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On Specifying Specificity: Facial Expressions at 4 Months

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Abstract

Izard (2004/this issue) clarifies the position of differential emotions theory by proposing a distinction between hard and soft versions of event–emotion expression relations. We concur that the best design to examine situational specificity in facial expressions is one that utilizes multiple stimulus situations assessed over multiple occasions and ages. However, the problem of how to identify, a priori, a family of stimulus situations remains. We offer an example from our own recent work demonstrating how facial expressions and physiological indexes may converge to indicate the presence of a meaningful family of stimulus situations. Specifically, we found evidence for a family of frustrating, goal-blocking events that elicited expressions and cortisol responses indicative of anger at 4 months. Yet, individual differences exist in that these situations also elicited expressions and cortisol changes indicative of sadness. Identification of a more comprehensive set of such situations throughout infancy will allow researchers to more systematically examine the degree to which situational specificity of emotions is present.

Izard's (2004/this issue) comments try to clarify the differential emotions theory (DET) perspective on event–expression specificity during infancy. As previously defined (Bennett, Bendersky, & Lewis, 2002), specificity in facial expressions is observed if an expression is prevalent in response to a particular elicitor (i.e., intrasituational specificity) and more prevalent in response to a predicted elicitor than in response to other elicitors (i.e., intersituational specificity). Hence, we sought to examine whether a relative, but not absolute, degree of specificity existed for various facial expressions in response to five different stimulus situations.

As noted by Izard (2004/this issue), his earlier writings may be interpreted as suggesting a degree of specificity between situations and emotions. For example, Izard (1984) wrote:

under reasonably normal circumstances, all the emotions emerge on schedule, and on emergence, each one is prepared *to respond to a limited set of incentive events* without any conditioning or learning experience. Thus, not only emotions but a *circumscribed set of event–emotion relationships* are part of our evolutionary–biological heritage. (pp. 28–29, italics added)

A hard version of specificity, as defined by Izard(2004/thisissue),“predicts that a specific stimulus will evoke a specific emotion expression at a given age” (pp. 418–419). We agree with Izard that our test of the specificity hypothesis more closely resembled a hard version in that we examined expressions at one age and utilized one stimulus event for each target

expression. However, even here, as might be implied by his definition, we did not hypothesize a perfect one-to-one matching of stimulus to expression. In fact, the overall question that we posed was “Are there *relatively* unique sets of facial expressions for a given context or situation?” (Bennett et al., 2002, p. 98). Furthermore, we cited work by Izard noting that “differential emotions theorists have maintained that most significant situations elicit multiple emotional responses (Blumberg & Izard, 1991),” and later stated that “specificity may be relative, not absolute” (Bennett et al., 2002, p. 107).

Currently Izard (2004/*this issue*) describes a soft version of the specificity hypothesis. This version is marked by individual differences in the emergence of emotions in response to families of stimulus events. Such individual differences, at least in part, are proposed to be due to differences in infants’ temperament or emotionality. Although this seems to clarify the DET perspective, this version on its face does not appear to be terribly different from a socialization approach, despite its recognition of the potential role of temperament. If individual differences in the emergence of the emotions exist and if emotions are elicited by unspecified families of stimulus events, the idea of specific emotional programs and emotions as adaptations to specific environmental conditions—the bioevolutionary approach—seems much weaker, as Darwin (1872/1965) suggested that emotional behaviors are adaptively tied to specific environmental events. To the degree that social experience and reinforcement or contingency account for individual differences in emotional responses to a loosely defined set of stimulus events, then the soft DET perspective approximates a socialization view.

