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ABSTRACT

Because of the sparcity of research on infants' response to social events, especially different categories of people, infants between 8 and 18 months of age were introduced to five different social events: strange adult male and female, strange 4-year-old female, mother, and self. The infants' responses indicated that approach affects stimulus differentiation (in terms of fear), while age affects level of response intensity. Strangeness of the social event was not sufficient to explain the results, and ethological and cognitive theories are discussed. It is suggested that the cognitive construct of self be introduced to explain the results. It appears reasonable to assume that by eight months the self as differentiated from other is well established, and some specific categories of self, such as size, sex, or efficacy, may also be established. (Author/LH)

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RESEARCH BULLETIN

Self, Other, and Fear: The Reaction of Infants to People

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Educational Testing Service
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Michael Lewis and Jeanne Brooks-Gunn

Abstract

The investigation of infants' responses to strange has not been very well examined. Particularly, almost no work has been done on infants' responses to social events: different categories of people. Infants between 8 and 18 months of age were introduced to five different social events: strange adult male and female, strange 4-year-old female, mother, and self. The infants' responses indicated that approach affects stimulus differentiation (in terms of fear), while age effects level of response intensity. Strangeness of the social event was not sufficient to explain the results, and ethological and cognitive theories were discussed. It was suggested that the cognitive construct of self be introduced to explain the results. It appears reasonable to assume that by 8 months the self as differentiated from other is well established. Moreover, we propose that some specific categories of self, such as size, sex, or efficacy, may be established as well.

Self, Other, and Fear: The Reaction of Infants to People[1]

Michael Lewis and Jeanne Brooks-Gunn

Educational Testing Service

Princeton, New Jersey

The fears of infants is an important area of inquiry, for it sits squarely on the domains of affect, cognitive and social development. The infant's reactions to other persons may be said to have an affective component: fear of strangers may be an index of attachment. Although attachment usually is defined by a positive approach to the mother, as measured by proximal and distal behaviors (Coates, Anderson & Hartup, 1972; Lewis & Ban, 1971), or by separation from the mother as measured by distress (Ainsworth & Bell, 1970; Goldberg & Lewis, 1969; Schaffer & Emerson, 1964), attachment may also be explored by examining the infant's responses to other persons, either when the mother is or is not present.

Fear of the strange may also be related to cognitive development. Indeed, the theoretical work of Hebb (1946, 1949), as well as of Piaget (1952) and others (Schaffer, 1966), has argued for a relationship between fear and novelty. Moreover, there may be a more indirect relationship, such as increased cognitive capacity leading to greater differentiation, thus producing more strange.

While the strange can include objects and events as well as people, most of the work on fear of the strange has involved people. We will only mention in passing that loud noises, in fact, intensity in general, have the possibility of frightening the infant (see Scarr & Salapatek, 1970). It is not our intention to deal with this dimension of stimulus events. As we have stated before (Lewis, 1971) this stimulus dimension adds little to our understanding of the infant's cognitive development since it acts upon the infant, and, as James

(1895) has stated, the infant's response is an immediate passive sensorial response. Rather, we are interested in stimuli that are defined by the interaction of the organism and the stimulus event (novelty and familiarity are examples of such interaction). We shall restrict our discussion further to include only the infant's social world, leaving out the study of nonsocial stimuli.

Fear of strangers or stranger anxiety has been studied, most of the work growing out of the ethological-attachment literature (Ainsworth & Bell, 1970; Schaffer & Emerson, 1964). Fear of strangers usually appears in the second half of the first year and extends, for some, long into the second year. While the ethological-imprinting position would argue for fear of strangers as a way of binding the infant to his caregivers, we recognize, as do Rheingold and Eckerman (1971), that not all infants exhibit fear of strangers. Some infants may show only signs of wariness or differential smiling towards unfamiliar people.

For all the current research on fear in infancy, there has been relatively little effort directed toward the social dimensions which elicit fear. Thus far, age of onset, number of infants exhibiting fear, and specific fears of animate objects have received the most attention. We are interested in the infant's fearful response to people, that is, it is the dimension of humanness that we wish to study. While humans and masks have been studied, only one study, that of Morgan and Ricciuti (1969), touches upon the dimensions that interest us. In this study a male and female stranger were used, and the data reveal that the infants were more frightened of the male. No information about the strangers was given. We do not know the sizes and shapes of each, but yet the data suggest differential fear as a function of the nature of the

social event. It is to this point that our study is directed. More concretely, our current study comes from an observation of an 8-month-old female. We observed that an approach by an adult stranger produced extreme fear. The infant screamed, cried, and tried desperately to escape. How different when a stranger 3 or 4 years old approached her: smiling, cooing, and reaching behavior was then exhibited. Why should this be--they were equally strange? Would this hold for children who were generally fearful? What does this mean for the cognitive functioning of the infant, let alone its significance for any theory of attachment? As a first step, this casual observation had to be repeated and extended.

In this study we were interested in the infants' responses to five different social events: a strange adult male and female of the same physical size, a strange female child 4 years of age, the infant's mother, and the infant itself. Twenty-four infants, 7-19 months old, were each placed in a pleasant room which was carpeted and had a few pieces of furniture and pictures on the wall. Only infants who were first-born or who had siblings over 5 years of age were included; 20 were first-born. The infant was seated in an infant tenda facing a door about 15 feet away. The mother sat next to the child. Each of the three strangers, one at a time, would first knock on the door. The mother would say "come in," and each would enter at the far end of the room. The stranger slowly walked toward the infant. Having reached the infant, the stranger would touch the infant's hand. Throughout the episode the stranger smiled but did not vocalize. Movements were deliberately slow to avoid eliciting startle responses. After touching the infant, the stranger slowly turned, walked to the door and left the room. The second and third strangers

followed the same procedure. There was approximately a 2-minute wait between visits or until the infant was quiet. After the strangers, the mother went to the door and walked toward the infant in the same manner as the strangers. For the infant-itself condition it was necessary for the infant to see itself. A mirror was used, and to avoid the effect of novelty, the mirror did not approach the infant (mirrors do not walk); rather, the infant approached the mirror. To do this, the mother moved the tenda so that it was directly in front of a mirror placed at the opposite end of the room. She slowly moved the tenda toward the mirror so that the infant was able to see his reflection without observing his mother. When the tenda touched the mirror, the mother moved away. The order was balanced for the three-stranger conditions and between the mother and self conditions.

