Article

How the Emotional Environment Shapes the Emotional Life of the Child

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Vanessa LoBue[1] and **Marissa Ogren**[1]

Abstract

Emotion understanding facilitates the development of healthy social interactions. To develop emotion knowledge, infants and young children must learn to make inferences about people's dynamically changing facial and vocal expressions in the context of their everyday lives. Given that emotional information varies so widely, the emotional *input* that children receive might particularly shape their emotion understanding over time. This review explores how variation in children's received emotional input shapes their emotion understanding and their emotional behavior over the course of development. Variation in emotional input from caregivers shapes individual differences in infants' emotion perception and understanding, as well as older children's emotional behavior. Finally, this work can inform policy and focus interventions designed to help infants and young children with social-emotional development.

Keywords

emotional development, emotion perception, emotion knowledge, emotional input, emotional facial expressions

Tweet

Infants and young children receive varied emotional input, which shapes their emotion understanding and their emotional behavior over the course of development. Learn what this means for policy.

Key Points

- Emotion understanding facilitates the development of healthy social interactions, but research has focused only on a subset of what children might see.
- Only recently has research moved beyond static, stereotyped, facial emotions to studying dynamic, naturalistic emotions.
- Given that emotional information varies so widely, the emotional *input* that children receive might shape their emotion understanding over time.
- This review explores how variation in the emotional input that infants and young children receive shapes their emotion understanding and their emotional behavior over the course of development.
- According to the research reviewed, caregiver-focused interventions immediately following the birth of an infant would most directly target the emotional environment and might thus have the most promise in effectively reducing the impact of any problematic emotional variability.

Emotion understanding—the set of abilities related to determining the emotions of others—is crucial for the development of healthy social interactions. Emotion understanding allows us to respond appropriately to others' needs, make predictions about social interactions, and even regulate our own emotional responses effectively. Indeed, children who have better emotion understanding are rated as more socially skilled by their teachers, they are rated as more likable by their peers, and they are better able to navigate aggressive interactions. Likewise, children with poor emotion understanding tend to be more aggressive, present with more behavioral problems and internalizing issues, and demonstrate lower academic achievement (see Denham, 2019, for a review). Thus, how children come to understand emotions over the course of development matters for both scientific and practical reasons.

Mechanisms (e.g., visual attention, brain systems) required for emotion perception and understanding in infants and young children are well understood for static displays. Abilities in discrimination, categorization, and identification of emotional facial configurations (e.g., stereotyped photographs of scowling or smiling faces) begins in infancy and proceeds at least through early childhood. In the first few months of life, for example, infants can discriminate between photographs of smiling, frowning, and wide-eyed stereotypical facial configurations (Farroni et al., 2007; Field et al., 1983; Young-Browne et al., 1977), and

[1]Department of Psychology, Rutgers University, Newark, NJ, USA

Corresponding Author:
Vanessa LoBue, Department of Psychology, Rutgers University-Newark, 101 Warren St Ste 301, Newark, 07102, New Jersey, USA.
Email: vlobue@psychology.rutgers.edu

can differentiate between wide-eyed gasping poses, frowning poses, and scowling poses by around 5 to 6 months (Schwartz et al., 1985; Serrano et al., 1992). By 6 to 7 months, infants can group different models posing the same emotional expression (Nelson et al., 1979), and they can detect category boundaries when images are morphed from one stereotypic configuration to another (Kotsoni et al., 2001). Between 12 to 18 months, infants use stereotyped fear configurations to guide action, avoiding novel objects or drop-offs that are paired with an adult's fearful face (Mumme et al., 1996; Mumme & Fernald, 2003; Sorce et al., 1985). And between the ages of 2 and 3, children begin to produce the expected labels for various stereotyped facial configurations, first by correctly distinguishing smiling (positive) versus scowling or frowning (negative) poses, then later, by correctly producing the specific labels (e.g., angry, sad, afraid) for various emotion categories (Widen, 2013; Widen & Russell, 2008).

