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ATTACHMENT, EXPLORATION, AND SEPARATION: ILLUSTRATED BY THE BEHAVIOR OF ONE-YEAR-OLDS IN A STRANGE SITUATION

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The concepts of attachment and attachment behavior are considered from an ethological-evolutionary viewpoint. Attachment behavior and exploration are viewed in balance, and the biological functions of each are discussed. As an illustration of these concepts, a study is reported of 56 white, middle-class infants, 49–51 weeks of age, in a strange situation. The presence of the mother was found to encourage exploratory behavior, her absence to depress exploration and to heighten attachment behaviors. In separation episodes such behaviors as crying and search increased. In reunion episodes proximity-seeking and contact-maintaining behaviors were heightened. In a substantial proportion of Ss, contact-resisting behaviors were also heightened in the reunion episodes, usually in conjunction with contact-maintaining behaviors, thus suggesting ambivalence. Some Ss also displayed proximity-avoiding behavior in relation to the mother in the reunion episodes. These findings are discussed in the context of relevant observational, clinical, and experimental studies of human and nonhuman primates, including studies of mother-child separation. In conclusion, it is urged that the concepts of attachment and attachment behavior be kept broad enough to comprehend the spectrum of the findings of this range of studies.

Within the last decade the term “attachment” has appeared with increasing frequency in both empirical and theoretical segments of the developmental psychological literature (see Cairns 1966; Gewirtz 1961, 1969; Maccoby & Masters, in press; Robson 1967; Schaffer & Emerson 1964;

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CHILD DEVELOPMENT

Schwarz 1968). The term, as originally introduced by Bowlby (1958, 1969) and as used by Ainsworth (1963, 1964, 1967), implies an ethological and evolutionary viewpoint, and hence has connotations not necessarily shared by those with other theoretical orientations. Infant-mother attachment has been conceived as related to separation anxiety (see Bowlby 1960), fear of the strange and strangers (see Morgan & Ricciuti 1969; Schaffer 1966), and exploration (see Ainsworth 1967; Ainsworth & Wittig 1969). It is believed that the interrelationships between these behaviors throw light upon the biological function of infant-mother attachment; that they do is strongly suggested by field studies of ground-living nonhuman primates. Although comparable reports of human infants in their natural home environment are not yet forthcoming, interaction between attachment behavior, exploration, separation anxiety, and fear of the strange may be observed in a controlled laboratory environment—the strange or unfamiliar situation.

It is the purpose of this paper to highlight some distinctive features of the ethological-evolutionary concept of attachment, by citing reports of the interactions between the infant's attachment behavior and other behaviors mentioned above; to illustrate these interactions by a report of the behavior of 1 year olds in a strange situation; and to note parallels between strange-situation behavior and behavior reported in other relevant observational, clinical, and experimental contexts.

Let us begin with some definitions and key concepts distinctive of the ethological-evolutionary viewpoint, as proposed by Bowlby (1958, 1969) and Ainsworth (1964, 1967, 1969). An *attachment* may be defined as an affectional tie that one person or animal forms between himself and another specific one—a tie that binds them together in space and endures over time. The behavioral hallmark of attachment is seeking to gain and to maintain a certain degree of proximity to the object of attachment, which ranges from close physical contact under some circumstances to interaction or communication across some distance under other circumstances. *Attachment behaviors* are behaviors which promote proximity or contact. In the human infant these include active proximity- and contact-seeking behaviors such as approaching, following, and clinging, and signaling behaviors such as smiling, crying, and calling.

The very young infant displays attachment (proximity-promoting)

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behaviors such as crying, sucking, rooting, and smiling, despite the fact that he is insufficiently discriminating to direct them differentially to a specific person. These initial behaviors indicate a genetic bias toward becoming attached, since they can be demonstrated to be either activated or terminated most effectively by stimuli which, in the environment of evolutionary adaptability, are most likely to stem from human sources. When these behaviors, supplemented by other active proximity-seeking behaviors which emerge later—presumably through a process of learning in the course of mother-infant interaction—become organized hierarchically and directed actively and specifically toward the mother, the infant may be described as having become attached to her.

The intensity of attachment behavior may be heightened or diminished by situational conditions, but, once an attachment has been formed, it cannot be viewed as vanishing during periods when attachment behavior is not evident. Therefore, it seems necessary to view attachment as an organization of behavioral systems which has an internal, structural portion that endures throughout periods when none of the component attachment behaviors have been activated.