Three behavioral scales--facial expression, vocalization, and motor activity--were used to rate the infants' reactions to the stranger conditions. The checklist (see Appendix) is similar to the one developed by Morgan and Ricciuti (1969). The infants' responses were measured at four distances. Distance 1, the farthest distance, was when the stranger entered; distance 2 (middle) was when the social event was in the middle of the room; distance 3 (close) was when the event was 3 feet from the infant; and distance 4 (touch) was when the event touched the infant. Observer reliability was measured by the proportion of agreements for two observers who were hidden behind a one-way mirror. The mean percentage of agreement across both the facial and motor scales was .90.

Insert Figures 1 and 2 about here

The vocalization scale proved worthless in that there was almost no vocalizing, crying, or fretting. The data to be presented are those for the facial and motor scales, the results of which were almost identical.

The mean data for the five social events are shown in Figure 1. A score of 3 indicates a neutral response, with 1 being the most negative and 5 being the most positive responses possible. This figure is a combination of the two scales. For the facial expression scale this varied from a broad smile to a puckering crylike expression, while for the motor scale this varied from reaching toward the social event to twisting away from the event and reaching to mother.

The data are rather obvious. Affective social differentiation increases with proximity. Thus, there are no affect differences toward the various social events at the farthest point and affect increases with approach. Social stimuli differ in their effect on the positive and negative affect of the infant. The male and female strangers elicit the most (and only) negative response, while the child stranger elicits a positive response. Moreover, the mother and self elicited the most positive responses. In an analysis of variance with social events and distance as the principal effects, stimulus distance, and stimulus x distance interaction were highly significant ($F = 11.25$, $p < .001$, $F = 16.10$, $p < .001$, $F = 18.04$, $p < .001$ respectively).

These findings are consonant with Morgan and Ricciuti's (1969) data and indicate that infants do not exhibit either negative or positive responses until the social event approaches or is in close proximity. This makes good sense since it is a compromise between the need to flee (something strange can hurt) and the need to experience newness in order to alter cognitive

structures. The rule might be stay and attend as long as the event does not get close; if it approaches, withdraw. Fear and negative affects may be in the service of this escape behavior. Why, though, does the infant not show the positive affect earlier? In order to maintain a parsimonious explanation, we would need to postulate that the intensely positive affects may also interfere with cognitive processes so that they too are only elicited at approach or proximity when social interaction becomes necessary. Of course, a simpler explanation would be related to a time lag notion, wherein the expression of affect, either positive or negative, takes more time. If the social event had waited at the door, would not the same affect have occurred? Morgan and Ricciuti (1969) controlled for this time effect and found it not relevant. On the strength of their results we must reject this hypothesis.

Insert Figure 3 about here

Differentiation of responses to the various social events is also related to age as well as to distance. When the sample is divided by median age, 12 Ss are between 7 and 11.5 months of age and 12 Ss are 12-19 months old. We realize that the small sample size and the arbitrary division of the infants into two age groups limits generalization; however, interesting age differences emerge (see Figure 3). While the patterns for the two age levels are similar, older infants exhibit a greater range of responses than do the younger ones. The older infants are more positive to the self, mother, and child, and are more negative toward the female and male strangers. It is only in amount of negative affect that the two ages are significantly different by t-test ($p < .05$ for male plus female strangers) although there is a trend indicating that they also exhibit more positive affect ($p < .10$). It is interesting to

note that these age differences are only found when the social event is in close proximity. The greater age and presumably greater cognitive development of the infants more than one year old did not result in prompter affective response. Approach determines the timing, while age affects the intensity of the response.

Age differences in the intensity of fear responses have also been found by others (Morgan & Ricciuti, 1969; Scarr & Salapatek, 1970) and may be influenced by perceptual-cognitive development. However, Scarr and Salapatek (1970) and Schaffer (personal communication) found no relationship either between fear of a female stranger and object permanence (when the age variance was controlled) or between fear of strangers and attention. While these may not be the relevant perceptual cognitive dimensions necessary for eliciting fear, these failures raise the question of what cognitive capacities are relevant to affective responses to social events. While discrimination between familiar and strange is essential, this may be so low a level of cognitive skill that all infants are capable of it and it is not really relevant to the study of the affective responses.

Insert Figure 4 about here

The sex of the infant may be related to the affective response to social events. The negative and positive responses of the boy and girl infants are remarkably similar except for their response to the male stranger. While the infants in general are more frightened of the male stranger, this effect is mostly produced by the girls. It is the girls who seem most frightened by the strange male. This is interesting in light of recent findings in our

laboratory (Ban & Lewis, 1971). When one-year-old infants were seen in a playroom with both their mothers and fathers, the girl children appeared to be more reluctant to interact with their fathers than the boys--especially in terms of the distal mode of looking! Although these present results are not significant, they raise the interesting questions of why infants are frightened more of a male stranger and why this is more true of females. No explanation based solely on low levels of paternal interaction as compared to mother's interaction can account for this latter sex difference.

