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The Effect of the Presence of an Unfamiliar Peer on Stranger Preference and Separation from the Mother in 15-Month-Olds

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THE EFFECT OF THE PRESENCE OF AN UNFAMILIAR PEER ON STRANGER PREFERENCE AND SEPARATION FROM THE MOTHER IN 15-MONTH-OLDS

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ABSTRACT

The purpose of the present study was to investigate the responses of 15-month-old toddlers to unfamiliar peers in the context of toddler-mother attachment. The subjects were twenty-two 15-month-old toddlers, who were observed singly and in pairs under mother-present and mother-absent conditions. Each toddler was involved in a sequence of six 3-minute episodes in an experimental room with toys. Using a counter-balanced procedure, three of the episodes for one toddler overlapped with three of the episodes for the other toddler so that one experimental session consisted of nine episodes. In both the one-toddler and the two-toddler halves of the six-episode sequence for each child, there were mother-present, mother-absent, and mother-reunion episodes. Observations were made through a one-way window and recorded on behavioral coding sheets.

The study showed that unfamiliar 15-month-old toddlers looked at each other significantly more often than they looked at their peer's mother, who was also a stranger to them. However, when the two mothers left the room, the presence of another toddler did not significantly reduce separation crying from what it was when toddlers were left alone.

Many of the behavioral signs of toddler-mother attachment were found, replicating previous studies. Behaviors that were significantly different between preseparation and separation episodes were that the toddlers cried more, looked more at the door, touched the door more

frequently, and played less when their mothers were absent. At reunion the toddlers' contact and contact-seeking to the mother was significantly more prevalent than in separation episodes. The toddlers' distance from the mother was less in reunion episodes than in preseparation ones, but not significantly so. Neither was visual regard of the mother significantly greater in one of the reunion periods than it had been in the corresponding preseparation period.

The toddlers' greater visual regard of peer strangers than of adult ones was interpreted as the beginning of the process of peer sociability. But this early sociability was viewed as taking place in the context of the toddler-caretaker attachment relationship, since unfamiliar 15-month-olds did not derive comfort from each other when separated from their mothers.

CHAPTER I

INTRODUCTION

The relationship between peers in the first two years of life has not been given abundant theoretical or experimental consideration. Because of the compelling view that an infant's relation to age-mates is a reflection of the child's primary relationship to its caretaker, it is the latter affiliation which has received the greater attention. In this study, both of these social systems were investigated. The focus was on the toddler's interest in and comfort with a peer, though this was studied within the context of the infant-mother bond.

The infant-caretaker tie develops over time and increases in strength during the period of infancy. The evidence that this bond has developed is behavior the infant manifests in the presence of the mother[1] and behavior the infant exhibits in the mother's absence or on her return from an absence. In the case of toddlers such behavior with the mother present might be smiling, going from and returning to the mother, or exchanging objects with the mother. With the mother absent, the behavior might include crying, looking toward the point of the mother's departure, or a decrease in play. The infant-caretaker

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[1]Throughout this thesis the word "mother" will often be used interchangeably with "caretaker," because usually the primary caretaker is, in fact, the mother. But the use of the word "mother" by this author does not imply that only mothers are primary caretakers.

relationship may be expressed in varying frequencies of any one or more of these behavior modes. The infant-mother bond is a higher-level concept whose existence is inferred from various constellations of behavior in certain contexts. The different types of behavior serve the postulated goal of the infant-caretaker attachment, which is to keep the child in proximity and communication with his mother.

The infant-caretaker relationship has been termed differently by varying theorists and investigators (Ainsworth, 1969; Maccoby & Masters, 1970). Psychoanalysts have referred to object relations, social-learning theorists to dependency, and within the last 15 to 20 years ethological-evolutionary theorists have adopted the word attachment (e.g., Bowlby, 1958). Another term sometimes employed by Harlow (e.g., 1966) is simply love, which in this relationship is the primary love between the infant and its mother. One or more of the above terms may be useful depending on the context. The term attachment is employed frequently in this writing because of its descriptive power for a whole range of behaviors and because it has come increasingly into general use.

Compared to the infant-mother relationship, the relationship between peers in the first two years of life has not been given much theoretical or experimental consideration. Despite some systematic investigations in the 1930's (e.g., Bühler, 1930; Maudry & Nekula, 1939) no significant amount of study in the area has followed. This may have been because the period of infancy was considered socially uneventful from the standpoint of peer interaction. Two-year-olds would watch each other, would tend to congregate in the same play area

and would make contacts with each other, but much of their time would be occupied in parallel play (Jersild, 1942, 1947). Their cooperative play could be observed more markedly around the age of three, and the interaction at earlier ages may have been thought less important from a "social" point of view. Recently, however, an incipient interest is being shown in the study of peer interaction in the first two years of life. Relations between age-mates appears to be ready to become a new area in the growing body of studies of the period of infancy and toddlerhood. One of the reasons for the awakening interest in scrutinizing infant-peer interactions may be the increasing development of group programs, especially day care, for children below the age of three. A related reason may be the trend among some present-day parents to informally provide their toddlers with peer play experiences for the benefit these may have on their sociability. Whatever the causes for the beginning of attention to peer interactions prior to the age of two, the present study is designed to contribute to that development.

It is a casually-observed phenomenon that toddlers are more curious about other toddlers than they are about strange adults. The infants' attraction to other babies seems to be of a different quality than any pull they may have toward strange elders. The present study was, in part, an investigation of 15-month-old children's curiosity about an unknown peer compared to their curiosity about the peer's mother. The investigation attempted to determine whether a strange infant is intrinsically more interesting to another infant than an adult stranger.

A second part of this study took peer interaction a step further. Observations were made to determine whether a toddler's being left with a strange toddler age-mate is more ameliorative of separation anxiety than being left alone. If so, this would mean that an infant peer is not only an object of curiosity but a source of comfort. The remaining part of this study compared the effect of the mother's presence versus her absence on her child's behavior. Also examined was the behavior of the toddler toward his mother upon reunion. These behavioral comparisons indicated infant-caretaker attachment and were a replication of previous studies.

Chapter II is a review of the pertinent literature regarding infant-caretaker attachment and infant peer interaction, with a statement of the hypotheses of the present study. Chapter III is a description of the method used to test the hypotheses. Chapter IV is a presentation of the results of the study. Chapter V is an interpretation of the findings and a discussion of their relation to previous work.

CHAPTER II

REVIEW OF THE LITERATURE

There is a growing experimental and theoretical literature concerning infant-caretaker relations in the first two years of life. The literature on infant-caretaker relations, especially that part dealing with the formation of infant attachment, will be reviewed first. The second part of this chapter will examine the studies of infant-peer relations. The chapter will close with a statement of the hypotheses for the present study.

Infant-Caretaker Relations

The infant-caretaker bond develops gradually into attachment. This growth will be traced with primary emphasis on behavior that is considered to be evidence of the fully-developed relationship.

The Beginning of the Infant-Caretaker Bond

The first problem arises in trying to decide at about what age the attachment to the caretaker becomes well-grounded. Hence a brief look at the waxing and waning of the infant-caretaker bond will be necessary. Also arising from this survey of the literature will be the controversy surrounding the developmental manifestation of the fear of strangers.

Stages of attachment. The current prominent definition of infant-caretaker attachment is that of Bowlby (1969). He suggested that "the child's tie to his mother is a product of the activity of a number of behavioral systems that have proximity to mother as a predictable outcome" (p. 179). Hence behavior which serves to bring an infant close to the mother, either through contact or through use of the distance receptors, mediates attachment. Mussen, Conger, and Kagan (1974) claimed to have a definition of attachment which relies less on the goal of proximity to the mother. They said attachment was an "infant's tendency during the first 24 months to approach particular people, to be maximally receptive to being cared for by these people, and to be least afraid when with these people" (p. 204).

Ainsworth (1964) delineated four phases in infant social behavior during the first year of life: 1) undiscriminating responsiveness to people, 2) differential responsiveness to the caretaker but continuing responsiveness to other people, 3) sharply defined attachment to the caretaker with a large decrease in undiscriminating friendliness, and 4) attachment to one or more familiar figures other than the caretaker. The fourth phase follows quickly after the third phase and overlaps with it.

From her observations of infants 2-15 months of age in Uganda (East Africa), Ainsworth (1963, 1964, 1967) listed patterns of infant attachment behavior. Some of the patterns of behavior she had not planned to research, but she delineated them from her field notes later. The patterns of attachment behavior are here listed mostly in the order of their onset developmentally. The age at which they were commonly

observed is stated with each type of behavior. The ages in parentheses are for those patterns Ainsworth identified post hoc from her notes. The patterns are as follows: differential crying (e.g., the baby cried when held by someone else but stopped when handed to the mother), 12 weeks; differential smiling (baby smiled more frequently with mother), (32 weeks); differential vocalization, (no norm established); visual-motor orientation toward the mother, (no norm established); crying when mother leaves the room, 25 weeks; "scrambling" over mother (playing with her hair, the features of her face, etc.), (30 weeks); burying face in mother's lap, (30 weeks); exploration from mother as a secure base, 33 weeks; clinging when frightened (many of the fear stimuli were strangers), 40 weeks; lifting arms in greeting, (22 weeks); clapping hands in greeting, (40 weeks); approach through locomotion, (30 weeks). It may be noted that the sequence of the onset of these behaviors is partly determined by the development of the sensory and motor systems of the infant.

In a longitudinal study based on the field observation of U. S. middle class infants, Stayton, Ainsworth, and Main (1973) found a similar continuum of types of behavior signifying attachment. They found the median age for greeting the mother across a distance to be 16.3 weeks, and for crying when the mother leaves the room, 22 weeks. By the end of the first year of life, following was the most frequent response to the mother leaving the room.

According to Bowlby (1969) the waning of the attachment pattern in relation to the primary caretaker is seen around the age of three. He finds support for this from the shared lore of nursery school

teachers who have had both three-year-olds and children younger than three. Until they have reached the age of about two years and nine months, they are upset when their mother leaves. Some confirmation for this notion is found from an observational investigation by Jones and Leach (1972) of young children being left and picked up by their mothers at an infant day care center. They recorded that crying at separation is common under two-and-one-half years of age but much less likely after that.

Now that the general age limits of the attachment phenomenon have been traced, the problem remains to find agreement regarding when the clear-cut attachment begins. The idea is that at some point in the continuum of developing differential responses to the mother the attachment becomes consolidated. Mahler (1972) speaks of the specific, preferential smile to the mother as "the supreme sign that a specific bond between the infant and his mother has been established" (p. 334). Schaffer and Emerson (1964) proposed the separation protest as the signal that attachment had begun. Ainsworth (1972) tended to link the establishment of attachment with the emergence of the infant's ability to crawl. Having the power of locomotion, the infant can follow his mother and maintain proximity to her on his own initiative. In her sample of infants from Uganda, Ainsworth (1967) found this phase of active initiative occurred somewhere between the first indications of separation anxiety and the development of stranger anxiety. Spitz (1965) postulated the beginning of the true object relation to the mother at the time of the onset of stranger anxiety, which he called "the eight-month anxiety." Most investigators agree that the

fully-developed infant attachment to the mother emerges sometime in the second half of the first year of life, but it could conceivably be placed earlier.

Fear of strangers. Controversy has arisen concerning the development of stranger anxiety in infancy, namely its relationship to attachment and separation anxiety, its age of onset, and most fundamentally, whether or not it exists. The present study investigated toddlers' reactions to strangers, and thus a brief look at the development of stranger anxiety at an earlier age is warranted. Because the literature in this area is now burgeoning only a few salient studies will be reviewed.

Spitz (1965) refocused attention on the fear of strangers in infants with his concept of the eight-month anxiety. He speculated that the infant compares the stranger's face with his memory of the mother's face and rejects the former. He then wondered why the infant's reaction should be fear and surmised that the infant's anxiety was fear of object loss. He said of the infant, "What he reacts to when confronted with a stranger is that this is not his mother; his mother 'has left him'" (p. 155). Thus for Spitz stranger anxiety was not different from separation anxiety.

Other investigators began separating fear of strangers from separation anxiety, primarily because of differences in the time of onset and the courses which the two fear systems ran. Freedman (1961) spoke simply of a fear of the strange person. The strangeness itself was frightening. Benjamin (1963) said that it was both fear of the strange as well as fear of object loss that fueled stranger anxiety

whereas separation anxiety was linked to fear of object loss alone. Inspired by Benjamin's observations, Tennes and Lampl (1964) did a post hoc longitudinal study of 19 infants from extensive records accumulated for another study. They found the age range for the onset of stranger anxiety was from 5 to 9 months, and, for two-thirds of the infants, the onset of separation anxiety was between 7 and 11 months.

Most investigators now agree that the fear of strangers and separation anxiety emerge at slightly different times in infancy, but noteworthy is the fact that there is disagreement about which comes first. A number of investigators concluded that fear of strangers appears prior to separation anxiety (e.g., Benjamin, 1963; Bowlby, 1969; Mussen, Conger, & Kagan, 1974; Tennes & Lampl, 1964). But Schaffer and Emerson (1964) discovered the mean age of the appearance of stranger anxiety at about 8 months, one month after their mean age for the onset of the separation protest. Ainsworth (1967), in her group of infants in Uganda, observed the appearance of the infants' stranger anxiety in the fourth quarter of the first year of life. Around this time, the stranger was often the stimulus that caused the infant to cling to his mother. The earliest panic reaction to strangers was observed just before 9 months. With the same infants Ainsworth had reported separation anxiety coming just before 6 months. Morgan and Ricciuti (1969) did an extensive study on the reaction to the adult stranger in infancy. They had eight boys and eight girls in each of five age groups: 4½, 6½, 8½, 10½, and 12½ months. They discovered that the younger infants reacted positively toward the stranger but that the older ones, especially the 12½-month-old group, often showed frowning, crying, or turning away. Positive

reactions, though, outnumbered negative reactions to the stranger in all ages and conditions except one: when the 12-month infants were four feet away from their mother. Still the trend of the negative responses suggest that stranger anxiety appears in full strength after the development of attachment.

Another point of view is that stranger anxiety does not exist in infants. Rheingold and Eckerman (1973) conducted a cross-sectional study of stranger fear with groups of 8-, 10-, and 12-month-old infants. The adult female strangers played peek-a-boo with the infants, handed them toys, and in other tests, chatted with the mother while the infant roamed freely. In one test, after talking with the mother, the stranger picked up the infant. Almost no fussing or crying was elicited in response to the stranger, especially in the early tests in which no physical contact was involved. Furthermore the stranger was able to pick up and hold 20 of the 24 infants for the full two minutes. Rheingold and Eckerman thus questioned whether the developmental appearance of stranger fear should be attributed to infants. They would reinterpret manifestations of crying or clinging that have been seen as stranger anxiety in terms of preference for the familiar person: "Thus, when we put out our arms to take a baby from the parents, we often see him turn to them and protest our taking him. Since the child smiles to us from the parent's arms--once we give up the attempt--it would be ill-advised to label this behavior fear of the stranger" (p. 217).

Indications of Attachment

One of the chief ways of studying attachment has been to investigate the effects of disruption in the infant-caretaker relationship

caused by separation. In fact it was the behavior of infants and young children who had been separated from their parents that Bowlby (1969) was trying to explain by developing his theory of attachment. The separations considered in this review will be limited to momentary ones, especially those brought about under laboratory conditions. Also the survey will be confined to the separation experiences of infants 18 months of age or under. Separation behavior will be taken up under three headings: separation protest, search behavior, and decrease in exploration. Another sign of attachment which has been studied is reunion behavior. This will be examined last.

Separation anxiety and the separation protest. Bowlby (1969) identified the three successive stages of the infant's or young child's reaction to separation as protest, despair, and detachment. Bowlby (1973) linked protest to separation anxiety, despair to mourning and grief, and detachment to defense. This review will examine only the first of these reactions, that of separation protest. The behavioral indication of separation protest is crying. Ainsworth, Bell, and Stayton (1972) stated that crying was classified as an attachment behavior because it is a signal that is likely to bring the mother into contact with the infant.

The infant's crying protest when left alone or with a stranger has generally been regarded as the major sign of attachment. It is the most obvious one. Studies differ in ascertaining the average age of onset for separation crying. Schaffer and Emerson (1964) in home interviews with mothers found the modal age of onset in working-class children in Glasgow to be 7 months, whereas in the study already mentioned

by Stayton et al. (1973), based on field observation of American middle-class infants, the median age of onset was 22 weeks (about 5 months). The differences could be accounted for by differing methods of study or differing characteristics of the subjects, namely, cultural background and socioeconomic class. In her sample of infants from Uganda, Ainsworth (1963, 1964, 1967) had determined the common age of onset to be a little under 6 months.

