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ABSTRACT

Separation and greeting responses were examined in a longitudinal study of 26 infants, aged 15 to 54 weeks, observed at home. All instances of a person's leaving and entering the room during home visits were observed. The developmental trend--both onset and relative frequency--of each separation behavior was plotted at three-week intervals. The onset of these behaviors was found to be earlier than most other investigators have reported. Following the mother upon her departure and greeting her positively upon her return were found to be more frequent than crying upon separation. Following showed the only sex difference; boys followed more than girls. Crying was more frequent when the infant was left confined rather than free to move about. Separation protest was differential to the mother from its onset, whereas following was not. Most positive greeting behaviors were differential, but smiling was not, seemingly serving affiliative as well as attachment functions. Infants when left totally alone are more likely to exhibit separation-related behaviors than when left with companions; this finding is interpreted in the light of Bowlby's ethological-evolutionary model of social development. (Author)

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Abstract

Separation and greeting responses were examined in a longitudinal study of 26 infants aged 15 to 54 weeks observed at home. All instances of a persons's leaving and entering the room during home visits were observed. The developmental trend--both onset and relative frequency--of each separation behavior was plotted at three-week intervals. The onset of these behaviors was found to be earlier than most other investigators have reported. Following the mother upon her departure and greeting her positively upon her return were found to be more frequent than crying upon separation. Following showed the only sex difference; boys followed more than girls. Crying was more frequent when the infant was left confined rather than free to move about. Separation protest was differential to the mother from its onset, whereas following was not. Most positive greeting behaviors were differential, but smiling was not, seemingly serving affiliative as well as attachment functions. Infants when left totally alone are more likely to exhibit separation-related behaviors than when left with companions; this finding is interpreted in the light of Bowlby's ethological-evolutionary model of social development.

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THE DEVELOPMENT OF SEPARATION BEHAVIOR IN THE FIRST YEAR OF LIFE: PROTEST, FOLLOWING, AND GREETING[1]

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In the second half of the first year of life a baby begins to respond more clearly than before to separation from his mother figure. He can discriminate her from others across a distance. He keeps track of her whereabouts, and, even though there may be no interruption of contact or interaction, he may protest her departure. When he becomes capable of locomotion he may follow her when she leaves. When she returns, he may happily greet her, or renew his protest against having been left by her, or express his mixed feelings by a combination of greeting and protest. It is with these separation-related responses that this report is concerned. They are viewed as pertinent to two significant behavioral systems—Attachment on one hand, and fear and anxiety on the other hand.

Distress upon the departure of an attachment figure has commonly been identified as "separation anxiety", and has received much attention, both empirical and theoretical, from students of early social development. "Separation anxiety" has, however, two distinct although related connotations. It has been used to refer to protest when an attachment figure is about to leave, or is leaving, or has left. It has also been used to refer to apprehension that an attachment figure might leave, and, in general, to refer to uncertainty about the accessibility of an attachment figure. The focus of this paper is on responses evoked by actual separation, and hence with "separation protest" or "separation distress", and also with greetings that must be viewed in the context of the separation that preceded them. We are not here directly concerned with apprehension about a mother's possible

departure or distrust about her accessibility. It is this apprehension or distrust that should properly be termed "separation anxiety".

Separation protest has been highlighted in reports of children experiencing "major" separations from home and from attachment figures (David, Nicholas & Roudinesco, 1952; Heinicke & Westheimer, 1965; Robertson & Bowlby, 1952; and Schaffer, 1958). It has also been described in reports of children experiencing "minor" separations in a familiar environment, whether at home (Ainsworth, 1967; Schaffer & Emerson, 1964) or elsewhere (Spitz, 1965), or in an unfamiliar environment (Ainsworth & Bell, 1970; Ainsworth & Wittig, 1969; Arsenian, 1943; Cox & Campbell, 1968; Rheingold, 1969; Rheingold & Eckerman, 1970; Tennes & Lampl, 1964, 1966). The protest of a young child when separated from a specific figure has often been regarded as a sign that an attachment has been established (e.g. Benjamin, 1961, 1963; Bowlby, 1958; Schaffer & Emerson, 1964; Spitz, 1965).

Bowlby (1958, 1969) and Ainsworth (1967, 1969, in press) have considered the relation of separation protest to attachment within the context of evolutionary theory. They identify certain infant behaviors as attachment behaviors, in that they promote contact, proximity, and interaction with companions, and then, later, are directed chiefly toward a specific attachment figure and organized around this figure. These attachment behaviors are conceived as having the biological function of protecting an infant from danger, and thus as forwarding the survival of individual, population, or species. Among the behaviors that serve a survival function through promoting proximity between an infant and his mother are crying when she leaves (separation protest), following, and greeting responses.

Although "separation anxiety" has long been a phenomenon of interest to psychological and psychoanalytic students of development, it has only rarely

been viewed in the general context of fear. Bowlby (in press) suggests that there are a number of stimulus situations picked up by distance receptors that are "natural clues" to danger. These are not in themselves dangerous or painful, but, he proposes, they have been frequently enough associated with dangerous situations throughout the evolutionary history of a species that fear behavior in response to them has been selected as advantageous for survival. These natural clues elicit fear without having been previously associated with pain, injury, or other fear-eliciting stimuli. For the human as well as for a variety of other species, they include loud noise, suddenly approaching objects, the strange, and being alone.

To be frightened when alone may be seen as adaptive, for the risk of danger is increased when young animals are alone and unattended. Thus an infant is viewed as preadapted to be afraid when alone, and to respond with behavior that is likely to bring him into proximity to other people. Such behavior includes distress calls which serve as signals to others to come to him, and, when possible, locomotor behavior. The latter may serve both to escape from the frightening situation and to escape to companions. Once a baby has become attached to a specific person, he seeks specifically to escape to his attachment figure regardless of the nature of the situation that frightened him.

Bowlby (in press) distinguishes between two kinds of fear responses, which may occur separately or together: alarm, which is fear aroused by some external clue to danger, and anxiety, which is fear aroused by the absence or inaccessibility of an attachment figure. Although anxiety (and proximity-promoting behavior) may be aroused by separation in the absence of any of the natural (or learned) clues to danger, it is much less likely to be aroused in the familiar environment of the home than elsewhere, and

when a child has confidence that his mother is accessible to him even though she may be absent at the moment. Even at home, however, a child may be more intensely afraid of an alarming stimulus if an attachment figure is not readily accessible to him. In this case, Bowlby argues, alarm is compounded by separation anxiety. Within the context of this approach, an infant's response to the departure of his mother may be seen to depend on a variety of circumstances: whether he is left alone or in company, whether he is confined or free to move, and whether he is faced with an alarming stimulus or some other circumstance that leads him especially to seek proximity to his mother.

Two previous studies have attempted to trace the development of separation protest. Schaffer and Emerson (1964), interested in differential separation protest as a criterion of a baby's having become attached to a specific figure, interviewed mothers at monthly intervals about their babies' responses to everyday separations in seven different situations, some at home and some elsewhere. Observation during visits supplemented interview in regard to at-home separations. Tennes and Lampl (1964, 1966) inquired about separation protest in monthly interviews, but also observed infants' responses to mothers' departures in the course of monthly visits to a clinic, interspersed between interviews.

The present study differs in two main respects from the other studies discussed above: it is concerned with following and greeting as well as with separation protest, and it is based upon extensive direct observations of infant behavior in the familiar environment of the home. Ainsworth (1967) found following to be the most conspicuous attachment behavior shown by Ganda babies in the second half of the first year, and noted that greetings were more common than separation protest in some babies who were clearly attached.

Otherwise neither following nor greeting behavior have been observed systematically in the home environment. The present study is a developmental study, dealing with the onset and developmental course of crying and following when a person leaves and of greeting him when he re-enters. It is concerned also with the effect of conditions that may influence separation behavior: the identity of the figure from whom a baby is separated, the sex of the baby, and other conditions such as being left alone or in company, and being confined or free to move about. It is not concerned with individual differences. These are dealt with elsewhere (Stayton & Ainsworth, in press).

Method

Subjects

The subjects were 26 infants and their mothers who were observed throughout the infants' first year of life in the course of a longitudinal study of the development of infant-mother attachment, portions of which have been reported elsewhere (Ainsworth & Bell, 1969, 1970, in press; Ainsworth, Bell & Stayton, 1971, 1972, in press; Ainsworth & Wittig, 1969; Bell & Ainsworth, in press; and Stayton, Hogan & Ainsworth, 1971). The subjects were from white, middle-class families who were originally contacted through pediatricians in private practice, usually before the birth of the baby. Sixteen of the infants were boys; 10 were girls. Six of the boys but none of the girls were first born. This confounding of parity and sex may obscure sex differences in our sample, and makes interpretation equivocal of any sex differences that are found.

Observations and records

The subjects were visited at home at three-week intervals, each visit lasting approximately four hours. The mother was encouraged to maintain a typical daily routine while the visitor-observer wrote detailed notes of

the behavior of the baby and his interaction with his mother and with other family members or visitors who might be present. These notes were subsequently dictated and transcribed into a narrative report. For the purposes of the present analysis the narrative reports from 15 to 54 weeks of age were used. Four people, two women and two men, served as the visitor-observers. Each visitor-observer followed his assigned subjects throughout the first year with occasional joint visits made by two observers.

Coding and assessments

The coding of the narrative reports was done by eight assistants who were initially trained and subsequently checked by one of us (DJS). The coders had little or no information about the subjects' history or other assessments previously made in the project.

The reports were coded for each instance when a person left or enterd a room in which the infant was situated. Among the particulars coded were: the identity of the person leaving or entering and the behavior of that person; the location of the infant (e.g. in a playpen or on the floor); the infant's ongoing activity and state prior to the departure or entry; his subsequent reaction; and the infant's other companions, if any.