How are we to account for the negative affect directed toward the adult strangers and the positive affect directed toward child stranger and to the mother and self? We would expect fear of the stranger; thus, the negative expression toward the adult strangers comes as no surprise. However, if it is strangeness alone that elicits fear or negative affect, why no fear (in fact, a positive affect) toward the child stranger? This brings into question the whole incongruity hypothesis. Consider the incongruity argument in relation to affect.[2] Briefly, it states that events that are highly incongruent will be those which produce fear, while those that are only partially incongruous will produce little fear. For example, the head of a monkey shown to other monkeys produces extreme fear because of its incongruity (Hebb, 1946). If the judgment of congruity is made with the mother as the referent, then the strange female is least incongruent, the strange male more so, and the strange female child most. Thus, the child stranger should produce the most fear. In fact, the child stranger produces no fear but positive affect. Incongruity may not be the sole determinant of fear. On the other hand, the mother may not be the only referent for the infant in his observation of social events.

Recall that infants also show positive affect to themselves. We will return to this issue of self shortly.

These data also suggest that we reconsider our formulation about the fear of strangers in infants. It now becomes clear that we cannot state that all strange social events that approach infants will elicit the same degree of negative affect. That is, strangeness per se is not a sufficient dimension. The social dimensions or space that elicits fear is multi-dimensional. Strangeness is necessary, but not sufficient. What are the characteristics of the child stranger that do not elicit fearful responses? Two appear most likely; the first is size. Clearly, the child stranger is smaller than the adults; also, the child stranger is closer in size to the infant, especially one sitting in a baby tenda. Ethologically it makes sense to postulate that organisms should be more frightened of strange things that are bigger, than of same size or smaller strange things. Same size or smaller things are less likely or able to hurt. The second dimension is the differential facial configuration between a young child and an adult. Perhaps this is the cue. Observation of the verbal responses of a 12-month-old as she looks through magazines and newspapers containing pictures of adults (these pictures were, of course, miniature) reveals the widely used word "baby" as she points to the figures, suggesting that she was responding to the size of the picture rather than the facial configuration. Whatever the explanation of why the infants were not upset by the child stranger, it is clear that a simple incongruity explanation fails to satisfy the data and that the space of social strangeness is multidimensional, unfamiliar being just one dimension.

The infant's highly positive response to the mother is as we expected; however, the equally positive response to themselves in the mirror is somewhat

more interesting. By using the term self we have been making an explicit assumption, one which was quite intentional. There is relatively little information on infants' responses to mirrors, but the anecdotal evidence that does exist all indicates that even at earlier ages there is an intense positive affective response to the mirror. In a recent study of 4-month-olds by Rheingold (1971), further evidence for the positive effect of seeing oneself in the mirror was reported. These infants showed more smiling to a mirror image than to either motion pictures or slides of an infant or to nonsocial stimuli.

Can one talk about the concept of the self at such early ages? Consider two aspects of the self: the first and most common is the categorical self (I am female, or I am intelligent, or I am big or small, or I am capable); the second, and by far the more primitive, is the existential statement "I am." The basic notion of self--probably as differentiated from other (either as object or person, the mother being the most likely other person)--must develop first. There is no reason not to assume that it develops from birth and that even in the early months some notion of self exists. We would argue that this nonevaluative, existential self is developed from the consistency, regularity, and contingency of the infant's action and outcome in the world. Self is differentiated by reafferent (or information) feedback; for example, each time a certain set of muscles operate (eyes close), it becomes black (cannot see). That is, the immediacy, simultaneity, and regularity of action and outcome produces differentiation and self. The action of touching the hot stove and the immediacy of the pain tells me it's my hand that is on the stove. This self is further reinforced if, when I remove my hand, the pain ceases. The infant's world is full of such relationships and they vary from

its own action on objects to its relationship with a caregiver. In these social interactions, the highly directed energy of the caregiver (touch, smile, look, etc.) is contingent and specific to infant action (smile, coo, etc.).

The relationship of self to the mirror is, likewise, related. Looking in the mirror is pleasurable because of the consistency, regularity, and contingency of the viewer's action and the viewed outcome. In no other situation is there such consistent action-outcome pairing. In other words, the mirror experience contains those elements that generally make up the fabric of the infant's growing concept of self. It is not possible for us to know if the infant is aware that the image is himself. Awareness is a difficult concept to study in nonverbal organisms, but it is clear that by the time one-word utterances emerge, such as "self" or "mine," the year-old infant has the concept of self. It is reasonable to assume that the concept existed prior to the utterance. In fact, if we consider the research on the development of object permanence (for example, Charlesworth, 1968), we find that, for the most part, object permanence has been established by 8 months of life, in many cases even earlier. If the infant has the cognition available to preserve memory of objects no longer present, how can we deny them the ability to have self-permanence? Indeed, is it reasonable to talk of object permanence capacity without self-permanence capacity? Given that this first self-other distinction is made very early, the various categorical dimensions of self may also proceed to unfold. The unfolding of the categories, whether sequential, hierarchical, etc., and the dimensions of the various categories are uncertain.

Is our understanding of the phenomenon of fear helped by evoking the concept of self? We would argue, yes. For example, Hebb's (1949, p. 243) study on the fear of monkeys could be explained by this concept. Consider the monkeys were fearful because they saw a monkey without a body and they were aware that they, too, were monkeys. Maybe they too could lose their heads to a mad professor. Would not humans placed in a similar situation show fear for their lives or safety?[3] In terms of our data, the notion of self also helps in explaining the data. Perhaps female infants are more frightened than male infants of male adult strangers because, while they are equally strange, the male infant recognizes that the male adult is more like himself. The specific category of self in this case may be gender. The Money, Hampson and Hampson (1957) data on sexual identity suggest that a year-old infant may already possess this category.

That there was a positive response to the child stranger and negative responses to the adult strangers is difficult to explain in any incongruity hypothesis unless we consider that the referent for the social comparison does not always have to be the infant's mother. There could be multiple referents, one of them being the mother, another being the self. Perhaps the positive response to the child stranger is produced because infants find the child like themselves; that is, they use themselves as referent and find the child like them and are therefore not afraid. In this case the categorical dimension of self may have to do with size. I am small vis-à-vis other social events and the child is also small, therefore, like me.[4]

The present data are clear; at least for the social events used, there was significantly different affect elicited as these events approached. The

dimensions on which these social events can be ordered are not at all clear. The most likely candidate for the differences between adults and child is size, but since both adults were the same size, the male-female differences cannot be accounted for by this dimension alone. We view this experiment, then, as a beginning in the study of the dimensions and consequences of social events. Clearly more work is necessary.

