

This article was downloaded by: [Mr Howard Steele PHD]

On: 01 July 2012, At: 08:04

Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Attachment & Human Development

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/rahd20>

Parental sensitivity to infant distress: what do discrete negative emotions have to do with it?

Judi Mesman ^a, Harriet Oster ^b & Linda Camras ^c

^a Centre for Child and Family Studies, Leiden University, The Netherlands

^b McGhee Division, School of Continuing Professional Studies, New York University, USA

^c Department of Psychology, DePaul University, Chicago, USA

Version of record first published: 15 Jun 2012

To cite this article: Judi Mesman, Harriet Oster & Linda Camras (2012): Parental sensitivity to infant distress: what do discrete negative emotions have to do with it?, Attachment & Human Development, 14:4, 337-348

To link to this article: <http://dx.doi.org/10.1080/14616734.2012.691649>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.tandfonline.com/page/terms-and-conditions>

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae, and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand, or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

Parental sensitivity to infant distress: what do discrete negative emotions have to do with it?

Judi Mesman^{a*}, Harriet Oster^b and Linda Camras^c

^aCentre for Child and Family Studies, Leiden University, The Netherlands;

^bMcGhee Division, School of Continuing Professional Studies, New York University, USA;

^cDepartment of Psychology, DePaul University, Chicago, USA

(Received 26 December 2011; final version received 1 April 2012)

Parental sensitivity, a crucial element of attachment theory, refers to the ability to correctly interpret and respond appropriately to infants' signals. The question of whether infants' emotional expressions communicate discrete negative emotions has been widely debated in the literature on infant emotional development, but it has rarely been discussed in the parental sensitivity literature. This article explores how insights from the parental sensitivity literature and from evolutionary and dynamical systems perspectives on infant emotion expressions can be brought together to enhance our understanding of parental responsiveness to infant distress. The current research concludes that sensitivity does not rely on reading discrete negative emotions in infant signals, but rather on an integration of complex, graded distress expressions with contextual factors and iterative interaction processes.

Keywords: maternal sensitivity; infant emotion; distress; evolution; dynamic systems

Introduction

Parental sensitivity, a key construct in research on parenting in infancy, refers to the ability to perceive infant signals, to interpret these signals correctly, and to respond to these signals promptly and appropriately (Ainsworth, Bell, & Stayton, 1974). Despite near-universal agreement that infants' facial, vocal, and bodily expressions of emotion are biologically-based adaptations that play a crucial role in early social and emotional development, there has been continuing debate about the nature of emotional expressions in infants and young children and their relation to the infant's underlying emotional feeling states and behavioral goals (Campos & Barrett, 1984; Camras, 2010; Izard & Malatesta, 1987; Oster, 2005). However, researchers in the field of parent–infant interaction have generally not been concerned with identifying the specific discrete emotions shown by infants' facial or vocal signals but have instead viewed the broader behavioral and caregiving contexts as sources of information about the likely causes of distress and the best way to alleviate that distress (Mesman, 2010). This article explores how insights from the parental sensitivity literature and from evolutionary and dynamical systems perspectives on

*Corresponding author. Email: mesmanj@fsw.leidenuniv.nl

infant emotion expressions can be brought together to enhance our understanding of parental responsiveness to infant distress.

Infant crying

Crying is the most salient expression of negative emotions in infancy and the most powerful in promoting proximity and caregiving behavior from adults (Bell & Ainsworth, 1972). This is because, regardless of the source of distress, infants are unable to regulate their distress without adult intervention, and because close proximity and physical contact are most effective in terminating distress in early infancy (Bell & Ainsworth, 1972). Several studies have examined whether adults can infer the infant's specific needs from the infant's crying. In a seminal study, Sherman (1927), elicited infant crying using procedures believed to represent different causes, such as hunger (postponing feeding), fear (fake-dropping the infant), pain (pricking it with a needle), or anger (physically restraining the infant). Adults asked to identify the cause of the crying were completely unable to infer the infants' specific needs based on the cry sounds. This result was later replicated by Müller, Hollien, and Murray (1974) for mothers listening to other babies as well as to their own babies. They concluded that "... the acoustic characteristics of the cries of the normal infant appear to carry little perceptual information to the mother with respect to the cry-evoking situation" (Müller et al., 1974, p. 95). Other studies have found that cry pitch and fundamental frequency provide information regarding the intensity and urgency of the infant's distress, showing that infant crying is a graded signal (e.g., Gustafson, Wood, & Green, 2000) and is also perceived as such by adults (e.g., Zeskind & Marshall, 1988). But this does not help parents figure out the specific needs signaled by everyday crying of normal healthy infants. So if parents cannot rely on the sound of crying to tell them what caused the infant's distress, they need to use other sources of information.

