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Abstract:

The theory of cognitive dissonance and its major experimental paradigms are described in this article. 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 or dissonance is created. Organisms are motivated by the state of dissonance and they may engage in 'psychological work' to reduce the inconsistency. Revisions to the original theory and their supporting research are then described. The major theoretical revisions differ primarily in terms of the motivation they posit for causing dissonance reduction. The revisions are self-consistency, self-affirmation, new look, and action-based model.

Keywords: Action-based model; Anterior cingulate cortex; Asymmetric frontal cortical activity; Attitude change; Cognitive dissonance; Effort justification; Induced compliance; Motivation; New look; Self-affirmation; Self-consistency; Spreading of alternatives

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Biographical Sketch

Eddie Harmon-Jones, Ph.D., is professor of psychology and Faculty of Neuroscience at Texas A&M University. Dr. Harmon-Jones's research focuses on emotions and motivations, their implications for social processes and behaviors, and their underlying neural circuits. His research has been supported by the National Institute of Mental Health, the National Science Foundation, and the Fetzer Institute. Dr. Harmon-Jones' articles have been widely cited, and he was recently listed as being in the top 1% of cited psychologists/psychiatrists by Institute for Scientific Information's Essential Science Indicators. In 1999, he coedited *Cognitive Dissonance: Progress on a Pivotal Theory in Social Psychology*. In 2002, he received the Distinguished Award for an Early Career Contribution to Psychophysiology from the Society for Psychophysiological Research. In 2003, Dr. Harmon-Jones coedited a special issue devoted to social neuroscience for the *Journal of Personality and Social Psychology*. In 2007, he coedited *Social Neuroscience: Integrating Biological and Psychological Explanations of Social Behavior*. In 2009, he coedited *Methods in Social Neuroscience*. He has also served as an associate editor of the *Journal of Personality and Social Psychology*, is currently an associate editor at *Emotion*, and is on the editorial boards of several other journals.

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a0010

Cognitive Dissonance Theory

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[AU3]

dt0010

Glossary

Action-based model A theoretical reinterpretation of the original theory of cognitive dissonance that posits that the cognitions most likely to cause dissonance are those cognitions with opposing action implications. Inconsistent cognitions that have no likelihood of influencing the individual's behavior should not arouse dissonance.

dt0015

Effort justification According to dissonance theory, individuals should experience dissonance whenever they engage in an effortful activity to obtain an outcome. Dissonance occurs because the cognition that the activity is unpleasantly effortful is inconsistent with engaging in the activity. Dissonance can be reduced by exaggerating the desirability of the outcome, which would add consonant cognitions.

dt0020

Induced compliance paradigm Experimental paradigm used by psychological researchers interested in studying cognitive dissonance processes. This paradigm has been used to test the hypothesis that dissonance should be aroused when a person acts in a way that is contrary to his or her attitudes. The amount of dissonance experienced will be inversely related to the amount of external pressure or justification for behaving in that manner. For example, an individual who is forced by an authority figure to behave contrary to his/her attitude should experience less dissonance than an individual who was subtly coerced into behaving contrary to the attitude. If the external pressure is low, individuals may change their attitudes to be more consistent with the counter-attitudinal behavior.

dt0025

Misattribution paradigm An experimental paradigm used by cognitive dissonance researchers to test whether dissonance-related attitude change was indeed motivated by negative emotional feelings, as the theory proposed. In this paradigm, dissonance is created in standard ways but some subjects are led to believe that their negative emotional

feelings created by dissonance are actually caused by another source, such as the bright lights in the room or a pill they had just consumed. When individuals believe that their dissonance-created negative feelings are caused by another source, they do not show the typical attitude change that occurs as a result of dissonance.

dt0030

New look A theoretical reinterpretation of the original theory of cognitive dissonance that posited that cognitive inconsistency was not the cause of dissonance but that feeling personally responsible for producing a foreseeable negative consequence was the cause. This reinterpretation was applied primarily to the induced compliance paradigm, which is the main experimental paradigm used to test dissonance theory.

dt0035

Self-affirmation A theoretical reinterpretation of the original theory of cognitive dissonance. This reinterpretation posits that dissonance is not the result of cognitive inconsistency or self-inconsistency, but is instead the result of a threat to one's self image.

dt0040

Self-consistency A theoretical reinterpretation of the original theory of cognitive dissonance. Instead of positing that any type of cognition can be involved in creating dissonance, this reinterpretation posits that only cognitions involving the self-concept will arouse dissonance. According to this view, dissonance only occurs when one behaves contrary to his/her self-view.

