

DOCUMENT RESUME

ED 229 152

PS 013 509

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TITLE The Effect of Maternal Touching on Infant Social Referencing.
SPONS AGENCY National Inst. of Mental Health (DHHS), Rockville, Md.
PUB DATE Apr 83
GRANT NIMH-1R03MH35384-01A1; NIMH-NRS-1F32MH07625-01
NOTE 21p.; Paper presented at the Biennial Meeting of the Society for Research in Child Development (Detroit, MI, April 21-24, 1983).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Emotional Response; Individual Differences; *Infant Behavior; *Mothers; Parent Child Relationship; *Parent Influence; Personality Traits; *Stranger Reactions; *Tactual Perception
IDENTIFIERS *Social Referencing

ABSTRACT

Whether maternal touching of the infant while speaking to him or her about a stranger facilitates or interferes with social referencing is investigated in this study. Thirty-three 10-month-olds received positive or neutral nonverbal messages when their mothers spoke to them about a stranger. Infants whose mothers did not touch them while speaking about the stranger were friendlier to the stranger (but not to the mother) in the positive affect condition than in the neutral affect condition. This effect was especially salient for infants of easier (rather than more difficult) temperament. This pattern of results suggests that infants had connected their mothers' messages with the stranger and engaged in social referencing. But when mothers touched their infants while speaking to them about the stranger, infants were friendlier to the stranger (and to the mother) in the positive than in the neutral condition. The influence of mother's affect was particularly noticeable for infants of easier temperament. Maternal touching may have made the infant less likely to connect the mother's message with the stranger specifically, resulting in a more general mood modification effect rather than in social referencing. (Author/MP)

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The Effect of Maternal Touching on
Infant Social Referencing

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During the course of this project, the author was supported by NIMH National Research Service Award 1F32MH07625-01 while at Educational Testing Service, and by NIMH Grant 1R03MH35384-01A1 at the University of Wyoming. Additional support was provided by an Arts and Sciences Basic Research Grant from the University of Wyoming. The data considered in this paper were collected at Educational Testing Service with the collaboration of Michael Lewis. Research assistance was provided by Judith Hayes and Pam Ritter at Educational Testing Service and by Susan Jones, Vickie Martin and Edie Plancher at the University of Wyoming. Communications should be directed to: Saul Feinman, Department of Sociology, University of Wyoming, Box 3293, University Station, Laramie, Wyoming 82071.

In C. Saarni (Chair), Processes in the Socialization of Affect. Symposium prepared for presentation at the Biennial Meeting of the Society for Research in Child Development, Detroit, April, 1983.

PS 013509

Abstract

Does maternal touching of the infant facilitate or interfere with infant social referencing in which the infant can use the mother's emotional message about a stranger to form his/her own emotional response to the stranger? Thirty-three 10-month-olds received positive or neutral nonverbal messages when their mothers spoke to them about the stranger. Infants whose mothers did not touch them while speaking about the stranger were friendlier to the stranger but not the mother in the positive affect condition than in the neutral affect condition. This effect was especially salient for infants of easier temperament. This pattern of results suggests that infants had connected their mothers' messages with the stranger and engaged in social referencing. But when mothers touched their infants while speaking to them about the stranger, infants were friendlier to the stranger and to the mother in the positive than the neutral condition. The influence of mother's affect was particularly noticeable for easier temperament infants. Maternal touching may have made the infant less likely to connect the mother's message with the stranger specifically, resulting in a more general mood modification effect and not in social referencing.

The Effect of Maternal Touching on
Infant Social Referencing

When encountering a stranger, the infant often turns to look toward the caregiver. This action may reflect an effort to ascertain that the emotional support and protection implied by the caregiver as a base of security (Ainsworth, Blehar, Waters, & Wall, 1978) will indeed be available when the infant meets a new person. But the caregiver may also be serving as a base of information for the infant, providing an interpretation of the stranger and influencing the infant's appraisal of that person. When confronted with an unfamiliar person, a novel toy, or an ambiguous phenomenon, infant attention to the caregiver and receptivity to the caregiver's communication about such events may signal the occurrence of a socialization episode in which the infant's affective and behavioral reactions are influenced.

In recent years, there has been a significant growth in the empirical and theoretical consideration of how caregivers may function as bases of information for the infant. One result of such work is an improved understanding of the role that social referencing plays in infants' mental activity and behavior. Social referencing is a process characterized by the "use of other persons' interpretations of the situation to form one's own understanding of that situation" (Feinman, 1982). This socialization process can be initiated by the infant when he or she requests information from a caregiver, or it can occur when a caregiver offers a definition of the situation even though the child has not solicited it. Social referencing information can be conveyed directly when one person tells another about her/his own appraisal of the situation. In addition, it can be communicated indirectly when one individual observes another's response to a situation and infers interpretation from that behavior. Social referencing can provide

affective or instrumental information; suggesting "how to feel" and "what to do", respectively, in the situation.

