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Dyadic Approach and Withdrawal Sequences of Preschool Children when Interacting with an Adult Male

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DYADIC APPROACH AND WITHDRAWAL SEQUENCES OF PRESCHOOL CHILDREN WHEN INTERACTING WITH AN ADULT MALE

by

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of

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Thirty-eight preschool children (20 male and 18 females) were filmed in a seated dyadic interaction with an adult experimenter. Frame-by-frame film analysis was done for head and arms of subjects and head, arms, and legs of experimenter for experimenter and subjects approach and withdrawal movements. Chi-square analysis were performed for the data both between and within zones with the following cells: approach-approach (A-A), experimenter and subject approach each other; approach-withdrawal (A-W), experimenter approaches and subject withdraws; withdrawal-approach (W-A), experimenter withdraws and subject approaches; withdrawal-withdrawal (W-W), both subject and experimenter withdraw.

The most frequent and significant movements for each zone and body part were A-W and W-A. It was found that in the 3 foot zone the

A-W cells (of the 2 X 2 contingency table) were the most frequent dyadic movements. For the 2 and 1 foot zones the W-A cells were the most frequent. For all three one-foot zones the W-W and A-A were respectively the least frequent dyadic interactional patterns. The intimate zone of personal space was found to be larger than the 18 inches previously identified for adults; it was found to be over 24 inches. Modifications for personal space and equilibrium theories to accommodate present findings are advanced.

(73 pages)

Introduction

Personal space is conceived of as a portable territory that one carries around with him (Sommer and DeWar, 1963). Research involving the way personal space is used has been conducted with animals and man (Hediger, 1950, 1961; Kummer, 1968; Hall, 1966; Sommer and DeWar, 1963; Somer, 1969; Felipe and Sommer, 1966; Castell, 1970; Goffman, 1971; Patterson, Mullens and Romano, 1971; Altman, 1975).

Two concepts that are closely allied to personal space are territorality and approach-withdrawal interaction. Territorality is analogous to personal space except that it refers to a definite area of space (Somner, 1966). For example, a parcel of land that a group calls its own is a territory. Issues concerning territorality have also been found to be present in both animals and man (Kummer, 1968; Hediger, 1950, 1961; Altman, 1975; Edney, 1975). Approach-withdrawal interaction is a concept that refers to movements made by individuals that follow particular patterns of space maintenance (Argyle and Dean, 1965; Peery, 1975). For example, as person A moves toward person B, B will move away from A. The aspects of territorality, personal space and approach-withdrawal interaction will be viewed as a means of boundary-space-distance regulation (BSDR). People will be seen to use

these three methods of regulation for maintaining a comfortable interactional distance (or prevention of interaction) with others in their environments.

Territorality

Altman (1975) states that territorality is a

> ...self/other boundary-regulation mechanism that involves personalization of or marking of a place or object and communication that it is 'owned' by a person or group. Personalization and ownership are designed to regulate social interaction and to help satisfy various social and physical motives. Defense responses may sometimes occur when territorial boundaries are violated. (p. 107)

Territorality can then be seen as a means of providing an individual with an object or a physical place. A territory can be anything from a large land like a country to a small area like a room. As Altman (1975) states, it can also refer to an object like a sweater, car, home, basketball, or the like.

Any object that is owned is marked. There are many ways that both animals and men mark a territory. A few of the methods used by animals are: Vocal sounds; bodily excretions; glandular secretions (Altman, 1975). Humans use books, clothing, body placement, and food (Sommer and Becker, 1969). These methods of marking are used to tell others that the area is taken.

Even though both men and animals place markers to inform others that an area is occupied, there are times when the marked area

is taken over by another individual or group either on a temporary or permanent basis. This is referred to as encroachment.

According to Lyman and Scott (1967) there are three types of encroachment. They are: Violation; invasion; contamination. Violation refers to an unwarranted entry or use of another's territory or domain. An example would be a woman using a men's restroom. This type of territory does not have a single owner, but is claimed by a group who have been given the area via cultural consent. Invasion refers to by-passing markers (boundaries) and taking over an area either on a temporary or a permanent basis. A distinction between those two types of encroachment was not drawn by Lyman and Scott. However, Altman (1975) states that invasion seems to refer to encroachment on a particular person or group. Violation in the men's room, for example, according to Altman, refers only to ignoring societal expectations of appropriate behavior. The final method of encroachment mentioned by Lyman and Scott (1967) is contamination. This refers to rendering a place impure. Defecation, urination, or spitting on someone else's property are concrete examples of territorial encroachment by violation.

When one encroaches upon the territory of another, there are several reactions that can occur either to warn the intruder of his encroachings or to repel the intruder. A few of the responses that can occur are repetition of the markings, vocal warnings, nonverbal warnings (gestures, arm wavings, facial expressions, etc.), active defense,

and aggressive behavior (Altman, 1975). An example of territorial defense is of two children that are playing together. If one child took the other's toy, then the owner of the toy might grab it back from the first child and yell, "No, it's mine!" The purpose of these behaviors are to provide a warning signal to the encroacher that he/she is violating an owned area and that the owner will not permit encroachment.

If an intruder does not yield to the warnings of the protector of the territory, then defense of the territory might occur (Hediger, 1950; Altman, 1975). The protector would try and maintain his/her domain by actual fighting, if necessary. For example, children will fight to retain possession of their toys if they are taken from them by other children. The action would be taken to show that the toys do not belong to those who tried to take them. As in the earlier example, if one child persisted in taking another child's toy, then the owner of the toy might hit the child and leave to play by himself.

Due to the basic nature of territorality (i.e. having a territory for one's own and preventing the unauthorized use by intruders) it can be seen as a means of BSDR. Using devices such as markings, vocal and active defense of an area, an animal/human can keep unwanted others out of the domain. Individuals can also be invited into the area. For example, in Altman's (1975) childhood recollections, it was not mentioned that some children were likely to interact in a friendly manner in both the Irish and Jewish communities. These interactants might have only been two children playing together. At the times these

interactants were together the boundaries of the communities would have been relaxed for these friends, and in time the boundaries would have been relaxed for the friends, in both areas, because it would have been known by all that these children had a friend in the other community.

As a means of BSDR, territorality serves the function of keeping others out of one's area, space, place, or the like until allowed in by the owner of the physically defined territory.

Personal Space

Personal space, like territorality, has to do with a bounded area. However, unlike territorality, personal space deals with the area that surrounds an individual (Goffman, 1971). Sommer (1969) describes it as follows:

> Personal space refers to an area with an invisible boundary surrounding the person's body into which intruders may not come. Like the porcupines in Schopenhauer's fable, people like to be close enough to obtain warmth and comradeship but far enough away to avoid pricking one another. Personal space is not necessarily spherical in shape, nor does it extend equally in all directions... It has been likened to a small shell, a soap bubble, an aura, and 'breathing room'. (p. 26)

Personal space is not limited to man alone. The phenomenon is also found in animals. Altman (1975) states that ethologists have studied personal space in animals for several years by observing their habits in natural settings. Hediger (1950) found that animals often maintain distances from other members of their groups or species. He noted that distances from each animal were remarkably constant. An example was given by Hediger of birds sitting on fences or telephone

wires. The distances between the animals were noted to appear to be paced off because the distances between each bird appeared to be equal.

Sommer (1969) stated that personal space is a boundary that prevents intruders from entering the space of an individual. While this definition is useful, it is not totally correct. Personal space is made to sound like a fortress that will repel all invaders, instead of a series of behaviors that check whether an approacher should be encouraged in his approach or discouraged from coming further. Hall (1966) in accordance with the sentry idea, states that personal space is a series of "bubbles" that surround a person. These "bubbles" are each of a different intensity, and people will regulate these "bubbles" to allow others into the more intense regions, depending on how intimately they are known, crowded conditions, and so forth.

Hall states that a person has four "bubbles" or zones over which he has control. The regions are the intimate cultural distance (0 feet to 1-1/2 feet away from the person), the personal cultural zone (1-1/2 feet to 4 feet away from the person), the social cultural distance (4 feet to 12 feet away from the person), and the public cultural distance (12 feet to 24 feet away from the person).