Despite this abundance of research suggesting that even infants have precocious abilities to discriminate between static stereotyped emotion configurations, emotional information in the real world is much more complex than these posed stereotypes represent. In fact, adults rarely express instances of emotion using posed, stereotypical configurations in everyday emotional interactions. In reality, people express instances of emotion with considerably more variation (Barrett et al., 2019). Further, a given facial expression can represent various emotion categories when expressed naturalistically; for example, people scowl when they are angry or sad, and they smile when they are happy, nervous, or even afraid. In addition, emotional expressions vary as a function of context and culture, and individuals express emotions differently even in very similar situations (Barrett et al., 2019).

Given that emotional information varies so widely, the emotional *input* that infants receive can also vary significantly (Oakes, 2017; Smith et al., 2018). This begs the question of how natural variation in emotional input might shape children's emotion understanding, and perhaps even their emotional behavior over the course of development. Here, we discuss evidence that variations in emotional input from caregivers shapes individual differences in infants' emotion perception and understanding. We also show how emotional input shapes older children's emotional behavior. Finally, we discuss how this work can inform policy, and specifically, where to focus interventions designed to help infants and young children with emotion understanding and social-emotional development more broadly.

How Input Shapes Children's Emotion Perception

Currently, few existing datasets record the emotional input that typically developing infants and young children receive in their environments. Indeed, many researchers have long assumed that emotion categories have exemplars that share a typical or representative set of features including emotional facial expressions that all individuals should universally express in a similar way (e.g., Izard, 2007; for discussion, see Barrett et al., 2019). However, more recent theories of emotional development broadly emphasize that emotional expression is variable and context-dependent (e.g., Barrett, 2017a; Hoemann et al., 2020; LoBue & Adolph, 2019); emotion categories are conceptually based populations of variable, situation-specific instances (Barrett, 2017a). Thus, individual differences in the emotional environment—or in this case, the emotional expressiveness of caregivers—might differentially shape emotion perception over time.

As some indirect evidence from clinical populations suggests, the emotional input to infants and young children affects how they perceive emotional facial configurations. For example, because of the increased exposure to negative affect in the emotional environment, infants of depressed mothers show a novelty response to positive emotional expressions, they have difficulty differentiating between positive and neutral expressions, and they demonstrate a habituation response to negative emotional expressions. Indeed, depressed mothers express more negative affect than do non-depressed mothers (e.g., Murray et al., 1993), even in face-to-face interactions with their infants (Aktar et al., 2017; Feldman et al., 2009). Perhaps not surprisingly then, infants of depressed mothers show less interest in negative facial configurations than do infants of non-depressed mothers (Cohn et al., 1990; Field, 1992). Likewise, infants of depressed mothers take longer to disengage (look away from) stereotypically happy configurations than do infants of non-depressed mothers (Diego et al., 2004; Field et al., 1998). Furthermore, while 5-month-old infants can typically differentiate between happy and neutral facial configurations in a habituation paradigm, infants of depressed mothers have difficulty discriminating between neutral and smiling faces (Bornstein et al., 2011).

Similarly, anxious mothers are often less sensitive to their infants' needs, less emotionally responsive, and more interfering when compared to non-anxious mothers (e.g., Kaitz & Maytal, 2005). Thus, infants of anxious caregivers might receive less feedback about their own emotional responses than infants of non-anxious caregivers, possibly making emotional information less salient. Accordingly, infants of anxious mothers engage less (duration of looking) with emotional facial configurations when compared to infants of non-anxious mothers (Vallorani et al., 2021). Further, infants of anxious mothers have difficulty disengaging (looking away from) negative facial configurations, especially angry or threatening ones (Morales et al., 2017). Thus, infants of anxious mothers appear to be less engaged with emotional facial configurations in general than infants of non-anxious mothers, with

the exception of threatening or anger configurations, in which they demonstrated a heightened sensitivity.

Like infants of anxious mothers, older children who have been physically maltreated are particularly sensitive to the presence of stereotypical anger configurations (Pollak & Kistler, 2002), but are less accurate than non-maltreated children at identifying configurations that represent emotion categories besides anger, especially positive emotions (Harms et al., 2019). For example, when shown an array of facial configurations that slowly morph from angry stereotypes to fearful or sad stereotypes, children are quite skilled at identifying the boundary where the face shifts from a predominantly angry to a predominantly fearful or sad expression. Children who have been physically maltreated, however, still identify some faces that have crossed the threshold from angry to sad/fearful as angry, suggesting that they are overly sensitive to angry configurations. This fits with literature suggesting that caregivers who physically maltreat their children express more anger, but less variability in their affective responses than caregivers of non-maltreated children (Plate et al., 2019; Shackman & Pollak, 2014).