dt0045

Spreading of alternatives According to research derived from cognitive dissonance theory, after individuals make difficult decisions, they often perceive their chosen option as more positive and their rejected option as more negative than they perceived these options prior to the decision, when the options were perceived as similar in value. In other words, the individuals spread apart their attitudes toward the decision options from predecision to postdecision.

p0010

Cognitive dissonance theory and research dominated social psychology from the 1950s until the 1970s. The theory revolutionized thinking about psychological processes, particularly regarding how rewards influence attitudes and behavior, and how behavior and motivation influence perception and cognition. In the 1990s, research on the theory was revived and it has since been gaining in interest. In addition to the explicit, renewed interest in the dissonance theory itself, the theory has had implicit influence on much of contemporary theorizing.

presentation of the theory appeared in 1957. The theory was presented in abstract terms and, consequently, it has been used to understand a variety of phenomena, as is shown below. Festinger theorized 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.

p0020

He called this unpleasant state 'dissonance.' Festinger theorized that the degree of dissonance in relation to a cognition = $D/(D + C)$, 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. Several theorists have proposed that the dissonance between cognitions could be determined by assessing whether a person expects one event to follow from another.

s0010

The Original Version of the Theory

p0015

Leon Festinger formulated the original theory of cognitive dissonance in the mid-1950s, and the first formal and complete

p0025 Festinger theorized that persons are motivated by the unpleasant state of dissonance and that they may engage in 'psychological work' to reduce the inconsistency. This work will typically be oriented around supporting the cognition most resistant to change. To reduce the dissonance, individuals could add consonant cognitions, subtract dissonant cognitions, increase the importance of consonant cognitions, or decrease the importance of dissonant cognitions. One of the most often assessed ways of reducing dissonance is change in attitudes. Attitude change is expected to be in the direction of the cognition that is most resistant to change. In tests of the theory, it is often assumed that the knowledge about recent behavior is usually most resistant to change, because if a person behaved in a certain way, it is often very difficult to undo that behavior. Thus, attitude change would be consistent with the recent behavior.

p0030 Festinger presented dissonance theory during the heyday of cognitive consistency theories, and he discussed dissonance as a cognitive consistency theory. However, as several subsequent theorists noted, dissonance theory contained an important element not present in other consistency theories. That is, dissonant and consonant cognitions are defined in relation to a particular focal or generative cognition. Moreover, this focal cognition is usually related to a behavior, a point to which we return later.

s0015 Experimental Paradigms Used to Test the Theory

s0020 Free Choice

p0035 In 1956, Jack Brehm examined dissonance theory's predictions for postdecision processing. According to the theory, after a decision, 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. The greater the number and importance of dissonant cognitions and the lesser the number and importance of consonant cognitions, the greater is the degree of dissonance experienced by the individual. In a decision situation, dissonance is typically greater the closer the alternatives are 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; this particular pattern of attitude change has been referred to as spreading of alternatives.

p0040 Brehm conducted an experiment in which participants made either an easy or a difficult decision between two alternatives. The difficult decision was one in which the alternatives were close in attractiveness, whereas the easy decision was one in which one alternative was much more attractive than the other. Participants were asked to evaluate the decision options before and after the decision. Brehm found that, after persons made a difficult decision, they changed their attitudes to become more negative toward the rejected alternative (and slightly more positive toward the chosen alternative). After an easy decision, participants did not change their attitudes. Some scientists have questioned whether this paradigm actually provides support for a dissonance theory interpretation. However, research has dealt with these challenges and provided evidence that difficult decisions cause spreading of alternatives for the reasons outlined by dissonance theory.

Induced Compliance

In 1959, Leon Festinger and Merrill Carlsmith reported an experiment to test the hypothesis that dissonance should be aroused when a person acts in a way that is contrary to his or her attitudes. To test this prediction, they brought participants into the laboratory and asked them to perform a boring task. Then, participants were paid either \$1 or \$20 to tell 'another participant' that the task was interesting. According to dissonance theory, lying for a payment of \$20 should not arouse much dissonance, because \$20 provides sufficient justification for the counter-attitudinal behavior (i.e., it adds 20 cognitions consonant with the behavior). However, being paid \$1 for performing the same behavior should arouse much dissonance, because \$1 provides just enough justification for the behavior (i.e., it adds only one consonant cognition). 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.

