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Predicting the accuracy of facial affect recognition: The interaction of child maltreatment and intellectual functioning

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ABSTRACT

Previous research demonstrates that both child maltreatment and intellectual performance contribute uniquely to the accurate identification of facial affect by children and adolescents. The purpose of this study was to extend this research by examining whether child maltreatment affects the accuracy of facial recognition differently at varying levels of intellectual functioning. A sample of maltreated ($n = 50$) and nonmaltreated ($n = 56$) adolescent females, 14 to 19 years of age, was recruited to participate in this study. Participants completed demographic and study-related questionnaires and interviews to control for potential psychological and psychiatric confounds such as symptoms of posttraumatic stress disorder, negative affect, and difficulties in emotion regulation. Participants also completed an experimental paradigm that recorded responses to facial affect displays starting in a neutral expression and changing into a full expression of one of six emotions: happiness, sadness, anger, disgust, fear, or surprise. Hierarchical multiple regression assessed the incremental advantage of evaluating the interaction between child maltreatment and intellectual functioning. Results indicated that the interaction term accounted for a significant amount of additional variance in the accurate identification of facial affect after controlling for relevant covariates and main effects. Specifically, maltreated females with lower levels of intellectual functioning were least accurate in identifying facial affect displays, whereas those with higher levels of intellectual functioning performed as well as nonmaltreated females. These results suggest that maltreatment and intellectual functioning interact to predict the recognition of facial affect, with potential

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long-term consequences for the interpersonal functioning of maltreated females.

Introduction

Facial expressions provide a rich source of information that viewers can use to generate hypotheses about the current emotional state of another person, leading to contextually relevant behavioral responses that have important individual and interpersonal functions. For instance, certain discrete facial movements can inform the viewer that another person is experiencing sadness. Once these facial movements are detected and appropriately categorized as an expression of sadness, the viewer can then provide an empathic verbal response to achieve individual goals, such as identifying the conditions leading to this emotional state, or interpersonal goals, such as providing general emotional support to a friend or facilitating individual emotion regulation in a child. Such responses can also inform the person expressing the emotion on how to communicate sadness in a way that provides access to important individual and social contingencies, such as empathy. However, different expressions of affect communicate different interpersonal needs, and accurately recognizing a host of different affective expressions can increase the probability of discriminating which behavioral response to provide in a given context. Thus, accurately recognizing facial expressions of affect is a key developmental task for children and adolescents with significant implications for individual and interpersonal functioning.

Facial affect recognition is facilitated by several neurological processes. Discrete movements in facial muscles are detected visually (Ekman & Friesen, 1978) and are processed by both global and specific neural systems associated with affect (Sabatini et al., 2009), including the amygdala (Monk et al., 2003; Phillips et al., 2004), flexible fusiform area (van de Riet, Grezes, & de Gelder, 2009), inferior parietal cortex (Adolphs, Damasio, Tranel, & Damasio, 1996), and orbitofrontal and occipital cortices (Sabatinelli et al., 2011). Activation in these neural systems leads to further information processing in key frontal areas responsible for higher order processes and tasks, such as language and categorization (Sprengelmeyer, Rausch, Eysel, & Przuntek, 1998). Activating frontal cortices provides access to encoded labels for emotion previously paired with similarly expressed movements in facial muscles. This process allows the individual to put socially acceptable emotion labels to visually processed information in order to increase the probability of correctly categorizing the expressed facial display.

Prior learning also plays a critical role in how facial affect displays are classified into distinct emotion categories (Pollak & Kistler, 2002). Like many behaviors, the strength of accurately recognizing facial affect depends largely on the frequency and intensity of exposure to different expressions (Beale & Keil, 1995; Keyes, 2012; Pollak, 2003). Parents can play a particularly important role in shaping affect recognition by providing repeated occasions where specific emotion labels corresponding to current affective expressions are given to a child. In contrast to parents who do not provide such opportunities (Krause, Mendelson, & Lynch, 2003; Sullivan, Carmody, & Lewis, 2010), parents who label and model affective expressions have children who are more competent emotionally (Denham, Mitchell-Copeland, Strandberg, Auerbach, & Blair, 1997; Fruzzetti & Shenk, 2008), setting them on a trajectory for improved emotional (Shipman et al., 2007), interpersonal (Eisenberg et al., 2001), and behavioral (Eisenberg et al., 2005) outcomes. As perceptual acuities, neurological systems, and learning experiences are continually refined and shaped across development, the ability to recognize emotions more accurately increases over time, providing important advantages for optimal development.

Research on the effects of child maltreatment, including physical abuse, sexual abuse, and neglect, has highlighted the importance of how certain environmental events can disrupt key developmental processes, including the accurate recognition of facial affect (Pollak, 2008). Child maltreatment affects nearly 700,000 children each year in the United States (US Department of Health & Human Services, 2011) and is associated with a number of adverse developmental (Shields & Cicchetti, 2001), physical