Viewed in the context of evolutionary theory, infant-mother attachment may be seen to fulfill significant biological functions, that is, functions that promote species survival. The long, helpless infancy of the human species occasions grave risks. For the species to have survived, the infant has required protection during this period of defenselessness. It is inferred, therefore, that the genetic code makes provision for infant behaviors which have the usual (although not necessarily invariable) outcome of bringing infant and mother together.

Exploratory behavior is equally significant from an evolutionary point of view. As Hamburg (1968) has pointed out, a prolonged infancy would miss its adaptive mark if there were not also provisions in the genetic code which lead the infant to be interested in the novel features of his environment—to venture forth, to explore, and to learn. The implication is that the genetic biases in a species which can adapt to a wide range of environmental variations provide for a balance in infant behaviors (and in reciprocal maternal behaviors) between those which lead the infant away from the mother and promote exploration and acquisition of knowledge of the properties of the physical and social environment, and those which draw mother and infant together and promote the protection and nurturance that the mother can provide.

The interaction between exploratory and attachment behaviors has been highlighted in field studies of ground-living nonhuman primates (e.g., Southwick, Beg, & Siddiqi 1965; DeVore 1963; Goodall 1965; Schaller 1965) as well as studies of such species in captive colonies (see Hinde, Rowell, & Spencer-Booth 1964, 1967) and in laboratories (e.g., Harlow 1961; Harlow & Harlow 1965; Mason 1965.) Although at first infant and

CHILD DEVELOPMENT

mother are in almost continuous close contact, soon they are in collusion to make more elastic the bonds that unite them. The infant ventures forth to investigate his environment and to play with other infants, and gradually spends more and more time "off" his mother. His expeditions take him further and further away from her, and she becomes increasingly permissive and retrieves him less promptly and less frequently. Alarm or threat of separation, however, quickly bring mother and infant together again.

Naturalistic studies of the attachment-exploration balance are very time consuming; the interaction between the two sets of behaviors must be observed over a wide range of situations. A short-cut alternative is to utilize a controlled strange or unfamiliar situation in which the child, with and without his mother, is exposed to stressful episodes of different kinds. So powerful is this technique in evoking behavioral changes that it is likely to be used with increasing frequency in studies of mother-infant interaction. The ethological-evolutionary view of the attachment-exploration balance is a useful model to use when planning and when interpreting the findings of strange-situation studies.

Of strange-situation studies already reported in the literature, only two have been guided by an ethological-evolutionary point of view. Harlow (1961) used a strange situation to demonstrate the security function of surrogate cloth mothers for infant rhesus macaques. Ainsworth and Wittig (1969) made a preliminary report of the attachment-exploration balance in human 1 year olds. Other studies—Arsenian (1943), Cox and Campbell (1968), Rheingold (1969)—focused on exploratory behavior and reported that the presence of the mother supports it, but paid scant attention to attachment behavior and its hierarchical manifestations in reunion episodes as well as during separation.

The strange-situation procedure provides more than an opportunity to observe how exploratory behavior is affected by mother-present, mother-absent, or other conditions. It is a laboratory microcosm in which a wide range of behaviors pertinent to attachment and to its balance with exploratory behavior may be elicited. Attachment behaviors may be seen as complicated by "negative" behaviors, such as avoidance and aggression. And yet, since the laboratory situation provides but a very small sample of mother-infant interaction, strange-situation findings are not self-interpreting. Perception of the implications of the behaviors that occur in it is facilitated by reference to the findings of other studies—naturalistic, clinical, and experimental. For this reason the ensuing report of a strange-situation study is presented as a useful *illustration* of the shifting balance between exploratory and attachment behavior implicit in the ethological-evolutionary view of attachment. The discussion which follows the presentation refers to relevant findings of other studies. The propositions offered in conclusion comprehend these other relevant considerations as well as the findings of the illustrative strange-situation study.

THE STRANGE SITUATION

In the course of a longitudinal, naturalistic investigation of infant-mother attachment during the first year of life, there was little opportunity in the home environment to observe the balance of attachment and exploratory behaviors under conditions of novelty and alarm. Therefore, a laboratory situation was devised as a test situation to which the Ss were introduced when nearly 1 year old. It was desired to observe the extent to which the infant could use his mother as a secure base from which he could explore a strange environment, with fear of the strange kept in abeyance by her presence. It was also intended to observe the extent to which attachment behavior might gain ascendancy over exploratory behavior under conditions of alarm introduced by the entrance of a stranger and under conditions of separation from and reunion with the mother.