Two theoretical reviews of infant social referencing (Feinman, 1982; Klínnert, Campos, Sorce, Emde, & Svejda, 1983) and the resulting exchange of comments between Campos (1983) and Feinman (1983) have discussed the parameters of the phenomenon and considered its developmental course in infancy and toddlerhood. Several investigations have suggested that social referencing does, indeed, occur during infancy. Sorce, Emde, Klínnert and Campos (1981) found that while 14 of 19 12-month-olds crossed a reduced visual cliff when their mothers smiled at them, none of the 17 infants whose mothers exhibited fear would cross. Similarly, Klínnert (1981) noted that the toy-directed behavior of 12- and 18-month-olds was regulated to some extent by their mothers' facial expressions.

In Feinman and Lewis' (1983) social referencing study, mothers provided a nonverbally positive or neutral message about a stranger either by communicating directly to their 10-month-olds about the stranger or through indirect means by letting their infants observe them greet the stranger. Infants, especially those of easier temperament, were friendlier to the stranger after their mothers spoke positively than neutrally, but only when mothers spoke directly to them about the stranger.¹ The opportunity to hear the affective tone of the mother's voice as she greeted the stranger did not influence infant behavior to the stranger. In this investigation, as in the visual cliff and the toy studies, the infant acted as if he/she was using the caregiver's apparent interpretation of the situation in forming her/his own appraisal of the situation.

In the stranger and social referencing study (Feinman & Lewis, 1983), some mothers touched their infants while providing the message about the stranger

but others did not touch. The resulting variation occurred naturally since mothers had been neither asked to touch nor requested to refrain from touching their infants. The analysis reported in the present paper used these data to investigate whether maternal touching of the infant while speaking to the infant about the stranger facilitated or interfered with social referencing. The impact of maternal touching was considered only for direct social referencing in which the mother talked to her infant about the stranger. The indirect condition in which the infant could observe the mother's greeting of the stranger was not included in this analysis.

In humans, touching has been hypothesized to symbolize friendship and affection (Eakin & Eakin, 1978), reflect power and status (Henley, 1973), convey emotions (Argyle, 1975; Jourard, 1966), and induce emotional arousal (Argyle, 1975; Jourard, 1966; Whitcher & Fisher, 1979). Touching among adults has been found to increase conformity (Kleinke, 1977), heighten self-disclosure (Jourard & Friedman, 1970), and improve affective, behavioral, and physiological reactions to surgery in females while producing the opposite effect in males (Whitcher & Fisher, 1979). Furthermore, it is often suggested that touching is necessary for normal physical, emotional, and social development both in humans (Montagu, 1971) and in nonhuman primates (Harlow, 1958).

In infants and young children, maternal touching is associated with caregiving, control, comfort, affection, play, and anger (Clay, 1968). It is a common response to infant fussing and vocalization (Dunn, 1977), and to toddler approaches and "arms up" gestures (Blurton-Jones & Leach, 1972). At six months, sons receive more maternal touching than do daughters (Goldberg & Lewis, 1969). Furthermore, handicapped one- and two-year olds are touched by their mothers considerably more often than are their nonhandicapped

counterparts (Brooks-Gunn & Lewis, 1979). While there has been some interest in the occurrence and effects of touching in infants and toddlers, there has been, apparently, little concern with the specific impact of touching upon learning. The analysis presented in this paper focused upon whether maternal touching influenced infant learning about a stranger through the process of social referencing.

Method

Participants

Eighty-seven 10-month-olds and their mothers² participated in the study. The present analysis focused upon 33 infants whose mothers spoke either neutrally or positively to them about a stranger as the stranger approached. Of these 33 infants, 15 (46%) were boys and 18 (54%) were girls.

Setting and Procedure

At the onset of the experimental session, the infant was in a highchair, and the mother sat to the infant's right. The chair in which the stranger would sit was to the infant's left. The door through which the stranger entered faced the infant. Four tape marks were placed on the floor to indicate to the stranger where to stop during the approach.