Infant facial expressions

Infant facial expressions and bodily movements can also provide information that parents can use to meet the infant's needs. In recent years, these sources of information have been emphasized in the literature on emotional development and in studies of individual differences in emotional reactivity (e.g., studies using Lab Tab observational temperament measures; Goldsmith & Rothbart, 1992, 1996). Research on infant facial expressions has not focused on the question of whether infants' facial expressions signal specific *causes* of distress, but rather on whether infants show facial expressions of discrete negative *emotions*. If infants' facial expressions indeed signal discrete emotions, they might provide mothers with information about the infant's goals and thus could promote a more sensitive and effective parental response. Izard's widely used Max coding system (Izard, 1983) is based on formulas derived from prototypical, universally recognized adult facial expressions of basic emotions. Researchers using the Max coding system assume that these facial expressions are invariant throughout life, and that infant facial expressions identified by Max formulas for negative emotions such as anger, fear, and sadness thus represent those specific discrete negative emotions in infants (e.g., Izard & Malatesta, 1987).

However, more recent studies have produced findings inconsistent with this claim. To date, there has been no conclusive evidence that infant facial expressions

identified by Max formulas for discrete negative emotions represent those specific emotions or that infants show differentiated facial expressions of negative emotion (see Camras & Shutter, 2010, for review). For example, in a collaborative cross-cultural study, Camras, Oster, Bakeman, Meng, Ujice, and Campos (2007) showed that 11-month-old European American, Chinese, and Japanese infants produce substantially similar sets of facial expressions in situations thought to elicit different negative emotions (fear vs. anger/frustration). Nonetheless, observers viewing videos of the complete constellation of infant behavior embedded in these situational contexts did indeed judge the babies to be differentially angry/frustrated or afraid. These findings suggest that facial expressions, by themselves, do not provide reliable information about specific infant emotions.

In two observer judgment studies involving forced-choice judgments and ratings of the intensity of each target emotion, infant facial expressions that fit Max formulas for discrete negative emotions were judged as showing distress rather than the target emotion (Oster, Hegley, & Nagel, 1992). Consistent with these findings, fine-grained coding with the objective, anatomically based Facial Action Coding System (FACS; Ekman, Friesen, & Hager, 2002) and Baby FACS (Oster, 2010) reveals that Max-specified expressions of discrete negative emotions involve distress components (facial actions seen in cry faces and pre-cry faces) that are not present in their presumed adult prototypes (see Oster, 2005; Oster et al., 1992, for details). These distress components (including raised cheeks, curving or bowing of the nasolabial furrow, and horizontally stretched mouth), are present in adult expressions of grief or distress as well as infant distress expressions (Duchenne de Boulogne, 1862/1990; Darwin, 1872/1998). The term “distress” is commonly used to refer to generalized negative emotion or intense negative emotion of any kind. Similarly, the terms “cry face” or “pre-cry face” are used to refer to facial expressions of negative affect that often accompany, precede, or follow fussing, crying, screaming, protests, or other negative affect vocalizations, but these facial expressions may also occur without vocalizations.

Thus, analogous to the outcome of studies of infant crying, empirical research has failed to provide convincing support for the position that infant facial expressions are signals of discrete negative emotions isomorphic with prototypical adult expressions of negative emotions. This means that infant facial expressions cannot inform parents about specific infant emotions. But infants' facial and vocal expressions do communicate the crucial information that the infant is distressed, as well as information about the intensity of distress, thus signaling the infant's need for parental attention and appropriate responding.

Maternal sensitivity to infant distress

According to attachment theory, a sensitive caregiver fosters secure attachment, as the infant will experience this caregiver as a safe haven to turn to in times of distress (Bowlby, 1969/1997; Goldberg, Grusec, & Jensen, 1999). The empirical literature on parental sensitivity in infancy also emphasizes the importance of responsiveness to infant distress signals for positive child developmental outcomes (e.g., Higley & Dozier, 2009; Leerkes, Blankson, & O'Brien, 2009; McElwain & Booth-LaForce, 2006). However, studies focusing explicitly on maternal sensitivity to infant distress are rare, as most studies observe mothers and infants in non-distressing play situations in which few infants show negative emotions. In addition, none of the

instruments used in these studies include specific mention of the mother's ability to distinguish between different types of distress.

Ainsworth's Maternal Sensitivity Scale (Ainsworth et al., 1974) describes a sensitive mother and an insensitive mother as follows: "When he is hungry she sees that he soon gets something to eat, perhaps giving him a snack if she does not want to give him his regular meal right away. On the other hand, the mother who responds inappropriately tries to socialize with the baby when he is hungry, play with him when he is tired, or feed him when he is trying to initiate social interaction." This seems to suggest that precise knowledge of the reason for the infant's signals is required in order to respond sensitively. However, Ainsworth's further definition of the scale points suggests that the appropriateness of the responses should be inferred mainly from the outcomes of her interventions. Ainsworth states that the highly sensitive mother has "'well-rounded' interactions with B, so that the transaction is smoothly completed and both she and B feel satisfied," whereas the insensitive mother "may respond with seeming appropriateness to B's communications but break off the transactions before B is satisfied." Thus, a positive influence on the baby's mood should be the guiding source of information when it comes to inferring the correctness of a mother's interpretation and response.