Method

Subjects.—The 56 Ss were family-reared infants of white, middle-class parents, who were originally contacted through pediatricians in private practice. One subsample of 23 Ss, who had been observed longitudinally from birth onward, were observed in the strange situation when 51 weeks old. The second subsample of 33 Ss, studied in the context of an independent project (Bell in press), were observed when 49 weeks old.

Procedure.—The strange situation was comprised of eight episodes which followed in a standard order for all subjects. The situation was designed to be novel enough to elicit exploratory behavior, and yet not so strange that it would evoke fear and heighten attachment behavior at the outset. The approach of the stranger was gradual, so that any fear of her could be attributed to unfamiliarity rather than to abrupt, alarming behavior. The episodes were arranged so that the less disturbing ones came first. Finally, the situation as a whole was intended to be no more disturbing than those an infant was likely to encounter in his ordinary life experience. A summarized account of the procedure has been given elsewhere (Ainsworth & Wittig 1969) but will be reviewed here.

The experimental room was furnished—not bare—but so arranged that there was a 9 × 9-foot square of clear floor space, marked off into 16 squares to facilitate recording of location and locomotion. At one end of the room was a child's chair heaped with and surrounded by toys. Near the other end of the room on one side was a chair for the mother, and on the opposite side, near the door, a chair for the stranger. The baby was put down in the middle of the base of the triangle formed by the three chairs and left free to move where he wished. Both the mother and the female stranger were instructed in advance as to the roles they were to play.

CHILD DEVELOPMENT

In summary, the eight episodes of the situation are as follows:

Episode 1 (M, B, O). Mother (M), accompanied by an observer (O), carried the baby (B) into the room, and then O left.

Episode 2 (M, B). M put B down in the specified place, then sat quietly in her chair, participating only if B sought her attention. Duration 3 minutes.

Episode 3 (S, M, B). A stranger (S) entered, sat quietly for 1 minute, conversed with M for 1 minute, and then gradually approached B, showing him a toy. At the end of the third minute M left the room unobtrusively.

Episode 4 (S, B). If B was happily engaged in play, S was nonparticipant. If he was inactive, she tried to interest him in the toys. If he was distressed, she tried to distract him or to comfort him. If he could not be comforted, the episode was curtailed—otherwise it lasted 3 minutes.

Episode 5 (M, B). M entered, paused in the doorway to give B an opportunity to mobilize a spontaneous response to her. S then left unobtrusively. What M did next was not specified—except that she was told that after B was again settled in play with the toys she was to leave again, after pausing to say “bye-bye.” (Duration of episode undetermined.)

Episode 6 (B alone). The baby was left alone for 3 minutes, unless he was so distressed that the episode had to be curtailed.

Episode 7 (S, B). S entered and behaved as in episode 4 for 3 minutes, unless distress prompted curtailment. (Ainsworth & Wittig 1969, planned a somewhat different procedure for episode 7, which was attempted for the first 14 Ss but, as it turned out, approximated the simpler procedure reported here, which was used for the remaining Ss.)

Episode 8 (M, B). M returned, S left, and after the reunion had been observed, the situation was terminated.

The behavior of the Ss was observed from an adjoining room through a one-way vision window. Two observers dictated continuous narrative accounts into a dual channel tape recorder which also picked up the click of a timer every 15 seconds. (This represents the procedure we now consider standard. For the first 14 Ss, however, the dual channel recorder was not available, so one observer dictated, while the other made written notes. For the second subsample of 33 Ss, author Bell was the sole observer.) The protocols were subsequently transcribed and consolidated, then coded. Reliability of observation was checked by separate codings of the dictated reports made by the two authors in four cases observed by both. Product-moment coefficients of 0.99 were found for each of locomotor, manipulatory and visual exploration, and one of 0.98 for crying.

The narrative record yielded two types of measure. A frequency measure was used for three forms of exploratory behavior—locomotor, manipulatory, and visual—and for crying. A score of 1 was given for each 15-second time interval in which the behavior occurred. The maximum was 12 for an episode, since the standard length of an episode was 3 minutes,

and longer or shorter episodes were prorated. Frequency measures were obtained for episodes 2 through 7. Product-moment reliability coefficients for two independent coders for eight randomly selected cases were as follows: exploratory locomotion, 0.99; exploratory manipulation, 0.93; visual exploration, 0.98; crying, 0.99.

The second measure was based upon detailed coding of behaviors in which the contingencies of the mother's or stranger's behavior had to be taken into consideration. The codings were then ordered into 7-point scales on the assumption that not only could the same behavior be manifested in different degrees of intensity, but that different behaviors could serve the same end under different intensities of activation. There were five classes of behavior thus scored.

