Social Referencing: The Infant's Use of Emotional Signals From a Friendly Adult With Mother Present

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Previous studies have demonstrated that 1-year-old infants look toward their mothers' facial expressions and use the emotional information conveyed. In this study, 46 1-year-olds were confronted with an unusual toy in a context where an experimenter familiar to the infants posed either happy or fearful expressions and where their mothers were present but did not provide facial signals. Most of the infants (83%) referenced the familiarized stranger. Once the adult's facial signals were noted, the infant's instrumental behaviors and expressive responses to the toy were influenced in the direction of the affective valence of the adult's expression. The results indicate that infants may be influenced by the emotional expressions of a much broader group of adults than has previously been recognized.

In this study we investigated whether infants would reference an adult other than their mothers and would make use of the affective information obtained. Emotional expressions of others provide important information about environmental events. Recent studies have shown that preverbal infants engage in "social referencing"—they look to others when confronted with a variety of events and use the emotional reactions of others to regulate their own behavior. The infants' mothers provided the emotional signals in these studies, by giving either prototypical facial expressions (Klinnert, 1984; Sorce, Emde, Campos, & Klinnert, 1985) or vocal signals (Svejda & Campos, in press) or by controlling the positive affect in multichanneled responses (Feinman & Lewis, 1983).

Although the purpose of these initial studies was to demonstrate that infant behavior is responsive to a social signaling process, the studies also reflect a basic assumption about infants' social referencing: If an infant is responsive to anyone's affective signals, the person most likely to influence the infant is his or her mother. The central role of mothers in infants' social referencing was initially suggested by Campos and Stenberg (1981), who postulated that "mother becomes the target of social referencing" (p. 295). In fact, the term maternal referencing was sometimes used interchangeably with the term social referencing.

In the same vein, Feinman (1982) discussed the "selectivity of the source of information" (p. 459) as a key aspect of social referencing. Although Feinman did not restrict the process to infants and their mothers, he suggested that the target of social references would be selected using the same parameters as those that influence the choice of a model in the imitation process (e.g., nurturance, similarity, and power). In any case, available data regarding infant visual behavior support the notion that infants select their mothers to reference. Lamb (1976) found that when a stranger entered the room, 1-year-olds looked toward their mothers more than toward their fathers, suggesting that the mother was the preferred source of information. Field (1979) found that infants 10–14 months of age looked toward their own mothers more than they did toward infant peers or other infants' mothers. Furthermore, the literature on infant attachment is replete with examples of infants looking frequently toward their attachment figures in a variety of contexts, and it could be inferred that at least some of these looks functioned as social references.

In an attempt to define the role of emotional signaling within the attachment relationship, Bradshaw, Goldsmith, and Campos (1984) placed 12-month-old infants in a social referencing situation, the visual cliff. They hypothesized that the infants would look more toward their mothers than they would toward an equally available but unfamiliar adult. A preference to look toward their mothers would be regarded as an index of the attachment relationship. Surprisingly, the infants looked toward the stranger almost as much as they looked toward their mothers. The results did not indicate whether the infants behaved in accordance with the stranger's emotional signals, because the mother's signals and the stranger's signals were the...
same. Zarbatany and Lamb (1985) also found that infants looked about equally toward their mothers and toward strangers. In their study, regulation of 12-month-old infants’ behavior by mothers’ and strangers’ signals was assessed, and the results showed that the infants’ behavior was affected by the mother’s signals, but not by the stranger’s. However, the paradigm involved leaving the infants alone with the stranger, and the stress they experienced may have caused them to be unable to use the stranger’s signals.

The evidence, then, is mixed as to whether infants are selective in their choice of a referencing target. To what extent might they use the affective signals of other adults? Increasing attention is now being given to the infant’s developing capacity to socialize with adults other than attachment figures and members of their immediate family. For example, Bretherton, Stolberg, and Kreye (1981) found that most infants in a group 12-24 months of age initiated proximal interactions with unfamiliar adults. Clarke-Stewart (1978) described how in dealing with strange adults, 30-month-olds were straightforward in their use of the affective cues that the adults directed toward them. Regardless of their mothers’ reactions to the strangers, the toddlers approached those adults who gave them positive affective signals and stayed away from those who responded negatively to them. Given this emerging picture in which infants are regarded as active participants in a broader social world, it seemed likely to us that social referencing would occur with a wider range of adults than had been studied to date.