The intimate culture distance is usually reserved for very personal relationships. Physical contact is usually considerable in this zone. In private situation, this closeness would permit extensive communication which could involve smell, touch, sound, and heat. The

public cultural distance is also a zone that is mostly reserved for intimate contacts. This is usually the distance which people reserve for contacts of a friendly nature. This zone still permits touching to take place, if it is desired, but the distance factor limits close embrasses. This zone is a transitional area between intimate contact and formal public behavior. The next zone, according to Hall, is the social cultural distance which is usually reserved for business and general social contact. People who work closely together and casual acquaintances usually are found to interact in this area. People will usually interact in this zone in public settings. Examples of people interacting in this zone have been observed by Hall (1966) and others in airports, in offices, and in public conversations on street corners. The final zone of personal space described by Hall, the public cultural distance, is typically used for formal occasions or meetings, public speakers, or for interactions with high-status persons. Lectures in classrooms, and public speakers are usually placed a minimum of 12 feet away from the audience they are addressing. The furthest zone of personal space is shown in a courtroom. Judges, lawyers, jurors, and defendants are usually placed so that most of the interaction with each other occurs within the public zone of personal space.

Each of these zones as described by Hall (1966) is used to avoid inappropriate intrusions upon others and to regulate interaction between people. An analogy is given by Hutton (1972) of the cell membrane. The boundaries of the membrane shift with outside forces and the

internal dynamics of the cell. The membrane will shift to achieve an acceptable functioning level. As nutrients are needed, for example, the cell membrane will become permiable and the nutrients can pass to the mitochondria for cellular digestion; as nutrients are not needed, the cell membrane will become less permiable and the nutrients will be kept further away from cellular ingestion.

Altman (1975) believes the work which has been done by Hall leads to some implicit notions. These ideas are that "...1) the zones are not necessarily universal, there are wide cultural variations in what behaviors are permissable in each zone and what distances are appropriate with certain persons in certain settings. (2) the zones are not important in terms of physical distance per se; they are important because of the interpersonal communication possibilities they offer." (p. 60) The work of Hall (1966) does imply personal space interaction is dependent upon many factors. The question arises, what factors help to determine what zone is utilized during interaction?

According to Hall (1966), when two people come into contact with one another, the degree of prior intimacy between them will determine how closely they will approach each other; those which are more intimate will come closer to one another than those that are acquaintances or strangers. Mehrabian conducted a series of studies which examined nonverbal behavior and interpersonal attraction (Mehrabian and Ferris, 1967, Mehrabian, 1968a, 1968b, 1969; Mehrabian and Williams, 1969; Mehrabian and Diamond, 1970, 1971). The results of

these studies indicated that the more favorable a social relationship is, the closer two interactants will approach (greater eye contact, greater forward body lean, and more smiling were also observed). These positive relationships created more permiable boundaries around the participants, and were shown in the many positive nonverbal behaviors.

Factors of social class also appear to have an affect on which zone a person is allowed into. Lott and Sommer (1967) performed an experiment in which they tested subjects with those who were either perceived as lower or higher status individuals. The results indicate that individuals tend to keep a greater distance between themselves and persons of lower and higher social status, than individuals who are of an equal social standing. The same status people were allowed into the personal cultural distance zone more often than the perceived higher class or lower class individuals. This occured when the subjects were allowed to seat themselves in a room when either the lower, same, or higher status confederates were already seated in the room.

It would seem from the results of the experiment of Lott and Sommer that people tend to feel more comfortable with strangers who appear to be of the same social class they are. Still, one is not going to allow same class individuals into their two most inner zones under normal conditions unless they are intimately known. This would be predicted by Hall (1966) and the series of Mehrabian studies.

A third factor that tends to ease the rigidity of personal space is the degree of familiarity with a place. Castell (1970) tested 1 1/2

to 3 year old children in their own homes and in a strange place. The results were as expected; the children stayed closer to their mothers in the strange place as opposed to their home environment.

What occurs when strangers violate the inner zones of one's personal space? The usual reaction is a tendency to try and accommodate to the reactions of the intruder, if possible, or to remove one's self from the violator.

Felipe and Sommer (1966) demonstrated that if a personal space violation occurs, then a reaction from the violated person will follow. During the experiment in a university library, the experimenter was to sit near a subject. He was to sit very close to the person and maintain a close body contact, trying to touch shoulders. However, if this was not possible, then the experimenter was to keep within the intimate zone of the subject. The results indicated that the subjects would try to adjust to the experimenter "sitting too close." They tried various methods of accommodating to the violation of the experimenter. The person would, "turn aside, interpose a notebook between himself and the stranger, and pull in his elbows." If this failed to reduce the tension that the subject felt, flight reactions occurred.

In a subsequent study, Felipe and Sommer (1966) found that individuals in mental institutions also reacted when their personal space was violated. The reactions of the mental patients were approximately equal to the reactions of the students in the university library. The patients tried to accommodate to the encroachment of the

experimenter; if this did not work, then the subjects would take flight from the experimental condition.

Patterson, Mullens, and Romano (1971) found in a library experiment, that the subjects reacted to the close sitting experimenter by leaning away, reorienting their body, glaring, and blocking themselves from the intruder (placing their elbows or hands between their bodies and the experimenter). These results were also similar to those obtained by Felipe and Sommer (1966) and Goffman (1971).

There are many reactions that can occur when the personal space of a subject is violated. Head aversion, eye aversion, placing of body parts or objects between the subject and experimenter, relocating one's body in relation to the experimenter, and flight reactions can occur.

The age at which personal space develops has not been determined, there still remains a great deal of controversy. Some researchers feel that personal space is not developed to any great degree until the person is between 9 and 12 years old (Meisels and Guardo, 1969; Guardo, 1969). Guardo (1969) used a testing approach to see if sixth-grade children could determine differences in personal space zones. Situations were portrayed on paper with figures in interaction. The children traced themselves on a card by a silhouetted figure that represented a friend, acquaintance, stranger, or enemy. From the results of the experiment, Guardo concluded that the facets of personal space at the adult level,

that she investigated, were established and learned by the time that the child was 11 or 12 years old.

Meisels and Guardo (1969) concluded from their work that the personal space zones of a child, associated with degree of liking, were established by the time the child was in third grade. The test given depicted different situations the children were asked to place a silhouette representing themselves in a face-to-face relationship with another figure representing others. The children were given several situations in which they placed the figures: with a friend, acquaintance, stranger, someone they liked very much, someone neither liked nor disliked, someone disliked very much, and someone feared.

Other researchers have concluded that children possess degrees of personal space at ages earlier than those suggested by either Guardo or Meisels. Jones and Aiello (1973) studied the differences between subcultures of the first, third, and fifth graders in New York City. The study attempted to determine if the subcultures differed in the distances they stood from a member of their own culture. The results indicate that there is a difference in the patterns of distance used by the different subcultures. However, the basic contention of Hall (1966) that proxemic patterns are learned early in life as supported by the investigation. Scott (1974) had children identify activities on different cards. The children were to make up a story about the interactants. The cards depicted people in each of the different zones Hall (1966) had identified. Scott found that kindergarten children identified the different zones with

chance results. However, as the grade level went up the children began to identify the zones with greater accuracy. He stated that by the time that children were 8 years of age they will be able to identify the personal space zones well. Scott states the public cultural distance and the intimate distance are the first two zones developed. The other two zones develop later. Eberts and Lepper (1975) conducted an experiment on children who were of preschool age. A bowling game was used to examine eye-contact which has been found to be an important variable in adult spatial behavior (Argyle and Dean, 1965). The child approached an adult experimenter, and the distance was recorded. It was found that eye-contact increased interaction distance. This finding follows the work and theories of Hall (1966) about how strangers will interact with one another. Eberts and Lepper (1975) replicated the experiment a month later and found good stability for the child's spatial behavior across experiments with children and adults. Eberts and Lepper conclude that personal space is acquired early in the development of the child.

Differences in results of the studies presented can be divided into two areas. The first area is that of a cognitive base. The children are asked to identify the different aspects of personal space from cards. In order to correctly identify the tasks correctly, the children must have a cognitive understanding of different types of people (friends, acquaintances, strangers, and so on). The children must know that some people should not be allowed to approach them. This is

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especially true of strangers and some members of various cultures. Children begin to understand the importance of distance from others when their parents begin teaching them attitudes needed for protection. For example, "Don't go anywhere with strangers," "Keep your hands to yourself," "Don't play with them because they are not like us," and "Don't get so close to me." All of these instructions that parents give their children will help to bring them to an understanding that people are treated differently, depending upon how intimately one knows them.