Proximity- and contact-seeking behaviors include active, effective behaviors such as approaching and clambering up, active gestures such as reaching or leaning, intention movements such as partial approaches, and vocal signals including "directed" cries.

Contact-maintaining behaviors pertain to the situation after the baby has gained contact, either through his own initiative or otherwise. They include: clinging, embracing, clutching, and holding on; resisting release by intensified clinging or, if contact is lost, by turning back and reaching, or clambering back up; and protesting release vocally.

Proximity- and interaction-avoiding behaviors pertain to a situation which ordinarily elicits approach, greeting, or at least watching or interaction across a distance, as when an adult entered, or tried to engage the baby's attention. Such behaviors include ignoring the adult, pointedly avoiding looking at her, looking away, turning away, or moving away.

Contact- and interaction-resisting behaviors included angry, ambivalent attempts to push away, hit, or kick the adult who seeks to make contact, squirming to get down having been picked up, or throwing away or pushing away the toys through which the adult attempts to mediate her interventions. More diffuse manifestations are angry screaming, throwing self about, throwing self down, kicking the floor, pouting, cranky fussing, or petulance.

These four classes of behavior were scored for interaction with the mother in episodes 2, 3, 5, and 8, and for interaction with the stranger in episodes 3, 4, and 7.

Search behavior was scored for the separation episodes 4, 6, and 7. These behaviors include: 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. Such behaviors imply that the infant is searching for the absent mother either actively or by orienting to the last place in which she was seen (the door in most cases) or to the place associated with her in the strange situation (her chair.)

CHILD DEVELOPMENT

In scoring these five classes of behavior, the score was influenced by the following features: the strength of the behavior, its frequency, duration, and latency, and by the type of behavior itself—with active behavior being considered stronger than signaling. Detailed instructions for scoring these behaviors as well as for coding the frequency measures are provided elsewhere.¹

Reliability coefficients (ρ) for two independent scorers for 14 randomly selected cases were, for behaviors directed to the mother, as follows: proximity- and contact-seeking, 0.93; contact-maintaining, 0.97; proximity- and interaction-avoiding, 0.93; contact-resisting, 0.96; search, 0.94.

Findings

The findings to be reported here are of behaviors characteristic of the sample as a whole. Individual differences were conspicuous, instructive, and significantly correlated with other variables. Some of these have been reported elsewhere (Ainsworth & Wittig 1969; Ainsworth & Bell in press; Bell in press) but they cannot be considered here.

Exploratory behavior.—Figure 1 shows how three forms of exploratory behavior vary in successive episodes from 2 through 7. There is a sharp decline in all forms of exploratory behavior from episode 2 when the baby was alone with his mother to episode 3 when the stranger was present also. (This and all other interepisode differences reported here are significant at the .01 level or better, as tested by the binomial test, unless noted otherwise.) Exploration remains depressed through episode 4 when the baby was left with the stranger. Visual and manipulatory exploration (visual at the .02 level) recover significantly in episode 5, aided by the the mother's attempts to interest the baby again in play, although similar efforts by the stranger in episodes 4 and 7 were ineffective. Visual and manipulatory exploration decline again in episode 6 after the mother departs for a second time, leaving the baby alone. All forms of exploratory behavior decline to their lowest point in episode 7 after the stranger had returned but while the mother was still absent.

To supplement the visual exploration score, which measured visual orientation to the physical environment, visual orientation to the mother and to the stranger were also coded. The only noteworthy findings may be summarized as follows: In episode 2, the baby looked at the toys and other

¹ The following materials have been deposited with the National Auxiliary Publications Service: instructions for conducting the strange situation procedure, instructions to the mother, instructions for coding behaviors for frequency measures, and instructions for coding socially interactive behaviors. Orders NAPS Document 00762 from ASIS National Auxiliary Publications Service, c/o CMM Information Sciences, Inc., 22 West 34th Street, New York, New York 10001; remitting \$3.00 for microfiche or \$1.00 for photocopies.