John Bowlby was acutely aware of this when he wrote: "There are several means by which a mother identifies the cause of her baby's crying. When it is pain, the type of crying is likely to provide a clue. When it is an external stimulus, she may herself have noticed the offending event. When it is hunger or cold, the circumstances are suggestive, and the provision of food or warmth is an effective test of the accuracy of her guess. When it is none of these things a mother may be flummoxed" (Bowlby, 1969/1997, p. 291). What Bowlby suggests here is that sensitive caregiving is an iterative process guided in part by contextual cues as well as facial and vocal expressions. A mother is unlikely to be able to infer the infant's needs from any single source but will have to use all available information and try out different strategies in order to soothe the baby. Consider the following observation of a mother and her 3-month-old infant in a recent study conducted at Leiden University:

The infant is crying on mother's lap. She looks at the baby and in a friendly soothing voice says "Hey, hey." Then she looks at the baby's foot: "Is your foot uncomfortable?" and she moves the baby's foot. The infant continues to cry and looks away. Mother says "What can you see over there? Shall mummy sing a song?" and when the baby continues to cry: "Or don't you feel like it yet?" The infant continues to cry. "No? Do you want to be upright?" Mother holds the baby upright against her chest and shoulder. The baby continues to cry. Mother says: "Mummy will turn you around so you can see everything," and turns the baby facing outward. The baby continues to cry. Then mother starts to sing a song and after 11 seconds the baby has stopped crying.

The mother in this example may have been flummoxed at first, but by trying out different strategies and monitoring the baby's responses, she finds a way to soothe the baby. It is important to note that whatever soothes the baby does not necessarily reflect what was ailing the baby in the first place. Singing a song may work to stop the baby's crying, but this of course does not mean the baby's crying was caused by the absence of singing, or even by the absence of attention. This mother may never know for sure why her baby was crying, but she did manage to soothe her baby. This interaction sequence also highlights two important elements of sensitivity as described by Ainsworth, namely "freedom of distortion" and empathy. A mother with a

distorted perception of her infant's needs would not have tried several different things to find out what would soothe the baby, but would rather have come up with a solution that fits her own needs and wishes and rigidly stuck to that strategy regardless of the results. So freedom from distortion is a necessary component of sensitivity as it allows a mother to freely explore what the baby needs. Finally, empathy is what drives a sensitive mother to make the effort to effectively soothe the baby in the first place. Awareness of a baby's distress is not enough. The sensitive mother in the example is motivated to take the time to give the baby what it needs because she empathizes with its distress. As also noted by Steele (2011) this does not mean that her initial unsuccessful attempts to soothe her baby are irreparable mistakes. In fact, such mismatches occur frequently in parent–infant interactions (Tronick & Gianino, 1986). It is the mother's willingness to resolve and repair that is essential.

The fact that maternal sensitive responding to infant distress is ultimately aimed at soothing the baby also means that sensitivity plays a crucial role in the development of emotion regulation. Sensitive responding to infant distress is often described as dyadic regulation, because the sensitive mother adapts her behavior based on the infant's cues to facilitate an optimal level of arousal, which in turn is known to facilitate self-regulation of emotions (Calkins, 1994; Sroufe, 1989). Interestingly, the literature on early childhood emotion regulation also does not tend to specify the discrete emotions to be regulated, but rather describes it as successfully managing emotional arousal in general (e.g., Calkins, 1994; Eisenberg, Cumberland, & Spinrad, 1998). This is consistent with the notion that regulating emotions (dyadic or self) is all about process and outcomes, and not so much about predefined responses to predefined emotional states.

In addition to fostering the development of self-regulation, consistent, prompt responding to infant crying makes it more likely the caregiver will be close enough to the infant to perceive and respond to more subtle close-range signals such as mild fussy vocalizations, negative facial expressions, gaze aversion, and bodily tension, thus in some cases averting full-out crying and fostering the development of effective noncry communications (cf. Bell & Ainsworth, 1972). Although maternal sensitivity is often discussed only in relation to crying, sensitive caregiving involves awareness that infants' expressions of emotion involve multiple communication modalities.

The salience of process and outcomes also explains why micro-analytic approaches to mother–infant interactions (e.g., Beebe et al., 2010) cannot by themselves fully capture the sensitivity construct. Such approaches only capture the contingency aspect of sensitivity (prompt and predictable responding) but not the aspect of appropriate responding, which is the unique and most essential part of the sensitivity construct (Mesman, 2010). However, as seen in the next section, micro-level analyses of dyadic interactions do yield very useful insights into the temporal structure of such interactions that cannot be captured by macro-level methods.