The second area of the difference in the results of the studies presented is that the children do not have a cognitive understanding or cannot verbalize what someone does and why someone performs a certain action; one performs an action and does not know why. This helps to explain why kindergarten children had only chance results on zone identification (Scott, 1974), yet preschool children were able to use eye-contact with a stranger as a judge for the distance that they would approach the experimenter (Eberts and Lepper, 1975).

Altman (1975) states personal space defense is a dual interaction. When an encroachment of personal space occurs the tendency is to rezone the interaction (back away). However, if the distance between two people is too great, then the distance will be decreased. People react to one another in such a way that the entire behavior response is to establish "...an appropriate boundary system." (Altman, 1975, p. 87) This reaction has also been observed by other researchers in different circumstances (Sommer, 1962; Kleck, 1970; Haase, 1970).

In summary, personal space is a mechanism that deals with protection. It involves a complex set of feedback mechanisms that either allow an individual into a closer zone, or allows an individual to approach to a comfortable zone or distance. When an individual is invaded, accommodation responses, flight reactions, or nonverbal behaviors will come into play to help maintain appropriate boundaries. There seem to be a set of equilibrium responses to assist an individual in maintaining a comfortable distance from others which is neither too close, nor too far away.

Seeing personal space as a series of flexible "bubbles" that are relaxed according to circumstances and will, helps one to understand this mechanism as a maintenance device to help keep unwanted persons from approaching more closely "than is comfortable." As a mechanism of BSDR, when personal space is violated, reactions will occur to help bring about an equilibrium position which will help interactants maintain a comfortable distance from one another.

Approach and Withdrawal

Placing this dual interaction concept into practice, Argyle and Dean (1965) proposed an approach and withdrawal theory of proxemics. They stated that a person is both repelled and attracted by another. They also state that one will take up a position of equilibrium in an interaction. With someone who is liked, the approach forces would be

stronger than the repelling (withdrawal) forces and greater proximity would result.

Approach and withdrawal reactions are responses exhibited by individuals when they defend against zone violations of their personal space.

Argyle and Dean (1965) believe equilibrium movement has an affect on more than physical distance between people. As was found by Eberts and Lepper (1975), Argyle and Dean (1965) say eye-contact will decrease as closer body distances are achieved. They state that decreased eye-contact is part of an equilibrium system. As eye-contact decreases or increases, among interactants the physical distance will increase or decrease accordingly. An inverse relationship is said to exist.

Approach and withdrawal interaction has to do with boundary protection and maintenance. The concept is new and has only been studied by a few researchers utilizing special equipment (Peery, note 1; Stern, 1971). The techniques which have been used to study approach and withdrawal interactions have used motion-picture film, and the data have been analyzed frame-by-frame (Peery, note 1; Stern, 1971).

Approach and withdrawal interaction consists of both withdrawal sequences and approach sequences in one subject of a dyad coupled together in an inverse relationship in the other subject. Approach sequences are bodily movements toward the other interactant. Withdrawal sequences are bodily movements away from the other individual. This

definition appears similar to the notion of personal space discussed earlier. The one distinction that must be made is that the approach and withdrawal interactions occur too quickly to be observable; a micro-analysis technique must be used.

A typical micro-analysis involves filming an interaction between two or more individuals and then analyzing the film frame-by-frame to see the approach and withdrawal interactions which had occurred.

The approach and withdrawal interaction fits the equilibrium model advanced by Argyle and Dean (1965). The movements maintain a comfortable distance between individuals and signal and kinds of movements desired or anticipated. However, there is more to the interaction than just maintaining distance. The interaction might be seen as maintaining a constant tension level between the interactants. As the participants come too close to one another, or go too far away, a tension level will be generated which will be either too high or too low for the comfort of the interactants. The interactants react to restore the equilibrium position for both the tension level and distance, thus bringing the interaction back into an acceptable level for both participants.

Stern (1971) found approach and withdrawal patterns between a mother and her three month-old twins during social interaction in close proximity. He performed frame-by-frame film analysis of his subjects and found highly significant approach and withdrawal interaction patterns during synchronous interaction when the mother was leading with a time

lag of 1/4 second. The children's heads turned away from their mother's face as she approached them. When the mother withdrew, the twins returned their gaze to her.

Similar to the findings of Stern (1971) are those of Perry (note 1), Perry used two day-old neonates as subjects. He had an adult experimenter get the neonates' attention and make several approach and withdrawal movements. Peery found that the children turned away when the experimenter approached, and the children turned toward the experimenter when the experimenter moved away from the neonates. Peery also used frame-by-frame film analysis.

The reason for film analysis in these studies is the movements occured too quickly for in vivo observation. The interactions occurred on a micro-level of interaction.

When one looks at the information on personal space and approach and withdrawal interaction, several similarities can be found: 1) both personal space and approach and withdrawal are means of maintaining a certain interaction level, they both utilize an equilibrium (or dual interaction) position of proxemics; 2) they both help to guard an individual against encroachment of bodily space. Besides having similarities, there are differences among personal space and approach and withdrawal. The one major difference is the method of observation. Personal space can be observed in vivo. However, the approach and withdrawal interaction cannot; one needs to observe this interactional sequence with frame-by-frame film analysis as has been used by previous researchers.

When one examines the body of literature on personal space and the approach and withdrawal interaction, the two ideas are very similar regarding defense of bodily space. But, when the work of Stern (1971) and Peery (note 1) are examined, these concepts do not seem identical. If they are, why does approach and withdrawal appear in infants? The work which has been done on personal space would predict that infants would not exhibit any proxemic-type behaviors.

Apparently personal space and approach and withdrawal reactions are similar, but not identical.

Since the concept of approach and withdrawal interactions has not been tested in preschool children, and the concept of personal space has been, in a limited way by Eberts and Lepper (1975), a comparison can be made which will help to determine if these two concepts are the same or different.

One of the basic problems that is noted in the past research on personal space is that children tested have been asked to identify the zones of personal space with cards, figures, or stories. Since personal space is a non-verbal behavior, it is difficult to describe. However, when this task is asked of preschool children (Guardo, 1969; Meisels and Guardo, 1969; Scott, 1974) the results obtained fall into question because preschoolers have limited verbal capacity and are not able to describe what they "know" accurately.

Because of the problem of preschoolers having limited verbal capacity, these children may have more than the intimate zone developed

as noted by Scott (1974). They may have developed four or more zones of personal space. However, because they are not able to identify zones in simulated interactions (stories, talking about it, and so forth), this does not preclude the presence of zones. The most accurate way to test whether zones are developed is to perform an in vivo study.

This study will examine the reactions of preschool children and their interactions with an adult across the boundaries that are identified by Hall (1966) as the intimate and personal. Reactions in each of three one-foot zones will be compared and contrasted.

This study will clarify whether 1) approach and withdrawal sequences are present in preschool children in a dyadic interaction with an adult experimenter as Peery (note 1) found with neonates, 2) if these approach and withdrawal sequences are present, then what will occur across different zones of personal space as measured in one-foot segments, and 3) what relationship exists between personal space and the approach and withdrawal sequences.

Since the study is exploratory specific hypotheses will not be generated. The only purpose will be to see if the approach and withdrawal interactions are present in preschool children, and if there is a relationship between them and personal space.

Method

Subjects

A total of 38 preschool children from the Child Development Laboratories (20 males and 18 females) were filmed with an adult male experimenter. The ages ranged from 3.5 to 5.5 years old ($\bar{X}$ = 4.4 years old). The subjects were predominately middle-class Caucasians from the communities around the university.

Data Collection

Subjects were filmed utilizing a Kodak XL-55 Super 8 mm movie camera, with a zoom lens, set on a tripod. High Speed Ektachrome film was used to avoid the need of extra light. Filming took place in the Faculty Lounge, which was selected because of its pleasant surroundings and its home-like atmosphere. Altman (1975) from his review of the literature states that when previous contact is had in a location, people will be more willing to be in closer contact with others. Even though the children had no previous contact with the surroundings of the lounge, the homey atmosphere of the room was expected to have generalizable associations with their own homes. Thus, the children were expected to be more relaxed than in less homey surroundings. A small child's chair was used by the children and a regular chair was used by the experimenter. The floor was marked off in one-foot

(30.48 cm) segments by the use of masking tape. The markings were used as a distance marker during data analysis.