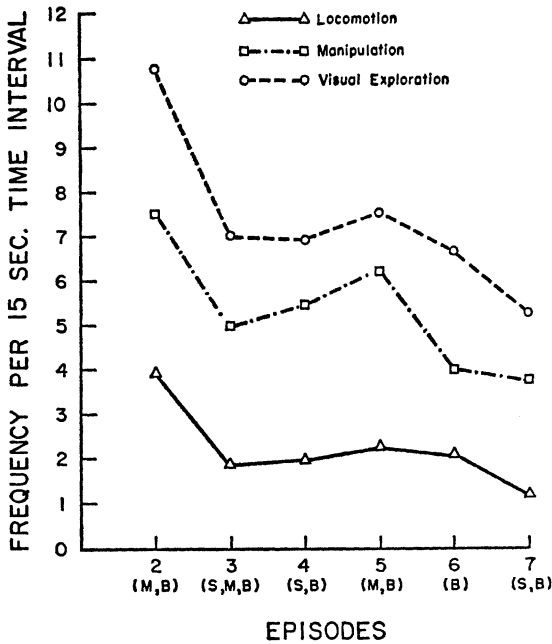


FIG. 1.—Incidence of exploratory behavior

aspects of the physical environment much more frequently than at the mother, at whom he glanced only now and then, keeping visual tabs on her; in episode 3, the stranger, the most novel feature of the environment, was looked at more than the toys, and the mother was looked at no more frequently than before.

Crying.—Figure 2 suggests that the strange situation does not in itself cause alarm or distress, for crying is minimal in episode 2. Crying does not increase significantly in episode 3 ($p = .068$), which suggests that the stranger was not in herself alarming for most Ss, at least not when the mother was also present. The incidence of crying rises in episode 4 with the mother's first departure; it declines upon her return in episode 5, only to increase sharply in episode 6 when she departs a second time, leaving the baby alone. It does not decrease significantly when the stranger returns in episode 7, which suggests that it is the mother's absence rather than mere aloneness that was distressing to most of the babies, and that the greater incidence of crying in episode 6 than in episode 4 is largely due to a cumulative effect.

Search behavior during separation.—The mean strength of search behavior was moderate in episode 4 (3.0), significantly stronger in episode 6 (4.6), and moderate again in episode 7 (2.5). Although this might sug-

CHILD DEVELOPMENT

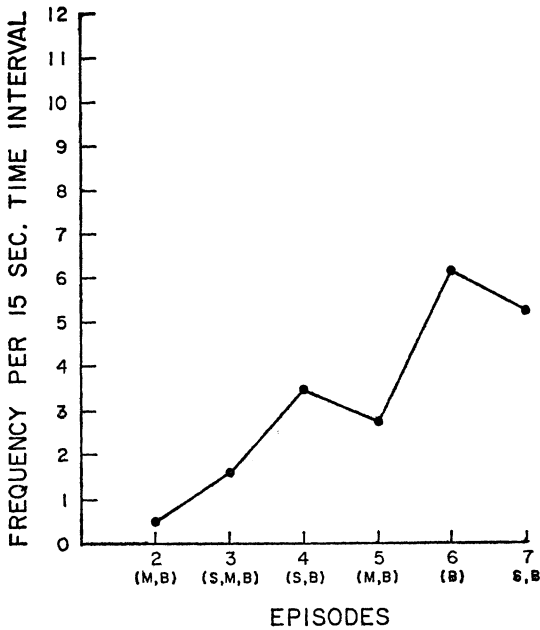


FIG. 2.—Incidence of crying

gest that search behavior is especially activated by being left alone and reduced in the presence of the stranger, this interpretation is not advanced because of the contingencies of the stranger's behavior and her location near the door. Some infants (37 percent) cried minimally if at all in episode 6, and yet searched strongly. Some (20 percent) cried desperately, but searched weakly or not at all. Some (32 percent) both cried and searched. All but four Ss reacted to being left alone with either one or other of these attachment behaviors.

Proximity-seeking and contact-maintaining behaviors.—Figure 3 shows that efforts to regain contact, proximity or interaction with the mother occur only weakly in episodes 2 and 3 but are greatly intensified by brief separation experiences. Contact-maintaining behavior is negligible in episodes 2 and 3, rises in the first reunion episode (5), and rises even more sharply in the second reunion episode (8). In the case of both classes of behavior the increase from episodes 2 through 5 to 8 is highly significant ($p < .001$). Some Ss showed these behaviors in relation to the stranger also. Thus, for example, a few infants approached the stranger in each of the episodes in which the stranger was present, but substantially fewer than those who approached the mother. Some infants were picked up by the stranger in episodes 4 and 7—in an attempt to comfort them—and some of

these did cling to her and/or resist being put down again. Nevertheless proximity-seeking and contact-maintaining behaviors were displayed much less frequently and less strongly to the stranger than to the mother.