In the approach, a 23-year-old female stranger entered the room and, in sequence, walked and stopped for five seconds at each mark. In the control condition, the mother did not speak during the approach. In all other conditions, the mother provided a message each time the stranger paused. After standing at the fourth mark -- which was located directly in front of the empty chair -- the stranger sat down, beginning the one-minute nonintrusive phase in which she looked through a magazine but did not initiate interaction with infant or mother. The mother handed a toy to the infant at this time, but did not interact with infant or stranger.

During the approach, mothers in the direct influence condition spoke to their infants about the stranger in either a positive or a neutral tone of voice. The indirect influence condition called for mothers to allow their infants to see them speak to the stranger in either a positive or a neutral tone. There was also a control condition in which the mother did not speak. The analysis presented below included only the direct communication condition.

Temperament Questionnaire

Mothers' responses to Carey and McDevitt's (1978) Revised Infant Temperament Questionnaire were used to classify infants as "easier" or "more difficult." The former category consisted of Carey and McDevitt's easy and intermediate-low groups, and the latter consisted of the intermediate-high, difficult, and slow-to-warm-up groups. Slightly less than half of the infants considered in the present analysis (48%) were in the easier temperament category.

Coding of Infant Behavior

For coding purposes, the one minute nonintrusive period was divided into four 15-second segments. In each period, coding was performed for the presence of the following infant behaviors: 1) smiling to the stranger; 2) smiling to the mother; 3) proximity to the stranger (moved towards or stayed near the stranger); 4) proximity to the mother (moved towards or stayed near the mother); 5) toy offer to the stranger; and 6) toy offer to the mother. Proximity was measured by the infant's movement within the range permitted by the highchair restraints, i.e., leaning over the side of the chair towards stranger or mother.

Intercoder agreement, based upon the judgements of one coder who considered all cases, and a second coder who viewed half of the cases, was 90% or better for all behaviors. Measures of the number of 15-second periods in

which the infant performed each behavior to the stranger or mother were created from these codes. The dependent criterion variables considered in the analyses were three summed scores calculated from these measures: 1) the sum of smiles, proximity, and toy offers to the stranger; 2) the sum of smiles, proximity, and toy offers to the mother; and 3) the sum of behaviors to the stranger minus the sum of behaviors to the mother.

In each of the four stages of the stranger approach, coding was performed for the presence of maternal touching of the infant. Intercoder agreement was 99% between one coder who considered all cases and a second coder who viewed half of the cases. For data analysis purposes, the touching data were simplified into a dichotomous variable indicating whether or not the mother touched the infant at any time during the stranger's approach.

Results and Discussion

Independent Variable Manipulation Checks

Nonverbal affective quality and length of mother's message were coded in order to evaluate the manipulation of the affect conditions, and to determine whether length and affect were correlated. Length of message was measured by the number of words, and the correlation between one coder who listened to all cases and another who listened to half of these cases was .99. Affect was coded on a scale from -8 (extremely negative) to +8 (extremely positive) with an intercoder correlation of .95 for those cases considered by both coders.

Of the 35 direct condition infants, rated affect was inappropriate for the assigned condition for two mothers, and these two infant-mother pairs were excluded from further analysis. For the remaining 33 infants, the number of words measure was not influenced by affect or temperament when mothers did not touch their infants during the approach ($p > .10$). But mothers who touched their infants spoke longer in the positive than in the neutral condition

$F(1,25) = 5.44, p < .03$). Consequently, length of mother's message was used as a covariate in further analysis.

Rated affect was higher in the positive condition than in the neutral condition ($F(1,24) = 193.42, p < .0001$), indicating that affect of mother's communication had been effectively manipulated. A marginally significant interaction of affect, touch, and temperament ($F(1,24) = 3.05, p < .10$) also influenced rated affect. Touch and temperament did not have an impact on rated affect in the positive condition ($p > .10$). But rated affect in the neutral condition was lower for easier infants who were touched by their mothers than for easier infants who were not touched ($F(1,24) = 5.98, p < .03$) or for more difficult infants who were touched ($F(1,24) = 4.48, p < .05$). These variations in rated affect will be discussed in interpreting the results.

Maternal Touching

In speaking to their infants during the stranger's approach, 46% of the mothers touched their infants. There was also a nonsignificant tendency for touching to occur more often in the positive affect condition (56%) than in the neutral affect condition (35%; $p > .10$). Touching had been found to be less common in the indirect condition (17%; $z = 2.53, p < .02$, two-tailed test). Indeed, the finding that only 6 of the 35 indirect condition mothers touched their infants, and that only one of these touches occurred in the neutral communication condition was one major reason why the present analysis focused only on the direct communication condition.

