Infant Behavior and Development 49 (2017) 104–113

Contents lists available at ScienceDirect

Infant Behavior and Development

journal homepage: www.elsevier.com/locate/inbede

Full Length Article

Approach-avoidance responses to infant facial expressions in nulliparous women: Associations with early experience and mood induction

Pietro De Carli[a,b], M.E. Riem Madelon[c,d,e,*], Laura Parolin[b]

[a] Department of Developmental and Social Psychology, University of Padua, Padua, Italy
[b] Department of Psychology, University of Milano-Bicocca, Milan, Italy
[c] Department of Medical and Clinical Psychology, Tilburg University, Tilburg, The Netherlands
[d] Centre for Child and Family Studies, Leiden University, Leiden, The Netherlands
[e] Leiden Institute for Brain and Cognition (LIBC), Leiden University, Leiden, The Netherlands

ARTICLE INFO

Keywords:
Approach avoidance
Infant emotions
Negative caregiving experiences
Mood manipulation

ABSTRACT

Infant expressions are important signals for eliciting caregiving behaviors in parents. The present study sought to test if infant expressions affect adults' behavioral response, taking into account the role of a mood induction and childhood caregiving experiences. A modified version of the Approach Avoidance Task (AAT) was employed to study nulliparous female university students' implicit responses to infant faces with different expressions. Study 1 showed that sad, neutral and sleepy expressions elicit a tendency for avoidance, while no tendency for approach or avoidance was found for happy faces. Notably, differences between approach and avoidance response latencies for sad faces and participants' negative caregiving experiences were positively correlated ($r = 0.30$, $p = 0.04$, Bonferroni corrected), indicating that individuals who experienced insensitive parental care show more bias toward sad infant faces. In Study 2, we manipulated participants' current mood (inducing sad and happy mood by asking to recall a happy or sad event of their recent life) before the AAT. Results showed that sad mood enhanced the bias toward sad faces that is buffered by positive mood induction. In conclusion, these findings indicate that implicit approach avoidance behaviors in females depend on the emotional expression of infant faces and are associated with childhood caregiving experiences and current mood.

1. Introduction

Infant signals are essential in communicating needs and eliciting caregiving reactions in adults (Ainsworth, Bell, & Stayton, 1974; Bowlby, 1969; Soltis, 2004). Infants are fully dependent on their parents and it is therefore likely that specific neurophysiological mechanisms have developed to subserve the perception of infant signals (Esposito, Valenzi, Islam, Mash, & Bornstein, 2015; Kringelbach et al., 2008; Piallini, De Palo, & Simonelli, 2015; Swain et al., 2014; Young et al., 2015). Specifically, facial expressions as well as crying and laughter represent the most powerful ways infants possess in order to communicate their status and to interact with adults. Parents' ability to properly recognize and respond to these signals is crucial for healthy infant development (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1969; Klein Velderman, Bakermans-Kranenburg, Juffer, & van IJzendoorn, 2006; Van Zeijl et al., 2006), especially in the domain of emotion regulation (Fonagy, Gergely, Jurist, & Target, 2002; Rutherford, Wallace,

* Corresponding author at: Department of Medical and Clinical Psychology, Tilburg University, The Netherlands.
E-mail address: m.m.e.hendricx@uvt.nl (M.E. Riem Madelon).

http://dx.doi.org/10.1016/j.infbeh.2017.08.005
Received 1 June 2017; Received in revised form 15 August 2017; Accepted 18 August 2017

Laurent, & Mayes, 2015). In this study we examined the perception of infants' emotional expressions in nulliparous women and their effect on approach/avoidance behaviors. The aim of the study was to understand how infant expressions affect adults' reaction and behavioral response, taking into account two important factors that influence responding to infant emotions: current mood and childhood caregiving experiences.

Infant signals elicit not only caregiving responses, but also evoke physiological arousal in adults, as well as negative emotions. A series of studies showed that infant crying elicits aversion (Frodi, Lamb, Leavitt, & Donovan, 1978; Groh & Roisman, 2009; Groh et al., 2015; Out, Pieper, Bakermans-Kranenburg, & Van IJzendoorn, 2010) and, in extreme cases, crying can trigger abuse or neglect (Barr, Trent, & Cross, 2006; Compier-de Block et al., 2014; Soltis, 2004). To our knowledge, no study specifically focused on the role of infant facial emotional expressions in shaping behavioral approach/avoidance responses, but evidence from neurophysiological studies can help in formulating hypotheses. Brain activation during the perception of different expressions on baby faces has been studied both in parents and in individuals without children. Strathearn and colleagues (Strathearn, Li, Fonagy, & Montague, 2008) found that only own-babies' emotional expressions, in particular happy expressions, were associated with the activation of dopaminergic neural reward circuits. This means that own infant's smiling is considered a reinforcement for mothers. In nulliparous females Montoya and colleagues (Montoya et al., 2012) found that happy infant faces resulted in more activation in neural reward areas (the ventral striatum, caudate, ventromedial prefrontal and orbitofrontal cortices) than sad infant faces. In contrast, a comparison of sad versus happy infant faces elicited more activation in neural empathy regions (the precuneus, cuneus and posterior cingulate cortex). This suggests that happy faces because of their more rewarding features may elicit a tendency to approach the infant. In contrast, sad faces may elicit a tendency to avoid the negative affect and to provide caregiving behavior to address the cause of negative feelings.