Contact-resisting and proximity-avoiding behaviors.—Table 1 shows the incidence of contact-resisting and proximity-avoiding behaviors directed to both mother and stranger. Contact-resisting behavior directed toward the mother occurred very rarely in the preseparation episodes because the mother had been instructed not to intervene except in response to the baby's demands, and therefore episodes 2 and 3 are omitted from the table. In the reunion episodes, some Ss resisted contact with the mother, but many did not. Therefore table 1 shows the incidence of this behavior rather than its mean strength.

About one third of the sample showed contact-resisting behavior to the mother in episode 5, at least to some degree, and about one half showed it in episode 8. All but one infant who scored relatively high (4 or higher) in contact-resisting behavior received a comparably high score on contact-maintaining behavior. Thus, at least when directed to the mother, contact-resisting behavior seems to represent classic ambivalence—wanting to be held, wanting to be close, and at the same time angrily resisting contact.

Contact and interaction with the stranger were also resisted but somewhat less frequently than with the mother. Six Ss showed fairly strong contact- or interaction-resisting behavior (scores of 4 or higher) with both

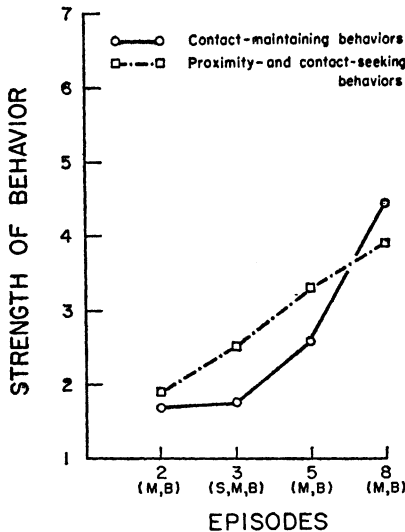


FIG. 3.—Strength of proximity-seeking and contact-maintaining behaviors directed toward the mother.

CHILD DEVELOPMENT

TABLE 1
INCIDENCE OF CONTACT-RESISTING AND PROXIMITY-AVOIDING
BEHAVIOR TO MOTHER AND STRANGER

STRENGTH OF BEHAVIOR	BEHAVIOR TO MOTHER		BEHAVIOR TO STRANGER		
	Episode 5	Episode 8	Episode 3	Episode 4	Episode 7
Resist Contact					
6-7.....	4	6	0	6	7
4-5.....	5	8	5	3	12
2-3.....	9	13	2	3	3
1.....	38	29	49	44	34
Avoid Proximity					
6-7.....	7	5	4	1	1
4-5.....	17	13	7	3	6
2-3.....	3	7	7	1	2
1.....	29	31	38	51	45

stranger in episode 7 and with mother in episode 8, but, for the most part, babies who tended to resist the mother did not resist the stranger and vice versa.

Proximity- and interaction-avoiding behavior did not occur in relation to the mother in the preseparation episodes, for the mother's nonparticipant role made no claim on the baby's attention. But, as shown in table 1, it occurred to some degree in about half the sample in each of the reunion episodes, 5 and 8. About one third of the sample avoided the stranger at some time in episode 3—ignoring her, avoiding meeting her eyes, or moving further away from her. The incidence of these behaviors declined in episode 4, and even in episode 7 remained less than in episode 3. About half the sample avoided neither mother nor stranger, but those who showed this behavior in any strength (score of 4 or over) to one did not show it to the other.

DISCUSSION

These findings illustrate the complex interaction between attachment behavior, response to novel or unfamiliar stimulus objects and situations, and responses to separation from the attachment object and to subsequent reunion. First, let us consider response to novelty. It is now commonly accepted that novelty may elicit either fear and avoidance or approach and exploration, depending both on the degree of novelty and upon circumstances. One of the conditions which facilitates approach and exploration of the novel is the presence, in reasonable but not necessarily close proximity, of the mother—the object of attachment. The infants of the present sample showed little alarm in the preseparation episodes of the strange situation. Their attachment behavior was not activated; they tended not

to cling to the mother or even to approach her. They used her as a secure base from which to explore the strange situation. This finding is not new. Similar observations have been reported by Arsenian (1943), Cox and Campbell (1968), Ainsworth and Wittig (1969), and Rheingold (1969) for human subjects, and by Harlow (1961) for rhesus macaque infants. The presence of the mother can tip the balance in favor of exploring the novel rather than avoiding it or withdrawing from it.

Absence of the mother tends to tip the balance in the opposite direction with a substantial heightening of attachment behavior and concomitant lessening of exploration. During the mother's absence, proximity-promoting behaviors (crying and search) are evident. The mother's return in the reunion episodes did not serve to redress the balance to its previous level. Attachment behaviors—proximity- and contact-seeking and contact-maintaining behaviors—remained heightened. Crying did not immediately subside in many cases and, despite the mother's attempts to evoke a renewed interest in exploring the properties of the toys, exploration remained depressed below its initial level.