The following infant behaviors were tabulated from the codings: crying and following when a person leaves the room; positive greeting, crying, and mixed response when a person enters the room. The major analyses performed for each of these infant variables examined the following factors and conditions. (1) Developmental trend: each infant behavior was examined for (a) age of onset and (b) frequency of occurrence at three-week intervals from 15 - 54 weeks of age, in relation to the mother's comings and goings. (2) Sex of infant. (3) Different figures: the infant's response to his mother was compared to his responses to two other classes of figures--siblings

and unfamiliar people, to determine if and when his behavior is differential to the mother. An unfamiliar person was judged to be anyone who was not a family member or a regular substitute caregiver. The observer himself was most frequently the unfamiliar person. (Fathers were not present often enough during the home visits to be included in this analysis. Likewise, adult caregivers other than the parents were present in too few families to provide a meaningful comparison.) (4) Condition of being alone: each infant variable was assessed when the infant was entirely alone, and when he was with other social companions, including the observer.

(a) Response to leave-room episodes. Each time a person left the room, the baby's behavior--either a cry, follow, or neutral response--was noted. The frequency of a behavior was expressed as the percentage of all leave-room episodes in which it occurred. The overall frequency of crying and following is probably a conservative estimate of response strength since the baby may not have noticed every departure which we tabulated, or the departing person may have returned so quickly that the infant had not mobilized a response to the departure.

Both theory and Schaffer and Emerson's (1964) observations suggest that being left alone may evoke protest earlier and more potently than being left in company. Schaffer and Emerson also reported that crying when put down precedes crying when a figure merely is perceived to leave, and Ainsworth (1967) observed differential crying when put down by the mother to occur substantially earlier than crying when her departure is perceived across a distance. Thus both putting an infant down and leaving him alone may be expected to be potent elicitors of crying that are not necessarily equivalent to the distally-perceived departure of a specific figure from the room. Therefore, instances of crying were tabulated separately for two conditions, both

of which exclude instances in which the baby was put down immediately prior to the departure: leave-room episodes in which the baby was left with others, and leave-room episodes in which he was left alone. The first measure was used to determine the age of onset for crying when the mother departs, and was also used for the other major analyses, i.e., to determine the relation to separation protest of infant sex, and of the departure of different figures. Protest under the conditions of being left alone or in company were also compared.

Crying and following when a person leaves the room were defined as follows. Crying: A baby was judged to have cried when a person left the room if his cry was initiated or increased in intensity at the time of the departure or thereafter. Crying was broadly defined to include the silent cryface, brief vocal protest, fussing, as well as loud, prolonged crying. Following: Following was scored only after a baby had acquired locomotor ability, and when he was on the floor free to follow. A baby was judged to have acquired locomotor ability if he could crawl or creep in a controlled direction toward some incentive. He was judged to have followed only if he went the full distance necessary to get into visual range of the person who departed, or at least as far as a barrier that prevented him from going farther. Instances in which the baby was invited to follow were not included.

In addition to the major analyses of this study, an analysis was performed to assess the effects of freedom-to-follow upon crying when mother leaves. Crying when infants are on the floor and free to follow was compared to crying when infants were confined, e.g. in crib, playpen, or seat.

A measure of crying when put down for the subjects of the present sample was borrowed from another analysis (Ainsworth, Bell, Blehar & Main, 1971). This measure is the percentage of episodes of being put down by his mother in

which a baby cries. Thus, protest on separation perceived across a distance (crying when mother leaves room) was compared to protest on separation when in close contact.

(b) Response to enter-room episodes. It is generally agreed that when an infant is four to six weeks of age he will smile when a person confronts him face-to-face. Also, even in the first quarter-year of life he may respond positively to being picked up (Ainsworth, Bell, Blehar & Main, 1971). These tendencies complicate a naturalistic study of greeting responses , for a person entering a room in which an infant is (perhaps especially his mother or other attachment figure) may go quickly to a baby and either bend over him face-to-face or pick him up. A quick approach of this sort makes it difficult to know whether a baby's smile or other greeting is in response to the entrance of the person or to the subsequent face-to-face or pick-up, since a young infant may take a few moments to mobliize a response. Therefore, our analysis of greetings took both sets of contingencies into consideration with two sets of measures: the frequency of a baby's response expressed as the percentage of all enter-room episodes in which it occurred, and the frequency of his response expressed as the percentage of episodes in which no face-to-face or pick-up immediately followed the person's entrance.

The baby's response to an enter-room episode was tabulated either as a positive greeting, crying, mixed response, or as neutral. These responses were defined as follows. Positive greeting was defined as an acknowledgement of the entrance, directed toward the person who enters, in which positive affect is at least implied. Examples of positive greetings are given below. Crying includes those instances when the baby began to cry or, if already crying, increased the level of his crying upon the entrance of a person. Crying includes all protest behavior from the silent cryface to

loud crying. A mixed response occurs when a baby both cries and positively greets the person entering, either simultaneously or in rapid succession. For example, an infant may cry and reach; or he may alternately fuss and laugh. Mixed greetings occurred so infrequently, however, that this measure was combined with crying for most of the analyses.

In addition to the frequency measures, positive greetings were subjected to two further analyses: an examination of the incidence of each common greeting behavior, and a measure of intensity. The former analysis was concerned only with the number of infants who showed each behavior in each quarter to the mother and to unfamiliar people, to the mother only, and to unfamiliar people only. Seven types of positive greeting were examined: smiling; vocalizing (including laughing); bouncing or jiggling; reaching; leaning, straining, or standing up in response to the entering figure; locomotor approach; and waving the arms. Laughing was included in vocalizing because our records did not always clearly distinguish between a laugh and a happy vocalization. Waving the arms was tallied only when it was an isolated response, and not when it was part of bouncing and jiggling.

For the measure of intensity a 5-point rating scale was devised. In general, the more playful and energetic the greeting and the more diverse the behaviors included in its expression, the higher the rating. Smiling and reaching; and smiling, reaching and bouncing are examples of greetings of increasing intensity. An immediate greeting was rated higher than a delayed one. The inter-rater agreement for the intensity of positive greetings was .94.

One condition which may contribute to the frequency and intensity of infant greetings is the frequency with which the baby is acknowledged by the person entering the room. Adults, including unfamiliar adults, often

acknowledge infants by smiling, talking, approachings and in other ways initiating interaction with the infant. Thus, the frequency with which mothers, unfamiliar people, and siblings acknowledge infants was compared to the frequency of infant greetings to those figures.

Results

Crying in leave-room episodes

On the average, mothers left the room about 3.4 times per hour during the home visits. Infants were found to cry in 17.8% of all leave-room episodes in the second quarter (15 - 24 weeks), 27.0% in the third quarter (27 - 36 weeks), and 22.5% in the fourth quarter (39 - 54 weeks). A more detailed developmental picture is shown in Figure 1. It may be seen that the frequency

Insert Figure 1 about here

of crying in all mother-leaves-room episodes was found to peak twice during this age-period--once at 30 weeks and once again at 48 weeks. The peaks are even more clear-cut when episodes in which the baby was put down before the departure or left alone are eliminated. The differences between the first peak at 33 weeks, the trough at 39 weeks and the second peak at 45 weeks were found to be significant (by t-test) at the 5% level.

The age of onset for crying when the mother leaves was estimated both from observations and by interview. (See Table 1.) The coded observations

Insert Table 1 about here

for each infant were examined for the first instance of crying when mother departs which was unconfounded by putting the infant down or leaving him alone. Observation established the median onset of crying when mother leaves at 22 weeks. The age of onset of those six infants who were observed to cry

at 15 weeks of age may well have been earlier; the present analysis did not cover the f ear. In order to compare our findings with other studies in t was ascertained by interview, e narrative reports were scanned for the first report by the mother that, in her judgment, her baby now protested her departure from the room. Interview established the median onset to be 26.6 weeks--about 4-1/2 weeks later than the median onset by observation. It is likely that a mother's impression of onset is formed more by strength and frequency of crying than by its first occurrence. One infant was never observed to protest his mother's departure nor was it his mother's impression that he did so.

That crying when a person leaves the room is a differential behavior is shown in Figure 2. Babies cry clearly more frequently when the mother leaves than when either siblings or unfamiliar figures leave. Since not all classes of figures were present (or departed) in all cases in all visits, tests of significance included only those visits in which both figures being compared were present, and the means compared were those for all such visits

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Insert Figure 2 about here

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from 15 to 54 weeks. (Since the different comparisons were based on different visits, the means may differ slightly.) Crying when mother leaves ($\bar{X}$ = 15.4%) is significantly more frequent than when siblings leave ($\bar{X}$ = 3.3%, t = 3.58, $p < .001$). Crying when mother leaves ($\bar{X}$ = 16.9%) is also significantly more frequent than when unfamiliar people leave ($\bar{X}$ = 5.4%, t = 3.58, $p < .001$). (The difference between siblings and unfamiliar persons is not significant.) Even in the second quarter, when babies infrequently cry when a person leaves, there was nevertheless a significant difference. (A nonparametric sign test was used for the second quarter because so many babies did not cry.) In the

second quarter (15 - 24 weeks), crying when mother leaves was more frequent than when a sibling leaves ($p < .05$) and than when an unfamilar person leaves ($p < .005$). It would appear that crying when a person leaves tends to be differential to the mother from its onset.

As shown in Figure 3, crying when the infant is left alone by his mother is frequent; it occurs in 46% of such leave-room episodes in the second quarter, in 44% in the third quarter, and 38% in the fourth quarter. It matters

Insert Figure 3 about here

little whether a baby is left alone in his crib for a nap or whether he is left alone under other circumstances. Over the three quarters studied, the mean frequency of protest to naps was 42% as compared to 38% for other occasions in which the baby is left alone in a room at home.