The camera was placed at one end of the room behind a partition. Only the camera lens was visible. The partition was placed approximately 25 feet from the chairs (see Appendix A).

Procedure

The children were told that they would get to try two kinds of candy and report which they preferred. The children were seated next to the experimenter at an angle of 45 degrees. The experimenter gave the children the first piece of candy, and while the children were eating it, the experimenter made several approach and withdrawal interaction sequences. The experimenter approached and withdrew from the children with his head, arms, and legs. Care was taken so that if more than one body part was in motion at once the direction of the movement was the same. After the children had eaten the first piece of candy, the children were given the second piece of candy to sample. While the children were eating it several more approach and withdrawal sequences were performed. The entire sequence was filmed.

Scoring

The film was analyzed on a hand operated Lentar "Dual 8" editor for super 8 mm film that allows analysis frame-by-frame. With this editor, segments of behaviors were analyzed one-at-a-time, and the behaviors (or Frames) were viewed in sequence. A scoring sheet to

count the behaviors was devised (see Appendix B). The approaches and withdrawals of the body parts of both the experimenter and subjects were analyzed separately and independently across the three one-foot (30.48 cm) zones that the experimenter's body parts crossed (see Appendix C).

Within each zone, scoring was handled by observing the independent body movements exhibited by the head, arms, and legs of the experimenter, and the head and arms of the subjects. Approach and withdrawal movements were analyzed separately for each body part. The only body parts scored were head and arms for subjects because pilot analysis with 4 subjects (2 male and 2 female) revealed that the leg movements of the subjects were not significantly ($p > .05$) related to the experimenter's movements. The torso of the subjects and experimenter in the pilot analysis had the same patterns as did their heads. Therefore, the torso was eliminated.

The data were taken from the scoring sheets and collapsed for each body part into 2 X 2 tables. Pilot analysis showed the movements exhibited by both the subjects and the experimenter could be seen as either an approach or withdrawal, perfectly lateral movements occurred less than .5 percent of the time and were not scored.

The cells in the tables were: approach-approach (A-A), both experimenter and child were approaching; approach-withdrawal (A-W), the experimenter approaches while the child withdraws; withdrawal-approach (W-A), the experimenter withdraws while the child approaches;

and withdrawal-withdrawal (W-W), both the experimenter and subject withdraw (see Figure 1).

Also, the data could be collapsed for each one foot zone to give 2 X 2 tables for the experimenter's body parts versus either the head or arms of the subject(s)'.

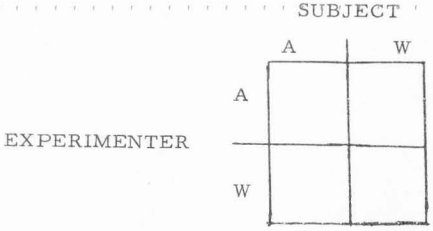

Figure 1. Sample 2 X 2 chi-square cell

Data Analysis

The data were analyzed in the following ways: 1) Mean frequency of occurance--this was performed for each of the three one-foot zones. These data were gathered to allow comparison between the different body parts and zones for the approaches and withdrawals. 2) Approach and withdrawal by dyad--a 2 X 2 table was generated for each subject, body part, and combination of body parts for each one-foot zone and a chi-square test was applied. The cells were A-A, A-W, W-A, and W-W. For example, the arms of the experimenter were divided into left, right, and combined total (which summed the results of both arms). The analysis was performed for each zone. 3) Approach and withdrawal

summed across dyads--percent of movements in each 2 X 2 cell were determined. These values were tabled for each subject by body part and summed into tables for males, females, and combined subjects.[1] A chi-square test was run for the normalized 2 X 2 tables to determine the significance levels of the data by body parts, and combinations of body parts. 4) Averages--the average percentages of significance for compared body parts for the raw data was computed and tabled for males and females. The percentage of subjects which had significance levels at or below .05, .01, and .001 levels of significance for the body parts were tabled. The percent contributed data were analyzed for each body part for males, females, and combined subjects. The significance level of each 2 X 2 table was determined from the chi-square value, and the results were tabled. These analyses were performed to make it possible to determine whether sex differences were present.

Intra-rater Reliability

An intra-rater reliability check was made by the original scorer to verify the original film analysis recorded. One subject was chosen at random and re-scored blindly.

A Pearson-Product Moment Correlation was calculated with N = 72 (all body parts compared) to check between scored and re-scored data. The correlation (r) = .908.

Results

Dyadic Analysis

Tables 1 and 2 show the percentage of the 2 X 2 chi-square matrices which reached significance at the levels indicated when comparing the direction of the subjects' head and arm movements with the direction of the experimenter's body parts are indicated. These analyses were performed to detect sex differences among the subjects. Also, they were performed to determine what percentage of subjects participated in the approach and withdrawal dyadic interaction at a statistically significant level. It was reasoned that for the combined data, high chi-square scores for only some subjects could bias the results. The mean number of movements per subject was 559.71 with the range being 387 to 762 movements. The three levels of significance were used to examine the percentage decrease for males and females to check if there were major drops in significance for the body parts of males and females.

The 2 foot zone had the greatest number or subjects which had results which were significant. While there were reactions at each zone, most of the movements occurred in the 2 foot zone (as can be seen in the totals for all three significant levels). The results described were influenced by the placement of the chairs used while interacting.

Table 1

Percentage of Significance for All Subjects for the Head of Males (M) and Females (F) vs Experimenter Body Parts for a Chi-square Analysis with df = 1

		Significance Levels								
		.05			.01			.001		
		distance (feet)								
		1	2	3	1	2	3	1	2	3
Head	M	60.0	85.0	65.0	35.0	70.0	45.0	10.0	20.0	15.0
	F	61.1	72.2	66.7	38.8	66.7	33.3	11.1	33.3	5.6
Arms	M	35.0	95.0	65.0	15.0	95.0	50.0	5.0	75.0	25.0
	F	22.2	94.4	77.8	16.7	88.9	61.1	5.6	61.1	38.9
left	M	0.0	75.0	55.0	0.0	55.0	45.0	0.0	35.0	20.0
	F	5.6	83.3	72.2	0.0	55.6	44.4	0.0	22.2	5.6
right	M	35.0	95.0	10.0	15.0	80.0	10.0	5.0	40.0	0.0
	F	27.8	83.3	33.3	5.6	66.7	11.1	0.0	22.2	0.0
Legs	M	20.0	90.0	10.0	20.0	80.0	5.0	10.0	80.0	0.0
	F	22.2	100.0	16.7	16.7	100.0	11.1	16.7	94.4	11.1
left	M	0.0	75.0	10.0	0.0	60.0	5.0	0.0	40.0	0.0
	F	5.6	77.8	16.7	0.0	61.1	11.1	0.0	27.8	11.1
right	M	20.0	70.0	0.0	20.0	65.0	0.0	10.0	45.0	0.0
	F	22.2	83.3	0.0	16.7	77.8	0.0	16.7	33.3	0.0
Totals	M	75.0	100.0	75.0	60.0	100.0	70.0	25.0	95.0	60.0
	F	72.2	100.0	88.9	55.6	100.0	83.3	33.3	100.0	66.7

N: Male = 20
Female = 18

Table 2

Percentage of Significance for All Subjects for the Arms of All Males (M) and Females (F) vs. Experimenter Body Parts for a Chi-square Analysis with df = 1

		Significance Levels								
		.05			.01			.001		
		1	2	3	1	2	3	1	2	3
Head	M	40.0	65.0	45.0	25.0	40.0	25.0	0.0	10.0	10.0
	F	66.7	55.6	27.8	44.4	27.8	16.7	5.6	5.6	0.0
Arms	M	30.0	90.0	55.0	15.0	80.0	35.0	0.0	60.0	10.0
	F	27.8	77.8	61.1	5.6	61.1	38.9	0.0	50.0	5.6
left	M	0.0	75.0	40.0	0.0	65.0	25.0	0.0	30.0	0.0
	F	0.0	61.1	50.0	0.0	50.0	16.7	0.0	22.2	5.6
right	M	30.0	85.0	5.0	15.0	60.0	0.0	0.0	30.0	0.0
	F	27.8	61.1	11.1	5.6	44.4	5.6	0.0	5.6	0.0
Legs	M	20.0	85.0	10.0	15.0	85.0	0.0	15.0	60.0	0.0
	F	16.7	83.3	16.7	5.6	72.2	5.6	5.6	66.7	0.0
left	M	0.0	65.0	10.0	0.0	50.0	0.0	0.0	25.0	0.0
	F	0.0	77.8	16.7	0.0	38.9	5.6	0.0	22.2	0.0
right	M	15.0	65.0	0.0	15.0	50.0	0.0	15.0	20.0	0.0
	F	16.7	77.8	0.0	5.6	55.6	0.0	5.6	22.2	0.0
Totals	M	60.0	100.0	85.0	35.0	90.0	60.0	20.0	90.0	35.0
	F	72.2	100.0	77.8	55.6	100.0	72.2	33.3	88.9	38.9