Analysis of Variance

The major data analysis consisted of analyses of variance which included: 1) measures of infant behavior as the dependent criteria; 2) affect of mother's message (positive, neutral), infant temperament (easier, more difficult), and maternal touching (touch, no touch) as independent factors; and 3) length of

message as a covariate. The means presented in Table 1 were derived from these analyses and adjusted to remove the influence of message length.³

Infant Behavior to the Stranger

The first question to be answered in considering the social referencing hypothesis is whether infant behavior to the stranger was influenced by mother's affect. Overall, infants displayed a higher frequency of friendly behavior (smiles, proximity, and toy offers) to the stranger in the positive condition ($M = 2.96$) than in the neutral condition ($M = 0.97$; $F(1,24) = 10.38$, $p < .004$). This effect was detected when mothers did not touch their infants ($F(1,24) = 8.01$, $p < .01$; Table 1) as well as when they did touch them ($F(1,24) = 4.02$, $p < .06$; Table 1).

An interaction of affect with temperament ($F(1,24) = 7.97$, $p < .01$) was also noted, indicating that affect had a significant impact upon behavior to the stranger for easier infants ($F(1,24) = 19.72$, $p < .001$) but not for more difficult infants ($p > .10$). For easier infants, the frequency of behavior to the stranger was higher in the positive than the neutral condition when infants were not touched ($F(1,24) = 6.92$, $p < .02$; Table 1) and when they were touched ($F(1,24) = 11.78$, $p < .003$; Table 1). More difficult infants who were not touched were nonsignificantly friendlier to the stranger in the positive condition, while those touched by their mothers were nonsignificantly friendlier to the stranger in the neutral condition (Table 1).

Social Referencing or Mood Modification?

The finding of a higher frequency of behavior to the stranger in the positive condition, especially for easier infants, and regardless of whether or not mothers touched their infants, suggests that touching neither detracts from nor contributes to social referencing. But this pattern also would have occurred if the mother's communication had not produced social referencing but

simply had modified the infant's general mood. In social referencing, mother's affect is used as information about the stranger specifically and does not create a parallel effect for infant behavior to the mother. Consequently, the measure of behavior to the stranger minus that to the mother should reflect the same influence of affect noted for behavior to the stranger. But in mood modification, the infant's general mood is altered which, in turn, shapes behavior to the mother as well as to the stranger in parallel fashion. Consequently, the measure of behavior to the stranger minus behavior to the mother should not reflect a significant impact of mother's affect because the influence of affect upon behavior to the mother cancels out the influence upon behavior to the stranger.

Infant Behavior to the Mother

An interaction of affect with touching ($F(1,24) = 4.75, p < .04$) was the major source of variation in behavior to the mother. When mothers did not touch their infants, message affect did not have a significant effect ($p > .10$) and this pattern was maintained both in easier and in more difficult temperament infants ($p > .10$; Table 1). Indeed, there was a tendency for easier infants to be friendlier to the mother in the neutral condition when the mother had not touched them. When mothers had touched their infants, there was a higher frequency of friendly behavior to the mother in the positive condition ($F(1,24) = 6.68, p < .02$; Table 1). This trend was especially clear in easier infants ($F(1,24) = 5.78, p < .03$; Table 1) and, although not significant ($p > .10$), was in the same direction for more difficult infants (Table 1).

Infant Behavior to the Stranger - Infant Behavior to the Mother

The measure of the difference of behavior to the stranger minus behavior to the mother was influenced by an interaction of affect with temperament ($F(1,24) = 4.32, p < .05$) as had been found in the behavior to the stranger

measure, and by an interaction of affect with touching ($F(1,24) = 4.56, p < .05$) as had been found in the behavior to the mother measure. When the mother did not touch her infant, the difference measure was higher in the positive than in the neutral condition ($F(1,24) = 6.16, p < .03$; Table 1). This effect was significant for easier infants ($F(1,24) = 7.50, p < .02$; Table 1) and, although not significant, was in the same direction for more difficult infants. But when mothers touched their infants during the stranger's approach, affect did not have a significant positive effect on the difference measure ($p > .10$) for either temperament group. Indeed, for the more difficult infants, there was a nonsignificant tendency for the difference score to be greater in the neutral than in the positive condition.

Methodological Issues

Unlike affect of mother's communication, the variable of maternal touching was not manipulated in the experimental design, but occurred naturally. As a consequence, consideration must be given to the possibility that other variables associated with touching could account for the apparent effect of touching on the infant's utilization of the mother's affective message. It was found that mothers who pointed to the stranger while communicating the message to their infants were also more likely to touch their infants ($z = 2.29, p < .03$, two-tailed test). To determine whether pointing could explain the effect of touching, the analyses of variance described above were performed again but with pointing included as an additional covariate. The results did not differ substantially from those presented in Table 1, suggesting that the effect of touching was not the product of its correlation with pointing.

