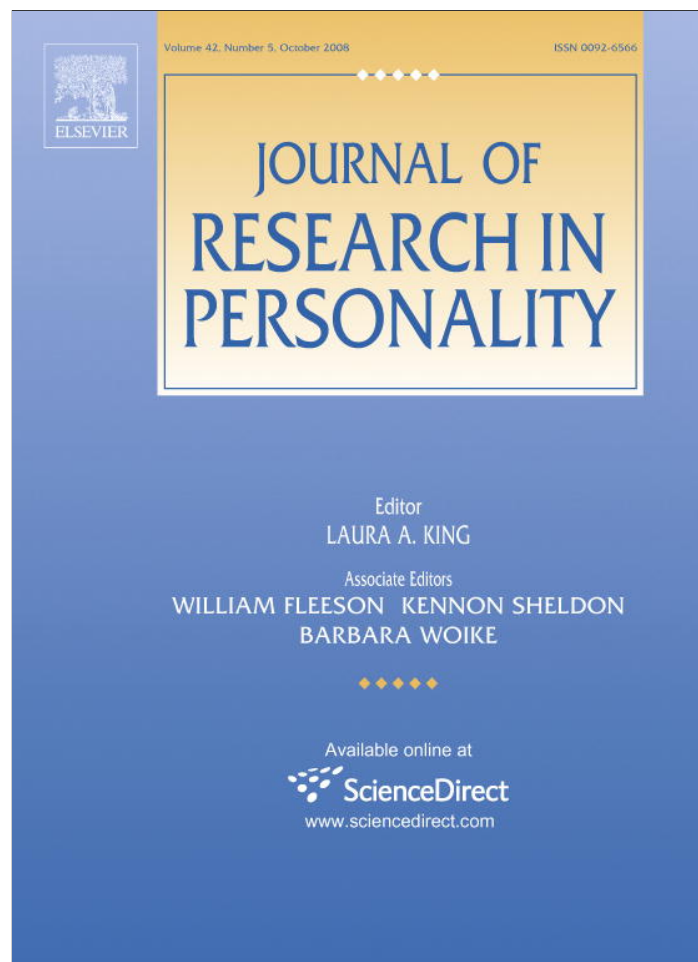


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Brief Report

Effect of trait and state approach motivation on aggressive inclinations

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ABSTRACT

Research has suggested that individual differences in behavioral approach sensitivity (BAS) are related to state and trait anger [Carver, C. S. (2004). Negative affects deriving from the behavioral approach system. *Emotion*, 4, 3–22; Harmon-Jones, E. (2003a). Clarifying the emotive functions of asymmetrical frontal cortical activity. *Psychophysiology*, 40, 838–848; Harmon-Jones, E. (2003b). Anger and the behavioural approach system. *Personality and Individual Differences*, 35, 995–1005]. The present research sought to extend this past work by testing whether individual differences in BAS would relate to aggressive inclinations, particularly when approach motivation was situationally primed. Results supported predictions, and thus suggest, contrary to several perspectives (e.g., [Gray, J. A. (1990). Brain systems that mediate both emotion and cognition. *Cognition & Emotion*, 4(3), 269–288; Watson, D. (2000). *Mood and temperament*. New York: Guilford Press]), that BAS is involved in more than just positive emotional experiences and behaviors.

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1. Introduction

Several extant models of emotion posit that positive affect is only associated with approach motivation, whereas negative affect is only associated with withdrawal motivation (e.g., Gray, 1990; Watson, 2000). However, these conceptions have been challenged by evidence showing that anger, a negative emotion, is associated with activity in the left frontal cortex, a brain region involved in approach motivation (e.g., d'Alfonso et al., 2000; Harmon-Jones & Sigelman, 2001; Jensen-Campbell, Knack, Waldrip, & Campbell, 2007; see Harmon-Jones, 2003a, for a review). Other research has found that trait anger and aggression are associated with trait behavioral approach sensitivity (BAS; Harmon-Jones, 2003b). Finally, research has found trait BAS to be associated with increases in state anger (Carver, 2004) and angry attentional processing (Putman, Hermans, & van Honk, 2004). The present study was designed to extend this body of past research by examining the relationship between trait BAS and a state manipulation of approach motivation on aggressive inclinations.