In some circumstances it may be ecologically relevant for infants to look for information from a relatively unknown adult and to incorporate that information into a behavior plan. The specific circumstances would depend on the context. Sroufe, Waters, and Matas (1974) have demonstrated that contextual factors have an important effect on infants’ social functioning, and we believe that such factors are probably quite important in social referencing situations. When a child is engaged in a positive, ongoing interaction with an adult and an ambiguous event occurs, that adult may well become the referencing target, regardless of the broader relationship he or she has with the child. Another contextual factor that necessarily determines emotional availability is physical proximity, and the geometry of a room may be a significant determinant of who becomes a referencing target.

We therefore decided to conduct a systematic study of social referencing involving a situation that included the factors just discussed. The setting was an unfamiliar playroom, and the situation was the entrance of an unusual remote-controlled toy. The toy approached the infant, who was playing with a friendly adult at some distance from the infant’s mother. Following a pilot study with this context, we hypothesized that (a) infants would visually reference the friendly adult as well as the mother, (b) infants who received a smile signal would be more likely to approach the toy than those who received a fear signal, (c) infants who received a fear signal would be more likely to go to their mothers, and (d) infants’ affect would be influenced by the friendly adult’s emotional signal of smiling or fear.

Method

Subjects

The subjects were 46 infants between 12 and 13 months of age, drawn from a subject pool of middle-class volunteers from metropolitan Den-
ers who were naive to the independent variable. The observers produced a second-by-second record of each infant’s behavior, focused on the direction of the infant’s gaze and all instrumental behaviors. The visual behaviors of interest were looks toward the experimenter or the mother. Other behaviors recorded were presence or absence of movement in the direction of the robot toy or the mother; duration of touching or playing actively with the robot toy; and duration of physical contact with the mother.

We assessed the reliability for these variables by having both of the observers rate 14 of the videotaped infants. For the visual behavior, the observers agreed on the occurrence of a change in gaze and subsequent direction of a gaze for 94% of the gaze changes in the reliability sample. They achieved 100% agreement on the occurrence and type of instrumental behaviors displayed by the infants; agreement involved the two raters reporting the onset of the same type of behavior within 3 s of each other.

The infants’ affective responses were rated by two separate observers, who were also blind to the independent variable condition. The observers rated infant affect every 5 s using a 5-point bipolar scale that ranged from high positive involvement with the robot toy (+4) through sober, interested expression (0) to obvious fear of the robot toy (−4). The scale took into account affective displays, such as smiling or crying, as well as the quality of behavior, such as kissing or kicking the robot toy. Both observers rated 14 of the videotaped infants. Reliability, assessed by calculating the percentage of 5-s periods for which the two raters were in perfect agreement on the rating scale, was 86%.

Mother’s Facial Signals

To control for the influence of the infants’ mothers, the mothers’ facial expressions were rated during each reference to her. Global ratings of positive, neutral, or negative were obtained for each such reference. Positive ratings included smiles; eyebrow lifts; bright, expectant, or pleasant expressions; and forward movements. Negative ratings included intense concentration, tight lips, and frowns. Observers were in perfect agreement on 77% of these global ratings.

Facial expression ratings revealed that the mothers were generally well able to maintain neutral expressions when their infants referenced them during the trials. In the fear group, mothers’ expressions were scorable for 59 of the 69 infant references. Of the 59 expressions, 79.7% were scored as neutral, 3.4% as negative, and 17.9% as positive. In the smile group, mothers’ expressions were scorable for 78 of the 80 infant references. Of the 78 expressions, 70.5% were scored as neutral, 1.3% as negative, and 28.2% as positive. The higher percentage of positive expressions in the smile group proved to be largely accounted for by two mothers, who smiled broadly when their infants referenced them. Eliminating the infants of these two mothers from the smile group resulted in maternal emotional signals for this group that were comparable to those of the fear group; that is, 85.5% were scored as neutral, 1.6% as negative, and 12.9% as positive. Although eliminating the two infants made the groups more comparable, both of the infants had referenced the experimenter and made definitive movements prior to looking at their mothers. Therefore, the two infants were retained as subjects with the provision that only data reflecting their behavior prior to the first look at their mothers be included; the data for all other variables for the two infants were excluded.

Results

Visual References

Our first hypothesis was that the infants would look at the experimenter in this context. Of the 46 infants in the study, 38 (or 83%) referenced the experimenter. The remaining 17% referenced only the mother. Further descriptions of looking behavior as well as analyses addressing differential reactions of the smile and fear groups will be reported only for the 38 infants who referenced the experimenter. During the 3-min trial, those infants who referenced the experimenter directed twice as many looks toward her as they did toward the mother; for the 38 infants in the final sample, the average number of looks toward the experimenter was 8.7, and the average number of looks toward the mother was 3.9. In addition, the infants’ first references after seeing the robot toy were predominantly toward the experimenter: 30 of the 38 infants looked first toward her. However, most of the infants (22 of 38) also looked toward the mother at least once before they took action.