In this discussion of fear two major theoretical positions have been evoked, and it would help to clarify the discussion by stating them explicitly. These are the ethological and cognitive approaches. The ethological position rests less (if at all) on a cognitive and more on an imprinting, IRM, instinctual approach. The argument for the present data would be as follows: infant imprinted on parents; all others, strange. Strange at a distance→observe, but do not flee. Strange approach→flee. The only caveat would be that strange has to be bigger than the organism. This model requires the use of no or little cognitive process, and following the ethological approach is rather mechanistic in nature.

The cognitive approach, on the other hand, invokes concepts such as incongruity, novelty and familiarity, and schema. These all rest on the interaction between the organism's past and its present experiences. Moreover, the cognitive approach requires the introduction of such processes as object permanence, at least in terms of remembering the mother. This approach stresses that the child's response to strange is a part of the larger emerging cognitive functions. We would extend this position by considering the concept of self and using it as an additional referent in terms of social interactions and cognitions. While the ethological approach has intrinsic appeal--especially

since it evokes a biological simplicity--it is difficult for us to consider infants not responding through the use of the elaborate cognitive functions which we know are already available to them.

Before concluding this paper, we should like to return to the most interesting of our findings, that of the infant's response to the child. The positive response of the infants to the child stranger is consistent with other primate evidence, all of which suggests that infant-peer interactions may have a special quality. It is well known that infants often follow and learn faster from an older sibling (peer) than from their parents. In fact, peers may serve quite well as adult substitutes in the early attachment relationships (for example, Chamove, 1966; Freud & Dann, 1951). Infants not only show little or no fear toward peers, but, in fact, can engage in a meaningful attachment behavior. We would suggest that these facts have importance for a general theory of interpersonal relationships.

The following speculations are based on these considerations. Phylogenetically, attachment relationships have changed from infant-peer to infant-adult dyads. Phylogenetically lower organisms' attachment behaviors are between peers of the specie. This is especially true if we consider that at the lower end of the scale most information the organism needs for survival is prewired into the system. All that is necessary for the developing specie is to practice these skills as they unfold. It would be more logical to practice these skills with someone also somewhat less proficient, for the skills of the adult would be too overwhelming. Moreover, since the adult has little or nothing to teach the infant, there needs to be little attachment to an adult. This would suggest that among birds, for example, the young could

be as easily or more easily imprinted on a peer than on an adult member. Whom are the ducklings imprinted on as they swim single file on the pond? The "mother" or the young duckling in front of them? As we proceed along the phylogenetic scale, learning becomes more important for the survival of the organism. As such, peers who are good for practicing present skills are no longer sufficient, and adults who are good in teaching new skills are needed. Thus, attachment on adults rather than peers becomes increasingly important. Single births and long periods of relative helplessness facilitate the infant-adult relationship; however, the data make clear that if infant-peer relationships can be sustained (as, for example, in laboratory colonies) infant-peer relationships satisfy many of the socioemotional requirements (Harlow & Harlow, 1969; Harlow, Harlow & Suomi, 1971). Its effect on learning, however, should be inhibiting.

The implication for caregiving is vast. We might argue that infant-peer relationships are not substitutes for infant-adult, but rather, are more basic, at least older in a phylogenetic sense. Small families isolated from one another may constitute a rather unique and new experience, not only for the caregivers, but for the infants themselves.

We have come a long way from the observations of the terrified 8-month-old. But we have collected information to indicate that infants of this age are not frightened of young children and often seek and are sustained by their company. In some sense they appear to be attached to all peers, familiar and strange. The social commerce with adults, however, is restricted to those that are familiar, and even then they often prefer their peers. Any theory of interpersonal relationships and fear of social events must come to grips with these facts.

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Footnotes

[1]Paper presented at Eastern Psychological Association meetings, Symposium on Infants' Fear of the Strange, Boston, April 1972. This research was supported in part by a Grant from the Spencer Foundation and by the National Institute of Child Health and Human Development, under Research Grant 1 P01 HD01762. Thanks are due to Marcia Weinraub and Gina Rhea who helped to formulate the problem and collect the data.

[2]The effect of incongruity on attentive behavior is still being explored. It is important to note that incongruity may produce little attention not because of any cognitive reason but because it produces fear which might result in withdrawal. Gaze aversion is one type of withdrawal.

[3]The Gardners report that in their study of sign language in the chimpanzee, the animal exhibits the concept of self. When shown a mirror Washoe responded with the signs "me Washoe." Thus, it is not unreasonable to attribute the concept of self to other primates.

[4]While there is no direct data to support this, there is a strong suggestion to be found in the data. A correlation matrix was obtained by comparing the children's response consistency across the five social events at the touch distance. As was to be expected, infants who were very fearful of the male stranger were also fearful of the female stranger ($r = .71$, $p < .001$); however, there was no significant relationship between the self and mother ($r = .12$). Thus, while the two strangers were treated alike, the self and mother were not. Moreover, as expected, high negative responses to the adult strangers were associated with more positive responses to both mother and the self; however, they were on the average more than twice as highly associated for the self ($r = -.47$, $p < .05$) than for mother ($r = -.22$).

