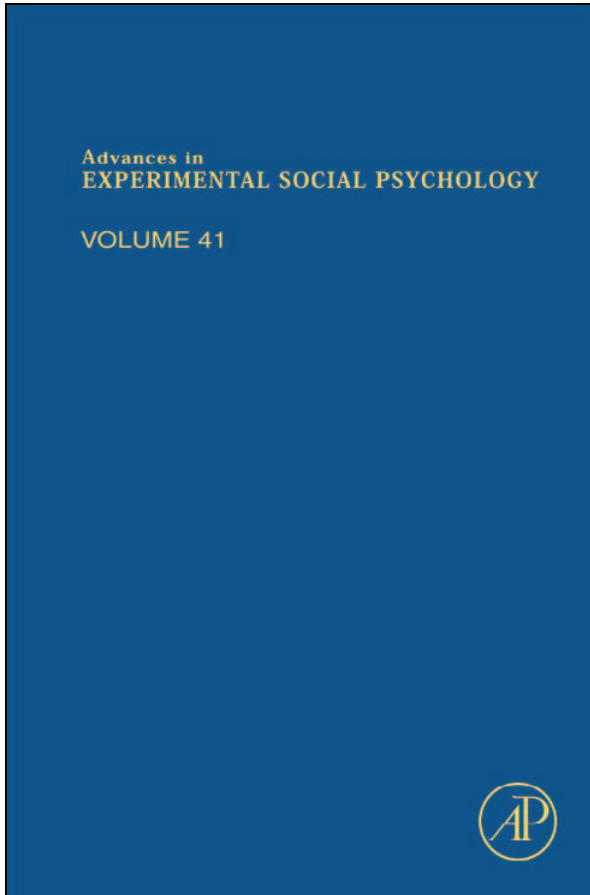


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From: Eddie Harmon-Jones, David M. Amodio, and Cindy Harmon-Jones, Action-Based Model of Dissonance: A Review, Integration, and Expansion of Conceptions of Cognitive Conflict. In Mark P. Zanna, editor: *Advances in Experimental Social Psychology*, Vol. 41, Burlington: Academic Press, 2009, pp. 119-166.

ISBN: 978-0-12-374472-2

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Academic Press.

# ACTION-BASED MODEL OF DISSONANCE: A REVIEW, INTEGRATION, AND EXPANSION OF CONCEPTIONS OF COGNITIVE CONFLICT

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## Contents

1. Overview of the Chapter	120
2. Overview of the Theory of Cognitive Dissonance	121
2.1. Experimental paradigms used to test dissonance theory	122
2.2. Alternative theoretical explanations	123
3. Action-Based Model of Dissonance: Why do Dissonance Processes Occur?	128
4. Tests of the Action-Based Model	130
4.1. Action-orientation and spreading of alternatives	130
4.2. Neural activity underlying dissonance and dissonance reduction	131
4.3. Increasing strength of action tendencies and discrepancy reduction	140
5. Considering the Action-Based Model and Other Modes of Dissonance Reduction	142
6. Individual and Cultural Differences	144
6.1. Self-esteem	145
6.2. Preference for consistency	146
6.3. Action-orientation	147
6.4. Cultural differences	147
6.5. Concerns about individual differences research	148
6.6. Creating a new individual differences measure related to dissonance processes	149
7. Conclusion	159
Acknowledgments	160
References	160

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## Abstract

An action-based model of dissonance is presented. This model accepts the original theory's proposal that a sufficient cognitive inconsistency causes the negative affective state of dissonance. It extends the original theory by proposing *why* cognitive inconsistency prompts dissonance and dissonance reduction. After reviewing past theoretical and empirical developments on cognitive dissonance theory, we describe the action-based model and present results from behavioral and physiological experiments that have tested predictions derived from this model. In particular, this evidence converges with recent neuroscience evidence in suggesting that the anterior cingulate cortex and left prefrontal cortical region are involved in conflict detection and resolution, respectively. We end by reviewing research on individual differences in dissonance arousal and reduction, and present a new measure designed to assess these individual differences.

## 1. OVERVIEW OF THE CHAPTER

Cognitive dissonance theory, first proposed by Festinger (1957), has generated hundreds of experiments and is considered one of the most influential theories in psychology (Jones, 1985). The theory and the research it has inspired have led to an increased understanding of attitude and behavior change processes, as well as an understanding of the relationships between cognition, perception, emotion, and motivation. In this article, we present the core ideas behind Festinger's original theoretical statement and discuss some notable attempts by researchers to revise and extend the basic theory. We then describe a more recent theoretical conceptualization of dissonance, referred to as an *action-based model*, which provides an overarching framework for understanding dissonance processes, and for integrating a wide range of data and previous theoretical revisions to Festinger's theory.

Briefly stated, the action-based model begins with the assumption that many perceptions and cognitions serve to activate action tendencies with little or no conscious deliberation. This assumption is consistent with several perspectives in psychological science, such as William James' (1890) ideomotor conception, Gibson's (1966, 1979) ecological approach to perception, and subsequent elaborations of these basic ideas (Berkowitz, 1984; Dijksterhuis & Bargh, 2001; Fiske, 1992; McArthur & Baron, 1983; Smith & Semin, 2004). The action-based model goes further to suggest that when these "cognitions" with action implications come into conflict, a negative affective state is aroused, referred to as *dissonance*. Our model posits that dissonance affect is aroused because conflicting action-based cognitions have

the potential to interfere with effective action. The organism is motivated to reduce this negative affect and ultimately reduce the “cognitive inconsistency” in order to behave effectively. This way of conceptualizing dissonance processes addresses many problems with past theories concerned with dissonance. It also suggests a broad organizing framework for integrating and understanding a wide array of other nondissonance theories and research.

## 2. OVERVIEW OF THE THEORY OF COGNITIVE DISSONANCE

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. This unpleasant state is referred to as “dissonance.” According to the theory, the magnitude of dissonance in relation to a cognition can be formulated as equal to  $D/D + C$ , where  $D$  is the sum of cognitions dissonant with a particular cognition and  $C$  is the sum of cognitions consonant with that same particular cognition, with each cognition weighted for importance (see Sakai, 1999; Shultz & Lepper, 1999, for precise mathematical models).

According to the original theory, the unpleasant state of dissonance motivates individuals to engage in psychological work in an effort to reduce the inconsistency between cognitions. Festinger (1957, p. 3) wrote, “The existence of dissonance, being psychologically uncomfortable, will motivate the person to try to reduce the dissonance and achieve consonance.” So, if a dieter consumed a fattening meal, he would likely be in a state of dissonance. Assuming that he stays committed to the diet, the theory would predict that he will reduce dissonance by adding consonant cognitions (e.g., “the diet will improve my appearance”), subtracting dissonant cognitions (e.g., “fattening foods are not very tasty”), increasing the importance of consonant cognitions (e.g., “my health is the most important thing in life”), or decreasing the importance of dissonant cognitions (e.g., “sensory pleasures are not very important”).

Researchers have most often measured dissonance reduction with attitude change. Attitude change in response to a state of dissonance is expected to be in the direction of the cognition that is most resistant to change. In laboratory tests of the theory, knowledge about recent behavior is usually assumed to be the cognition most resistant to change. If one has recently performed a behavior, it is usually difficult to convince oneself that the behavior did not occur. Thus, attitudes often change to become more consistent with a recent behavioral commitment.

## 2.1. Experimental paradigms used to test dissonance theory

Three experimental paradigms constitute the majority of tests of dissonance theory. Each paradigm induces participants to experience an inconsistency between cognitions and then gives them an opportunity to express a change in attitudes. The change in attitudes is measured, and is presumed to reflect the degree of dissonance reduction. In this section, we describe the basic logic behind each of these paradigms to provide the reader with a basis for evaluating much of the research conducted on dissonance over the past half century.

### 2.1.1. Free choice

After a decision between alternatives, all of the cognitions that favor the chosen alternative are consonant with the decision, whereas all the cognitions that favor the rejected alternative are dissonant. An individual's experience of dissonance is greater when the number and importance of dissonant cognitions is higher, and/or when the number and importance of consonant cognitions is lower. The dissonance an individual experiences is typically greater after choosing between alternatives that are closer in attractiveness (as long as each alternative has several distinguishing characteristics). Dissonance caused by a decision can be reduced by viewing the chosen alternative as more attractive and/or viewing the rejected alternative as less attractive. [Brehm \(1956\)](#) conducted the first free choice experiment. In it, participants made either an easy or a difficult decision between two alternatives (i.e., household objects such as an automatic toaster and a fluorescent desk lamp). The difficult decision was one in which the alternatives were close in attractiveness, whereas the easy decision was one in which the two alternatives were very different in their attractiveness (i.e., one alternative was much more attractive than the other). Participants were asked to evaluate each of the alternatives before and after their decision to choose one of the alternatives. After an easy decision, attitudes toward the alternatives did not change. In contrast, after a difficult decision, attitudes toward the alternatives changed, such that they became more negative toward the rejected alternative (and slightly more positive toward the chosen alternative). This method of reducing dissonance by changing one's attitudes toward the two choice options to be more consistent with a decision has been referred to as "spreading of alternatives."

### 2.1.2. Induced compliance

Dissonance should also be aroused when a person acts in a way that is contrary to his or her attitudes, because the recent behavior is inconsistent with one's preexisting attitude. But how can an experimenter unobtrusively induce a research participant to perform such an act? In the first test of this prediction, [Festinger and Carlsmith \(1959\)](#) had participants perform a boring task that involved turning a series of wooden pegs. After completing

this very tedious task, participants were paid either \$1 or \$20 to tell “another participant” that the task was interesting. Festinger and Carlsmith reasoned that lying for a payment of \$20 should not arouse much dissonance, because \$20 provides sufficient justification for the counterattitudinal behavior (i.e., it adds cognitions consonant with the behavior). By comparison, being paid \$1 for performing the same behavior should arouse much dissonance, because \$1 was just enough justification for the behavior (i.e., it adds fewer consonant cognitions than \$20). As expected, participants in the \$1 (low-justification) condition changed their attitudes to be more positive toward the task, whereas participants in the \$20 (high-justification) condition did not change their attitudes. Thus, this paradigm was successful in arousing dissonance and motivating dissonance-reducing attitude change.

### 2.1.3. Effort justification

Dissonance is aroused whenever a person engages in an unpleasant activity to obtain some desirable outcome. From the cognition that the activity is unpleasant, it follows that one would not engage in the activity. In other words, the cognition that the activity is unpleasant is dissonant with engaging in the activity. As an individual puts increasing effort into an unpleasant activity, the dissonance he or she feels as a result of the activity should increase. Dissonance can be reduced by changing one's view of the outcome to be even more desirable (a means for adding consonant cognitions).

In the first experiment designed to test these theoretical ideas, [Aronson and Mills \(1959\)](#) had women undergo a severe or mild “initiation” to become a member of a group. In the severe initiation condition, the women engaged in an embarrassing activity to join the group, whereas in the mild initiation condition, the women engaged in an activity that was not very embarrassing to join the group. The group turned out to be rather dull and boring. The women in the severe initiation condition evaluated the group more favorably than the women in the mild initiation condition.

The above paradigms continue to be used fruitfully in research (e.g., [Beauvois & Joule, 1996](#); [Cooper, 2007](#); [Harmon-Jones & Mills, 1999](#); [Olson & Stone, 2005](#)). Other experimental paradigms have been used to test the theory but they are used less frequently and because of space limitations are not described here ([Wicklund & Brehm, 1976](#)).