Protest at separation from the mother is also seen in nonhuman primate infants. Jensen and Tolman (1962) briefly separated two pigtailed monkey (Macaca nemistrina) infants at 5 and 7 months of age from their mothers in order to study both the behavior of the mothers and the infants during separation and reunion. They encountered a high level of separation protest from the infants:

> Separation of mother and infant monkeys is an extremely stressful event for both mother and infant as well as for the attendants and for all other monkeys within sight or earshot of the experience. The mother becomes ferocious toward attendants and extremely protective of her infant. The infant's screams can be heard almost over the entire building. The mother struggles and attacks the separators. The baby clings tightly to the mother and to any object to which it can grasp to avoid being held or removed by the attendant. (p. 132)

Seay and Harlow (1965) separated eight infant rhesus monkeys (Macaca mulatta) at about 7 months of age from their mothers for two weeks. The infants lived alone during separation except for daily test sessions with another separated infant. Immediately after separation the infants showed "disoriented running about, climbing, screeching and crying" (p. 437). Crying, which was described as an effective index of distress in the rhesus monkey, was significantly higher after separation than in the preseparation period.

Spencer-Booth and Hinde (1967) separated four rhesus monkey infants from their mothers for a period of 6 days. The infants were 30-32 weeks old, about the same age as the infants used by Seay and Harlow. The infants were living with their mothers in small social groups including other adults. The mothers were removed from this social setting for the separation period. Their finding was that at the time of separation the infants gave a higher number of "whoo" calls, indicating distress.

In a study of the long-term reaction to separation, Kaufman and Rosenblum (1967) removed the mothers from four group-living pigtail monkey infants for four weeks. The age of the infants ranged from 4.8 to 6.1 lunar months. At separation there were loud screams by both mother and infant and "massive struggling to regain each other" (p. 654). After separation and throughout the first day, a higher incidence of cooing (the distress call of the young macaque), intermittent screeching, agitated movement, and erratic play were observed.

The four studies cited indicate the consistency of the finding of separation protest for macaque infants parted from their mothers. Similar results have been found in laboratory experiments with human infants.

Arsenian (1943) studied 24 human infants and young children between the ages of 11.2 and 30.1 months who were in a women's state reformatory nursery. The mothers were inmates at the institution. Sixteen of the young children were observed while alone for five minutes in a strange room with attractive toys and pictures. Eight of them were seen in the same room one at a time with their mother or

mother-substitute. As will be characteristic of all the observational experiments cited in this review, observations were made from behind a one-way screen. Five observational sessions on alternate days were conducted with the full number of subjects in each condition, and five more sessions were held with depleted numbers in each group. Arsenian found that the infants with their mothers or mother-substitutes showed less than one-third as much crying and autistic gesturing as the alone group on the first trial. After the fourth trial in the mother-group, crying and self-directed behavior (e.g., thumb sucking or fingering parts of the body) practically disappeared, whereas in the alone-group, the first four trials were taken up mostly by this "emotional" behavior. One confounding element in Arsenian's experiment was that only three young children in the mother-present group had their mothers present for the experiment, while the other five had nursery helpers, presumably familiar to the infant.

Ainsworth and Wittig (1969) produced infant-mother separations in the laboratory with 14 white, middle-class infants around 51 weeks of age. During one phase the infant was left with an adult stranger and during another phase the infant was left in the experimental room alone. A significantly greater amount of crying occurred when the infant was left with the stranger or when the infant was left alone than occurred when the mother was with the infant. In addition, crying was significantly more frequent when the infants were alone than when they were with the stranger.

The Ainsworth and Wittig study was considerably enlarged by Ainsworth and Bell (1970). A total of 56 infants, 49-51 weeks of age,

were examined. Since the procedure of this writer's experiment was fashioned from elements of the procedure used by Ainsworth and her colleagues, the procedure will be set forth here in detail. Ainsworth and her colleagues regarded it as their standard procedure. It has the following episodes (Ainsworth & Bell, Note 1):

1. Mother, baby, observer. The mother carries the baby into the room and the observer leaves.

2. Mother and baby. Three minutes. Mother places the baby down on the floor facing the toys, and the mother goes to a chair.

3. Stranger, mother, baby. Three minutes. An unfamiliar woman enters, sits quietly for one minute, engages the mother in conversation for one minute, and invites the baby's attention for one minute.

4. Stranger and baby. Three minutes. The stranger continues to play with the baby while the mother leaves as unobtrusively as possible.

5. Mother and baby. The mother speaks outside the closed door, opens the door and stands in the doorway, and greets the baby. The stranger leaves unobtrusively. The mother enters and spends time with her infant until he is again playing with the toys.

6. Baby alone. Three minutes. When the baby is occupied with the toys, the mother goes to the door, says "bye-bye," and leaves.

7. Stranger and baby. Three minutes. The stranger enters and tries to play with or comfort the baby.

8. Mother and baby. The mother returns, pauses in the doorway, talks to the baby, and then picks up the baby. During the mother's entrance the stranger leaves.

Episodes 4, 6, and 7 are curtailed if the infant becomes extremely distressed or panics.

Ainsworth and Bell (1970) found the same results for crying during separation that had been obtained in the Ainsworth and Wittig (1969) study, with the greatest frequency of crying during episodes when the infant was alone. The authors thought the primary cause for the most crying in the infant-alone episode was a cumulative effect since it was the second separation in the experimental session.

Coates, Anderson, and Hartup (1972) in the process of obtaining data on the interrelationships among attachment behaviors, tested two samples of 23 infants. The two groups in the first sample had mean ages of 10.7 and 14.8 months, whereas the groups in the second sample had mean ages of 14.6 and 18.7 months. They too, found that separation from the mother produced crying in their infant groups.

Search behavior. A constellation of forms of behavior while the mother was absent from the experimental room was termed search behavior by Ainsworth and Bell (1970). It is much the same as the following behavior noted when the mother leaves the room and the infant is free to pursue her. In fact the separation protest encountered in the experimental situation with infants who are able to crawl or walk can be attributed to frustration over their inability to follow the mother through the closed door. In the home situation Stayton et al. (1973) had noted that at the end of the first year of life, following was the most frequent infant behavior in response to the mother's leaving the room. It occurred twice as much as crying.

In the experimental situation, Ainsworth and Bell (1970) included the following items in their definition of search behavior: "Following the mother to the door, trying to open the door, banging on the door, remaining oriented to the door or glancing at it, going to the mother's empty chair or simply looking at it" (p. 55). They found a moderate amount of search behavior when the infant was left with the stranger. Search behavior was significantly stronger when the baby was left alone than in the stranger-with-baby episode.

Arsenian (1943) had mentioned the same type of behavior but termed it retreat. She said it was the most typical pattern of behavior in the infants that were left alone. Her description of the pattern was that the child would move to the gate and remain in the gate region through which the adult figure had exited. Early "retreats" in the series of observational trials were accompanied by much crying but later in the series, playing occurred in the gate area.

Decrease in exploration at separation. One of the common findings after separation from the mother is a decrease in the infant's exploration of the environment. This has been noted in infants who are old enough to grasp objects with their hands and who have developed locomotion; indeed, infants who are old enough to have formed an attachment. Decrease in exploration at separation is then taken as a sign of that attachment.

Ainsworth (e.g., 1967; Ainsworth & Wittig, 1969) spoke of exploration from the mother as a secure base as one of the evolving patterns of attachment behavior shown by an infant. Such exploratory behavior would not be described as an attachment pattern were it not for

the fact that the infant still is concerned about his mother's location (Ainsworth, 1967). This concern is shown clearly when the mother gets up and leaves the room. The infant often checks on his mother's presence through the use of his distance receptors. Or he may come to her, sometimes show her an object, and go away from her.

Exploration and attachment are in one sense antithetical to each other, because the former takes the child away from his mother whereas the latter keeps him in proximity to her (Bowlby, 1969). Increasingly with age the child will move away from his mother and eventually the attachment behavior will weaken. But in the child of about one year old, there is evidence of interaction between exploration and attachment. The development of confident exploration of the environment may depend upon the formation of an attachment, whereas decreased exploration is likely to appear in the absence of the attachment object.

Some evidence for the facilitating effect of an attachment object for the infant's exploration of his environment comes from the study of Harlow and Zimmerman (1959) with rhesus monkey infants. They raised rhesus monkey infants on mother surrogates made of wire-grid cylinders, some covered with terry cloth and some left bare, with faces painted above the bodies. These two types of surrogate were known as the "wire mother" and the "cloth mother." One comparison involved a few infants raised on a wire mother with a bottle and nipple set into her body and another small group raised with a cloth mother but fed from outside the cage. The infants who had the cloth mother spent more time clinging to her than those who had the lactating wire mother, and they also showed greater exploratory and manipulatory behavior in the

presence of their cloth mother than did the infants with the wire mother. Hence the infants who formed an attachment to a comforting cloth mother explored more than the infants who did not form an attachment to their wire mother.

When the cloth mother was removed from the infants raised with her, they exhibited a lack of exploratory and manipulatory behavior. The little contact with objects that was made was momentary, frantic, and erratic. This was the same behavior shown by infants raised on the wire mother in both wire-mother-present and wire-mother-absent conditions. Hence the forming of an attachment and the presence of the attachment object facilitated exploration. A decrease in exploratory behavior when the attachment object was not present became a sign of the attachment.

Decreases in exploratory play when the mother was separated from the infant were observed in several of the nonhuman primate studies already cited. Seay and Harlow (1965) tested their rhesus infants in pairs during separation. They found a significant decrease in infant-infant social behaviors such as clasp-pull-nip and mutual contact play. Kaufman and Rosenblum (1967) discovered a marked reduction in both social and exercise play during the first day after separation for their pigtail monkey infants. Spencer-Booth and Hinde (1967) found decreased movement and play in their rhesus monkey infants after separation from their mothers. Although the infants' activity increased during the six days of separation, it was less intense than previously. They handled strange objects less and reacted with increased emotionality to frightening stimuli.

Infant-mother separation had a similar depressing effect on exploratory play in several of the laboratory studies with human infants already cited. Arsenian (1943) discovered the children in the mother-group displayed over three times as much play, locomotion, and talking on the first trial as the children in the alone group. Ainsworth and Bell (1970) found the infant's locomotion, manipulation, and visual exploration dropped markedly after the stranger came into the room with the mother and baby. It remained at the lower level for the first separation, and manipulation and visual exploration dropped even lower during the infant-alone separation.

An additional experiment reported specifically on exploratory play in relation to the absence of the mother. Using twenty human infants between 13 and 15 months of age and another sample of twenty from 20 to 37 months of age, Cox and Campbell (1968) obtained a decrease in the children's activity and play upon separation from the mother. The procedure had three phases: 1) the mother stayed with the child, who was placed on the floor for four minutes, 2) the mother left for four minutes, and 3) the mother returned for four more minutes. Half of each sample formed a control group in which the mother was present for the full 12 minutes. In the mother-absent phase decreases were noted in the children's speech, movement, and play. These behaviors increased again when the mothers returned. The decrement in exploration during the mothers' absence was less marked for the older toddlers.

Reunion behavior. In laboratory procedures in which the infant and mother are separated, events between them do not immediately return to a preseparation state when they are reunited. Thus reunion behavior,

such as increased contact, is regarded as an additional indication of attachment.

Jensen and Tolman (1962) found the mother-seeking behavior of their two pigtail macaque infants to be increased when reunited after a brief separation. Kaufman and Rosenblum (1967), using infants of the same species discovered the following types of behavior in the reunion compared to the preseparation period: greater clinging and nipple contact, less inanimate object exploration and play. Seay and Harlow (1965) reported greater infant-mother embracing and ventral contact with their sample of rhesus monkey infants immediately after reunion. Spencer-Booth and Hinde (1967) found that at reunion all four rhesus monkey infants spent more time on their mother than they had prior to separation.

The human studies present a similar pattern of contact-seeking at reunion. Coates et al. (1972) reported that reunion elicited more visual regard and touching of the mother by the infant than before separation. In one of several investigations which placed infants in a strange environment, Rheingold (1969) tried several variations of a strange room--barren, with toys, with a person, or with the mother--to see the effect on the behavior of 10-month-old infants. All infants cried in the first three strange environments (all without the mother) before the first three-minute phase had ended. No subjects cried in the strange environment with the mother. In the third phase the mothers were reunited with their infants in the first three conditions. The effect was the same as reunion following separation. The subjects whose mothers rejoined them tended to cry more, vocalized less, explored less,

traveled to the mother faster, and spent more time with her than subjects in the first phase who had their mothers with them and had experienced no separation.

Ainsworth and Bell (1970) found more proximity-seeking and contact maintaining behaviors in reunion episodes than in preseparation episodes. But a noteworthy manifestation in the reunions was that there were also contact-resisting behaviors in conjunction with contact-maintaining ones. As was noted, the Ainsworth and Bell standard procedure had two reunions: one after the baby had been left with the stranger and another after the baby had been left alone. Contact-resisting behavior was shown by one-third of the infants on the first reunion and by one-half of them on the second reunion. They concluded the infants were exhibiting some anger to their mothers for their previous departure.

This writer's experiment examined the four indicators of attachment mentioned above--crying, search, decreased exploration, and reunion behavior--in order to replicate the findings of the investigators cited regarding the effects of separation from the mother in a strange environment. Ross, Kagan, Zelazo, and Kotelchuck (1975) discovered that the separation phenomenon will occur in a familiar as well as an unfamiliar environment, even though the laboratory environment increased separation effects over those that were obtained with an identical experiment in the child's home.

Infant-Peer Relations

When moving from infant-caretaker relations to infant-peer relations, a dramatic drop in the number of studies is encountered. More

systematic work has been done on peer relations in the infant rhesus macaque, primarily due to the investigations of Harlow and his colleagues, than on peer relations in the human infant. Harlow and Harlow (1965) described five affectional systems in most primates. The first one has already been treated in this review under infant-caretaker relations. The second is the mother-infant, or maternal affectional system, and the third is what Harlow terms the "peer affectional system." This is the one with which we are concerned in this section. The remaining two systems Harlow and Harlow name are the heterosexual affectional system and the paternal affectional system.

Harlow (1969) divided the peer affectional system into four stages: the reflex stage, the exploratory stage, the stage of peer utilization or social play, and the stage of aggressive play. The second stage seems relevant for comparison to the 15-month-old toddlers used in this study. Harlow divided the stage into three parts: 1) visual exploration, 2) oral exploration, and 3) tactual exploration. The primary hypothesis of the present study will concern infants' visual regard of each other. Harlow (1969) described the visual exploration component as that "in which the animal orients closely to, and peers intently at, the object or other animal" (p. 339). Harlow judged that inanimate object exploration and social exploration were very similar response patterns.

Only one nonhuman primate investigation will be mentioned in the context of age-mate interaction for the purpose of the present experiment. It is an infant-mother separation study by Suomi, Collins, and Harlow (1973) with rhesus monkeys which includes a variable bearing on

the effects of infant peer relations. Suomi et al. separated 12 rhesus monkey (Macaca mulatta) infants from their mothers at 60, 90, and 120 days of age. Two types of living conditions following separation were provided. In one type the separated infants were housed alone in a cage and in the other infants were housed together in pairs. The investigators found that living with or without a companion had a differential effect on behavior following separation both immediately and in the longer run. The immediate effects were the ones relevant to the present observational experiment. All subjects exhibited screeching, loud cooing, and increased locomotion--behavior signifying a "protest" reaction--in the first two days following separation. But slightly higher levels of disturbance were exhibited by 60- and 120-day subjects living alone, with a markedly greater level of agitation shown by the 90-day singly housed subjects. During the rest of the week following separation, the infants living alone exhibited a much higher frequency of self-clasping behavior and a much lower amount of locomotion than the infants living in pairs.

The significant human studies of infant peer interaction fall into two widely separated time periods: the 1930's and the 1970's. Bühler (1930) was one of the first to conduct a systematic observational investigation of behavior in the first year of life. Sixty-nine children were observed, of which there were five or more at each month of age. Sixty percent of the children were from the Kinderübernahmsstelle (Reception House for Children) in Vienna, and from these Bühler was able to record infant-peer reactions in the first year of life. However, these peer reactions took place across a distance, because each child

was confined to his own bed. At 2 months, Bühler said an infant cries lustily when it hears another infant cry. At 5 months, another child is perceived and their glances may meet. At 9 months, one infant "lalls" to his peer and offers him toys. The 9-month-old still permits toys to be taken away from him, but 10-month-old infants will resist. An 11-month-old child attempts to gain the attention of the peer by "lalling."

If two infants of 6-10 months are put facing each other, Bühler (1933) said the characteristic social reactions would be seeking of contact by touching, exchanging toys, and pushing and pulling. She said persistent contact in the second half-year of life will not be made unless toys are provided in which both infants are interested. During the first year the infant is able to interact with only one other infant.

Bridges (1933) observed 62 infants ranging in age from 3 weeks to 2 years over a period of three months in the Montreal Foundling and Baby Hospital. Between 9 and 12 months of age, the infants were placed two or three together in a playpen for an hour, at 12-15 months they were allowed to play on the floor of the ward during the afternoon, and from 15 months to 2 years, they formed the nursery group which played together in a room most of the day. The following are some of Bridges' observations: At 4 or 5 months a baby may show interest in another baby's cry, at 7 or 8 months an infant may smile or reach out to another in a nearby crib, at 10 months the infant seems indifferent when another baby takes his toy, at one year infants will struggle over toys, at 13 or 14 months infants will smile and laugh at each other and imitate each other, at 14 or 15 months they may bite or hit another infant to regain a toy. It may be noted from this account and also that of Bühler (1933),

in which she paired infants, that early social interaction frequently takes place over toys.

