

On the Motivational Nature of Cognitive Dissonance Dissonance as Psychological Discomfort

Andrew J. Elliot

Department of Psychology University of Wisconsin–Madison

Patricia G. Devine

Department of Psychology University of Wisconsin–Madison

ABSTRACT

Most empirical research investigating the motivational properties of cognitive dissonance has focused on the arousal component of dissonance rather than on the psychological component explicitly delineated by L. Festinger (1957). In 2 induced-compliance experiments, a self-report measure of affect was used to demonstrate that dissonance is experienced as psychological discomfort and that this psychological discomfort is alleviated on implementation of a dissonance-reduction strategy, attitude change. Experiment 1 yielded supporting evidence for both of these propositions. Experiment 2 replicated the 1st experiment and ruled out a self-perception-based alternative explanation for the dissonance-reduction findings in Experiment 1. Results from the 2 experiments strongly support Festinger's conceptualization of cognitive dissonance as a fundamentally motivational state.

Andrew J. Elliot (now at the Department of Psychology, University of Rochester)

We gratefully acknowledge the help of Dan Berman, Patsy Harding, Paige Levin, Michelle Maravich, Jana Price, and Kevin Thompson who served as experimenters in the present research. We are also indebted to the following people who provided helpful comments on drafts of this article: Kenn Barron, Leonard Berkowitz, Keith Campbell, Sophia Evett, Edward Hirt, Judith Harackiewicz, Robert Krueger, Constantine Sedikides, and Julia Zuwerink. In addition, we thank three anonymous reviewers for their insightful suggestions.

Correspondence may be addressed to Andrew J. Elliot, Department of Psychology, University of Rochester, Rochester, New York, 14627.

Received: August 4, 1993

Revised: January 4, 1994

Accepted: January 4, 1994

As presented in his classic monograph, [Festinger's \(1957\)](#) cognitive dissonance theory is fundamentally motivational in nature. Festinger posited that the perception of an inconsistency among an individual's cognitions generates a negative intrapersonal state (dissonance), which motivates the individual to seek and implement a strategy to alleviate this aversive state. To empirically validate the motivational nature of dissonance processes, it is necessary to directly demonstrate that (a) dissonance is experienced as a negative intrapersonal state, and (b) this negative intrapersonal state is alleviated on implementation of a reduction strategy (Elkin & Leippe, 1986). A perusal of the extant dissonance literature reveals that the

first requirement has been fulfilled in part, whereas the second has received a paucity of empirical attention and remains to be directly demonstrated. The present set of experiments addressed both of these foundational motivational issues—the nature of the dissonance experience and dissonance reduction—in the interest of further validating one of social psychology's grandest theories (Aronson, 1992).

The Nature of the Dissonance Experience: Is Dissonance a Negative Intrapersonal State?

[Festinger \(1957\)](#) conceptualized dissonance in two distinguishable ways: He explicitly delineated psychological discomfort as a component of dissonance, and he alluded to dissonance as a bodily condition analogous to a tension or drive state like hunger (Croyle & Cooper, 1983). In 1962, Brehm and Cohen proffered a restatement of cognitive dissonance theory in which they distinctly characterized dissonance as a state of arousal and focused extensively on its drive-like properties. Research investigating the nature of dissonance has primarily focused on Brehm and Cohen's derived arousal component of dissonance rather than on the psychological component explicitly delineated by Festinger.

Dissonance as Arousal

Most empirical explorations of the arousal or drive-like properties of dissonance have used indirect research techniques, specifically, incidental retention, response competition, or misattribution paradigms. The incidental retention and response competition research was conducted under the premise that if dissonance was indeed an arousal state, it should affect task performance in a manner similar to other, empirically validated, arousal states (Pallak & Pittman, 1972). For instance, dissonance manipulations should facilitate performance on simple, overlearned tasks, but dissonance manipulations should undermine performance on more difficult or complex tasks. A number of conceptually similar experiments have been conducted from this learning theory perspective, most of which have yielded results supporting the proposition that dissonance has arousal properties (see Kiesler & Pallak, 1976, for a review of the literature).

Dissonance theorists adopting a misattribution approach drew heavily on Schachter and Singer's (1962) two-factor theory of emotion in characterizing dissonance as an arousal state amenable to various cognitive labels. Zanna and Cooper (1974) conducted an induced-compliance experiment to test this conceptualization of dissonance. They reasoned that subjects who have freely chosen to write a counterattitudinal essay should not subsequently change their attitude if given the opportunity to attribute their presumed arousal to a plausible external source. In line with their predictions, high-choice subjects given a placebo that would ostensibly make them feel tense changed their attitude less than their high-choice counterparts who had supposedly ingested a drug that would make them feel relaxed. Zanna and Cooper's seminal study, in concert with a number of conceptual replications and extensions (see reviews by Fazio & Cooper, 1983; Zanna & Cooper, 1976), makes an impressive case for the position that dissonance has arousal properties.

In addition to these indirect avenues of exploration, a few investigators have sought direct, physiological assessments of dissonance arousal (Buck, 1970, cited in Fazio & Cooper, 1983; Croyle & Cooper, 1983; Gerard, 1967; Gleason & Katkin, 1974, cited in Croyle & Cooper, 1983; McMillen & Geiselman, 1974; Quany & Becker, 1974, cited in Croyle & Cooper, 1983). Early returns from studies that used this approach were suggestive, though ultimately inconclusive because they either did not use standard dissonance paradigms or they failed to replicate typical dissonance findings (see reviews by Elkin &

Leippe, 1986 ; Fazio & Cooper, 1983). A set of induced-compliance experiments by Elkin and Leippe (1986) provided the first definitive evidence supporting the dissonance-as-physiological-arousal hypothesis. In both of the Elkin and Leippe experiments, subjects displayed elevated galvanic skin responses (GSRs) as well as attitude change following the composition of a freely chosen counterattitudinal essay. Losch and Cacioppo (1990) have recently obtained a similar pattern of results using a misattribution paradigm and frequency of nonspecific skin conductance responses as the physiological indicator of dissonance arousal. The Elkin and Leippe and Losch and Cacioppo experiments provide direct and compelling evidence that there is a physiological arousal component to the dissonance state.

Consideration of the cumulative, multiparadigmatic empirical evidence reviewed above leads to the unequivocal conclusion that dissonance does have arousal properties. An independent, though equally important, question remains: Is dissonance, as Festinger posited, also a psychologically aversive experience?

Dissonance as Psychological Discomfort

Much like the dissonance-as-arousal question, most empirical investigations of the psychological aversiveness of dissonance have used an indirect approach, specifically, the misattribution paradigm. Although the initial misattribution studies provided supportive evidence for the proposition that dissonance has arousal properties, they shed little light on whether this arousal is general in nature or specifically experienced as psychological discomfort. Subsequent research exploring this issue tended to yield discrepant results. Some experiments demonstrated that dissonance arousal could be misattributed to a positive external source (thereby suggesting that the arousal is undifferentiated in nature; Cooper, Fazio, & Rhodewalt, 1978 ; Rhodewalt & Comer, 1979), whereas others seemed to indicate that dissonance arousal could not be misattributed to a positive external source (suggesting that the arousal is specifically experienced as an aversive state; Higgins, Rhodewalt, & Zanna, 1979 ; Losch & Cacioppo, 1990 ; Zanna, Higgins, & Taves, 1976).

[Cooper and Fazio \(1984\)](#) have reconciled these seemingly discrepant positions by drawing a distinction between dissonance arousal and dissonance motivation in their "New Look" model of cognitive dissonance. Dissonance arousal is characterized as a state of undifferentiated physiological arousal that may be labeled positively or negatively. When labeled negatively and attributed internally (to one's having freely chosen to write a counterattitudinal essay, for instance), this dissonance arousal becomes dissonance motivation—"the psychological discomfort that motivates or 'drives' the attitude change process" (Fazio & Cooper, 1983, p. 132). Thus, both arousal and psychological discomfort work in tandem as integral components of the complete dissonance process: Arousal instigates the attributional interpretation, whereas the resultant psychological discomfort prompts the implementation of a dissonance-reduction strategy.