## 2.2. Alternative theoretical explanations

After these and other dissonance results appeared, some theorists began to question whether the results were due to motivational processes. These theorists suggested that attitude change was due to cold, purely cognitive processes such as self-perception ([Bem, 1967](#)) or to managing one's impression to others ([Tedeschi et al., 1971](#)). However, subsequent research confirmed that dissonance is best characterized as a motivated process (for

reviews, [Harmon-Jones, 2000a,b](#)). For example, individuals experiencing the state of dissonance have been found to exhibit heightened electrodermal activity (which is associated with activation of the sympathetic nervous system; [Elkin & Leippe, 1986](#); [Harmon-Jones et al., Simon & Nelson, 1996](#)) and report increased negative affect (e.g., [Elliot & Devine, 1994](#); [Harmon-Jones, 2000c](#); [Zanna & Cooper, 1974](#)). After cognitive discrepancy is reduced (i.e., attitude change occurs), self-reported negative affect is reduced ([Elliot & Devine, 1994](#); [Harmon-Jones, 2000c](#)). Moreover, research using a misattribution paradigm reveals that discrepancy reduction is motivated by the need to reduce negative affect ([Zanna & Cooper, 1974](#)). Thus, this research showing that negative affect occurs as a result of cognitive dissonance and that it creates a motivation to engage in dissonance-reducing activities strongly suggests that the dissonance process is a motivated one.

Beginning in the late 1960s, researchers began to propose motivational explanations for dissonance effects that differed from Festinger's originally proposed theory. Whereas the original theory focused on a very basic incompatibility between cognitions, these newer theories invoked higher-order, more complex processes. They changed the focus from inconsistency to the individual's self-concept and the individual's concern with harming others.

### 2.2.1. Self-consistency

In self-consistency theory, [Aronson \(1969, 1999\)](#) proposed that dissonance only occurs when a person acts in a way that violates his or her self-concept, that is, when a person performs a behavior inconsistent with his or her view of the self. Because most persons view themselves in a positive light, such that they are competent, rational, and moral, dissonance is experienced when a person behaves in an incompetent, irrational, or immoral way. One of the primary predictions derived from this revision is that high self-esteem individuals should respond with more dissonance reduction than low self-esteem individuals, because dissonance experiments induce individuals to act in ways discrepant from a positive self-view. Studies testing this prediction have produced mixed results: some showed that high self-esteem individuals showed greater attitude change, some showed that low self-esteem individuals showed greater attitude change, and some found no differences between self-esteem groups (see [Stone, 2003](#), for review). Also, [Beauvois and Joule \(1996, 1999\)](#) obtained results that appear incompatible with this self-consistency revision. Therefore, the experience of dissonance and the engagement in dissonance-reducing activities does not appear to be limited to discrepancies involving the self-concept.

### 2.2.2. Self-affirmation

In his alternative to Festinger's dissonance theory, [Steele \(1988\)](#) proposed that individuals possess a motive to maintain an overall self-image of moral and adaptive adequacy. He stated that dissonance-induced attitude change

occurs because dissonance threatens this positive self-image. Whereas Festinger's dissonance theory posited that individuals are motivated to reconcile inconsistent cognitions, Steele proposed that, instead, individuals are merely motivated to affirm the integrity of the self or maintain a "perception of global integrity, that is, of overall moral and adaptive adequacy" (Steele et al., 1993, p. 885; see Sherman & Cohen, 2006, for a recent review). In support of this idea, Steele presented experiments where, following a dissonance induction, participants either were or were not presented with an opportunity to affirm an important value. When participants were allowed to affirm an important value, dissonance-related attitude change did not occur.

However, Simon et al. (1995) presented evidence supporting an alternative explanation for Steele's findings that was in line with the original theory of dissonance. Festinger's original theory proposed that the degree of dissonance experienced depended upon the importance of the dissonant and consonant cognitions. Simon et al. proposed that the mechanism by which self-affirmation reduced dissonance was by reducing the importance of the cognitions involved in the dissonance. They hypothesized that making an important value salient could reduce dissonance by reducing the individual's perception of the importance of the dissonant act, even if the value was unrelated to the self-concept. They conducted an experiment in which, following the induction of dissonance, participants were either given an opportunity to affirm an important value (i.e., "a self-affirmation condition, rank issues such as politics in term of their personal importance"), asked to consider a value that was not important to them personally but was of general importance (i.e., "an issue-salient condition, rank the same issues as above but in terms of their importance in general"), or were given no special instructions (control condition). Participants in the control condition changed their attitudes to be more consistent with the induced compliance behavior, as expected. Participants in both the self-affirmation and issue salient conditions did not change their attitudes. Writing about an important value caused participants to reduce the importance of the behavior and attitude to the point that attitude change did not occur. This occurred even when the values were not personally important and thus not self-affirming. Other evidence has been presented that is difficult to interpret in self-affirmation theory terms, such as evidence suggesting that self-affirmations relevant to the recent dissonant act increase rather than decrease dissonance-related attitude change (Aronson et al., 1999).

The self models of dissonance also have difficulty explaining the dissonance effects produced in rats (Lawrence & Festinger, 1962), as rats are believed to lack self conceptions of morality, rationality, and competence. Recent research has revealed that four-year-old humans and capuchin monkeys, who also lack the complex self-concepts which would seem to be required by self models of dissonance, show evidence of dissonance reduction (Egan et al., 2007). Hence, although self aspects appear to

moderate dissonance processes, they are not necessary to cause dissonance (Harmon-Jones, 2000d; Stone & Cooper, 2003). In terms of the original theory, self-related cognitions would be expected to affect the magnitude of dissonance, as cognitions related to the self are often important to an adult human. In other words, the experimental results derived from the self models are compatible with the original theory. Furthermore, the self models are unable to explain basic dissonance motivation effects concerning discrepancies that do not involve the self.

### 2.2.3. Aversive consequences

Cooper and Fazio (1984) proposed that the discomfort experienced in dissonance experiments was not due to an inconsistency between the individual's cognitions, but rather to feeling personally responsible for producing an aversive consequence. In support of this idea, Cooper and Worchel (1970) replicated and extended Festinger and Carlsmith's (1959) classic experiment in which participants were given low or high justification to claim that a boring task was interesting. In addition to the conditions of the original experiment, Cooper and Worchel added a condition in which, when the participant told the confederate that the boring task was interesting, the confederate was not convinced. Attitude change occurred only in the low-justification condition where the confederate believed the participant. This result and others (for review, see Cooper & Fazio, 1984) have been interpreted as indicating that dissonance-related attitude change only occurs when individuals feel personally responsible for producing an aversive consequence.

According to the original theory of cognitive dissonance, the production of aversive consequences would be expected to increase the amount of dissonance produced because an aversive consequence in itself may be an important dissonant cognition, or it may further strengthen one's behavioral commitment (see Harmon-Jones, 1999). However, the original theory would deny that an aversive consequence is *necessary* to produce dissonance. In the induced-compliance experiments testing the necessity of aversive consequences, there are a number of reasons why attitude change may have occurred *only* when participants' behavior led to aversive consequences. The null finding that attitudes were unchanged in the no-aversive-consequences conditions, like all null effects, is difficult to explain and subject to multiple alternative explanations. One possibility is that attitude change was produced, but the small sample sizes in these experiments may have had insufficient power to detect the change. Another possibility is that not enough dissonance was aroused in these experiments to produce attitude change without the additional important cognition of an aversive consequence. Finally, the dissonance in the no-aversive consequences conditions may have been reduced by some other route besides attitude change.

To examine whether attitude change could occur in an induced compliance setting in which aversive consequences were not produced, we

conducted several experiments (Harmon-Jones, 2000c; Harmon-Jones et al., 1996). Under the guise of an experiment on memory, participants were exposed to an attitudinal object (e.g., a boring passage they read). Participants were assured of privacy and anonymity, and then given high or low choice to write a counter-attitudinal statement (to manipulate justification) about the object. They were asked to discard the statement in the trash after writing it, so that there was no chance of the statement causing an aversive consequence. This manipulation was based on Cooper and Fazio's (1984) statement that, "making a statement contrary to one's attitude while in solitude does not have the potential for bringing about an aversive event" (p. 232). In other words, the experiments were designed so that aversive consequences were clearly absent to demonstrate that cognitive dissonance processes could occur in such situations.

In one experiment (Harmon-Jones et al., 1996), participants were asked to read a boring passage. They were then given high or low choice to write that they found the boring passage interesting. Although no aversive consequences were produced, persons in the high-choice condition changed their attitudes to be more favorable toward the passage. In addition, participants in high-choice condition evidenced more sympathetic nervous system arousal, as measured by nonspecific skin conductance responses, than those in the low-choice condition.

In another experiment, chocolate-loving participants wrote a statement that they disliked a piece of chocolate they had just eaten under conditions of low or high choice (Harmon-Jones, 2000c). Participants in the high-choice condition changed their attitudes to report a decrease in their enjoyment of chocolate. In addition, self-reported negative affect was increased following dissonance-producing behavior and was reduced following the attitude change. These experiments also demonstrate that the experience of cognitive dissonance evokes an unpleasant state that motivates discrepancy reduction.

The results obtained in these experiments indicate that dissonance affect and dissonance-related attitude change can occur in situations in which a cognitive inconsistency is present but does not involve the possibility of aversive consequences. Because participants' counterattitudinal statements were produced in private and with anonymity and were discarded after they were written, the participants did not cause an aversive consequence. In these experiments, participants did not lose a reward, gain a punishment, tell a lie to another person, or inflict any other kind of injury on other persons. There was simply an abstract benefit of helping in research. The discrepancy between the participants' perception of a stimulus and the participants' knowledge of what they had been induced to state about that stimulus was sufficient to create dissonance.

These experiments supported the original conception of dissonance theory over this revision. McGregor et al. (1999) have also discussed and

demonstrated that attitudinal ambivalence research has provided evidence of dissonance-related negative affect in the absence of feeling personally responsible for producing negative consequences. More specifically, they found that the simultaneous accessibility of participants' conflicting attitudes (i.e., how quickly and equally quickly conflicting evaluations came to mind) predicted the ambivalence participants felt (Newby-Clark et al., 2002). Nevertheless, some important questions regarding the basic mechanism underlying dissonance effects remained: Why does dissonance evoke this negative motivational state? Why does this state motivate attitude change?

### 3. ACTION-BASED MODEL OF DISSONANCE: WHY DO DISSONANCE PROCESSES OCCUR?

Festinger (1957) posited no answer to the question of why dissonance processes occur other than to state that inconsistency is motivating. Brehm and Cohen (1962) and Beauvois and Joule (1996, 1999) pointed out that a behavioral commitment is an important component of the dissonance process. However, in these previous statements, these theorists did not indicate why cognitions with implications for action motivate persons to engage in discrepancy reductions. The action-based model of cognitive dissonance was proposed to answer this "Why?" question (Harmon-Jones, 1999).

The action-based model concurs with theorizing in other areas of psychology in proposing that perceptions and cognitions can serve as action tendencies (Berkowitz, 1984; Dijksterhuis & Bargh, 2001; Fiske, 1992; Gibson, 1979; James, 1890; McArthur & Baron, 1983; Smith & Semin, 2004). Indeed, this perspective on perception/cognition is quite consistent with the situated cognition approach of Smith and Semin (2004), which proposes, among other things, (1) that mental representations are action oriented; (2) that cognition is embodied in that it draws on our sensorimotor abilities, environments, brains, and bodies; and (3) that cognition and action are the result of dynamic processes of interactions between an agent and environment.

The action-based model further proposes that *dissonance between cognitions evokes a negative affective state because it has the potential to interfere with effective and unconflicted action*. In essence, discrepant cognitions create problems for the individual when those cognitions have conflicting action tendencies. Dissonance reduction, by bringing cognitions into line with behavioral commitments, serves the function of facilitating the execution of effective and unconflicted action (see also, Jones & Gerard, 1967).