N: Male = 20
Female = 18

The angle at which the chairs were placed in relation to each other prevented a great deal of movement in the 3 and 1 foot zones. Thus, the 2 foot zone received the most interactional dyadic movement. The 2 foot zone maintained its higher significance across the three levels tested. The 3 foot zone had the next greatest percentage followed by the 1 foot zone. The percentage of movement pattern indicates that the greatest amount of bodily reactions occurred in the 2, 3, and 1 foot zones respectively. When examing the totals of Table 1 and 2 it can be seen that all zones hold a consistent pattern over the three levels of significance.

By inspection, it can be seen that there are no great differences between male and female subjects for the percentages of significance seen in Tables 1 and 2. The significance levels of body parts within zones and the totals are consistent. The row of totals (which sums across body parts) show that 100 percent of the subjects engaged in an interaction which produced statistically significant chi-square values, especially in the 2 foot zone. The concern that only a few subjects contributed to the statistical significance is, therefore, unfounded.

Table 3 shows the significance levels for the head and arms of combined male and female subjects when compared with the experimenter's body parts. The 2 foot zone because of the placement of the chairs, had the greatest number of movements. However, as can be seen by Table 3, these dyadic approach and withdrawal movements occurred at or beyond the .001 level of significance in each zone. The only exceptions

Table 3

Significance Levels for the Head and Arms of Combined Subjects vs. Combined Experimenter Body Parts for a Chi-square Analysis with df = 1 for Raw Data

	Combined Subjects (Head) distance (feet)			Combined Subjects (Arms)		
	1	2	3	1	2	3
Head	.001	.001	.001	.001	.001	.001
Arms	.001	.001	.001	.001	.001	.001
left	N.S.	.001	.001	N.S.	.001	.001
right	.001	.001	.001	.001	.001	.001
Legs	.001	.001	.001	.001	.001	.001
left	.05	.001	.001	N.S.	.001	.001
right	.001	.001	.05	.001	.001	N.S.
Totals	.001	.001	.001	.001	.001	.001

N = 38

to these interactional significance levels were the experimenter's left arm and leg in the 1 foot zone and his right leg in the 3 foot zone. This indicates that there is a pattern to these movements of either A-A (experimenter and subject approach each other) coupled with W-W (experimenter and subject withdraw), or A-W (experimenter approach and subject withdrawal) coupled with W-A (experimenter withdrawal and subject approach).

Table 4 presents the significance levels of the head, arms, and totals (combined head and arms) of the subjects when compared with the experimenter's body parts. The data presented have been normalized to see if the statistical significance is maintained when each subject is contributing equally to the chi-square analyses.

The data were normalized by computing the percent contributed to each cell of the chi-square analysis for every body part of the experimenter that the subjects' head and arms were compared with the total contribution of each subject, which was 1, instead of the actual number of movements were recorded. All of the data was summed and collapsed and an additional chi-square analysis was run on the normalized data.

For the head of the subjects, only the right leg of the experimenter in the 3 foot zone has no significance. The left arm and leg of the experimenter in the 1 foot zone and the right leg of the experimenter in the 3 foot zone did not reach significance at the levels of the other body parts. However, when the head and arms of the subjects are combined and examined together with the experimenter's body parts, only the

Table 4
Significance Levels for Head, Arms, and Combined Body Parts of the Subjects vs Experimenter Body Parts for a Chi-square Analysis With df = 1 for Normalized Data

	Combined Subjects (Head) distance (feet)			Combined Subjects (Arms)			Combined Subjects (Head and Arms)		
	1	2	3	1	2	3	1	2	3
Head	.001	.001	.001	.001	.001	.001	.001	.001	.001
Arms	.001	.001	.001	.001	.001	.001	.001	.001	.001
left	N.S.	.001	.001	N.S.	.001	.001	.001	.001	.001
right	.001	.001	.001	.001	.001	.001	.001	.001	.001
Legs	.001	.001	.001	.001	.001	.001	.001	.001	.001
left	.05	.001	.001	N.S.	.001	.001	.001	.001	.001
right	.001	.001	.05	.001	.001	N.S.	.001	.001	N.S.
Totals	.001	.001	.001	.001	.001	.001	.001	.001	.001

N = 38

experimenter's right leg in the 3 foot zone remains nonsignificant. The main reason for these body parts not reaching significance was the lack of movements within the zones caused by the placement of the experimental chairs. All of the chi-square analyses were significant for each of the body parts. The 2 foot region had the greatest significance for the total body parts followed by the 1 foot region, and finally by the 3 foot region. However, when the totals are examined for the collapsed data in Tables 3 and 4, there are no differences between the zones.

Mean Frequency of Occurrance

Figure 2 shows the percentage of occurrences for the approaches and withdrawals of the experimenter for all body parts combined (totals), and for the head, arms, and totals (head and arms combined) of the subjects for the three one-foot zones. In the 3 foot zone, there are more approaches by the subjects than by the experimenter. A greater percentage of withdrawals for the experimenter is present in the 3 foot zone than for the subjects. The patterns for the 2 and 1 foot zones are opposite of the 3 foot zone. The subjects were withdrawing more than they approached, and the experimenter approached more than he withdrew.

One of the major reasons why these movements had the above pattern seemed to relate to the violation and defense of boundaries. Many times as the experimenter began his approach, the subject also began an approach movement. The experimenter would then withdraw

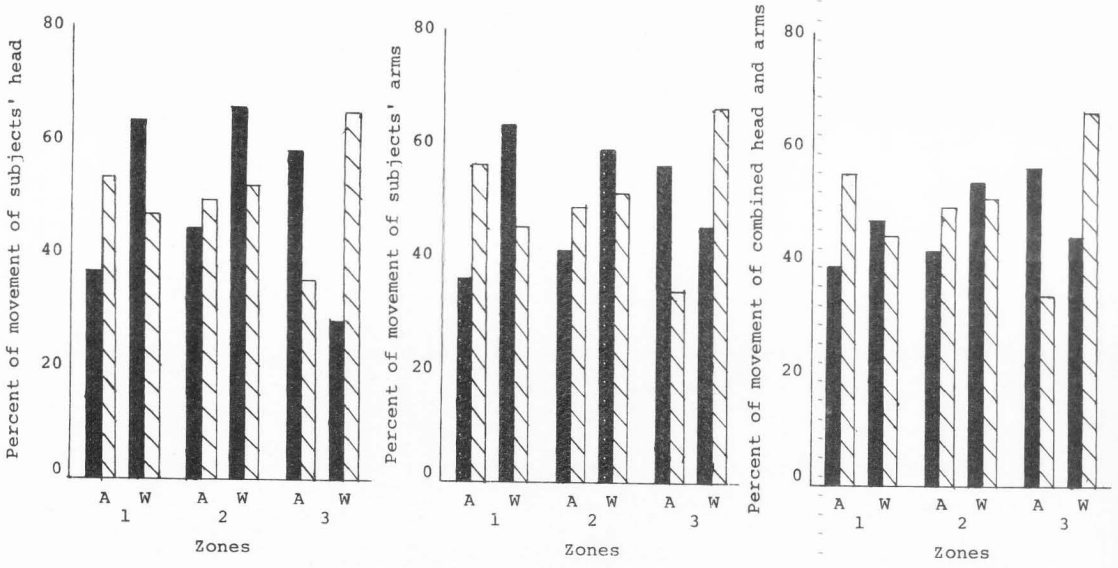

Figure 2. Percentage of total movements which were approach and withdrawal for subjects' head, arms and combined head and arms with experimenter's combined parts in each zone.

