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Abstract

Over 50 years of work on cognitive dissonance theory has suggested that dissonance reduction is a motivated process. However, no research has unambiguously demonstrated the direction of this motivation—whether it is approach or avoidance oriented. The action-based model of dissonance proposes that dissonance reduction is an approach-related process that assists in the implementation of decisions. It follows from the action-based model that approach-related personality traits should be related to greater dissonance reduction. The current research tested this idea. Study 1 found that trait behavioral approach sensitivity (BAS) related to more spreading of alternatives (more liking for the chosen over the rejected decision alternative) following a difficult decision. Study 2 found that BAS related to attitudes being more consistent with recent induced compliance behavior. This research therefore suggests that dissonance reduction is an approach-motivated process.

Keywords

attitudes, affect-cognition interface, dissonance, individual differences, motivation/goals

Cognitive dissonance theory is concerned with how perception and cognition influence and are influenced by motivation and emotion (Festinger, 1957; Harmon-Jones & Mills, 1999). The original theory of cognitive dissonance predicted that when an individual holds two or more elements of knowledge that are relevant to each other but inconsistent with one another, a state of discomfort is created. The individual is motivated to engage in psychological work to decrease the discrepancy between cognitions. Although research on the theory, spanning more than 50 years, has demonstrated that dissonance reduction is a motivated process (for reviews, see Harmon-Jones, Amodio, & Harmon-Jones, 2009; Wicklund & Brehm, 1976), no research has unambiguously demonstrated the direction of this motivation—whether it is approach or avoidance oriented. Moreover, little theoretically driven research has investigated the influence of broad personality traits on dissonance reduction (for review, see Frey, 1986).

The action-based model of dissonance begins by assuming that many perceptions and cognitions activate action tendencies. The action-based model further suggests that when cognitions or perceptions with action implications come into conflict, a negative affective state is aroused, because conflicting action-based cognitions have the potential to interfere with effective action (Harmon-Jones et al., 2009). This conflict activates the anterior cingulate cortex, a region involved in affective, defensive responses to the detection of basic cognitive conflicts (Hajcak & Foti, 2008) and the conflict aroused by typical dissonance manipulations (van Veen, Krug, Schooler, & Carter, 2009). Once conflict is detected or

dissonance is aroused, dissonance reduction is likely to occur. According to the model, the changing of cognitions to reduce dissonance assists in behaving effectively, and this dissonance reduction is often an approach-motivated process aimed at translating a behavioral intention into effective action. The action-based model proposes that dissonance reduction is an adaptive, approach-related process (Harmon-Jones et al., 2009) present in a number of species (Egan, Bloom, & Santos, 2010; Egan, Santos, & Bloom, 2007).

The action-based model proposes that discordant cognitions can interfere with effective action if the cognitions have competing action tendencies. According to the action-based model, dissonance reduction serves the function of causing the individual to bring the cognitions in line with behavioral intentions, which assists in goal-directed behavior (Harmon-Jones & Harmon-Jones, 2002). For example, individuals who reduce dissonance may perceive aversive environments to be less aversive (Balcetis & Dunning, 2007) because doing so assists in acting upon those environments.

The action-based model of dissonance predicts that the state in which dissonance reduction occurs is conceptually similar to

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Jones and Gerard's (1967) concept of an unequivocal behavior orientation. Dissonance reduction typically occurs following a behavioral commitment (Beauvois & Joule, 1999; Brehm & Cohen, 1962), when the individual is in an action-oriented state (Beckman & Irle, 1985; Gollwitzer, 1990; Kuhl, 1984). An action-oriented state, or implemental mindset, is a state in which intentions are formed to execute behaviors associated with a commitment (Gollwitzer & Bayer, 1999; Gollwitzer & Sheeran, 2006). In this state, the individual is approach motivated to behave effectively with regard to the commitment.