The action-based model proposes both a proximal and a distal motivation for the existence of dissonance processes. The proximal motive for reducing dissonance is to reduce or eliminate the negative emotion of dissonance. The distal motivation is the need for effective and unconflicted action. Thus,

consistent with the socially situated cognition approach (Smith & Semin, 2004), the action-based model assumes that emotion, cognition, and action constitute adaptive regulatory processes that ultimately serve survival needs.

Past discussions of the theory of cognitive dissonance have referred to two different constructs as “cognitive dissonance.” One is the inconsistency between cognitions. The second is the unpleasant emotional/motivational state that occurs when a person holds two contradictory cognitions. In order to better understand the processes of dissonance, the action-based model distinguishes between the two. We refer to inconsistency between cognitions as “cognitive discrepancy,” whereas we call the unpleasant emotive state “dissonance.” The unpleasant emotive state of dissonance provides motivation to change one’s attitudes or engage in other discrepancy-reduction processes.

After an individual makes a difficult decision, psychological processing should assist with the execution of the decision. The tendency of participants in dissonance research to view the chosen alternative more favorably and the rejected alternative more negatively after a decision may help the individual to follow through, to effectively carry out the actions that follow from the decision.

As an example, consider an important, effortful behavioral decision, such as beginning an exercise program. In this situation, the “actions” implied by the decision are the exercise behaviors. The benefits of exercise, from better-fitting clothes to improved long-term health, constitute consonant cognitions. The drawbacks of exercise, including the time commitment and muscle soreness, constitute dissonant cognitions. Dissonance affect comes from the conflict aroused by the dissonant cognitions, and this unpleasant affect motivates the individual to decrease the discrepancy by bringing the cognitions in line with the behavioral commitment. The better an individual is able to reduce the number and importance of dissonant cognitions and increase the number and importance of consonant cognitions, the more likely it is that he or she will faithfully perform the actions required by the exercise program over the long-term and reap its benefits.

In contrast to models of cognitive dissonance that view dissonance processes as irrational and maladaptive (Aronson, 1969), the action-based model views dissonance processes as adaptive. Of course, adaptive, functional psychological processes that are useful and beneficial in most circumstances may not be beneficial in all circumstances. Occasionally, dissonance reduction may cause persons to maintain a prolonged commitment to a harmful chosen course of action, when it would be better to disengage. However, when we state that dissonance processes are adaptive, we mean that they benefit the organism in the majority of cases.

In addition, we must distinguish between dissonance motivation and dissonance reduction. The action-based model, like the original theory, proposes that cognitive discrepancy produces negative affect, and that the negative affect motivates the individual to change his or her attitudes.

However, it is possible for a person to continue to maintain conflicting attitudes (although negative affect may persist). Furthermore, there are some situations in which individuals do disengage from harmful chosen courses of action, even though they may experience high levels of negative affect in the process.

## 4. TESTS OF THE ACTION-BASED MODEL

### 4.1. Action-orientation and spreading of alternatives

According to the action-based model of dissonance, the post-decisional state is similar to an action-oriented state (Beckmann & Irle, 1985; Gollwitzer, 1990; Kuhl, 1984), where the individual is in a mode of “getting things done.” Once a decision is made, an organism should be motivationally tuned toward enacting the decision and behaving effectively with regard to it. An implemental or action-oriented mindset is one in which plans are made to effectively execute behaviors associated with the decision (Gollwitzer & Bayer, 1999). We suggest that this implemental or action-oriented state is similar to an approach motivational state. When a person is in an action-oriented state, implementation of decisions is enhanced (Gollwitzer & Sheeran, 2006). We suggest that these action-oriented states and implemental states are similar to Jones and Gerard’s (1967) concept of an unequivocal behavior orientation.

We proposed that the action-oriented state that follows decision-making is equivalent to the state in which dissonance motivation operates and discrepancy reduction occurs (Harmon-Jones & Harmon-Jones, 2002). Thus, experimentally manipulating the degree of action-orientation experienced following a decision should affect the degree of discrepancy reduction. In one experiment, participants were asked to make either an easy decision or a difficult decision. Participants then completed a mindset questionnaire. The neutral mindset asked participants to list seven things they did in a typical day, whereas the action-oriented mindset questionnaire asked participants to list seven things they could do to perform well on the physical exercise they had chosen. Participants then reevaluated the exercises. Participants who made a difficult-decision in the action-oriented condition demonstrated a greater increase in preference for the chosen over the rejected exercise (i.e., spreading of alternatives) than participants in the other three conditions.

In a second experiment, we replicated the results of the first experiment using a different manipulation of action-orientation (Harmon-Jones & Harmon-Jones, 2002). In this experiment, action-orientation was induced by asking participants to think about a project or goal that they intended to accomplish, and to list the steps they intended to use to successfully follow

through with their decision (Gollwitzer, 1990). Two comparison conditions were also included, one in which participants wrote about a neutral, ordinary day and one in which participants wrote about an unresolved problem, which was defined as a problem characterized by the fact that they were not yet sure whether to take action to change things. Thus, as in the previous experiment, participants first made a difficult decision, but this time the decision was between two equally attractive research studies in which they could participate. Following the decision, participants completed the action-orientation manipulation described above, and then rereated their attitudes toward the research studies. Results indicated that the participants in the action-orientation condition engaged in more spreading of alternatives following a difficult decision than did participants in the comparison conditions. This study provided stronger support for the action-based model because, in this case, the action-orientation induction was unrelated to the decision in the experiment.

Correlational evidence also suggests that action-oriented processing facilitates discrepancy reduction (Beckmann & Kuhl, 1984). In this study, dispositional action orientation was measured by Kuhl's (1980, 1984) action versus state orientation questionnaire. A sample item from the scale says, "When I have decided to buy one item of clothing and I find several things I like: (1) "I often waver back and forth, trying to decide which I should buy" (state-oriented answer); and (2) "I usually don't think much about it and make a quick decision" (action-oriented answer). Participants were individuals searching for an apartment and they were shown information about 16 apartments. Participants rated the attractiveness of the apartments before and after choosing the apartment they preferred (i.e., before and after a tentative decision). After the decision, individuals who were dispositionally high in action-orientation increased the attractiveness rating of the chosen apartment more than individuals who were dispositionally low in action-orientation. Thus, both state and trait evidence support our contention that dissonance reduction occurs in an action-oriented state—a state that assists in the implementation of decisions and in effective action.

#### 4.2. Neural activity underlying dissonance and dissonance reduction

The action-based model of cognitive dissonance corresponds closely to recent models of self-regulation developed in the field of cognitive neuroscience, and it provides an important theoretical framework for placing neural processes in the context of motivated cognition. In this section, we describe findings from research on the neural processes associated with the monitoring of response conflicts and the implementation of intended behavior that are consistent with the action-based model of dissonance.

#### 4.2.1. Dissonance arousal, conflict monitoring, and the anterior cingulate cortex

According to the action-based model, dissonance is aroused by the activation of cognitions that interfere with goal-driven behavior. Although few studies have directly examined the process of dissonance arousal in the brain, much attention has been given to questions of how the brain processes response conflicts on task such as the color-naming Stroop (1935) task. For example, when completing the color-naming Stroop task, one's goal is to identify the ink color of a word stimulus, regardless of the word's meaning. However, the processing of word meaning is typically automatic, and when a word's meaning is incongruent with one's goal to judge the word's color, such as when the word "red" is presented in blue ink, there is conflict between the intended and the automatic response tendencies. In studies examining neural activity during the Stroop task, anterior cingulate cortex activity is greater during incongruent trials than congruent trials (Carter et al., 1998). Similar findings have been observed using other response-conflict tasks, such as the Eriksen flanker's task (Gerhing et al., 1993; Eriksen & Eriksen, 1974), and the Go/No-Go task (Botvinick et al., 1999; Kiehl et al., 2001). Researchers have interpreted these findings as evidence that the anterior cingulate cortex plays an important role in monitoring the moment-to-moment representations of action tendencies for potential conflicts, presumably so that other neurocognitive mechanisms may be engaged to override the unwanted tendency and to promote an effective goal-directed response (Botvinick et al., 2001). Thus, conflict monitoring represents the first component of a dual-process model of cognitive control, whereby the need for control is initially detected.

Recently, we have suggested that the anterior cingulate cortex, and its associated role in conflict monitoring, corresponds well to the process of dissonance arousal (Harmon-Jones, 2004). The conflict-monitoring account is consistent with the action-based model of dissonance, because it too focuses on conflicts between action tendencies. Amodio et al. (2004) integrated the conflict-monitoring framework with social psychological theories of self-regulation by examining conflict between automatic stereotyping tendencies and participants' goals to respond without prejudice. In this study, anterior cingulate cortex activity was monitored using an event-related potential measure referred to as the "error-related negativity" component (Gerhing et al., 1993; van Veen & Carter, 2006). When participants—who reported low-prejudice attitudes—accidentally made responses that reflected the application of racial stereotypes, thus constituting a clear response conflict, the anterior cingulate cortex was strongly activated. By comparison, anterior cingulate cortex activity was lower on other trial types that did not elicit conflicting actions.

In subsequent research, Amodio et al. (2008) demonstrated that heightened anterior cingulate cortex activity associated with racially-biased responses was only observed for participants with strong personal

motivations to respond without prejudice. Participants without personal motivations (i.e., high-prejudice participants) did not show enhanced anterior cingulate cortex activity when their responses reflected the application of stereotypes. Thus, when participants made responses that were dissonant with their attitude-based intentions, anterior cingulate cortex activity was high. Furthermore, across studies, participants with stronger anterior cingulate cortex activity to dissonant responses were more likely to engage in controlled behavior (slower, more careful responding). These studies provided initial evidence for the role of the anterior cingulate cortex, and its associated conflict monitoring function, as a critical process underlying dissonance arousal. Importantly, this line of research demonstrated that high-level conflicts, the type with which dissonance theory has been most concerned, also activate the anterior cingulate cortex, in line with lower-level forms of conflict typically studied in the cognitive neuroscience literature (e.g., in studies using the Stroop task).

More recently, [van Veen et al. \(2007\)](#) examined dissonance-related brain activity more directly in a study that used the induced compliance paradigm. The authors observed heightened anterior cingulate cortex activity during the manipulation of dissonance, and participants' degree of anterior cingulate cortex activation was significantly associated with attitude change. The finding that dissonance reduction was associated with increased anterior cingulate cortex activation is consistent with the action-based model, which suggests that discrepancy reduction results from the need for effective and unconflicted action (distal motive). Although this interpretation of anterior cingulate cortex activity is compatible with the original theory of dissonance, it is not clearly compatible with other versions of dissonance, because these versions focus primarily on high-level self-consistencies (or other nonconsistency-oriented motivations such as aversive consequences or self-affirmation), and thus are not directly associated with coordinating action.

Response conflict tasks used in studies of the anterior cingulate cortex have also been found to cause increases in skin conductance, which indexes sympathetic nervous system arousal ([Hajcak et al., 2003, 2004](#)), and measures of negative affect such as the startle eyeblink response ([Hajcak & Foti, 2008](#)). Situations that typically evoke cognitive dissonance also cause increased skin conductance ([Elkin & Leippe, 1986](#); [Harmon-Jones et al., 1996](#); [Losch & Cacioppo, 1990](#)) and negative affect ([Elliot & Devine, 1994](#); [Harmon-Jones, 2000c](#); [Zanna & Cooper, 1974](#)). Taken together, these studies suggest that the anterior cingulate cortex is involved in generating the negative affective state of dissonance.