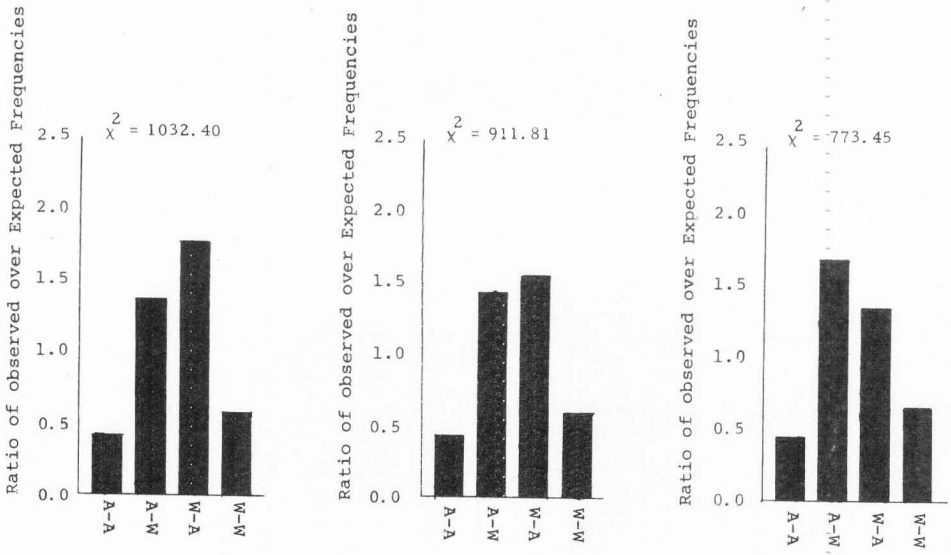

Figure 3. Ratio of observed over expected frequencies for each possible direction of movement for male subjects' combined body parts (head and arms) with the experimenter's combined parts in each zone.

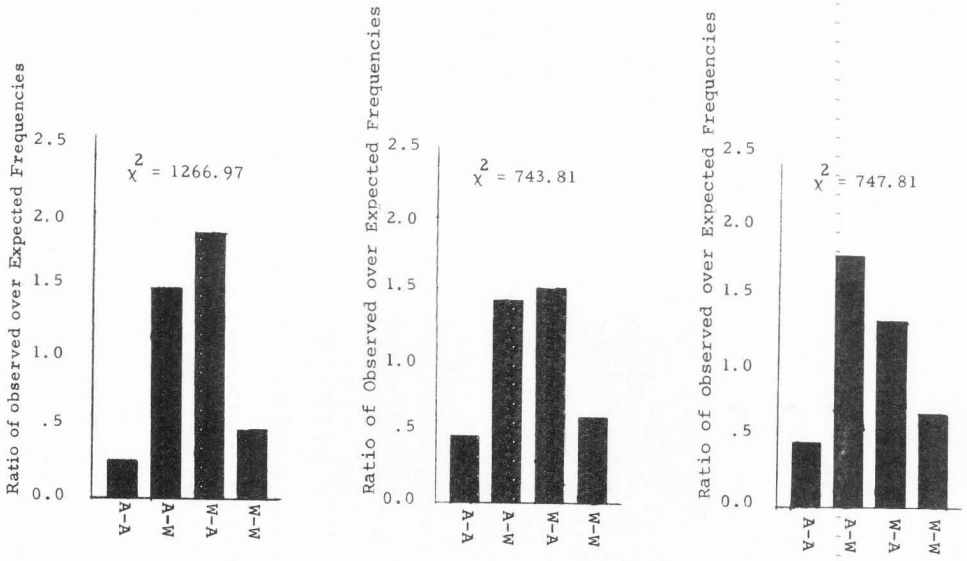

Figure 4. Ratios of observed over expected frequencies for each possible direction of movement for female subjects' combined body parts (head and arms) with the experimenter's combined parts in each zone.

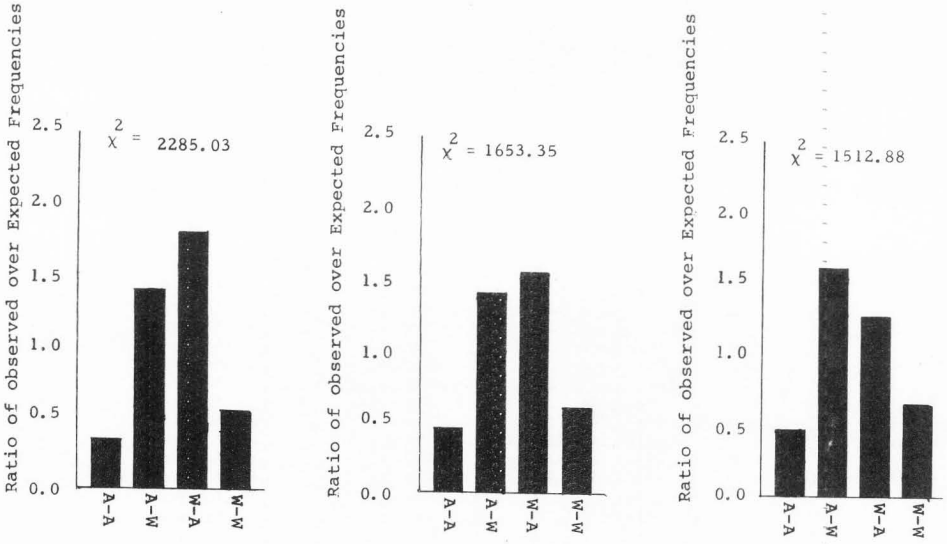

Figure 5. Ratios of observed over expected frequencies for each possible direction of movement for combined subjects' (male and female) combined body parts (head and arms) with the experimenter's combined parts in each zone.

(as seen in the 3 foot zone). However, many times the experimenter made only a small withdrawal, then he started his approach to the subject, which was followed by the subject's withdrawal in the 2 and 1 foot zones.

Patterns of Interaction

The data were examined for the behavior within dyads to determine the pattern of the interaction between interactants. Each cell of the 2 X 2 contingency table was analyzed to determine which interaction possibilities (A-A, A-W, W-A, W-W) contributed most to the chi-square values. Figure 3, 4 and 5 present the ratio of observed to expected frequencies for each of the three one-foot zones for males, females and all subjects combined. The movements within each dyad were examined for the contributions of each body movement within the dyad, the patterns for the possible dyad movements (A-A, A-W, W-A, W-W) were ranked from highest to lowest. The ranking was identical for males, females, and for each of the three one-foot zones. Therefore, the direction of the combined scores of the expected verses observed ratios presented in Figures 3, 4 and 5 are representative of each subject.

For the 3 foot zone, and A-W cell is the largest contributor to the chi-square analysis followed by the W-A, W-W, and A-A cells. The 2 foot zone is different from the 3 foot zone in that it has a different distribution of the dyad interaction cells. The W-A cell is the interaction which contributed the most data to the chi-square analysis followed by

the A-W, W-W, and A-A movements. The 1 foot zone has the same characteristics as does the 2 foot zone. The one observable difference is that the relative contributions of the dyadic cells have changed. The W-A cell has increased its contribution while the A-W, W-W and A-A cells have decreased their contributions.

Of even greater importance than finding out the trend of the dyadic interactions (to have interactions of A-W and W-W), is the direction of influence of the ratio of the observed and expected frequencies. As can be seen in Figure 3, 4 and 5, the A-A and W-W cells contributed much less than expected while the A-W and W-A cells contributed much more than was expected. If the cells had contributed the expected amount, then the results would have been one for the cell. The participants followed an approach and withdrawal interaction for all three of the one-foot zones with only the type of interaction differing in the zones (for the 3 foot zone the interaction was of a A-W, and in the 2 and 1 foot zones the W-A was the major interaction).

The different cells for each zone contributed different amounts to the chi-square value. The A-W and the W-A cells were the major contributors to the chi-square values generated, and the W-W and A-A cells contributed the least amount to the chi-square value. This was true for each of the three 1 foot zones tested.

All of the data presented show that there is an approach and withdrawal interaction among the subjects and experimenter when they are interacting with one another. The general tendency is for person A to

withdraw when B approaches, and for; A to approach when person B withdraws; it can be said that there is a dual interaction present.