Figure 3 suggests that crying when left alone ($\bar{X} = 40.0\%$) occurs both earlier and more frequently than crying when left by the mother in the company of another person ($\bar{X} = 16.6\%$). The difference between these conditions is most striking in the second quarter. The difference in overall means for the entire period of 15 to 54 weeks is highly significant ($t = 3.7$, $p < .001$). Infants, especially those under six months of age, are more likely to protest the loss of all social companionship than the specific departure of the mother.

Crying when put down by mother ($\bar{X} = 26.6\%$) occurs more frequently than crying when mother departs ($\bar{X} = 15.1\%$) throughout the second, third, and fourth quarters. (See Figure 4.) The overall difference is highly significant ($t = 3.86$, $p < .001$). Thus, infants do protest the cessation of contact more readily than separation perceived across a distance.

Insert Figure 4 about here

No significant sex difference was found for the frequency of crying when mother leaves the room. For the third and fourth quarters combined, boys protested 21.9% of mother's departures, and girls 25.8% ($t = .35$, $p > .60$).

Following in leave-room episodes

Following when mother leaves the room as a function of age is shown in Figure 5. The first observed instance of following occurred at 30 weeks of

Insert Figure 5 about here

age. The group trend shows an acceleration in the frequency of following which seems attributable in part to the increasing efficiency of crawling and creeping. The most frequent following was observed at 48 weeks of age and occurred in 57.6% of the leave-room episodes. In the fourth quarter, crying when mother leaves occurred in 22.5% of all leave-room episodes while following occurred in 47.5%. Following, therefore, is the most frequent response to separation, and when permitted occurs about twice as frequently as crying.

It was not possible to assess the onset of following in the same way as the onset of the other separation reactions. Since mothers often confine their infants, especially during the earliest stages of locomotion, the first observed instance of following was sometimes long after the infant was capable of following. Interview and observation combined did establish the median onset of locomotion at 30.9 weeks. The range of onset was from 24 weeks to 48 weeks of age. Figure 6 represents following as a function of

Insert Figure 6 about here

onset of locomotion. Three weeks after onset of crawling, babies followed mothers at a mean frequency of 16% of the leave-room episodes; six weeks

after onset, they followed at a mean frequency of 49%. This six-week interval is probably a period when babies are learning to use crawling efficiently and when this is accomplished, they begin to follow quite frequently. Thus, since the median onset of locomotion was placed at 30.9 weeks, the average by given the opportunity would probably show some instance of following by 34 weeks of age and would be following quite frequently by 37 weeks.

Differential following was examined. The number of visits (and cases) was few in which someone other than the mother left and the baby was both able to crawl and free to follow. Based on these relatively infrequent instances, however, there is no evidence that following in the familiar home environment is differential. Following occurred in 46.5% of mother's departures and 40.8% of siblings' departures ($N = 17$, $t = .66$); and in 34.8% of the departures of unfamiliar persons ($N = 17$, $t = .96$).

Following the mother when left alone was compared with following her when left in the company of another person. Babies were found to follow when alone in 85.8% of the relevant episodes, but when left with others only 59.0%. This difference is significant ($N = 17$, $t = 2.62$, $p < .02$). It is clear that being left alone is a condition that heightens the tendency to follow.

A sex difference was found in regard to following the mother. Boys followed in 58.1% of mother-leaves-room episodes, while girls followed in 34.4% ($t = 2.64$ $p < .02$).

The relationship between crying and following in mother-leaves-room episodes was examined to see whether freedom to follow the mother reduced the tendency to cry. When infants (who are capable of locomotion) were on the floor and free to follow, they were found to cry less ($\bar{X} = 15.1\%$) than when confined ($\bar{X} = 23.1\%$, $t = 1.92$, $p < .07$).

Positive greeting in enter-room episodes

The development of positive greeting to the mother when she returns is illustrated in Figure 7. There is an overall increase in the frequency of

Insert Figure 7 about here

greetings--the greatest increment occurring between the second and third quarters. Infants greeted their mothers in 18.8% of her enter-room episodes in the second quarter (15 - 24 weeks), 30.1% in the third quarter (27 - 36 weeks) and 33.8% in the fourth quarter.

The age of onset of greeting the mother across a distance is clearly earlier than crying when separated. The coded observations for each infant were examined for the first instance of positive greeting which was unconfounded with a face-to-face confrontation or pick-up. The median age for onset of greeting was found to be 16.3 weeks, about 5-1/2 weeks before the onset of crying when mother leaves. (See Table 1.) Since slightly more than a third of the babies were greeting their mothers by 15 weeks, it may be inferred that some infants give greetings in the first quarter.

The incidence of positive greetings to the mother was compared to the incidence of greetings given to unfamiliar people and to siblings. The differential frequency is shown in Figure 8 and the comparison of rated intensity in Figure 9.

Insert Figures 8 & 9 about here

The difference between the frequency of greeting the mother ($\bar{X}$ = 27.8%) and unfamiliar people ($\bar{X}$ = 24.9%) over all three quarters was not found to be significant. When the intensity of the greetings was examined, however, a significant difference was found between greeting the mother ($\bar{X}$ = 2.09)

and greeting unfamiliar people ($\bar{X}$ = 1.83, t = 3.36, $p < .001$). Figure 9 shows that this difference in the intensity of greetings occurs largely in the fourth quarter. (Although in terms of these measures it appears that greetings do not become differential to the mother until the fourth quarter, and then only in terms of intensity, an analysis that considers the seven greeting behaviors separately gives evidence of substantial differentiality.)

The overall difference in frequency of greeting the mother ($\bar{X}$ = 29.1%) and siblings ($\bar{X}$ = 15.1%) was found to be significant (t = 3.58, $p < .001$). The rated intensity, however, did not reveal a significant difference between greetings to mother ($\bar{X}$ = 2.09) and to siblings ($\bar{X}$ = 2.06).

One factor which may contribute to the frequency of greetings given mother, unfamiliar people, and siblings is the frequency with which the baby is acknowledged by the person entering the room. Therefore, the frequency with which mothers, unfamiliar people, and siblings acknowledged the infants when entering the room was examined. (See Figure 10.) No differ-

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Insert Figure 10 about here

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ence was found in the frequency of acknowledgments given by mothers ($\bar{X}$ = 31.4%) and by unfamiliar people ($\bar{X}$ = 31.3%). There was a difference in acknowledgments given by mothers ($\bar{X}$ = 30.6%) and by siblings ($\bar{X}$ = 18.5%, t= 3.18, $p < .001$).

The frequency of positive greeting to mother after having been alone and having been in company is shown in Figure 11. Babies are more likely

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Insert Figure 11 about here

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to greet their mothers after having been alone ($\bar{X}$ = 39.2%) than when in company ($\bar{X}$ = 20.9%, t = 3.17, $p < .001$). The difference is most evident in the

third and fourth quarters. (See Figure 11.) There was no difference in the intensity of positive greetings to mother after having been alone ($\bar{X}$ = 2.12) and in company ($\bar{X}$ = 2.10).

There were no significant sex differences found for positive greetings. Boys greeted 30.6% of mother's entries and girls greeted 29.2% of her entries. The rated intensity of boys' greetings was 2.11; the intensity of girls' greetings was 2.05.

Further light is thrown upon both the development of greeting and its differential nature by an examination of the separate positive greeting behaviors. (A behavior was scored if it was demonstrated at least once during the quarter to the person or persons in question.) A greeting was judged to be differential to the mother, if, by the binomial test: (a) significantly more babies displayed the behavior only to the mother than both to the mother and to unfamiliar people, and (b) significantly more babies displayed the behavior only to the mother than only to unfamiliar people. Table 2 shows the relevant figures for each behavior for each quarter, and included the number of babies who displayed the behavior to neither mother nor unfamiliar people, although these did not enter into the test of differentiality.

Insert Table 2 about here

Smiling was the most common type of positive greeting in all three quarters. In the third and fourth quarters smiling was clearly not differential to the mother according to our double-barrelled test. Significantly more babies smiled at both mother and at unfamiliar people than reserved smiles exclusively for the mother. In the second quarter, although more babies smiled at both mother and unfamiliar persons than at the mother only, the difference was not significant; but significantly fewer smiled at unfamiliar

people only. These findings, especially those for the third and fourth quarters, help to account for the finding, previously reported, that the frequency of positive greetings was not differential to the mother, since smiling is the most common component of positive greetings. It is possible that even smiling might emerge as differential were different measures used, either latency or intensity or both, but this issue can be settled only by observational records more precise than those feasible in the present study — for example, videotaped records of response to different figures in enter-room episodes in the home environment.

Vocalization was also a common type of positive greeting in all quarters. Unlike smiling, however, vocalization was strikingly differential to the mother throughout. Bouncing and jiggling, as though in excitement, was common in the second and third quarters, but became less common in the fourth. Like vocalization it was differential throughout, although somewhat less clearly so in the fourth quarter.

Reaching did not occur often enough to be differential until the fourth quarter. It seems likely that reaching is more likely to occur in pick-up episodes than in greeting across a distance, to which this analysis was confined.. Leaning or straining toward the entering person, or pulling up to a standing position, was differential to the mother in both third and fourth quarters, although it occurred much less commonly than vocalizing or even bouncing. Waving the hands, which may well have begun as part of the bounce and jiggle response, was too infrequent in isolation from more generalized bodily activity to be differential.

Locomotor approach in greeting did not occur until the third quarter, and did not become common until the fourth. In the third quarter it was clearly differential to the mother. In the fourth enough babies approached

both mother and unfamiliar people to blur the differentiality of the response, but none reserved approach exclusively for unfamiliar figures.

