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"Aren't you supposed to be sad?" Infants do not treat a stoic person as an unreliable emoter

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ABSTRACT

The current study examined how 18-month-old infants react to a "stoic" person, that is, someone who displays a neutral facial expression following negative experiences. Infants first watched a series of events during which an actor had an object stolen from her. In one condition, infants then saw the actor display sadness, while she remained neutral in the other condition. Then, all infants interacted with the actor in emotional referencing, instrumental helping, empathic helping, and imitation tasks. Results revealed that during the exposure phase, infants in both groups looked an equal amount of time at the scene and engaged in similar levels of hypothesis testing. However, infants in the sad group expressed more concern toward the actor than those in the neutral group. No differences were found between the two groups on the interactive tasks. This conservative test of selective learning and altruism shows that, at 18 months, infants are sensitive to the valence of emotional expressions following negative events but also consider an actor's neutral expression just as appropriate as a sad expression following a negative experience. These findings represent an important contribution to research on the emergence of selective trust during infancy.

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As not all individuals have accurate or relevant knowledge about a given topic, children must be selective in whom they choose to learn from (Harris, 2007). There is ample evidence showing that toddlers and preschoolers are not gullible and show selectivity in learning (Harris & Corriveau, 2011; Mascaro & Sperber, 2009; Mills, 2013; Rendell et al., 2011; Sperber et al., 2010). Recently, selective trust has also begun to be documented during the infancy period, although the bulk of this research has focused on infants' detection of verbal communication or functional cues, such as mislabeling or misusing a familiar object (Brooker & Poulin-Dubois, 2013; Koenig & Echols, 2003; Koenig & Woodward, 2010; Zmyj, Buttelmann, Carpenter, & Daum, 2010).

Interestingly, the appropriateness of an actor's emotional expressions has also been manipulated in order to examine infants' sensitivity to "accuracy" in the emotional domain. As others' behaviors can often be predicted and explained through their emotional expressions, the detection and understanding of emotional expressions is critical in early socio-cognitive development. Infants are able to both categorize and discriminate a variety of emotional expressions early in development and begin to use emotional information from others to regulate their own behaviors. For example, infants are more likely to approach a novel object when a person displays a positive expression toward it, and avoid it when a negative expression is

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posed (Hornik, Risenhoover, & Gunnar, 1987; Mumme, Fernald, & Herrera, 1996; Quinn et al., 2011). In fact, such social referencing is observed even when the referent is out of sight, as 14- and 18-month-olds are more likely to initially search into a container previously associated with a "happy" expression by an actor, than into a container associated with a "disgust" emotional expression (Repacholi, 1998). This suggests that infants as young as 14 months are able to use both the experimenter's attentional cues and emotional expressions to predict the nature of the referent that is the focus of her attention.

Importantly, as others' emotional expressions may not always be accurate, children also begin to modify their behaviors based on the accuracy of the emoter. In a study with preschoolers, Hepach, Vaish, and Tomasello (2012) had 3-year-olds watch an adult constantly express sadness in either an appropriate or inappropriate context (being harmed or not), and found that children were more likely to show concern, less "checking" behaviors, and more prosocial behavior when the negative emotions matched the context. In an investigation of *infants'* exposure to emotional accuracy and how this affects their behaviors, infants as young as 14 months have been shown to be less likely to imitate or follow the gaze of an actor who had previously displayed inaccurate affect while looking into a container (e.g., positive affect while looking into an empty container) (Chow, Poulin-Dubois, & Lewis, 2008; Poulin-Dubois, Brooker, & Polonia, 2011). More recently, Chiarella and Poulin-Dubois (2013) reported that 18-month-olds, but not 15-month-olds, showed more concern when exposed to justified sadness and more checking behaviors when they saw actors express an unjustified emotion (happiness or sadness) after experiencing an emotional event. That is, infants were able to detect both positive (polyannas) and negative (crybabies) emotion-context mismatches. In a follow-up study, they had infants watch as an actor always expresses sadness after consistently receiving a desired object ("crybaby", unjustified group) or after receiving an undesired object (justified group) (Chiarella & Poulin-Dubois, 2014). Results showed that infants not only detected the actor's unjustified negative emotions, but also reacted differently to the actor during subsequent tasks measuring emotional referencing and prosocial behaviors. More specifically, infants in the justified group were more likely to be guided by her positive emotions when deciding which of two containers to look into first, and were quicker to help her when she needed emotional, but not instrumental, help. These findings show that infants as young as 18 months show selective behaviors toward emotionally unjustified individuals. Interestingly, it was recently reported that infants as young as 14 months show increased pupil dilation when they witness an actor express emotions incongruent with her actions (e.g., patting a toy tiger with an angry expression), suggesting some lower level processing of sympathetic arousal (Hepach & Westermann, 2013). Similarly, 10-month-olds have been shown to be sensitive to a cartoon's incongruent facial reactions after either successfully or unsuccessfully arriving at a desired goal (e.g., sadness after successfully jumping over a barrier; Skerry & Spelke, 2014).