A large-scale investigation of peer relationships from 6 months to 2 years of age was done by Maudry and Nekula (1939) at a social agency in Vienna. Twenty-four "chief subjects" and 68 "partners" were divided into age groups as follows: 6-8 months, 9-13 months, 14-18 months, and 19-25 months. Infant-infant pairs in each age group were observed in a playpen from behind a one-way screen for twenty minutes. The experimenter intervened to change play materials every four minutes. One measure which the authors termed the first reaction to the new situation was taken at several points throughout the 20 minute session. Immediate orientation to the toys predominated at all ages over orientation to the peer or the surroundings. However, a ratio of the total of turning to the toys over the total of social relations showed a steady decrease as the age of the groups tested increased. For the age groups in ascending order the ratio was 2.7, 2.4, 1.6, and 0.9, respectively. The authors classified the infants social behavior into the following global categories: chance contact (e.g., interested in the same toy), negative social behavior (mostly fighting for the same toys), and positive social behavior (e.g., looking, grasping, smiling, giving and receiving toys). Chance contact decreased with increasing age until the 14-18 months age group. Negative social behavior was highest in the 9-13 months age group and declined with increasing age after that. Positive social behavior constituted one-third of the social behavior seen in the 6-8 months and 9-13 months age groups, after which it increased with age until it was about one-half of the social behavior which

occurred in the 19-25 months age group. The authors concluded that 14-18 months of age was a transitional period when infants' interest tended to shift from the toys to the partner. The importance of the toys, however, should be noted in all three of the social behavioral categories used by the authors.

One recent study of social development in a group of infants raised together is that of Vincze (1971) done in Budapest, Hungary. For over two years she studied the social contacts in a group of nine children living together in the National Methodological Institute for Infant Care. She distilled the following observations about the developmental course of infant social relations toward peers: From 6 months onward mutual smiling and laughing occurred; mutual touching and manipulatory activity attained its highest frequency between 5 and 7 months and then began to decline from 8 months onward; infants who could crawl began to scramble over one another from 7 months onward; from the 7th month onward inanimate objects began to assume a dominant role in social interactions and struggling over toys occurred; at 10 months infants were observed offering and withdrawing toys with one another. Vincze argued that the behavior of an infant in trying to take another's toy should not be considered a hostile act, because the infant's goal is to get the toy and not to hurt the peer.

In a recent careful study, Eckerman, Whatley, and Kutz (1975) observed 10 pairs of children in three age groups, 10-12, 16-18, and 22-24 months of age. The mothers of the young peer pairs were present in the play room. Eckerman et al. found that the children's contact of the same objects and involvement in the peer's play with objects

increased with age. Behaviors concerning the exchange of toys--offering a toy, accepting a toy, taking a toy, taking over a toy, and struggling over a toy--made up the greatest frequency of activities in the experimenters' category of direct involvement in the peer's play. By two years of age there was more social play than solitary play.

Both longitudinal and cross-sectional investigations of infant peer sociability agree that soon after the infant becomes mobile through the ability to crawl, inanimate objects in his environment become the prime ingredients in his interaction with his age-mates. Without these tools, or objects of social intercourse, it would be difficult to imagine along what lines infant peer social interaction would proceed.

In an investigation done by Lenssen (1973), the infant peer is introduced as one of the unfamiliar persons in a study of the fear of the stranger. She introduced each of 45 10-month-old male infants with their mothers to another 10-month-old infant and his mother and to a 5-month-old infant and his mother. One of the results, based on data from nine subjects, was that the baby visually oriented to the other 10-month-old baby much more frequently than to the strange mother.

In another stranger anxiety experiment, 4-5 year old children were used as strangers. Greenberg, Hillman, and Grice (1973) presented a total of twelve strangers to their infants, six adults and six 4-5 year olds, with both sexes represented equally in each group. They used 96 infants, 48 who were 8 months old and another 48 who were 12 months old. Two of their significant findings were that 8-month-old infants respond more affirmatively to strangers than 12-month-olds and

that all infants respond more agreeably to the child than to the adult strangers.

These two studies add another dimension to infant peer interaction (assuming that infant-older child interaction may be somewhat similar). It is that unfamiliar peers may seek each other out in preference to adult strangers. Thus the genesis of the peer affectional system may not simply be a chance meeting of infant age-mates over a mutually desired toy but a more active impulse to find and encounter one another.

To this writer's knowledge, no other study than that of Lenssen (1973) compares an infant's preference for a peer stranger versus an adult stranger. The finding was important enough to be repeated with another sample in the present study. A further step was to study how robust the nascent peer affectional system was among infants. Could the company of an unfamiliar peer reduce separation anxiety? The experiment of Suomi et al. (1973) was suggestive that infant monkeys were slightly more comfortable if they were housed in pairs after separation rather than alone.

Hypotheses for this Study

The present study will examine 1) the perusal by 15-month-old children of peer strangers versus adult strangers, and 2) the influence of an unfamiliar peer on 15-month-old children separated from their mothers. Based on casual observation and the study of Lenssen (1973), it is hypothesized, first, that the investigator will find more visual regard by the toddler of his peer than of the adult stranger, the other

child's mother. A second hypothesis is that if the toddlers remain together while their mothers leave, they will show less distress during their mothers' absence than if they were left alone. In further comparisons between phases of the procedure, it should be possible to replicate previous findings in regard to separation crying, search behavior at separation, decreased exploratory behavior without the mother, and increased contact behavior on the mother's return.

Fifteen-month-old toddlers were selected for study because, according to previous work, the attachment to the mother is strong at this age, while an increase in positive behavior toward peers may be developing. A primary reason for using 15-month-olds was to have all the infants walking, rather than having some walking and some creeping.

CHAPTER III

METHOD

The purpose of this study was to investigate toddler-peer interaction variables in the context of the infant-mother attachment relationship. Hence the subjects were toddlers accompanied by their mothers. A laboratory-observational method was used, many features of which were derived from the procedure used by Ainsworth and Bell (Note 1). The essential components of such a method are an experimental room with a one-way window, human observers, and observations made within specific time intervals. In addition specific behavioral categories for the observations were employed in this study. In this chapter the method will be discussed under the following headings: subjects, experimental room and equipment, procedure, behavioral coding categories and observers, and statistical description and analysis.

Subjects

The subjects were 22 toddlers, whose mean age was 15.3 months and who ranged in age from 14.5 months to 15.9 months. The children were home-reared and all were white. Fourteen of the toddlers were male; 8 were female. Ten were firstborn. Over three-quarters of them played with someone near their own age (about 3½ years or under) at least once a month. Each toddler was accompanied to the experiment by his mother.

The subjects were drawn from the city area in and near Grand Forks, North Dakota and East Grand Forks, Minnesota. Names of parents of potential subjects were collected by using the daily list of births in the local newspaper. Old issues of the newspaper were consulted to find children who would be approximately 15-months-old at the time of the running of the experiment. This list was checked with the current edition of the local telephone directory. Those families whose names appeared in the directory were sent a letter inviting their participation in a child observational study. (A copy of the letter is included as Appendix A.) After allowing time for the families to receive the letter, the families were telephoned to determine whether the mother and child would be a part of the experiment. Letters had been mailed to about 77 families, and from them about 62 were contacted on the telephone. Of those families who could be reached by phone, 61% were willing to participate in the study, although only 42% were used because of cancellations and other reasons.

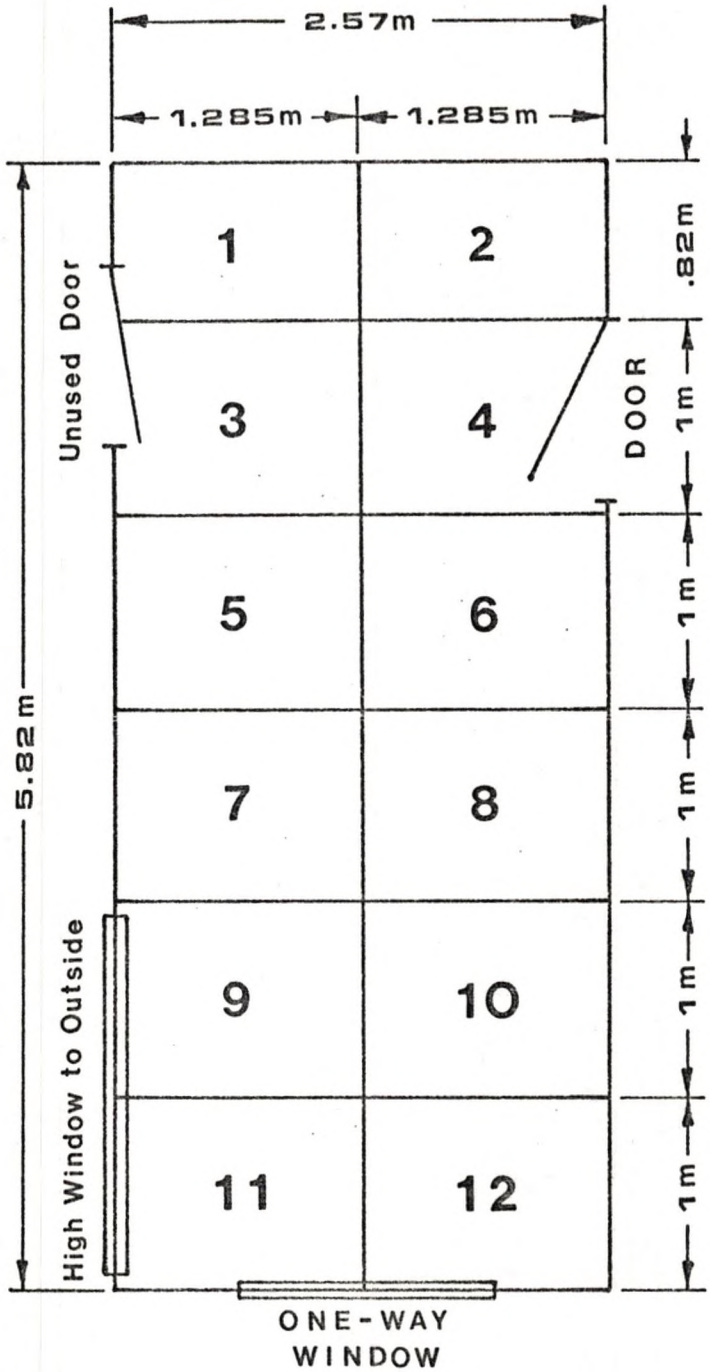
Assignment of one mother-child pair with another was made on the basis of the availability of the pair for a particular time and the need of the experimenter to fill remaining hours in the schedule. Cancellations sometimes necessitated substitutions for the original assignments. Each experimental session involved two infant-mother pairs. Of the 11 sessions held, 3 occurred in the early morning, 4 in the late morning, 2 in the late afternoon, and 2 in the evening. The early afternoon was avoided because this time of day is frequently a nap period for toddlers. An attempt was made to have mothers refrain from bringing their children to the experiment during their usual naptimes. Nevertheless, judging

from postexperimental interviews with the mothers, four toddlers were present during usual nap times. Pairing the toddlers by schedule considerations resulted in the following combinations: two female pairs, five male pairs, and four mixed pairs. Although sex effects cannot be ruled out, Eckerman et al. (1975) found no significant sex differences in four peer interaction categories, including watching, in the second year of life, and Stayton et al. (1973) discovered no significant sex effect for crying when the mother leaves the room during the first year of life.

Experimental Room and Equipment

The experimental room in which the toddlers played and interacted with their mothers or the strangers was carpeted and measured 5.82 m by 2.57 m. A one-way window was at one end of the room. The walls of the room were for the most part bare, but at the end of the room opposite the one-way window was a room-width counter top with a sink. Below the counter were drawers and floor-level cabinets. Several items, including a cash register, were on the counter top, but they were out of the reach of the toddlers or unable to be moved. The cabinet doors were tied shut. The drawers were empty except for one containing old newspapers.

The floor was marked into 12 rectangles by chalk and a few small pieces of masking tape. Except for the rectangles numbered 1 and 2 near the cabinets, all rectangles measured 1.0 m by 1.285 m. The floor rectangles in front of the cabinets were .82 m by 1.285 m. Figure 1 shows the floor arrangement of the experimental room.


2.57m
1.285m
1.285m
.82m
1m
1m
1m
1m
1m
5.82m
Unused Door
DOOR
High Window to Outside
1
2
3
4
5
6
7
8
9
10
11
12
ONE-WAY
WINDOW

A standard group of toys were on the floor of the room during each session. They were two large cardboard blocks, 10-7/8 inches (27.6 cm) by 5-3/8 inches (13.7 cm) by 5-3/8 inches (13.7 cm), a stuffed Raggedy Ann and Raggedy Andy doll, each about 19 inches (48.3 cm) long, two toy telephones, one red and one blue, and two pink soft-rubber balls, about 2-1/2 inches (6.35 cm) in diameter. The toys were arranged on floor rectangles 5 and 6 at the beginning of each session. Also in the experimental room were two chairs, placed in rectangles 9 and 10. On each chair was a magazine. Behind the one-way window was a smaller room in which the observers stood and which contained a cassette audio-tape recorder with a three-minute timing tape. On the tape, the end of every 15-second period was marked by a tone. Prior to the tone the experimenter's recorded voice said, "Record 1," or "Record 2," and so on, up to "Record 12." Each 3-minute episode in the experimental room was broken into twelve 15-second intervals. The timing tape was rewound and replayed for each 3-minute episode.

Procedure

The sequence of a session in the experimental room was divided into the following nine 3-minute episodes: 1) the first mother and the first toddler, 2) the first toddler alone (separation), 3) the first mother and the first toddler (reunion), 4) the first mother and the first toddler joined by the second mother and the second toddler, 5) the two toddlers by themselves (separation), 6) the two mothers and the two toddlers (reunion), 7) the second mother and the second toddler, 8) the second toddler alone (separation), and 9) the second mother and the

second toddler (reunion). Episodes 7, 8, and 9 for the second toddler were identical to Episodes 1, 2, and 3, respectively, for the first toddler. The counterbalanced procedure was used to control for order effects, especially since Ainsworth and Bell (1970) had attributed the greater incidence of crying in their second separation episode to a cumulative effect. Small amounts of time were used between episodes for rewinding the timing tape, signaling the mother, waiting for a toddler's distress to abate and so on. If the distress of the toddler was high in Episodes 2, 5, or 8, the episode was often curtailed short of 3 minutes. This was done on nine occasions during Episodes 2 and 8, and on two occasions during Episode 5. The decision was mostly based on the desire of the mother, who was looking through the one-way window along with the observers and the experimenter.

The two mother-child pairs for an experimental session were scheduled to arrive 15 minutes apart so that the mothers and infants would not be introduced to each other prior to their meeting in the experimental room. In practice, whichever pair arrived first was taken to a separate waiting room. In each waiting area a few toys were present to amuse the child. The first contact with the mother-child pair was usually by the receptionist. The experimenter would then introduce himself as the one who had telephoned and usher the mother and toddler to the appropriate waiting area.

In the waiting area the mother was informed by the experimenter about her part in the session. The mothers were instructed in a conversational manner as the experimenter sometimes read and sometimes talked from a set of written instructions in front of him. A different order

of instructions was given to the first mother and the second mother because of the counterbalancing. The instructions to the mothers were essentially the same each time they were given with only occasional changes in words or phraseology. (A copy of the full instructions given to a first mother or a second mother is included in Appendix B.) Any requests by the mothers for clarification of the procedure were answered. The mother was then given a card to hold during the experiment to remind herself of the sequence of the procedure in the event that she forgot. (Copies of the text of the two reminder cards are in Appendix C.) After the mother had been instructed, the mother and toddler were introduced to the four observers.

To begin the session, the experimenter led the first mother and her toddler to the experimental room and asked them to enter the room and begin the procedure. The first mother had been told that while advancing into the room she was to lead her child to the toys in the middle of the floor. Then she was to go to the farthest chair and seat herself, picking up the magazine and occupying herself by pretending to read it. She was asked not to talk or play with her toddler unless he first talked to her or needed comforting. In that case, she was instructed to respond in her normal way, which could include answering the child's speech, picking the child up, or trying to interest the child in a toy. This first episode went on for 3 minutes. At the end of that time, if the child was not distressed, the experimenter knocked three times on the wall of the experimental room. This was the mother's signal to leave.