Although [Cooper and Fazio's \(1984\)](#) New Look model represents an impressive reformulation of dissonance processes, the fact remains that the dissonance arousal component of their model has been empirically substantiated with far greater rigor than the dissonance motivation (i.e., psychological discomfort) component. Whereas the arousal component has been extensively documented in numerous indirect and direct studies (as reviewed earlier), the psychological discomfort component has nearly exclusively been investigated through the indirect, misattribution paradigm. The few studies that have used a direct self-report measure of dissonance affect have done so in an auxiliary fashion, and consequently, the studies possess a number of characteristics that preclude an unequivocal demonstration

of the psychological aversiveness of dissonance. To date, there have been no systematic attempts to directly empirically validate the psychological discomfort component of dissonance. A primary purpose of the present experiments is to fill this empirical void.

Dissonance Reduction: Is Dissonance Eliminated On Implementation of a Reduction Strategy?

A number of dissonance researchers have demonstrated a negative linear relationship between the implementation of a reduction strategy and the presence of dissonance (Kidd & Berkowitz, 1976 ; Shaffer, 1975 ; Wixon & Laird, 1976). Unfortunately, the assessments of dissonance in these studies are inadequate (see Footnote 1), and the observed correlations fail to demonstrate Festinger's proposed causal relationship leading from the implementation of a reduction strategy to the diminution of dissonance. Only three studies have adopted an experimental approach to put Festinger's dissonance-reduction hypothesis to an empirical test.

[Pallak and Pittman \(1972, Experiment 2\)](#) orthogonally manipulated dissonance induction (through high versus low choice to perform a dull pronunciation task) and dissonance reduction (through the provision or not of post-choice information congruent with, and thus justifying, subjects' counterattitudinal decision) before engaging subjects in a complex version of the Stroop color—word interference task. Consistent with predictions, the researchers found that high-choice subjects in the no-justification condition displayed more performance decrements than their low-choice counterparts, whereas this response competition effect was not found for high- or low-choice subjects provided with a justification for their decision. Presumably, the provision of information consonant with the subject's decision to perform the dull task ("Your pronunciation task results will be very useful to us") reduced the dissonance originally aroused by the cognitions "I chose to perform this task" and "This task is dull and boring." Although the assessment of dissonance in this study was indirect, these results do represent the first empirical demonstration that dissonance is alleviated by the implementation of a reduction strategy (albeit a strategy provided by the experimenter).

In two induced-compliance studies, Elkin and Leippe (1986) used a direct assessment of physiological arousal in testing Festinger's (1957) dissonance-reduction postulate. In Experiment 1, arousal (as indicated by GSRs) was measured three times over the course of a counterattitudinal essay paradigm: during a premanipulation rest period (Baseline), after the essay-writing task (post-essay), and following the provision of an attitude-change opportunity (post-attitude change). Results indicated that high- but not low-choice subjects displayed an increase in GSRs from Baseline to post-essay. However, even though high-choice subjects changed their attitude in the direction of their counterattitudinal behavior, they failed to show dissonance reduction in the form of a significant decrease in GSRs from post-essay to post-attitude change. In their second experiment, Elkin and Leippe replicated Experiment 1 and additionally found that only high-choice subjects not presented with an attitude change opportunity after the writing of the counterattitudinal essay displayed subsequent arousal reduction. After contemplating a number of potential explanations for their results, Elkin and Leippe concluded their article by calling into question the veracity of Festinger's proposal: "It is only through the arousal's subsequent reduction that motivation can be implied, and we found no evidence that explicit attitude change reduced arousal...Cognitive dissonance, then, may or may not be a motivational state" (p. 64).

Given the paucity of extant data and the incongruity in the three experiments that do exist, Elkin and

Leippe's (1986) equivocal conclusion seems warranted. However, their research investigated the effect of the implementation of a reduction strategy on the arousal component of dissonance. The status of the psychological component of dissonance after the implementation of a reduction strategy remains, to date, uncharted territory.

For a number of reasons, psychological discomfort may be the preferred component of dissonance to consider in exploring the dissonance-reduction process. First, physiological measures (used to assess the arousal component of dissonance) yield characteristically imprecise data because the use of physiological measures to assess covert psychological states remains at an incipient stage of development (Cacioppo & Tassinary, 1990 ; Lazarus, 1991 ; Tesser & Collins, 1988). Although self-report measures (the logical choice to assess the psychological component of dissonance) are susceptible to their own unique set of pitfalls (cf. Nisbett & Ross, 1980 ; Nisbett & Wilson, 1977), when used properly they can provide reliable, valid, and precise assessments of internal psychological states (Ericsson & Simon, 1980 ; Lieberman, 1979 ; MacKay, 1980 ; Smith & Miller, 1978 ; Quattrone, 1985). Second, the New Look model (Cooper & Fazio, 1984) postulates that arousal has no proximal role in dissonance reduction, it only serves a distal function as the instigator of attributional interpretation. It is the phenomenological experience of discomfort generated by the attributional judgment that proximally drives the implementation of a strategy specifically designed to alleviate the discomfort. On the basis of this model, it is likely that the implementation of a reduction strategy would result in reduced psychological discomfort, not necessarily in reduced arousal per se. Third, even if both components serve proximal motivational functions in the dissonance process, the time course of dissonance reduction may not be uniform for arousal and psychological discomfort. That is, subjects may experience immediate phenomenological relief on implementation of a dissonance-reduction strategy, followed by a more gradual diminishing of their dissonance-based arousal. Given such a progression, it would clearly be easier to empirically demonstrate immediate alleviation of the psychological discomfort component of dissonance than a reduction of the arousal component, which may entail a protracted time sequence of unknown length.

In sum, the present studies focused on the psychological discomfort component of dissonance in attempting to empirically validate Festinger's (1957) proposal that cognitive dissonance is a fundamentally motivational state. A set of induced-compliance experiments manipulated dissonance induction and varied the placement of self-report measures of affect and attitude in an attempt to directly measure psychological discomfort and its presumed alleviation following attitude change. Our predictions, generally stated, fall directly out of Festinger's original statement of dissonance theory:

- Dissonance induction: Subjects reporting their affect immediately after dissonance induction will show greater levels of discomfort than those for whom dissonance has not been induced.
- Attitude change: Dissonance subjects will demonstrate greater attitude change than no-dissonance subjects.
- Dissonance reduction: Immediately after changing their attitudes, dissonance-induction subjects will report levels of discomfort equivalent to that of no-dissonance subjects.

The following set of experiments tested these straightforward predictions and concomitantly attempted to eliminate a plausible alternative explanation.

Experiment 1

Method Subjects and Selection

Several hundred undergraduates at the University of Wisconsin–Madison completed an "Opinion Questionnaire" as part of an introductory psychology survey. On a series of 15-point scales (1 = strongly disagree ; 15 = *strongly agree*), students indicated their opinions on several campus issues, including the critical item "The University should raise tuition by 10% for the (upcoming) semester." Twenty male and 20 female students who strongly opposed the tuition increase (circled 1 on the scale) were randomly selected and successfully recruited to participate in the study. 2 Subjects received extra credit in return for their participation.

Design and Procedure

Subjects were randomly assigned to one of four experimental conditions, which were created by varying the order and type of materials (described in detail below) in the experimental packet. In the Pre-essay affect/attitude (PRE AFF/ATT) condition, subjects received the materials in the following order: the high-choice/counterattitudinal essay manipulation, the affect measure, the attitude measure, and the essay forms (see Figure 1). This placement of the affect and attitude measures provided the purest assessment of dissonance affect (see Wicklund & Brehm, 1976) and allowed for an investigation into the timing of dissonance-induced attitude change. Post-essay attitude/affect (POST ATT/AFF) subjects received the materials in the following temporal sequence: the high-choice/counterattitudinal essay manipulation, the essay forms, the attitude measure, and the affect measure. This ordering of the materials provided an opportunity to replicate the classic induced-compliance attitude change effect and to investigate the immediate affective consequences of this attitudinal shift. Baseline subjects received the affect measure first, followed by the low-choice/counterattitudinal essay manipulation, the essay forms, and the attitude measure. Excepting the initial affect assessment, which provided an indicator of affect uninfluenced by experimental manipulation, this condition was designed to represent the attitude change control commonly used in the induced-compliance paradigm. Proattitudinal (PROATT) controls received the materials in the following order: the high-choice/proattitudinal essay manipulation, the affect measure, the essay forms, and the attitude measure. Placement of the affect measure immediately after the proattitudinal commitment provided a control for negative affect simply generated by the prospect of the essay-writing task itself; the attitude measure was placed last to serve as an additional attitude-change control.