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; the cognition that the activity is unpleasant is dissonant with engaging in the activity. Dissonance should be greater, the greater the unpleasant effort required to obtain the outcome. Dissonance can be reduced by exaggerating the desirability of the outcome, which would add consonant cognitions.

In the first experiment designed to test these ideas, in 1959, Aronson and Mills 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 dull and boring. The women in the severe initiation condition evaluated the group more favorably than the women in the mild initiation condition. This paradigm continues to be used fruitfully in research, and it has been usefully applied in psychotherapy.

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.

Challenges to the Research and Original Theory

After these and other dissonance results appeared in the literature, some theorists began to question whether the results were due to motivation. Some theorists hypothesized that the effects were due to nonmotivational, cognitive processes or impression management concerns. However, subsequent research confirmed that dissonance is a motivated process. That is, research revealed that during the state of dissonance, individuals evidence heightened electrodermal activity (which is associated with activation of the sympathetic nervous system) and report increased negative affect. After discrepancy is

reduced (attitude change occurs), self-reported negative affect is reduced. However, electrodermal activity does not decrease at this point unless individuals are distracted from the cognitive discrepancy. It is possible that the arousal following attitude change is the result of a motivation to follow through with the commitment.

p0070 Moreover, research using the misattribution paradigm has revealed that discrepancy reduction is motivated by the need to reduce negative affect. In the misattribution paradigm, participants are provided a stimulus (e.g., a placebo) that is said to cause specific side effects. It is assumed, following Schachter and Singer's two-factor theory of emotion, that individuals may mistakenly attribute their dissonance arousal to this other source, but only when the expected side effects of the other source are similar to the state produced by dissonance. The nature of the internal state can then be inferred indirectly by determining the type of stimuli to which individuals misattribute the state aroused by dissonance. In this paradigm, participants are exposed to treatments that will or will not arouse dissonance, and then they are either provided or not provided a possible external cause for their experienced state. Research has indicated that participants in the dissonance arousing conditions will misattribute their arousal to stimuli that are said to cause negative affective side effects and that once this misattribution is made, dissonance reduction (attitude change) does not occur.

p0075 Beginning in the late 1960s, researchers began to propose motivational explanations for dissonance effects that differed from Festinger's originally proposed theory. Three revisions of dissonance theory have been proposed, and their originators have provided evidence to support these conceptions. These include Aronson's self-consistency theory, Steele's self-affirmation theory, and Cooper and Fazio's new look at dissonance.

s0040 **Self-Consistency**

p0080 In his self-consistency theory, Elliot Aronson proposed that dissonance is due not merely to an inconsistency between cognitions. Instead, he posited that dissonance 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 sense of self. Because most persons have a positive self-concept, dissonance is most often experienced when a person behaves negatively, behaving in an incompetent, irrational, or immoral manner. One of the primary predictions derived from this revision is that low and high self-esteem individuals should respond with less and more dissonance reduction (e.g., attitude change), respectively, because in dissonance experiments high self-esteem individuals are induced to act in ways that are more discrepant from their positive self-views. Experiments testing this prediction have produced mixed results. Also, Beauvois and Joule obtained results that are difficult to explain with this revision.

s0045 **Self-Affirmation**

p0085 Claude Steele proposed a different alternative to Festinger's dissonance theory. He proposed that persons 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. 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, Greenberg, and Brehm presented evidence p0090 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. hypothesized that making an important value salient could reduce dissonance by reducing the individual's perception of the importance of the dissonant act. They conducted an experiment in which participants who opposed a tuition increase were given a high choice to write essays in support of a tuition increase (a counter-attitudinal statement). After writing the essay, participants were either given an opportunity to affirm an important value (self-affirmation condition), or asked to write about a value that was not important to them personally but was of general importance (value salient condition, e.g., world hunger), or neither (control condition). Participants were then asked to rate the degree to which they supported a tuition increase. Participants in the control condition changed their attitudes to be more favorable toward a tuition increase, as expected. Participants in both the self-affirmation and value-salient conditions did not change their attitudes. They had trivialized, or reduced the importance of, the tuition increase issue by thinking about other important values, even when these 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.

In more recent work testing his self-standards model of dissonance, p0095 Jeff Stone 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 untrustworthy, precise, and ethical traits) immediately after the writing of the counter-attitudinal essay. When normative standards (by rating what their peers thought they ought to be on untrustworthy, precise, and ethical traits) 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 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 (2003, p. 852)." Stone 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.