In summary, smiling is the most common positive greeting behavior throughout the first year. It is not differential to the mother even in the second quarter, although then more babies smile at the mother than at unfamiliar figures. Like smiling, vocalization (including laughing) is common throughout all quarters; unlike smiling, it is clearly differential to the mother throughout. The more active forms of greeting behavior, except for bouncing, are slow to emerge, but they tend to be differential to the mother, especially in the third quarter. Waving the arms is an exception; it is to rare to be considered differential.

Crying and mixed responses in enter-room episodes

The frequency of crying and mixed response when mother enters the room is shown in Figure 7. Crying and mixed response are clearly less common reunion reactions than positive greeting throughout the second, third, and fourth quarters. Mixed responses were observed least frequently and in only 16 of the 26 infants. When averaged over 15-54 weeks, crying occurred in 6% and mixed response occurred in 2% of the mother's entrances; while positive greetings occurred in 30% of mother's entrances.

The median age of onset for crying and/or mixed response when mother enters (across distance) was 27 weeks. Thus, crying and/or mixed response at reunion emerges about five weeks after crying upon separation and much later than positive greetings.

Crying and mixed response to entries of the mother were not compared to those of unfamiliar people since crying when unfamiliar people enter may often be attributable to fear of strangers rather than to reunion after separation. Crying and mixed responses to entrances of siblings were examined,

however, and were found to be very infrequent. A cry or mixed response to siblings was observed on one occasion each for only eight of the 20 babies. Thus, crying upon reunion is clearly differential to the mother.

Crying and mixed response were examined to see if the condition of being left alone heightens their frequency. No difference was found in the frequency of crying and mixed responses to mother after having been alone ($\bar{X}$ = 6.6%) and in company ($\bar{X}$ = 8.4%). (Refer to Figure 12.) Thus, only

Insert Figure 12 about here

the frequency of positive behaviors was found to be heightened in reunion situations by the condition of being alone.

There was no significant sex difference. Boys cried or gave mixed response to 9.0% of mother's entrances and girls to 8.6% of mother's entrances.

Discussion

Most investigators of infant-mother separation have examined protest or distress to the exclusion of other possible reactions, giving the impression that crying is the typical and expected behavior. The present findings indicate that in the familiar home environment, an infant capable of locomotion follows his mother about twice as frequently as he cries. This finding is consistent with the observation of Ainsworth (1967) that Ganda infants tended to cry less as they became more efficient and hence more confident in following their mothers--whether by creeping or walking. Furthermore, a baby positively greets his mother far more frequently than he cries when she returns; expressions of pleasure or delight far exceed those of protest or anger. Indeed, our findings suggest that a baby is more likely to give a positive greeting to his mother when she returns than to cry when she leaves. Thus, although infants in the first year may be seen to react

to separation in the familiar environment in a variety of ways, their attempts to regain proximity, contact, or interaction with the missed person are more often active and/or positive than distressed.

The frequency measures of separation behaviors used here probably underestimate the strength of the behaviors. As noted earlier, many of the comings and goings of the mother in the home environment may go unnoticed or may occur so quickly that the infant cannot mobilize a response. An experimental situation (in the home) which assures that each separation is perceived by the infant and is of sufficient length to permit a reaction to be mobilized would probably yield more frequent responses.

The onset of separation behaviors indicates the point at which an infant would respond to his mother's exits or entrances across a distance. The present findings suggest that the onset of separation reactions is earlier than has been indicated by most other investigators. In the present sample, the median onset of crying when mother leaves was found to be 22 weeks or about 5-1/2 months. Schaffer and Emerson (1964) found the average onset to be around seven lunar months (28 weeks). Tennes and Lampl (1964) and Spitz (1965) suggest that the onset of separation anxiety is around eight months. Ainsworth (1967), however, found the onset of crying when mother leaves in her Ganda sample to be approximately the same as presented here. The present study and Ainsworth's (1967) study were based on more frequent and extensive observations than the other studies and this methodological difference may account for the discrepancy. When interviews with the mothers of the present sample were used to assess onset, the median onset was found to be 26.6 weeks, about the same as reported by Schaffer and Emerson (1964).

Of all the behaviors related to separation, positive greetings were found to be the earliest to appear; the median age of onset was placed at

16.3 weeks. In her Ganda sample, Ainsworth (1967) reported that positive greetings emerged toward the end of the second quarter, about two months later than the present sample. Earlier greetings may have been overlooked, however, since at first she focused her observation on responses to separation more than on responses to reunion. Crying when reunited with mother was not observed in the present sample until several weeks after the onset of crying when separated. The median onset of crying and mixed response when mother returns is 27 weeks. Following was the last separation behavior to emerge; the onset was estimated to be about 34 weeks. Following appeared earlier in Ainsworth's Ganda sample, but this difference seems attributable to the Ganda babies' earlier development of locomotor skills.

The developmental trend of crying when mother departs indicated that separation protest peaked twice during the second half of the first year--once in the third quarter at about 7 - 7-1/2 months and once again at about 1,-1/2 - 11 months. The frequency of following and crying and mixed responses when mother returns showed similar peaks at about 10-1/2 - 11 months. Two hypotheses concerning these peaks may be advanced. One hypothesis is that the earlier peak follows the acquisition of differential behavior to the mother and other figures across some distance and that the second peak coincides with the consolidation of a "true" attachment relationship, when the infant actively initiates contact and interaction with the mother by such behaviors as approaching, following and clinging. Thus, the two peaks could represent phases III and IV in the development of attachment identified by Ainsworth (1967). The second hypothesis is that the decrement in separation crying which takes place in the period between 36 - 42 weeks of age reflects the infant's pleasure in exercising his newly acquired ability to crawl--a pleasure which may temporarily distract him from his concern for his mother's

wherabouts. Indeed, this is the period when the majority of babies in this sample first used locomotion in a truly efficient manner. Furthermore, the decrement in crying at the end of the first year may be attributable to the enjoyment of exercising further new locomotor skills including walking, as Schaffer and Emerson (1964) suggested.

Separation behaviors are considered to be attachment behaviors. Not only do they promote proximity, contact, and/or interaction with social companions, but they are believed to be differential to a preferred figure--usually the mother. Most investigators suggest that separation crying is differential to the mother by at least 7 - 9 months of age. In the present sample, crying when a person leaves the room clearly was differential to the mother when compared to siblings and unfamiliar people. In fact, separation crying was found to be differential even in the second quarter. Crying when a person leaves thus tends to be specific to that figure from its onset.

Our finding that separation crying is differential as early as the second quarter of the first year is discrepant with the study of Fleener and and Cairns (1970) who did not find discriminative crying until 12 lunar months and beyond. There are a number of methodological differences between the studies which may account for the difference. First, Fleener and Cairns tested for differential crying in a strange situation, i.e. laboratory setting, with a totally strange person. (While our observer-visitors were relatively unfamiliar, they were certainly not total strangers to the infants.) A stranger who stands, passes by the infant's crib, pausing to say "bye-bye" (Fleener and Cairns' procedure) may elicit fear-of-stranger crying in younger infants quite independently of the departure that soon follows. Furthermore, Fleener and Cairns report that once infants began to cry, whatever the precipitating event, they tended to persist in crying throughout the experimental

session. Secondly, only two instances of mother-infant separation and stranger-infant separation per child were observed. Both the persistence of crying and the limited observations may have made Fleener and Cairns' study insensitive to differential separation protest in younger babies.

In contrast to crying, the frequency of following was not found to be differential to the mother. Although this finding may be surprising, two factors may account for it. First, the present findings are based on observations in a familiar and relatively nonstressful environment. In an unfamiliar or alarming situation following is likely to be highly differential to the mother. Ainsworth and Wittig (1969), for example, found that in a strange situation, infants commonly attempted to follow their mothers during separation episodes while they did not follow the stranger when she left. Second, locomotion is clearly not exclusively an attachment behavior. Whereas locomotion may be used in seeking proximity to an attachment figure, whether in following a departing person or in approaching a returning person, it is important in exploration as well. Under conditions when an infant is neither alarmed nor anxious about the whereabouts of his attachment figure nor otherwise under stress, he may approach other persons in exploration, play or just sociably. This, we believe is what happened frequently enough when an infant in our sample followed a sibling or an unfamiliar person. But when stress heightens attachment behavior, one would expect following to be differential, as indeed it is in a strange situation.

The findings in regard to the differential nature of positive greetings are complex. Our frequency measure for all types of positive greetings lumped together suggests that these are not differential to the mother, Our measure of intensity, again considering all positive greetings lumped together, suggests that they are differential to the mother especially in the fourth quarter.

When the different greeting behaviors were considered separately, however, they were found to be differential to the mother as soon as they had achieved onset in enough children for a test of differentiation to be made—except for smiling. Both vocalization and the more active behaviors, such as bouncing, leaning toward, reaching, and locomotor approach (excepting only waving the hands), appear to be differential from onset onwards.

Although smiling has been studied more intensively than any other attachment behavior, development research has been limited to an early segment of the first year. The findings led Bowlby (1969, pp. 280-286) to identify four main phases of development: (a) a phase of spontaneous and reflex smiling at the beginning, (b) a phase of unselective social smiling, starting at about the end of the second week in some babies, (c) a phase of selective social smiling, beginning at about the end of the first quarter, and, finally, (d) a phase of differential social responsiveness, which lasts for the rest of life. Thus, smiling is undiscriminating as to figure at first, but becomes discriminating at least by the second quarter-year. Our findings suggest that it remains somewhat discriminating through the second quarter, but that it then becomes less differential again. This is not to suggest that differential social responsiveness does not continue, but rather to suggest that smiling itself, while remaining an attachment behavior inviting increased proximity and/or interaction with attachment figures, becomes also an affiliative behavior, in response to the overtures of persons other than the mother or other attachment figures, and as initiating or mediating interaction with them.