#### 4.2.2. Dissonance reduction and the prefrontal cortex

The arousal of negative affect by cognitive discrepancy drives efforts to reduce the dissonant state, either through actions or cognitive restructuring (e.g., attitude change). The process of cognitive discrepancy reduction can

occur rapidly. Indeed, research has revealed that dissonance-related attitude change can occur immediately after individuals commit to engage in behavior and before they actually engage in the behavior (e.g., essay writing; [Rabbie et al., 1959](#)). According to the action-based model, the process of discrepancy-reduction engages approach-oriented motivational processes, as the individual works to successfully implement the new commitment. To our knowledge, only the action-based model makes the prediction that discrepancy reduction following commitment to action involves approach motivational processes, which the model views as part of the distal motive of effecting unconflicted behavior.

Recent neurocognitive models of control posit that the prefrontal cortex governs the implementation of a controlled response following the detection of conflict by the anterior cingulate cortex ([Botvinick et al., 2001](#); [Miller & Cohen, 2001](#)). That is, as discrepancy-related activity in the anterior cingulate cortex rises, anterior cingulate cortex-to-prefrontal cortex communication or signaling increases. The prefrontal cortex is then believed to play a critical role in responding to the discrepancy by amplifying an intended response tendency to override the unintended tendency ([Kerns et al., 2004](#)). In relating the neurocognitive model of control to cognitive dissonance, the action-based model suggests that whereas the anterior cingulate cortex is associated with dissonance arousal, regions of the prefrontal cortex are critical for dissonance reduction. The dissociation between the neural processes related to dissonance arousal and discrepancy reduction supports the idea that these two processes reflect the operation of independent underlying mechanisms. However, the neurocognitive model of control does not clearly specify which regions of the prefrontal cortex contribute to different aspects of discrepancy reduction and action control, and it is silent on the role of motivation in the process of control.

Converging evidence from studies using a range of methods suggest that prefrontal cortex activity is lateralized on the basis of motivational direction, with the left frontal region being involved in approach motivational processes (“going toward”), and the right frontal region being involved in inhibitory or withdrawal motivational processes (“going away”). For instance, [Robinson and colleagues](#) (e.g., [Robinson & Downhill, 1995](#)) have observed that damage to the left frontal lobe causes depressive symptoms, with stronger depressive symptoms among patients with damage closer to the frontal pole. Given that depression relates to impaired approach-related processes (and associated approach-related emotion), damage to brain regions involved in approach motivation would lead to depression.

A growing body of research assessing electroencephalographic (EEG) activity has similarly found that increased left-frontal cortical activation relates to state and trait approach motivation ([Amodio et al., 2007, 2008](#); [Harmon-Jones, 2003, 2004](#); [Harmon-Jones & Allen, 1997, 1998](#)). Source localization of frontal asymmetry in alpha power, which comprises the

index of frontal asymmetry in EEG studies, has demonstrated that it reflects activity in the dorsal prefrontal cortex (Pizzagalli et al., 2005). Initial studies of the prefrontal cortex's role in motivation examined the association between greater left-sided frontal activity and questionnaire measures of behavioral approach sensitivity (Harmon-Jones & Allen, 1997) and the approach-related emotion of anger (Harmon-Jones & Allen, 1998). Subsequent research has related greater left-sided frontal activity to the state engagement in approach-related responses (Amodio et al., 2007; Harmon-Jones & Sigelman, 2001) and to the accessibility of approach-related goals (Amodio et al., 2004). In addition, several fMRI studies have observed greater left-sided prefrontal cortex activity during the retrieval of approach-related action words (Bunge, 2004; Petersen et al., 1988). These findings are consistent with the idea that the left prefrontal cortex is particularly involved in the implementation of intended action and the formation (and restructuring) of goals to guide future action. This body of findings is in line with the action-based model's position that the discrepancy reduction process serves to promote goal-directed behavior through the restructuring of goal-relevant attitudes and beliefs.

It is notable that the relation between right-sided prefrontal cortex activity and withdrawal motivation is less clear, with few EEG studies reporting an association between right-sided frontal activity and either state or trait assessments of withdrawal motivation. By comparison, several recent studies suggest that the right prefrontal cortex plays a special role in the inhibition of action (Aron et al., 2004). This evidence represents data from fMRI studies of normal participants as well as brain lesion patients. Given the remaining ambiguities concerning the frontal asymmetry and withdrawal motivation, more research is currently needed to clarify the relation between withdrawal motivation and response inhibition, both at the conceptual and neurocognitive levels of analysis (Amodio et al., 2008).

Considered as a whole, research on left prefrontal cortex function suggests that it is involved in approach motivational processes aimed at resolving inconsistency (MacDonald et al., 2000; van Veen & Carter, 2006). In what follows, we describe a set of studies that have examined the role of left prefrontal cortex activity and approach motivation as they relate directly to the resolution of dissonance-arousing discrepancies. The overarching prediction of the action-based model is that commitment to a chosen course of action should lead to an enhancement in relative left frontal cortical activity, which in turn should be associated with attitude change in support of the chosen course of action.

***Induced Compliance and Relative Left Frontal Cortical Activation*** In an experiment by Harmon-Jones et al. (2008), participants were randomly assigned to a low versus high choice condition in an induced compliance paradigm. Immediately after starting to write the counterattitudinal essay

(regarding a tuition increase at their university), participants' EEG activity was recorded. After essay completion, attitudes were assessed. Participants in the high choice condition evidenced greater relative left frontal activation than individuals in the low choice condition (Harmon-Jones et al., 2008). Moreover, commitment to write the counter-attitudinal essay (high-choice) caused attitudes to be more consistent with the behavior, as compared to a low-commitment (low-choice) condition. However, in this experiment, relative left frontal activation did not relate to attitudes, perhaps because the attitude measure lacked the needed sensitivity (e.g., it did not tap attitude change from precommitment, but only tapped attitudes following the commitment).

***Neurofeedback of Relative Left Frontal Cortical Activity and Free Choice*** In the previous experiment, when the psychological process (commitment to a chosen course of action) was manipulated and the proposed physiological substrate was measured (left frontal cortical activation), commitment to a chosen course of action increased relative left frontal cortical activation (Harmon-Jones et al., 2008). To provide stronger causal inferences regarding the role of the left frontal cortical region in following through with the commitment (discrepancy reduction), it is important to manipulate the physiology and measure the psychological outcome. Manipulation of the mediator also provides stronger causal evidence than simply correlating the proposed mediator with the outcome (Sigall & Mills, 1998; Spencer et al., 2005). Therefore, we conducted another experiment in which relative left frontal cortical activation was manipulated after dissonance was aroused to test whether a manipulated increase in relative left frontal cortical activation would increase dissonance reduction (attitude change).

To manipulate relative left frontal cortical activity, we used neurofeedback training of EEG. Neurofeedback presents the participant with real-time feedback on brainwave activity. If brainwave activity over a particular cortical region changes in the direction desired by the experiment, then the participant is given "reward" feedback; if brainwave activity does not change in the desired direction, either negative feedback or no feedback is given. Rewards can be as simple as the presentation of a tone that informs the participant that brain activity has changed in the desired way. Neurofeedback-induced changes result from operant conditioning, and these changes in EEG can occur without awareness of how the brain activity changes occurred (Kamiya, 1979; Siniatchkin et al., 2000). Participants typically are not aware of how they brought about changes in brain activity; in fact, extensive practice is required to gain awareness of how one may intentionally cause changes in brain activity (e.g., 8 weeks of practice, Kotchoubey et al., 2002).

In past research, neurofeedback was effective at decreasing but not increasing relative left frontal activity after only 3 days of training. The decrease in relative left frontal activity brought about with this brief neurofeedback training caused less approach-related emotional responses (Allen

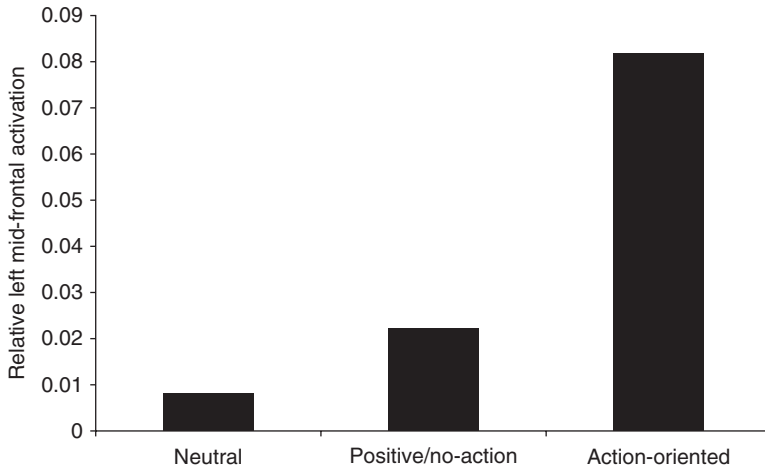
et al., 2001). Based on these past results, we predicted that a decrease left frontal condition would be more successful at changing brain activity than an increase left frontal condition.

Most importantly, we predicted that a decrease in relative left frontal activity would lead to a decrease in discrepancy reduction as measured by spreading of alternatives. To test these predictions, we used the decision paradigm developed by Brehm (1956). First, participants were randomly assigned to increase or decrease relative left frontal activation during 2 days of neurofeedback training. Then, on the third day, immediately following a difficult decision, participants received neurofeedback training in the same direction as the previous 2 days. Finally, attitudinal spreading of alternatives was assessed. In support of predictions, neurofeedback training caused a reduction in relative left frontal cortical activity, which caused an elimination of the familiar spreading of alternatives effect (Harmon-Jones et al., 2008). Together with past research showing that commitment to a chosen course of action increases activity in the left frontal cortex (Harmon-Jones et al., 2008), this experiment's manipulation of relative left frontal cortical activity, a presumed mediator of the effect of commitment on discrepancy reduction, provides strong support for the role of relative left frontal activity in discrepancy reduction processes.

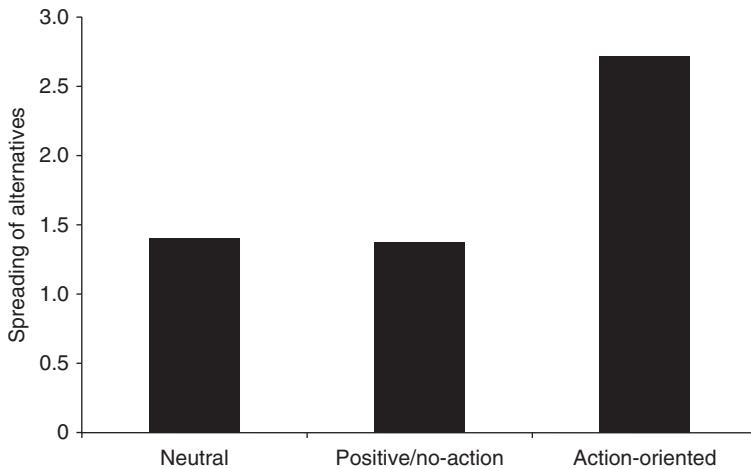
***Action-Oriented Mindset and Relative Left Frontal Cortical Activation*** A follow-up experiment (Harmon-Jones et al., 2008, Experiment 2) was designed to conceptually replicate the experiment described in the previous section. In this experiment, we manipulated action-oriented mental processing following a difficult decision. We expected to replicate past research in which the action-oriented mindset increased discrepancy reduction following a decision (Harmon-Jones & Harmon-Jones, 2002). Secondly, we expected the action-oriented mindset would increase relative left frontal cortical activity. Finally, we expected this increase in left frontal cortical activity would relate to discrepancy reduction, as assessed by spreading of alternatives.