The mother was told to leave quickly, saying, "Bye, bye, I'll be back," and closing the door behind her. If her child was upset, she was to try to calm him or interest him in a toy before she left. Then the mother was invited to come around to the observation window to look in. If the toddler became extremely upset, the mother was asked by the experimenter whether she wished the episode to be shortened so she could return to her child. The experimenter's decision was based on the mother's response, or her uneasiness whatever her response, and the strength of the distress of the child. When the mother returned, she was instructed to greet her child in her usual manner. She was told she could embrace him, comfort him, or do anything that was natural in the situation. As soon as it became possible, she was to return to her chair and resume reading her magazine.

At the end of 3 minutes, the experimenter ushered the second mother and her toddler to the door of the experimental room. The second mother and child then entered. Both mothers had been instructed to introduce themselves and to find out the name of the other toddler. Then each mother was to say to the other child once, "Hello ____," or "Hi ____," using the name of the other child. At some point during this time the second mother seated herself on the vacant chair. After this both mothers were instructed to pay no special attention to the children but to engage in conversation with each other. After 3 minutes of this, the experimenter knocked three times on the wall. This was the signal for both mothers to leave. Again, each was to say to her child, "Bye, bye, I'll be back." The last mother closed the door, and they both came to the observation window to look into the room. If one or the other

child became extremely distressed, the same criteria as previously were used to decide whether to curtail the episode. When both mothers returned to the room, they were to respond to their toddlers in their usual manner. As soon as it became possible, they were to return to their chairs and resume their conversation.

Three minutes later, the experimenter again knocked three times on the wall. This was the signal for the first mother and her toddler to leave. The second mother and her toddler were in the room by themselves (Episode 7), and the second mother was now to occupy herself by pretending to read the magazine. After 3 minutes the experimenter knocked once more three times on the wall. This was the signal for the second mother to leave. In other words, Episode 7, 8, and 9 with the second mother and second toddler proceeded just as had Episodes 1, 2, and 3 with the first mother and first toddler. At the end of Episode 9 the experimenter came into the experimental room to tell the second mother the session was over.

At the end of the session, the experimenter held a brief interview with each of the mothers separately. At this time the child's birth date and age at the time of the session were recorded. It was ascertained whether the toddler had any siblings, whether the mother worked, and whether the child stayed often with a babysitter. (A copy of the interview recording sheet is included in Appendix D.)

Behavioral Coding Categories and Observers

Behind the one-way window in the experimental room stood four observers with pencils and clipboards recording the behaviors of the

toddlers on coding sheets. The observers were three female undergraduate psychology majors in their senior year and one male psychology graduate student. Two different coding sheets, each with a different set of behavioral categories, were used. Consequently two observers watched one toddler, while the remaining two observers watched the other toddler. Observations were recorded every 15 seconds. In a 3-minute episode, there were 12 such time intervals in which the presence of a behavior could be noted. One coding sheet was used for each toddler for each episode. (A sample of each coding sheet is included in Appendix E.) Thus for every toddler, there were six episodes recorded by two observers who each made observations during seventy-two 15-second intervals for the session.

Prior to the experiment, the investigator discussed the coding sheets with the observers. One practice session with mothers and toddlers was held in order to familiarize the observers with the use of the coding sheets. The practice session was discussed and the observers' helpful suggestions were incorporated into the actual procedure.

On one behavioral coding sheet were boxes to check for location, visual regard, and mother-initiated behavior toward the toddler, which included, picks up, puts down, tries to interest in a toy, and limits or disciplines. Thus one observer was specifically concentrating on the child's looking and locomotion and the mother's large-scale interactions with the child.

The other behavioral coding sheet was limited to movement of the toddler's hands and expressions involving the voice and mouth. Under "hands," the following categories were included: touch or grasp,

manipulates with fingers, reaching, clinging or embracing, climbing up, offers toy, accepts toy, rejects offered toy, resists offered contact, grabs toy from peer (or attempts), resists grabbing of toy, and aggressive behavior. Under "voice and mouth" the following behaviors were listed: crying (continuous), fussing or short cry, vocalization, smile, and biting. The direction of the behavior by the toddler was noted by letters: M for mother, P for peer, S for strange mother, T for toy, D for door, and O for other. In some cases this indicated to whom the toddler was responding.

Each observer stayed with only one of the two coding sheets throughout the experiment. After six sessions, or prior to the pair comprised of toddlers 13 and 14, each pair of observers using the same behavioral coding sheet switched within their pair from the first to the last counterbalanced toddler. This was to prevent any systematic observer effect from being added to one or the other of the counterbalanced orders.

After the experiment, the benefit from collapsing some of the behavioral categories into more global ones was recognized. The two crying measures 1) continuous crying and 2) fussing or short cry were combined into one measure of all crying. Although the observers had used the two original crying categories in mutually exclusive fashion, the interobserver agreement for each type of crying was not high (continuous crying, 76%; fussing or short cry, 70%) compared to the interobserver agreement for all crying (96%). Thus the observers agreed at a high level about whether the toddler was crying or not but they had a difficult time making the distinction between the two types of crying.

Several categories of behavior associated with the toddlers' use of their hands were collapsed into a measure of tactile exploration toward inanimate objects and another one of contact and contact-seeking toward persons. In the tactile exploration category were included the coding sheet categories of touch or grasp, manipulates with fingers, and reaching--when directed to toys, the door, or other. These coding categories had not been used independently by the observers. Two or more of them might be employed by one of the raters to describe a toddler's behavior during a 15-second interval. In the collapsed category of tactile exploration, only one tally was given for the behavior in a particular direction when more than one of the three subcategories was marked. The amount of tactile exploration could not be seen as additive from the number of subcategories indicated because the behaviors might occur quickly in succession in a 15-second interval.

Using a global category called tactile exploration toward objects has a minor limitation. Some instances of this behavior are scored when a child is holding onto a toy even though his attention is on something else, such as looking at the door. This may inflate the measure of tactile exploration during separation episodes when the toddler is often at the door and during reunion episodes when the child is attending to the mother's presence. But there are other, apparently more frequent, instances where touch or grasp do constitute what would commonly be called exploratory behavior.

The other collapsed hand-use category, the one directed toward persons, was termed contact and contact-seeking. It included the coding sheet categories of touch or grasp, manipulates with fingers, and

reaching--when directed toward the mother, the peer, or the strange mother--as well as the categories of clinging or embracing and climbing up. Again the molecular categories had not been employed in mutually exclusive fashion by the raters. As before, they could not be seen as additive within a 15-second interval, and thus only one tally was given in a 15-second interval for contact and contact-seeking toward a particular individual no matter how many subcategories had been indicated.

The other hand-use categories on the coding sheets were infrequently used, and the sparse data from them was not subjected to statistical tests of significance or checks for reliability. Descriptive observations were made from them. Coding categories, in other areas were also dropped from the analysis, such as biting, which never occurred, and smiling, in which the direction of the smiling was not indicated. The categories under the heading of mother-initiated behavior to the toddler did not prove useful in putting together the group data on toddlers. They were more useful for a descriptive view of reunion behavior and for looking at individual cases.

The interobserver reliability for the major behavioral categories was computed from joint observations of four toddlers in Episodes 1, 2, and 3, and four toddlers from the identical Episodes 7, 8, and 9. In the counterbalanced procedure, two observers were free during the first three episodes of the session, Episodes 1, 2, and 3, and similarly, two observers were free during the last three episodes of the session, Episodes 7, 8, and 9. Every third experimental session--the first, the fourth, the seventh, and the tenth sessions--the free observers also rated the behavior of the toddler in the experimental room. No

interobserver reliability was calculated for Episodes 4, 5, and 6 because all four observers were busy rating one of the two toddlers on different sets of behaviors. The assumption was made that the inter-judge reliability found in the sample of joint ratings from Episodes 1, 2, and 3, or 7, 8, and 9, was near to that which was actually present in Episodes 4, 5, and 6.

The interobserver reliability was found by computing percentage of agreement scores between the two judges who rated a category of behavior. This was figured as twice the number of agreements over the total number of ratings for the two observers. In all but one case two types of percentage of agreement were computed by varying conceptually the total number of ratings which the judges made. In one type, both the mark rating the occurrence and the blank signifying the nonoccurrence of a behavior taken from the observer's coding sheets were counted as a rating. This also included, where applicable, the occurrence or the nonoccurrence of the behavior in specified directions, to the mother, the peer, the strange mother, the toys, the door, or other. In the other type of percentage of agreement, the total number of ratings is based solely on those instances in which the judges noted the occurrence of the behavior, or its occurrence toward specified targets. If the second percentage of agreement is lower than the first, the meaning is that the absence of the behavior was easier to agree about than its presence. By chance 50% agreement would be expected between any two observers on the first type of percentage of agreement. The chance expectation on the second type would depend on how heavily used was the behavioral category by the raters.

Table 1 shows the percentages of agreement between observers for the categories of visual regard, all crying, tactile exploration, contact and contact-seeking, location, and vocalization. The highest interobserver agreement was for crying.

Table 1

Percentages of Agreement between Observers for the Major Behavioral Categories Based on Observations of Eight Toddlers in Episodes 1, 2, 3, 7, 8, and 9.

Behavioral Category	Types of Agreement	
	Occurrence and non-occurrence of the behavior[a]	Occurrence of the behavior[a] only
Visual Regard	86	81
All Crying	96	96
Tactile Exploration	94	92
Contact and Contact-Seeking	87	76
Location	--	84
Vocalization	89	84

[a]Also includes direction of the behavior in visual regard, tactile exploration, and contact and contact-seeking.

Statistical Description and Analysis

The totals for all toddlers in the various categories of behavior for each episode were computed by first summing for each toddler the

number of 15-second intervals in which the behavior occurred in a specific episode. These episode scores for each toddler were then summed over all 22 toddlers to get a grand total for the behavior (or the behavior directed at a certain target) for that episode. It was from these totals that the means and the standard deviations for the episode were computed.

The curtailed episodes were included in the totals by prorating the number of 15-second intervals in which the behavior occurred over the entire episode. Nine of 22 toddler-alone episodes were curtailed. The average curtailment was at 68.3 seconds with a range from 15 seconds to 120 seconds. (A full-length episode was 180 seconds.) Two of the 11 two-toddlers separation episodes were curtailed, thus involving four toddlers' scores. One of these episodes lasted 30 seconds and the other 135 seconds. Thus the totals from separation episodes could be slightly inflated or depressed for a given behavior. It is probably not possible to determine in which direction the influence went. However, the crying measure is thought to be very accurate, because an episode was terminated when the toddler's crying showed great distress and likely would have continued for the full three minutes.

The observers were instructed to record the toddler's location at the end of each 15-second segment. From these toddler location ratings using the grid marked on the floor, a rough measure of proximity to the mother was obtained. It was hoped that a measure of infant locomotion could also be computed, but there was no consistent way to interpret the ratings which resulted, and thus this measure was dropped from the analysis.

The mother-proximity score for each 15-second interval was based on the notation of the chair in which the mother chose to sit. Thus the number of "squares" (actually rectangles) between the infant and the mother could be counted. When it was necessary to judge the length of a diagonal line between the toddler and mother, the coder moved by right angles in counting "squares" from the mother to the infant, thus counting distance between two adjacent diagonal "squares" meeting at the corners as two "squares". This was done because the "squares" used in the floor grid were actually rectangles 1 m by 1.285 m, except for the two at the far end of the room which were even less square-like in shape. From the center of one "square" (or rectangle) to the center of the diagonally adjacent one was 1.63 m, just a little over 1½ squares if one were counting through them vertically. The fractional "square" was rounded up to make a full "square". The distances from the mother in each 15-second interval were averaged for each toddler for the entire episode. These averages were then summed over all toddlers in each mother-present episode and a mean for all toddlers in that episode was found.

For statistical comparisons between means the Wilcoxon matched-pairs signed-ranks test was used (Siegel, 1956), because it did not appear that the assumptions for the use of Student's *t* test could be met.

CHAPTER IV

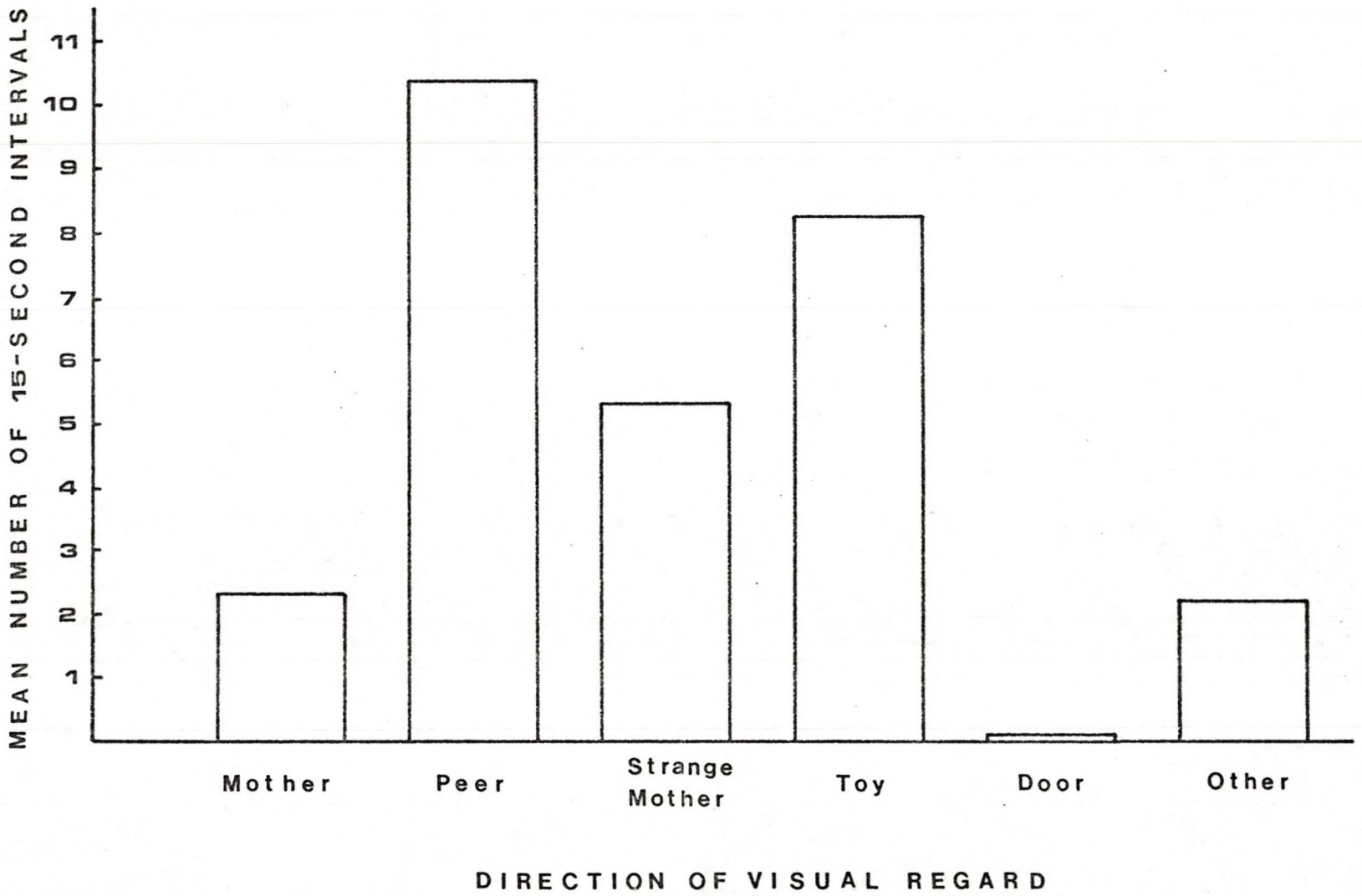
RESULTS

The results are divided into three sections. Part one is data relevant to a test of the first hypothesis about stranger preference. Part two deals with the second hypothesis regarding the comfort value of a peer when the infant is experiencing separation from the mother. Part three pertains to a variety of behaviors which signify the infant-mother attachment relationship.

Stranger Preference Measured by Visual Regard

The first hypothesis was that the toddler when confronted with another mother and toddler, both strangers to him, would gaze more at the age-mate than at the unfamiliar mother. The measure of this was the observers' ratings of the direction of visual regard.