Together, this work provides an indirect link between caregivers' emotionality and trajectories of emotion perception in infants and young children. But one could argue that anxiety, depression, and maltreatment constitute atypical emotional environments, and that infants who experience more typical forms of emotional variation would not demonstrate differences in emotion perception. However, milder, everyday stress might also change the emotional environment in ways that shape infants' emotion perception over time. One commonly experienced feature of a typical environment, for example, is everyday parenting stress, or what can be operationalized as "parenting hassles" (Crnic & Greenberg, 1990). Even minor parenting hassles can translate to meaningful differences in the way parents interact with their infants and young children. For example, parenting hassles link to more authoritarian parenting and less positive, less responsive interactions with children (Belsky et al., 1995; Crnic & Greenberg, 1990; Deater-Deckard & Scarr, 1996).

A recent study demonstrated that infants exposed to heightened levels of normative parenting hassles show differential responses to emotional facial configurations when compared to infants exposed to lower or average levels of hassles. In the study, infants at 4, 8, and 12 months of age saw happy, angry, and neutral facial configurations on one of the four corners of a screen, and eye-trackers measured how quickly they detected, or first fixated, each face. At 4 months, the infants whose parents reported a high number of parenting hassles were faster to detect angry or threatening facial configurations compared to the other infants. However, while infants of parents who reported a low or average number of hassles got faster to detect threat over time relative to the other emotions, infants of parents who reported high levels of hassles *slowed* in their detection of angry (but not happy) facial configurations compared to neutral faces between 4 and 12 months (Burris et al., 2021). This suggests that high levels of normative parenting stress relate to differences in the way infants perceive emotional information, and that these differences are detectable by *4 months of age*.

While most of these studies have examined the negative impact of emotional input on infant and child development, the direction of these results is not always negative. For example, a recent study presented 9-month-old infants with angry, sad, and happy faces, each paired with a neutral face. For each pair, an emotional voice corresponded to each of the emotional facial configurations. Caregivers who self-reported more emotional expressiveness had infants who were more successful at matching happy and neutral faces with their corresponding voices (Ogren et al., 2018). These results suggest that family members' broad patterns of emotional expressiveness, spanning multiple emotion categories, might provide infants with more examples of what various emotions convey and how they are typically expressed, leading to better emotion matching (Ogren & Johnson, 2020).

Beyond emotional facial expressions, emotion language could also guide the development of infants' emotion understanding. In fact, several researchers have argued that emotion language may be particularly important for helping children learn to group emotional information and draw boundaries between different emotion categories (Barrett, 2017b; Barrett et al., 2019; Hoemann et al., 2020; Lindquist et al., 2015; Lindquist & Gendron, 2013). Accordingly, children's language abilities relate to emotion understanding between the ages of 4 and 11 (Cutting & Dunn, 1999; Pons et al., 2003). Further, parent mental-state language relates to children's emotion understanding before the age of 7 (Tompkins et al., 2018). Between 14 and 18 months, infants can map labels (e.g., "toma") to faces (Ruba et al., 2020a) and use those labels to create superordinate categories of emotion (Ruba et al., 2020b), showing that before the age of 2, infants are capable of mapping emotion words to broad emotion categories. Thus, beginning in infancy, the emotion language children receive may influence their developing perception and understanding of emotion categories.

Taken together, characteristics of the caregivers' emotionality and language are related to the development of emotion perception from early in infancy. This suggests that emotional input from parents might shape the way infants perceive emotional information. Indeed, less engagement, or slower looking, and difficulty disengaging from emotional stimuli—characteristic of infants of anxious mothers—associate with the development of anxiety in infants and children. Thus, emotional input from depressed or anxious caregivers could provide a foundation for the development of these same emotional problems in the infants themselves (see Burris et al., 2019 for a review). Further, physically maltreated boys who have a bias for angry faces are more aggressive than their same-aged peers, suggesting that a bias for

anger in emotional facial configurations might translate into more externalizing behaviors over time, at least in boys (Shackman & Pollak, 2014). Thus, the way infants and young children perceive and understand emotional expressions might affect how emotional information is represented and subsequently guides social interactions.

