Mothers’ Sensitivity to Infant Signals

Lewis A. Leavitt, MD

ABSTRACT. Of all of the infant’s signals, the cry is particularly influential in the developing pattern of mother–infant interaction. If a mother terminates crying successfully, she may gain confidence; if unsuccessful, she may begin to focus on her perceived ineffectiveness. Pediatricians and nurses who work with mothers of young infants need to carefully evaluate what mothers “think” about their successes and failures in managing daily child care. Helping mothers “reframe” perceptions of their infant may be a simple but powerful intervention to optimize their interactions. Pediatrics 1998;102:1247–1249.

O f all the signals that infants emit, the cry is particularly influential in the developing pattern of mother–infant interaction. The infant cry as a signal of distress presents one of the first challenges faced by parents. If successful at terminating crying, a mother may gain confidence in her own parenting skills; if unsuccessful, the mother may begin to focus on her own perceived ineffectiveness. Mothers’ perceptions of an infant, as well as their style of coping with the infant, are in part based on experiences and expectations developed before the infant’s birth. During the early weeks and months of mother–infant interaction, mothers perceive their own infant’s signals filtered by expectations and models of infant behavior constructed from experience.

My laboratory has been engaged in the development of experimental techniques to evaluate mothers’ responsiveness to infant signals and how this responsiveness is related to mothers’ cognitive sets and experiences. In this report, I review some of our findings that demonstrate the importance of mother–infant interaction. The next step, of course, was to examine what this implied.

In a longitudinal study, we measured mothers’ heart rate responses to videotaped infants in the laboratory when the infants were 4 months old. We then observed the same mothers feeding their infants when the infants were 9 months old and, at 15 months, assessed the infants on a cognitive measure. We found that mothers who were more responsive physiologically to infant signals were more sensitive behaviorally to their infants during feeding. Moreover, these infants paired with more behaviorally sensitive mothers had more mature scores on a cognitive task (object concept on the Uzgiris and Hunter Scale). With this study, we found a link between our laboratory assessment of mothers’ responsiveness and an actual behavioral assessment of mother–infant interaction. We also have a link between physiologic response, behavioral response, and infant development.

THE ROLE OF EXPERIENCE

Another aspect of mothers’ experiences with an infant’s cry is the role of her experience in child care success in shaping infant interaction. When mothers interact with their infant, they develop experiences of success as well as of failure in managing the

PARENTAL PERCEPTIONS AND EXPECTATIONS

The first study under discussion involved mothers and fathers watching a videotaped presentation of an infant in both a smiling and a crying state. The same infant was described in a paragraph as a typical (normal), difficult, or premature infant. The same cry, when labeled as coming from a difficult or premature infant, was more aversive to fathers and mothers than when it was labeled as a cry from a typical infant. This result demonstrates the importance of parental perceptions and expectations in determining processing of infant signals. It emphasizes the importance of framing or labeling the experience of interacting with an infant on responses for that infant.

In another study of mothers watching videotapes of crying and smiling infants, we asked mothers to rate their own infant’s temperament. Mothers who rated their infants as “easy” in temperament were more responsive physiologically to a change in infant signal (measured by heart rate) than were mothers who rated their infant as difficult. This finding demonstrates that a mother’s perception of her infant is associated with physiologic responses to infant signals. The next step, of course, was to examine what this implied.

Received for publication Aug 2, 1998; accepted Sep 29, 1998.
Address correspondence to John G. Warhol, PhD, The Warhol Institute, 225 First Ave, Atlantic Highlands, NJ 07716.
demands of child care. Soothing a crying child effectively can provide the mother with the model of herself as a competent and successful caregiver. Unfortunately, occasions may arise that lead a mother to perceive herself as ineffective. Learned helplessness theory\(^5,6\) provides a model for understanding this process. In a large number of studies, it has been shown that experience with events that are perceived as uncontrollable leads one to expect that this state of uncontrollability will continue.

In a set of experiments in the laboratory,\(^3,4\) we modeled the experience of being unsuccessful in controlling an infant cry. Mothers listened to a sequence of infant cries and were asked to perform an intervention (moving a handle or pushing a button) to terminate the cry. Mothers were placed in three groups. Group I mothers were “helpless”; no effort by them could stop the cries. Group II mothers could stop the cries readily. Group III mothers were a yoked control group that simply heard the same amount of crying as mothers in group I.