New Look

Joel Cooper and Russell Fazio proposed the idea that the p0100 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. They stated, "Dissonance has precious little to do with the inconsistency among cognitions per se, but rather with the production of a consequence that is unwanted". In support of this idea, in 1970, Cooper and Worchel replicated and extended Festinger and Carlsmith's classic experiment. In addition to the conditions of the original experiment, Cooper and Worchel added conditions in which, when the participant tells the confederate that the boring task is interesting, the confederate is not convinced by the lie. They found that attitude change occurred only in the low-justification condition where the confederate believed the lie. This result and others have been interpreted as indicating that dissonance-related attitude change occurs only when individuals feel personally responsible for producing an aversive consequence. The new look, or aversive consequences, revision of cognitive dissonance theory was widely accepted.

p0105 However, the results obtained in paradigms other than the counter-attitudinal action paradigm are not consistent with the aversive consequences model. Dissonance research using a selective-exposure paradigm has demonstrated that persons are more willing to examine materials that confirm their beliefs than materials that dispute their beliefs. Research using a belief disconfirmation paradigm has shown that, when persons are exposed to information that challenges their beliefs, they often strengthen their original belief. Research using a hypocrisy paradigm has shown that persons change their behavior to be more in line with their beliefs when they are reminded of times when they did not live up to their beliefs. It is difficult to reconcile any of these lines of dissonance research with a conception of dissonance theory in which the production of an aversive consequence is the only motivator of dissonance-related attitude change.

p0110 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 may be an important dissonant cognition. 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, attitude change may have occurred only when participants caused aversive consequences for a number of reasons. First, the lack of attitude change in the no-aversive consequences conditions is a null effect. Null effects are difficult to explain and subject to multiple alternatives. Second, attitude change may have been produced, but may have been too slight to be detected with the small sample size of these experiments. Third, not enough dissonance may have been aroused in these experiments to produce attitude change without the additional help of an aversive consequence. For example, too much justification for the counter-attitudinal behavior may have been provided. Fourth, in these experiments, dissonance may have been produced in the no-aversive consequences conditions, but may have been reduced by a route other than attitude change.

p0115 To examine whether attitude change could occur in an induced compliance setting in which aversive consequences were not produced, Harmon-Jones and colleagues conducted several experiments. Under the pretext of participating in an

experiment on memory, participants were exposed to an attitudinal object. They were assured of privacy and anonymity, and then given high or low choice to write a counter-attitudinal statement about the object (to manipulate justification). 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 on the basis of Cooper and Fazio's statement, "making a statement contrary to one's attitude while in solitude does not have the potential for bringing about an aversive event" (1984, p. 232). Other experiments revealed that dissonance produced in this experimental paradigm caused more nonspecific skin conductance responses and greater self-reported negative affect.

These results demonstrate that dissonance affect and dissonance-related attitude change can occur in situations in which a cognitive inconsistency is present but the production of aversive consequences is not present. They also demonstrate that the experience of cognitive dissonance evokes an unpleasant motivational state that motivates dissonance reduction. These experiments have supported the original conception of dissonance theory over the revisions. But why does dissonance evoke this negative motivational state? Why is inconsistency aversive? Festinger simply proposed that inconsistency was aversive but never thoroughly explained or tested why inconsistency was aversive. p0120

Action-Based Model of Dissonance

s0055

To address these questions, Harmon-Jones proposed an action-based model of dissonance. The model concurs with other areas of psychological research in proposing that perceptions and cognitions can serve as action tendencies. The model further proposes that dissonance between 'cognitions' evokes an aversive state because it has the potential to interfere with effective and unconflicted action. Dissonance reduction, by bringing 'cognitions' into consonance, serves the function of facilitating the execution of effective and unconflicted action. The action-based model uses the term 'cognitions' to be consistent with the language of the original theory. However, for the model, the more accurate term for the psychological construct involved in dissonance is action tendency. That is, it is the inconsistency between important action tendencies that causes dissonance. This line of thinking is consistent with the thinking of past dissonance theorists who emphasized behavior as the focal or generative cognition. The action-based model extends these past views by suggesting that the other (nongenerative) cognitions most likely to arouse dissonance are those that have action tendencies inconsistent with the generative cognition. p0125

The action-based model proposes that inconsistency between cognitions makes persons uncomfortable because inconsistency has the potential to interfere with effective action. From the viewpoint of the action-based model, cognitions are important because they guide the actions of an organism. When an individual holds two relatively important cognitions that are inconsistent, the potential to act in accord with them is undermined. To reduce the inconsistency and resulting negative affect, individuals engage in a variety of cognitive strategies. p0130