How Input Shapes Children's Emotional Behavior

While the evidence that emotional input from caregivers is related to emotion perception in infants and young children is compelling, it does not provide a causal link between the input children receive and their subsequent emotion perception abilities. However, emotional input can directly affect infants' and young children's emotional *behavior*. For example, 12-month-old infants avoid crawling over the deep side of a glass-covered drop-off if their mothers stand on the other side posing a fearful facial expression. Conversely, when mothers pose a happy face instead of a fearful face, most of the infants cross (Sorce et al., 1985). Eighteen-month-old infants avoid walking over ambiguous drop-offs on a real cliff (with no safety glass) when their mothers behave fearfully, but they traverse the cliff when their mothers smile and beckon them to descend (Tamis-LeMonda et al., 2008). Twelve-month-old infants also play less with toys that were previously paired with a fearful face and/or voice than toys paired with happy or neutral faces and voices (Mumme et al., 1996; Mumme & Fernald, 2003)—as do 15- to 20-month-old infants (Dubi et al., 2008; Gerull & Rapee, 2002). Emotional input from adults can elicit avoidance-related responding in both infants and toddlers.

With older children, negative input from the face can lead to avoidance responses *and* an increase in actual fear, or what is often measured as children's fear beliefs. For example, when researchers paired negative or positive facial expressions with novel animals, 7- to 10-year-old children were more reluctant to approach the animal paired with the negative expression, and reported greater fear beliefs about these animals when compared with animals paired with the positive expression (Askew & Field, 2007; Broeren et al., 2011).

Even stronger effects of negative input have been found for the use of negative verbal information. For example, after pairing a novel animal with either negative, positive, or neutral verbal information, 6- to 9-year-old children showed greater avoidance responses, higher fear beliefs, and increased heart rate when asked to approach the animal paired with the negative verbal information when compared to the animals paired with the positive and neutral information (Field & Lawson, 2003; Field & Schorah, 2007). The increase in fear beliefs and avoidance behavior resulting from negative verbal information are still evident after 6 months, suggesting that verbal input can have long-lasting effects on children's fear beliefs and fearful behavior (Field et al., 2008).

Further, increased fear beliefs that result from negative verbal information might also generalize to other stimuli. For example, 4- to 12-year-old children, presented with either positive or negative information about a novel dog-like animal, were more fearful of the animal after receiving negative versus positive information, and this response was still evident after a 1-week delay. Most importantly, children who were given negative information about the novel animal also became more fearful of other dogs and similar animals after the manipulation (Muris et al., 2002).

Taken together, this body of work demonstrates that negative information can have a causal effect on emotional behavior, in both infants and young children. In fact, the *vast majority (up to 89%)* of intense childhood fears apparently comes from negative verbal information, either delivered from parents or from the media (Ollendick & King, 1991). Negative verbal information might even help account for some of our most common phobias, such as fears of snakes and spiders. In recorded parent-child conversations as they walked through a reptile house at a local zoo, both parents and children provided less positive and more negative information about snakes and spiders than other animals, and most of the time, parents were the ones initiating these conversations (Conrad et al., 2021). In a more controlled study, parents and their preschool-aged children read a neutral book about snakes, spiders, lizards, and turtles, while researchers recorded their conversations. Again, both parents and children provided less positive and more negative information about snakes and spiders than about the other animals. On top of that, parents' own fears of snakes and spiders and their use of negative language during the book reading were related to children's fears (Reider et al., 2021 under review).

Although parents' own language might shape children's fears of snakes and spiders, reducing negative language can also reduce children's fears. Using the same paradigm, before reading the neutral picture book, researchers simply told parents that their own negative language could promote the development of specific fears in their children. In this condition, parents used less negative language when compared to a control condition. Further, children in this condition expressed less fear of snakes and spiders than children in the control group (Reider et al., 2021 under review). Reducing negative language can reduce fear in children. Likewise, increasing positive information about novel stimuli can decrease children's fear beliefs and increase their approach behaviors (Field & Lawson, 2003; Muris et al., 2002).