We then gave each group a subsequent task in which all of the mothers could stop the cries equally well. We found that mothers in group I—the group exposed to uncontrollable failure—did not perform as well as the other groups in stopping the cries in the second task.

We then performed an intervention. After the uncontrollable task, we told mothers that performance on the second task was unrelated to the performance on the first. This intervention reversed the debilitating effect of the experience of failure.

In another experiment, we labeled the same cries used in all the experimental sessions as coming from a difficult infant. We found that this labeling of the cry hindered performance across the board on a solvable task of stopping the cries.

These experiments in the laboratory give us a model for understanding the role of experience and mental representation of the infant as a scaffolding that shapes mother–infant interaction. The experiments also suggest interventions a clinician may use in helping reframe the image a mother has of her infant.

**FORMING A REALISTIC SENSE OF EFFECTIVENESS**

We have proposed that mothers develop a sense of their effectiveness in accomplishing child care tasks based on her experience with success and failure. We have examined this experimentally by using a laboratory task that assesses mothers’ estimates of how effectively they accomplish the task of terminating an infant cry.\(^10\) In the laboratory, mothers are presented with a series of cries and asked to press or to not press a button to terminate the cries. After the task, they are asked to rate their success. In fact, the task was designed so that neither button response was more effective than the other, so that a mother’s estimate of control (or success) is an estimate of her illusion of control.

One week later, mothers were tested on the same learned helplessness task described earlier. We also measured mothers’ heart rate responses to the cries. Our results showed that mothers with a high illusion of control were more susceptible to helplessness in the learned helplessness task; ie, absence of control had a debilitating effect on later performance. Moreover, mothers with a high illusion of control showed less of an attentive heart rate response to an impending cry. This experiment suggests that a high illusion of control may be a maladaptive response to the performance demands of child care. The results suggest that it may be beneficial to help mothers form realistic impressions of how they interact with their infant.

**SENSORY SENSITIVITY**

Carrying our investigation of mothers’ responsiveness to infant cries a step further, we have examined sensitivity at a sensory level in the laboratory.\(^6\) We asked whether a mother’s cognitive set (whether she rates her child as easy or difficult) and coping strategy (illusion of control) affect the actual processing of an infant signal. We used the methodology of Signal Detection Theory\(^11,12\) to examine to what degree variation in maternal response to an infant cry is attributable to differences in signal processing (ie, sensitivity at the sensory level) or to differences in the response (or decision-making system). In other words, does illusory control affect how sensitive mothers are to the actual acoustic signal of the cry or does it affect their bias to respond or to not respond to a cry? The experiment requires that mothers listen to cries constructed with systematic small variants from a standard cry and to determine whether the cries were the same or different. We found that mothers who exhibited high illusory control were least sensitive in detecting differences in cries and that labeling the same cry as coming from a difficult versus an easy infant changed sensitivity.

This study, in conjunction with our other studies, demonstrates that the mother’s cognitive set—developed through her experience with her infant, her expectations of her infant, and her developing sense of her own effectiveness in child care—is associated with physiologic and behavioral response to infant signals. Moreover, this cognitive set and the coping style developed in conjunction affect the processing of the physical signals emitted by the infant.

Our experiments suggest that clinical interventions of reframing or reinterpreting infant behaviors may play an important role for mothers of typically developing infants and especially for mothers of atypically developing infants. The signals of atypically developing infants (for example, premature infants and infants with Down’s syndrome) may be filtered and interpreted in a manner that hinders optimal mother–infant interaction.\(^7,13\) Our laboratory methods provide us with an approach to determine the important components determining mother–infant interaction. They can be used in evaluating components of proposed clinical interventions.

**CONCLUSIONS**

There are, of course, many variables that affect mother–infant interaction. Our experiments have shown that mothers’ perceptions of their infant, their expectations, and their assessments of their own ef-
fectiveness are associated with important variations in physiologic and behavioral responses to infant signals. These variations, in turn, are associated with infant development. Clinicians must attend to these aspects of the developing mother–infant relationship to help foster optimal child development.

REFERENCES

Mothers' Sensitivity to Infant Signals
Lewis A. Leavitt
Pediatrics 1998;102;1247

The online version of this article, along with updated information and services, is located on the World Wide Web at:
/content/102/Supplement_E1/1247.full.html