The experimental sessions were conducted 4 to 10 weeks after the initial attitude assessment by an experimenter who was unaware of subjects' experimental condition. Subjects were run in groups of 3 to 9, and care was taken to ensure that several conditions were represented in each experimental session. On arriving at the laboratory, subjects were provided with a packet containing the materials for the experiment. To minimize impression-management concerns, subjects were informed that they would all be placing their completed packets in the same envelope, which would be circulated at the completion of the study. A note at the bottom of each form in the packet instructed subjects to turn the page and continue; thus, each subject completed the packet of materials at his or her own pace. On completion of their packet, subjects were debriefed, given an extra credit card, and dismissed.

Experimental Materials Choice and position manipulations.

All subjects read the following introductory paragraph (see Elkin & Leippe, 1986 , for a similar

procedure):

In exchange for research facilities and funding, the Psychology Department has agreed to conduct a survey for the University administration. The University, in conjunction with the Board of Trustees, has set up a committee on campus to investigate the possibility of a tuition increase for the upcoming semester. The tuition increase would be 10%. After reviewing what they find, the committee will make a recommendation to the administration regarding the tuition increase.

Subjects were then informed that the psychology department had been asked to collect arguments on both sides of the tuition issue to allow the committee to make the best possible decision. Low-choice (Baseline) subjects proceeded to read the following:

In the past, research has shown that a good way of doing this is to instruct people, no matter how they feel personally, to list arguments on only one side of the issue. Therefore, you have been randomly assigned to write a strong, forceful essay in support of a tuition increase of 10% for the (upcoming) semester. Your arguments will be sent directly to the committee for evaluation.

High-choice, counterattitudinal essay (PRE AFF/ATT and POST ATT/AFF) subjects were told the following:

In the past, research has shown that a good way to do this is to ask people to list arguments on only one side of the issue. The committee has already finished gathering arguments against a tuition increase and is now ready to gather arguments in support of a tuition increase. So while we would like to stress the voluntary nature of your decision regarding which side of the issue to write on, the committee needs strong, forceful arguments in support of a tuition increase of 10% for the (upcoming) semester. Your arguments will be sent directly to the committee for evaluation.

High-choice, proattitudinal essay (PROATT) subjects read the same paragraph, only the phrase "in support of" was substituted for the word against, and vice versa. In addition, all high-choice subjects read and signed the following release form:

I realize what is involved in this task and that I am performing it of my own free will. The essay that I write will be sent directly to the committee on campus that will make a decision on this issue based on the arguments it receives from me and other students. I am aware that I may stop participating now without loss of participation credit (sign and date below if you agree to participate and allow the release of your essay).

Essay forms.

Two pages of lined university stationery were provided with instructions that subjects should take at least 5 to 7 min to compose their essay.

Affect measure.

The affect measure comprised 24 items representing an amalgam of dissonance-relevant terms (e.g., uncomfortable) and other items not directly related to Festinger's conceptualization of dissonance (e.g., guilty and *happy*). Inclusion of these additional items not only minimized concerns regarding experimental demand but also enabled a test of dissonance-relevant affect as the distinct affective consequence of dissonance induction. Subjects were instructed to indicate how they were feeling "right

now" by circling numbers on a series of 7-point (1 = does not apply at all; 7 = *applies very much*) scales.

Attitude-change measure.

A 1-item question, identical to the "critical item" used in the introductory psychology survey, served as the attitude-change measure. The following sentence served as a preface: "The committee is also interested in your responses to the following item (this form will accompany your essay)."

Choice manipulation check and attitude importance measure.

To check the efficacy of the choice manipulation, subjects were queried "How much choice did you have to write or not write the essay?" Subjects responded on a 15-point (1 = no choice at all; 15 = *a great deal of choice*) scale. Finally, subjects responded to an attitude importance item, "How important is the tuition issue to you?" on a 15-point (1 = not at all important; 15 = *very important*) scale.

Results Preliminary Analyses Gender.

Gender was initially included as a factor in all of the analyses reported below but was dropped from the final analyses because of the absence of main effects or interactions.

Choice manipulation check.

A one-way analysis of variance (ANOVA) yielded a significant effect of experimental condition on subjects' perceptions of choice in writing the essay, $F(3, 36) = 3.36, p < .05$. A planned comparison 3 revealed that subjects in the three high-choice conditions reported greater perceived choice ($M = 10.73$) than subjects in the low-choice (Baseline) condition ($M = 5.80$), $F(1, 36) = 9.24, p < .01$ (see [Table 1](#) for means by condition).

Attitude Change

Before exploring the utility of a self-report measure of dissonance, it was important to determine whether the experimental procedure produced a replication of the classic induced-compliance effect. All subjects participating in the experiment had indicated in the introductory psychology survey that they were strongly against the proposed tuition increase. Therefore, attitude ratings in excess of 1 (strongly disagree) represented attitude change. A one-way ANOVA yielded a significant effect of experimental condition on Attitude Change, $F(3, 36) = 10.42, p < .01$. As displayed in Table 1, a planned comparison indicated that subjects in the POST ATT/AFF condition changed their attitude more than subjects in the Baseline condition, $F(1, 36) = 10.93, p < .01$, thus replicating the classic induced-compliance effect. A conceptually similar comparison revealed that POST ATT/AFF subjects changed their attitude more than PROATT subjects, $F(1, 36) = 29.26, p < .01$. POST ATT/AFF subjects also showed greater Attitude Change than subjects in the PRE AFF/ATT condition, $F(1, 36) = 15.27, p < .01$, suggesting that attitude change did not occur immediately after consenting to compose the counterattitudinal essay. Although not expected, Baseline subjects reported greater attitude change than those in the PROATT condition, $F(1, 36) = 4.43, p < .05$.

Dissonance and Other Affect Indices

Having replicated the classic induced-compliance effect, we next examined whether subjects reported elevated levels of dissonance affect after freely consenting to write a counterattitudinal essay and whether such affect dissipated on implementation of a reduction strategy—attitude change. Discomfort, the affect index of central theoretical interest, was created by averaging subjects' responses to the uncomfortable, uneasy, and *bothered* items (Cronbach's $\alpha = .81$). This indicator of the psychological

component of dissonance was constructed on the basis of Festinger's (1957) description of the dissonance state (see also Berkowitz, 1968 ; Singer, 1968), our own intuitions regarding the phenomenology of dissonance, and prior, conceptually related research on affective responses to experimental manipulations (Devine, Monteith, Zuwerink, & Elliot, 1991 ; Monteith, 1993).

Other affect indices were created to test whether dissonance induction leads uniquely to elevated Discomfort or simply to increased affect in general. Subjects' ratings of how disappointed with themselves, *annoyed* with themselves, guilty, and *self-critical* they felt were averaged to form a Negself index (Cronbach's $\alpha = .75$). A Positive index was composed of good, happy, optimistic, and *friendly* (Cronbach's $\alpha = .93$). The latter two indices were identical to those used in a conceptually similar research domain (Monteith, 1993).

A one-way ANOVA yielded a significant effect of experimental conditional on subjects' reported Discomfort, $F(3, 36) = 4.00, p < .05$. As displayed in Table 1 , a planned comparison indicated that PRE AFF/ATT subjects reported greater Discomfort than subjects in the Baseline condition, $F(1, 36) = 9.00, p < .01$. Likewise, PRE AFF/ATT subjects reported greater Discomfort than PROATT controls, $F(1, 36) = 7.40, p = .01$, suggesting that the elevated Discomfort in the PRE AFF/ATT condition was not simply apprehension related to the essay-writing task itself. Dissonance reduction was evidenced by lower reported Discomfort in the POST ATT/AFF condition relative to the PRE AFF/ATT condition, $F(1, 36) = 7.40, p = .01$. POST ATT/AFF subjects did not differ from subjects in the Baseline condition, nor from PROATT controls. No significant effects were revealed in ANOVAs using the Negself and Positive indices, suggesting that Discomfort was the distinct affective consequence of the dissonance induction.

Supplementary Analyses

The above results suggest a negative relationship between Discomfort and Attitude Change in the high-choice counterattitudinal essay conditions. Specifically, when Discomfort is high, Attitude Change should be minimal, whereas when the individual's attitude has been changed, Discomfort should be reduced to baseline levels. The correlation within the high-choice counterattitudinal essay conditions between Discomfort and Attitude Change was $-.36 (p = .06, \text{one-tailed})$, thereby providing further empirical support for the reciprocal nature of the Discomfort—Attitude Change relationship.