Evidence That Dissonance Reduction Is Associated With State Approach Motivation

In a test of the idea that state approach motivation would increase dissonance reduction, Harmon-Jones and Harmon-Jones (2002) manipulated the degree of action-orientation that participants experienced following a decision. First, participants made an easy or a difficult decision regarding which of several physical exercises they would perform during the experiment. Then, in the action-oriented mindset condition, participants listed seven things they could do to perform well on the exercise they had chosen. But in the neutral mindset condition, participants listed seven things they did in a typical day. Participants then evaluated the exercises. Among participants who made a difficult decision, those in the action-oriented condition demonstrated more spreading of alternatives (demonstrated by a greater increase in preference for the chosen over the rejected exercise) than those in the neutral mindset condition. No spreading of alternatives occurred in either easy decision condition.

Harmon-Jones, Harmon-Jones, Fearn, Sigelman, and Johnson (2008) conceptually replicated the experiment described above, with the addition of a more general action-oriented (implemental) mindset condition (see Taylor & Gollwitzer, 1995) and a condition intended to evoke low-approach positive affect. In the low-approach positive affect condition, participants described a time when something had happened that made them feel very good about themselves but was not caused by anything they themselves had done. Electroencephalographic activity was measured to assess approach motivation, as relative left frontal cortical activity is associated with approach motivation (Amodio, Master, Yee, & Taylor, 2008; Amodio, Shah, Sigelman, Brazy, & Harmon-Jones, 2004; Berkman & Lieberman, 2010; Harmon-Jones, 2003, 2004; Harmon-Jones & Allen, 1997, 1998; Robinson & Downhill, 1995). Consistent with predictions, an action-oriented mindset increased both left frontal cortical activity and spreading of alternatives, compared to the low approach positive affect condition and the neutral condition (for a conceptual replication in an induced compliance experiment, see Harmon-Jones, Gerdjikov, & Harmon-Jones, 2008).

The results above are consistent with the prediction, derived from the action-based model, that dissonance reduction is facilitated by state approach motivation. However, they are all based on experiments in which action-orientation was manipulated and/or asymmetric frontal cortical activity was assessed,

and one could question whether approach motivation was the key construct manipulated or measured. The prediction of dissonance reduction being facilitated by approach motivation would be bolstered by more straightforward demonstrations of the relationship between approach motivation and dissonance reduction. One way to do this would be to link a well-established measure of trait approach motivation to dissonance reduction. In addition, we sought to integrate dissonance theory with another prominent motivational theory that assigns a pivotal role to approach motivation—revised reinforcement sensitivity theory (Corr, 2008).

Behavioral Approach Sensitivity

In revised reinforcement sensitivity theory, behavior is guided by interaction of the behavioral approach system (BAS), behavioral inhibition system (BIS), and the fight-flight-freeze system (Corr, 2008; Gray & McNaughton, 2000). The BIS serves to inhibit behavior in response to conflicts between motivational impulses of the BAS and the fight-flight-freeze system. This revised BIS differs from the originally proposed BIS, which was posited to respond to conditioned punishment cues. The revised BIS is compatible with the action-based model's conception of a conflict detection process that produces dissonance arousal.

The BAS (Gray, 1990), behavioral activation system (Fowles, 1988), and behavioral facilitation system (Depue & Collins, 1999) are similar to conceptions of an approach or appetitive motivational system. According to revised reinforcement sensitivity theory, the BAS causes reactions to appetitive stimuli and is responsible for approach behavior. The BAS causes the individual to begin movement toward goals. Greater BAS sensitivity should be reflected in greater proneness to engage in goal-directed effort. Individual differences in BAS are associated with attentional and emotional responses to incentives and incentive-related cues (Carver & White, 1994; Gable & Harmon-Jones, 2008), physiological responses to appetitive stimuli (Hawk & Kowmas, 2003; Peterson, Gable, & Harmon-Jones, 2008), and aggressive responses at trait and state levels (Harmon-Jones, 2003; Harmon-Jones & Peterson, 2008; Smits & Kuppens, 2005). Trait BAS has also predicted greater conditioning responses to rewards (Zinbarg & Mohlman, 1998), and trait BAS has been found to relate to greater relative left frontal cortical activity (Amodio et al., 2008; Harmon-Jones & Allen, 1997; Peterson et al., 2008).