Figure Captions

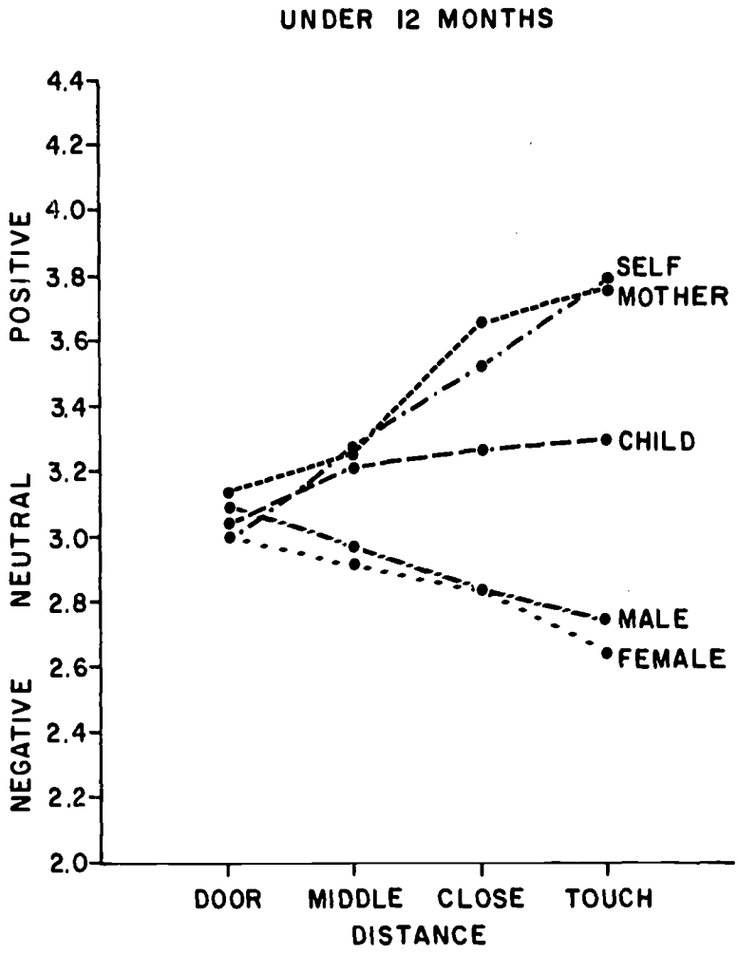
Fig. 1. Mean facial and motor responses to the five social events for all infants. A score of 3 indicates a neutral response. Scores less than and more than 3 indicate negative and positive responses respectively.

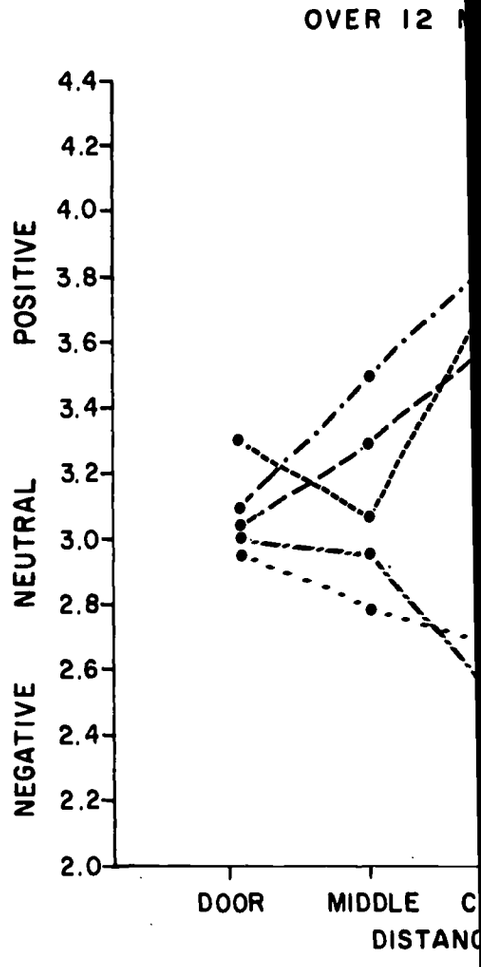
Fig. 2. Mean facial responses to the five social events for all infants.

Fig. 3. Mean facial and motor responses to the five social events for infants less than and more than 12 months of age.

Fig. 4. Mean facial responses to the five social events for male and female subjects.