The contextual and iterative nature of maternal sensitive responsiveness to distress presented above is consistent with a dynamical systems perspective on infant distress (Camras, 2011) and with an ontogenetic perspective on infants' emotional expressions (Oster, 2005), both of which will be discussed below.

A dynamical systems perspective on infant distress

Dynamical systems approaches have emphasized subtle contextual influences on infants' affective behavior. Emotions themselves are viewed as “attractor states,”

i.e., assemblies of responses that are shaped by situational variables (e.g., the “cause” of the emotion, the context in which it takes place) as well as facilitating or inhibitory synergistic relationships among the responses themselves (e.g., constraints on facial movements imposed by the mechanics of respiration during crying). For example, in a naturalistic study of her 4- to 9-week old daughter’s expressive behavior, Camras (1992) found that within the context of a single crying episode her infant cycled through the Max-specified expressions of “physical pain,” “anger,” and “sadness” as the volume and intensity of her crying waxed and waned in coordination with her breathing. Thus the crying context in which the facial expressions were formed shaped the morphology of these expressions. That is, the infant’s expressions appeared to vary in accord with the dynamics of her crying rather than with the experience of different discrete emotions. Correspondingly (and consistent with Oster, Hegley, and Nagel’s 1992 study), observers viewing videotapes of the infant’s expressions rated her as being distressed more than angry, sad, or in pain (Camras, Sullivan, & Michel, 1993).

Other dynamical systems’ researchers (e.g., Fogel and his colleagues as reviewed in Camras & Witherington, 1995) have studied infant positive affect by using a microgenetic approach involving fine-grained observation of contextual factors (including maternal behaviors) that shape various forms of infants’ responding. A particular contribution of Fogel’s dynamical systems perspective has been the observation that the same maternal behavior might evoke different responses in the infant depending upon the situational context and the infant’s current state of arousal. While similar observations have been made by others (e.g., Sroufe, 1985), a dynamical systems perspective provides a compelling theoretical framework in which such phenomena can be conceptualized. That is, according to the dynamical systems perspective, “attractor states” (such as positive affect) involve the self-organization of multiple components rather than simple stimulus-response associations (e.g., frustration automatically leading to anger expressions). While the studies by Fogel and his colleagues have focused on positive play interactions rather than episodes of distress, they may serve as a blueprint for future studies of maternal sensitivity, allowing for the identification of patterns of responding that lead to more or less successful attempts to alleviate distress. Importantly, such an approach would use the dyad as the unit of analysis and allow for identifying processes that may work for some mother–child pairs but not for others and in some situational contexts but not in others.

An ontogenetic perspective on infant distress expressions

From an ontogenetic perspective and consistent with dynamical systems’ emphasis on the contextual embedding of behavior, the facial and vocal expressions of infants and toddlers are not just immature or precocious adult expressions (Oster, 2005). Rather, they can be considered ontogenetic adaptations (Oppenheim, 1980), behaviors that evolved because they serve crucial communicative functions in *infancy* (Darwin, 1872/1998) and thus contribute to the survival and normal development of infants. As noted in Konner’s (1972) account of mother–child interactions in a foraging people in Botswana, “an infant is first of all, and at every point in his development, an adapted organism. He is first of all surviving, and in the meantime developing” (p. 302). Certain features of immature organisms are themselves adaptive because they signal the appeal or helplessness of the

young of many species (for example, babyish facial structures or protective coloration).

An ontogenetic perspective can explain both the presence of distinctive infant facial expressions and the absence of prototypical, adult-like expressions of discrete negative emotions. Smiling, crying, and certain other distinctive infant expressions are universal and present from the beginning of life. The morphology of these distinctive expressions is very similar in infants and adults (Oster, 2005, 2010). The facial expressions of a grieving adult look very much like those of a distressed infant or child, and not like an angry adult. These distinctive infant expressions play a key role in early parent–infant interactions, as noted by Darwin (1872/1998); and they continue to play similar communicative functions throughout life.

On the other hand, the absence of adult-like expressions of discrete negative emotions may also be adaptive. Studies have shown that parents who are at risk for insensitive caregiving or maltreatment are more likely to misidentify infants' emotional expressions – especially subtle expressions – or to attribute negative intentionality to their children (e.g., Bugental, Lin, Rainey, Kotovic, & O'Hara, 2002; Dixon, Hamilton-Giachritsis, & Browne, 2005; Kropp & Haynes, 1987; Milner, 2003). From an evolutionary perspective, distress expressions are more likely to elicit empathy than discrete, adult-like angry or fearful faces. Thus, showing adult-like expressions of discrete negative emotions that are not tempered by signs of distress would be maladaptive for infants, as such expressions might provoke punitive or harsh responses from adults.