The outcome of placing two toddlers together with their mothers was that the toddlers spent markedly more time looking at each other than they did observing the strange adult. From the visual regard measures taken in Episode 4 (see Figure 2), it is revealed that the toddlers looked at their age-mates during an average of 10.32 intervals out of 12 whereas the same children looked at the strange mother during a mean of 5.32 intervals out of 12. This difference in their watching the two strangers in the room was significant, $T\ (22) = 4$, $p<.001$ (Wilcoxon


MEAN NUMBER OF 15-SECOND INTERVALS
1
2
3
4
5
6
7
8
9
10
11
Mother
Peer
Strange Mother
Toy
Door
Other
DIRECTION OF VISUAL REGARD

matched-pairs signed-ranks test). Table 2 displays the visual regard means and standard deviations in all episodes for the seven categories of objects and people toward which looking was directed. The counterbalanced Episodes 7, 8, and 9 are included under the identical Episodes

Table 2

Mean Number of 15-Second Intervals out of 12 in Each Episode in which the Toddlers' Vision Was Oriented to the Specified Person or Object

Episode	Episode Description	Direction of Visual Orientation						
		Mother	Peer	Strange Mother	Toy	Door	Other	Unfocused
1[b]	(M,T) Preseparation	5.45 (3.11)[a]	--	--	9.36 (3.38)	0.50 (0.84)	5.36 (3.65)	0.27 (0.91)
2	(T) Separation	--	--	--	4.82 (3.98)	6.95 (3.39)	7.45 (3.58)	2.41 (3.65)
3	(M,T) Reunion	6.73 (2.56)	--	--	7.23 (2.70)	0.59 (0.72)	6.14 (3.08)	0.64 (1.23)
4	(2M,2T) Strangers	2.32 (1.87)	10.32 (1.36)	5.32 (3.12)	8.23 (3.23)	0.14 (0.34)	2.23 (1.78)	0.00 (0.00)
5	(2T) Separation	--	10.36 (2.71)	--	4.05 (3.34)	4.68 (2.94)	3.32 (2.87)	0.86 (2.55)
6	(2M,2T) Reunion	4.36 (1.99)	7.73 (2.83)	5.05 (3.36)	6.73 (2.53)	0.18 (0.49)	2.95 (2.34)	0.09 (0.42)

[a]Numbers in parentheses are standard deviations calculated with N = 22 weighting.

[b]Counterbalanced Episodes 7, 8, and 9 are summed with Episodes 1, 2, and 3, respectively.

1, 2, and 3, respectively.[2] The symbols used for Episodes 1 through 6 are, in order--M,T; T; M,T; 2M,2T; 2T; 2M,2T--to designate the number of toddlers, or mothers and toddlers, in the experimental room.

A perusal of the figures for Episode 4 will show that despite the toddlers' frequent looking at each other, their looking at the toys remained relatively high, too. In fact in no other episode except Episode 1, in which the toddler was alone with his mother, was the mean number of 15-second intervals during which the toys were gazed at greater. In Episode 6 in which the mothers are reunited with their toddlers, the toddlers' visual regard of their age-mates dropped to a lower level of frequency but still above that for their scrutiny of the strange mothers. During Episode 5, when the toddlers are separated from their mothers, and when they were frequently in distress, they looked at each other in well over three-quarters of the 15-second intervals.

The Relative Comfort of Separation Shared with an Age-Mate Measured by Crying

The second hypothesis was that the toddlers would experience greater comfort after separation from the mother when they were left with a peer than when they were left alone. Crying constituted the measure of the infants' distress. The greatest frequency of crying was expected in the separation episodes. To test the hypothesis that the infant would show less distress when left with one of his peers than when left alone, the frequency of crying in Episode 5 was compared with

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[2]Throughout the remainder of this thesis, Episodes 1, 2, and 3 will be used to include the identical counterbalanced Episodes 7, 8, and 9, respectively.

that in Episode 2. As Table 3 shows, the mean number of 15-second intervals in which crying occurred in Episode 2 (toddler alone) was 8.91 whereas the mean for Episode 5 (toddler with peer) was 8.09.

Table 3

Mean Number of 15-Second Intervals out of 12 in which the Toddlers Cried in Each Episode

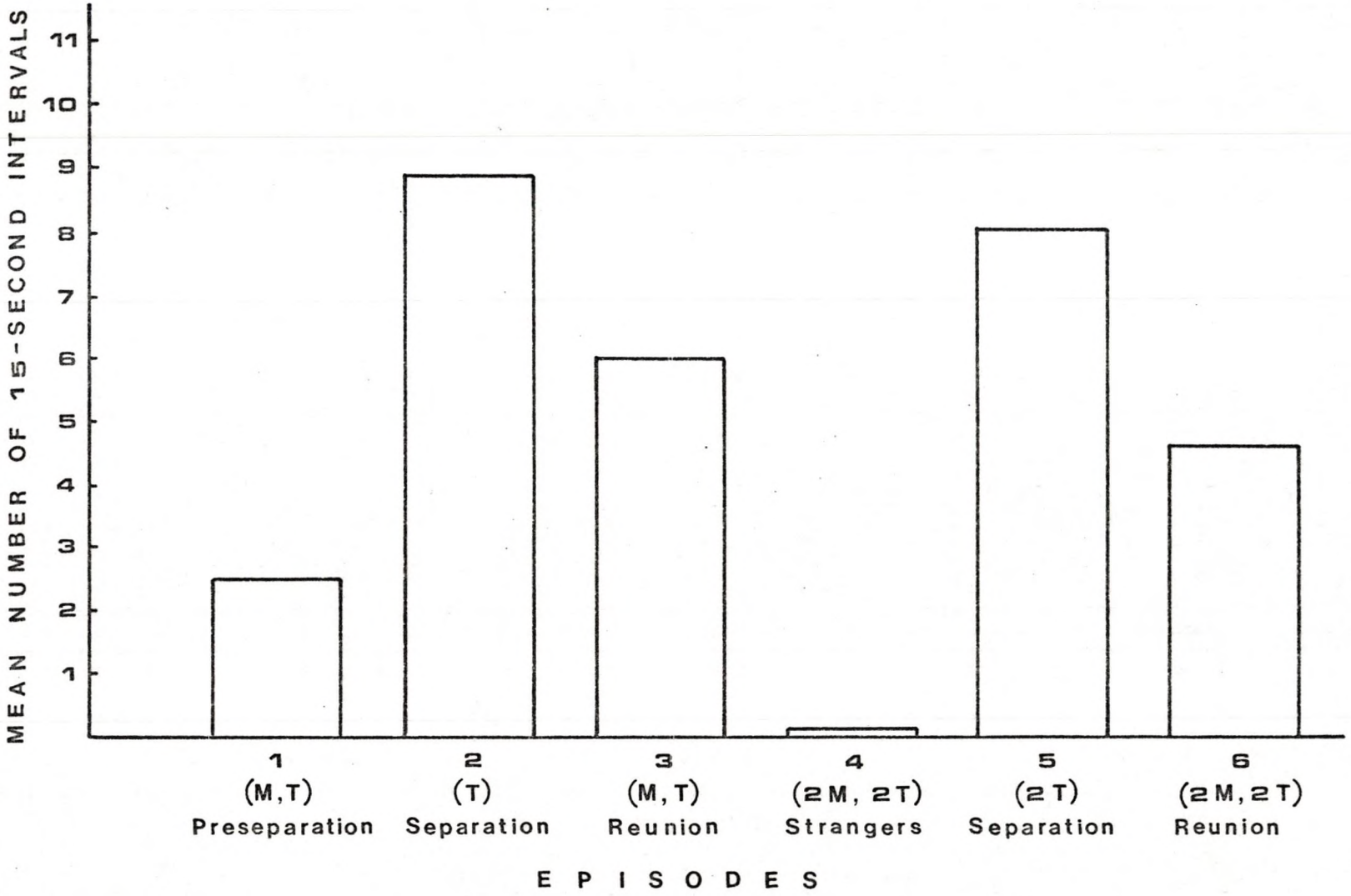
Episodes					
1[a] (M,T) Preseparation	2 (T) Separation	3 (M,T) Reunion	4 (2M,2T) Strangers	5 (2T) Separation	6 (2M,2T) Reunion
2.50 (3.87)[b]	8.91 (4.49)	6.00 (4.07)	.14 (.62)	8.09 (4.73)	4.64 (4.41)

[a]Counterbalanced Episodes 7, 8, and 9 are summed with Episodes 1, 2, and 3, respectively.

[b]Numbers in parentheses are standard deviations calculated with N = 22 weighting.

This small difference between crying when alone and crying when with the age-mate was in the expected direction, but it was not significant at the .05 level, T (14) = 28 (Wilcoxon matched-pairs signed-ranks test). Figure 3 shows the mean number of 15-second intervals out of the 12 in each episode in which crying occurred.

An impression gained from observing some of the toddler pairs when they were by themselves in Episode 5 was that if one started crying, the other might start crying, or if one was in an enduringly happy mood, the other might be inhibited. It seemed that either crying or not crying soon became the behavior of both. If this was the case, a high percentage of agreement would be expected between the two toddlers in a


MEAN NUMBER OF 15-SECOND INTERVALS
1
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7
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10
11
1 (M,T) Preseparation
2 (T) Separation
3 (M,T) Reunion
4 (2M, 2T) Strangers
5 (2T) Separation
6 (2M,2T) Reunion
EPISODES

pair in regard to crying or not crying. Taken all together, the toddlers' agreement score within pairs lent little support to the notion of mutual influence, because the agreement figure was a mere 68%. However, there were three pairs where the agreement was 100%--two pairs who cried all the way through Episode 5, and one pair who did not cry at all. In addition there were two pairs who had a 100% agreement in crying until their episode was curtailed, in one case after 30 seconds, and in the other, after 135 seconds. It is very likely they would have cried through the entire period. When this assumption was included in the calculation of agreement over all toddlers within their pairs, the composite agreement figure was raised slightly to 71%. The range of agreement scores, when taken pair by pair, was very wide. The lowest agreement score was 17%, and in two other pairs, it was 25%. In two of these low-score pairs one infant never cried, while the other cried or fussed most of the time. One of these infants that never cried had his bottle. In one pair, one infant cried a little at the first of the episode without participation by the other. Then the other cried for the latter two-thirds of the episode without participation by the earlier crier until the last 15-second segment in which they both cried.

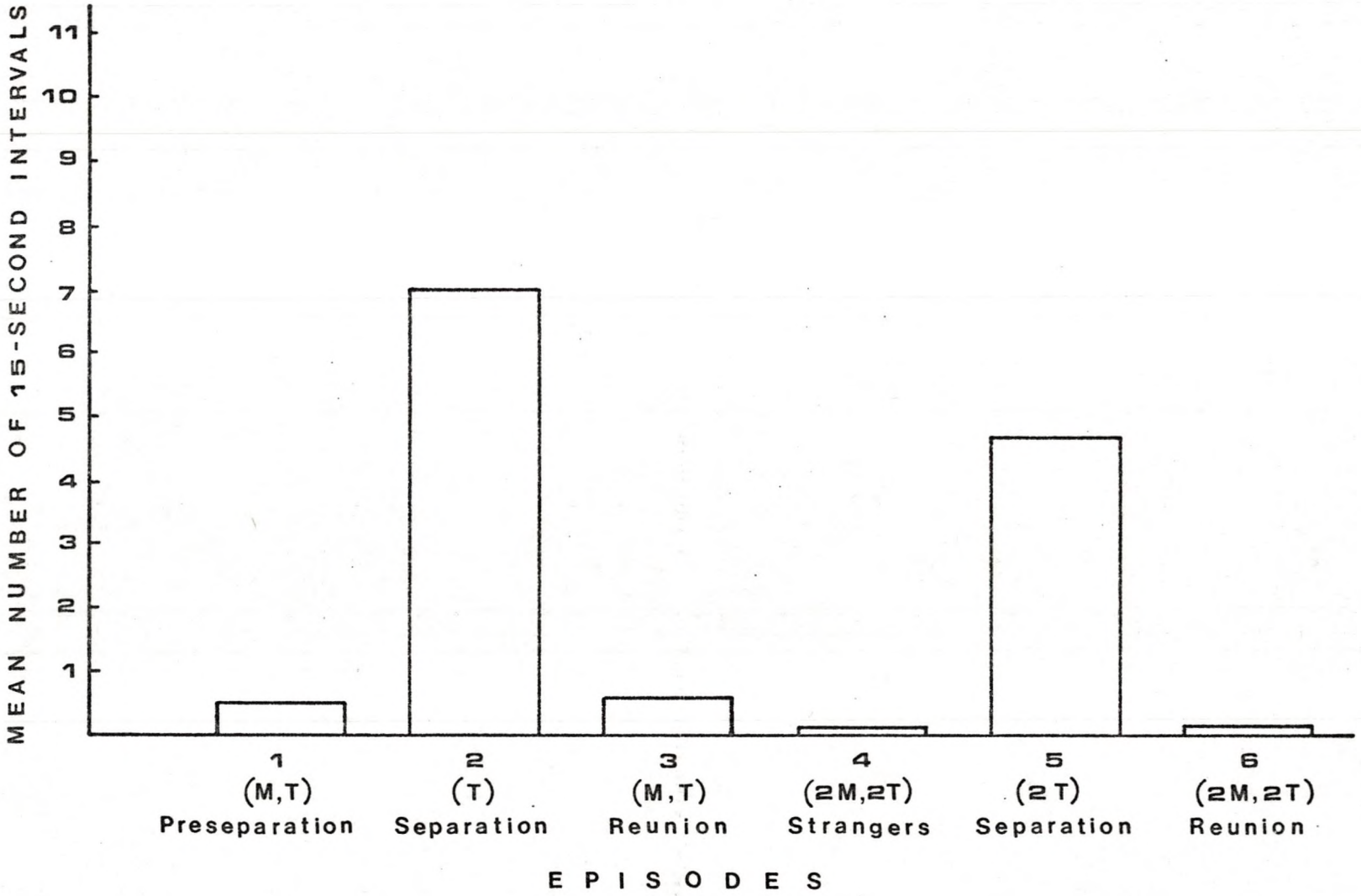
Infant-Caretaker Attachment Indexed by Measures Already Discussed as well as Tactile and Location Ratings

As discussed previously, certain changes in behavior occurring after laboratory manipulation are postulated as indications of infant-caretaker attachment. Some of these behavioral changes are the separation protest (crying), searching toward the door from which the mother

exited, decline in play and exploration during the mother's absence, and differences in the infant's contact with, and orientation to, the mother from preseparation to postseparation periods. Crying and visual regard ratings, which are important indices of attachment, have already been discussed and will be considered in this section from the standpoint of the infant-caretaker bond. In addition, there were two other major measures recorded during this experimental procedure, those of touch or physical contact and of location on the floor. The results of these two measures were used as well to detect the establishment of infant-caretaker attachment.

Crying was much more frequent in the separation episodes than in the mother-present episodes immediately preceding separation. Figure 3 shows marked and similar increases in crying for both mother-absent episodes. When the totals for each toddler for preseparation crying, and again for separation crying, were pooled, the difference between preseparation and separation crying was significant, $T(22) = 0$, $p < .001$ (Wilcoxon matched-pairs signed-ranks test). Thus the occurrence of the separation protest for this 15-month-old sample was strikingly demonstrated.

When the mother left the room and closed the door, there was often an attempt to follow her by touching and manipulating the door and by looking at the door. This type of activity was included by Ainsworth and Bell (1970) in what they called search behavior. Occasionally in this experiment, search behavior involved going to the mother's chair, but this particular piece of furniture was not specified in the visual regard ratings or the tactile exploration ratings. Figure 4 shows


MEAN NUMBER OF 15-SECOND INTERVALS
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(M,T)
Preseparation
2
(T)
Separation
3
(M,T)
Reunion
4
(2M,2T)
Strangers
5
(2T)
Separation
6
(2M,2T)
Reunion
EPISODES

graphically what is represented in Table 2, that toddlers looked at the door much more frequently in separation episodes than in pre- or post-separation episodes. When the scores of the two preseparation episodes were combined, as well as those of the two mother-absent episodes, the difference between the toddlers' visual regard of the door in the two conditions was highly significant, T (21) = 0, $p<.001$.[3]