Initial Reaction

To determine whether the two groups of infants were similar at the start, we compared initial reactions for the time period following the entrance of the robot toy and prior to the infant’s first reference to the experimenter. Because this time period varied across infants, a mean score of affective state was calculated for each infant, based on the number of 5-s affective ratings for the time period. We compared the two groups (38 infants) by conducting a t test on the scores. The mean affective rating for the fear group was 2.26, and the mean for the smile group was 2.79, t(36) = 0.41, p = .69. These data suggest that the initial reactions of the two groups of infants were similar prior to the introduction of the differential affective signals.

Behavioral Responses to the Robot Toy

Our second hypothesis was that infants who received the smile signal would approach the robot toy more than would infants who received the fear signal. As shown in Table 1, 13 of 19 infants in the smile group approached and touched the robot toy, whereas 8 of 19 infants in the fear group did—a marginally significant trend, χ²(1, N = 38) = 2.66, p < .10. Moreover, the quality of behavior for the two groups of infants as they approached and touched the robot toy was very different. Of the infants who touched the robot toy, those in the smile group approached it significantly more quickly than those in the fear group did. For the smile group, the mean latency to touch the robot toy was 60 s, whereas for the fear group, it was 98 s, t(19) = 2.24, p = .025. Furthermore, the smile-group infants (excluding the two who received positive maternal signals during the trial) touched the robot toy for a longer period of time: They touched it for 42 s, whereas the fear-group infants touched it for 11 s, t(17) = 2.61, p < .01.

Our third hypothesis predicted that more infants who received the fear signal would approach and touch their mothers within the 3 min of the trial. This hypothesis was supported: 13 infants in the fear group went to their mothers and touched them, whereas 6 of 17 infants in the smile group did, χ²(1, N = 36) = 3.95, p < .05.

Finally, we looked at the infants’ affective reactions to the facial signals. We wanted to determine whether the infants’ own affective states were influenced by these signals and if so, whether the affective changes preceded, accompanied, or followed the infants’ instrumental behaviors. As stated earlier, the
two groups showed similar (mostly positive) affect prior to the first reference to the experimenter. During the 15 s following that first reference, the affect of both groups remained positive but the smile-group infants tended to look more positive than the fear-group infants. However, later in the trial, during the 5-s period when the infants first moved toward either the robot toy or the mother, the affect of the fear-group infants became negative, whereas the affect of the smile-group infants became sober. The mean rating for the fear group was 3 points lower than the mean for the smile group. The difference in affect maintained during the 15 s following the action. The affective data for the four time periods were subjected to a repeated measures analysis of variance, with group and time period as the two factors. The overall interaction was significant, $F(3, 102) = 4.15, p < .01$, and a main effect for group was also significant, $F(1, 34) = 11.64, p < .002$. The changes in infant affect across the trial are illustrated in Figure 1. The simple effects for group for each time period are presented in Table 1, which shows a trend at the first postreference point ($p = .126$) and significant effects at the second and third points ($p < .01$ and $p < .05$, respectively). On the whole, then, the infants in the fear group showed more negative affect throughout the trial.

Discussion

Over the past decade there has been a great deal of emphasis on infants' reliance on attachment figures for a sense of security (e.g., Bowlby, 1969; Sroufe & Waters, 1977). Investigations of social referencing have focused on infants' propensity to visually check with their mothers when confronted with ambiguous circumstances and to respond behaviorally to their mothers' emotional signals. We questioned whether emotional signals influence the behavior of 1-year-old infants even when the source is a relatively unfamiliar adult.

Our findings indicate that social referencing is not exclusively directed toward attachment figures. Social referencing consists of two components, social attention and behavior regulation, both of which were affected by the behavior of the familiarized adult in this study. More specifically, over 80% of the infants we tested looked toward the familiarized adult after the entry of the robot toy, and once the infant noted the adult's facial signals, his or her instrumental behaviors and expressive responses to the robot toy were influenced in the direction of the affective valence of the adult's expression.

