{2}$"	soap tray removes, faucets removable
crib with doll	pink	5"crib 3"baby	baby removable, crib rocks
purse	red	7"	opens, clasps shut, inner zipper has strap
doll	pink	8"	legs, arms move

*The tow truck replaces the steamroller of same color, size and manipulative interest used by Rabban.

Following Rabban (1950) procedure, the toys are laid out on the children's playtable in pairs, thusly:

high chair	dishes
gun	fire truck
buggy	purse
tow truck	cement mixer
crib	doll
dump truck	6 soldiers
racer	bathinette

Since pretesting showed that younger <u>S</u>s often choose only from those pairs nearest them on the table, the above pairs of toys were presented so that $\frac{1}{2}$ of the <u>S</u>s saw them in the above order, $\frac{1}{2}$ in the reverse order.

TABLE 3

Number of Dyads for Videotaped Proximity

	3 years	4-5 years	
Female	11	11	
Male	8	10	
Total	19	21	n = 40

TABLE 4

Inter-Observer Correlation Coefficients by Category

Category	Correlation Coefficient
Individual Movement - 1	.91
Individual Movement - 2	.82
Individual Movement - 3	.88
Individual Movement - 4	.81
Individual Movement - 5	.93
Individual Movement - Front Table	.95
Individual Movement - Off	.94
Joint Proximity - Close	.84
Joint Proximity - Moderate	.88
Joint Proximity - Far	.91
Joint Proximity - Front Table	.94
Joint Proximity - Off	.96

TABLE 5

Time Spent in Proximity Zones

	3 years					4-5 years				
	dyad	total # frames	number frames close	number frames moderate	number frames far (incl. front table)	dyad	total # frames	number frames close	number frames moderate	number frames far (incl. front table)
F	1	121	1.50	96	23.50	1	140	24.50	47	61.50
	2	164.5	28.00	79.50	31	2	196	26.50	110.50	35
	3	143	1.	53.50	88.50	3	110.7	13.80	67.40	29.50
	4	145	19.80	120.20	3	4	116	51	62	3
	5	144.5	26	107	11.50	5	120	8.83	88.17	23
	6	143	11.50	123.50	8	6	115	6.83	94.01	14.16
	7	67.5	6.55	26.40	34.55	7	122.5	6.50	110.84	4.16
	8	93	10.50	29.50	30	8	102	1.35	33.80	66.85
	9	129.5	7.83	77.33	38.34	9	117.5	9	77.50	24.50
	10	110.5	20.65	56.94	21.13	10	173	42.65	106.69	23.66
	11	270	29.	171.50	64	11	113	10	86.68	15.33
$\bar{x}$ =		139	14.76	85.58	32.14	$\bar{x}$ =	129.6	18.27	80.42	27.33
M	1	241	45	77.50	67.50	1	143.5	35	78.50	30
	2	95.5	2	58.50	31.50	2	142	17	119	6
	3	119	19.65	36.31	39.54	3	100.5	18.28	70.16	12.06
	4	145	17	123	5	4	112	3.32	49.86	58.82
	5	125.5	23.50	62.50	38.50	5	95	0	7	87.50
	6	207.5	122	67.34	13.11	6	141	13.83	36.55	64.72
	7	120	.30	31.32	82.35	7	93	8.7	45.50	38.8
	8	79	25.16	45.01	5.83	8	196	9	131.50	20.5
						9	168	15.33	91.48	61.19
						10	117	14.74	84.27	16.99
$\bar{x}$ =		141.6	31.83	62.69	35.42	$\bar{x}$ =	130.8	13.5	71.4	39.7

TABLE 6

Dyadic Proximity Frequency

2 x 2 x 3 ANOVA (repeated measure on C)

(unweighted mean solution for unequal cell frequencies)

Source	SS	df	MS	F	p
Between $\underline{Ss}$		39			
A (Sex)	12.94	1	12.94	<1	ns
B (Age)	114.57	1	114.57	<1	ns
AB	.10	1	.10	<1	ns
Error between	20,991.61	36	583.10		
Within $\underline{Ss}$		80			
C (Prox. Zones)	65,609.79	2	32,804.90	40.11	$<.01$
AC	3,479.59	2	1,739.80	2.15	$<.10$
BC	459.55	2	229.78	1	ns
ABC	1,855.70	2	927.85	1.13	ns
Error within	58,883.23	72	817.83		