To further extend past research, we included a condition to manipulate positive affect that was low in approach motivation (i.e., participants wrote about a time when something happened that caused them to feel very good about themselves but was not the result of their own actions). This was done to distinguish between the effects of positive affect and of approach motivation on spreading of alternatives. Past research suggested that action-oriented mindsets increase positive affect (Taylor & Gollwitzer, 1995), but we do not predict that positive affect, itself, causes increased left frontal cortical activity or an increase in spreading of alternatives.

Results from the experiment were consistent with predictions and revealed that the action-oriented mindset increased relative left frontal cortical activity and spreading of alternatives, as compared to a neutral condition and a positive affect/low-approach motivation condition. See Figs. 3.1 and 3.2. These results



**Figure 3.1** Relative left frontal activation as a function of mindset condition.



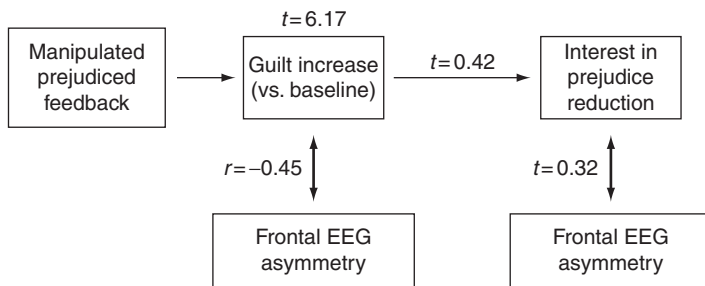
**Figure 3.2** Spreading of alternatives as a function of mindset condition.

provide a conceptual replication of the past results by using a different operationalization of action-oriented motivational processing. Both experiments revealed that the hypothesized increase in action-oriented processing was manifested in increased relative left frontal cortical activity. Moreover, both

studies revealed that relative left frontal activation correlated positively with spreading of alternatives. This correlation occurred across both conditions within the neurofeedback experiment and within the action-oriented mindset condition of the second experiment. We suspect that the second experiment did not produce significant correlations within the neutral and positive-no-action conditions because, in these conditions, participants were instructed to think about information that was not associated with approach-motivated post-decision processing. In contrast, participants in the action-oriented mindset condition were instructed to think about information that should have facilitated approach-motivated post-decision processing, according to the action-based model and previous research.

***Left prefrontal cortex activity and approach motivation following prejudice-related discrepancy*** Discrepancies between one's attitude and behavior are often investigated in the context of intergroup relations. For example, most White Americans today believe it is wrong to discriminate on the basis of race. But at the same time, most White Americans show evidence of automatically-activated tendencies to express racial stereotypes and negative evaluations. Thus, in intergroup situations, people are often confronted with a discrepancy between their nonprejudiced beliefs and their implicit tendencies to express prejudice. This phenomenon clearly represents a case of cognitive dissonance, although it is not typically described in such terms.

To examine the roles of left-prefrontal cortex activity and approach motivation in the context of prejudice, we preselected White American participants who reported holding low-prejudice attitudes in an earlier testing session (Amodio et al., 2007). Participants were told that we would examine their neural responses as they viewed pictures of White, Black, and Asian faces. Following this task, participants were given bogus feedback indicating that their neural activity revealed a strong negative emotional response toward Black faces, compared with White and Asian faces. This feedback was highly discrepant with participants' nonprejudiced beliefs and, as expected, aroused strong feelings of guilt on a self-report measure (beyond changes in other emotions), and participants were not immediately given an opportunity to engage in behavior that might reduce their guilt. Participants also showed a decreased in left-sided frontal cortical activity compared with baseline levels, and the degree of this decrease was correlated with their experience of guilt. This pattern suggested that the initial arousal of guilt-related dissonance was associated with a reduction in approach-motivation tendencies. Although this study was not designed to measure changes in anterior cingulate cortex activity, the decrease in left-sided prefrontal cortex activity is consistent with the idea that dissonance arousal is associated with a reduction in approach motivation accompanied by an increase in behavioral inhibition (e.g., Amodio et al., 2008).



**Figure 3.3** Summary of guilt study.

The effects of left–frontal activity and approach motivation were examined in the second part of the study. After the guilt manipulation, participants were told that the study was completed, but that in the time remaining in the session, they could help us by judging some stimuli ostensibly to be used in a future experiment. Here, we provided an opportunity to reduce their discrepancy-related guilt. We told participants that we wanted their feedback on different magazine articles that we might have participants in a future study read. Participants read the headlines of a series of different articles. Some headlines referred to articles associated with reducing prejudice (e.g., “Improving Your Interracial Interactions”). Others were filler headlines that were unrelated to intergroup relations (e.g. “Five Steps to a Healthier Lifestyle”). Participants viewed each title for 6 s while EEG was recorded. After viewing each title, they rated their personal desire to read the article. We found that participants who reported stronger guilty affect in response to the bogus feedback indicating their prejudiced response—an index of dissonance arousal—reported significantly stronger desire to read articles related to reducing prejudice. Induction-related feelings of guilt were unrelated to participants’ desire to read the filler articles. Furthermore, stronger desire to read prejudice reduction articles was associated with greater left-sided prefrontal cortex activity, consistent with the idea that discrepancy reduction involves the engagement of approach-related action (i.e., associated with egalitarian behavior), which involves activity of the left prefrontal cortex (Fig. 3.3). Hence, these results supported the action-based model of dissonance in the context of prejudice and feelings of guilt.

#### 4.3. Increasing strength of action tendencies and discrepancy reduction

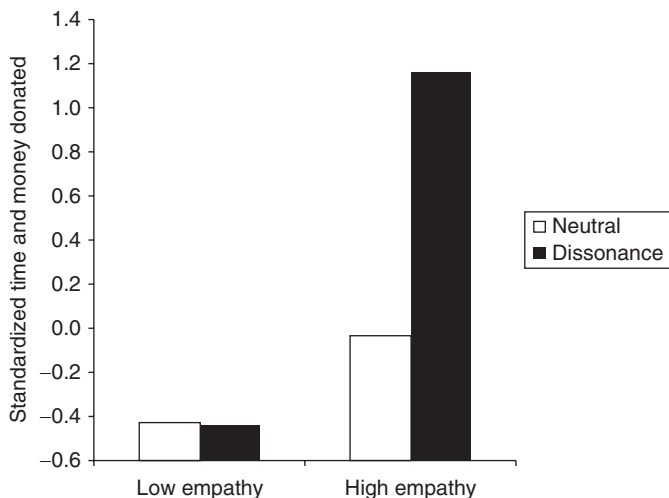
According to the action-based model of dissonance, dissonance should be increased as the salience of the action implications of cognitions that are involved in a dissonant relationship are increased. Several theoretical perspectives on emotion consider emotions to involve action tendencies

(Brehm, 1999; Frijda, 1986). To the extent that an emotion generates an action tendency, as the intensity of one's current emotion is increased and is involved in a dissonant relationship with other information, dissonance should be increased.

Research has demonstrated that the emotion of sympathy (empathy) increases helping behavior because it evokes altruistic motivation, that is, motivation to relieve the distress of the person in need of help (Batson, 1991). We conducted an experiment that tested whether an inconsistency between the emotion of sympathy and knowledge about past failures to act in accord with the sympathy would evoke motivation to reduce this inconsistency (Harmon-Jones et al., 2003).

In the experiment, we tested the hypothesis that after experiencing sympathy for a target person in need of help, individuals will be more motivated to help that person when they are reminded of times that they failed to help similar persons. This prediction is predicated on the idea that the aroused sympathy would be the "cognition" most resistant to change and that individuals would thus work to support it if dissonance were aroused in relation to it. Participants were informed that they would be listening to a pilot broadcast for a local radio station and that the researchers would like students' reactions to the tape. Participants then listened to a tape-recorded message that was purportedly from a person in need of help (an adolescent with cancer). Before listening to the tape, participants were assigned to one of two conditions: one in which they tried to imagine how the person must feel (high empathy set) or one in which they tried to remain objective as they listened to the tape (low empathy set). Then they listened to the tape-recorded message. Afterward, they completed questionnaires assessing self-reported emotional responses and evaluations of the tape-recorded message. Participants were then asked to list times when they failed to help other persons who were in need of help (in order to induce dissonance) or they completed a demographic survey (control condition). Finally, participants were given an opportunity to help by volunteering time to assist the person with addressing letters that would request money from possible donors or by donating money to the person's family. The design was a 2 (low vs high empathy)  $\times$  2 (reminded of times that did not help vs not reminded) between-participants factorial. Consistent with predictions derived from the action-based model, more helping was observed in the high-empathy/reminder of past failures condition than in other conditions. See Fig. 3.4.

It is important to note that this experiment is similar to other dissonance research using a hypocrisy paradigm (Aronson, 1999; Stone et al., 1997). However, the present experiment differs from the hypocrisy research in an important way. In the hypocrisy experiments, the dissonance was aroused between a public behavior (e.g., video-taped speech to be delivered to other students about safe sex) and a reminder of past failures to practice what was



**Figure 3.4** Amount of helping as a function of empathy and dissonance conditions.

spoken (i.e., they had not always practiced safe sex). In the current experiment, dissonance was aroused between a private emotional experience that generates an action tendency and a reminder of past failures to behave in accord with what the emotion motivates the person to do. Thus, past hypocrisy work only shares with the current experiment the explicit reminder of past failures to behave in certain ways. More importantly, the action-based model generated the hypothesis that because sympathy generates an action tendency, it can evoke dissonance. In general, we view past work on hypocrisy as consistent with the action-based model, because the conflicting “cognitions” have strong behavioral implications and the reduction of the dissonance between these “cognitions” enables one to behave effectively with regard to the cognition most resistant to change (i.e., in past studies, the information provided in the speech).

## 5. CONSIDERING THE ACTION-BASED MODEL AND OTHER MODES OF DISSONANCE REDUCTION

Would a change in action orientation and/or relative left frontal cortical activity affect discrepancy reduction in other dissonance-evoking situations? We would expect left frontal cortical activity to affect dissonance processes when dissonance is aroused by a strong commitment to behavior, which is what typically occurs in the induced compliance and free choice

paradigms (e.g., Beauvois & Joule, 1996; Brehm & Cohen, 1962). In such situations, we predict that individuals are motivated to follow through with their behavioral commitment and to change their attitudes to be consistent with their behavior (Stone et al., 1997). However, in some induced compliance situations, individuals may reduce dissonance by means other than attitude change, perhaps because their commitment is not sufficiently strong (Gilbert & Ebert, 2002) or because their original attitude is highly resistant to change (Simon et al., 1995). Thus, in other dissonance paradigms, we would predict relative left frontal activation to relate to dissonance reduction to the extent that dissonance is likely to be reduced via approach motivational processes, such as changing one's attitudes to be more supportive of the recent behavioral commitment.

Changing one's cognitions to bring them in alignment with each other is one way of reducing the negative emotion of dissonance. This is the method of reducing dissonance most often measured in research. However, this is not the only way a person can deal with the emotive state of dissonance. It is also possible to trivialize the dissonant cognitions (Simon et al., 1995) or engage in reality-escaping behaviors such as drinking alcohol to reduce the negative dissonance state and the motivation to engage in discrepancy reduction (Steele et al., 1981). The action-based model would predict that reducing dissonance by means other than attitude change would be more likely when action was not greatly needed or when the action implications of the cognitions were low.