Two judges, unaware of experimental condition, rated each essay for extremity of position (on a 5-point scale where 1 = not at all extreme and 5 = *very extreme*) and number of themeconsistent arguments. The interjudge correlations were .86 and .90 for the extremity and number of arguments ratings, respectively, and the more experienced judge's ratings were retained in instances of disagreement. One-way ANOVAs failed to yield a significant effect of experimental condition on either variable. In addition, none of the correlations within the high-choice counterattitudinal essay conditions between Discomfort or Attitude Change and either of the essay characteristics were significant. No significant effects were obtained for Attitude Importance.

Discussion

The results from this experiment support Festinger's conceptualization of cognitive dissonance as a fundamentally motivational state. Subjects who had just freely consented to write a counterattitudinal essay reported greater Discomfort than baseline controls and those who had just freely consented to compose a proattitudinal essay. This finding leads us to conclude that cognitive dissonance is experienced as psychological discomfort. In addition, the fact that dissonance-induction subjects reported baseline levels of discomfort immediately on changing their attitude suggests that their implementation

of this reduction strategy was efficacious in eliminating dissonance affect. Attitude change, therefore, appears to be in the service of alleviating the psychological discomfort generated by freely chosen counterattitudinal behavior. This finding represents the first direct empirical evidence in support of Festinger's dissonance-reduction postulate.

Interestingly, subjects provided with an attitude change opportunity before the actual composition of the essay (those in the PRE AFF/ATT condition) did not make use of this strategy to alleviate their dissonance affect. This would appear to contradict the findings from studies that have documented attitude change following commitment to write a counterattitudinal essay, but before the actual composition of the essay (see Wicklund & Brehm, 1976). However, these studies differ from the present experiment in a number of important ways that may account for the differential results. First, the attitude issue used in the present experiment (the possibility of a tuition increase) was quite important to subjects, in contrast with the attitude issues used in many of the previous studies (e.g., whether the federal government was assuming responsibilities that could be left up to the states; Wicklund, Cooper, & Linder, 1967). Second, only subjects who reported polarized attitudes were selected for recruitment in the present study (i.e., those who circled 1 on the 15-point scale), whereas in previous studies, subjects were recruited according to the valence of their attitude relative to the scale midpoint (e.g., 1 through 7 on a 15-point scale). Research on attitude structure and attitude change has demonstrated that important and extreme attitudes are more resistant to change than unimportant and nonpolarized attitudes (Krosnick, 1988 ; Osgood & Tannenbaum, 1955 ; Rhine & Severance, 1970). Thus, it is likely that subjects in the present experiment would need to engage in more "cognitive work" (Goethals & Cooper, 1975) before changing their attitudes than subjects in previous studies. A third difference between the present and past experiments is that the time for this cognitive work to take place was minimal in the present experiment (the attitude-change opportunity was presented very soon after commitment to write the counterattitudinal essay), whereas in some of the previous studies there was a sizable delay between commitment to write the counterattitudinal essay and presentation of the attitude-change opportunity (e.g., Waterman, 1969).

In light of these differences, it seems that PRE AFF/ATT subjects (in contrast with subjects in previous studies) were unable to use immediate attitude change as a viable reduction strategy because they had not yet had time to access plausible counterattitudinal arguments (in the course of essay composition) that would justify a shift in their important, polarized attitudes. Once plausible counterattitudinal arguments had been accessed (for those in the POST ATT/AFF condition), attitude change in the direction of these arguments became a justifiable method of dissonance reduction. This suggests that dissonance-reduction processes are constrained, subject to a "plausibility principle" requiring that potential reduction strategies pass a believability or plausibility test before being implemented (Festinger, 1957 ; Pyszczynski & Greenberg, 1987 ; see Kunda, 1990 , for the development of a related argument).

The design of the first experiment left room for an alternative explanation for the reduction findings. Discomfort was assessed on consent to write the counterattitudinal essay in the PRE AFF/ATT condition and following attitude change in the POST ATT/AFF condition. Thus, there was a span of approximately 7 to 10 min between assessments of Discomfort in these two conditions, during which time subjects composed their essays and completed the attitude-change measure. A rival explanation for the observed pattern of results is that consenting to write a counterattitudinal essay generated psychological discomfort, which gradually diminished (of its own accord) over the course of the essay-writing period. Attitude change in this scenario would not be driven by psychological discomfort, but would simply be a function of cognitive, self-perceptual processes (e.g., subjects observed their composition of an essay

favoring the tuition increase and dispassionately inferred that this behavior reflected, to some degree, their actual position; see Bem, 1972).

Experiment 2 was designed to address this alternative explanation by providing a more stringent test of Festinger's (1957) reduction postulate. POST ATT/AFF and Baseline conditions remained identical to those in Experiment 1, but in a new condition—Post-essay affect/attitude (POST AFF/ATT)—affect was assessed after subjects consented to write and actually composed the counterattitudinal essay. Thus, the only difference between the POST AFF/ATT and POST ATT/AFF conditions was that in the former the affect measure preceded the attitude-change measure, whereas in the latter the attitude-change measure came first (see Figure 2). If it could be shown, in accord with predictions, that Discomfort was elevated in the POST AFF/ATT condition relative to the Baseline condition, and Discomfort for the POST ATT/AFF condition was reduced to baseline levels, the self-perception hypothesis would no longer be tenable. A supplementary feature of Experiment 2 was the use of a larger sample size to afford the opportunity to empirically, rather than theoretically and intuitively, derive Discomfort and the other affect indices.

Experiment 2

Method Subjects and Selection

Several hundred undergraduates completed an "Opinion Questionnaire" as part of an introductory psychology survey. As in Experiment 1, this questionnaire included the critical item "The University should raise tuition by 10% for the (upcoming) semester." Participants responded on a 15-point (1 = strongly disagree; 15 = *strongly agree*) scale. Twenty-nine male and 43 female students who strongly disagreed with the potential tuition increase were randomly selected and successfully recruited to participate in the experiment. 6 Subjects received extra credit in return for their participation.

Design, Procedure, and Materials

Subjects were randomly assigned to one of three experimental conditions, which were created by varying the order and type of materials in the experimental packet. In the POST AFF/ATT condition, subjects received the high-choice/counterattitudinal essay manipulation, then the essay forms, the affect measure, and the attitude-change measure. Subjects in the POST ATT/AFF condition received the high-choice/counterattitudinal essay manipulation, the essay forms, the attitude-change measure, and finally the affect measure. Baseline subjects completed the affect measure first, followed by the low-choice/counterattitudinal essay manipulation, the essay forms, and the attitude-change measure.

The procedure and materials used in Experiment 2 were essentially identical to those used in Experiment 1, excepting the addition of several subsidiary questions at the completion of the experiment. These questions were "How much effort did you put into thinking about and writing the essay?," "Before the experimental session, how well did you know the arguments in support of a tuition increase?," and "Before this experimental session, how well did you know the arguments against a tuition increase?" Subjects responded to these items on a series of 15-point scales. Experimental sessions were run 6 to 9 weeks after the introductory psychology survey in groups of 4 to 8. After completing the packet at their own pace, subjects were debriefed, given an extra credit card, and dismissed.

Results Preliminary Analyses Gender.

Preliminary analyses failed to yield any gender main effects or interactions; thus, all of the analyses

reported below collapsed across the gender variable.

Choice manipulation check.

A one-way ANOVA yielded a significant effect of experimental condition on the Choice measure, $F(2, 69) = 4.86, p < .01$. A planned comparison revealed that subjects in the two high-choice conditions reported greater perceived choice in writing the essay ($M = 10.98$) than subjects in the low-choice (Baseline) condition ($M = 6.17$), $F(1, 69) = 21.38, p < .01$ (see [Table 2](#) for means by condition).