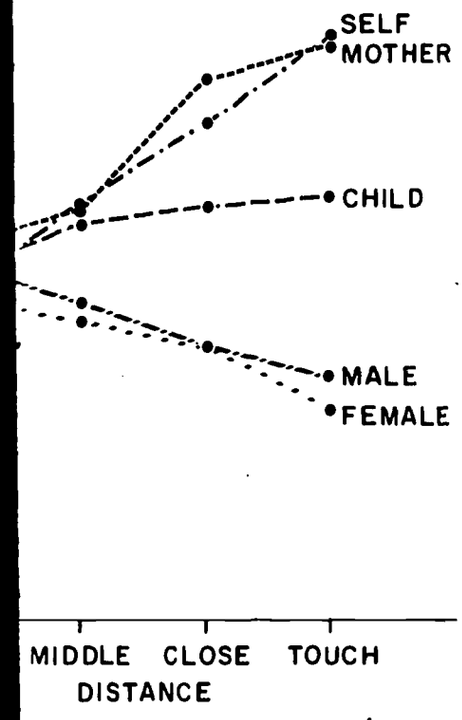
FACIAL & MOTOR RESPONSES



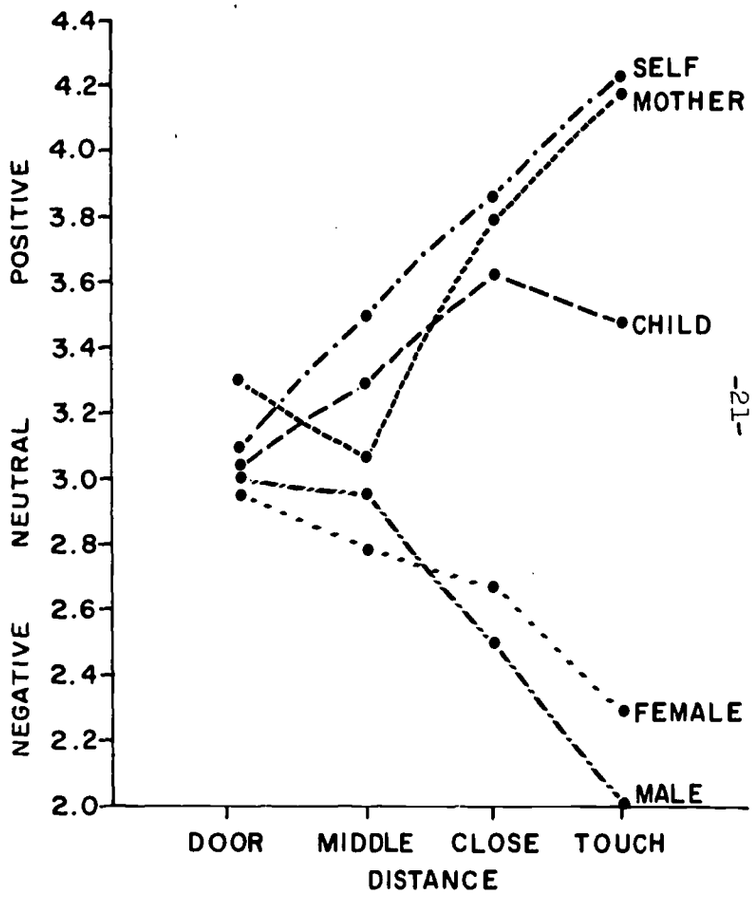


FACIAL & MOTOR RESPONSES

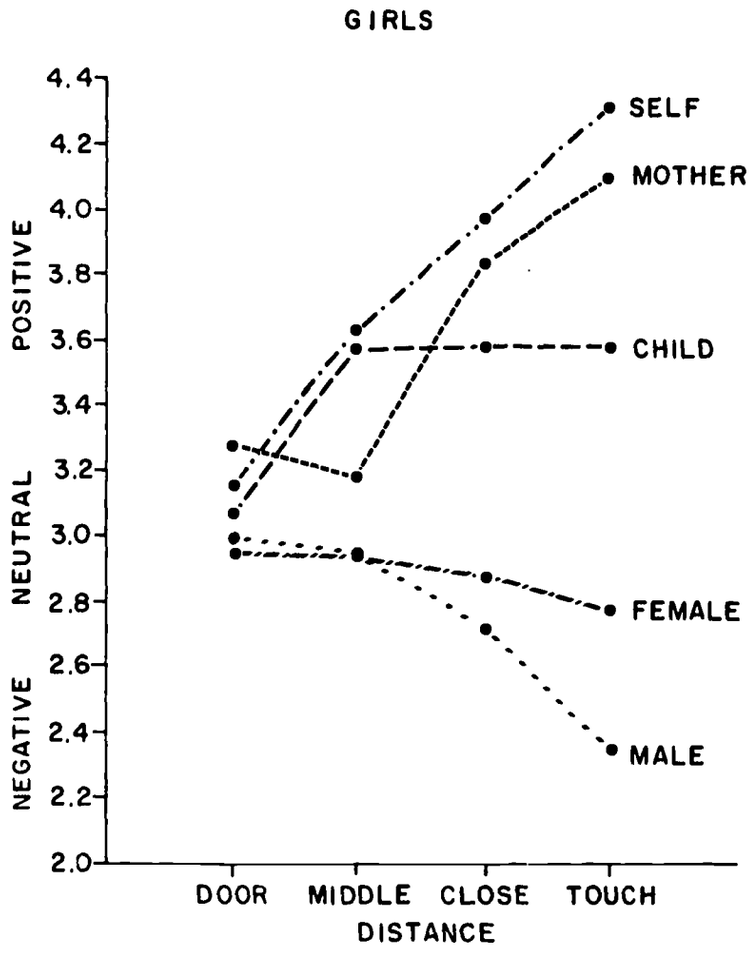
UNDER 12 MONTHS

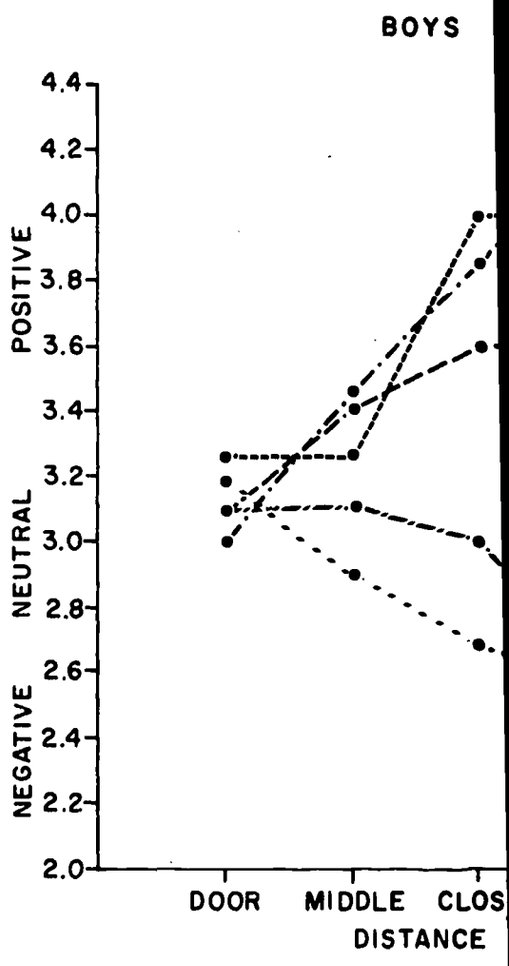


OVER 12 MONTHS



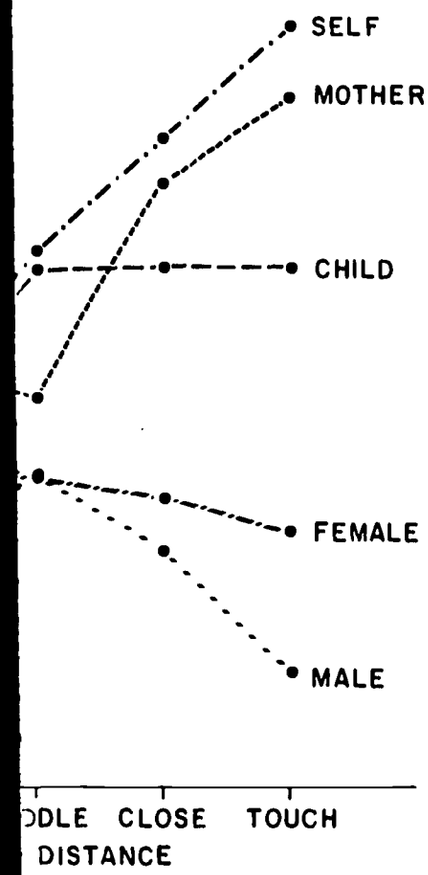
FACIAL RESPONSE



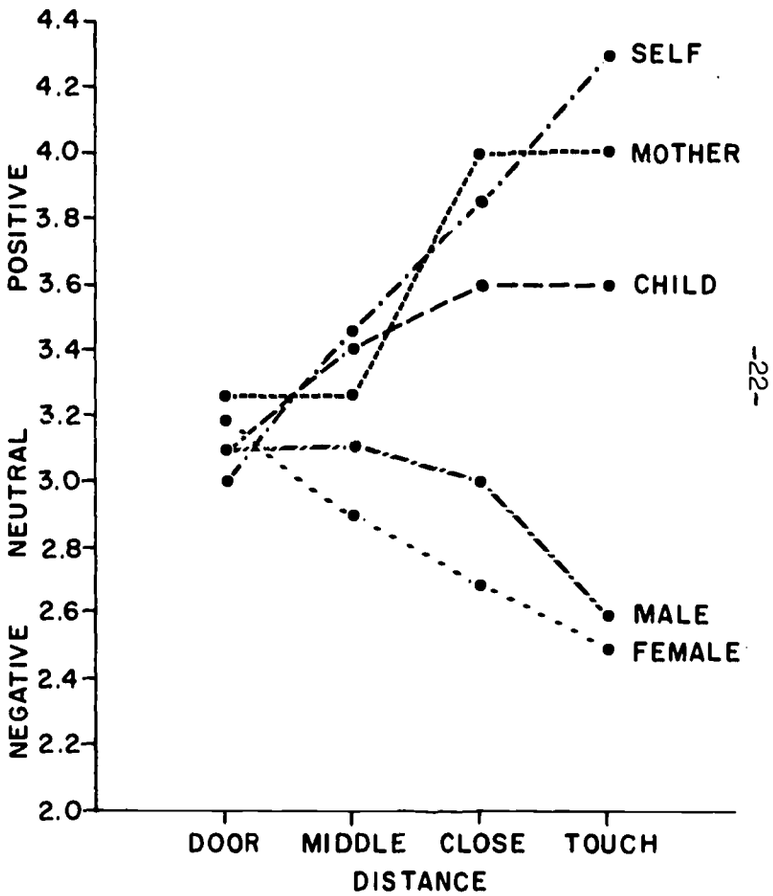