It was assumed that separation episodes totaling 9 minutes at most would not have any lasting effect on the balance between attachment and exploratory behavior, and indeed the posttest behavior of the infants tended to confirm this assumption. Nevertheless these minuscule separations evoke behaviors which are similar in kind to those provoked by longer separations, although differing in duration and intensity. The behavior of these 1-year-old humans in response to separations lasting only a few minutes bears remarkable resemblance to the behavior of infant monkeys in response to separation for longer periods—a week (Spencer-Booth & Hinde 1966) or a month (Kaufman & Rosenblum 1967). In these experiments the mother was removed, and the infant left in his familiar social group. Attachment behavior, including distress calling and search for the mother, was heightened, and exploratory and play behavior was depressed during the separation. The infants responded more intensely to frightening stimuli during separation than when the mother was present. As separation continued there was some lessening of the intensity of distress and search, and some recovery of exploration and play—a recovery not manifest by the human infants in this sample in their very brief separations. When the mother was restored, however, the infant monkeys clung to her more and explored less than they had before separation—differing in this from nonseparated controls—and these effects lasted for three months or more.

The response of infant monkeys to experimental separations strongly resembles the behavior of young children, aged from 8 months to 3 years, when they undergo separations of several days, weeks, or even months away from home in hospitals or residential nurseries. Robertson and Bowlby (1952), Bowlby (1953), Schaffer (1958), and Heinicke and Westheimer (1965) have shown that the child is at first acutely distressed, protests the

CHILD DEVELOPMENT

separation, and attempts to regain the mother by all means at his disposal. This initial phase of response tends to give way to despair, which in turn may give way—if the separation endures long enough—to a brightening of affect and renewed responsiveness to companions and to things in the environment. Attachment behavior directed toward the mother may have disappeared, but reunion with the mother tends to reactivate it and indeed to intensify it beyond its pre-separation level. This heightened level tends to persist for a more or less prolonged period, usually much longer than the separation itself. During the period after reunion when the child's attachment behavior is heightened, he is focused on his mother, attends less to other people and to things in his environment, explores less, and presumably learns less. An unduly prolonged heightening of attachment behavior may be viewed as a distortion of the attachment-exploration balance. Some long-term follow-up studies (e.g., Bowlby, Ainsworth, Boston, & Rosenbluth, 1956) suggest that this kind of behavior, often described as overdependent, may in some instances be a lasting effect of long, depriving separations.

Let us turn from attachment behavior to consider those behaviors that work against contact- and proximity-seeking, namely, contact-resisting and proximity- and interaction-avoiding behaviors. Contact-resisting behavior, as directed toward the mother, usually occurred in conjunction with contact-seeking behavior, and hence, as suggested earlier, implies an ambivalent response. Ambivalent or rejecting and angry responses are reported as common in young children returning home after brief separations (e.g. Heinicke & Westheimer 1965.) Separation heightens aggressive behavior of this kind as well as attachment behavior, and predisposes the child toward angry outbursts upon minimal provocation. Spencer-Booth and Hinde (1966) report similar increase of aggression in monkeys: Unusually intense tantrums occur in response to any discouragement of contact-seeking behavior during the period of reunion after separation. Some of our strange-situation Ss showed contact-resisting behavior toward the stranger. Although in some cases this may indicate fear of the strange person, it seems likely that in some, perhaps most, it is a manifestation of aggression evoked by the mother's departure.

Proximity-avoiding behavior, on the other hand, seems likely to stem from different sources in the case of the stranger than in the case of the mother, even though the overt behavior seems the same in both cases. Ignoring the stranger, and looking, turning, or moving away from her probably imply an avoidance of the unfamiliar and fear-evoking person. This is suggested by the fact that these responses are more frequent (as directed toward the stranger) in episode 3, when the stranger has first appeared, than in later episodes. Similar avoidance of the mother cannot be due to unfamiliarity, and seems unlikely to be caused by fear. Such behavior occurs in the reunion episodes, and is more frequent than avoidance of the stranger.

Proximity- and interaction-avoiding behavior in relation to the mother is shown in striking form by some young children upon reunion after separations lasting for weeks or months. Robertson and Bowlby (1952) and Heinicke and Westheimer (1965) report that some children do not seem to recognize their mothers upon reunion, and that for a longer or shorter time they remain distant from her and treat her like a stranger. Bowlby (1960) has termed this kind of distancing "detachment." During a prolonged separation, detachment tends to succeed protest and despair reactions, and after reunion it may persist for a long time—even indefinitely in cases in which separations have been very long and depriving. Such behavior has not yet been reported in nonhuman primates—perhaps because their experimental separations have been brief, perhaps because of species differences.