Attitude Change

As in Experiment 1, all subjects participating in the experiment had indicated in the introductory psychology survey that they were strongly against the proposed tuition increase. Therefore, attitude ratings in excess of 1 (strongly disagree) represented attitude change. A one-way ANOVA yielded a significant effect of experimental condition on attitude change, $F(2, 69) = 5.43, p < .01$. As displayed in Table 2, a planned comparison revealed that POST AFF/ATT subjects changed their attitude to a greater degree than baseline controls, $F(1, 69) = 7.44, p < .01$. Likewise, POST ATT/AFF subjects changed their attitude more than baseline controls, $F(1, 69) = 8.80, p < .01$. POST AFF/ATT and POST ATT/AFF subjects did not differ from each other. These comparisons replicate the standard induced-compliance finding.

Affect Indices

To empirically derive affect indices, a factor analysis was performed on the individual affect items. A principal-axis analysis with varimax rotation yielded a five-factor solution that accounted for 66.3% of the total variance. Because of the relatively small case-to-variable ratio, a loading criteria of .6 was used to ascertain the items comprising each factor (Comrey, 1973; Tabachnick & Fidell, 1989). The first factor, Discomfort, accounted for 41% of the total variance and was composed of uncomfortable, uneasy, and *bothered*. This factor is identical to the Discomfort index that was used as an indicator of the psychological component of dissonance in Experiment 1. Negself, the second factor, accounted for 11.1% of the total variance and consisted of angry toward myself, dissatisfied with myself, disgusted with myself, and annoyed with myself. A third factor, Positive, accounted for an additional 5.7% of the variance and consisted of the following items: happy, good, friendly, energetic, and optimistic. Thus, the Negself and Positive factors proved to be highly similar to their corresponding affect indices used in Experiment 1. The fourth factor, Embarrass, comprised embarrassed and *shame* and accounted for 4.6% of the total variance. A final factor accounted for little additional variance and failed to yield a theoretically interpretable factor loading. Separate affect indices were created by averaging the items that loaded on each of the four interpretable factors. All four resultant indices proved highly reliable (Cronbach's alphas exceeded .80).

A one-way ANOVA yielded a significant effect of experimental condition on the Discomfort index, $F(2, 69) = 7.97, p < .01$. A planned comparison (see Table 2) revealed that POST AFF/ATT subjects reported elevated levels of Discomfort relative to Baseline subjects, $F(1, 69) = 14.25, p < .01$. An additional planned comparison revealed that subjects in the POST ATT/AFF condition reported lower levels of Discomfort than their POST AFF/ATT counterparts, $F(1, 69) = 9.07, p < .01$. POST ATT/AFF and Baseline subjects did not report different levels of Discomfort. These comparisons, in tandem with the Attitude-Change results, provide strong evidence in support of the dissonance-as-psychological-discomfort and dissonance-reduction hypotheses.

Additional analyses were conducted with the remaining three affect indices created from the factor

analysis. A one-way ANOVA using Nagsself as the dependent variable yielded a marginally significant effect for experimental condition, $F(2, 69) = 2.86, p < .07$, whereas there were no significant effects with the Positive or Embarrass indices. Given the somewhat sizable correlation between Discomfort and Nagsself ($r = .55, p < .01$) and the observed trend with Nagsself, a set of analyses of covariance (ANCOVAs) were deemed necessary to determine the precise nature of the affect generated by the dissonance induction (see Devine et al., 1991, for a comparable data-analytic procedure). When the Discomfort index was covaried from Nagsself affect, the marginal trend disappeared ($p > .30$), whereas covarying Nagsself from the Discomfort index had little impact on the effect for experimental condition, $F(2, 68) = 6.15, p < .01$. These analyses suggest that psychological discomfort was the distinct affective consequence of performing the counterattitudinal behavior under conditions of free choice.

Supplementary Analyses

As in Experiment 1, the Pearson correlation between Discomfort and Attitude Change was computed for the condition (POST ATT/AFF) in which these variables were expected to be reciprocally related. The obtained correlation was in the anticipated direction ($r = -.22$), although marginally significant ($p = .13$, one-tailed). However, when the two experiments were combined meta-analytically using the Stouffer method (Rosenthal, 1978), the correlation between Discomfort and Attitude Change did obtain significance ($Z = 1.84, p < .05$, one-tailed), indicating that the Discomfort—Attitude Change relationship in the high-choice counterattitudinal essay conditions was reciprocal in nature. 8

Following the procedure described in Experiment 1, each essay was rated for extremity of position and number of arguments (interjudge correlations were .77 and .91, respectively). One-way ANOVAs failed to yield a significant effect of experimental condition on either variable. There were also no significant correlations within the high-choice counterattitudinal essay conditions between either of the focal dependent measures and the essay characteristics. Analyses on the subsidiary measures (e.g., Attitude Importance and Effort Expenditure) failed to yield any significant effects.

Discussion

The results of this experiment provide further substantiation of the motivational underpinnings of cognitive dissonance theory. Subjects who wrote a counterattitudinal essay under conditions of free choice subsequently reported higher levels of Discomfort than baseline controls. This finding both replicates the dissonance-as-psychological-discomfort effect in Experiment 1 and additionally demonstrates that the Discomfort generated by consenting to compose a counterattitudinal essay does not merely dissipate of its own accord during the essay-writing period. Dissonance affect was only reduced on implementation of a reduction strategy, attitude change, which dropped Discomfort immediately to baseline level. The present pattern of data does not support the alternative hypothesis based on self-perception theory; rather, the results strongly support Festinger's (1957) proposal that attitude change is in the service of reducing the psychological Discomfort generated by counterattitudinal behavior.

The design of this experiment enabled a more fine-grained analysis of dissonance processes than was possible in Experiment 1. Specifically, by varying only the order of the affect and attitude-change measures in the POST AFF/ATT and POST ATT/AFF conditions, we were able to clearly demonstrate the role of attitude change in reducing dissonance affect. However, an alternative explanation for the baseline level of Discomfort evidenced by the POST ATT/AFF subjects is that the presentation of the attitude-change opportunity merely served to distract these individuals from their negative affective state. We conducted an additional experiment to test whether a distractor of the length of the attitude-change opportunity would be sufficient to reduce Discomfort to Baseline. In the Distract condition, subjects

freely chose to write a counterattitudinal essay, actually composed the essay, responded to questions regarding their age, year at school, and place of residence (pilot testing revealed that responding to these distractor questions took the same amount of time that it took to complete the attitude-change measure), and then completed the affect measure. Baseline subjects merely completed the affect measure after responding to the distractor items. A *t* test revealed that subjects in the Distract condition reported higher levels of Discomfort ($M = 3.75$) than those in the Baseline condition ($M = 1.94$), $t(1, 22) = 3.49$, $p < .005$. This result, in tandem with the effects demonstrated in Experiment 2, strongly suggests that it is attitude change, not distraction, that reduces Discomfort to baseline level.

The elevated Discomfort in the POST AFF/ATT condition in Experiment 2 (and in the Distract condition just discussed) raises important questions regarding the mode of dissonance reduction typically used in the "real world." Given the link between Discomfort and attitude change established in the present experiments, it is logical to deduce that POST AFF/ATT subjects had not changed their attitude at the time affect was assessed. It is only when subjects were explicitly provided with an attitude-change opportunity (those in the POST ATT/AFF condition) that they implemented this dissonance-reduction strategy. Therefore, our experiments, like the vast majority in the extensive dissonance corpus, are silent regarding the strategic methods typically used in the service of dissonance reduction (alternatives to attitude change include the addition of consonant cognitions, a diminishing of the importance of the cognitions involved in the dissonant relation, repression of the dissonant relation, passive forgetting, misattribution, self-affirmation, attitude bolstering, etc.; Abelson, 1959 ; Elkin & Leippe, 1988 ; Hardyck & Kardush, 1968 ; Sherman & Gorkin, 1980 ; Steele, 1988). On a positive note, our validation of a self-report measure of dissonance affect and our demonstration that the implementation of a dissonance-reduction strategy eliminates Discomfort provide dissonance researchers with the empirical tool and theoretical grounding necessary to explore this important issue.