FACIAL RESPONSE

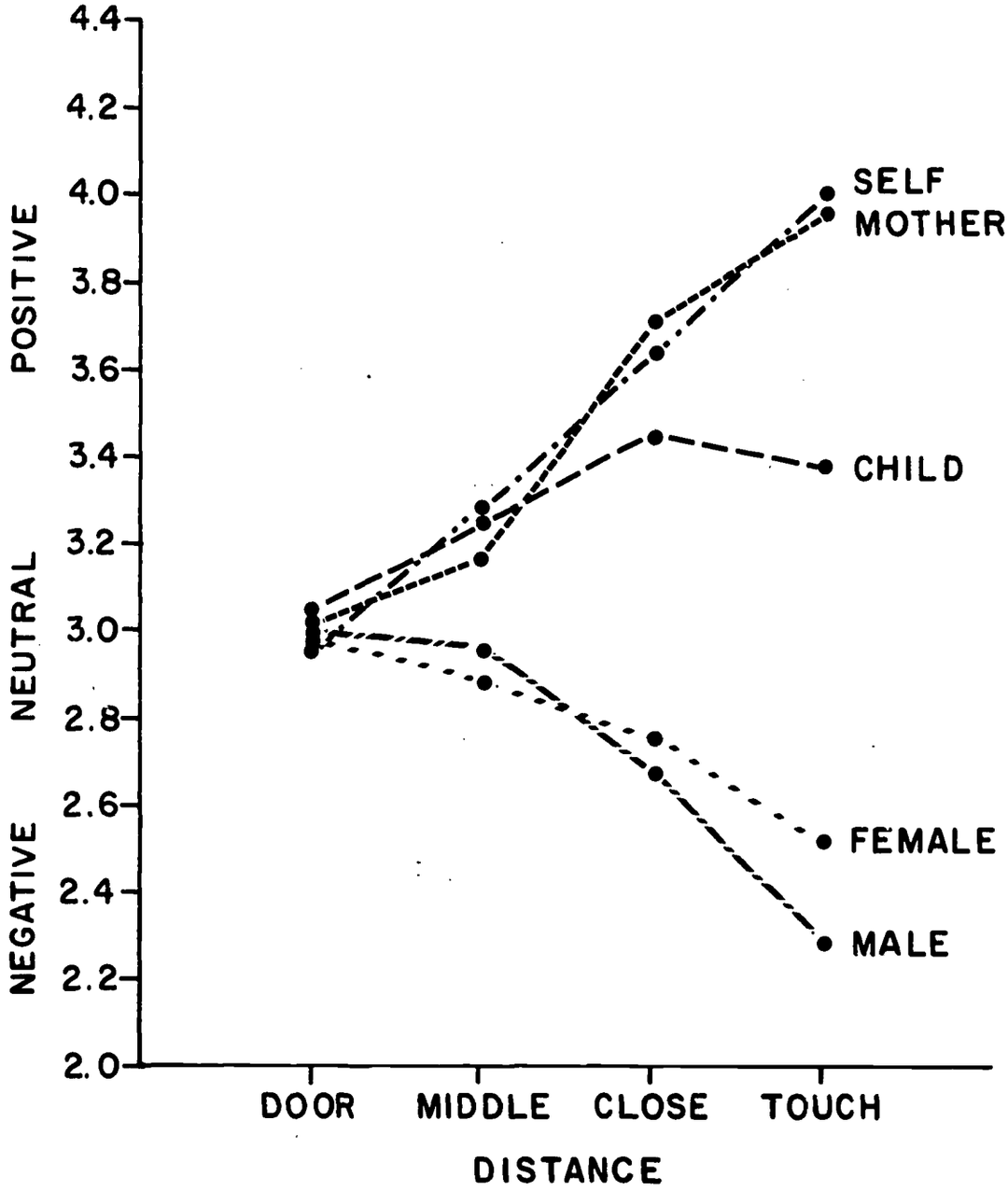
GIRLS



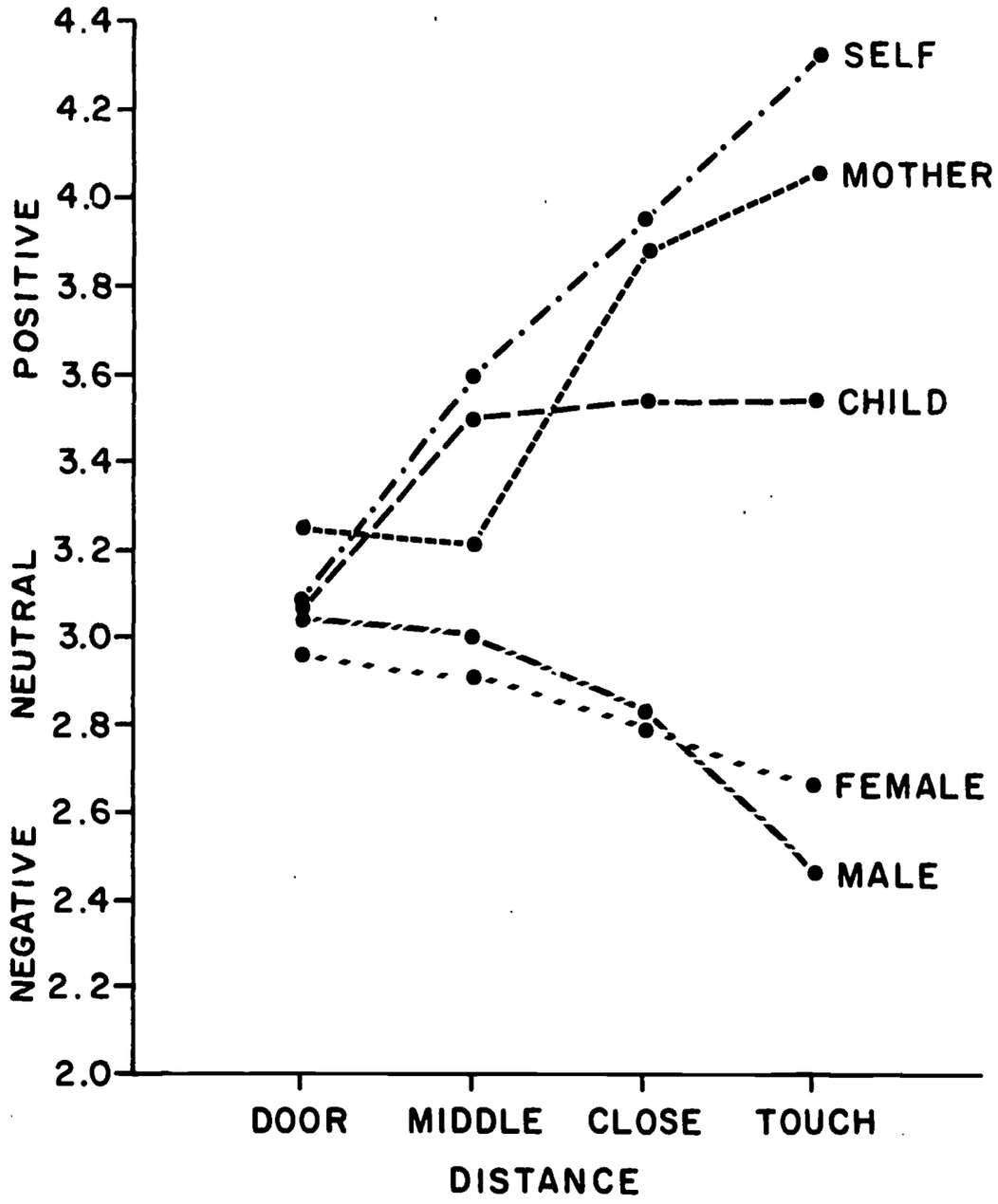
BOYS



FACIAL & MOTOR RESPONSES
ALL AGES



FACIAL RESPONSE
ALL AGES



APPENDIX

Scales

	Child				Mother			
	Far	Middle	Close	Touch	Far	Middle	Close	Touch
FACIAL								
+2 Smile broad								
+1 Smile slight								
0 Neutral express.								
-1 Slight frown								
-2 Puckering, cry								
MOTOR ACTIVITY								
+2 Reaches to E / Touches E								
+1 G.B.M. to E / Looks at E								
0 Inattention / Explores room / Att. directed away								
-1 Neg. express. to E / Avoids E glance / Pulls hand away E								
-2 Attempts to escape E / Reaches to M								