Further, language about emotions can predict positive, prosocial behaviors, such as helping and sharing. For example, in a storybook interaction between parents and their toddlers, parents who talked more about emotions

while reading the book had 18 to 24-month-old children who helped and shared more than parents who engaged in less emotion talk (Brownell et al., 2013). Overall, negative emotional input—from both emotional expressions and from negative language—can promote avoidance behavior and fear beliefs in children. But likewise, positive emotional input can reduce avoidance behavior and fear beliefs in children, and even promote prosocial behavior.

Implications for Policy

Altogether, input from a child's emotional environment can shape their emotion perception over the first few years of life. Thus, differences in emotional input might contribute to how emotion information is acquired, represented, and subsequently used to guide social interactions. Emotional input, both through emotional expressions and emotional language, can directly affect infant and young children's behaviors and fear beliefs, and while negative input can increase fearful behaviors, positive input can decrease them. This work has several implications for interventions and policy.

First and foremost, emotional input begins to shape the infants' emotional understanding from the first few months of life. Indeed, differences in trajectories of infants' emotion perception based on environmental factors start as early as 4 months of age (Burris et al., 2021). The neural circuitry that supports the processing of faces and emotional information develops during the first year of life (Bowman et al., 2021). Moreover, individual differences in emotion understanding are stable from 3 to 6 years of age (Brown & Dunn, 1996), and from 7 to 11 years of age (Pons & Harris, 2005). Thus, by the time children are in preschool, their emotion understanding is already stable, suggesting that interventions might be most effective starting early in infancy, even as early as 4 months of age.

Second, the emotional input that infants receive most often comes from the people in their immediate environment, such as their caregivers. Thus, rather than focusing on the infants themselves, interventions aimed to help infants' developing emotion understanding should likely begin with the caregivers. Children of parents with anxiety and depression are at increased risk of developing these problems themselves (Woodruff-Borden et al., 2002). Of course, this relation could also have a biological basis. Indeed, mothers who are anxious while pregnant are more likely to have infants who later develop emotional problems (O'Connor et al., 2002; Van den Bergh & Marcoen, 2004); stress, or changes in a pregnant mother's mood might change the physiology of the prenatal environment, potentially affecting the biology of the developing fetus (Beijers et al., 2014; Kaplan et al., 2008). However, as discussed above, anxious parents also provide infants with a different emotional input when compared to non-anxious parents: they are less engaged during interactions with their children (Woodruff-Borden et al., 2002). Further, they are often less sensitive to their infants' needs, and they are more interfering when compared to non-anxious mothers (e.g., Kaitz & Maytal, 2005). These behaviors create a different emotional environment for infants that could shape the way they perceive and understand emotional expressions.

Anxiety is common, affecting approximately one-third of adults during their lifetime (Bandelow & Michaelis, 2015). According to the World Health Organization, depression is also common, affecting over 300 million people, or 4.4% of the world's population (WHO, 2017). Postpartum depression is even more common, affecting 10 to 15% of new mothers (Patel et al., 2012). Given the commonality of anxiety and depression in adults, especially new mothers, interventions that target parents with infants—particularly mothers immediately postpartum—might be the most effective way to mitigate any developmental problems with emotional understanding. This does not preclude interventions that target the children themselves. Indeed, a recent meta-analysis on the efficacy of emotion understanding interventions for children (e.g., Roots of Empathy Program, Mixed Emotion Training) suggests that they are effective (Sprung et al., 2015). But, interventions that target the *caregivers* have been effective in reducing childhood emotional problems as well (e.g., Rapee et al., 2009). And according to the research reviewed here, caregiver-focused interventions would more directly target the emotional environment, thus more effectively reducing the source of any problematic emotional variability when compared to child-focused interventions. Furthermore, designing interventions that help brand *new* parents cope with the stress of parenthood might change the emotional environment for the infant before it begins shaping emotion perception. Thus, early parent-focused interventions might be the best way to proactively promote the development of emotion understanding, therefore carrying the most potential to encourage long-term social-emotional health in children and families.

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ORCID iDs

Vanessa LoBue https://orcid.org/0000-0002-4386-3549
Marissa Ogren https://orcid.org/0000-0003-4441-5219

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