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Unattractive infant faces elicit negative affect from adults

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ABSTRACT

We examined the relationship between infant attractiveness and adult affect by investigating whether differing levels of infant facial attractiveness elicit facial muscle movement correlated with positive and negative affect from adults ($N = 87$) using electromyography. Unattractive infant faces evoked significantly more *corrugator supercilii* and *levator labii superioris* movement (physiological correlates of negative affect) than attractive infant faces. These results suggest that unattractive infants may be at risk for negative affective responses from adults, though the relationship between those responses and caregiving behavior remains elusive.

Facial attractiveness can elicit preferential treatment beginning in infancy (Langlois et al., 2000), both from parents (Langlois, Ritter, Casey, & Sawin, 1995) and strangers (Stephan & Langlois, 1984). Stereotypes about children's and infants' abilities based on their physical attractiveness can influence behavior toward those children, which in turn affects the children's social interaction and personality development (Langlois & Stephan, 1981). This research seeks to examine attractiveness as a characteristic that elicits differential affect from adults, using electromyography to detect subtle affective changes.

1. Adult judgments of children based on attractiveness

Adults' ability to judge the attractiveness of infants is highly reliable and consistent (Hildebrandt, 1983; Langlois et al., 2000), indicating that they are aware of differences in attractiveness. For children judged as "cute," this may be beneficial: Adult women presented with photographs of infants looked longer at infants rated high on cuteness (Hildebrandt & Fitzgerald, 1978). Meanwhile, children lower in attractiveness may face greater challenges, as research has shown that adults have negative biases and stereotypes about their abilities and personal characteristics (Stephan & Langlois, 1984; Ritter, Casey, & Langlois, 1991). Stephan and Langlois (1984) presented undergraduates with a set of photographs of a sample of infants and asked them to rate the infants for attractiveness and for 10 evaluative adjective pairs. They found that more attractive babies were rated as smarter and more likeable, whereas less attractive babies were rated as causing parents more problems.

These positive and negative judgments may be related to adults' aversion to looking at unattractive children's faces as well as their preference for looking at attractive children's faces. When presented with photographs of normal and abnormal baby faces (including babies with Down's syndrome, cleft palate, and fetal alcohol syndrome), men chose to increase their viewing

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time of normal baby faces. Likewise, women chose to decrease their viewing time for abnormal baby faces (Yamamoto, Ariely, Chi, Langleben, & Elman, 2009). More babylike faces also elicit increased protection from adults (Alley, 1983), while infants with cranio-facial anomalies elicit less smiling and vocalizing from their mothers (Field & Vega-Lahr, 1984). This further suggests that adults may have preferences for normal and attractive infant faces over abnormal or unattractive ones and that even infants may be at risk for invoking negative affective and behavioral responses based on their facial appearance.

More generally, adults prefer to view attractive faces and perceive them more positively, while simultaneously rating unattractive faces as less intelligent, social, and altruistic than medium and high attractive faces (Griffin & Langlois, 2006). The assumption that unattractive faces are associated with more negative attributes may be related to humans' tendency to pay more attention to negative information in faces (Oehman, Lundqvist, & Esteves, 2001) due to their potential threat, or may reflect a larger pattern of negativity bias across domains (Vaish, Grossman, & Woodward, 2008).

2. Measuring affect: Electromyography

Electromyography (EMG) is often used to study affect and is a particularly useful technique because it can detect subtle changes in facial muscle movement associated with affective response and because recording is non-invasive and painless (de Wied, van Boxtel, Zaalberg, Goudena, & Matthys, 2006). Certain muscles are correlated with specific affective responses and indications of liking, including participant self-reports of emotion (Larsen, Norris, & Cacioppo, 2003). Cacioppo, Petty, Losch, and Kim (1986) found that facial EMG yields reliable information about both the valence and the intensity of emotional reactions to stimuli. Facial EMG activity can occur even without awareness of the specific facial expression (Dimberg, Thunberg, & Elmehed, 2000), and additionally can detect mild affective reactions to subtle stimuli that do not elicit fully developed emotional expressions (Dimberg et al., 2000).

Due to these methodological advantages, facial EMG has been used in several studies to capture differential affective reactions toward a variety of stereotyped groups. For example, Vanman, Saltz, Nathan, and Warren (2004) used EMG to show differences in muscle activation when looking at African–American/Caucasian faces. Participants showed differential EMG responses toward faces of different races. These differences had not emerged for the same participants using the Implicit Association Test but were, in fact, more predictive of discriminatory behavior toward African–Americans.

Facial EMG has also been used in several studies to assess affect with regard to differential facial attractiveness. Researchers have found that neural activities related to attractiveness perception are engaged even when participants are not explicitly asked to judge it (Aharon et al., 2001; Trujillo, Jankowitsch, & Langlois, 2014), which furthers the argument that EMG can be used to reliably assess differential reactions from participants. Specifically, attractiveness effects have been found in the activation of *zygomaticus major* (ZM; pulling the corner of the lips into a smile; a positive affect response) and unattractiveness effects in the activation of *corrugator supercili* (CS; knitting the brow; a negative affect response) and *levator labii superioris* (LLS; raising the nostril; a disgust response) (Gerger, Leder, Tinio, & Schacht, 2011; Principe & Langlois, 2011).

Hildebrandt and Fitzgerald (1978) previously utilized electromyography to explore adults' affective responses to infant faces of varying attractiveness, but failed to establish that the attractiveness of infant faces could elicit differential types and levels of facial muscle movement responses from adults. However, we believe that this null finding can be explained by their use of a single electrode site (ZM), resulting in data that captured only positive affective responses.

This paper aims to replicate and extend the work of Principe and Langlois (2011), who studied affective responses to adult faces of varying levels of attractiveness, as well as the work of Hildebrandt and Fitzgerald (1978), who explored positive affective responses to infants varying in attractiveness. Our goal was to explore whether infant attractiveness influenced adults' positive and negative affective responses, as measured by facial muscle movement. We hypothesized: (1) Participants would show increased levels of negative affect, as measured by facial EMG (CS and LLS sites), while looking at images of unattractive infants, and (2) Participants would show increased levels of positive affect (ZM site) while looking at images of attractive infants.

3. Method

3.1. Participants

Ninety-three undergraduates ($M = 20.26$ years old, $SD = 2.91$ years; 49 female) were recruited through their Introductory Psychology course and received course credit in exchange for their participation. We excluded data from analysis for 6 participants for the following reasons: equipment error ($n = 3$), participant off-task ($n = 2$), and real-life parent ($n = 1$). The final sample included 87 participants (44 female) and included 35% Caucasian, 28% Asian/Asian–American, 27% Hispanic/Latino, and 10% African–American undergraduates.

3.2. Stimuli

The images were 14 faces of 3-month-old infants. Seven of the faces were attractive and seven were unattractive. The photos displayed color cropped images of the infants' faces against a white background. The faces were occluded such that the neck and shoulders of the infant were not visible to decrease variation across images and focus attention on the infants' faces. Images were standardized for size, head tilt, color saturation, and blur level. These faces were taken from a