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# The relationships between the BIS and BAS, anger and responses to anger

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## Abstract

The aim of the current study was to examine the relations of the Behavioural Inhibition System (BIS) and the Behavioural Approach System (BAS) with anger and other responses in situations depicting anger provocation. In all, 36 male and 64 female pharmacy workers completed the BIS/BAS Scales, the Spielberger State-Trait Anger Expression Inventory-2 (STAXI), and the Anger Response Inventory (ARI). The BIS/BAS Scales have one scale for the BIS, and three subscales for the BAS (Reward Responsiveness, Drive, and Fun-Seeking). The ARI contains 23 anger scenarios. Participants were asked to imagine themselves in that scenario and then indicate how angry they would feel and how they would respond in that situation. It was found that the BIS and BAS-Drive related to STAXI trait anger, with the BIS relating to expressing anger inwardly and BAS-Drive negatively relating to the control of angry feelings. With the ARI scenarios, both BIS and BAS-Drive predicted Anger Arousal. When controlling for Anger Arousal, BAS-Fun Seeking significantly predicted aggressive responses to the anger scenarios, while BIS significantly predicted anger responses directed inwardly. The results are discussed in light of the relations between the BIS and BAS and anger.

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*Keywords:* Reinforcement sensitivity theory; Behavioural inhibition system; Behavioural approach system; Trait anger; Aggression

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In recent times there has been an increasing focus on the appetitive and aversive motivation systems believed to underlie behavioural and affective tendencies. These systems have been presumed to underlie stable personality traits (Cloninger, 1988; Depue & Collins, 1999; Gray, 1990). One popular model in this regard is Reinforcement Sensitivity Theory (RST) (for a review of RST see Corr, 2004). In the original RST, the appetitive system was labeled the Behavioural Approach System (BAS) and one of the aversive systems was labeled the Behavioural Inhibition System (BIS). The BAS was presumed to be sensitive to conditioned signals of reward or non-punishment, while the BIS was presumed to be sensitive to conditioned signals of punishment or frustrative non-reward. A third system, labeled the Fight-Flight System (FFS), mediated responses to unconditioned aversive stimuli. It should be noted that there have been recent revisions to RST that entail changes to the proposed systems in RST (McNaughton & Corr, 2004). In the revised RST, the BIS now mediates goal conflict and risk assessment, while the renamed Fight-Flight-Freeze System (FFFS) mediates responses to both conditioned and unconditioned aversive stimuli. In the current study, we consider the BIS and BAS as conceptualized in the 'old' RST, as existing self-report measures have not currently been revised to incorporate the changes to RST (Smillie, Pickering, & Jackson, 2006).

Beyond their role in motivation and learning, activation of the BIS and BAS has been linked with affective states (Carver & White, 1994; Gomez & Cooper, *in press*; Gomez, Cooper, & Gomez, 2000; Gray, 1990, 1994). The BAS has been linked with positive affective states and the BIS with negative affective states (Gray, 1994). A review of the RST and affect research largely supports these relationships (Gomez & Cooper, *in press*). Many of the studies attempting to link BIS and BAS activation with positive and negative affective states have, however, only examined positive and negative affect generally, rather than examine how specific emotion states might relate to the BIS and BAS. It should be noted that while postulating three fundamental brain systems related to emotion (i.e. the BIS, BAS and FFS), Gray (1994, p. 246) noted that 'any real emotional experience reflects a blend of activity in all three fundamental emotion systems'. This implies that a particular positive or negative affective state may result from activation of a combination of some or all three systems. It is desirable that RST research moves beyond the simple relations between general positive and negative affective states and the BIS and BAS to the examination of specific emotion states. In the current study, we seek to assess how the BIS and BAS relate to trait anger and responses to anger inducing situations.

Carver (2004) has suggested that affect is based on a subjective assessment of progress towards approaching or avoiding a goal. Good progress towards approaching or avoiding a goal will result in positive affect, while inadequate progress towards approaching or avoiding a goal results in negative affect. This implies that positive affect can be related to activation of the BIS and that negative affect can be related to activation of the BAS. In other words, there are two bipolar dimensions of affect in relation to approach and avoidance processes. Thus, the negative affects of sadness, anger and depression for example may relate to slow progress towards approach oriented goals. Carver suggests that variation amongst the approach related negative affects may be accounted for by different levels of engagement in the approach process. If a goal seems completely unattainable, then depression or sadness may result. If a goal seems attainable but progress is poor, anger or frustration may result.

Carver (2004) indeed found across three studies that sadness and anger were more strongly related to individual differences in the BAS rather than the BIS. It should be noted, however, that in

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