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Anger and selective attention to reward and punishment in children

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ABSTRACT

Anger is a negative emotion associated with approach motivation and may influence children's attention preference. Three experiments examined the effect of anger on the attentional biases accompanying reward versus punishment cues in Chinese 5- and 6-year-olds. Experiment 1 tested children who were prone to report angry feelings in an unfair game. Experiment 2 measured children who were rated by parents and teachers for temperamental anger. Experiment 3 explored children who reported angry feelings in a frustrating attention task with rigged and noncontingent feedback after controlling for temperament anger. Results suggested that both the angry and anger-prone children were faster to engage attention toward the reward cues than toward the punishment cues in the three experiments. Furthermore, the angry children in the frustrating attention task (and those with poor attention focusing by parental report) were slower in disengaging attention away from the reward versus punishment cues (especially after negative feedback). Results support the approach motivation of anger, which can facilitate children's attention toward the appetitive approach-related information. The findings are discussed in terms of the adaptive and maladaptive function of anger.

Introduction

Conceptually based on the motivational systems, a Behavioral Activation System (BAS) was proposed in response to rewarding or positive stimuli and a Behavioral Inhibition System (BIS) was proposed in response to punishing or negative stimuli (Gray, 1987; Schneirla, 1959). These motivational

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systems had been applied to the area of emotion study, emphasizing approach-oriented emotions such as happiness and anger as well as avoidance-oriented emotions such as fear and disgust (Davidson, Ekman, Saron, Senulis, & Friesen, 1990; Fox, 1991). There is a general consensus that emotion plays a key role in shaping selective attention (Bradley, 2009; Megill, 2003). Moreover, from an evolutionary perspective, approach and avoidance motivations are particularly relevant for survival (e.g., approaching food, avoiding injury) and, thus, are likely to influence our attention (Kenrick & Shiota, 2008).

In light of these accounts, fear, shyness, and anxiety temperament produce an active avoidance motivation in visual attention by prioritizing the processing of aversive and punishment-related information (e.g., Derryberry & Reed, 2002; Eysenck & Calvo, 1992; Pérez-Edgar & Fox, 2005). For example, based on a modified Posner spatial attention task that used reward and punishment cues to prime attention, Pérez-Edgar and Fox (2005) reported that temperamentally shy children under stress and anxiety preferentially attended to punishing cues, whereas non-shy children attended more to rewarding cues.

Unlike fear and anxiety, anger activates an active approach motivation during goal blockage (Carver & Harmon-Jones, 2009), and this assertion has been echoed by a growing number of studies based on both behavioral data (e.g., Derryberry & Rothbart, 2001; He, Xu, & Degnan, 2012) and psychophysiological data (e.g., Harmon-Jones, 2004). For example, anger/frustration observed during anger-eliciting tasks (i.e., toy removal and toy behind barrier) at 10 months of age was positively related to parental report of approach and pleasure at 7 years of age, whereas fear (typically an avoidance-related emotion), in response to a novel stimulus and a social episode with a stranger, was negatively correlated with approach/positive anticipation (Rothbart, Derryberry, & Hershey, 2000). In our recent study (He et al., 2012), 2- to 5-year-olds who displayed anger expression within a frustrating context (i.e., an attractive toy was removed by the mother) showed more approach behaviors intending to overcome obstacles both during toy removal and during another independent locked box task. In addition, a number of studies have revealed that greater anger experience is associated with higher resting levels of left frontal electroencephalogram (EEG) asymmetry, which is believed to reflect an approach tendency (Carver & Harmon-Jones, 2009; Harmon-Jones, 2004; Harmon-Jones & Allen, 1998; Pizzagalli, Sherwood, Henriques, & Davidson, 2005). For instance, anger manipulated under a condition where participants were subjected to insulting comments was positively correlated with relative left frontal activity and aggressive behaviors (Harmon-Jones & Sigelman, 2001).

The approach nature of anger is linked to selective attention toward rewarding information. Using an eye tracker, Ford and colleagues found that adults either in an angry state (Ford et al., 2010) or high in trait anger (Ford, Tamir, Gagnon, Taylor, & Brunyé, 2012) gazed longer at rewarding images versus control images. Personality research has suggested that trait anger (expressing outwardly) related positively with the reward responsiveness dimension of BAS (Carver, 2004) and inversely to BIS (Smits & Kuppens, 2005). All of these findings support the notion that people who have a tendency to express anger are sensitive to reward-related stimuli.

This association of anger and rewards is functionally adaptive. This is because anger orients an individual toward desirable goals, according to the functional perspective that views anger as an energizer and an organizer of behavior (Campos, Campos, & Barrett, 1989). By this, individuals prone to anger show great optimism in judgment and decision making (Lerner & Keltner, 2001), angry people confer high status and competence (Tiedens, 2001), and angry people believe that they have a high likelihood of being able to rectify the negative situation and, thus, display great goal-directed behaviors to pursue positive goals such as rewards (Lazarus, 1991). Making a similar argument, angry children should be more concerned with identifying desirable objects and have an attentional bias to rewarding stimuli. Such attentional bias may influence which aspects of the environment are selected for processing and, hence, shape how children experience and cope with their social world. As a result, angry children exhibited high persistence during goal blockage (Dennis, Cole, Wiggins, & Cohen, 2009; He et al., 2012; Lewis, Sullivan, Ramsay, & Alessandri, 1992), increased interest and joy after the obstacle removal (Lewis et al., 1992), and enhanced surgency in temperamental report (Derryberry & Rothbart, 2001; He et al., 2013). However, very few studies have ever focused on such a cognitive mechanism of attentional bias to rewards and punishments in angry children.