TABLE 7

Dyadic Proximity Frequency: ANOVA for Simple Effects

Sex within Proximity Area (dyadic)

Source	SS	df	MS	F	p
A for close proximity (C_1)	373.5539	1	373.5539	<1	ns
A for moderate proximity (C_2)	2514.1826	1	2514.1826	3.40	$<.05$
A for far proximity (C_3)	604.7450	1	604.7450	<1	ns
Error (error between & w/in)	79874.84	108	739.5818		
Zones within sex					
C for males	20605.4308	2	10302.7154	12.60	$<.01$
C for females	48935.9756	2	24467.9878	29.92	$<.01$
Error within	58883.2300	72	817.8200		

TABLE 8

Mean Frequency Observed Dyadic

Proximity in 3 Zones (in frames)

	close	moderate	far
F (n=22)	33.03	106.00	59.47
M (n=18)	45.33	134.09	75.12

TABLE 9

Mean Individual Movement by Seat Position

dyad	seat position left (1) Right	(3) Middle	(5) Left	seat position right (1) Right	(3) Middle	(5) Left	totals
F(3) (n=11)	$\bar{x}$=1.48	26.48	84.52	35.69	63.55	1.15	212.87
F(4-5 (n=11)	$\bar{x}$= .548	12.52	85.20	21.61	69.59	.92	190.388
M(3) (n=8)	$\bar{x}$=8.25	29.75	60.47	37.10	58.01	2.94	196.52
M(4-5) (n=10)	$\bar{x}$=1.46	13.50	63.59	29.60	53.32	5.10	166.57

TABLE 10

2 x 2 x 2 x 3 ANOVA

Age x Sex x Seat Position x Individual Movement Zones (1,3,5)

Source Between Ss	SS	df	MS	F	p
A(Sex)	663.9764	1	663.9764	<1	ns
B(Age)	1,131.3185	1	1,131.3185	1.53	ns
AB	22.95	1	22.95	<1	ns
error between	26,559.8936	36	737.7748		
C (Seat Position	34.7406	1	34.7406	<1	ns
AC	306.4322	1	306.4322	<1	ns
BC	103.1482	1	103.1482	<1	ns
AB x C	6.4148	1	6.4148	<1	ns
error II	15,907.6381	36	441.8788		
D(Indiv. M. Zone)	26,860.1413	2	13,430.0706	9.85	$<.01$
AD	2,021.7452	2	1,010.8726	<1	ns
BD	997.4870	2	498.7435	<1	ns
AB x D	215.7778	2	107.8889	<1	ns
error III	98,200.7490	72	1,363.8993		
C x D	147,355.6684	2	73,677.8342	137.75	$<.001$
A x C x D	3,815.5576	2	1,907.7789	3.57	$<.05$
B x C x D	1,367.9249	2	683.9625	1.28	ns
A x B x C x D	283.5178	2	141.7589	<1	ns
error IV	84,510.0548	158	534.8738		

TABLE 11

Tests for Simple Effects

Source	SS	df	MS	F	p
Sex x Seat Position x Individual Movement:					
C_1 (Seat Position Left)					
A (Sex)	1,872.5479	1	1,872.5479	2.30	<.1
D (Indiv. Move. Zones)	212,780.2592	2	106,390.1296	133.93	<.01
AD	8,803.5101	2	4,401.7551	5.59	<.01
C_2 (Seat Position Right)					
A (Sex)	68.4807	1	68.4607	<1	ns
D (Indiv. Mov. Zones)	135,639.6802	2	67,819.8401	85.37	<.01
AD	2,895.0183	2	1,447.5142	1.84	ns
Error D	182,710.8038	230	794.3948		
Error A	109,270.6974	266	786.7319		
Sex within Zones:					
Seat Left					
A at D_1 (zone 1)	145.7100	1	145.71	<1	ns
A at D_2 (zone 3)	44.60	1	44.60	<1	ns
A at D_3 (zone 5)	5,147.7197	1	5,147.7197	4.46	<.01
Error between and within	124,760.6426	108	1,155.1911		
Zones within Sex:					
Seat Left					
D for females	76,666.7490	2	238,333.7451	18.00	<.01
D for males	34,125.1347	2	17,062.5973	12.51	<.01
Error D	98,200.7490	72	1,363.8993		
Seat Right					
D for females	42,767.5551	2	21,383.7776	15.68	<.01
D for males	26,499.4991	2	13,249.8996	9.71	<.01