Since smiling is the most common and most frequent positive greeting, whether as an isolated behavior or in combination with other greeting behaviors the fact that it is not differential in the second half of the first year

(at least in terms of our frequency measures) tends to obscure the equally important fact that other components of greeting tend to remain differential or to become so once they emerge in an infant's repertoire. More intensive studies than the present one are required before one can identify the developmental features of the dimensions that differentiate between smiling as directed toward attachment figures, smiling that is affiliative in function, and smiling that is perhaps propitiatory or defensive. In a strange situation babies tend to smile at both the mother and at strangers (Bretherton & Ainsworth, in press) but they tend to greet their mothers by approaching, reaching, and/or clinging also, whereas these more active behaviors are very rarely manifested toward a stranger (Ainsworth & Wittig, 1969).

The differential nature of active greeting behaviors was emphasized also by Ainsworth (1967); Ganda infants were reported to greet their mothers by lifting their arms, and later with locomotor approach. This present study shows that although unfamiliar figures may be greeted with a pleasant smile, behaviors that are more active, enthusiastic, or intense differentiate greetings of preferred familiar figures from those who are unfamiliar. The findings feature excited jiggling from the beginning of the second quarter, and leaning, reaching, and locomotor approach as they emerge in developmental sequence.

Crowing and laughing were frequent components of Ganda greeting responses. Ainsworth also identified differential vocalization as an attachment behavior. Indeed vocalization may be viewed as a proximity-promoting (attachment) behavior from the beginning. It emerges clearly as a differential behavior in enter-room episodes, although the analysis of the data in our present study has not yet dealt with it in other contexts. Vocalization obviously develops eventually into a mode of communication with other persons regardless of their

attachment status. Our findings suggest, however, that it is still closely linked to attachment figures in the latter part of the first year of life.

The present findings clearly support Bowlby's thesis (in press) that to be left alone is a natural clue to an increased risk of danger, a circumstance that tends to intensify fear responses to other potentially fear-arousing stimuli, and a condition that in itself is very likely to activate attachment behavior. Even before a baby has become attached to a specific figure he tends, when alone, to emit signals that promote proximity to anyone who happens to be close enough to receive them. In the second quarter, infants cried in 46% of the episodes in which they were left alone, whereas they cried in only 8% of other episodes in which it was specifically the mother who left. Bell and Ainsworth (in press) found that an infant in the first quarter-year is very much more likely to cry if he is alone than when he is within visual or auditory range of his mother, and least likely to cry if he is in actual physical contact with her. Schaffer and Emerson (1964) reported that by 12 weeks 17% of their sample showed protest behavior when left alone--although before 8 weeks they did not note any instance of protest in this separation. In the present sample, being alone not only heightened crying, but also increased the likelihood of following the departing figure and of giving a positive greeting upon reunion. Thus, it seems that loss of all companionship is an earlier and even more potent activator of proximity-promoting behavior than separation from a specific attachment figure--although this is not to deny that once a baby has become attached he may specifically wish for his attachment figure when he is distressed and alone.

Finally, the present findings also support Bowlby's point that anxiety is aroused when the lines of communication with the attachment figure are cut off, and when it thus is not only distant (or even absent) but also

inaccessible. Ainsworth (1967) observed that Ganda infants in the last quarter-year tended to follow when their mothers left the room, and to cry only if they were prevented from following. Here we also report that in leave-room episodes following is a more frequent response than crying, and that babies cry more frequently when they are confined than when they are unconfined and free to follow. Thus it is the fact that the mother becomes inaccessible rather than that she disappears from view that evokes separation protest once a baby becomes capable of actively searching for her.

Footnotes

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2 Requests for reprints or the scale for rating the intensity of positive greetings should be sent to Mary D. S. Ainsworth, Department of Psychology, The Johns Hopkins University, Baltimore, Maryland 21218.

References

Ainsworth, M. D. S. Infancy in Uganda: Infant care and the growth of love. Baltimore: The Johns Hopkins University Press, 1967.

Ainsworth, M. D. S. Object relations, dependency, and attachment: A theoretical review of the infant-mother relationship. Child Development, 1969, 40, 969-1025.

Ainsworth, M. D. S. Attachment and dependency: A comparison. In J. L. Gewirtz (Ed.) Attachment and dependence. Washington, D. C.: V. H. Winston & Sons. (Distributor: Wiley, New York). In press.

Ainsworth, M. D. S. & Bell, S. M. Some contemporary patterns of mother-infant interaction in the feeding situation. In A. Ambrose (Ed.) Stimulation in early infancy. London: Academic Press, 1969. Pp. 133-170.

Ainsworth, M. D. S. & Bell, S. M. Attachment, exploration and separation: Illustrated by the behavior of one-year-olds in a strange situation. Child Development, 1970, 41, 49-67.

Ainsworth, M. D. S. & Bell, S. M. Mother-infant interaction and the development of competence. In K. J. Connolly (Ed.) Development of early competence. London: Academic Press. In press.

Ainsworth, M. D. S., Bell, S. M., Blehar, M. P. & Main, M. B. Physical contact: A study of infant responsiveness and its relation to maternal handling. Paper presented at the biennial meeting of the Society for Research in Child Development, April, 1971.

Ainsworth, M. D. S., Bell, S. M. & Stayton, D. J. Individual differences in strange-situation behavior of one-year-olds. In H. R. Schaffer (Ed.) The origins of human social relations. London: Academic Press, 1971. Pp. 17-57.

Ainsworth, M. D. S., Bell, S. M. & Stayton, D. J. Individual differences in the development of some attachment behaviors. Merrill-Palmer Quarterly, 1972, 18, 123-143.

Ainsworth, M. D. S., Bell, S. M. & Stayton, D. J. Infant-mother attachment and social development: Socialization as a product of reciprocal responsiveness to signals. In M. P. M. Richards (Ed.) The integration of a child into a social world. Cambridge: Cambridge University Press. In press.

Ainsworth, M. D. S. & Wittig, B. A. Attachment and exploratory behavior of one-year-olds in a strange situation. In B. M. Foss (Ed.) Determinants of infant behaviour IV. London: Methuen, 1969. Pp. 111-136.

Arsenian, J. M. Young children in an insecure situation. Journal of Abnormal and Social Psychology, 1943, 38, 225-249.

Bell, S. M. & Ainsworth, M. D. S. Infant crying and maternal responsiveness. Child Development. In press.

Benjamin, J. D. Some developmental observations relating to the theory of anxiety. Journal of the American Psychoanalytic Association, 1961, 9, 652-668.

Benjamin, J. D. Further comments on some developmental aspects of anxiety. In H. S. Gaskill (Ed.) Counterpoint. New York: International Universities Press, 1963. Pp. 121-153.

Bowlby, J. The nature of the child's tie to his mother. International Journal of Psychoanalysis, 1958, 39, 350-373.

Bowlby, J. Attachment and loss. Vol. 1 Attachment. London: Hogarth. (New York: Basic Books). 1969.

Bowlby, J. Attachment and loss. Vol. 2 Separation. London: Hogarth. (New York: Basic Books). In press.

Bretherton, I & Ainsworth, M. D. S. Responses of one-year-olds to a stranger in a strange situation. In press.

Cox, F. N. & Campbell, D. Young children in a new situation with and without their mothers. Child Development, 1968, 39, 123-131.

David, M., Nicholas, H. & Roudinesco, J. Responses of young children to separation from their mothers. Courrier, 1952, 2, 66-78.

Fleener, D. E. & Cairns, R. B. Attachment behaviors in human infants: Discriminative vocalization on maternal separation. Developmental Psychology, 1970, 2, 215-223.

Heinicke, C. M. & Westheimer, I. Brief separations. New York: International Universities Press, 1965.

Rheingold, H. L. The effects of a strange environment on the behavior of infants. In B. M. Foss (Ed.) Determinants of infant behaviour IV. London: Methuen, 1969. Pp. 137-168.

Rheingold, H. L. & Eckerman, C. O. The infant separates himself from his mother. Science, 1970, 168(3927), 78-83.

Robertson, J. & Bowlby, J. Responses of young children to separation from thier mother. II. Observations of the sequences of response of children aged 16 to 24 months during the course of separation. Courrier, Centre International de l'Enfance, 1952, 2, 131-142.

Schaffer H. R. Objective observations of personality development in early infancy. British Journal of Medical Psychology, 1958, 31, 174-183.

Schaffer, H. R. & Emerson, P. E. The development of social attachments in infancy. Monographs of the Society for Research in Child Development, 1964, 29 (3, Serial No. 94).

Spitz, R. A. The first year of life. New York: International Universities Press, 1965.

Stayton, D. J. & Ainsworth, M. D. S. Individual differences in infant response to brief, everyday separations from the mother: Crying, following, and greeting. In press.

Stayton, D. J., Hogan, R. & Ainsworth, M. D. S. Infant obedience and maternal behavior: The origins of socialization reconsidered. Child Development, 1971, 42, 1057-1069.

Tennes, K. H. & Lampl, E. E. Stranger and separation anxiety in infancy. Journal of Nervous and Mental Diseases, 1964, 139, 247-254.

Tennes, K. H. & Lampl, E. E. Some aspects of mother-child relationship pertaining to infantile separation anxiety. Journal of Nervous and Mental Diseases, 1966, 143, 426-437.