General Discussion

Over the years, a great deal of empirical work has been devoted to attempting to document the motivational properties of cognitive dissonance. Initially instigated by challenges from without, most notably from Bem's (1967) self-perception theory, these empirical labors were subsequently spurred on by disagreements within the dissonance camp as to the role of arousal in the dissonance process and the precise nature of the dissonance state (Cooper et al., 1978 ; Higgins et al., 1979 ; Zanna & Cooper, 1974 ; Zanna et al., 1976). Although dissonance researchers have accumulated a compelling body of evidence indicating that there is an arousal component to dissonance and that this arousal serves an important function in the dissonance process (Cooper & Fazio, 1984 ; Elkin & Leippe, 1986 ; Losch & Cacioppo, 1990), their empirical labors have been less fruitful in clarifying the precise nature of the dissonance state. In addition, not a single study has directly demonstrated that dissonance is alleviated by the implementation of a reduction strategy; both empirical attempts to date have proved unsuccessful (Elkin & Leippe, 1986). It is our contention that progress in documenting the motivational properties of dissonance has been dramatically slowed (if not stalled) by a fixation on the arousal component of dissonance. Psychological discomfort, the component of the dissonance state explicitly identified by Festinger (1957) , has received a dearth of empirical attention. By focusing on psychological discomfort in the present experiments, we were able to obtain data that both clarify the nature of the dissonance experience and directly demonstrate the alleviation of dissonance on implementation of a reduction strategy.

Subjects who reported their affect immediately after freely consenting to compose a counterattitudinal essay reported greater levels of Discomfort than control group subjects, but the dissonance induction did not systematically (and independently) affect reports of positive affect (e.g., happy) or self-directed negative affect (e.g., guilty). Thus, the phenomenological experience of cognitive dissonance appears to be a distinct, aversive feeling, not an undifferentiated arousal state. Although research using misattribution paradigms and physiological indicators have provided suggestive empirical evidence as to the valence of dissonance, the indirect nature of the misattribution approach and the characteristic imprecision of physiological assessments has precluded a perspicuous analysis of the dissonance state. In contrast, the use of a self-report measure of affect in the present experiments afforded a precise delineation of the phenomenology of cognitive dissonance.

The elevated Discomfort displayed by dissonance-induction subjects was shown to dissipate on implementation of a dissonance-reduction strategy. These subjects reported elevated levels of dissonance affect subsequent to writing the counterattitudinal essay but prior to the provision of an attitude-change opportunity, whereas they showed baseline levels of Discomfort immediately on changing their attitude in the direction of the position advocated in the previously composed essay. Correlational analyses attested to the reciprocal nature of the Attitude Change—Discomfort relationship for dissonance-induction subjects. By demonstrating that attitude change is in the service of reducing the Discomfort generated by counterattitudinal behavior, we have obtained the first direct empirical evidence in support of Festinger's (1957) dissonance-reduction postulate. In addition, the data from the present experiments, when juxtaposed with results from the Elkin and Leippe (1986) studies, substantiate Cooper and Fazio's (1984) claim that "attitude change is motivated not so much by dissonance arousal as by the feeling of discomfort" (p. 257). Elkin and Leippe (1986) used a physiological assessment device to measure both dissonance arousal and its subsequent reduction following attitude change. Although the researchers were successful in demonstrating that dissonance induction produces elevated levels of arousal, they failed to show a reduction in this arousal following attitude change. In light of Cooper and Fazio's (1984) *New Look at dissonance*, the null results obtained in their reduction analyses are not surprising, as arousal only serves a distal and not a proximal function in dissonance-reduction processes. Attitude change, from a *New Look* perspective, is proximally motivated by psychological discomfort, a proposition supported by the present set of experiments.

We want to be clear that we are not advocating the wholesale abandonment of measures of physiological arousal in the exploration of cognitive dissonance. On the contrary, we concur with Cooper and Fazio (1984) that arousal is an important, indeed a necessary, component of the dissonance process. Rather, our aim is to encourage dissonance researchers to expand the conceptualization and assessment of dissonance to encompass psychological discomfort as well as physiological arousal. One potentially productive avenue of research would be to analyze the respective roles of arousal and discomfort in the dissonance-reduction process through the assessment of both components within the context of a single study. Had Elkin and Leippe (1986) used such a methodology, we suspect that they would have found dissonance-induction subjects reporting immediate psychological relief on attitude change but showing elevated physiological arousal as a result of the cognitive activity associated with attitude adjustment. Clearly, use of this multivariate approach would afford more intricate and formal testing of Cooper and Fazio's provocative reconceptualization of cognitive dissonance processes.

A self-report measure of dissonance affect was developed and used in the present set of studies for the specific purpose of empirically testing two motivationally relevant cognitive dissonance hypotheses within the induced-compliance paradigm. However, this assessment device may prove useful to the

broader dissonance literature as well by serving as a manipulation check for the evocation of dissonance affect. The absence of a manipulation check represents a major methodological shortcoming of the dissonance tradition, one that has generated much interpretational ambiguity and may even have led to the abandonment of some interesting research questions. Disconfirmatory results have proved difficult for dissonance researchers to interpret in the absence of a manipulation check, as such findings could indicate that dissonance was not evoked by the experimental procedures, that the experimental procedures failed to exert the predicted influence on the outcome measures of interest, that the experimental procedures evoked other processes that counteracted the impact of the dissonance induction, or that dissonance was reduced through the implementation of an alternative cognitive—behavioral strategy. Cialdini, Petty, and Cacioppo (1981) pointed to the selective exposure effect as one research question that was (temporarily) abandoned in the face of a mosaic of seemingly inconsistent results—results that proved difficult to interpret due, in part, to the failure of selective exposure researchers to employ a dissonance manipulation check (see also Frey, 1986). Despite the fact that physiological assessments of arousal would serve the function of a dissonance manipulation check quite nicely, it seems highly unlikely that dissonance researchers would invest the time and effort necessary to employ such measurement devices in their experiments. We nominate our self-report measure of dissonance affect as a more efficient, yet equally efficacious, alternative. Such a measure could serve the additional function of a dissonance-reduction manipulation check, attesting to the efficacy or inefficacy of a hypothesized reduction strategy.

In the present studies, we found, congruent with Festinger's predictions, that counterattitudinal behavior evoked psychological discomfort. It is doubtful, however, that discomfort would be the affective consequence of any and all forms of counterattitudinal behavior. Appraisal theorists of emotion (e.g., Frijda, 1988; Ortony, Clore, & Collins, 1988; Roseman, 1984; Scherer, 1982; Smith & Ellsworth, 1987) have empirically demonstrated that the distinct affect experienced by an individual in a given situation is closely related to that individual's cognitive appraisal of the situation along a variety of dimensions. In light of this research, it seems reasonable to posit that the qualitative nature of the affect experienced as a result of counterattitudinal behavior would not be uniform across all counterattitudinal behaviors, but would vary as a function of the way the counterattitudinal behavior was cognitively appraised along various dimensions.

Shortly after the publication of Festinger's classic monograph, Aronson (1968) modified dissonance theory by highlighting the role of the self: "If dissonance exists, then it is the result of cognitions inconsistent with the self-concept" (p. 23). The self may be implicated to varying degrees in the dissonance process, and we posit self-relevance as a critical dimension of appraisal that greatly influences the qualitative nature of the affect experienced as a result of counterattitudinal behavior. Writing a counterattitudinal essay on the topic of a potential tuition increase (an important, but not self-defining, issue) may generate psychological discomfort in university undergraduates, but it is likely that an animal rights activist who freely consented to compose an essay advocating the use of animals in scientific experimentation would experience a more specific affective consequence (e.g., guilt). Our recent work in the prejudice domain (Devine et al., 1991) has demonstrated that the violation of well-internalized, self-defining standards generates general negative affect (e.g., discomfort) and a more specific, self-directed aversiveness (e.g., guilt and self-criticism), whereas inconsistent responding to less internalized standards simply evokes general negative affectivity (see Higgins, 1987, for a review of conceptually similar research). Thus, it is likely that cognitive inconsistencies involving elements of high self-relevance (see Dickerson, Thibodeau, Aronson, & Miller, 1992) would generate specific negative

affect toward the self as well as a general negativity, whereas a dissonant relation composed of less significant cognitions would simply evoke general negativity. Whether these differential affective consequences would, in turn, have ramifications for the efficacy of various reduction strategies is an interesting question worthy of empirical consideration (see Elliot, 1993 , for a more extended discussion of this point). Investigation of the self-relevance variable would seem to be a fruitful avenue for future research, as emotion researchers themselves have been negligent in incorporating this variable into their theoretical conceptualizations (Tesser & Collins, 1988 ; Weiner, 1986).