It is also possible to experience dissonance and not reduce it. The negative emotion of dissonance provides motivation to change one's cognitions but this motivation may not always lead to such changes. In this situation, the cognitive discrepancy would still be present but the negative affect would remain elevated. The action-based model predicts that if an individual experiences dissonance but does not reduce it, the effectiveness of his or her behavior related to the commitment would be hampered. The effectiveness of behavior could be hampered by hindering pursuit and acquisition of an immediate goal or it may be hampered in more diffuse ways. These and other ways of dealing with cognitive discrepancies, and with the negative emotion of dissonance, need to be considered in future research.

The action-based model does not make the claim that dissonance reduction always occurs in the direction of a decision. Sometimes a person makes a decision and the evidence is overwhelming that the wrong decision has been made. This information would arouse dissonance. When a person realizes that he/she has made a mistake, his/her original decision is no longer the cognition most resistant to change. Consider Leon, who chose to attend one university over another. After beginning the first semester, Leon might realize that the university he chose is completely unsuitable for him. He will likely not be able to reduce the dissonance associated with his decision; rather, the negative emotion of dissonance would likely increase. At some point, as

dissonant cognitions continue to increase, he may choose to reverse his decision and look for a different university (Festinger, 1957, reports the results of such an experiment). Like the original theory of dissonance, the action-based model predicts that the direction of attitude change will be in the direction of the cognition that is most resistant to change.

## 6. INDIVIDUAL AND CULTURAL DIFFERENCES

Recent research has suggested that individual and cultural differences may moderate dissonance processes. For instance, individuals with greater preferences for consistency show greater attitude change after being given high-choice in an induced compliance situation (Cialdini et al., 1995), and individuals from Eastern cultures as compared to Western cultures show greater dissonance-related attitude change when inter-dependence is salient (Hoshino-Browne et al., 2005). As noted by Wicklund and Brehm (1976), individual (or cultural) differences in dissonance-related attitude change could emerge because of differences in the initial perception of discrepant cognitions, the awareness of dissonance, the tolerance of dissonance, and/or the mode of dissonance reduction. If attitude change is the only measure in a standard dissonance experiment examining individual differences, it is impossible to determine why a particular individual difference may be related to a pattern of attitude change. In order to determine why a particular individual, or cultural, difference relates to a pattern of attitude change, it would be necessary to measure the relationship of this difference to factors influencing dissonance.

Assuming no differences in the above variables (e.g., initial perception of discrepancy), the action-based model suggests that these individual and cultural differences may be associated with differences in the extent to which unconflicted action would be important. For example, preference for consistency may be related to tendencies toward action orientation. In addition, individuals high in preference for consistency may prefer consistency because of the implications inconsistency has for behavior, and they may be more concerned about executing effective behavior. With regard to cultural differences, cultures that value or emphasize the group over the individual may cause one to evaluate cognitions, their relevance to each other and to behavior, and their inconsistency according to group standards rather than individual standards. Alternatively, these cultures may differ in their tendencies toward individual versus group action orientation. In the following section, we review research conducted in the last two decades on the relationship between individual differences and dissonance processes. We then present data on a new questionnaire designed to measure aspects of the dissonance process.

## 6.1. Self-esteem

One individual difference that has received much empirical attention is self-esteem. This is because self versions of dissonance theory predicted that individuals who differed in self-esteem level would respond differently to dissonance-inducing situations. For example, the self-consistency revision proposed that persons with positive self-concepts should respond with more dissonance when they lie or act counter to their values (behaviors that have typically been used to evoke dissonance) because the discrepancy between their positive self-conception and their knowledge of their behavior (e.g., lying to another person) is greater for them than it is for persons with negative self-concepts who may have expected themselves to behave in these ways. In addition, the negative consequences of a decision (the negative aspects of the chosen and the positive aspects of the rejected), which suggest that the person made an unwise decision, are inconsistent with a positive self-concept. And individuals with high self-esteem should show greater evidence of discrepancy reduction following a difficult decision. Gibbons et al. (1997) provided evidence supporting this prediction. In their research, they found that smokers with high self-esteem who relapsed showed lowered perceptions of health risk associated with smoking and a greater decline in commitment to quitting smoking, whereas smokers with low self-esteem did not. Moreover, the decline in risk perception was related to maintenance of self-esteem for those who relapsed. These results support predictions derived from self-consistency theory, by showing that individuals with high self-esteem engaged in more discrepancy reduction than individuals with low self-esteem.

More recently, Jordan et al. (2003) found support for self-consistency theory's predictions using an approach that separates trait self-esteem into an explicit (more conscious) and implicit (less conscious) dimension. Based on the ideas (1) that explicit and implicit self-esteem are independent and (2) that individuals with high explicit but low implicit self-esteem may be particularly defensive, they predicted that such individuals would show greater discrepancy reduction than other individuals (i.e., low explicit/low implicit, low explicit/high implicit, and high explicit/high implicit). In this study, participants made a decision between two moderately positive and similarly rated food entrées. Then, following the decision, participants rerated the food entrées. Results revealed the predicted interaction of explicit and implicit self-esteem on spreading of alternatives. That is, individuals high in explicit but low in implicit self-esteem showed more spreading of alternatives than all other individuals. Thus, expansion of the understanding of self-esteem by incorporation of two independent dimensions—explicit and implicit—led to a new and refined prediction and result concerning the effect of self-esteem on discrepancy reduction.

In direct contrast to predictions derived from self-consistency theory, the self-affirmation model predicts that persons with high self-esteem would be less likely than persons with low self-esteem to engage in discrepancy reduction, because persons with high self-esteem have more positive self-concepts and self resources with which to affirm and repair their perception of self-integrity. According to the self-consistency model, the actions often elicited in dissonance experiments are more discrepant from a positive than from a negative self-concept, and thus individuals with high self-esteem should experience more dissonance when they engage in these actions. To test these competing predictions, [Steele et al. \(1993\)](#), using a free-choice paradigm, found that reminding individuals of their self-esteem levels by having them complete self-esteem scales prior to their decision caused individuals with low self-esteem to be more likely than individuals with high self-esteem to justify their decision (spread alternatives). [Steele et al. \(1993\)](#) concluded that these effects were opposite to effects predicted by the self-consistency model, but consistent with the self-affirmation model. It is important to note that justification of the decision (i.e., change in evaluation of the decision alternatives) did not differ between high and low self-esteem individuals in the condition in which they were not reminded of their level of self-esteem, suggesting that neither the self-consistency nor self-affirmation model can adequately explain the data.

In more recent work testing his self-standards model of dissonance, [Stone \(2003\)](#) has found that individuals with low self-esteem show less attitude change following induced compliance if their personal self-standards were primed (by rating their personal ideal for themselves on traits such as untrustworthy, precise, and ethical) immediately after the writing of the counterattitudinal essay. When normative standards (by rating what their peers thought they ought to be on traits such as untrustworthy, precise, and ethical) or no particular standards were primed, participants with low self-esteem showed the same amount of attitude change as participants with high self-esteem. [Stone \(2003\)](#) suggested that “for self-consistency to operate in dissonance, something in the context must make idiosyncratic self-knowledge accessible. Otherwise, dissonance processes are not necessarily moderated by individual differences in the structure and content of self-knowledge (p. 852).” [Stone \(2003\)](#) suggested that these results cast doubt on both self-affirmation and self-consistency theories, and he proposed that both the self-affirmation and self-consistency models are correct, but under different conditions.

## 6.2. Preference for consistency

[Cialdini et al. \(1995\)](#) developed a measure they referred to as preference for consistency. The questionnaire assessed self-reported agreement with 18 items such as “I prefer to be around people whose reactions I can anticipate”

and “I typically prefer to do things the same way.” In one study, individuals who scored in the lower and upper thirds of the distribution on preference for consistency participated in an induced compliance experiment. Results revealed that individuals high in preference for consistency engaged in more discrepancy reduction after high as compared to low choice. In contrast, individuals low in preference for consistency did not show a significant difference between high and low choice conditions. It is interesting to note, however, that the least favorable attitude occurred in the low choice/high preference for consistency conditions, and that the low and high preference for consistency groups’ attitudes did not appear to differ in the high choice condition.

Subsequent studies have revealed that individuals high, as compared to low, in preference for consistency experience greater negative affect when their highly inconsistent cognitions (i.e., evaluations of abortion) are made simultaneously accessible (Newby-Clark et al., 2002). In addition, higher preference for consistency is related to feeling more offended by being stood up by a friend for a poor reason (insufficient justification) as compared to a good reason (sufficient justification; Nail, Correll et al., 2001).

### 6.3. Action-orientation

Other evidence suggests that individual differences in action-orientation relates to discrepancy reduction (Beckmann & Kuhl, 1984). As reviewed previously, students searching for an apartment who were dispositionally high in action-orientation increased the attractiveness rating of their decision more than did individuals who were dispositionally low in action-orientation.

### 6.4. Cultural differences

Heine and Lehman (1997) found that North Americans and East Asians differ in their attitudinal responses to difficult decisions. Whereas North Americans showed the typical spreading of alternatives following the difficult decision (regarding choice over popular compact disc music selections), East Asians did not. This observed effect was not consistent with earlier observations by Sakai and colleagues (Sakai, 1981; Sakai & Andow, 1980) who had found dissonance-related attitude change following public but not private induced compliance.

However, Hoshino-Browne and colleagues (Hoshino-Browne et al., 2005) noted this discrepancy between results and suggested that the experiments by Sakai and colleagues may have produced dissonance-related attitude change because participants were concerned about the interpersonal consequences of their actions. That is, the participants, who were typically motivated to be interdependent with others and avoidant of interpersonal conflict, experienced dissonance because they had acted

inconsistently with those cultural ideals. To address these issues and others, Hoshino-Browne and colleagues conducted four studies in which European Canadians and Asian Canadians made difficult decisions for themselves or for a friend. Results indicated that whereas European Canadians spread alternatives more for self than friend decisions, Asian Canadians spread alternatives more for friend than self decisions. These results serve as a reminder that the importance of the cognitions was one of the factors affecting the magnitude of dissonance in Festinger's original theory. Cultural values would be expected to relate to the importance of cognitions, and thus, to the amount of dissonance these behaviors would evoke.

## 6.5. Concerns about individual differences research

Individual difference studies have shed new light on dissonance processes and connected the dissonance literature with other research literatures concerned with self processes and cultural differences. Moreover, the individual differences studies have increased the predictive power of the theory. Although some inconsistencies in results with individual differences and dissonance processes have been noted, subsequent studies have been conducted to address these inconsistencies.

Importantly, almost all studies of the relationship between individual differences and dissonance processes measured attitudes in the free choice or induced compliance paradigms. As noted by [Wicklund and Brehm \(1976\)](#), to fully understand the role of individual differences in dissonance processes, investigators need to be concerned with the variables (both independent and dependent) that are involved in dissonance. If only attitudes are measured in standard dissonance paradigms, it is difficult to know why a particular individual difference related to a particular pattern of attitude change results. Such designs leave open questions such as: Was dissonance aroused at all for the group of individuals who failed to show attitude change? Was dissonance aroused and not reduced at all or reduced via a mechanism other than attitude change? To assist in answering these questions, three variables need to be considered.

The first relevant variable is the initial perception of dissonant cognitions. A behavior that creates dissonance for one person may cause consonance for another. Consequently, when a group of individuals shows attitude change following a free choice but another does not, this result may be due to group differences in the initial perception of dissonant cognitions. Experiments designed with this variable in mind can explore the effects of such behaviors. Future research should explore ways of manipulating and measuring the initial perception of dissonance, as most dissonance studies simply expose individuals to one dissonance-evoking situation and then examine the effect of individual differences on attitudes.