For example, dissonance results when one 'freely chooses' to engage in behavior that is inconsistent with an attitude or p0135

belief. The 'free choice' is subtly induced by the experimenter in experimental research. Experiments have shown that when individuals engage in such behavior, they often change their attitudes to be consistent with their recent behavior, as discussed previously. After making difficult decisions, individuals value the chosen alternative and devalue the rejected alternative more than they did prior to the decision. In both of these dissonance-evoking situations, dissonance occurs because there are cognitions that are inconsistent with a chosen course of action. That is, in the former situation, the past attitude is inconsistent with the current behavior. In the latter situation, the positive aspects of the rejected alternative and the negative aspects of the chosen alternative are inconsistent with the decision. The dissonance thus has the potential of interfering with the translation of the decision into effective action. According to the action-based model, attitude change produced by dissonance is the result of following through with the commitment to the behavior. The attitude change is posited to be one of a number of processes that would assist with the translation of the commitment into effective and unconflicted action. Thus, according to the action-based model, dissonance evokes a negative affective state that signals the organism that something is wrong and motivates the organism to engage in behavior to correct the problem. The correction of the problem often involves following through with the commitment to the behavior or decision. This view of dissonance is consistent with past as well as present theorizing on the function of dissonance and dissonance reduction.

Other scientists have advanced similar but not identical conceptions. For instance, in 1951, Lewin discussed the organism's capacity to 'freeze' upon an action tendency following a decision. In 1967, Jones and Gerard discussed the concept of an unequivocal behavior orientation that was described as an adaptive strategy that forced the individuals to bring their relevant cognitions into harmony with each other. Another perspective consistent with the present model is Julius Kuhl's theory of action control. He proposed that to insure that the intended action rather than a competing action tendency will be executed, the intended action tendency has to be selectively strengthened and protected against interference until the action is executed. The postdecisional spreading of decision alternatives may serve the function of putting the decision into action. When one considers that dissonance is primarily a theory about postdecisional processing, it is easy to see how these theories fit with the present conception of the function of the dissonance process.

s0060 Experimental Tests of the Action-Based Model

s0065 Action-Orientations

p0145 An action-oriented state is a state that often occurs following a decision. When a person is in an action-oriented state, implementation of decisions is enhanced. In 2002, Harmon-Jones and Harmon-Jones integrated these ideas with dissonance theory to propose that this action-oriented state that follows decision-making is equivalent to the state in which dissonance motivation operates and dissonance reduction occurs. They hypothesized that experimentally manipulating the degree of action-orientation experienced following a decision should affect the degree of dissonance reduction.

Harmon-Jones and Harmon-Jones conducted an experiment to test these ideas. Participants were asked to make either an easy decision or a difficult decision, choosing to perform one of two physical exercises that the participant rated attractive and unattractive or rated as very similar in attractiveness. Participants were asked to fill out a mindset questionnaire after the decision. The neutral mindset questionnaire asked participants to list seven things they did in a typical day, while the action-oriented mindset questionnaire asked participants to list seven things they could do to perform well on the exercise they had chosen. Participants were then asked to re-evaluate the exercises. Results indicated that participants in the high-choice, action-oriented condition changed their attitudes to prefer the chosen exercise more than participants in the other conditions.

In a second experiment testing the action-based model, Harmon-Jones and Harmon-Jones replicated the results of the first experiment using a different manipulation of action-orientation. In this experiment, action-orientation was induced by asking participants to think of an important decision that they had made and to list the steps they intended to use to successfully follow through with their decision. The participants in the action-orientation condition engaged in more attitude change following a difficult decision than did participants in the comparable conditions. This study replicated the results of the previous study, but provided stronger support for the model because it used an action-orientation induction unrelated to the decision at hand.

Neural Processes Involved in Dissonance

To assist in translating the behavioral commitment or intention into effective action, approach-motivational processes should be activated, as the individual works to successfully implement the new commitment. Thus, the increase in approach motivation should activate the left frontal cortex, as much past research has found this cortical region to be involved in approach-motivational processes.

Other research has suggested that activity in the anterior cingulate cortex is involved in monitoring the occurrence of errors or the presence of response conflict. Importantly, research has found increased anterior cingulate cortex activity, as measured by the event-related potential known as the error-related negativity, when behavior conflicts with the self-concept. This finding suggests that even higher level conflicts, the type with which dissonance theory has been most concerned, also activate the anterior cingulate cortex. More recently, Vincent van Veen and colleagues found increased anterior cingulated cortex activation in the induced compliance paradigm.