Izard (2004/*this issue*) notes that four of our five hypotheses were reasonable inferences from his original view of DET, but that our hypothesis examining fear expressions at 4 months in response to a masked stranger was not. Izard points to earlier writings (e.g., Izard, 1977) indicating that fear is uncommon and possibly maladaptive for infants to express at age 4 months. Although fear expressions do become more common during the first 2 years of life (Scarr & Salapatek, 1970), research does indicate that fear expressions can occur during early infancy. A recent study found mothers to perceive fear expressions among their infants at about 1 month of age (Nagy et al., 2001). Furthermore, Nagy et al. reported that fear expressions related to taking a bath, a context not typically examined in prior research, were reported the earliest, whereas fear expressions in response to sudden and novel stimuli, which are typically used in fear-elicitation studies, were expressed significantly later. Although one might argue that mothers in their study only perceived wariness, a precursor of fear and not fear itself (Sroufe, 1996), our lab has previously reported the presence of observer-coded fear expressions in infants at age 4 months (Sullivan & Lewis, 1989). Thus, although Izard correctly notes that fear expressions have not been consistently observed at age 4 months, we nonetheless examined their prevalence in response to a masked stranger, as well as to the other stimulus events. Izard suggests that the infants who did exhibit fear expressions in our sample may have been older participants, as some of our participants in this longitudinal study were older than 4 months at the time of their initial visit. In testing this hypothesis with a chi-square analysis, however, we found no difference in the prevalence of fear expressions between those infants who came in at age 4 months (85% of the sample) and those who came in at age 5 months or later (15% of the sample). More important to the specificity hypothesis, however, there was no evidence of situational specificity for fear expressions in our sample at age 4 months.

Given the importance of context in development (Lewis, 1997; Lewis & Michalson, 1983; Witherington, Campos, & Hertenstein, 2001), we concur with Izard (2004/*this issue*) that the best design to examine situational specificity in facial expressions is one that utilizes multiple stimulus situations, assessed over multiple occasions and ages. In fact, in following our 4-month-old sample to age 12 months we found some support for increased situational

specificity in response to most (i.e., tickling, tasting as our substance, and arm restraint) but not all (i.e., masked stranger) elicitors at 12 months (Bennett, Bendersky, & Lewis, 2004). However, such increased specificity could be a function of socialization as well. For example, with increasing socialization “inappropriate” facial expressions may be extinguished and “appropriate” facial expressions encouraged.

Izard (2004/this issue) emphasizes that DET proposes “infants have the capacity to respond with a particular emotion expression to a type or family of stimuli” (p. 419). That one looks at a single exemplar of this class should not detract from the theory, especially if the example is particularly central to the family. Moreover, what constitutes a family and how can this be defined on an a priori basis? How does one identify such a family of events if individual events hypothesized to be members of the family (e.g., arm restraint for goal blocking) fail to elicit the expected expression (e.g., anger)?

Some of our own work might be instructive. We have frustrated children in two ways. In the first, the infant initially learns that moving his or her arm to pull on a string causes a picture to appear and music to start. After learning the contingent response, an extinction phase is introduced in which pulling the string no longer produces the picture and music (Lewis, Alessandri, & Sullivan, 1990). In the second, we use a standard still-face procedure in which social interaction with the mother is suddenly stopped. In both situations stress hormones (cortisol) and facial responses to the two different frustrations were obtained. Both situations elicited anger, sadness, and a little fear in these 4-month-olds. Interestingly, in both situations anger was associated with a decrease in stress, and sadness was associated with an increase in stress (Lewis & Ramsay, 2004). Such studies support the idea that as Darwin (1872/1965) suggested, anger is associated with attempts to overcome an obstacle to a goal (thus no stress response), whereas sadness is associated with giving up (thus a high stress response). These facial and hormonal reactions are in response to the family of situations we might wish to call frustration or blockage of a goal regardless of whether the blockage is social (e.g., still face) or nonsocial (e.g., loss of a contingency).

Our focus is on examining the specificity of facial expressions in response to particular stimulus events. Given that facial expressions are not synonymous with emotions (Lewis & Michalson, 1983; Michel, Camras, & Sullivan, 1992), future research examining situational specificity should ideally assess multiple components of infants’ emotion responses, including their expressions, vocalizations, gestures, and arm movements, and biological measures such as cortisol response and assessment of brain activity. Such research will help to further identify the families that elicit distinct emotional responses in young children, the degree to which situational specificity is present, and whether such specificity changes for infants, either individually or as a group, over the course of development.

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