TABLE 12

Mean Frequency Individual Movement (in frames)

		ZONES (1) Right	(3) Middle	(5) Left
F	Seat Left	2.028	39.00	169.72
	Seat Right	57.300	133.14	2.07
M	Seat Left	9.710	43.25	125.06
	Seat Right	66.700	111.32	8.04

TABLE 13

Toy Selection During Videotaped Session (n = 80)

	F3	F4-5	M3	M4-5
Dolls	19	18	9	7
Trains	3	4	7	13
(Totals)	22	22	16	20

TABLE 14

Mean Frequency Observed Dyadic Proximity by Toy Selection

During Videotape Session (Males Only) (N=18)

	3 year males					4-5 year males				
	close	moderate	far	front table	off	close	moderate	far	front table	off
dolls	.31	.56	.11	.01	.02	.10	.55	.12	.13	.07
	s^2=.04	.05	.02	.0001	.0003	.007	.001	.001	.0001	.02
	(n=4)					(n=2)				
trains	.13	.41	.26	.09	.15	.12	.46	.26	.18	.002
	s^2=.01	.03	.01	.02	.02	.01	.06	.04	.16	.0
	(n=3)					(n=5)				
mixed	.003	.26	.69	0	.05	.11	.65	.905	.01	.09
	(n=1)					(n=2)				

TABLE 15

Mean Relative Frequency Individual Movement by Toy

Choice During the Videotaped Session

		3 years Males							4-5 years males						
		1	2	3	4	5	6	7	1	2	3	4	5	6	7
Dolls		.06	.10	.37	.13	.33	.003	.001	.06	.15	.35	.19	.14	.10	.001
	$S^2=$	.02	.03	.09	.02	.15	0	0	.008	.08	.39	.29	.20	.39	0
		(n=9)							(n=7)						
Trains		.31	.12	.21	.08	.13	.08	.07	.16	.16	.17	.10	.31	.08	.14
	$S^2=$	.14	.03	.22	.01	.03	.03	.002	.05	.01	.03	.01	.13	.07	0
		(n=7)							(n=13)						
		3 years females							4-5 years females						
Dolls		.01	.12	.32	.10	.31	.01	.93	.07	.12	.32	.11	.17	0	.0002
	$S^2=$	.03	.02	.08	.02	.14	.001	.07	.02	.03	.11	.03	.37	.001	.008
		(n=19)							(n=18)						
Trains		.26	.16	.21	.02	.34	.01	.01	.13	.17	.30	.14	.25	.04	.02
	$S^2=$	.16	.05	.13	.001	.33	.0002	.0001	.03	.04	.06	.03	.08	.002	.001
		(n=3)							(n=4)						

TABLE 16

Average Projective Proximity (in inches)

	3 years			4-5 years		
	M-M	M-F	F-F	M-M	M-F	F-F
Female	4.41 (S^2=5.7) (n=22)	4.27 (6.20)	4.18 (6.40)	4.91 (S^2=12.4) (n=22)	3.73 (3.50)	4.23 (10.90)
Male	3.88 (S^2=1.9) (n=16)	3.56 (2.10)	3.38 (1.60)	4.70 (S^2=11.3) (n=20)	4.85 (6.20)	5.95 (17.60)

TABLE 17

Projective Proximity

	Same-sex pair	Opposite-sex pair	Mixed-sex pair
Number choosing close proximity (1-2")			
F (n=44)	4	2	2
M (n=36)	4	6	3
Number choosing moderate proximity (3-4")			
F (n=44)	32	28	34
M (n=36)	23	21	23
Number choosing far proximity (5+")			
F (n=44)	8	14	8
M (n=36)	9	9	10

TABLE 18

Correlation Between M-M and F-F

Projective Proximity

	3 years	4-5 years
Female	+.84 (z=3.85, p $<$ .01) (n=22)	+.38 (n=22)
Male	+.14 (n=16)	+.12 (n=20)

TABLE 19

Correlation Between Preferred Projective Same-Sex Proximity and Relative Frequency Zone 1 or 5 Movement