Based on this past research, dissonance (or potential response conflict) first activates the anterior cingulate cortex, and then activates the left dorsolateral prefrontal cortex, which assists in resolving the conflict. To test the prediction that dissonance is associated with increased left frontal cortical activity, university students who were opposed to a tuition increase participated in a study ostensibly concerned with attitudes and personality. They were randomly assigned to one of two choice conditions. In the low-choice condition, participants were told they were to write an essay supporting a 10% tuition increase at their university. In the high-choice

condition, participants were told that writing the essay in favor of the tuition increase was their choice and completely voluntary. However, the instructions subtly encouraged them to write such an essay. EEG was assessed for 1 min following the beginning of the writing of the counter-attitudinal essay, as past research has revealed that dissonance is greatest at this point in time. Moreover, the commitment alone (and not the complete essay writing) is sufficient to evoke dissonance. Then, participants completed an attitude measure. Replicating past research, results revealed that high-choice participants changed their attitudes more than low-choice participants. Supporting the primary prediction, results also revealed that high-choice participants evidenced greater relative left frontal activity than low-choice participants.

p0175 Another experiment extended the above research by testing the hypothesis that an action-oriented mindset would not only facilitate discrepancy reduction following a decision, but would also increase relative left frontal cortical activity. Replicating past results, the current experiment demonstrated that the action-oriented mindset caused greater spreading of alternatives than the neutral mindset condition. Moreover, the action-oriented mindset caused greater relative left frontal activation than the other condition. These results supported our predictions and suggest that the dissonance reduction involves activation of the left frontal cortex and approach-motivational processes.

p0180 In the previous experiment, the psychological process (action-orientation) was manipulated and the proposed physiological substrate was measured (left frontal cortical activation). Studies of this type are limited in the causal inferences that can be drawn. Because the measured physiological activation may be only one of a number of physiological activations that occur in response to the psychological manipulation, it is possible that one of the other unmeasured physiological activations is more responsible for the psychological process. To provide stronger causal inferences regarding the role of a particular neural structure's involvement in a particular psychological process, it is important to reverse the direction and manipulate the physiology and measure the psychology. Such measurement also provides stronger causal evidence than simply correlating the proposed mediator with the outcome. Thus, an experiment used neurofeedback to manipulate left frontal cortical activity. After neurofeedback training, participants were given a difficult decision and following the decision their attitudinal spreading of alternatives was measured. The manipulated decrease in relative left frontal activity led to a decrease in spreading of alternatives.

s0075 Individual and Cultural Differences

p0185 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, and individuals from Eastern cultures show greater dissonance-related attitude change as compared to individuals from Western cultures when inter-dependence is salient. As noted by Wicklund and Brehm, 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.

Heine and Lehman found that North Americans and East Asians differ in their attitudinal responses to difficult decisions. While North Americans showed the typical spreading of alternatives following the difficult decision (regarding choice over popular compact disk music selections), East Asians did not. This observed effect was not consistent with earlier observations by Haruki Sakai and colleagues who had found dissonance-related attitude change following public but not private induced compliance. p0190

However, Hoshino-Browne and colleagues 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. p0195

Conclusion

Several experiments have challenged the revisions of dissonance theory and have provided support for Festinger's original conception of dissonance. Clearly, dissonance has much to do with inconsistency and is not due to such limiting conditions as a self-threat or the production of an aversive consequence. As Aronson noted, a number of social psychological theories, such as self-affirmation theory, could be thought of as dissonance in other guises. In addition to the theories noted by Aronson, much research and theory concerned with guilt and self-regulation over prejudiced and other impulses may be understood from the perspective of dissonance. Incorporation of the key variables and past research of dissonance theory into these and other research enterprises will likely benefit those enterprises and lead to a more cumulative psychological theory. s0080 p0200

Festinger did not propose why cognitive inconsistency produces discomfort and motivates perceptual, cognitive, and p0205

behavioral changes. However, the action-based model of dissonance does propose an underlying motivation. Research on the action-based model suggests that dissonance reduction may serve the function of assisting in the successful execution of a commitment, which may facilitate effective and unconflicted action. Incorporation of these ideas derived from action control thinking may assist in stimulating new 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.

p0210 As dissonance theory goes on to its sixth decade, it clearly has weathered many challenges but still provides much explanatory, integrative, and generative power.

See also: Attitude Change (00040); Attitude Formation (00041); Motivation (00238); Self-Esteem (00313).

Further Reading

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