Another possible reason why infants, toddlers, and at times even children show more generalized expressions of distress and not clearly differentiated, adult-like expressions of discrete negative emotions is that intense negative emotion of any kind, whether frustration, fear, or disappointment, may overwhelm their capacity to regulate distress (Tomkins, 1963). Regardless of the reason for their distress, infants cannot fight or flee and so need the help of caregivers to attend to their needs, remove frustrating obstacles, and comfort and reassure them. This continues to be true even for toddlers and young children. Temper tantrums, long viewed as manifestations of pure anger or rage, have been shown to involve vocal, bodily, and facial expressions of distress as well as anger (Giesbrecht, Miller, & Müller, 2010; Green, Whitney, & Potegal, 2011; Potegal & Davidson, 2003).

Like distress vocalizations (Gustafson et al., 2000), infant facial expressions of negative affect are not just global and diffuse but communicate graded information about variations in the intensity of distress, ranging from mildly negative grimaces to big, open-mouth cry faces. Distinctive variants or modulations of pre-cry and cry faces, such as pouts and “kidney mouth” faces, often directed at the caregiver, may communicate more subtle information about efforts to regulate negative affect (Oster, 2005, 2010). However, these distinctive infant facial expressions do not map clearly onto discrete adult negative emotion categories.

Infant emotion theories and the maternal sensitivity construct

It is proposed that maternal sensitivity to infant distress does not rely on identifying specific discrete emotions but rather on ongoing interpretations of infant and contextual cues and an iterative process of response selections to find out what will soothe the infant at a particular moment in time. This is consistent with a dynamical systems perspective on infant distress, which would predict that sensitive caregivers

respond to infants' affective expressions by considering them in light of their context rather than as fixed signals related invariably to a specific discrete emotion. Dynamic systems theory emphasizes the back-and-forth nature of dyadic interaction that is inherent to the proposition that mothers attune their behaviors to their infant's needs by continuously adapting their behavior and evaluating their effect on the infant's emotional state. This view is also supported by the ontogenetic perspective to infant emotions, which views them as evolved, adaptive behaviors that serve to evoke caregiving. In this light, the specific source of distress is not crucial; rather, the ability to summon adult care and protection is what is most important. Once that has been obtained, it is up to the adult to find out what will alleviate the infant's distress through a process of dynamical exchanges and behavioral iterations based on careful observation of the infant's signals.

Conclusions and future directions

As the literature shows, the interpretation of infant negative emotion expressions is not straightforward. Facial and vocal expressions of distress clearly communicate the emotion of *distress*, in the absence of any contextual cues (as when one hears the cries of an infant who is out of sight, or when an infant's face contorts into a cry face without any obvious cause). But by themselves, these expressions do not usually communicate the specific causes of distress or the specific negative emotion experienced, and adults are largely unable to distinguish specific infant needs from their cry sounds or facial expressions alone. Sensitivity to infant distress thus depends on careful observation of the infant and its state, integrating multiple sources of information, and if that does not yield a clear answer, trying out different things until the baby is soothed.

Even the context does not always provide the definitive clue (as in the observation example), because the same situation may elicit different emotions in different infants or in the same infant at different times. In reality, a parent often does not actually need to be able to find out the precise cause of the infant's distress or to identify a specific negative emotion. Even if the cause of distress or the specific emotion experienced by the infant is obvious (e.g., frustration or anger in response to interference with the infant's goals, or fear elicited by a strange object), this does not guarantee sensitive responding. Ainsworth emphasizes that sensitivity requires accurate interpretation of and empathy with the infant's distress (Ainsworth et al., 1974).

It is important to note that distinguishing between visibly and measurably different infant affect expressions is not irrelevant, but that such distinctions do not refer to discrete emotions and causes of emotions, but to signals of intensity and urgency. According to Ainsworth's sensitivity scale (Ainsworth et al., 1974), an important characteristic of highly sensitive parenting is awareness of the infant's "more subtle communications, signals, wishes, and moods." Because infants' vocal and facial expressions of negative affect communicate finely graded information about the intensity and urgency of distress, subtle whimpers, pre-cry faces, or pouts can serve as early warning signals, allowing parents to intervene and avert full-blown distress.

The above considerations also have relevance for interventions aimed at enhancing parental sensitivity. Important avenues for intervention include increasing awareness of sometimes subtle distress signals, enhancing the process of

interpretation of such signals, and teaching skills for appropriate responsiveness to distress. Indeed, interventions focusing on recognizing infant distress based on both expressive and contextual cues and enhancing sensitive responsiveness have shown to be effective in increasing sensitive parenting and fostering positive child outcomes (e.g., Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2003; Van Zeijl et al., 2006). Such interventions would be especially important for parents at risk for child maltreatment and those who attribute negative intentionality to their children's distress. On the other hand, interventions based on providing parents and health care practitioners with information on interpreting infant cry faces as discrete negative emotions, rather than expressions of distress, as in Sullivan and Lewis' (2003) "practitioner's primer," could have a negative effect on sensitivity as it teaches parents to rely on cues that have no proven relation to infants' specific emotions and needs and could contribute to negative attributions by mothers at risk of maltreatment.