Table 4

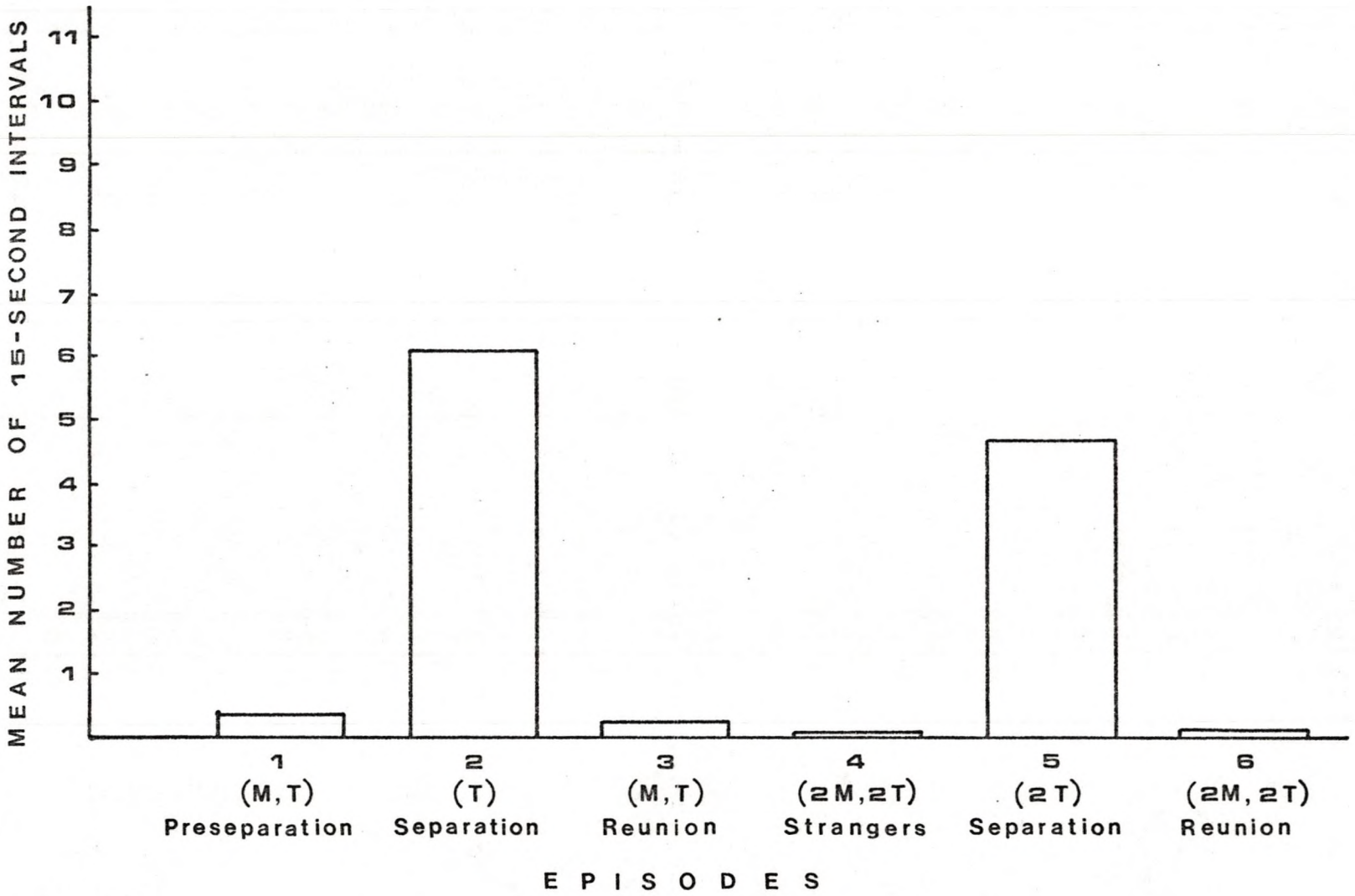
Mean Number of 15-Second Intervals out of 12 in Each Episode in which the Toddlers' Tactile Exploration (including Reaching) Was toward the Specified Object Category

Episode	Episode Description	Direction of Tactile Exploration		
		Toy	Door	Other
1[a]	(M,T) Preseparation	9.23 (3.99)[b]	0.36 (0.88)	1.77 (2.59)
2	(T) Separation	6.36 (4.94)	6.05 (3.67)	3.09 (3.97)
3	(M,T) Reunion	5.96 (4.02)	0.27 (0.54)	2.27 (2.63)
4	(2M,2T) Strangers	8.14 (3.96)	0.05 (0.21)	1.91 (2.56)
5	(2T) Separation	5.68 (4.53)	4.64 (3.72)	2.27 (3.18)
6	(2M,2T) Reunion	5.68 (3.77)	0.09 (0.29)	1.50 (2.37)

[a]Counterbalanced Episodes 7, 8, and 9 are summed with Episodes 1, 2, and 3, respectively.

[b]Numbers in parentheses are standard deviations calculated with N = 22 weighting.

[3]This and all remaining tests of significance are Wilcoxon matched-pairs signed-ranks tests.


MEAN NUMBER OF 15-SECOND INTERVALS
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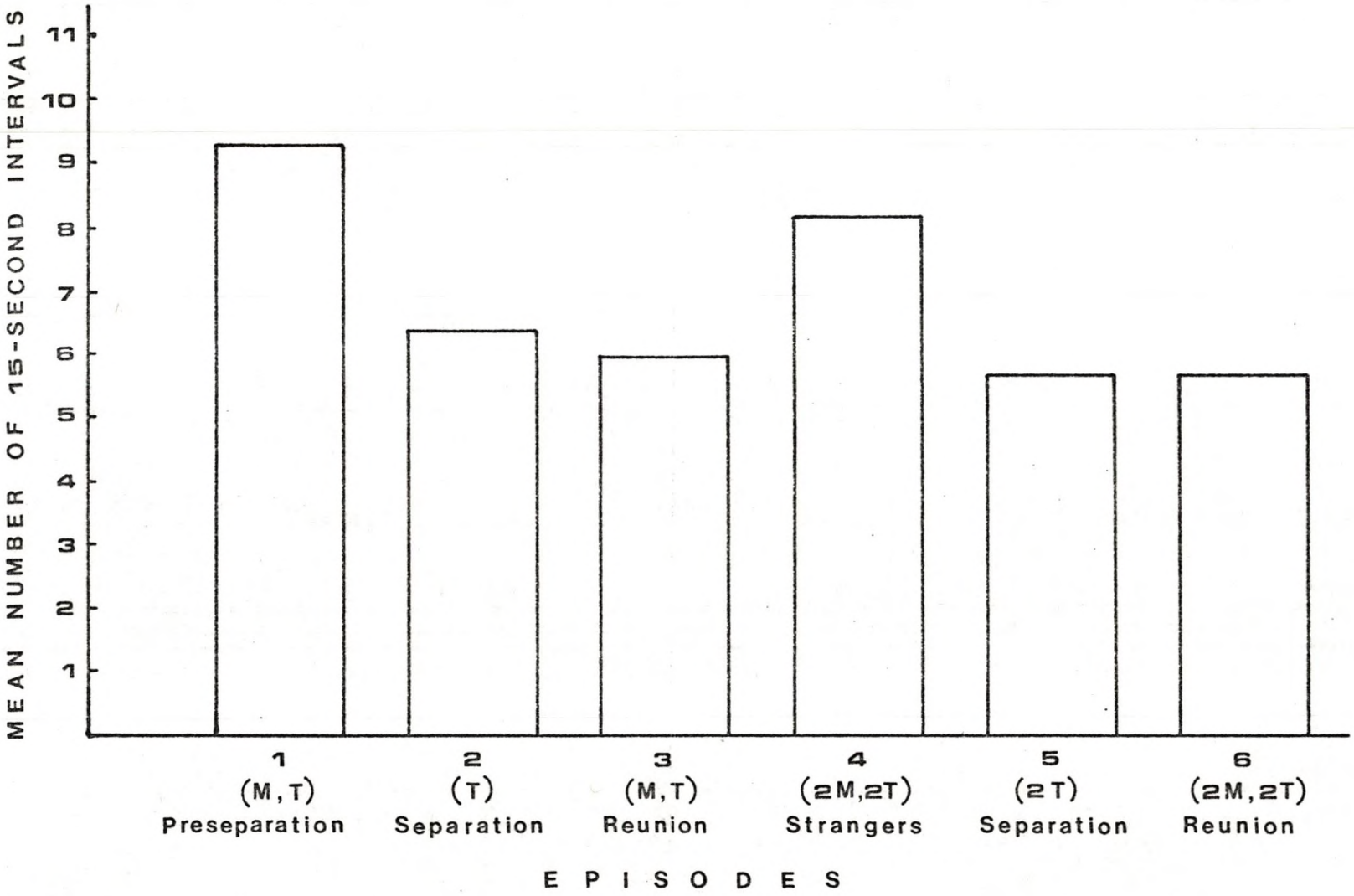
1 (M,T) Preseparation
2 (T) Separation
3 (M,T) Reunion
4 (2M,2T) Strangers
5 (2T) Separation
6 (2M,2T) Reunion
EPISODES

The toddlers' touching or manipulating the door was included in the tactile exploration data shown in Table 4. Figure 5 displays the striking upsurge from pre- to postseparation in the amount of time the toddlers' hands were on the door or were reaching for the door. When data was combined from the separation episodes, and also from those prior to separation, the difference was significant, $T\ (22) = 1$, $p<.001$.

A decrease in play by the subjects during separation was indicated by lower tactile exploration directed toward the toys during separation episodes than in the episodes immediately preceding (see Table 4). Figure 6 illustrates the mean number of 15-second intervals of tactile exploration of the toys in each episode. When preseparation and separation episode scores were pooled, respectively, the decrease in tactile exploration of the toys when the mother was absent was significant, $T\ (22) = 34$, $p<.01$.

It may be noted that there was a moderate amount of tactile exploration of "other" things in the room as well as toys. "Other" items were such things as the mother's magazine or the cabinet doors, which were tied shut, at the end of the room. Tactile exploration of "other" things rose very slightly during separation episodes because the toddlers' hands may have often been on the wall near the door. In one unusual separation episode when the toddler was alone, the twine tying two of the cabinet doors shut became undone, and the toddler happily busied herself pulling out plastic dishes and glass jars. In this instance the items pulled from the cabinet were coded as toys.

Reunion behavior, too, when compared with preseparation behavior, has been used as an index of infant attachment to the caretaker. In


MEAN NUMBER OF 15-SECOND INTERVALS
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(M,T)
Preseparation
2
(T)
Separation
3
(M,T)
Reunion
4
(2M,2T)
Strangers
5
(2T)
Separation
6
(2M,2T)
Reunion
EPISODES

this study, visual regard of the mother increased moderately in reunion episodes over its previous values in the preseparation episodes (see Table 2). The difference in visual regard to the mother between Episodes 1 and 3 did not reach statistical significance at the .05 level, $T(19) = 47$, but the difference between Episode 4 and 6 was significant, $T(19) = 22$, $p<.01$. On the average the toddlers stayed physically closer to their mothers at reunion times than prior to separation. This result is shown in Table 5 which presents the mean number of "squares" distant from the mother for all toddlers in each mother-present episode.

Table 5

Mean Number of "Squares" Distant from the Mother for All Toddlers in Each Mother-Present Episode

Episodes			
1[a] (M,T) Preseparation	3 (M,T) Reunion	4 (2M,2T) Strangers	6 (2M,2T) Reunion
1.88 (0.96)[b]	1.47 (0.87)	1.91 (1.04)	1.56 (0.89)

[a]Counterbalanced Episodes 7 and 9 are summed with Episodes 1 and 3, respectively.

[b]Numbers in parentheses are standard deviations calculated with N = 22 weighting.

The differences were in the expected direction, but neither difference, between Episode 1 and 3, $T(22) = 76.5$, or between Episode 4 and 6, $T(20) = 64$, was significant at the .05 level.

Contact and contact-seeking to the mother was much higher in reunion episodes than in preseparation episodes. Table 6 presents the

data from the contact and contact-seeking category, which was directed toward persons. The difference in this behavior directed toward the mother between pre- and postseparation, based on pooled scores from the

Table 6

Mean Number of 15-Second Intervals out of 12 per Episode in which the Toddlers' Contact and Contact-Seeking Was toward the Specified Person

Episode	Episode Description	Direction of Contact and Contact-Seeking		
		Mother	Peer	Strange Mother
1[a]	(M,T) Preseparation	1.77 (2.80)[b]	--	--
2	(T) Separation	--	--	--
3	(M,T) Reunion	5.32 (3.44)	--	--
4	(2M,2T) Strangers	1.73 (3.12)	0.32 (0.70)	0.05 (0.21)
5	(2T) Separation	--	0.41 (1.03)	--
6	(2M,2T) Reunion	6.23 (3.88)	0.05 (0.21)	0.09 (0.29)

[a]Counterbalanced Episodes 7, 8, and 9 are summed with Episodes 1, 2, and 3, respectively.

[b]Numbers in parentheses are standard deviations calculated with N = 22 weighting.

similar episodes, was significant, $T(21) = 6$, $p<.001$. Much of the greater contact between toddler and mother at reunion was due to the fact that the mothers often picked up their children at these times,

although this was frequently done in response to some overture or distress signal from the child.

Ten of the mothers picked up their child during both reunion episodes. Nine of them took their infants into their arms during only one reunion. Only three mothers did not pick up their children at either reunion. In the last counterbalanced order of episodes (Episodes 4, 5, 6, 7, 8, and 9) 10 out of 11 mothers picked up their toddlers at one or both reunions, and of these, 6 of them gathered up their infants when they and the child were together by themselves in a preseparation episode after the other mother and toddler had left. This episode may have been for all practical purposes an expansion of the reunion episode. Alternatively the exit of the other mother and child may have signalled to the remaining child the possibility of another separation.

Seven infants resisted offered contact from the mother in the reunion episodes, and three other toddlers resisted these initiatives in the preseparation episodes with the mother only. However, the latter three were all in the last counterbalanced order (Episodes 4, 5, 6, 7, 8, and 9) so that, again, the preseparation episode with mother and toddler could be thought of as an expansion of the previous reunion episode with two mothers and two toddlers. Of the seven who resisted offered contact during reunion, only one resisted during the reunion shared with the other mother and toddler. Ten toddlers resisted toys offered by the mother in one or both reunions, while only four of these same toddlers had resisted in preseparation episodes.

Other Measures and Observations

Some descriptive behavioral observations were made from the infrequently used categories for the subjects' tactile behavior. In addition, the toddlers' vocalization was studied for what it might contribute to the results.

Age-Mate Interaction

Twelve toddlers out of the total of 22 had interaction with the age-mate by touching, seeking to touch, or resisting contact made by the other toddler. Sixteen toddlers out of 22 had some social interchange in Episodes 4, 5, and 6 around the toys, which included the rating categories: offers toy, accepts toy, rejects offered toy, grabs toy from peer (or attempts), and resists grabbing of toy. The remaining six subjects who had no interaction with each other through the medium of the toys were in pairs with each other. These six infants were also members of the group of toddlers who had no active physical contact with each other. Only three toddlers displayed any aggressive behavior toward the other, such as hitting or attempts to hit, and none of these were members of the same pair. The behavior was exhibited only briefly. Two of the toddlers manifested the behavior during the separation episode when their frustration might conceivably have been the highest.

Toddler-Mother Interaction

Regarding the social interaction of giving and receiving toys, 19 out of 22 toddlers engaged in this activity with their mothers at

some time during the experimental session. This figure excludes two other toddlers who did no more than resist offered toys from their mother during the session and did not offer toys to her. One toddler had no recorded interaction with his mother by means of a toy.

Much of the exchange of toys may have been at the instigation of the mother, for only 11 out of 22 infants, half of them, offered their mothers toys during the session.

Vocalization

In many respects the totals for infant vocalization were the converse of the crying scores. While crying increased in the separation episodes, vocalization decreased in these periods. This decrease in vocalization is shown in Table 7. All infants vocalized at some time during the experimental session, although the least amount of vocalization recorded was for one toddler who made an utterance during only one 15-second interval. When perusing Table 7, it is noteworthy that the toddlers tended to vocalize more when with the mother alone in Episode 1 than when the strange mother and unfamiliar peer were present, too, in Episode 4. This difference, however, narrowly missed statistical significance with the Wilcoxon test, $T(19) = 47.5$, $p > .05$.

Table 7

Mean Number of 15-Second Intervals out of 12 in Each Episode in which the Toddlers Vocalized

1a (M,T) Preseparation	2 (T) Separation	3 (M,T) Reunion	4 (2M,2T) Strangers	5 (2T) Separation	6 (2M,2T) Reunion
5.32 (3.65)[b]	1.00 (1.60)	4.55 (3.54)	3.55 (3.65)	2.05 (3.60)	2.18 (3.38)

[a]Counterbalanced Episodes 7, 8, and 9 are summed with Episodes 1, 2, and 3, respectively.

[b]Numbers in parentheses are standard deviations calculated with N = 22 weighting.

CHAPTER V

DISCUSSION

The results of this study indicated that curiosity about peers is strong in 15-month-olds but highly dependent on the presence of the mother, the infant's object of attachment. The relationship between attachment and peer relations is a fascinating one for theoretical speculation, as is the development of early peer interest considered by itself.

The results replicate many of the findings of previous investigators regarding the effects of infant-mother separation. The marked increase in crying in separation phases compared to preseparation ones had previously been found in infants under 18 months by Ainsworth and Wittig (1969), Ainsworth and Bell (1970), and Coates et al. (1972). According to Tennes and Lampl (1964) the age period from 13 to 16 months was the one in which separation anxiety was at its peak in their middle- to upper-class sample. The search behavior toward the door through which the mother exited, which was very prominent in this study, had been demonstrated by Ainsworth and Bell (1970). Arsenian (1943) described the same phenomenon when she spoke of the infant's crying or playing near the gate through which the adult had vanished. She labeled it "retreat" behavior which indicates her theoretical framework was different from present-day notions based on the concept of infant attachment. The reduction in tactile exploration during separation episodes

which was found in this experiment is in conformity with previous investigations in which the mother left the observational room (Ainsworth & Bell, 1970; Cox & Campbell, 1968).