In the studies to be described here, the measure of individual differences in behavioral approach and inhibition sensitivities is Carver and White's (1994) BIS/BAS scales. The BIS and BAS scales have been shown to predict reports of anxiety and happiness, respectively, in the presence of situational cues of impending threat and impending reward (Carver & White, 1994). They have also predicted greater responses to punishment and reward, respectively, in the context of conditioning (Zinbarg & Mohlman, 1998). BIS has been found to relate to greater relative right frontal cortical activation in response to aversive stimuli, whereas BAS has been found to relate to greater relative left frontal cortical activation in response to appetitive stimuli (Peterson, Gable, & Harmon-Jones, 2008). The cumulative evidence suggests that the BIS/BAS scales relate to behavioral inhibition and behavioral approach phenomena (but see Brenner, Beauchaine, & Sylvers, 2005).

The items of the BAS scales focus on affective and behavioral responses to incentive cues. That is, all BAS-related items describe positive emotional and behavioral reactions to aspects of incentive pursuit (being motivated to seek them, being

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persistent in pursuit of them, and having positive feelings when obtaining them). No BAS item refers to a negative event or negative affect. The opposite is true of BIS items. Each refers to a threatening event, and assesses emotional responsiveness to threat. The semantic content of the items, then, creates a bias against linking BAS items to negative affect, attitudes or behaviors.

In several studies, however, this trait measure of BAS related positively to anger. In two studies, BAS related to trait anger, as assessed by the Buss and Perry (1992) aggression questionnaire (Harmon-Jones, 2003b). One study also revealed that BAS related positively to trait physical aggression, as measured by the Buss and Perry (1992) questionnaire. Smits and Kuppens (2005) have replicated the relationship between BAS and trait anger.

Carver (2004) also conducted a series of anger studies using BIS/BAS measures. One study (Carver, 2004, Study 1) focused intentionally on a stimulus context that Gray (1990) contended should engage the aversive motivational system: the experience of frustrative nonreward. Participants were led to believe that they would be able to obtain a reward if they performed well at a laboratory task. However, they were then led to believe that they failed to perform well. There was no punishment in this situation, merely the absence of a desired reward. The increase in reports of frustration level from the start of the session until the failure to attain the incentive correlated with an aspect of BAS, but not to the measure of BIS. Two other studies by Carver (2004) conceptually replicated these results.

An additional study using the BIS/BAS scales made use of a paradigm in which participants are exposed to faces displaying emotional expressions. Attention toward angry faces has been linked to higher self-reported anger, and attention away from angry faces has been linked to high levels of cortisol, which is associated with fear (see review by van Honk & Schutter, 2007). The usual interpretation of such results is that quick attending to angry faces is the first step in an approach-based dominance confrontation. Using the BIS/BAS scales, Putman et al. (2004) found that BAS predicted attentional vigilance to angry faces presented below conscious thresholds.

These studies provide evidence supportive of the idea that trait approach motivation (or BAS) relates to anger and aggression-related responses. However, each of these studies simply correlated trait BAS with angry responses. Consequently, each study is limited in terms of the causal inferences that can be drawn. Stronger evidence for the idea that BAS and approach motivation prime or ready the organism for aggression could be obtained by conducting a study in which individuals who differ in BAS are subjected to situations or state manipulations that increase approach motivation to assess whether such a situation potentiates aggression compared to other situations.

To test this idea, individuals who differed in trait BAS were insulted by another person and then randomly assigned to a condition in which they were primed with a neutral event, a positive-low-approach-motivated event, or a positive-high-approach-motivated event. Following the prime, participants were asked to evaluate the other person and make a hiring recommendation about this person. Based on the definition of aggression as any form of behavior that is aimed at intentionally harming another, we consider the hiring recommendation a measure of aggression (see also Anderson & Bushman, 1997; Berkowitz, 1993; Rohsenow & Bachorowski, 1984).

2. Methods

2.1. Participants

Sixty-eight (37 male) right-handed introductory psychology students at Texas A&M University participated in exchange for course credit. Five participants were removed from analyses due to computer problems, for a total of 63 participants (high approach: $n = 19$; positive no approach: $n = 22$; neutral: $n = 22$).

2.2. Procedure

Participants were told they would be randomly assigned to listen to two of 20 pilot radio broadcasts for KANM Student Radio under the guise that their feedback would be used to determine which broadcasts should be considered for on-air broadcast. First, participants completed the BIS/BAS scale (Carver & White, 1994). Participants were then given additional written instructions about the broadcasts. A clipboard with envelopes containing various questionnaires was placed next to their chair. The experimenter then returned to the other room, where she remained until the end of the experiment.