A comprehensive understanding of cognitive dissonance theory will only be obtained when dissonance researchers painstakingly explore, reconceptualize, and eventually validate each segment of the dissonance process, from the initial presentation of the dissonance induction to the final alleviation of the dissonance state. Over 30 years of toiling has yielded 1,000+ publications that represent considerable progress toward that end, yet empirical lacunas remain. We believe that our empirical validation of the psychological aversiveness of the dissonance state and the subsequent alleviation of this state on attitude change begins to fill one such void. The segment of the dissonance process most obviously in need of further empirical attention is the temporal period between the onset of psychological discomfort and the implementation of a reduction strategy. Dissonance theorists have characterized this temporal period as a rich vein of gold waiting to be mined (Gerard, 1992 ; see also Kunda, 1990), yet few have ventured down the mineshaft (for exceptions, see Gerard, 1967 ; White & Gerard, 1983). Space considerations allow only an enumeration of a few of the myriad research questions ready to be mined: factors influencing the amount of effort expended in the service of dissonance reduction, determinants of the mode of dissonance reduction selected for implementation, the precise cognitive mechanisms used in the various modes of dissonance reduction, the (potentially) continued influence of dissonance arousal on the intensity of dissonance affect experienced, and the respective roles (or confluence) of dissonance affect and cognitive goal states in the proximal motivation of reduction processes. We suspect that the quantity and, perhaps, the qualitative nature of affect generated by the dissonant relation would need to be considered in the exploration of each of these research questions.

Conclusion

[Gerard \(1992\)](#) has described cognitive dissonance theory as "cognitive theory with an engine" (p. 324). In the present set of experiments we have provided direct empirical evidence that there is indeed an engine within the cognitive body of Festinger's influential conceptualization. As dissonance theory experiences something of a renewal in the 1990s (or, in Aronson's, 1992 , terms, as the repressed makes its return), we encourage researchers to "get under the hood" (to borrow a phrase from H. Ross Perot) and explore the inner workings of the affective and cognitive processes involved in the motivated-dissonance-induction-to-reduction sequence. Perhaps the empirical tool used in the present research will be of assistance to dissonance researchers as they embark on this endeavor.

References

- Abelson, R. (1959). Modes of resolution of belief dilemmas.(*Journal of Conflict Resolution*, 3, 342—352.)
- Aronson, E. (1968). Dissonance theory: Progress and problems.(In R. Abelson, E. Aronson, W. McGuire, T. Newcomb, M. Rosenberg, & P. Tannenbaum (Eds.), *Theories of cognitive consistency: A*

- sourcebook (pp. 5—27). Chicago: Rand McNally.)
- Aronson, E. (1992). The return of the repressed: Dissonance theory makes a comeback.(Psychological Inquiry, 3, 303—311.)
- Bem, D. (1967). An alternative interpretation of cognitive dissonance phenomenon.(Psychological Review, 74, 183—200.)
- Bem, D. (1972). Self-perception theory.(In L. Berkowitz (Ed.), Advances in experimental social psychology (Vol. 6, pp. 1—62). San Diego, CA: Academic Press.)
- Berkowitz, L. (1968). On the discomfort of cognitive inconsistency.(In R. Abelson, E. Aronson, W. McGuire, T. Newcomb, M. Rosenberg, & P. Tannenbaum (Eds.), Theories of cognitive consistency: A sourcebook (pp. 400—407). Chicago: Rand McNally.)
- Brehm, J. & Cohen, A. (1962). *Explorations in cognitive dissonance*. (New York: Wiley)
- Buck, R. (1970). *Relationships between dissonance-reducing behavior and tension measures following aggression*. (Unpublished doctoral dissertation, University of Pittsburgh)
- Cacioppo, J. & Tassinary, L. (1990). Inferring psychological significance from physiological signals.(American Psychologist, 45, 16—28.)
- Cialdini, R., Petty, R. & Cacioppo, J. (1981). Attitude and attitude change.(Annual Review of Psychology, 32, 357—404.)
- Comrey, A. (1973). *A first course in factor analysis*. (San Diego, CA: Academic Press)
- Cooper, J. & Fazio, R. (1984). A new look at dissonance theory.(In L. Berkowitz (Ed.), Advances in experimental social psychology (Vol. 17, pp. 229—266). San Diego, CA: Academic Press.)
- Cooper, J., Fazio, R. & Rhodewalt, F. (1978). Dissonance and humor: Evidence for the undifferentiated nature of dissonance arousal.(Journal of Personality and Social Psychology, 36, 280—285.)
- Croyle, R. & Cooper, J. (1983). Dissonance arousal: Physiological evidence.(Journal of Personality and Social Psychology, 45, 782—791.)
- Devine, P., Monteith, M., Zuwerink, J. & Elliot, A. (1991). Prejudice with and without compunction.(Journal of Personality and Social Psychology, 60, 817—830.)
- Dickerson, C., Thibodeau, R., Aronson, E. & Miller, D. (1992). Using cognitive dissonance to encourage water conservation.(Journal of Applied Social Psychology, 22, 841—852.)
- Elkin, R. & Leippe, M. (1986). Physiological arousal, dissonance, and attitude change: Evidence for a dissonance—arousal link and a "don't remind me" effect.(Journal of Personality and Social Psychology, 51, 55—65.)
- Elkin, R. & Leippe, M. (1988). *Dissonance reduction and accountability: Effects of assessment and self-presentational concerns on mode of inconsistency resolution*. (Unpublished manuscript, Adelphi University)
- Elliot, A. (1993). *Importance is important: Toward an integrative theoretical conceptualization of the effects of counterattitudinal behavior on initial attitudes*. (Unpublished manuscript, University of Wisconsin, Madison)
- Ericsson, K. & Simon, H. (1980). Verbal reports as data.(Psychological Review, 87, 215—251.)
- Fazio, R. & Cooper, J. (1983). Arousal in the dissonance process.(In J. Cacioppo & R. Petty (Eds.), Social psychophysiology: A sourcebook (pp. 122—152). New York: Guilford Press.)
- Festinger, L. (1957). *A theory of cognitive dissonance*. (Stanford, CA: Stanford University Press)
- Frey, D. (1986). Recent research on selective exposure to information.(In L. Berkowitz (Ed.), Advances in experimental social psychology (Vol. 19, pp. 41—80). San Diego, CA: Academic Press.)
- Frijda, N. (1988). The laws of emotion.(American Psychologist, 43, 349—358.)
- Gaes, G., Melberg, V. & Tedeschi, J. (1986). A study examining the arousal properties of the forced compliance situation.(Journal of Experimental Social Psychology, 22, 136—147.)