Avoidance responses of the kind observed in the strange situation in relation to the mother—looking away, turning away—may be detachment in the making and so constitute a primitive kind of defense. The constellation of individual differences in the strange-situation sample supports this hypothesis, although it is impossible here to present detailed evidence.

It may be pertinent, however, to refer to a similar looking-away response found in two experiments on the conditioning and extinction of attachment behaviors. Brackbill (1958) worked with the smiling response. During the conditioning period she provided contingent reinforcement for smiling by responding socially to the baby each time he smiled—and smiling increased in frequency. During the extinction period she met the baby's smile with an impassive face. Not only did the frequency of smiling decrease, but when the experimenter failed to respond to a smile, the baby fussed and looked away. It became increasingly difficult to catch the baby's eye. He looked away from the person who had previously reinforced his attachment behavior but who no longer did so. Similar results are reported for an experiment on babbling by Rheingold, Gewirtz, and Ross (1959).

These findings highlight the fact that in extinction—as indeed learning theorists have often themselves emphasized—there is an active process of blocking the response by another, antithetical behavior, rather than or in addition to the weakening of the strength of smiling (or babbling) behavior itself. This suggests that detached behavior may consist of responses, incompatible with attachment behavior, which have, often temporarily, gained the greater strength. That attachment can endure despite a period of detachment is shown by the strength with which attachment behavior can break through into overt expression in the case of young children who do not at reunion seem to recognize their mothers, but who subsequently manifest much heightened proximity-seeking and contact-maintaining behavior.

In summary, continuities have been noted between attachment and

CHILD DEVELOPMENT

exploratory behavior and their activating and terminating conditions, observed in the microcosm of the laboratory strange-situation, and similar behaviors and conditions as reported by field studies, clinical studies, and experimental studies for both humans and nonhuman primate subjects. It is urged that the concept of attachment and attachment behavior employed as a guide in future studies be given a broad enough perspective to comprehend the spectrum of findings relevant to attachment which have been sampled in this discussion.

PROPOSITIONS FOR A COMPREHENSIVE CONCEPT OF ATTACHMENT

The following propositions are suggested as essential to a comprehensive concept of attachment. They are based on an ethological-evolutionary point of view, and have been formulated on the basis of reports of a broad range of investigations, including naturalistic studies of mother-infant interaction, and studies of mother-child separation and reunion in both human and nonhuman primates, as well as the illustrative strange-situation study reported here.

1. Attachment is not coincident with attachment behavior. Attachment behavior may be heightened or diminished by conditions—environmental and intraorganismic—which may be specified empirically. Despite situationally determined waxing and waning of attachment behavior, the individual is nevertheless predisposed intermittently to seek proximity to the object of attachment. It is this predisposition—which may be conceived as having an inner, structural basis—that is the attachment. Its manifestations are accessible to observation over time; a short time-sample may, however, be misleading.

2. Attachment behavior is heightened in situations perceived as threatening, whether it is an external danger or an actual or impending separation from the attachment object that constitutes the threat.

3. When strongly activated, attachment behavior is incompatible with exploratory behavior. On the other hand, the state of being attached, together with the presence of the attachment object, may support and facilitate exploratory behaviors. Provided that there is no threat of separation, the infant is likely to be able to use his mother as a secure base from which to explore, manifesting no alarm in even a strange situation as long as she is present. Under these circumstances the relative absence of attachment behavior—of proximity-promoting behavior—can not be considered an index of a weak attachment.

4. Although attachment behavior may diminish or even disappear in the course of a prolonged absence from the object of attachment, the attachment is not necessarily diminished; attachment behavior is likely to reemerge in full or heightened strength upon reunion, with or without delay.

5. Although individual differences have not been stressed in this discussion, the incidence of ambivalent (contact-resisting) and probably defensive (proximity-avoiding) patterns of behavior in the reunion episodes of the strange situation are a reflection of the fact that attachment relations are qualitatively different from one attached pair to another. These qualitative differences, together with the sensitivity of attachment behavior to situational determinants, make it very difficult to assess the strength or intensity of an attachment. It is suggested that, in the present state of our knowledge, it is wiser to explore qualitative differences, and their correlates and antecedents, than to attempt premature quantifications of strength of attachment.

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CHILD DEVELOPMENT

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