Prior to the development of revised reinforcement sensitivity theory, Carver and White (1994) developed a self-report instrument to measure individual differences in incentive sensitivity and threat sensitivity, the BIS/BAS scale. This scale has become widely accepted and used to measure approach and avoidance motivation.

The Present Studies

If dissonance reduction is an approach-related process that assists in effective behavior following a decision, as proposed

by the action-based model, we would expect individuals who are dispositionally high in BAS to engage in more dissonance reduction. The present research extends past research by providing a demonstration of the relationship between trait approach motivation and dissonance reduction. It accomplishes this by linking a well-established measure of trait approach motivation to dissonance reduction, essentially testing whether BAS statistically moderates the effect of dissonance manipulations on dissonance reduction. It also integrates dissonance theory with another prominent motivational theory that assigns a pivotal role to approach motivation—revised reinforcement sensitivity theory (Corr, 2008). Study 1 was conducted as an initial test of the idea that BAS is associated with dissonance reduction.

Study 1

Brehm (1956) conducted the first examination of dissonance reduction in a free-choice paradigm. In that study, participants made either an easy or a difficult decision between two household items. The difficult decision was between items that were close in attractiveness, and the easy decision was between items that were very different in attractiveness. After a difficult decision, participants changed their attitudes to be less favorable toward the rejected alternative and slightly more favorable toward the chosen alternative. After an easy decision, participants did not change their attitudes toward the alternatives. In Study 1, we predicted that BAS would relate to greater spreading of alternatives following a difficult decision.

Method

Participants. Participants were 68 undergraduate psychology students (21 men, 47 women) who participated to partially fulfill a course requirement.

Procedure. Participants were run individually. The experimenter brought each participant to the lab and obtained consent to participate. Participants then read an introduction to the experiment that stated the study was an examination of reactions to cognitive experiments and personality.

The experimenter asked participants to carefully read descriptions of cognitive experiments and rate how desirable they found each one. Participants read seven descriptions of tasks that were designed to sound like cognitive experiments. Each description had unique appealing and unappealing characteristics. Next, participants rated how desirable it would be to perform each task on a 9-point scale, where 1 = *not at all desirable* and 9 = *very desirable*.

The experimenter left the room while participants completed the BIS/BAS questionnaire. While participants completed this questionnaire, the experimenter selected two tasks that the participant had rated similarly and positively. The experimenter returned to the room and handed the participant the descriptions of the two highly rated tasks. She told the participant that he or she would be performing one of the tasks and asked the participant to choose the one he or she preferred. Participants then

completed a filler questionnaire, which asked them to describe, in detail, a typical day, in order to provide a delay and distraction between the decision and rerating.

The experimenter then asked the participant to re-rate all seven tasks. She said:

Past research has found that people's evaluations of tasks sometimes change from one moment to the next, whereas at other times, their evaluations do not. Therefore, it's a good idea to assess evaluations multiple times. So please report your current preferences, that is, how you feel about the tasks right now, without regard for your earlier evaluations.

After participants finished rerating the tasks, they performed a Stroop task, for consistency with the cover story. Participants were then debriefed, given course credit, and dismissed.

Questionnaires. The BAS scale is made up of three subscales, derived from factor analysis: BAS drive, BAS fun-seeking, and BAS reward-responsiveness. BAS drive measures the individual's persistence in working for rewards. BAS fun-seeking measures the individual's desire for new rewards and spontaneity in reward seeking. BAS reward-responsiveness measures the individual's positive responses to rewarding events. The BIS scale has a single factor, and it measures the individual's punishment sensitivity or threat sensitivity. As in much previous research (Amodio et al., 2008; Harmon-Jones & Allen, 1997), we created a BAS total score by averaging the BAS items. Results for the BAS subscales are presented in a footnote.