Table 1

Onset of Separation Behaviors

Age in weeks	Number of infants showing onset			
	Crying when mother leaves		Positive greeting when mother enters	Crying & mixed response when mother enters
15 or earlier	6[a]	2[b]	9[a]	3[a]
18	2	2	9	1
21	3	1	4	
24	6	2	4	6
27	5	7		3
30	3	3		3
33		5		2
36		1		2
39		1		2
42		1		1
45				2
never observed	1	1		1
Median age in weeks	22.0[a]	26.6[b]	16.3[a]	27.0[a]

[a] Onset by first observed occurrence

[b] Onset by interview

Table 2

Number of Infants Displaying Each Type of Positive Greeting to Mother and/or to Unfamiliar People

Figure	Positive Greeting Behaviors													
	Smile		Vocalize		Bounce		Reach		Lean		Approach		Wave	
	f	p	f	p	f	p	f	p	f	p	f	p	f	p
2nd Quarter														
M & U/P	9	.332	3	.025	2	.002								
M only	12	.006	14	<.001	14	<.001								
U/P only	2		0		0									
Neither	3		9		8									
3rd Quarter														
M & U/P	19	.003#	3	.001	4	.025	2		1	.003	0	.001	0	
M only	5		18	<.001	13	.001	3		11	.003	10	.001	4	
U/P only	2		1		1		1		1		0		1	
Neither	0		4		8		20		13		16		21	
4th Quarter														
M & U/P	21	.002#	8	.054	3	.07	1	.035	0	.002	6	.084	2	
M only	4		17	<.001	9	.033	7	.035	9	.002	13	<.001	2	
U/P only	0		0		2		1		0		0		2	
Neither	1		1		12		17		17		7		20	

In these cases the p value indicates a significant tendency for babies to display the behavior to both mother and unfamiliar people rather than to mother only.

Figure Captions

Figure 1: Frequency of crying when mother leaves the room at three-week intervals from 15 to 54 weeks of age

Figure 2: Frequency of crying when mother, siblings, or unfamiliar people leave the room.

Figure 3: Frequency of crying when mother leaves baby alone or in company of another person.

Figure 4: Frequency of crying when mother leaves the room or when she puts the baby down.

Figure 5: Frequency of following when mother leaves the room as a function of age in weeks. N represents the number of babies at each age who could crawl and who were observed on the floor in a leave-room episode.

Figure 6: Frequency of following when mother leaves the room at onset of locomotion and at three-week intervals thereafter.

Figure 7: Frequency of positive greeting, crying, and mixed response when mother enters room at three-week intervals from 15 to 54 weeks of age.

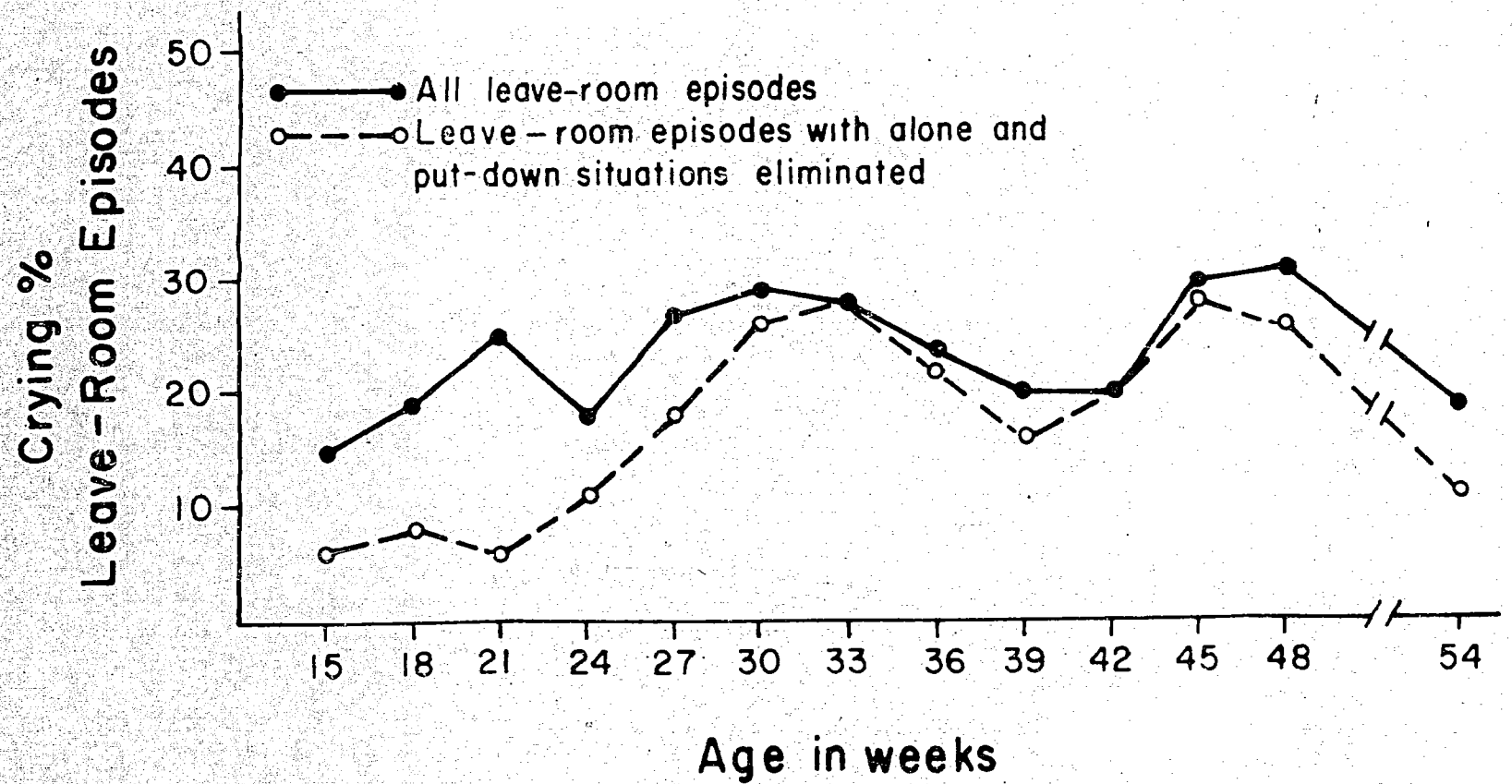
Figure 8: Frequency of positive greeting when mother, siblings, or unfamiliar people enter room.

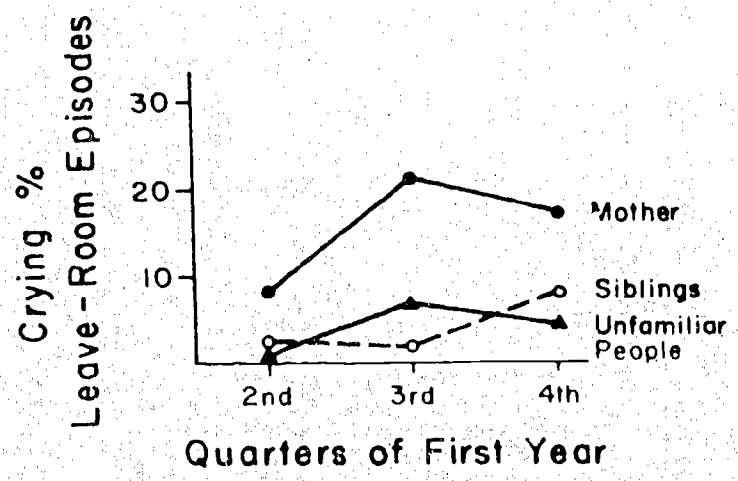
Figure 9: Intensity of positive greeting when mother, siblings, or unfamiliar people enter room.

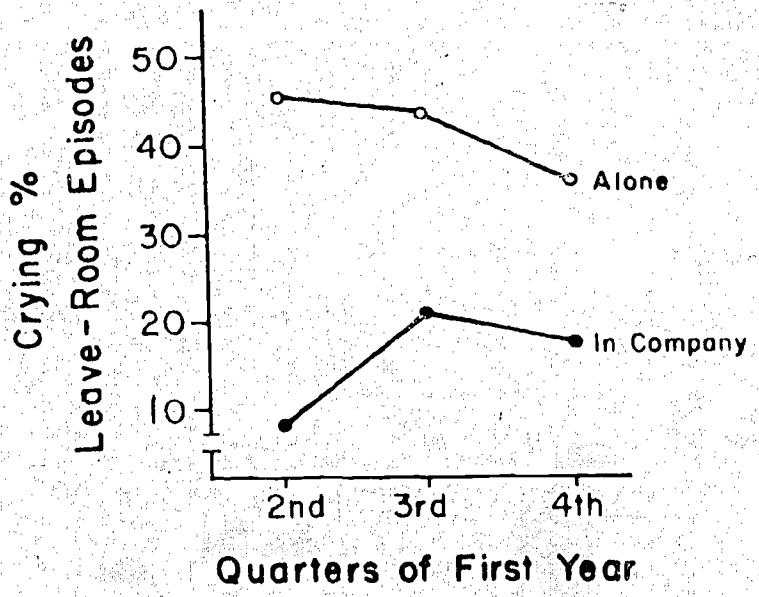
Figure 10: Frequency of acknowledgments given to baby by mother, siblings, and unfamiliar people.

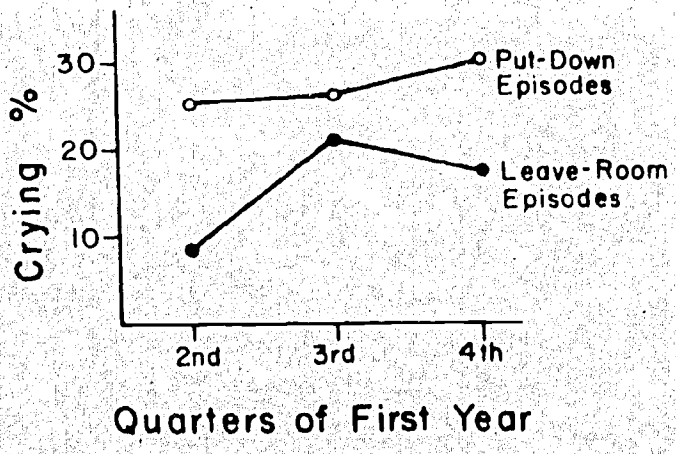
Figure 11: Frequency of positive greeting at mother's entrance when baby is alone or in company of another person.