Then, participants listened to the neutral broadcast. It began with a short introduction to the topic, followed by a 2-min discussion of the need for renovation of a highly used building on campus. Immediately following the broadcast, participants completed a questionnaire assessing their "attitude towards television" in which participants were to write about a typical day of television watching. The questionnaire was meant to mirror the mindset manipulations and be relatively neutral. After 5 min of writing, participants evaluated the broadcast: how interesting it was, how much they liked the speaker, how worthwhile the broadcast was, how likely it was that they would listen to a similar broadcast on the radio, and how likely it was that they would recommend future radio jobs for the person who spoke in the broadcast. The question regarding hiring recommendation in particular was considered a measure of aggression because participants were led to believe that their feedback could harm someone by causing them not to be rehired at the radio station (Anderson & Bushman, 1997). The other items were included as fillers, to assist in preventing participants from becoming suspicious. Responses were given on a 9-point scale, where 1 = not at all/definitely no and 9 = extremely/very/definitely yes. The neutral broadcast and ratings

about it were included for a number of reasons. First, the neutral broadcast should assist in reducing suspicion about the insulting broadcast. Second, it should assist in putting participants in a similar, relatively neutral state prior to the insulting broadcast. Finally, by collecting similar ratings of the neutral and insulting broadcast, we can use the neutral broadcast ratings to statistically control for their effect on ratings of the insulting broadcast. These statistical controls are particularly important because they can demonstrate that the individual differences predict ratings of emotive stimuli over and above ratings of neutral stimuli.

Next, participants listened to the insulting broadcast. It began with a short introduction to the topic, followed by a 4-min discussion by a professor of the university who supported the need for stricter graduation requirements for today's college students. Specifically, the professor considered himself "an expert on students" and felt today's "20-something generation just doesn't seem to be as good as previous generations." This broadcast has been found to evoke anger in two previous studies (Harmon-Jones, Harmon-Jones, Abramson, & Peterson, 2008).

Following the broadcast, participants completed one of three questionnaires designed to manipulate their mindset. The positive-high-approach mindset asked participants to write about "an intended project" that they felt determined to achieve and that could be completed within the next three months. They were instructed to list the steps they would take to complete the project. The positive-low-approach mindset asked participants to write about a day or time in which something happened that "caused you to feel very good about yourself." Lastly, the neutral mindset asked participants to write about a "typical and routine" day in their life. This manipulation has been used successfully in other research and found to affect relative left frontal cortical activation in expected directions (Harmon-Jones, Harmon-Jones, Fearn, Sigelman, & Johnson, 2008). This condition manipulation was randomly assigned via envelope and experimenters were blind to the participant's condition. After 5 min of writing, participants evaluated the broadcast using the same evaluation criteria used previously. They were then debriefed and dismissed.

2.3. Statistical analyses

We used linear regression models to test the effects of mindset condition and BIS/BAS sensitivity on aggressive inclinations toward the broadcasts. Because of our predictions that the approach mindset would interact with BAS to cause increased aggression in response to the insulting broadcast, we contrast coded the three conditions. In the "approach" coding variable, the approach mindset condition was coded as 2 and the remaining conditions were coded as -1 . In the "positive" coding variable, the low approach positive condition was coded as 1, the neutral condition was coded as -1 , and the approach condition was coded as 0. We then entered both coding variables, BAS/BIS (centered), and the interactions as predictors of the change in the evaluations of the broadcasts (anger broadcast rating minus neutral broadcast rating).

3. Results and discussion

3.1. Between condition effects

For the reactions to the broadcasts, the insulting professor was rated as less likable ($M = 3.44$, $SD = 2.23$) and he was less likely to be recommended for future radio jobs ($M = 3.48$, $SD = 2.56$) than the renovation broadcast speaker (liking $M = 4.70$, $SD = 1.56$; recommendation $M = 4.76$, $SD = 1.80$), liking $t(62) = 3.85$, $p < .001$, and recommendation $t(62) = 3.52$, $p < .001$. No interactions with approach-motivation condition emerged for either variable, p 's $> .30$. These results demonstrate that the insulting professor broadcast was effective at evoking aggressive inclinations for all participants regardless of condition assignment.

For the other filler questions, the insulting professor broadcast was rated as more interesting ($M = 5.32$, $SD = 2.14$) than the neutral broadcast ($M = 4.05$, $SD = 1.64$), $t(62) = 4.49$, $p < .001$, and it was rated as being more likely to be listened to on the radio ($M = 4.03$, $SD = 2.62$ vs. $M = 2.75$, $SD = 1.64$), $t(62) = 4.33$, $p < .001$. These results are likely due to the insulting professor broadcast being more personally relevant to participants. The two broadcasts did not differ in being worthwhile, and the speakers were rated as equally intelligent, p 's $> .28$. No interactions with approach-motivation condition emerged for these variables, p 's $> .30$.