Results and Discussion

We first assessed whether spreading of alternatives occurred by performing a 2 (Time: Predecision vs. Postdecision) \times 2 (Alternative: Chosen vs. Rejected) within-participants ANOVA. Main effects of time, $F(1, 67) = 18.92, p < .001$, and alternative, $F(1, 67) = 44.21, p < .001$, emerged. A Time \times Alternative interaction emerged, $F(1, 67) = 27.42, p < .001$, demonstrating significant spreading of alternatives, as predicted. The interaction revealed that participants evaluated the chosen alternative more favorably ($M = 6.85, SD = 1.14$) than the rejected alternative ($M = 5.74, SD = 1.47; p < .001$) after the decision, whereas prior to the decision, the alternatives were evaluated similarly (chosen $M = 6.81, SD = 0.85$; rejected $M = 6.62, SD = 0.96; p > .10$).

Next, to test the relationship of BAS with spreading of alternatives, we computed an index of spreading of alternatives by taking the difference between the predecision ratings of the chosen and rejected alternatives and subtracting it from the difference between the postdecision ratings of the chosen and rejected alternatives. As predicted, spreading of alternatives was directly related to BAS ($r = .25, p = .04$; see Figure 1).¹

BAS was inversely related to BIS ($r = -0.34, p = .004$). Spreading of alternatives was also inversely related to BIS ($r = -0.30, p = .01$). This result was not clearly predicted by the action-based model. In some past data sets, BAS has been unrelated to BIS (Carver & White, 1994), while in other studies

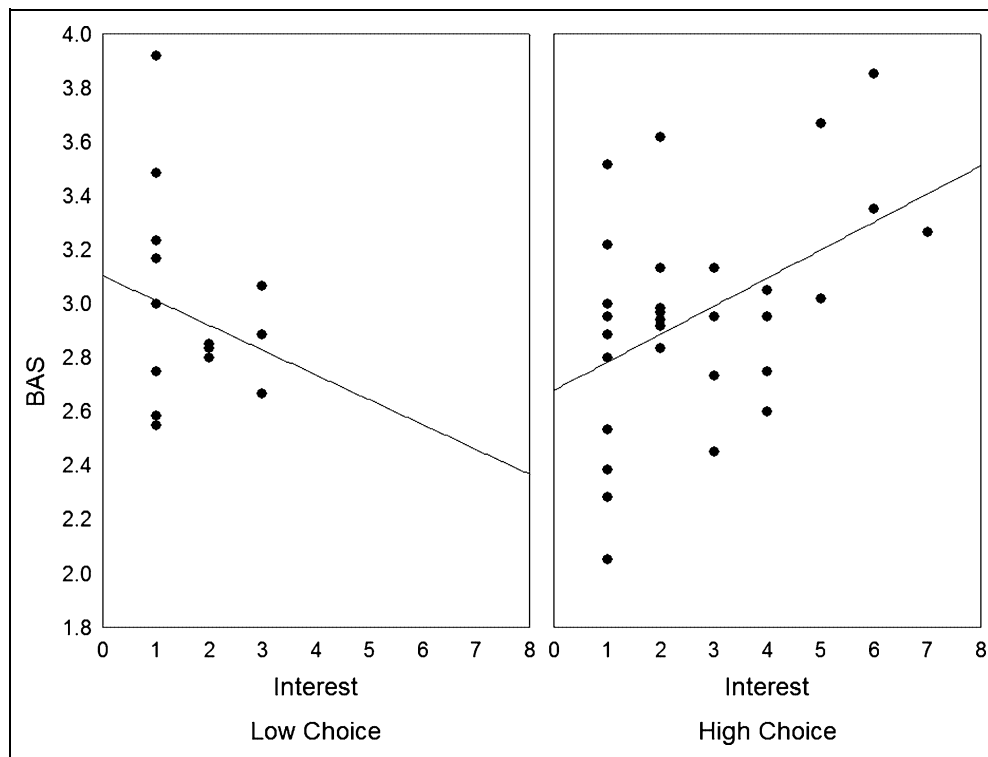


Figure 1. Scatterplot of relationship between spreading of alternatives and BAS, Study 1

BAS has been negatively related to BIS (Smillie & Jackson, 2005). Because BIS was negatively correlated with BAS in our sample, it is not surprising that BIS was also negatively correlated with spreading of alternatives.