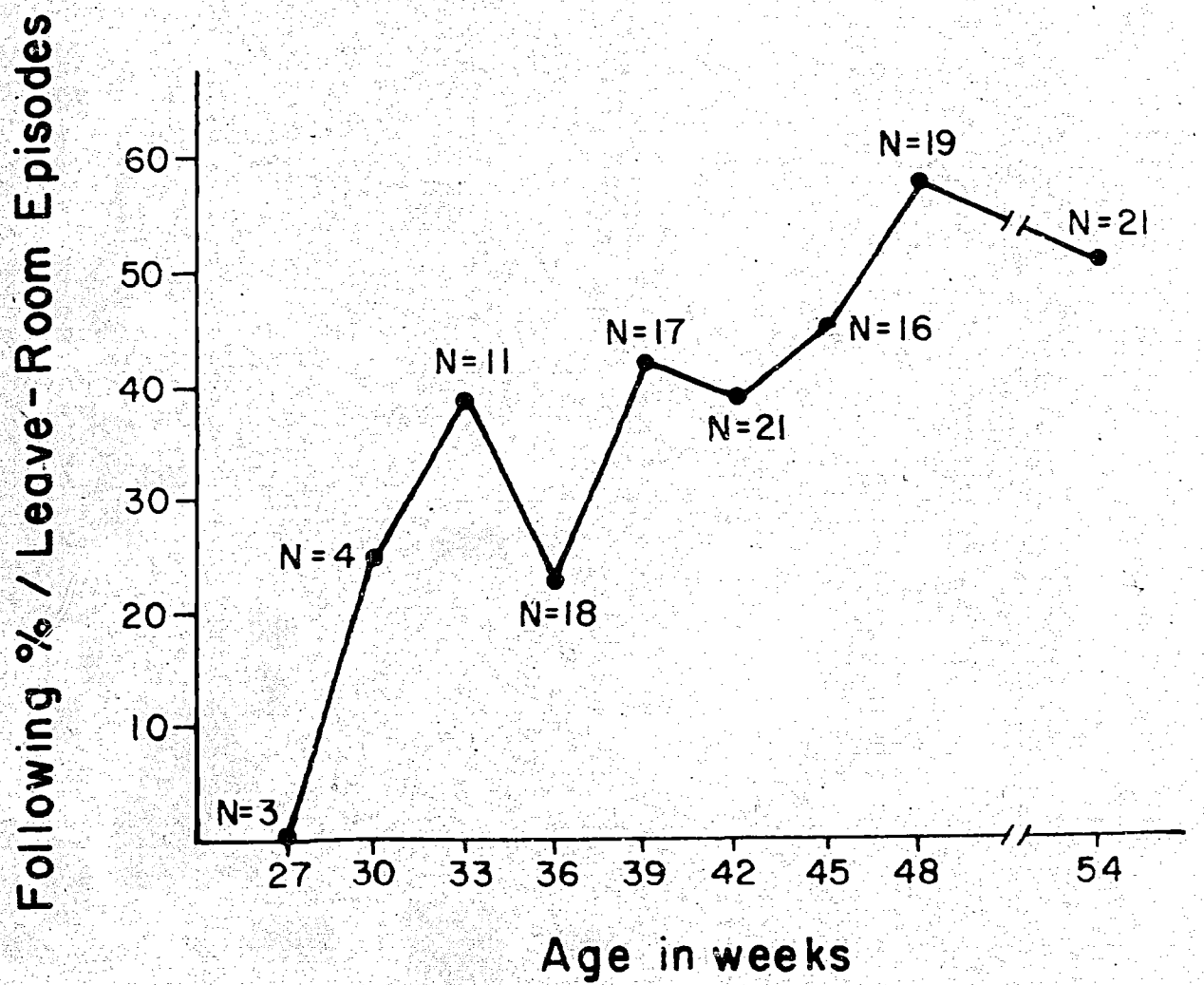
Figure 12: Frequency of crying and mixed responses at mother's entrance when baby is alone or in company of another person.

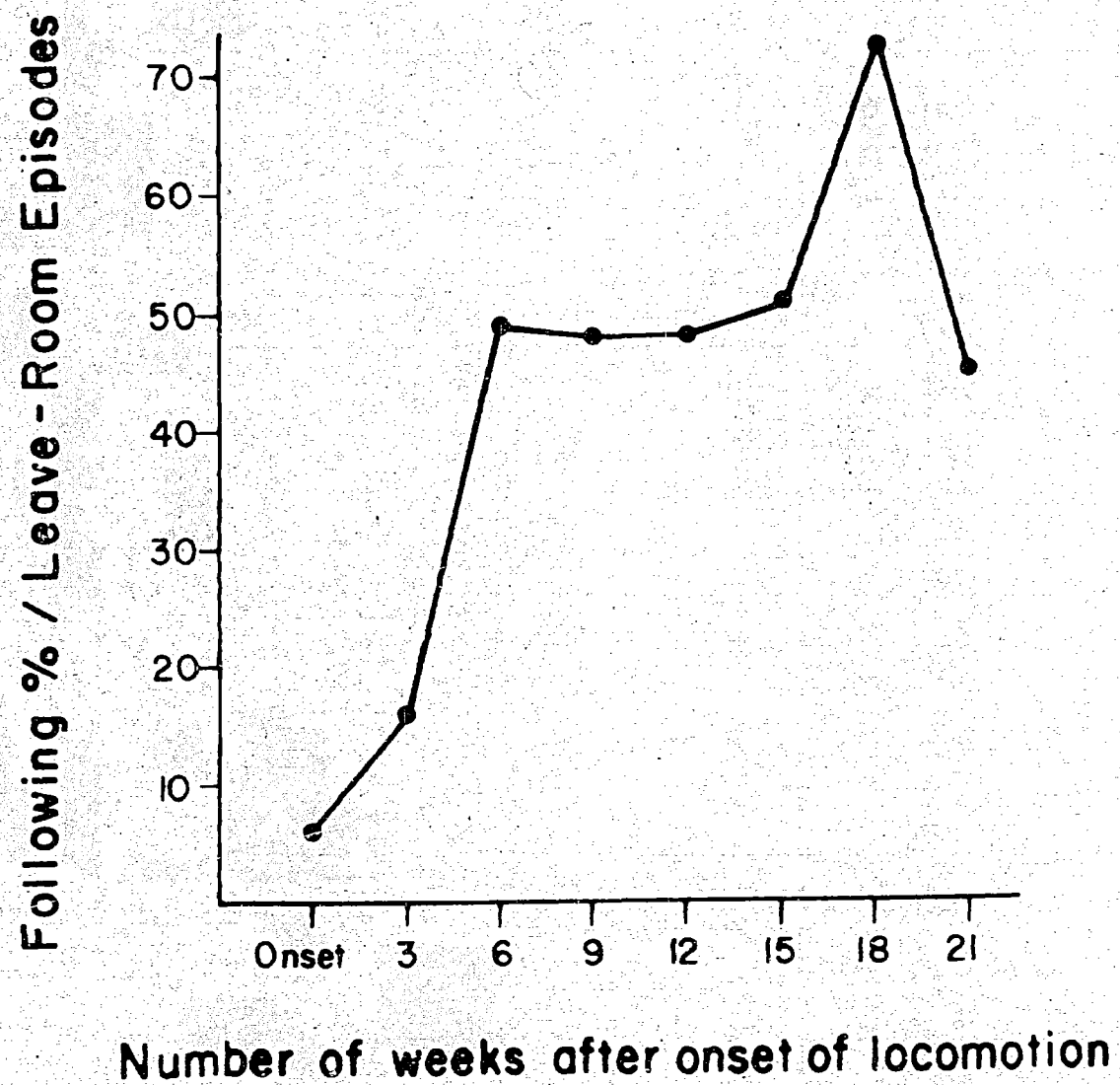

Crying %
Leave-Room Episodes
50
40
30
20
10
All leave-room episodes
Leave-room episodes with alone and put-down situations eliminated
15
18
21
24
27
30
33
36
39
42
45
48
54
Age in weeks