The second set of variables involved in the dissonance process relates to dissonance arousal. Once the individual perceives a sufficient cognitive discrepancy, dissonance arousal should occur. Individuals are likely to differ in their awareness of this arousal, how long this awareness lasts, and the tolerance of this arousal. Differences may also exist in the causal relationship between dissonance arousal and discrepancy reduction. That is, some individuals may need more arousal to provoke discrepancy reduction.

The third set of variables involved in the dissonance process relates to dissonance or discrepancy reduction. [Festinger \(1957\)](#) predicted that dissonance reduction would first be aimed at cognitions that are least resistant to change. Experimental work by [Gotz-Marchand et al. \(1974\)](#) supported these predictions. Individual differences research has also supported these predictions. For example, following induced compliance, individuals high in public self-consciousness reduce dissonance via attitude change, presumably because they are more firmly committed to their public behavior than to their private attitudes ([Scheier & Carver, 1980](#)). In contrast, individuals high in private self-consciousness reduce dissonance via derogation of their behavior, presumably because they are more firmly committed to their private attitudes than their public behavior. Other, more recent work has suggested that the order of discrepancy-reduction mode presentation can have effects on discrepancy reduction, such that individuals seem most likely to use the mode presented first ([Simon et al., 1995](#)). It is possible that order effects such as these only emerge when the cognitions are roughly equal in resistance to change, because other research has suggested that, in general, individuals prefer to reduce dissonance via discrepancy reduction rather than through self-affirmation ([Stone et al., 1997](#)).

## 6.6. Creating a new individual differences measure related to dissonance processes

The specification of the three critical components of the dissonance process requires that studies concerned with individual differences measure or manipulate these variables to fully understand how a given individual difference relates to dissonance processes. Along the same lines, individual difference measures may be used to separate out the various aspects of the dissonance process. Because the first component of the dissonance process—the initial perception of the dissonance situation—is more amenable to manipulation than measurement, we sought to create a questionnaire that focused on assessing individual differences in the remaining two components: dissonance arousal and dissonance reduction.

Previous research on individual differences and their relationship to dissonance has typically focused on existing individual differences measures and their relationship to the dissonance reduction component (i.e., attitude change) in laboratory studies. However, one could instead start with the

experimental paradigms used by dissonance researchers and create an individual difference measure based on these paradigms. That is, we know that dissonance is evoked following difficult decisions, induced compliance, and the exertion of effort. By using these situations as a starting point for the creation of an individual differences measure, we could benefit from insights gained from decades of laboratory research on dissonance processes. Moreover, it would also permit an easy method of assessing individual differences in dissonance processes, thus allowing the extension of dissonance-based individual differences into other realms of inquiry. Finally, such a measure could permit the testing of theoretically-derived predictions in novel ways.

The action-based model specifies that dissonance arousal be separated conceptually and empirically from dissonance/discrepancy reduction. Accordingly, when we created the following individual differences measure, we generated some items that we thought would capture dissonance arousal/affect and other items that would tap dissonance/discrepancy reduction. In addition, we created items that measured reactions in three of the most commonly used dissonance paradigms—induced compliance, free choice/difficult decision, and effort justification.

We believed it important to separate dissonance arousal from discrepancy reduction, even though most past conceptualizations suggest a direct relationship between arousal and reduction. However, research has consistently failed to support this relationship, particularly when subjective reports of the negative affective experience of dissonance are measured (Elliot & Devine, 1994; Harmon-Jones, 2000c). That is, although some experiments found a positive correlation between discrepancy-produced negative affect and discrepancy reduction (attitude change) in the critical high-dissonance condition (Zanna & Cooper, 1974), other studies did not find such a correlation even though the dissonance situation created subjective negative affect (Elliot & Devine, 1994; Harmon-Jones, 2000c; Higgins et al., 1979). These results suggest that the subjective experience of negative affect need not correlate directly with discrepancy reduction measures such as attitude change. Indeed, individuals who continue to experience dissonance-related negative affect for prolonged periods may be the very individuals who have difficulty reducing the dissonance or engaging in discrepancy reduction. These individuals may be unable to alter their cognitions because their cognitions may be too resistant to change. In addition, individuals who experience high levels of dissonance-related negative affect may be more acutely aware of their negative affect and thus less able to reduce it through discrepancy reduction (Pyszczynski et al., 1993).

Thus, we predicted that dissonance arousal and dissonance reduction would be separate but correlated constructs. We also predicted that the arousal and reduction responses within the three dissonance situations would be inter-related.

After generating a set of appropriate items and having a large pool of undergraduate students respond to the items, we submitted the responses to an exploratory factor analysis. Then, on a separate sample, we conducted a confirmatory factor analysis. The resulting items of these two studies are shown in Table 3.1. The results of the confirmatory factor analysis revealed a model that contained six lower-order factors (dissonance situation X arousal/reduction) plus two higher-order factors (arousal vs reduction); see Tables 3.2 and 3.3. The results of this analysis are displayed in Fig. 3.5. We refer to the measure as the dissonance arousal and reduction questionnaire (DARQ; Harmon-Jones et al., 2008). Dissonance arousal and reduction are inversely correlated (see Fig. 3.5).

The DARQ subscales correlated with other measures with which they would be expected to correlate (see Table 3.4 for the list of questionnaires and their example items). For example, dissonance arousal correlated directly with Personal Fear of Invalidity,  $r = 0.48$  (all reported correlations are significant,  $p < 0.05$ ). Dissonance arousal also correlated directly with Response to Lack of Structure,  $r = 0.34$ . These questionnaires are subscales of the Personal Need for Structure and Personal Fear of Invalidity scales (Thompson et al., 1989; see also, Neuberg et al., 1997), which were designed to measure trait preferences for cognitive simplicity and structure. The third subscale from these scales, Desire for Structure, was not correlated with dissonance arousal,  $r = 0.00$ . Dissonance reduction, on the other hand, was directly correlated with Desire for Structure,  $r = 0.13$ , and inversely correlated with Fear of Invalidity,  $r = -0.20$ . It was not correlated with Responses to Lack of Structure,  $r = -0.02$ . In addition, Preference for Consistency (Cialdini et al., 1995) was not significantly correlated with dissonance arousal,  $r = 0.08$ , but was directly correlated with dissonance reduction,  $r = 0.19$ . These correlations help to establish the convergent validity of the DARQ, but because the correlations are far from perfect, they also suggest that the DARQ measures constructs different than these measures.

In addition, from the action-based model, we derived some predictions regarding the relationships of the DARQ with other variables. In particular, we predicted that dissonance reduction should relate positively to variables associated with effective behavior. To assess this, measures of depression, life satisfaction, and well being were included. Depression was measured with the Beck Depression Inventory (BDI; Beck et al., 1979), and life satisfaction was measured with the Satisfaction With Life Scale (Diener et al., 1985). Other dimensions of well being were measured with Ryff and colleagues' six dimensions of psychological well-being scale (Ryff & Keyes, 1995). These dimensions include positive evaluations of oneself and one's past life (Self-Acceptance), a sense of continued growth and development as a person (Personal Growth), the belief that one's life is purposeful and

**Table 3.1** Factor analyses of dissonance arousal and reduction questionnaire (DARQ) items

DARQ Item	Subscale	Sample 1 ( <i>N</i> = 428)	Sample 1 (Revised)	Sample 2 ( <i>N</i> = 427)
1. After I work hard on something, I feel down and wonder whether it was worth it.	Effort – Ar.	0.63	0.61	0.67
2. After I work hard on something, I often wish I hadn't bothered.	Effort – Ar.	0.71	0.71	0.64
3. I really dislike the let-down feeling I have after I finish a big project.	Effort – Ar.	0.31	**	**
4. When I work hard on something, the results are usually disappointing.	Effort – Ar.	0.69	0.69	0.68
5. After I work hard on something, I really appreciate the results of my efforts.	Effort – Red.	0.74	0.74	0.71
6. My favorite things are the things I've had to work the hardest to get.	Effort – Red.	0.72	0.72	0.64
7. The harder I have to work to get something, the more I like it.	Effort – Red.	0.64	0.64	0.65
8. If something comes easily, it's not worth that much to me.	Effort – Red.	0.07	**	**
9. I really enjoy looking back on my work when the work was really hard.	Effort – Red.	0.67	0.67	0.61
10. If I have to work hard to achieve	Effort – Red.	0.75	0.74	0.68

**Table 3.1** (continued)

DARQ Item	Subscale	Sample 1 ( <i>N</i> = 428)	Sample 1 (Revised)	Sample 2 ( <i>N</i> = 427)
11. After I make a decision, I tend to stick with it.	Decision – Red.	0.63	0.62	0.57
12. Typically, I appreciate what I decided to do.	Decision – Red.	0.64	0.65	0.69
13. After making a decision, I'm happy with what I chose and I don't think about it anymore.	Decision – Red.	0.46	0.45	0.46
14. I feel good once I make up my mind about a tough decision.	Decision – Red.	0.68	0.69	0.58
15. I often regret my decisions.	Decision – Ar.	0.74	0.74	0.69
16. After making a tough decision, I often wish I could change my mind.	Decision – Ar.	0.63	0.62	0.69
17. I often suffer from regret after I buy something expensive.	Decision – Ar.	0.47	0.48	0.35
18. It's an awful feeling when I've made a difficult decision and there's no going back.	Decision – Ar.	0.38	0.39	0.52
19. I rarely regret things after making a tough decision.	Decision – Ar.	–0.36	**	**
20. I rarely feel guilty over mistakes I made.	Induced – Ar.	0.34	**	**

(continued)

**Table 3.1** (continued)

DARQ Item	Subscale	Sample 1 (N = 428)	Sample 1 (Revised)	Sample 2 (N = 427)
21. I feel really bad about myself if I do something stupid.	Induced – Ar.	0.71	0.71	0.69
22. After I do something foolish, I dislike myself.	Induced – Ar.	0.62	0.62	0.71
23. Whenever I do something wrong, I feel like I'm not a good person.	Induced – Ar.	0.74	0.74	0.61
24. If I do something that makes me feel guilty, I usually can think my way out of the guilt.	Induced – Red.	0.26	**	**
25. If I do something that seems wrong at first, I soon realize that there was a good reason for it.	Induced – Red.	0.47	0.45	0.48
26. I can think of good reasons for things I've done, even things that might seem foolish to someone else.	Induced – Red.	0.68	0.70	0.72
27. When I think I've made a mistake, I often realize that I did the right thing after all.	Induced – Red.	0.50	0.50	0.30
28. There are always good explanations for things I have done, even things that might at first seem irrational.	Induced – Red.	0.57	0.56	0.60