Study 2

Study 1 provided evidence consistent with the hypothesis that trait approach motivation relates to dissonance reduction, as measured by spreading of alternatives. Support for the hypothesis would be bolstered if trait approach motivation were to relate to dissonance reduction measured in another dissonance paradigm. One of the most commonly used paradigms for testing dissonance theory predictions is the induced compliance paradigm. In this paradigm, individuals are subtly induced to behave contrary to an attitude. This is referred to as a high-choice condition, and it is compared to a low-choice condition, in which individuals are told they must behave contrary to an attitude. Following this manipulation, attitudes are assessed, and hundreds of experiments have revealed that individuals given high choice to engage in counterattitudinal behavior have attitudes more consistent with their recent counterattitudinal behavior than do individuals given low choice (see Harmon-Jones & Mills, 1999; Wicklund & Brehm, 1976).

In one version of the induced compliance paradigm, individuals are exposed to an attitude object (e.g., boring passage to read), and then they are given low or high choice to write a statement contrary to their attitude. Experiments have revealed that participants given high choice to engage in this

counterattitudinal behavior felt more negative affect, evidenced greater skin conductance, and changed their attitudes to be more consistent with their behavior than did individuals given low choice to engage in the same behavior (Friedman & Arndt, 2005; Harmon-Jones, 2000; Harmon-Jones, Brehm, Greenberg, Simon, & Nelson, 1996). In the present study, we used this same paradigm and predicted that BAS would relate to attitudes following counterattitudinal behavior in the high-choice but not low-choice condition.

Method

Participants. Forty-five introductory psychology students participated to partially fulfill a course requirement. They were randomly assigned in a 2-to-1 ratio to either a high-choice or low-choice condition, so that there would be sufficient number of participants in the high-choice condition to permit tests of the primary hypothesis.²

Procedure

Introduction and cover story. The written introduction explained that the study was interested in factors that affect the recall of characteristics of stimuli and further that the research would assess how writing sentences evaluating stimuli would affect recall of the details of the stimuli. Participants were informed they would read a passage (selected from a variety of passages) and that they would be asked to recall information from the passage. The introduction also informed participants that they would write a statement about a passage,

complete some other questionnaires, and then complete a final questionnaire that would assess recall of the passage. The introduction ended with instructions that informed participants of their anonymity. After reading the introduction, participants completed the BIS/BAS questionnaire used in Study 1.

The boring passage. Next, participants were presented a passage to read. Every participant received the same passage, which was a boring description of a tachistoscope taken from an equipment manual (see Harmon-Jones et al., 1996, for evidence of the boring nature of this passage).

Choice manipulation. Next, participants were presented with written choice manipulation instructions. The instructions for both low- and high-choice conditions began with a paragraph that reiterated the purpose of the study—to examine how writing a statement evaluating a passage affected recall of the details of the passage.

Participants assigned to the *low-choice condition* then read:

We are randomly assigning people to write either a sentence that indicates they thought the passage they read was very interesting or a sentence that indicates they thought the passage was uninteresting. You have been randomly assigned to write that the passage was very interesting. In the space below, you are to write one sentence that firmly says that the passage you read was very interesting. We need you to go through the process of writing the sentences and thinking the thought.

Participants assigned to the *high-choice condition* read the following:

In the space below, we would like you to write one sentence either saying that the passage you read was very interesting—OR—one sentence saying that the passage you read was not at all interesting. The choice of which to do is up to you. We need you to go through the process of writing the sentences and thinking the thought.