	3 years	4-5 years
Female	+.32 (n=22)	-.13 (n=22)
Male	+.08 (n=16)	+.20 (n=20)

TABLE 20

Correlations Between Relative Frequency Observed Proximity and Projective Proximity, Same-Sex Pair

		3 years		4-5 years	
		CLOSE	FAR	CLOSE	FAR
Projective Proximity Same-Sex Pair	Female	+.10 (n=11)	+.34	-.06 (n=11)	-.42
	Male	-.73* (n=8)	+.13	-.18 (n=10)	+.48

*z=1.93, p < .1

TABLE 21

Average Sex-Role Identification Scores.

Picture Test and Toy Choice Measure

	3 years		4-5 years	
	Picture Test (total=3)	Toy Choice Test (total=9)	Picture Test (total=3)	Toy Choice Test (total=9)
Female	1.77 (n=22)	5.91	1.9 (n=22)	7.0
Male	2.06 (n=16)	6.75	2.35 (n=20)	8.2

TABLE 22

Correlations Between Picture Test

x Toy Choice Test

	3 years	4-5 years
Female	+.40 (n=22) z=1.83 $p < .1$	+.03 (n=22)
Male	-.03 (n=16)	+.17 (n=20)

TABLE 23

Two-Way AOV, Fixed Effects.

Picture Test Scores

	SS	df	MS	F	p
Sex	.015	1	.015	<1	ns
Age	3.615	1	3.615	5.75	$<.05$
Sex x Age	1.51	1	1.51	2.4	ns
Error	47.85	76	.629		
Totals	52.991	79			

TABLE 24

Two-Way AOV, Fixed Effects.

Toy Choice Scores

	SS	df	MS	F	p
Sex	.115	1	.115	<1	ns
Age	103.52	1	103.52	65.69	$<.01$
Sex x Age	21.005	1	21.005	13.33	$<.01$
Error	119.75	76	1.576		
Totals		79			

TABLE 25

Correlations Between Sex-Role Identification and Individual Movement (by Seat Position)

	Seat Position Left			Seat Position Right		
	Zone 1(4)	Zone 3	Zone 5(L)	Zone 1(R)	Zone 3	Zone 5(L)
Picture Test:						
F(3) (n=11)	+.49	-.23	-.49	+.35	+.41	+.42
Toy Test:						
F(3) (n=11)	-.43	-.06	-.09	+.13	+.07	+.59
Picture Test:						
F(4-5) (n=11)	-.52	+.44	-.16	-.57	+.38	+.28
Toy Test:						
F(4-5) (n=11)	-.77* (z=2.46)	-.62	-.07	-.41	+.09	+.27
Picture Test:						
M(3) (n=8)	-.63	+.36	+.26	-.50	+.45	-.10
Toy Test:						
M(3) (n=8)	-.63	-.02	-.09	+.28	-.41	-.13
Picture Test:						
M(4-5) (n=10)	-.04	+.47	+.27	+.30	-.65	+.19
Toy Test:						
M(4-5) (n=10)	-.20	+.16	-.16	+.26	+.10	+.25

TABLE 26

Same-Sex Projective Proximity Choices by High versus Low Toy Choice and Picture Test Score

		Close (1-2")		Moderate (3-4")		Far (5+")	
		T	P	T	P	T	P
F	High	0	1	21	17	3	4
(n=44)	Low	4	3	11	15	5	4
M	High	2	2	8	10	7	5
(n=36)	Low	2	2	15	13	2	4