In summary, there is evidence that infants are able to detect inappropriate emotional reactions (Chiarella & Poulin-Dubois, 2013; Hepach & Westermann, 2013; Skerry & Spelke, 2014) and also exhibit selective behaviors in emotional referencing and empathic helping tasks when interacting with someone who previously showed misleading negative expressions (Chiarella & Poulin-Dubois, 2014). However, it remains unknown if infants will be willing to help and whether they will follow someone's emotional cues after witnessing a "stoic" actor, that is, someone expressing *no* emotions after a negative experience.

The literature on infants' reactions to neutral facial expressions has typically used it as a control measure for the effects of other emotions, such as happiness, sadness, anger, and fear. For example, research on social referencing has shown that 12-month-olds are equally likely to approach a toy toward which a model expressed a happy or neutral facial expression, but not if the expression was negative (Hornik et al., 1987; Mumme et al., 1996). Similarly, Repacholi (2009) showed that 18-month-olds were equally likely to imitate an action by a model who showed a neutral or positive facial expression but less so if she showed a negative expression toward an ambiguous object. These findings, as well as others (Cacioppo & Berntson, 1999; Cacioppo, Gardner, & Berntson, 1997, 1999), suggest that in the absence of any emotional cues or information about an ambiguous novel object or stimulus, infants express a "positivity offset" (Vaish, Grossmann, & Woodward, 2008); that is, they evaluate these objects and stimuli as if they had experienced a positive reaction. However, many of these studies examined infants' willingness to approach or interact with an object which had been previously ambiguous. In an investigation of infants' reactions to a non-ambiguous context using neutral facial expression, Vaish, Carpenter, and Tomasello (2009) had 18- and 25-month-olds watch an actor experiencing a harmful situation (where her possessions were taken away or destroyed) and a neutral situation (where there was no harm done to the victim's possessions). After each event, the victim remained neutral. Both 18- and 25-month-olds were more likely to show concern and checking behaviors in the "harm" condition than in the "neutral" condition, despite the actor's neutral facial expression in both cases. Children in both age groups were also more likely to help the victim who had experienced the "harm" condition than the "neutral" condition. These findings suggest that infants as young as 18 months will show empathy and prosocial behaviors toward an individual experiencing a negative event even in the absence of overt negative cues. Although the study by Vaish et al. (2009) revealed that infants showed empathic reactions and helped an individual in the absence of overt emotional cues, the design had two important limitations. First, the authors did not include a manipulation of the *facial* expression with respect to a negative situation. Thus, it remains unknown whether infants would respond similarly to a "victim" expressing a justified reaction to a negative situation (e.g., sadness) and to a victim who remained neutral. In addition, only prosocial sharing and instrumental helping were manipulated in the study, so generalization of emotional "inaccuracy" to other tasks is unknown. In a recent study manipulating sad and neutral expressions during instrumental helping tasks, Newton, Goodman, and Thompson (2014) reported that 19-month-olds were equally willing to instrumentally help (i.e., fulfill a goal) individuals who displayed sad or neutral facial expressions. These findings suggest that during an instrumental prosocial act, neutral facial expressions alone are not sufficient for 19-month-olds to be selective in their willingness to engage in goal-oriented prosocial actions. An important limitation to this study was that the authors manipulated the neutral and sad facial expressions *during* the