In terms of instrumental behaviors, fear signals resulted in significantly more infants approaching the mother, whereas smiles resulted in a marginal trend toward more infants approaching the robot toy. Furthermore, within the subset of infants who approached the robot toy, those who received positive signals approached it more quickly and touched it longer than did those who received fearful signals. Anecdotal observations on the quality of touching behavior indicated that the infants who received positive signals were more likely to pat or kiss the robot toy, whereas those who received fearful signals were more likely to swat it or knock it over.
The expressive states of the two groups of infants were also influenced by the emotional messages from the familiar adult. The infants who received smiles were more positive than those who received fear signals. Thus, not only did the infants adapt their behavior according to the information received from the familiar adult, but also their emotional state was influenced by the adult whom they had just met.

There were three other noteworthy findings in this study. First, facial expressions of the experimenter influenced behavior even when the infant’s reaction to the toy was not initially uncertain. All too often, social referencing is assumed to operate only when primary appraisal fails. In the present study, the infant’s initial reaction to the robot toy was predominantly positive, yet the adult’s facial signals resulted in the infant’s regulating his or her behavior in a manner appropriate to the posed affect. Although they may be clearest when events are maximally uncertain (e.g., Gunnar & Stone, 1984), social referencing effects are not restricted to conditions of uncertainty.

Second, emotional expressions of others do not necessarily produce all-or-none responses in infants. Although a substantial number of infants did approach the robot toy despite the adult’s expression of fear, the effects of the fear signal were clearly evident in parametric analyses, such as latency to approach the robot toy, length of time touching the robot toy, and the quality of handling the robot toy.

Third, in this study we found that expressive changes corresponded in time with changes in the infant’s instrumental behaviors. This finding thus leaves open the question of whether affective changes mediate (i.e., precede) the instrumental behavior changes or instrumental behavior results in expressive changes. We suspect that both processes are operating. Microanalytic techniques may be required to show that affective resonance or state correspondence occurs in response to the detection of emotional expressions in others prior to the occurrence of any instrumental behavior (Klinnert, Campos, Sorce, Emde, & Svejda, 1983; Stern, 1985) or that the subject’s appraisal of the probable success or failure of an instrumental reaction will also determine the nature of the subject’s expressive state (Lazarus, 1968).

We have suggested that the willingness of the infants to turn to slightly familiar adults was related to certain contextual components. The presence in the room of the infant’s mother was a significant aspect of the social context and may have facilitated the infants’ use of the stranger’s signals. The availability of the mother constituted a major difference between this study and that of Zarbatany and Lamb (1985), in which the infants did not use the stranger’s signals. Future investigations should pursue the systematic assessment of the relation between availability of the mother, infant stress level, and infants’ use of emotional signals. A related contextual component is the practical issue of proximity; the experimenter was sitting only 2 ft (.6 m) from the infant, whereas the child’s mother was sitting across the room. Pilot studies had showed that a play time during which the adult experimenter actively attempted to engage the infant went a long way toward establishing sufficiently friendly relations such that the baby would reference the experimenter. This finding is consistent with evidence that, like other people, infants are more likely to engage in social interactions with people who show a desire to engage in interaction with them. Still another factor is the positive exchange that took place between the mother and the experimenter before the test. An earlier study suggested that these positive exchanges influence the subsequent response of the infant to a stranger (Boccia & Campos, 1983). It is unclear how much of a role each of these contextual factors played in facilitating the infant’s reliance on the familiar adult in the present study. Whatever the influence of each of the factors, it was possible to manipulate them within a single situation such that the majority of 1-year-old infants would reference and be influenced by a person they hardly knew. Perhaps what the infants responded to was the adult’s emotional availability; that is, perhaps the contextual factors that enhanced the probability that the infants would reference the familiarized adult are some of the conditions that represent the emotional availability of one human being for another.

On the other hand, there are undoubtedly great individual differences in the extent to which 1-year-olds will rely on unknown adults after a short time of exposure. Within the present study there were infants who never referenced the mother, those who referenced both the mother and the experimenter, and those who referenced the experimenter only. This range of responses can probably be explained by many factors, including the infant’s temperament traits, such as sociability or fearfulness; the infant’s experiences of being exposed to a variety of people and situations; and the infant’s history of qualitative interactions, both with care givers and others, which facilitate infants’ development of trust in the broader social world (Feinman & Lewis, 1983).
In summary, the present study not only has demonstrated that infants are influenced by the emotional signals of relatively unknown adults, but also has illustrated that when theorizing about the social world of infants, it is no longer accurate to think solely in terms of the infants' attachment figures. The conditions under which extrafamilial emotional signaling takes place and the identification of sources of individual differences in response to emotional signals are exciting new areas of investigation.

References


Received January 8, 1985
Revision received November 19, 1985