Moderate Distance

Toy Choice

	High	Low
F	21	11
M	8	15

$\chi^2 = 7.47$, df = 1

$p < .01$

FIGURES

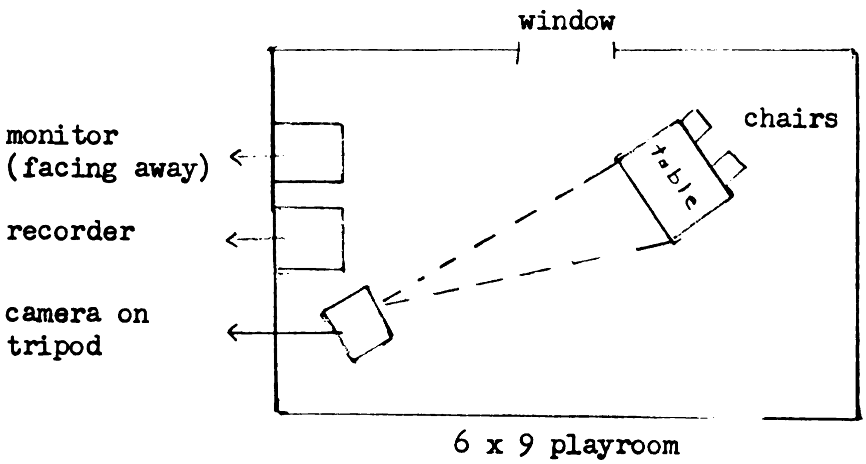
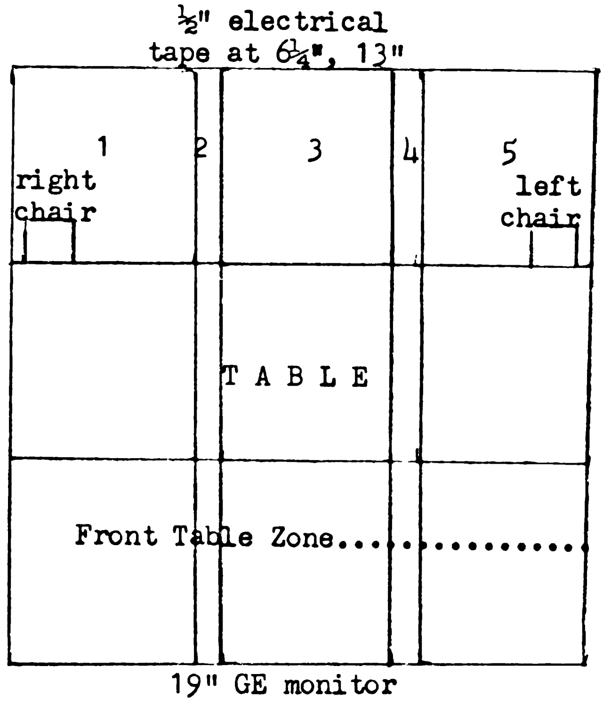


FIGURE 1

Physical Arrangements for Videotape

Sessions (both schools)



Note: Proximity zones are derived from the above and are degined in the Appendix.

FIGURE 2

Depection of Individual Movement and

Dyadic Proximity Zones

APPENDIX

APPENDIX

RULES FOR CODING PROXIMITY AND INDIVIDUAL MOVEMENT

Individual Movement: The observer is to watch only one pair member during a tape viewing. S is considered to be in zones 3 or 5 only when facial features (e.g. both eyes, nose, mouth) are within that zone. Hair, forehead, or chin may intersect the tape line, however. When the head is turned to the side or away, judgment is based on whether eyes, nose, and mouth would be within the appropriate zone. Zones 2 and 4 are idicated when S's eyes, nose, or mouth intersect those lines. When facial features are not visible, as when S goes to the front of the table and plays with his back to the camera, estimation of tape intersection is necessary.

"Front table"--S is at the front of the table or on the side near the front. Side position near the back of the table is coded "1" or "5".

"Off"--S is coded "off" when no part of body is visible. When hands playing with toys are seen, S is coded as being in the zone in which the hands are observed. No audio cues to S position are considered.

Proximity: Both pair members are viewed simultaneously. When a S's head intersects a tape line, the S is considered to be within the zone in which most of the head falls. When the tape appears to exactly bisect the head, the S is considered to be within the zone to his left. For example, if S 1 is in the zone 1 and S 2's head exactly bisects the zone 2 tape, both Ss are considered to be in the same zone, and "close" proximity is recorded.

"Front table"--One S only is at front table (as defined above) the other is in a back table zone. When both Ss are in the front of the table, they are coded as being in the relevant proximity zone.

"Off"--One or both Ss are off-camera, as defined above. No distinction between joint versus single off-camera position is made.

Frequency: The number of instances of, for example, "close" proximity by a dyad over the total number of frames in which the dyad is observed (excluding those frames in which E is present).

Duration: The number of frames in which a given zone position is maintained. Frame number length is later converted in number of seconds by determining average number of seconds duration for each 50 frames.

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