The evidence that infants do not show clearly differentiated, adult-like facial and vocal expressions of discrete negative emotions does not necessarily mean that infants express or experience only global, undifferentiated distress or do not experience emotions like anger and fear. Body movements and instrumental behaviors provide compelling evidence that infants do experience something like these emotions (e.g., Camras et al., 1997; Green et al., 2011; Potegal & Davidson, 2003). However, infants' facial and vocal expressions of negative emotions invariably involve elements of distress, and their distinctive, *infant* expressions signal a need for help and comforting or removal of the source of frustration or fear, regardless of the specific emotion the infant might be experiencing.

In terms of the assessment of sensitivity, it is important to not define specific or concrete parental behaviors as sensitive or insensitive a priori (except maybe for harsh behaviors), because the sensitivity of a behavior lies in its positive effect on the infant, not in its specific content. This also makes the construct more easily applicable across cultures, as the content or modality of responsiveness may be culturally determined, whereas the level of responsiveness is not (e.g., Kärtner, Keller, & Yovsi, 2010). In addition, when observing parental sensitivity it is important to not only focus on the outcome of parental behaviors, but also on the interaction *process*. As mentioned by Ainsworth, the sensitive parent should show empathy and therefore willingness to take the time to find out what the baby needs and what she can do to alleviate its distress, rather than simply look for a quick and easy fix. Finally, given the potentially iterative nature of sensitive interactions with infants, using a variety of strategies should not necessarily be viewed as a sign of insensitivity. This may seem at odds with Ainsworth's statement about mothers with low sensitivity: "These mothers may try a series of interventions as though searching for the best method or solution." However, it is assumed that this sentence is meant to refer to random trial-and-error unrelated to the infant's behavior, which would be labeled as insensitive. Nevertheless, it is important to keep in mind that searching for an effective response may be very sensitive, given that the precise source of infant distress can often not be readily observed, and a sensitive parent would try her best to find out what the source is or at least what will alleviate the distress. To further strengthen our conceptualization of parental sensitivity, a dynamic system's approach could be combined with objective measurement of the modality, intensity, and configuration of infant distress signals and the steps that sensitive versus insensitive parents take in responding to the infant's distress. Such an approach

could also be used to examine the differential effect on dyadic interactions of what Gergely and Watson (1999) refer to as the “markedness” of parents’ affective mirroring of infant emotional expressions, as opposed to their “unmarked” expressions of negative emotion. This is related to the issue of intentional versus intuitive emotion responses to infants (Mesman, 2010) which may have different effects on infant regulation. In addition, it would be interesting to study which specific infant cues and parental responses trained observers of sensitivity primarily use to decide on a sensitivity rating.

In sum, perception of and empathy with the child’s distress are hallmarks of parental sensitivity as Ainsworth emphasized; but there is little evidence that this is dependent on the identification of discrete infant emotions. Rather, a sensitive parent picks up on the most subtle gradations and variants of infants’ distress signals and recognizes when dyadic regulation is needed. As Mary Ainsworth stated in the description of her sensitivity scale, “The most sensitive mother—the one with the lowest threshold—is alert to the baby’s most subtle, minimal, understated cues.” So infant distress signals do not tell the parent about the specific causes of distress or about specific, discrete negative emotions, but do call the parent to action. Which action is required depends on careful observation of the context as well as monitoring the effectiveness of responses to the distress and adapting responses accordingly.