For high-choice participants, additional instructions followed under the heading “Notice to Research Participant.” The instructions read:

We have finished having people write that they thought the passage they read was not interesting. Thus, in order to finish the study, we need people to write that they thought the passage was very interesting. Therefore, although it is your choice, we would really appreciate it if you would write one sentence that firmly says that the passage you read was very interesting.

Following the writing, participants were presented a question that assessed how interesting they found the passage. Instructions explained that this assessment was needed in order to see how one’s opinion about the passage affected recall. Responses to the question (“How interesting is the passage you read?”) were made on a 7-point scale (1 = *not at all interesting*, 7 = *extremely interesting*).

The next questionnaire assessed how much choice the participant had over the position taken in the sentence he or she had written. Responses to this question were made on a 7-point scale (1 = *no choice at all*, 7 = *very much of a choice*). Once participants completed this questionnaire, they read an explanation of the study.

Results and Discussion

Consistent with the results of past experiments using this dissonance paradigm, participants given high choice to write the counterattitudinal statement rated the passage as more interesting ($M = 2.70$, $SD = 1.76$) than did participants given low choice ($M = 1.60$, $SD = 0.83$), $t(43) = 2.28$, $p = .03$. High-choice participants also indicated that they perceived more choice ($M = 3.73$, $SD = 1.78$) than low-choice participants ($M = 2.73$, $SD = 2.09$), $t(43) = 1.68$, $p = .10$.

Central to the predictions of the current research, trait approach motivation predicted more positive attitudes following the arousal of dissonance but not within the control condition. This was supported by a regression analysis in which trait BAS and condition interacted to predict attitude (interest in the passage), $F(1, 41) = 4.16$, $p = .05$, $\beta = .50$. Follow-up tests revealed that within the high-choice condition, higher BAS scores related to more positive attitudes ($r = .45$, $p = .01$);³ a non-significant correlation of BAS and attitude was observed within the low-choice condition ($r = -.20$, $p = .47$).

BIS did not interact with choice condition to predict attitude, $F < 1.0$. Moreover, BIS was not correlated with attitude within high- ($r = -.08$, $p = .68$) or low-choice conditions ($r = -.18$, $p = .53$). In addition, BIS and BAS were not correlated ($r = -.06$, $p = .71$) (see Figure 2).

General Discussion

The current studies provide the first evidence that dissonance reduction is related to trait approach motivation, particularly trait BAS. These results provide support for the action-based model of dissonance and empirically link dissonance theory with revised reinforcement sensitivity theory. In Study 1, BAS predicted greater spreading of alternatives in a free-choice dissonance paradigm. In Study 2, BAS predicted more positive attitudes following induced compliance.

In Study 1, BIS was negatively related to spreading of alternatives. Our original predictions did not include a prediction for the relationship of BIS and spreading. However, if dissonance reduction were an avoidance-motivated process, a *positive* relationship between BIS (punishment sensitivity) and dissonance reduction would be expected. In contrast, a negative relationship occurred. In Study 1, BAS and BIS were negatively correlated, suggesting that individuals who were high in approach motivation were also low in avoidance motivation. Such individuals should be particularly approach action oriented and likely to spread alternatives following decisions. Indeed, when a BAS–BIS difference score was created to capture this dimension, it correlated robustly with spreading of

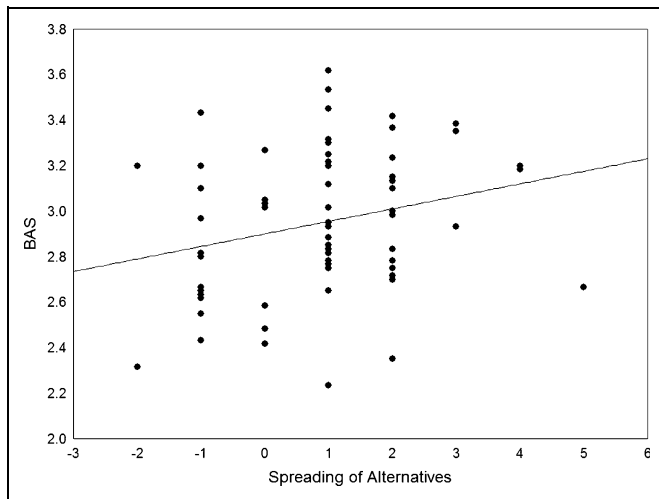


Figure 2. Scatterplot of relationship between attitude and BAS within choice conditions, Study 2

alternative ($r = .34, p = .005$). In Study 2, dissonance-related attitudes did not relate to BIS, and BIS did not relate to BAS. Taken together, these results suggest that BIS only relates to dissonance-related attitude change when BAS is negatively correlated with BIS.