Adult facial expressions have been shown to elicit approach or avoidant responses, depending on the valence and salience of the emotional expression. The valence of an emotional expression seems to be automatically evaluated in order to provide a quick and adaptive response (Al-Shawaf, Conroy-Beam, Asao, & Buss, 2016; Bradley, Codispoti, Cuthbert, & Lang, 2001; Lang, Bradley, & Cuthbert, 1998; Tooby & Cosmides, 2008). Emotional expressions elicit different behavioral responses that can be studied by means of a behavioral approach-avoidance task: participants are asked to approach or distance emotional faces presented on the screen through pulling or pushing a lever (Marsh, Ambady, & Kleck, 2005; Roelofs, Elzinga, & Rotteveel, 2005; Seidel, Habel, Kirschner, Gur, & Derntl, 2010). Results consistently show that happiness is associated with approach (Phaf, Mohr, Rotteveel, & Wicherts, 2014). Expressions of fear, sadness and anger elicit conflicting results (Paulus and Wentura, 2016; Phaf et al., 2014), probably because individual differences play a role in the perception of other people's sadness. For instance, whereas other people's sadness may elicit empathy and approach behavior aimed at helping the person in distress in some individuals, it may elicit avoidant responses in individuals who feel uncomfortable or even aversion when they are confronted with a sad person. Moreover, results can be explained by the social context of the perceived emotion, both in case of approach or avoidance. For example, a recent study showed that preference for approach or avoidance is influenced by contrast between emotions presented in the task. Paulus and Wentura (2016) showed that negative emotions (anger, fear, sadness) are avoided when paired with happiness, while anger and sadness elicit approach when paired with fear (that elicits avoidance). Thus, contextual and individual difference factors shape approach and avoidant responses to emotional expressions and this may reflect differences in social interaction in real life. Previous research indicates that there is an association between approach avoidance tendencies regarding social stimuli and actual behavior in interaction with these social stimuli, although the mechanism underlying this association is not completely clear (Van Dessel, Gawronski, Smith, & De Houwer, 2017). For instance, highly socially anxious individuals report more avoidance tendencies toward smiling and angry, but not neutral faces, compared to controls (Heuer, Rinck, & Becker, 2007; Staugaard, 2010) and post traumatic symptomatology is associated to a greater bias to avoid happy faces (Clausen et al., 2016).

One factor that may influence responses to emotional expressions is childhood caregiving experiences. For example, previous studies have shown that experiences of childhood abuse affect neural responses to sadness (Dannlowski et al., 2013). Adults with histories of maltreatment also have deficits in recognizing emotions (Ardizzi et al., 2015) and childhood abuse has been found to be associated with bias to threat in children (Pine et al., 2005) and in adults (Fani, Bradley-Davino, Ressler, & McClure-Tone, 2011). In addition, it has been shown that parents with a history of abuse respond differently to infant emotions. Parents with a history of parental emotional rejection were less accurate in identifying infant fear and anger and reported more negative attributions when asked to guess the causes of infant behaviors (Leerkes & Siepak, 2006). Since experiences of abuse during own childhood enhance the risk of using harsh caregiving responses (Pears & Capaldi, 2001), it is important to examine influences of childhood experiences on responding to infant emotions.

Another factor that may influence the processing of infant emotional expressions is mood. Mothers with a postpartum depression are more likely to identify negative emotions in infant faces while they are more inaccurate at detecting positive emotions (Webb & Ayers, 2015). Mothers with a history of depression may also manifest withdrawal behaviors in response to their infants' distress. This seems one of the mechanisms implicated in disrupted interaction between depressed mothers and their children (Arteche et al., 2011), especially in terms of interactive emotion regulation (Reck et al., 2004). In a developmental perspective, maternal altered affect recognition could be central to the development of adverse emotional and behavioral outcomes in infants (Kluczniok et al., 2016). Furthermore, research indicates that mild depressive symptoms also affect responding to expressions of infant distress in individuals without children (Riem, Pieper, Out, Bakermans-Kranenburg, & van IJzendoorn, 2011).

Although mood and childhood experiences are known to influence parenting behavior, it is yet unclear whether these factors also influence responding to infant emotional expressions *before* the transition into parenthood. According to the concept of intergenerational transmission (Belsky, Conger, & Capaldi, 2009) also non-parents carry the imprint of parenting style experienced in childhood. It is therefore likely that influences of early parenting experiences on responses to infant emotions become apparent even