References

- Ainsworth, M.D.S., Bell, S.M., & Stayton, D.J. (1974). Infant–mother attachment and social development. In M.P. Richards (Ed.), *The introduction of the child into a social world* (pp. 99–135). London: Cambridge University Press.
- Bakermans-Kranenburg, M.J., van IJzendoorn, M.H., & Juffer, F. (2003). Less is more: Meta-analyses of sensitivity and attachment interventions in early childhood. *Psychological Bulletin*, *129*, 195–215.
- Beebe, B., Jaffe, J., Markese, S., Buck, K., Chen, H., Cohen, P., et al. (2010). *The origins of 12-month attachment: A microanalysis of 4-month mother–infant interaction*. *Attachment & Human Development*, *12*, 3–141.
- Bell, S.M., & Ainsworth, M.D. (1972). Infant crying and maternal responsiveness. *Child Development*, *43*, 1171–1190.
- Bridges, K. (1932). Emotional development in early infancy. *Child Development*, *3*, 324–341.
- Bugental, D.B., Lin, E.K., Rainey, B., Kotovic, A., & O’Hara, N.O. (2002). A cognitive approach to child abuse prevention. *Journal of Family Psychology*, *16*, 243–258.
- Calkins, S.D. (1994). Origins and outcomes of individual differences in emotion regulation. *Monographs of the Society for Research in Child Development*, *59*(2-3, Serial No. 240).
- Campos, J.J., & Barrett, K.C. (1984). Toward a new understanding of emotions and their development. In C.E. Izard, J. Kagan, & R.B. Zajonc (Eds.), *Emotions, cognition, and behavior* (pp. 229–263). New York, NY: Cambridge University Press.
- Camras, L.A. (1992). Basic emotions and expressive development. *Cognition and Emotion*, *6*(3,4), 269–284.
- Camras, L.A. (2011). Differentiation, dynamical integration, and functional emotional development. *Emotion Review*, *3*, 138–146.
- Camras, L.A., & Shutter, J. (2010). Emotional facial expressions in infancy. *Emotion Review*, *2*(2), 120–129.
- Camras, L.A. & Witherington, D.C. (2005). Dynamical systems approaches to emotional development. *Developmental Review*, *25*, 328–350.
- Camras, L.A., Oster, H., Bakeman, R., Meng, Z., Ujicie, T., & Campos, J.J. (2007). Do infants show distinct negative facial expressions for fear and anger? Emotional expression in 11-month-old European-American, Chinese, and Japanese infants. *Infancy*, *11*, 131–155.

- Camras, L.A., Oster, H., Campos, J., Ujjiie, T., Miyake, K., Wang, L., et al. (1997). Observer judgements of American, Chinese and Japanese infants' emotions. In K. Barrett (Ed.), *New directions for child development, No. 77: The communication of emotion* (pp. 89–105). San Francisco, CA: Jossey-Bass.
- Camras, L.A., Sullivan, J., & Michel, G. (1993). Do infants express discrete emotions? Adult judgments of facial, vocal and body actions. *Journal of Nonverbal Behavior, 17*, 171–186.
- Darwin, C. (1998). *The expression of the emotions in man and animals* (3rd ed.). New York, NY: Oxford University Press. (Original work published 1872).
- Dixon, L., Hamilton-Giachritsis, C., & Browne, K. (2005). Attributions and behaviours of parents abused as children: A mediational analysis of the intergenerational continuity of child maltreatment (Part II). *Journal of Child Psychology and Psychiatry, 46*, 58–68.
- Duchenne de Boulogne, B.G. (1990). *The mechanism of human facial expression* (A. Cuthbertson, Ed. & Trans.). New York, NY: Cambridge University Press. (Original work published 1862).
- Eisenberg, N., Cumberland, A., & Spinrad, T.L. (1998). Parental socialization of emotion. *Psychological Inquiry, 9*, 241–273.
- Ekman, P., Friesen, W.V., & Hager, J. (2002). *Facial Action Coding System* [CD ROM]. Salt Lake City, UT: Research Nexus, Subsidiary of Network Information Research Corporation.
- Gergely, G., & Watson, J.S. (1999). Early social-emotional development: Contingency perception and the social biofeedback model. In P. Rochat (Ed.), *Early social cognition: Understanding others in the first months of life* (pp. 101–136). Mahwah, NJ: Lawrence Erlbaum.
- Giesbrecht, G.F., Miller, M.R., & Müller, U. (2010). The anger-distress model of temper tantrums: Associations with emotional reactivity and emotional competence. *Infant and Child Development, 19*, 478–497.
- Goldberg, S., Grusec, J.E., & Jenkins, J.M. (1999). Confidence in protection: Arguments for a narrow definition of attachment. *Journal of Family Psychology, 13*, 475–483.
- Goldsmith, H.H., & Rothbart, M.K. (1992). The Laboratory Temperament Assessment Battery (LAB-TAB). Locomotor version, 2.01. Unpublished manuscript, University of Wisconsin, Madison.
- Goldsmith, H.H., & Rothbart, M.K. (1996). The Laboratory Temperament Assessment Battery (LAB-TAB). Prelocomotor version, V. 3.00. Unpublished manuscript, University of Wisconsin, Madison.
- Green, J.A., Whitney, P.G., & Potegal, M. (2011). Screaming, yelling, whining, and crying: Categorical and intensity differences in vocal expressions of anger and sadness in children's tantrums. *Emotion, 11*, 1124–1133.
- Gustafson, G.E., Wood, R.M., & Green, J.A. (2000). Can we hear the causes of infants' crying? In R.G. Barr, B. Hopkins, & J.A. Green (Eds.), *Crying as a sign, a symptom, and a signal: Clinical, emotional and developmental aspects of infant and toddler crying* (pp. 137–157). London: Mac Keith Press.
- Higley, E., & Dozier, M. (2009). Nighttime maternal responsiveness and infant attachment at one year. *Attachment & Human Development, 11*, 347–363.
- Izard, C.E. (1983). *The maximally discriminative facial movement coding system* (Rev. ed.). Newark, DE: Instructional Resources Center.
- Izard, C.E., & Malatesta, C.Z. (1987). Perspectives on emotional development I: Differential emotions theory of early emotional development. In J.D. Osofsky (Ed.), *Handbook of infant development (2nd ed., pp. 494–554)*. New York, NY: Wiley.
- Kärtner, J., Keller, H., & Yovsi, R.D. (2010). Mother–infant interaction during the first 3 months: The emergence of culture-specific contingency patterns. *Child Development, 81*, 540–554.
- Konner, M.J. (1972). Aspects of the developmental ethology of a foraging people. In N. Blurton Jones (Ed.), *Ethological studies of child behavior* (pp. 285–304). London: Cambridge University Press.
- Kropp, J.P., & Haynes, O.M. (1987). Abusive and nonabusive mothers' ability to identify general and specific emotion signals of infants. *Child Development, 58*, 187–190.
- Leerkes, E.M., Blankson, A.N., & O'Brien, M. (2009). Differential effects of sensitivity to infant distress and non-distress on social-emotional functioning. *Child Development, 80*, 762–775.