Given the importance and longevity of dissonance theory in social psychology, it is surprising that so few studies have examined the influence of broad personality dimensions on dissonance reduction. Part of the reason for this may have had to do with Wicklund and Brehm's (1976) discussion of the difficulty of conducting such research. As they noted, personality could influence the perception of dissonant cognitions, the negative arousal state produced by dissonant cognitions, the tolerance for this state, and/or the way dissonance is reduced (see also Harmon-Jones et al., 2009). These are all important issues, but researchers have yet to develop ways of measuring most of these constructs. The negative arousal state has been successfully measured in some past dissonance studies, but surprisingly, it has not been found to correlate with dissonance reduction (Harmon-Jones, 2000; Harmon-Jones et al., 1996). Without waiting any longer for development of the tools needed to measure all of these constructs, we moved forward and tested our theoretically derived prediction that trait approach motivation would relate to dissonance reduction. Because the trait results converge with previous results obtained with state manipulations of approach motivation, we are confident that trait approach motivation affects dissonance reduction.

Future studies should explore the extent to which trait approach motivation relates to discrepancy reduction in other dissonance paradigms and with other dissonance outcome variables. The action-based model would predict that trait approach motivation should be particularly likely to predict discrepancy reduction when action is salient and/or pressing. A decrease in the press for action may reduce the correlation of trait approach motivation and discrepancy reduction. Moreover,

trait approach motivation should be particularly likely to predict discrepancy reduction variables that are associated with bolstering the action commitment. Other dissonance reduction techniques, such as trivializing the behavior or distracting oneself from the dissonance, may be less likely among individuals high in approach motivation.

The present results demonstrating a connection between trait BAS and dissonance reduction are important because they support the proposal, derived from the action-based model of dissonance, that dissonance reduction is an approach-related process. Furthermore, these results help to integrate dissonance with theories of action-orientation and extend the reach of the action-based model and of dissonance theory generally into basic motivational theories concerned with approach motivation.

Declaration of Conflict of Interest

The authors declared that they had no conflicts of interests with respect to their authorship or the publication of this article.

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Notes

1. We used the guidelines suggested by Tabachnick and Fidell (2001) to test for outliers and found no univariate outliers (defined as cases with z scores in excess of 3.29) or multivariate outliers (using Mahalanobis distance set at $p < .001$ evaluated with χ^2 with df equal to the number of variables).
2. An additional 16 of the high-choice participants and 1 of the low-choice participants did not comply with the request to write a counterattitudinal statement. These results provide an additional indication that participants perceived themselves to have choice. This noncompliance rate (34.8%) is slightly higher than rates found in past lab research (29.7% from Friedman & Arndt, 2005) and is likely due to the fact that the current experiment was conducted online. Importantly, compliers and noncompliers did not differ in BAS ($p = .84$) or BIS scores ($p = .27$).
3. In Study 1, spreading of alternatives was positively correlated with all BAS subscales, but not all correlations were significant: BAS-Drive ($r = .14, p = .24$), BAS-Reward Responsiveness ($r = .12, p = .35$), and BAS-Fun-Seeking ($r = .25, p = .04$). In Study 2, within the high-choice condition, attitude was positively correlated with all BAS subscales, but not all correlations were significant: BAS-Drive ($r = .50, p = .005$), BAS-Reward Responsiveness ($r = .35, p = .06$), and BAS-Fun-Seeking ($r = .23, p = .22$).

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