Figure 6 shows the chi-square values for males, females, and combined subjects. For males, the chi-square values increase as distance between subject and experimenter decrease in a linear function from the 1 to the 3 foot zones. The females are affected the least in the 3 and the 2 foot zone. However, there is a significant increase in the chi-square value between the 2 and 1 foot zones. This tends to suggest that the females reacted more strongly to the experimenter's intrusions at close range. When the subjects are combined, the trend is to have an increasing pattern from the 3 to the 1 foot zones. The slope increases faster for combined subjects than for either males or females.

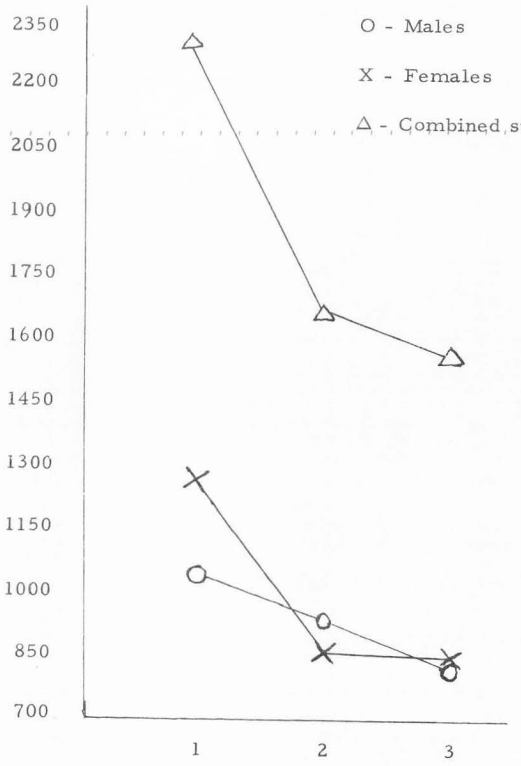

Figure 6. Chi-square values for males, females and combined subjects (males and females) for each zone.

Discussion

The data emphasize two interesting areas. First, there is an approach and withdrawal interactional dyadic sequence between preschool children and an adult male. Second, there is a pattern to the approach and withdrawal interaction across the three zones examined, which increases our understanding of personal space in preschoolers.

Approach-withdrawal-approach-patterns

In Tables 1 and 2, it was seen that there was an interactional effect between all subjects. All participated in approach and withdrawal patterns. Also, it was found that there was no difference between male and female subjects. Each subject, regardless of sex, reacted to the approach and withdrawal movements of the experimenter in much the same way.

The chi-square values (Tables 3, 4 and Figure 1) are very significant for both normalized and raw data. In fact, the generated chi-square values are much higher and more significant for the normalized data as opposed to the raw data. This reinforces the observation that when all subjects are compared equally with regard to the interactions which occur, the approach-withdrawal (A-W) and the withdrawal-approach

(W-A) cells contribute the greatest amount of information to the chi-square values.

The interactional nature of the dyadic movement can be seen in Figure 1. As the experimenter approached, the subjects withdrew. Also as the experimenter withdrew, the subjects approached. The interaction was not led by the experimenter at all times. On many occasions the subjects forced the experimenter to retreat when he approached too closely. The finding shown in Figure 1 tends to support the notion that a dual interaction is occurring between the interactants. The reactions of one are dependent upon the reactions of the other. Rather than approach-withdrawal Peery (note 2) has suggested that approach-withdrawal-approach is a more conceptually appropriate label for this behavior.

The reason for the lower number of movements in the 3 and 1 foot zones for the body parts of the legs and arms is due to the placement of the experimenter chairs. As can be seen in Appendix A, the chairs of the experimenter and subject were placed at a constant distance from one another. As the two interactants moved about, there were difficulties moving the body parts into the zones with equal frequency. The left arm and left leg of the experimenter had difficulty going into the 1 foot zone. The right arm and right leg of the experimenter had difficulty in manuvering into the 3 foot zone. This placement of chairs also helps account for the greater movements which the 2 foot zone received.

Personal Space

The second point, that there is a pattern to the approach and withdrawal interactions across the zones examined can be seen by Figures 3, 4 and 5. There was a shift in the pattern among the A-W and the W-A cells for the percent contributed to the chi-square value as one moves from the 2 to the 1 foot zones. The approach-withdrawal-approach (A-W-A) patterns are the same for the 2 and 3 foot zones. A possible explanation for this can be found in the interactions between the subjects and the experimenter. For all three zones examined, the W-W and A-A cells contributed the least to the chi-square values. While thinking of the approach and withdrawal sequences as being an interaction which utilizes personal space boundaries for comfort, the most uncomfortable situations would be when two people are approaching one another. One reason for the interactants backing away is that the zone that has been established for their interaction has been violated. This would cause "uncomfortable" feelings as the two came into more intimate contact. As was seen in the work on personal space, when two people approached one another, there was a tendency to back away from one another and reestablish a comfortable interactional distance (Altman, 1975). This same type of situation could also be predicted when interactants moved away from one another. The distance would become too great and they would try to establish a comfortable interaction level. Trying to establish a comfortable interaction distance helps to account for the high significance of the A-W and the W-A cells

which show that the approach and withdrawal interaction is taking place among the preschool subjects. It can be stated that the subjects and experimenter in their interactions were following the interactional pattern which has been shown for personal space. Altman (1975) and others would state that accommodation was occurring with the subjects as the experimenter approached and withdrew. The movement patterns (A-W and W-A) would fit the dual interactional sequences that have been seen when personal space adjustment and accommodation has been observed.

Another possible explanation for the shifting of the A-W movements in the 3 foot zone, to the W-A movements in the 2 and 1 foot zones can be seen in terms of encroachment of space. The experimenter forced himself upon the subjects many times and he would not retreat even when the subjects gave out nonverbal cues to warn the experimenter of his encroaching upon personal space. In the 3 foot zone, the subjects started to approach the experimenter when he began his approach. However, as the experimenter kept approaching, the subjects retreated backwards. The reverse case is true for the 1 foot zone. The subjects retreated and then began an approach movement towards the experimenter. The experimenter withdrew when the subject began approaching him in the 1 foot zone.

The reactions noted by the experimenter and subjects in the 1 foot zone can be seen in terms of the experimental condition. As the experimenter continued his approach across the three 1-foot zones,

the subjects backed off and they ran out of space when they were unable to move further back unless they left the experimental setting because of the limitations that their chair back presented in stopping movement (one 3 1/2 year old female did). The problem of the child's chair preventing backwards movement caused the subjects to make an approach movement to force the experimenter back to stop the uncomfortable encroachment. The subjects then followed the experimenter back to a distance with which they felt comfortable.

The one point that should be remembered is the approach and withdrawal interaction occurrs very quickly; faster than an observer can score in vivo. One might think then how is this interaction between participants regulated? One possible mechanism for such regulation is subliminal perception. The brain processes the information, but it is below the threshold where one is cognitively aware of it. Similar to the research on subliminal perception when information is flashed on a screen briefly. While one may not have been cognitively aware of the message, the brain has recorded it unconsciously and can act upon the information as needed.

Implications for personal space theory. The approach and withdrawal interactions, which have been observed, can be seen to be a part of the personal space interaction described by Hall (1966) and others. The dyadic approach and withdrawal interactional sequences can be seen as forerunners to the personal space interaction between the two participants. As stated before, the approach and withdrawal sequence

occurs at a much faster rate than does personal space. In fact, many approach and withdrawal dyadic responses can be made before a reaction of the subject is noticed by an observer who is watching the interaction in vivo. The mechanism of approach and withdrawal interaction is seen to work on a specialized area of behavior. It helps to establish the initial boundaries that are used by the personal space interaction noticed in vivo by many researchers. Also, like personal space and territorality, the approach and withdrawal interaction can also be seen as a BSDR mechanism.

The approach and withdrawal interactions are a component of personal space. As an interaction is occurring, the interactants will utilize the approach and withdrawal movements to guage their interaction level with one another. However, if person A approaches person B so that B becomes uncomfortable with the distance between the two, then the easily observed reactions of personal space will be observed. When the appropriate boundary has again been reestablished, then the minute distancing reactions of approach and withdrawal will occur. Many of these movements will make up a personal space reaction.

An analogy can be drawn to someone who is having fire come closer to him/her all of the time. In the first few feet, small movements away from the fire will not be noticed because the danger to the person is small. However, as the fire comes closer, great discomfort will result and the person would wish to move away from the fire because of the pain and bodily injury that would be associated with fire. The

movements of the person as the fire came very close would be large and an away movement of larger proportions would be noted than when the fire was further away.