To investigate whether the especially low rated-affect displayed by mothers who touched their easier infants while providing a neutral message about the stranger might account for any of the reported effects, all analyses

were repeated but with the very low rated-affect cases excluded from the neutral condition. This analysis was also repeated a second time with the higher rated-affect cases in the neutral condition excluded. The results in both of these analyses paralleled those found for all 33 infants, indicating that the affect by temperament by touching interaction in rated-affect could not explain the findings presented in Table 1.

Maternal Touching and Social Referencing

When mothers refrained from touching their infants while providing the message about the stranger, infant behavior -- especially that of easier temperament infants -- was consistent with the social referencing hypothesis. Infants were friendlier to the stranger in the positive than in the neutral condition. The absence of an analogous effect upon behavior to the mother suggests that the infant had utilized the mother's message as information about the stranger, i.e., that social referencing had occurred.

But when mothers touched their infants, similar patterns of behavior to the mother and to the stranger emerged as a function of mother's affect. Especially for easier infants, there was a higher frequency of friendly behavior to both the stranger and the mother in the positive affect condition, a pattern that is not expected in social referencing. This pattern of behavior to the mother and stranger may reflect the operation of an underlying mood modification process which occurs because the mother's touch distracts the infant from understanding that the message provides information about the stranger specifically. If touch prevents the infant from connecting the message with the stranger but, instead, orients the infant solely to the mother's communication, then the affect of that communication is likely to produce a general modification of the infant's mood which is reflected, in turn, in behavior to the mother as well as to the stranger. While the mother's

affective message did indeed influence infant affect and behavior, the effect produced does not seem to be social referencing.

Social referencing appears to be a complex juggling act in which the infant 1) attends to the mother's message, 2) observes the approaching stranger, and 3) connects the former with the latter specifically. Perhaps touching disrupts this balance by weakening the linkage of the message with the stranger. Touching may lead the infant to believe that the affective communication conveys information about the mother or about the world in general, rather than about the stranger specifically. As a result, touching may transform social referencing into mood modification.

Footnotes

1. Additional analysis of the impact of temperament on infant social referencing can be found in Feinman and Lewis (1982).
2. Two infants participated with their fathers. Both fathers were significant caregivers, and one insisted that he, rather than his wife, accompany their child. Since 98% of the infants participated with their mothers, the term "mother" is used in place of the term "caregiver."
3. See Dixon, Brown, Engelman, Frane, Hill, Jennrich, and Toporek (1981, pp. 675-677) for the computational procedure used in the computer generation of the adjusted means.

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Table 1

Mean Frequencies of Infant Behavior by Affect of Mother's Message, Maternal Touching, and Infant Temperament, Adjusted to Remove the Effect of Length of Message

Maternal Touching:	No	No	No More Difficult	Yes	Yes	Yes More Difficult
Temperament Category:	Both	Easier		Both	Easier	
	N = 7/11 ^a	3/5	4/6	9/6	5/3	4/3
<u>Behavior^b to Stranger</u>						
Positive Affect	2.92	3.58	2.42	3.00	4.05	1.68
Neutral Affect	<u>0.77</u>	<u>0.56</u>	<u>0.95</u>	<u>1.34</u>	<u>0.11</u>	<u>2.58</u>
Positive-Neutral	2.15	3.02	1.47	1.66	3.94	-0.90
<u>Behavior^b to Mother</u>						
Positive Affect	2.85	2.82	2.87	3.75	3.79	3.70
Neutral Affect	<u>3.38</u>	<u>4.26</u>	<u>2.64</u>	<u>1.36</u>	<u>0.71</u>	<u>2.02</u>
Positive-Neutral	-0.53	-1.44	0.23	2.39	3.08	1.68
<u>Behavior^b to Stranger - Behavior^b to Mother</u>						
Positive Affect	0.07	0.76	-0.45	-0.75	0.26	-2.01
Neutral Affect	<u>-2.60</u>	<u>-3.69</u>	<u>-1.69</u>	<u>-0.02</u>	<u>-0.60</u>	<u>0.56</u>
Positive-Neutral	2.67	4.45	1.24	-0.73	0.86	-2.57

a In each pair, the first n refers to the positive affect condition and the second n refers to the neutral affect condition.

b The sum of smiles, proximity, and toy offers.