A behavioral change in reunion episodes which had not been present in preseparation episodes was the infant's higher level of contact and contact-seeking toward the mother. This had been discovered earlier by Ainsworth and Bell (1970) and Coates et al. (1972). Ainsworth and Bell had noted, too, some contact-resisting behavior on reunion in conjunction with contact-maintaining behavior, which they characterized as the infant's ambivalence toward his mother. Such behavior was recorded infrequently in this study, where the behavioral check-list category was "resists offered contact". Slightly less than one-third of the toddlers exhibited this behavior but never during both reunions. The rejecting of toys offered by the mother during reunion might conceivably be included as part of this ambivalent behavior. If so, 8 toddlers showed some hostile behavior toward their mothers at one of the reunions during the session, but only 5 toddlers at both reunions. Four of the 13 toddlers had exhibited such "angry" behavior at non-reunion times. Thus an indication of ambivalent behavior at reunion was present in this study but the incidence was not high. It may be that the behavioral checklist used in this study was not as refined a measure as the dictated narrative used by Ainsworth and Bell for recording this aspect of infant-mother interaction.

During the stranger-toddler interactions in this experiment no fear of either peer or adult stranger was exhibited. Instead, much curiosity was shown by each toddler toward his age-mate, and no anxiety

was noted when the strange mother was present. Perhaps the 15-month-olds had emerged from their periods of stranger anxiety. The age range for this phenomenon given by Mussen et al. (1974) is 6 months to 12-15 months. Tennes and Lampl (1964) had found that 9 out of 15 of their infant sample had ceased to exhibit stranger anxiety in the age period between 14 and 16 months. Then too, it must be remembered that Rheingold and Eckerman (1973) found an absence of fear of the stranger in friendly circumstances in 8, 10, and 12 month olds, the very ages in which it was supposed to occur.

Another noteworthy item about toddler relations apart from the hypotheses of this study was the presence of peer interaction in connection with the toys. This occurred in 73% of the cases and constituted the primary form of social intercourse after visual regard of the peer. Eckerman et al. (1975) demonstrated that activity between infants which centered around the exchange or attempted exchange of toys increased with age in the second year of life. The categories they included in this toy-exchange behavior correspond closely to categories used in this study for describing the toddlers' interaction through the use of the toys. Eckerman et al. suggest that inanimate objects become important conveyances for social interaction between the ages of one and two. Earlier investigators (Bridges, 1933; Bühler, 1933; Maudry & Nekula, 1939) had prominently mentioned toys in their descriptions of infant social interaction.

In the present study, the giving and taking of toys was not only an interactional process between peers but occurred between infant and mother as well. Nineteen of the 22 infants participated in this behavior

with their mothers at some time during the experimental session. Much of the interaction may have been initiated by the mother, but this does not negate the fact that it was a mode of social interchange between a toddler and his mother.

The hypothesis that the presence of an unfamiliar age-mate would lessen the separation reaction for a toddler was not confirmed in this study. The finding of Suomi et al. (1973) was that rhesus monkeys showed less protest in the first two days after separation when housed in pairs instead of alone, especially those who were separated from their mothers at 90 days of age. This result was at variance with the finding on human infants in this study. This could be attributed to the large differences in method between the two studies. Suomi et al. measured infant disturbance in the first two days after separation whereas in this investigation separation protest was recorded in the first three minutes after separation. Suomi et al. said all of their subjects, regardless of housing condition, had exhibited agitation immediately after separation. No separate analysis of the behavior of the infants immediately after separation was made.

In the case of the toddlers in the present study, their curiosity and interest in their peer simply seemed to have been overwhelmed by their reaction to the separation. An infant who may have had attracting power when the mother was present was not turned to as an object of comfort when the fear reaction set in. It may be that in such a situation an adult stranger, who has more similarity to a parenting figure than an age-mate, would be of more comfort. A small but nonsignificant decrease in crying was found by Ainsworth and Bell (1970) when the adult stranger

returned after the infant had been left alone by its mother. Similarly, Stayton et al. (1973) had discovered in their longitudinal study of infants in the first year of life that there was more crying when the mother left the baby alone than when she left him with someone else.

The results of this study revealed that when an infant was with his caretaker he tended to pay much attention to his peer. He used his caretaker as a "secure base" (Ainsworth & Wittig, 1969) from which to explore his world, which included his age-mate. But the toddler peer was not a source of security when anxiety intruded.

Maccoby and Masters (1970) visualized an experiment with an infant monkey who had been raised with a mother, and who had opportunities to play with age-mates. This monkey would be subjected to a stressful situation in the presence of the mother and an age-mate. If this experiment were carried out, they guessed that the infant would run to the mother to seek comfort even though it had previously been spending most of its time with its age-mate. They said this would constitute evidence that the two types of relationships, one to the age-mate and one to the caretaker, were different systems as Harlow and Harlow (1965) had proposed. A parallel, they suggested, might be seen with the human infant: "We can only speculate that children rarely hold out their arms to another child, or run to another child for contact comfort under stress, or cling to another child" (p. 146). These are approaches the child might make to its mother. Yet it must not be forgotten that the infant-caretaker system and the peer interactional system have some overlapping modes of behavior, too. This was noted in the present experiment

in the giving and taking of toys, which the infant does with his mother as well as with his peer.

The primary hypothesis of this study was that toddlers would look at the unfamiliar peer more than they would at the unfamiliar mother. This postulate was strongly confirmed. The finding is the same as that of Lenssen (1973) for 10-month-old male infants. Eckerman et al. (1975) found in their three groups of infants--10-12 months, 16-18 months, and 22-24 months--that the subjects spent much of their time watching each other. Their procedure did not include a rating of the infants' visual attention to the strange mother. But related to the finding of this study was their demonstration that the infants' play with the strange mother, who was seated on the floor, was rare compared to their play with the unfamiliar age-mate. Maudry and Nekula in 1939 had reported within their category of positive social behavior, that 30% of the responses were for "looking and grasping for the partner" (p. 209).

The preference of the toddler for the small human stranger rather than the adult one is difficult to explain theoretically, even though parents of toddlers accept this fact as the natural course of events. The greater amount of visual regard to the toddler could possibly be attributed to the novelty of the infant stimulus over that provided by adults who more frequently came in contact with the toddler. Yet most of the toddlers played periodically with another young child. The fact that the mother sat in a chair while the toddler remained closer to the floor could conceivably have had an impact on the result. But as mentioned, Eckerman et al. (1975) had the mothers seated on the

floor, which did not elicit much play from the strange toddler. Another line of reasoning is that the toddler stranger at some times may have been the most mobile stimulus in the room. Infants' attention to moving stimuli in preference to stationary ones is well known. However, at the time, the mothers were engaged in conversation with each other, which required some facial and body movement on their part.

The size of the preferred stranger may have been an important factor. As reported earlier, Greenberg et al. (1973) found that 8- and 12-month-old infants responded more favorably to 4 to 5-year-old strangers than to adult ones. It has been noted in unsystematic observations that toddlers respond with great curiosity to small pet animals approximately their size. Implicit in such an explanation is the assumption that 10-month-olds or 15-month-olds have an awareness at some level of their own size or body limits. This is a reasonable assumption to make about the 15-month-olds who were the subjects of this study.

Another possible explanation is that unfamiliar peers are more willing to play with children than are strange adults. This would be a good reason for children to seek the company of their age-mates. But it would not seem to apply to the 15-month-olds used in this study. An adult is often as willing to engage in the type of play of which a toddler is capable, such as giving and receiving toys, as is an age-mate. In fact an adult can do much more--play peek-a-boo, give chase, and swing the toddler in the air. An offshoot of this type of explanation is the suggestion of Eckerman et al. (1975) that an age-mate may be easier for a toddler to imitate than is an adult. Yet, in response to

this suggestion, it would not seem that a toddler would be much aware of what he can and cannot imitate.

Although several of the above suggestions may describe factors involved in the toddlers' preferring to watch each other in this experiment, none of them seem compelling as a total explanation. The question remains why a toddler should spend more time looking at an age-mate stranger than at an adult stranger, when it would appear that most of his needs have been met by adults. This tendency is without doubt the rudimentary beginning of what Harlow (1969) terms the "peer affectional system." The infant seems to possess an inherent propensity to scrutinize other infants and to respond to them. It is a fitting response, because it corresponds to the importance of peer relationships in childhood and youth for human social development.

It is impossible experimentally to isolate human toddlers from their peers for long periods of time to study the effects on their behavior, but such an experiment has been done with monkeys. Harlow and Harlow (1965, 1966) reported a study in which rhesus monkeys were deprived of peer contact shortly after birth for four months and for eight months. Afterward the four-month monkeys were found to be aggressive and wary in their peer interactions, and the eight-month monkeys to be even more so. Harlow and Harlow (1965) contended that the monkeys did not develop mechanisms of modulation and control, because they were deprived of peer interaction prior to the normal phase of aggressive play in rhesus monkeys. A direct generalization from these infant monkeys to infant humans is not possible. For one reason it would seem that a child with its long period of postnatal development would have to suffer

deprivation of peers for a longer period for deviant behavior to occur. Nevertheless the principle undoubtedly holds that a child could not go a long time without any peer contact and still be expected to display normal peer relations when its isolation was over.

Infants looking at one another, exchanging toys and contending over them--these events are of more than passing interest from a developmental point of view. At a particular maturational level the child actively begins to seek out peer contacts when age-mates are present in his environment. His gravitation toward his peers is unmistakable. The evidence that peer relationships are necessary and beneficial to human functioning makes this early behavior appear distinctly adaptive. The attraction to peers may be seen as a built-in developmental tendency. It is the start of the process of emerging sociability.

In summary, a significant difference has been found between a 15-month-old's greater visual regard of a peer than of a strange adult. This interest in toddler peers was not found to be the same as finding comfort from them. Being with a peer did not significantly ameliorate distress when a toddler was separated from his mother. For such distress, the only source of comfort was the return of the mother, which was demonstrated in the process of replicating many previous findings regarding infant-caretaker attachment.

APPENDICES

APPENDIX A

LETTER TO PARENTS

Dear _____

I am a graduate student in psychology beginning a study of the behavior of toddlers who are or soon will be 15-months-old. In order to do this project, I will need the help of mothers and their toddlers for one session of approximately an hour-and-a-half in mid-May at the University of North Dakota.

The study employs the observational method, during which the mother will be with her child much of the time to provide important contributions to the procedure. While engaging in the session the mother-child pair will meet another mother and her toddler.

I am asking you to help me by your participation in this study. It has been approved by my master's degree committee, including my major advisor, Nancy J. Huntsman, Ph. D., Assistant Professor of Psychology, whose telephone number is 777-3451.

I will be contacting you by telephone in a few days to see if you wish to take part in this study. If you have not been called within a week, please call me at 775-0962 if you are interested in participating.

Sincerely yours,

Robert A. Harms

APPENDIX B

INSTRUCTIONS FOR FIRST AND SECOND MOTHER

Instructions for First Mother

I would like to give you some instructions about what we will do. Part of this I may have told you over the phone, but I would like to refresh your memory.

For our observations, I am asking you to create several different situations for _____ to respond to. I have divided the observation time into six parts, each about three minutes in length. They go like this:

First, you and _____ will be together in the playroom.
Second, _____ will be alone in the room, a period which may be shortened if he/she gets upset.
Third, you and _____ will be back together in the room.
Fourth, another mother and her toddler, who will be _____'s age, will be with you in the room.
Fifth, the two toddlers only will be in the room, again a period which may be shortened if necessary.
Sixth, and finally, both mothers and both toddlers will be in the room.

The room in which we will make our observations will have toys and two chairs with magazines on them. There is nothing in the room which the children can harm. The cupboard doors at the far end have been tied shut; the drawers have been emptied. The observations will be done by my four colleagues who will be standing behind the one-way window, through which they will be able to see the children without the children seeing them. Your side of the window will look something like a mirror.

When you enter the room, lead _____ to the toys, which will be in the middle of the floor. Leave him/her there and go to the farthest chair and seat yourself. Pick up the magazine and occupy yourself by pretending to read it. Throughout your time in the room, do not talk with _____ or play with him/her unless he/she first talks to you or needs comforting. Then respond in your normal way, which may include answering his/her speech, picking him/her up, or trying to interest him/her in a toy. Do whatever you usually do.

After you have been in the room about three minutes, you will hear three knocks on the wall. This is your signal to leave. If your child is upset, try to calm him/her and interest him/her in a toy before you go. Then leave quickly, saying "Bye, bye, I'll be back," and close the door behind you. Then you may come around to the observation window and look in.

When it is time for you to go back, greet _____ in your usual manner. You may embrace him/her or do anything you like, if it is natural in the situation. Comfort him/her if that is needed. As soon as it becomes possible, return to your chair and resume reading your magazine.

In a short time another mother and her toddler will enter the room. Introduce yourself to her and find out the name of her child. Say to her child once, "Hello _____," or "Hi _____," using the name of the child. After that pay no particular attention to the other child or to your own child but engage in conversation with the other mother. The other mother has been instructed to do the same: find out the name of your child, say it once to him/her, and then talk to you. The two of you may talk about the weather or anything at all.

After three minutes you will hear again three knocks on the wall. This is the signal for you and the other mother to leave. Do not leave if one of the children is upset but wait until he or she is calm. Then leave immediately while saying to your child, "Bye, bye, I'll be back." You say this either before or after the other mother but not in unison. The last mother out closes the door. Again you may come around to the observation window and look in.

When it is time for you to return, you will do it in the same way as before, except that there will be two of you this time, and one of you will immediately follow the other. When it is possible, take your seat again and resume your conversation with the other mother.

After a short time you will hear once more three knocks on the wall. This is the signal for you and _____ to leave. The other mother and her child will stay behind in the room.

Do you have any questions?

During the session you may hold this card, which will remind you of what you are to do.

Now I would like to introduce the observers to you.

Instructions for Second Mother

I would like to give you some instructions about what we will do. Part of this I may have told you over the phone, but I would like to refresh your memory.

For our observations, I am asking you to create several different situations for _____ to respond to. I have divided the observation time into six parts, each about three minutes in length. They go like this:

First, you and _____ with another mother and her child will be in the playroom. The children will be about the same age.

Second, the two toddlers only will be in the room, a period which may be shortened if either or both of them gets upset.

Third, both mothers and both toddlers will be in the room.

Fourth, you and _____ will be in the room without the other mother and child.

Fifth, _____ will be alone in the room, again a period which may be shortened if necessary.

Sixth and finally, you and _____ will be back together in the room.

The room in which we will make our observations will have toys, two chairs, and two magazines. There is nothing in the room which the children can harm. The cupboard doors at the far end have been tied shut; the drawers have been emptied. The observations will be done by my four colleagues who will be standing behind the one-way window, through which they will be able to see the children without the children seeing them. Your side of the window will look something like a mirror.

When you enter the room, lead _____ to the toys, while at the same time introducing yourself to the mother already in the room. Leave _____ with the toys and seat yourself on the vacant chair. Find out the name of the other toddler from the mother and say to her child once, "Hello _____," or "Hi _____," using the name of the child. After that pay no particular attention to the other child or to your own child but engage in conversation with the other mother. The other mother has been instructed to do the same: find out the name of your child, say it once to him/her, and then talk to you. The two of you may talk about the weather or anything at all. Throughout your time in the room, do not talk with _____ or play with him/her unless he/she first talks to you or needs comforting. Then respond in your normal way, which may include answering his/her speech, picking him/her up, or trying to interest

him/her in a toy. Do whatever you usually do. After you have been in the room about three minutes, you will hear three knocks on the wall. This is the signal for you and the other mother to leave. If your child is upset, try to calm him/her and interest him/her in a toy before you go. Likewise if the other child is upset, wait until the other mother has calmed him/her. Then leave quickly, saying to your child, "Bye, bye, I'll be back." You say this either before or after the other mother but not in unison. The last mother out closes the door. Then you may come around to the observation window and look in.

When it is time for you to go back, enter the room with the other mother, and greet _____ in your usual manner. You may embrace him/her or do anything you like if it is natural in the situation. Comfort him/her if that is needed. As soon as it becomes possible, return to your chair and resume your conversation with the other mother.

In a few more minutes you will hear again three knocks on the wall, which will signal the other mother and child to leave the room. When they have left, pick up the magazine and occupy yourself by pretending to read it.

After three minutes you will hear once more three knocks on the wall. This is your signal to leave. Do not leave if your child is upset but wait until you have calmed him/her. Then leave immediately, saying, "Bye, bye, I'll be back," and close the door behind you. Again, you may come around to the observation window and look in.

When it is time for you to return, you will do it in the same way as before. When it is possible, take your seat again and resume

reading your magazine. A few minutes later you will be notified that the session is over.

Do you have any questions?

During the session you may hold this card, which will remind you of what you are to do.

Now I would like to introduce the observers to you.

APPENDIX C

REMINDER CARDS FOR MOTHERS

Text of Reminder Card for First Mother

First Part: Lead child to toys. Pretend to read. Three knocks on wall; prepare to leave, saying, "Bye, bye, I'll be back." Close door.

Second Part: You are out of room looking through one-way window.

Third Part: You return. Greet your child. You may embrace child if natural. Comfort child if needed. Return to chair and magazine when possible.

Fourth Part: When other mother and child enter, introduce yourself to mother and greet other child by name. Carry on conversation with other mother. Three knocks on wall; both mothers prepare to leave, saying, "Bye, bye, I'll be back." Close door.

