



# Anger and the behavioral approach system

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## Abstract

Two studies were conducted to test the hypothesis that trait anger is related to trait behavioral approach sensitivity (BAS). In both studies, trait BAS, as assessed by Carver and White's (1994) scale, was positively related to trait anger, as assessed by the Buss and Perry (1992) aggression questionnaire. One of the two studies found that trait anger also related to trait behavioral inhibition sensitivity (BIS) at the simple correlation level. In both studies, statistically controlling for general negative affect, which correlates with both anger and BIS, revealed that BAS and not BIS related to anger. In these regression analyses, general negative affect also related to anger, suggesting that BAS and general negative affect independently contribute to anger. Additional results in Study 2 revealed that BAS was positively correlated with physical aggression, and regressing aggression onto BAS, BIS, and general negative affect revealed that physical aggression was positively related to BAS, negatively related to BIS, and positively related to negative affect. Together with other research on anger and left frontal cortical activity (e.g. Harmon-Jones & Sigelman, 2001), the present results strongly challenge theoretical models that assume that approach motivation is associated only with positive affect.

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Several motivation theorists have proposed that two systems underlie much behavior. One system, is posited to manage appetitive, incentive motivation and approach behavior. It has been referred to as a behavioral activation system (BAS; Fowles, 1980, 1988), behavioral approach system (BAS; Gray, 1982, 1987a, 1987b, 1990, 1994a, 1994b), and behavioral facilitation system (Depue & Collins, 1999; Depue & Iacono, 1989; Depue, Krauss, & Spont, 1987). It has also

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been referred to as an approach or appetitive motivational system (Cacioppo & Berntson, 1994; Cacioppo, Gardner, & Berntson, 1999; Davidson, 1998; Lang, Bradley, & Cuthbert, 1990, 1997). The other proposed system manages aversive motivation and the behaviors of avoidance and withdrawal. This system has been referred to as the behavioral inhibition system (BIS; Gray, 1982, 1987a, 1987b, 1990, 1994b), aversive/defensive system (Lang et al., 1990, 1997), and withdrawal motivational system (Davidson, 1998).

In addition, these motive systems are posited to be involved in the generation of emotions that are relevant to approach and withdrawal behavior. And although the theories underlying the proposed motivational systems differ in several regards, most of the theories posit that the approach motivational system (e.g. BAS) is involved in the generation of positive affect (Depue & Iacono, 1989; Gray, 1994b; Lang et al., 1990, 1997), whereas the aversive motivational system (e.g. BIS) is involved in the generation of negative affect (Gray, 1982, 1994a, 1994b; Lang et al., 1990, 1997).

Much theory and research suggest that the BAS is associated with positive affect. Theoretically, Gray (1990, 1994b) and Watson (2000) have linked the BAS with positive affect. In support of these ideas, Carver and White (1994) found that individuals high in BAS responded with more happiness when confronted with a challenging task. They also found that trait positive affect was positively associated with BAS.

Other research has demonstrated that individuals high in BAS evidence greater left than right frontal cortical activity, as measured by the inverse of EEG alpha power, during baseline resting sessions (Harmon-Jones & Allen, 1997; Sutton & Davidson, 1997). These findings are consistent with the idea that the BAS is related to positive affect, as other research has demonstrated that greater relative left frontal activity is associated with greater positive affect and less depression (Henriques & Davidson, 1990, 1991; Tomarken, Davidson, Wheeler, & Doss, 1992). Also, greater relative left frontal activity has been associated with more positive affective reports to happy film clips (Davidson, Ekman, Saron, Senulis, & Friesen, 1990).

The idea that the approach motivation system (e.g. BAS) is responsible for the creation of only affects of positive hedonic tone is a view widely accepted in much contemporary theorizing (Cacioppo & Berntson; 1994, Cacioppo et al., 1999; Lang et al., 1990, 1997; Watson, 2000; Watson, Wiese, Vaidya, & Tellegen, 1999). Although the BAS may be involved in the generation of positive affective responses, it is also possible that the BAS may be responsible for negative affective responses when these responses are associated with behavioral approach. Indeed, the primary function of the BAS is approach motivation, and approach motivation can be associated with negative affect. As Carver (2001) has recently reviewed, the negative affect of sadness occurs when individuals fail to meet approach oriented goals. In contrast, the negative affect of anxiety occurs when individuals fail to meet avoidance oriented goals (see e.g. Finlay-Jones & Brown, 1981; Higgins, Shah, & Friedman, 1997).

Other research is consistent with the idea that the BAS is associated with approach-related but negative affect. In particular, research has revealed that relative left frontal cortical activity, a putative correlate of BAS, is associated with anger, which is often associated with approach motivation (see Harmon-Jones & Sigelman, 2001, for a review). That is, research has demonstrated that increased left frontal cortical activity and decreased right frontal cortical activity are associated with trait anger (Harmon-Jones & Allen, 1998) and state anger (Harmon-Jones & Sigelman, 2001; Harmon-Jones, Sigelman, Bohlig, & Harmon-Jones, in press). In addition, individuals

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