3.2. Interactions with BAS

We expected that approach-motivation condition would interact with individual differences in BAS to predict aggressive inclinations. As expected, BAS sensitivity and approach mindset interacted to predict change in liking and change in hiring recommendation, $\beta = -.32$, $t(57) = -2.6$, $p < .05$ and $\beta = -.27$, $t(57) = -2.3$, $p < .05$, respectively (BAS \times positive mindset p 's $> .55$). In other words, individuals in the approach mindset who were high in BAS were less likely to like the speaker or recommend the speaker get future jobs at the radio station, relative to their evaluations of the neutral broadcast. No other significant BAS-interaction effects emerged. Also, controlling for ratings of interest in the regressions did not affect the significance of the interactions.

To follow up these interactions, we examined within-condition correlations between BAS and each criterion variable. Within the approach mindset condition, BAS related to change in liking, $r = -.62$, $p < .01$, and change in hiring recommenda-

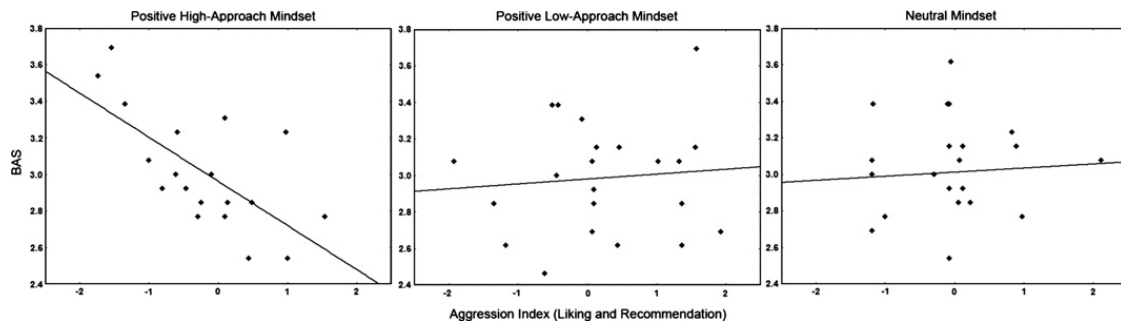


Fig. 1. Relationship between BAS and aggression within conditions.

tion, $r = -.56$, $p < .05$. No significant relationships were found within the positive mindset (liking $r = .07$; hiring $r = -.02$) and neutral mindset conditions (liking $r = .28$; hiring $r = -.02$). It is possible that the positive and neutral mindsets reduced approach-motivated aggressive inclinations while the approach mindset enhanced these inclinations, particularly for individuals high in BAS.

In addition, we computed an overall aggression index by first standardizing and then averaging together the ratings of liking and recommendation, so that lower scores indicate greater aggression. As expected, BAS sensitivity and approach mindset interacted to predict aggression, $\beta = .33$, $t(57) = 2.7$, $p < .01$ (BAS \times positive mindset $p > .86$). We then examined within-condition correlations between BAS and the aggression index. BAS related to aggression only within the approach mindset condition, $r = -.67$, $p < .01$ (other r s $< .09$, p s $> .69$) (see Fig. 1).

3.3. Interactions with BIS

While no BIS \times approach motivation condition interactions significantly predicted the broadcast evaluations (p s $> .16$), across all conditions greater BIS sensitivity was associated with a decrease in ratings of liking [$\beta = -.37$, $t(57) = -3.0$, $p < .01$], intelligence of the speaker [$\beta = -.33$, $t(57) = -2.6$, $p < .05$], how worthwhile the broadcast was [$\beta = -.37$, $t(57) = -3.0$, $p < .01$], and how likely they were to listen to similar broadcasts on the radio [$\beta = -.32$, $t(57) = -2.6$, $p < .05$]. Relationships between BIS and ratings of interest and recommendation were negative but not significant, p s $> .10$.

3.4. Conclusions

The current results are in accord with predictions. They suggest that individuals with greater dispositional approach motivation are more likely to show aggressive inclinations toward an insulting person when their approach motivational system has been recently activated. These results are consistent with a growing body of research that suggests that approach motivation is associated with more than only positive emotional experiences and behaviors (e.g., Carver, 2004; Harmon-Jones, 2003a, 2003b). Thus, they challenge previous conceptions of the relationship between affective valence and motivational direction, that is, that approach motivation is only associated with positive affects and that withdrawal motivation is only associated with negative affects (e.g., Gray, 1990; Watson, 2000). Importantly, the current research extends past work, which has focused on emotional experiences, by showing the interactive effects of BAS personality and situationally-activated approach motivation on aggressive inclinations.

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