Fifth Part: You and other mother observe through one-way window.

Sixth Part: You and other mother return. Greet your child. Do whatever is desired or needed as before. Return to chair and your conversation with the other mother when possible.

Finish: Three knocks on wall; you and your child leave. Close door.

Text of Reminder Card for Second Mother

First Part: Lead child to toys. Introduce self to other mother and greet other child by name. Carry on conversation with other mother. Three knocks on wall; both mothers prepare to leave, saying, "Bye, bye, I'll be back." Close door.

Second Part: You and other mother are out of room looking through one-way window.

Third Part: You and other mother return. Greet your child. You may embrace child if natural. Comfort child if needed. Return to chair and your conversation with the other mother when possible.

Fourth Part: Three knocks on wall signaling other mother and child to leave. When they are gone, pretend to read magazine.

Three knocks on wall; prepare to leave, saying, "Bye, bye, I'll be back." Close door.

Fifth Part: You observe through one-way window.

Sixth Part: You return. Greet your child. Do whatever is desired or needed as before. Return to chair and magazine when possible.

Finish: You will be told when the session is over.

APPENDIX D

RECORDING SHEET FOR INTERVIEW WITH MOTHERS

Interview

MOTHER'S NAME _____ DATE OF OBSERVATION:

ADDRESS _____ CHILD'S BIRTH DATE:

TODDLER'S NAME _____ AGE:

TODDLER NO. _____

PAIR _____

Does _____ have any brothers or sisters:

Do you work?

Does _____ often stay with a baby sitter?

Does he/she play with another toddler his/her own age?

When does _____ take a nap?

Did you know the other mother or child? (Have your children ever seen each other before?)

How did _____ react the last time he/she went to the doctor's office? How long ago? Did he/she react differently here?

Do you have any comments or questions about the session today?

APPENDIX E

CODING SHEETS USED BY THE OBSERVERS

TODDLER NO. ____
PAIR ____
EPISODE NO. ____

BEHAVIOR CODING SHEET--FIRST JUDGE

LOCATION/LOCOMOTION

		2	3	4	5	6	7	8	9	10	11	12
Loc. beg. 15"												
Loc. end 15"												

EYES	1	2	3	4	5	6	7	8	9	10	11	12
Visual regard												
Unfocused												

MOTHER INITIATED BEHAVIOR TO TODDLER		2	3	4	5	6	7	8	9	10	11	12
Picks up												
Puts down (or attempts)												
Tries to interest in toy												
Limits or disciplines												

M = Mother; P = Peer; S = Strange Mother; T = Toy; D = Door; O = Other.
r = response to behavior initiated by peer or mother, rP or rM.

TODDLER NO. ____
PAIR ____
EPISODE NO. ____

BEHAVIOR CODING SHEET--SECOND JUDGE

HANDS	1	2	3	4	5	6	7	8	9	10	11	12
Touch or grasp												
Manipulates with fingers												
Reaching												
Clinging or embracing												
Climbing up												
Offers toy												
Accepts toy												
Rejects offered toy												
Resists offered contact												
Grabs toy from P (or attempts)												
Resists grabbing of toy												
Aggressive behavior												

VOICE AND MOUTH	1	2	3	4	5	6	7	8	9	10	11	12
Crying (continuous)												
Fussing or short cry												
Vocalization												
Smile												
Biting												

M = Mother; P = Peer; S = Strange Mother; T = Toy; D = Door; O = Other.
r = response to behavior initiated by peer or mother, rP or rM.

APPENDIX F

TODDLERS' SCORES FOR EACH MAJOR VARIABLE FOR EACH EPISODE

Tables 8 - 13

Table 8

Number of 15-Second Intervals out of 12 in Each Episode for Direction of Visual Regard for Each Toddler

	Episode 1					Episode 2			
Toddler	Mother	Toy	Door	Other	Unfocused	Toy	Door	Other	Unfocused
1st order of episodes									
1	1	12	0	1	0	7	11	5	2
3	0	12	0	0	0	12	0	0	0
5	8	11	0	0	0	0*	6*	0*	12*
7	2	9	0	9	0	12	8	4	0
9	5	12	1	3	0	6	1	9	0
11	4	11	2	8	0	3	7	7	0
13	4	12	0	1	0	6	6	9	1
15	3	12	0	2	0	9	6	5	0
17	8	11	0	5	0	0*	12*	10*	2*
19	8	12	0	1	0	9	4	9	0
21	3	12	0	8	0	8*	12*	9*	0*
2nd order of episodes									
2	4	11	0	2	0	7	6	5	1
4	1	8	1	12	0	2	7	5	6
6	6	6	1	7	0	0*	8*	12*	0*
8	9	11	0	6	0	0*	5*	10*	5*
10	12	2	0	6	0	0*	10*	12*	0*
12	8	4	2	10	0	2	7	10	1
14	4	11	0	4	0	5*	5*	7*	5*
16	8	1	0	11	4	0*	12*	12*	12*
18	5	6	3	9	0	10	3	3	0
20	7	12	0	5	0	5	5	12	0
22	10	8	1	8	2	3*	12*	9*	6*

*Prorated sum based on curtailed episode.

Table 8-Continued

Toddler	Episode 3				
	Mother	Toy	Door	Other	Unfocused
1st order of episodes					
1	10	7	0	2	1
3	5	11	0	3	0
5	8	11	0	1	0
7	8	8	0	10	0
9	10	6	0	7	0
11	5	5	1	8	0
13	10	6	0	5	2
15	8	12	1	3	0
17	7	9	1	6	0
19	5	11	1	1	0
21	9	8	0	7	0
2nd order of episodes					
2	8	4	0	8	0
4	5	4	1	7	1
6	2	4	2	10	0
8	4	8	0	9	0
10	10	8	0	8	0
12	2	9	2	4	0
14	4	8	0	4	2
16	4	2	2	11	4
18	10	4	0	11	0
20	7	9	1	7	0
22	7	5	1	3	4

Table 8-Continued

Toddler	Episode 4						
	Mother	Peer	Strange Mother	Toy	Door	Other	Unfocused
1st order of episodes							
1	1	12	0	9	0	1	0
3	0	12	4	6	0	1	0
5	1	12	7	8	0	1	0
7	2	11	8	0	0	6	0
9	1	12	10	3	0	0	0
11	3	12	4	12	0	3	0
13	2	10	2	10	0	2	0
15	5	11	8	9	0	1	0
17	3	12	5	6	0	5	0
19	0	11	3	11	0	1	0
21	6	9	7	7	0	4	0
2nd order of episodes							
2	2	9	4	12	0	1	0
4	0	9	0	7	1	2	0
6	1	11	2	11	1	3	0
8	5	10	11	12	0	0	0
10	6	8	9	6	0	1	0
12	1	9	2	11	0	1	0
14	0	8	3	11	0	4	0
16	3	11	9	4	0	5	0
18	2	9	6	11	0	1	0
20	3	10	5	10	0	1	0
22	4	9	8	5	1	5	0

Table 8-Continued

Toddler	Episode 5				
	Peer	Toy	Door	Other	Unfocused
1st order of episodes					
1	12	3	7	0	0
3	12	3	0	1	0
5	12	4	5	6	0
7	11	0	5	11	0
9	12	1	1	3	0
11	12	7	2	0	0
13	9	6	9	3	3
15	12*	0*	6*	0*	0*
17	12	10	1	1	0
19	7	6	5	6	0
21	11*	0*	9*	7*	1*
2nd order of episodes					
2	12	6	3	1	0
4	12	2	5	2	2
6	8	4	5	5	0
8	11	1	12	3	0
10	10	5	2	8	0
12	9	4	3	4	0
14	9	9	4	3	1
16	0*	0*	6*	0*	12*
18	12	11	2	4	0
20	12	7	3	4	0
22	11*	0*	8*	1*	0*

*Prorated sum based on curtailed episode.

Table 8-Continued

Toddler	Episode 6						
	Mother	Peer	Strange Mother	Toy	Door	Other	Unfocused
1st order of episodes							
1	6	10	0	6	0	3	0
3	2	10	4	6	0	2	0
5	6	7	2	5	0	0	0
7	6	4	1	10	0	2	0
9	7	10	5	5	1	2	0
11	4	10	6	7	0	3	0
13	4	10	9	6	0	3	0
15	3	11	10	0	0	5	0
17	5	11	2	7	0	2	0
19	3	4	2	10	0	0	0
21	7	6	10	8	0	3	0
2nd order of episodes							
2	6	10	9	10	0	2	0
4	0	7	1	5	0	8	0
6	3	3	6	5	0	10	0
8	2	8	8	8	0	2	0
10	5	5	10	8	0	0	0
12	3	9	3	10	0	3	0
14	8	1	0	5	0	4	2
16	5	9	5	2	0	3	0
18	2	8	4	9	1	5	0
20	3	6	9	8	2	2	0
22	6	11	5	8	0	1	0

Table 9

Number of 15-Second Intervals out of 12 in Each Episode in which Each Toddler Cried (All Types of Crying)

Toddler	Episodes					
	1	2	3	4	5	6
1st order of episodes						
1	0	12	12	0	12	12
3	0	1	0	0	0	0
5	0	12*	2	0	12	2
7	0	12	3	0	8	8
9	0	6	1	0	3	1
11	0	3	6	0	0	0
13	0	11	4	0	12	10
15	0	0	8	0	12*	5
17	0	12*	7	0	0	2
19	0	1	0	0	7	0
21	0	12*	9	3	12*	12
2nd order of episodes						
2	2	12	7	0	12	7
4	0	12	5	0	9	0
6	10	12*	12	0	11	11
8	10	12*	12	0	12	11
10	11	12*	8	0	8	3
12	6	11	4	0	10	5
14	4	12*	8	0	12	8
16	9	12*	11	0	12*	5
18	0	2	0	0	0	0
20	0	5	2	0	2	0
22	3	12*	11	0	12*	0

*Prorated sum based on curtailed episode.

Table 10

Number of 15-Second Intervals out of 12 in Each Episode for Direction of Tactile Exploration for Each Toddler

	Episode 1			Episode 2		
Toddler	Toy	Door	Other	Toy	Door	Other
1st order of episodes						
1	12	0	0	12	11	0
3	12	0	0	12	0	0
5	12	0	0	12*	9*	0*
7	11	1	3	12	8	0
9	12	0	0	9	1	1
11	12	0	0	3	6	5
13	12	0	0	5	4	3
15	12	0	1	3	6	11
17	12	0	2	0*	12*	10*
19	12	0	0	12	5	2
21	12	0	0	12*	0*	0*
2nd order of episodes						
2	11	0	3	6	7	3
4	6	0	6	1	9	11
6	5	1	1	0*	8*	4*
8	12	0	0	0*	5*	0*
10	1	1	1	5*	0*	0*
12	1	4	9	0	7	7
14	10	0	0	12*	10*	0*
16	1	0	1	0*	12*	0*
18	5	0	7	9	2	1
20	12	1	5	3	5	10
22	8	0	0	12*	6*	0*

*Prorated sum based on curtailed episode.

Table 10-Continued

Toddler	Episode 3			Episode 4		
	Toy	Door	Other	Toy	Door	Other
1st order of episodes						
1	3	0	0	11	0	0
3	10	0	2	6	0	2
5	7	0	0	9	0	0
7	9	0	1	0	0	7
9	5	0	6	2	0	7
11	3	0	6	11	0	8
13	7	0	4	11	0	0
15	2	0	4	12	0	2
17	11	0	0	2	0	4
19	12	0	0	10	0	0
21	10	0	0	8	0	1
2nd order of episodes						
2	2	0	1	10	0	0
4	5	1	5	5	0	0
6	3	1	4	10	1	3
8	0	1	1	11	0	0
10	2	0	3	12	0	0
12	8	2	1	12	0	1
14	12	0	0	9	0	1
16	0	0	0	5	0	5
18	1	0	10	11	0	0
20	7	1	2	12	0	1
22	12	0	0	0	0	0

Table 10-Continued

Toddler	Episode 5			Episode 6		
	Toy	Door	Other	Toy	Door	Other
1st order of episodes						
1	5	8	0	1	0	0
3	2	3	1	5	0	3
5	1	5	5	5	0	0
7	0	2	9	4	0	0
9	12	11	0	0	0	3
11	5	0	11	7	0	10
13	11	8	0	9	0	0
15	0*	4*	0*	0	0	0
17	7	0	0	10	0	0
19	9	10	4	10	0	1
21	0*	9*	0*	8	0	1
2nd order of episodes						
2	6	3	2	10	0	0
4	3	8	8	4	0	3
6	5	5	0	3	0	0
8	12	6	0	4	0	1
10	12	0	3	10	0	1
12	4	2	1	8	0	0
14	12	2	1	12	0	0
16	0*	12*	0*	0	0	4
18	12	2	2	7	1	5
20	7	2	3	8	1	1
22	0*	0*	0*	0	0	0

*Prorated sum based on curtailed episode.

Table 11

Number of 15-Second Intervals out of 12 in Each Episode for Direction of Contact and Contact-Seeking for Each Toddler

Toddler	Episode 1	Episode 3	Episode 4		
	Mother	Mother	Mother	Peer	Strange Mother
1st order of episodes					
1	0	7	0	0	0
3	0	1	0	1	0
5	0	2	0	0	0
7	1	5	12	0	0
9	0	4	0	0	0
11	0	3	0	0	0
13	0	5	2	1	0
15	0	6	4	0	0
17	1	3	0	0	0
19	0	0	3	1	0
21	0	1	0	3	0
2nd order of episodes					
2	2	8	0	1	0
4	0	6	1	0	0
6	2	10	1	0	1
8	0	7	0	0	0
10	6	4	1	0	0
12	4	3	0	0	0
14	3	12	1	0	0
16	12	12	10	0	0
18	1	3	1	0	0
20	3	4	1	0	0
22	4	11	1	0	0

Table 11-Continued

Toddler	Episode 5	Episode 6		
	Peer	Mother	Peer	Strange Mother
1st order of episodes				
1	0	9	0	0
3	0	5	0	0
5	0	9	0	0
7	0	11	0	0
9	0	10	0	0
11	0	1	0	0
13	0	6	0	0
15	0*	12	0	0
17	1	6	0	1
19	0	1	0	0
21	0*	10	0	0
2nd order of episodes				
2	0	1	0	0
4	0	4	0	0
6	1	10	0	0
8	0	8	0	0
10	0	2	0	0
12	4	4	1	0
14	0	11	0	0
16	0*	10	0	0
18	3	0	0	0
20	0	1	0	1
22	0*	6	0	0

*Prorated sum based on curtailed episode.

Table 12

Mean Number of "Squares" Distant from Mother for Each Toddler for Each Mother-Present Episode

Toddler	Episodes 1	3	4	6
1st order of episodes				
1	2.0833	1.2500	2.0000	1.1667
3	2.5000	2.0000	1.7500	1.5000
5	0.9167	1.3333	0.5833	1.6667
7	2.7500	1.0000	0.0833	2.6667
9	2.0000	1.2500	3.8333	0.8337
11	2.5833	1.2500	2.0000	1.5833
13	1.3333	1.0833	2.0000	2.5000
15	2.5000	0.4167	0.0000	0.0000
17	1.8333	1.5000	3.1667	0.7500
19	0.6667	1.2500	0.8333	0.2500
21	2.2500	1.1667	2.2500	0.0833
2nd order of episodes				
2	1.9167	0.3333	3.7500	2.3333
4	3.9167	2.0000	1.7500	1.9167
6	2.3333	3.1667	1.8333	2.0833
8	3.6667	1.1667	2.8333	2.9167
10	0.4167	1.9167	2.5000	1.5000
12	1.7500	3.0833	2.9167	2.9167
14	1.6667	0.1667	2.0000	2.0833
16	0.1667	3.5000	0.4167	0.2500
18	1.7500	1.9167	2.3333	2.4167
20	2.0000	1.2500	1.1667	1.0833
22	0.2500	0.3333	2.0000	1.7500

Table 13

Number of 15-Second Intervals out of 12 in Each Episode in which Each Toddler Vocalized

Toddler	Episodes					
	1	2	3	4	5	6
1st order of episodes						
1	2	0	0	0	0	0
3	4	6	6	8	2	1
5	12	0*	5	0	0	0
7	4	1	9	0	0	1
9	8	0	11	0	0	1
11	4	2	3	7	6	6
13	6	1	8	6	0	1
15	5	1	3	1	0*	0
17	9	0*	6	2	2	1
19	11	0	5	9	10	6
21	6	2*	3	7	0*	0
2nd order of episodes						
2	2	0	2	0	0	0
4	4	1	7	0	0	1
6	0	0*	0	4	0	0
8	9	0*	0	7	0	0
10	1	0*	1	1	0	3
12	9	1	10	11	12	12
14	3	0*	4	1	0	0
16	0	0*	0	1	0*	0
18	4	2	8	4	8	5
20	12	5	9	9	5	10
22	2	0*	0	0	0*	0

*Prorated sum based on curtailed episode.

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