So it is with interpersonal relations. As people come into contact with one another, they begin to get nervous and uncomfortable if others approach too closely. The person will wish to establish an appropriate boundary in which to interact with the other person and will tend to maintain this boundary as they interact. Support for this conceptualization is seen in Figures 3, 4 and 5. There was a shifting pattern among the A-W and the W-A cells between the 3 and 1 foot zones.

Because the approach and withdrawal interactional sequences change from approach-withdrawal (A-W) to withdrawal-approach (W-A) across zones (Figures 3, 4 and 5), the distance at which the intimate and personal zones are divided must be reconsidered. The suggestion of Hall (1966) concerning the 18 inch boundary for these zones may not be accurate. For the preschool subjects, the 18 inch boundary was contained in the 2 foot zone. Figures 3, 4 and 5 give the impression that the distance at which the A-W and W-A cells contribute equally to the chi-square analysis is beyond 24 inches (Hall would predict that the 2 foot contributions of the A-W and the W-A cells would have been about equal).

Several explanations can be offered for what occurred. The first is that the preschool subjects extended their intimate zone to make an

interaction more difficult because the experimenter was a stranger. The second reason is preschool children do not have adult spatial patterns, which have been described by Hall (1966) and others; the adult patterns could become established as the children mature. Still another explanation may be that the personal space distances conceived by Hall (1966) are in error. Previous personal space studies have all utilized in vivo observation or description situations. No "micro" measures have been taken. This study has looked at the personal space mechanism on a micro-level. More accurate responses were obtained because individual behaviors have been broken into smaller components, i.e., a personal space reaction was filmed and analyzed frame-by frame with a constant distance measure to see what occurred as subjects and experimenter interacted.

Implications for Equilibrium Theory

Equilibrium theory was advanced by Argyle and Dean (1965). They felt that in an interaction, people will tend to minimize the discomfort felt by inappropriate intrusion by others on personal space by various means. As interactants came closer together, eye-contact decreased. This was said to take place because the comfort level of the interaction was low and intimacy-reducing behavior was performed to restore equilibrium to the interaction. By performing these different equilibrium manuvers, the anxiety and discomfort that occurred during an interaction would be restored.

In this study it was found that an equilibrium position holds for a micro-level of analysis; as person A approached person B, the tendency was for person B to withdraw. Also, as person A withdrew from person B, then B tended to approach A. This suggests that the interactants were trying to maintain an equilibrium position and were trying to reduce the anxiety felt in the equilibrium position.

Establishing an appropriate interaction distance was noted for all three 1-foot zones. Argyle (1968) and Argyle and Dean (1965) would state that in an interaction one will use different bodily cues to try and ward off an interactant if approached too closely. For example, as the experimenter approached the subjects in the 3 foot zone, the subject would approach the experimenter to ward him off (he would be warned nonverbally that he was violating the subject's accepted interaction distance with him). The child would approach in response to the distance violation of the experimenter. As the experimenter continued to approach, the discomfort of the subject would become greater and the child would withdraw to reestablish the equilibrium position of the interaction. If the experimenter withdrew when the subject approached, then the subject would have continued his approach movement to maintain equilibrium.

Further Work

From the results of this study, some interesting questions arise that indicate a need for further study of the approach and withdrawal question. A few of these questions are:

1. What facial cues are used by subjects or experimenters to indicate that spatial violation is occurring?
2. Are there differences between cultures as to the cues used (facial, gestural, and so forth) to defend against intrusion?
3. Are the changes of A-W and W-A sequences different for each culture? Does this pattern hold for different aged subjects in the American culture?
4. Would the same results be obtained (as was found in this study) if a female experimenter was used instead of an adult male?
5. Does the approach and withdrawal sequence appear in peers as well as it does with adults?
6. Is the approach and withdrawal sequence the same from neonates through old age, or are there differences due to age and development?

Each of these questions need to be explored by future researchers to determine what differences exist between the results of this study, and those that would look at different variables than have been examined in the present study.

Footnotes

[1] The data were analyzed by percent contributed to allow comparison for total body parts (head and arms) of the subjects. This could not be performed for the raw data because it could not be assumed that the behaviors of the experimenter's and subject(s)' body parts between zones were independent of each other. The data was turned into percents to normalize the data and allow comparisons between and within subjects.

Notes

1. Peery, J. C. Approach-withdrawal patterns of social interaction in the neonate. Unpublished manuscript.

2. Peery, J. C. Personal communication.

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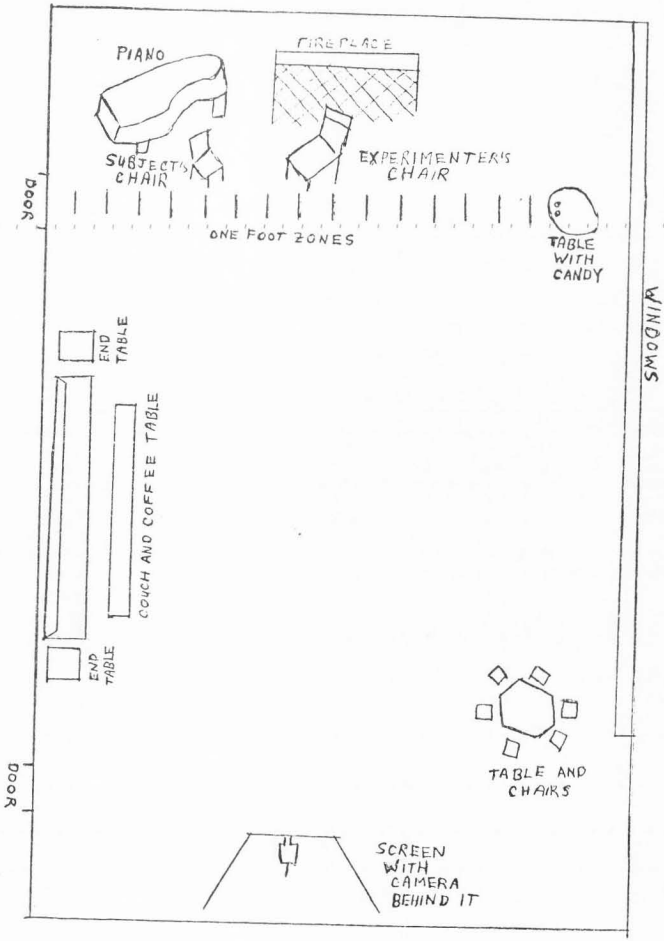
APPENDICES

Appendix A

Experimental Condition


PIANO
FIREPLACE
SUBJECT'S CHAIR
EXPERIMENTER'S CHAIR
DOOR
ONE FOOT ZONES
TABLE WITH CANDY
WINDOWS
END TABLE
COUCH AND COFFEE TABLE
END TABLE
DOOR
TABLE AND CHAIRS
SCREEN WITH CAMERA BEHIND IT

Appendix B

Scoring Sheet

Experimenter		Subject 3						Subject 2						Subject 1						
		N-A	W-A	T	A-W	N-W	T	N-A	W-A	T	A-W	N-W	T	N-A	W-A	T	A-W	N-W	T	
HEAD	N-A																			
	W-A																			
	T																			
	A-W																			
	N-W																			
	T																			
ARMS	N-A																			L
																				R
	W-A																			L
																				R
	T																			
	A-W																			L
																				R
	N-W																			L
																				R
	T																			
LEGS	N-A																			L
																				R
	W-A																			L
																				R
	T																			
	A-W																			L
																				R
	N-W																			L
																				R
	T																			

Appendix C

Definitions of Behavior

Body part--any body appendage (head, right or left arm, or left or right leg) of either the experimenter or subject.

Approach--a movement of any body part towards another person.

Withdrawal--a movement away from the other person by any body part.

Approach-approach (A-A)--an approach movement of the experimenter in which the subject also makes an approach movement.

Approach-withdrawal (A-W)--an approach movement performed by the experimenter in which the subject makes a withdrawal movement.

Withdrawal-approach (W-A)--a withdrawal movement is made by the experimenter and the subject performs an approach movement.

Withdrawal-withdrawal (W-W)--a withdrawal movement is made by the experimenter and the subject also makes a withdrawal movement.

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