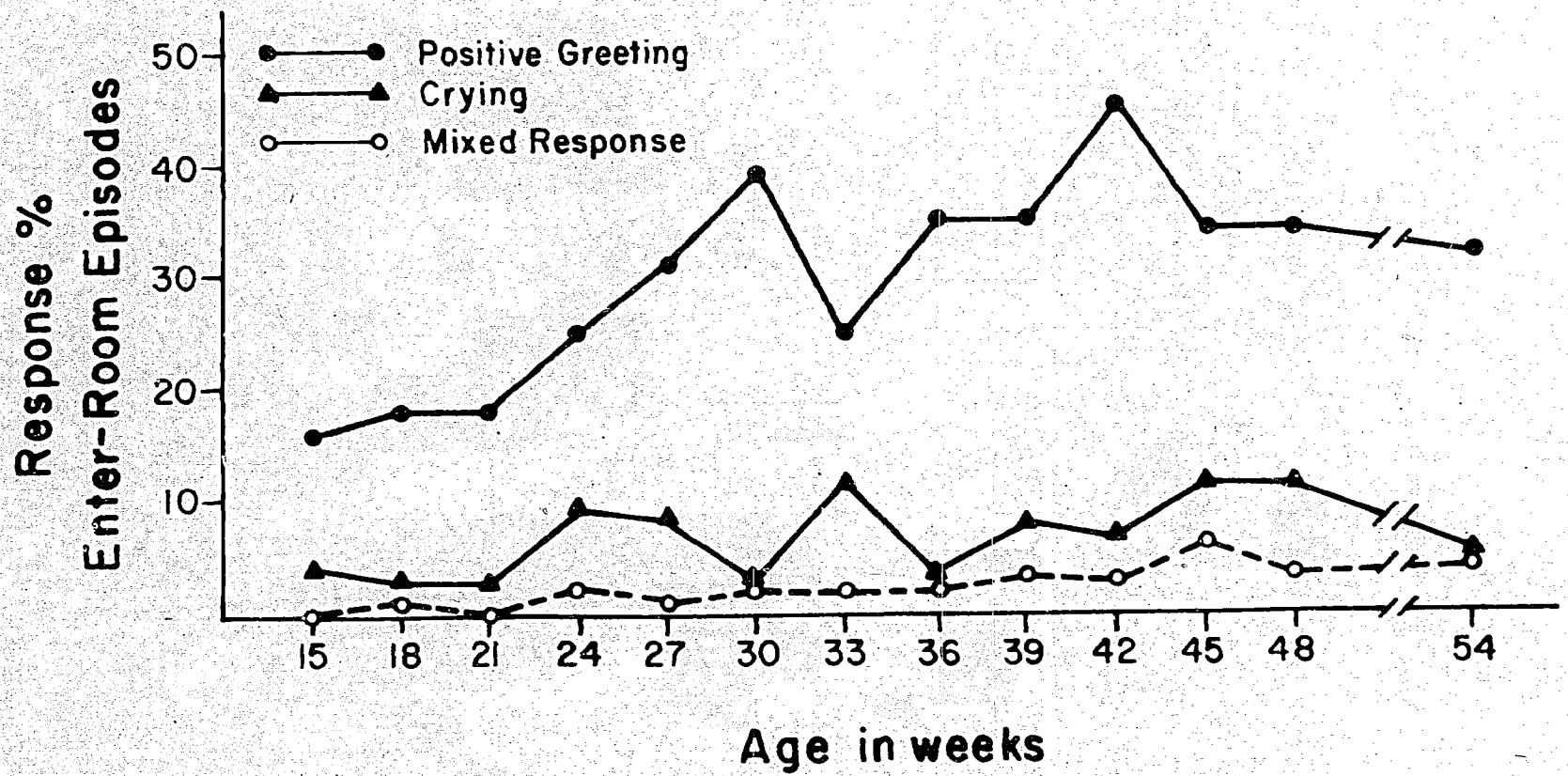

Crying %
Leave-Room Episodes
30
20
10
Mother
Siblings
Unfamiliar People
2nd
3rd
4th
Quarters of First Year

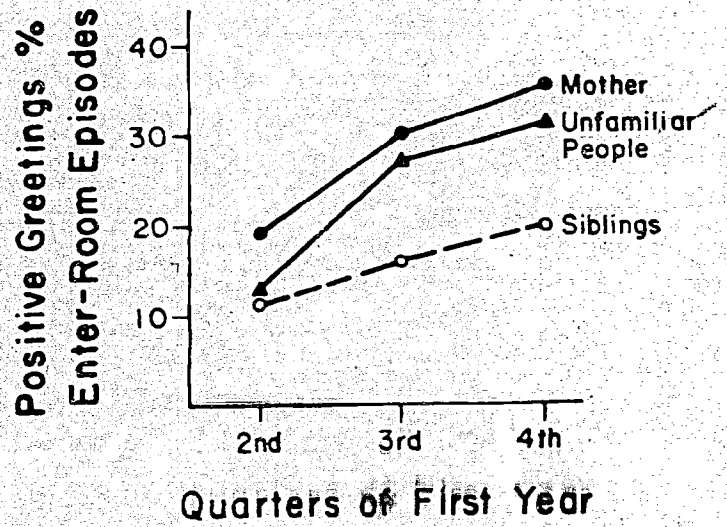

Crying %
Leave-Room Episodes
50
40
30
20
10
Alone
In Company
2nd
3rd
4th
Quarters of First Year

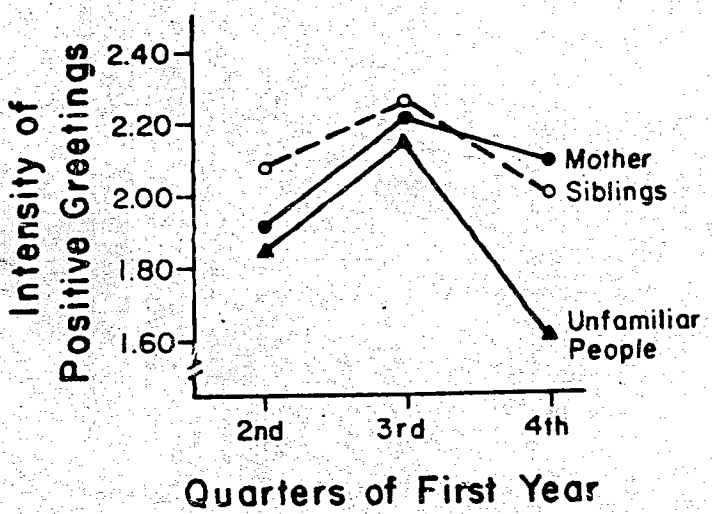

Crying %
30
20
10
Put-Down Episodes
Leave-Room Episodes
2nd
3rd
4th
Quarters of First Year

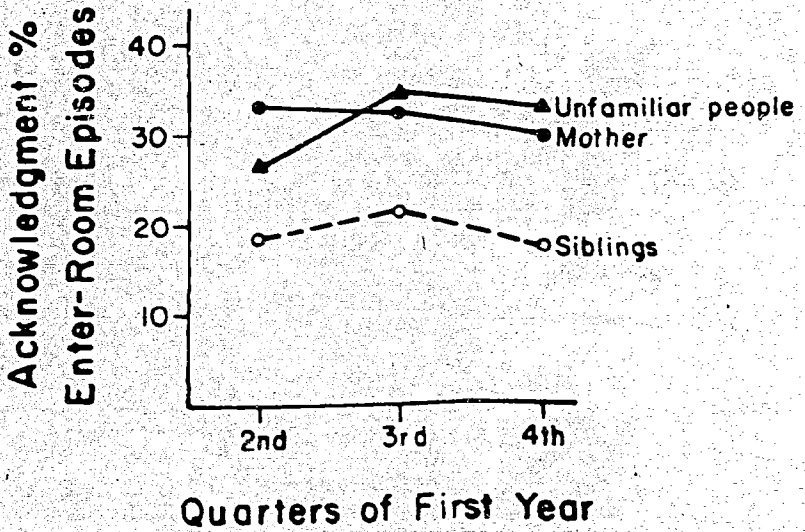

Following % / Leave-Room Episodes
60
50
40
30
20
10
N=3
N=4
N=11
N=18
N=17
N=21
N=16
N=19
N=21
27
30
33
36
39
42
45
48
54
Age in weeks

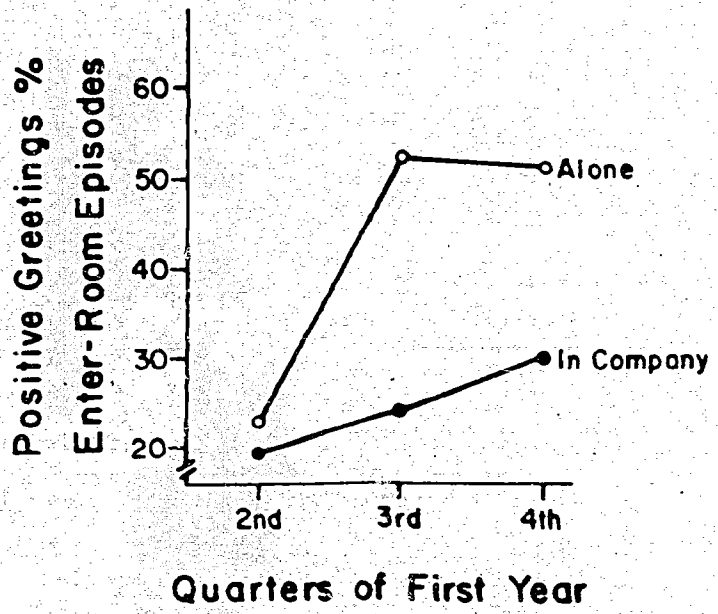

Following % / Leave-Room Episodes
70
60
50
40
30
20
10
Onset
3
6
9
12
15
18
21
Number of weeks after onset of locomotion


Response %
Enter-Room Episodes
50
40
30
20
10
Positive Greeting
Crying
Mixed Response
15
18
21
24
27
30
33
36
39
42
45
48
54
Age in weeks


Positive Greetings %
Enter-Room Episodes
40
30
20
10
Mother
Unfamiliar People
Siblings
2nd
3rd
4th
Quarters of First Year


Intensity of
Positive Greetings
2.40
2.20
2.00
1.80
1.60
Mother
Siblings
Unfamiliar People
2nd
3rd
4th
Quarters of First Year


Acknowledgment %
Enter-Room Episodes
40
30
20
10
Unfamiliar people
Mother
Siblings
2nd
3rd
4th
Quarters of First Year


Positive Greetings %
Enter-Room Episodes
60
50
40
30
20
Alone
In Company
2nd
3rd
4th
Quarters of First Year

Crying and Mixed Response %
Enter-Room Episodes
30
20
10
Alone
In Company
2nd
3rd
4th
Quarters of First Year