- McElwain, N.L., & Booth-LaForce, C. (2006). Maternal sensitivity to infant distress and nondistress as predictors of infant–mother attachment security. *Journal of Family Psychology, 20*, 247–255.
- Mesman, J. (2010). Maternal responsiveness to infants: Comparing micro-level and macro-level measures. *Attachment & Human Development, 12*, 143–149.
- Milner, J.S. (2003). Social information processing in high-risk and physically abusive parents. *Child Abuse and Neglect, 27*, 7–20.
- Müller, E., Hollien, H., & Murray, T. (1974). Perceptual responses to infant crying: Identification of cry types. *Journal of Child Language, 1*, 89–95.
- Oppenheim, R.W. (1980). Metamorphosis and adaptation in the behavior of developing organisms. *Developmental Psychobiology, 13*, 353–356.
- Oster, H. (2005). The repertoire of infant facial expressions: An ontogenetic perspective. In J. Nadel & D. Muir (Eds.), *Emotional development: Recent research advances* (pp. 261–292). New York, NY: Oxford University Press.
- Oster, H. (2010). *Baby FACS: Facial Action Coding System for infants and young children*. Unpublished monograph and coding manual, New York University.
- Oster, H., Hegley, D., & Nagel, L. (1992). Adult judgments and fine-grained analysis of infant facial expressions: Testing the validity of *a priori* coding formulas. *Developmental Psychology, 28*, 1115–1131.
- Potegal, M., & Davidson, R.J. (2003). Temper tantrums in young children: 1. Behavioral composition. *Journal of Developmental and Behavioral Pediatrics, 24*, 140–147.
- Sherman, M. (1927). The differentiation of emotional responses in infants. II. The ability of observers to judge the emotional characteristics of the crying of infants, and of the voice of an adult. *Comparative Psychology, 7*, 335–351.
- Sroufe, L.A. (1989). Pathways to adaptation and maladaptation: Psychopathology as developmental deviation. In D. Cicchetti (Ed.), *Rochester symposia on developmental psychopathology* (Vol. 1, pp. 13–14). Hillsdale, NJ: Erlbaum.
- Sroufe, L.A. (1995). *Emotional development: The organization of emotional life in the early years*. New York: Cambridge University Press.
- Steele, H. (2011). Early social and emotional experience matters: The first year of life. In D. Skuse, H. Bruce, L. Dowdney, & D. Mrazek (Eds.), *Child psychology and psychiatry: Frameworks for practice* (2nd ed.). Chichester: John Wiley & Sons.
- Sullivan, M.W., & Lewis, M. (2003). Emotional expressions of young infants and children: A practitioner's primer. *Infancy and Young Children, 16*(2), 120–142.
- Tomkins, S.S. (1963). *Affect, imagery, consciousness* (Vol. II). New York, NY: Springer.
- Tronick, E.Z., & Gianino, A. (1986). Interactive mismatch and repair: Challenges to the coping infant. *Zero-to-Three, 6*, 1–6.
- Van Zeijl, J., Mesman, J., van IJzendoorn, M.H., Bakermans-Kranenburg, M.J., Juffer, F., Stolk, M.N., et al. (2006). Attachment-based intervention for enhancing sensitive discipline in mothers of 1- to 3-year-old children at risk for externalizing behavior problems: A randomized controlled trial. *Journal of Consulting and Clinical Psychology, 74*, 994–1005.
- Zeskind, P.S., & Marshall, T.R. (1988). The relation between variations in pitch and maternal perceptions of infant crying. *Child Development, 59*, 193–196.