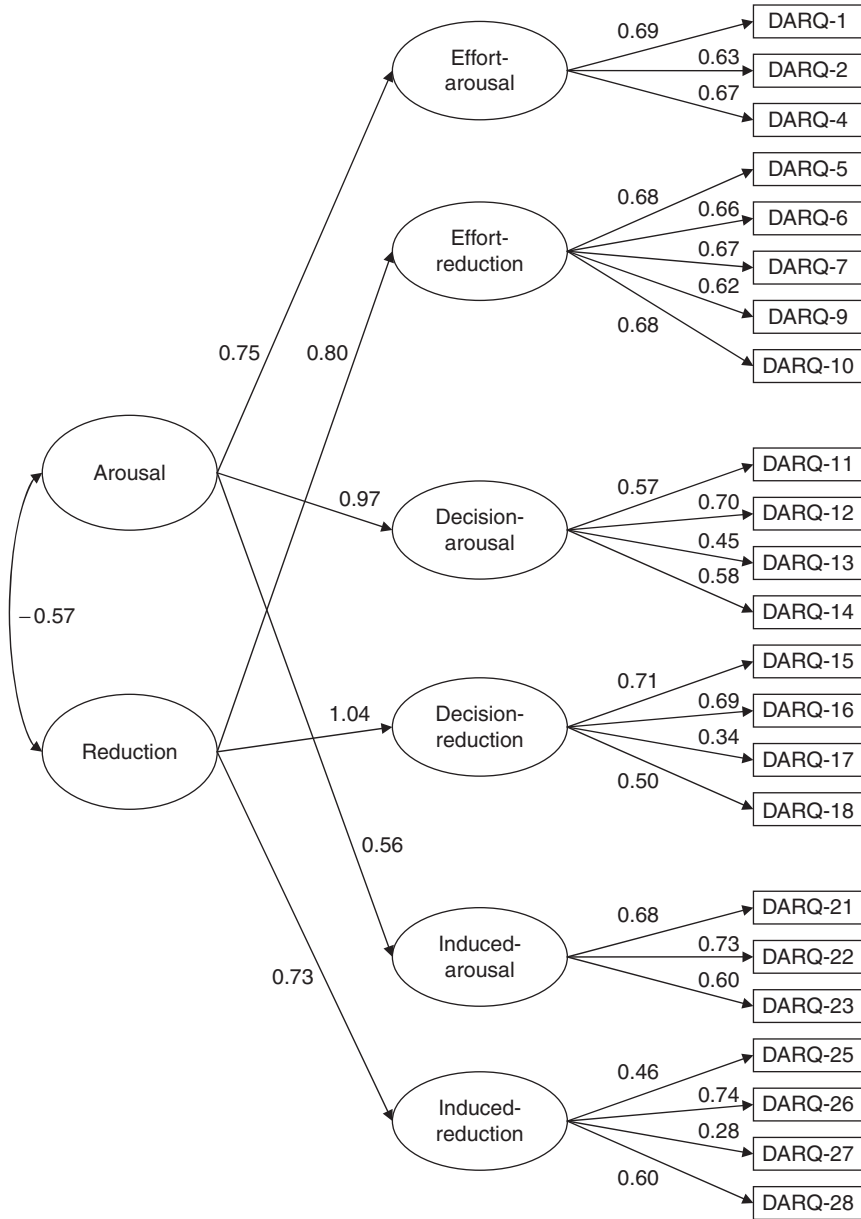
Note. \*\*omitted items. Ar. = arousal; Red. = reduction. All factor loadings estimated via maximum likelihood confirmatory factor analysis for six-factor oblique solution.

**Table 3.2** Fit indices for six-factor (lower-order) models (corresponds to Table 3.1 loadings)

Model	$\chi^2$	df	RMSEA	TLI (NNFI)	CFI	SRMR
Model 1 (Sample 1: exploration sample)	875.53	335	0.061	0.92	0.93	0.077
Model 1- Revised (Sample 1: exploration sample)	465.67	215	0.052	0.95	0.96	0.062
Model 2 (Sample 2: confirmation sample)	383.09	215	0.043	0.97	0.97	.052

**Table 3.3** Fit indices for higher-order models (confirmation sample)

Model	$\chi^2$	df	RMSEA	TLI (NNFI)	CFI	SRMR
Model A—one- factor model “unitary dissonance”	584.44	224	0.061	0.94	0.94	0.079
Model B—two- factor model “arousal and reduction”	506.13	223	0.055	0.95	0.96	0.072
Model C— three-factor model “effort, decision, and induced compliance”	581.04	221	0.062	0.94	0.94	.078



**Figure 3.5** Hierarchical two-factor model of dissonance arousal and reduction.

**Table 3.4** Example items for the personality scales

<p><b><u>Personal Fear of Invalidity</u></b> (Thompson et al., 1989)</p> <ul style="list-style-type: none"> <li>– Sometimes I become impatient over my indecisiveness.</li> <li>– Sometimes I see so many options to a situation that it is really confusing.</li> </ul> <p><b><u>Response to Lack of Structure</u></b> (Thompson et al., 1989)</p> <ul style="list-style-type: none"> <li>– It upsets me to go into a situation without knowing what I can expect from it.</li> <li>– I hate to be with people who are unpredictable.</li> </ul> <p><b><u>Desire for Structure</u></b> (Thompson et al., 1989)</p> <ul style="list-style-type: none"> <li>– I enjoy having a clear and structured mode of life.</li> <li>– I like to have a place for everything and everything in its place.</li> </ul> <p><b><u>Preference for Consistency</u></b> (Cialdini et al., 1995)</p> <ul style="list-style-type: none"> <li>– I prefer to be around people whose reactions I can anticipate.</li> <li>– It is important to me that my actions are consistent with my beliefs.</li> </ul> <p><b><u>Beck Depression Inventory</u></b> (Beck et al., 1979)</p> <ul style="list-style-type: none"> <li>– I do not feel sad; I feel sad; I am sad all the time, and I can't snap out of it; I am so sad or unhappy that I can't stand it. (participants select the statement that best describes them).</li> <li>– I don't feel particularly guilty; I feel guilty a good part of the time; I feel quite guilty most of the time; I feel guilty all of the time. (participants select the statement that best describes them).</li> </ul> <p><b><u>Satisfaction With Life Scale</u></b> (Diener et al., 1985)</p> <ul style="list-style-type: none"> <li>– In most ways my life is close to my ideal.</li> <li>– The conditions of my life are excellent.</li> </ul> <p><b><u>Ryff's Psychological Well-Being Scale</u></b> (Ryff &amp; Keyes, 1995)</p> <p><b><u>Self-Acceptance</u></b></p> <ul style="list-style-type: none"> <li>– The past had its ups and downs, but in general I wouldn't want to change it.</li> <li>– When I compare myself with friends and acquaintances, it makes me feel good about who I am.</li> </ul> <p><b><u>Personal Growth</u></b></p> <ul style="list-style-type: none"> <li>– I think it is important to have new experiences that challenge how you think about the world.</li> <li>– I have the sense that I have developed a lot as a person over time.</li> </ul> <p><b><u>Purpose in Life</u></b></p> <ul style="list-style-type: none"> <li>– I am an active person in carrying out the plans I set for myself.</li> <li>– I enjoy making plans for the future and working to make them a reality.</li> </ul> <p><b><u>Positive Relations With Others</u></b></p> <ul style="list-style-type: none"> <li>– People would describe me as a giving person, willing to share my time with others.</li> <li>– I know that I can trust my friends and they know that they can trust me.</li> </ul> <p><b><u>Environmental Mastery</u></b></p> <ul style="list-style-type: none"> <li>– I am quite good at managing the many responsibilities of my daily life.</li> </ul>
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(continued)

**Table 3.4** (continued)

<p>– I generally do a good job of taking care of my personal finances and affairs.</p> <p><u>Autonomy</u></p> <p>– I am not afraid to voice my opinions even when they are in opposition to the opinions of most people.</p> <p>– My decisions are not usually influenced by what everyone else is doing.</p> <p><b>Carver and White's (1994) <u>BIS/BAS Scale</u></b></p> <p><u>BAS—Drive</u></p> <p>– When I want something, I usually go all-out to get it.</p> <p>– I go out of my way to get things I want.</p> <p><u>BAS—Reward Responsiveness</u></p> <p>– When I get something I want, I feel excited and energized.</p> <p>– When I'm doing well at something, I love to keep at it.</p> <p><u>BAS—Fun-seeking</u></p> <p>– I will often do things for no other reason than that they might be fun.</p> <p>– I crave excitement and new sensations.</p> <p><u>BIS</u></p> <p>– I feel pretty worried or upset when I think or know somebody is angry at me.</p> <p>– I feel worried when I think I have done poorly at something.</p>
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meaningful (Purpose in Life), the possession of quality relations with others (Positive Relations With Others), the capacity to manage effectively one's life and surrounding world (Environmental Mastery), and a sense of self-determination (Autonomy).

As expected, dissonance arousal was inversely related to psychological well-being, whereas dissonance reduction was directly related to psychological well-being. Specifically, dissonance arousal related directly with depression ( $r's > 0.40$ ). In contrast, dissonance arousal was related inversely with subjective well-being and all of Ryff's dimensions ( $r's > -0.35$ ). Dissonance reduction, on the other hand, related inversely with depression, but directly with subjective well-being and all of Ryff's dimensions ( $r's > 0.27$ ). The above relationship of dissonance arousal and depression (and subjective well-being) remained significant when controlling for Desire for Structure, Response to Lack of Structure, Fear of Invalidity, and Preference for Consistency. Identical results occurred for the relationship of dissonance arousal and Ryff's well-being dimensions. In addition, the relationship of dissonance reduction and depression (and subjective well-being) remained significant when controlling for Desire for Structure, Response to Lack of Structure, Fear of Invalidity, and Preference for Consistency. Identical results occurred for the relationship of dissonance reduction and Ryff's well-being dimensions.

Given the action-based model's predictions regarding the relationship between dissonance reduction and approach motivation, we predicted that dissonance reduction would relate to trait differences in approach motivation, as measured by Carver and White's (1994) Behavioral Activation Scale (BAS). As expected, dissonance reduction was directly related to BAS,  $r = 0.41$ . Dissonance arousal, on the other hand, was inversely related to BAS,  $r = -0.15$ .

This recent research using the DARQ suggests that dissonance arousal and dissonance reduction are separable but related constructs at the individual differences level of analysis. They both relate in expected ways with existing constructs but their overlap with these existing constructs is not so high as to suggest redundancy. Consistent with the action-based model, dissonance reduction was directly related to distal measures of effective behavior such as satisfaction with life, positive relationships with others, and environmental mastery. Moreover, dissonance reduction was directly associated with approach motivation, also in line with predictions derived from the action-based model. Taken together, these results suggest that use of the DARQ in future research may shed new light on cognitive dissonance processes.

## 7. CONCLUSION

The action-based model assumes that dissonance processes operate because they are functional, that is, most often useful for the organism. However, the action-based model does not claim that dissonance reduction is always functional. We think of dissonance processes as being similar to other functional, motivated behaviors such as eating. Eating is necessary for the survival of the organism; however, disordered eating can be harmful. Similarly, dissonance reduction often benefits persons by assisting them in acting on their decisions without being hampered by excess regret or conflict. However, if a person makes a poor decision and then reduces the dissonance associated with the decision, he/she will persist in acting on the decision when it might be advantageous to disengage. The action-based model proposes that dissonance reduction, while not always functional, is functional more often than not. In the majority of cases, it is advantageous for persons to reduce dissonance, and act effectively on their decisions. The dissonance-reduction mechanism functions to override continued psychological conflict that would potentially interfere with effective action.

We suggest that the action-based model provides an explanation of the underlying, basic motivation behind dissonance processes. The action-based model assumes that, in most cases, dissonance processes are behaviorally adaptive. Dissonance reduction primarily functions to facilitate effective

action. The reason organisms experience discomfort when they hold conflicting cognitions is because conflicting cognitions impede effective action. We hope that this new way of thinking about dissonance processes will stimulate research on dissonance theory and assist in connecting the large body of dissonance theory evidence with other research literatures concerned with action orientation, behavioral regulation, emotion regulation, and the neural processes that underlie these important psychological processes.

## ACKNOWLEDGMENTS

The work in this article was supported by a National Science Foundation Grant (BCS-9910702). We would like to thank Leonard Berkowitz and Brandon Schmeichel for their helpful comments, and Dan Newman for help with the DARQ. Correspondence concerning this article should be addressed to Eddie Harmon-Jones, Texas A&M University, Department of Psychology, 4235 TAMU, College Station, TX 77843, or via the internet to [eddiehj@gmail.com](mailto:eddiehj@gmail.com).

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