- Gerard, H. (1967). Choice difficulty, dissonance, and the decisions sequence.(*Journal of Personality*, 35, 91—108.)
- Gerard, H. (1992). Dissonance theory: A cognitive psychology with an engine.(*Psychological Inquiry*, 3, 323—327.)
- Gleason, J. & Katkin, E. (1974). *Physiological indices of dissonance arousal and reduction in a stressful situation*. (Unpublished manuscript, University of Missouri, Columbia)
- Goethals, G. & Cooper, J. (1975). When dissonance is reduced: The timing of self-justificatory attitude change.(*Journal of Personality and Social Psychology*, 32, 361—367.)
- Gorsuch, R. (1983). *Factor analysis* (2nd ed.).(Hillsdale, NJ: Erlbaum)
- Greenwald, A. & Ronis, D. (1978). Twenty years of cognitive dissonance: Case study of the evolution of a theory.(*Psychological Review*, 85, 53—57.)
- Hardyck, J. & Kardush, M. (1968). A modest modish model for dissonance reduction.(In R. Abelson, E. Aronson, W. McGuire, T. Newcomb, M. Rosenberg, & P. Tannenbaum (Eds.), *Theories of cognitive consistency: A sourcebook* (pp. 684—692). Chicago: Rand McNally.)
- Higgins, E. (1987). Self-discrepancy: A theory relating self and affect.(*Psychological Review*, 94, 319—340.)
- Higgins, E., Rhodewalt, F. & Zanna, M. (1979). Dissonance motivation: Its nature, persistence, and reinstatement.(*Journal of Experimental Social Psychology*, 15, 16—34.)
- Kidd, R. & Berkowitz, L. (1976). Effect of dissonance arousal on helpfulness.(*Journal of Personality and Social Psychology*, 33, 613—622.)
- Kiesler, C. & Pallak, M. (1976). Arousal properties of dissonance manipulations.(*Psychological Bulletin*, 83, 1014—1025.)
- Krosnick, J. (1988). Attitude change and attitude importance.(*Journal of Experimental Social Psychology*, 24, 240—255.)
- Kunda, Z. (1990). The case for motivated reasoning.(*Psychological Bulletin*, 108, 480—498.)
- Lazarus, R. (1991). Cognition and motivation in emotion.(*American Psychologist*, 46, 352—367.)
- Leonard, W. (1975). Constructing a dissonance index.(*Journal of Social Psychology*, 97, 145—146.)
- Lieberman, D. (1979). Behaviorism and the mind: A (limited) call for a return to introspection.(*American Psychologist*, 34, 319—333.)
- Losch, M. & Cacioppo, J. (1990). Cognitive dissonance may enhance sympathetic tonis, but attitudes are changed to reduce negative affect rather than arousal.(*Journal of Experimental Social Psychology*, 26, 289—304.)
- MacKay, C. (1980). The measurement of mood and psychophysiological activity using self-report techniques.(In I. Martin & P. Venables (Eds.), *Techniques in psychophysiology*. New York: Wiley.)
- McMillen, D. & Geiselman, J. (1974). Effect of cognitive dissonance on alpha-frequency activity: The search for dissonance.(*Personality and Social Psychology Bulletin*, 1, 150—151.)
- Monteith, M. (1993). Self-regulation of prejudiced responses: Implications for progress in prejudice reduction efforts.(*Journal of Personality and Social Psychology*, 65, 469—485.)
- Nisbett, R. & Ross, L. (1980). *Human inference: Strategies and shortcomings of social judgment*. (Englewood Cliffs, NJ: Prentice Hall)
- Nisbett, R. & Wilson, T. (1977). Telling more than we can know: Verbal reports on mental processes.(*Psychological Review*, 84, 231—259.)
- Ortony, A., Clore, G. & Collins, A. (1988). *The cognitive structure of emotions*. (Cambridge, England: Cambridge University Press)
- Osgood, C. & Tannenbaum, P. (1955). The principle of congruity in the prediction of attitude change.(*Journal of Experimental Social Psychology*, 62, 42—55.)

- Pallak, M. & Pittman, T. (1972). General motivational effects of dissonance arousal.(*Journal of Personality and Social Psychology*, 21, 349—358.)
- Pyszczynski, T. & Greenberg, J. (1987). Toward an integration of cognitive and motivational perspectives on social inference: A biased hypothesis-testing model.(In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 20, pp. 297—340). San Diego, CA: Academic Press.)
- Quanty, M. & Becker, L. (1974). *Physiological indices of dissonance arousal and reduction in a stressful situation*. (Unpublished manuscript, University of Missouri, Columbia)
- Quattrone, G. (1985). On the congruity between internal states and action.(*Psychological Bulletin*, 98, 3—40.)
- Rhine, R. & Severance, L. (1970). Ego-involvement, discrepancy, source credibility, and attitude change.(*Journal of Personality and Social Psychology*, 16, 175—190.)
- Rhodewalt, F. & Comer, R. (1979). Induced compliance attitude change: Once more with feeling.(*Journal of Experimental Social psychology*, 15, 35—47.)
- Roseman, I. (1984). Cognitive determinants of emotion: A structural theory.(In P. Shaver (Ed.), *Review of personality and social psychology* (pp. 11—36). Beverly Hills, CA: Sage.)
- Rosenthal, (1978). Combining the results of independent studies.(*Psychological Bulletin*, 85, 185—193.)
- Russell, D. & Jones, W. (1980). When superstition fails: Reactions to disconfirmation of paranormal beliefs.(*Personality and Social Psychology Bulletin*, 6, 83—88.)
- Schachter, S. & Singer, J. (1962). Cognitive, social, and physiological determinants of emotional state.(*Psychological Review*, 69, 379—399.)
- Scherer, K. (1982). Emotion as process: Function, origin, and regulation.(*Social Science Information*, 21, 555—570.)
- Shaffer, D. (1975). Some effects of consonant and dissonant attitudinal advocacy on initial attitudes salience and attitude change.(*Journal of Personality and Social Psychology*, 32, 160—168.)
- Sherman, J. & Gorkin, L. (1980). Attitude bolstering when behavior is inconsistent with central attitudes.(*Journal of Experimental Social Psychology*, 16, 388—403.)
- Singer, J. (1968). The bothersomeness of inconsistency.(In R. Abelson, E. Aronson, W. McGuire, T. Newcomb, M. Rosenberg, & P. Tannenbaum (Eds.), *Theories of cognitive consistency: A sourcebook* (pp. 393—399). Chicago: Rand McNally.)
- Smith, C. & Ellsworth, P. (1987). Patterns of appraisal and emotion related to taking an exam.(*Journal of Personality and Social Psychology*, 52, 475—488.)
- Smith, E. & Miller, F. (1978). Limits on perception of cognitive processes: A reply to Nisbett and Wilson.(*Psychological Review*, 85, 355—362.)
- Steele, C. (1988). The psychology of self-affirmation: Sustaining the integrity of the self.(In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 21, pp. 261—346). San Diego, CA: Academic Press.)
- Tabachnick, B. & Fidell, L. (1989). *Using multivariate statistics* (2nd ed.).(Cambridge, MA: Harper & Row)
- Tedeschi, J., Gaes, G. & Melburg, V. (1986). Pills and attitude change: Misattribution of arousal or excuses for negative actions? *Journal of General Psychology*, 113, 309—328.(Tesser A. Collins J. 1988 *Journal of Personality and Social Psychology*, 55, 695—709.)
- Waterman, C. (1969). The facilitating and interfering effects of cognitive dissonance on simple and complex paired associates learning tasks.(*Journal of Experimental Social Psychology*, 5, 31—42.)
- Weiner, B. (1986). Attribution, emotion, and action.(R. Sorrentino & E. Higgins (Eds.), *Handbook of motivation and cognition* (Vol. 1, pp. 281—312). New York: Guilford Press.)
- White, G. & Gerard, H. (1983). Post-decision re-evaluation of choice alternatives.(*Personality and Social*

Psychology Bulletin, 9, 365—369.)

Wicklund, R. & Brehm, J. (1976). *Perspectives on cognitive dissonance*. (Hillsdale, NJ: Erlbaum)

Wicklund, R., Cooper, J. & Linder, D. (1967). Effects of expected effort on attitude change prior to exposure. (*Journal of Experimental Social Psychology*, 3, 416—428.)

Wixon, D. & Laird, J. (1976). Awareness and attitude change in the forced compliance paradigm: The importance of when. (*Journal of Personality and Social Psychology*, 34, 376—384.)

Zanna, M. & Cooper, J. (1974). Dissonance and the pill: An attribution approach to studying the arousal properties of dissonance. (*Journal of Personality and Social Psychology*, 29, 703—709.)

Zanna, M. & Cooper, J. (1976). Dissonance and the attribution process. (In J. Harvey, W. Ickes, & R. Kidd (Eds.), *New directions in attribution research* (pp. 199—217). Hillsdale, NJ: Erlbaum.)

Zanna, M., Higgins, E. & Taves, P. (1976). Is dissonance phenomenologically aversive? *Journal of Experimental Social Psychology*, 12, 530—538.

1

These characteristics include a post hoc assessment of dissonance affect (e.g., asking subjects, after the provision of an attitude-change opportunity, to reflect on and report how they felt while writing the counterattitudinal essay [Shaffer, 1975 ; see also Gaes, Melberg, & Tedeschi, 1986 ; Rhodewalt & Comer, 1979 ; Tedeschi, Gaes, & Melberg, 1986 ; Wixon & Laird, 1976]), a confounded or unconventional dissonance manipulation (e.g., the coterminous manipulation of essay position and facial expression while writing the essay in the induced-compliance paradigm [Rhodewalt & Comer, 1979 ; see also Kidd & Berkowitz, 1976 ; Russell & Jones, 1980]), use of a conceptually or psychometrically inadequate indicator of dissonance (e.g., use of a dissonance index composed of the Anxiety, Hostility, and Depression subscales of the Multiple Affect Adjective Checklist [Russell & Jones, 1980 ; see also Kidd & Berkowitz, 1976 ; Leonard, 1975 ; Rhodewalt & Comer, 1979 ; Zanna et al., 1976]), procedural details that may have evoked other assessment-relevant processes (e.g., the placement of a time limit on the writing of the essay in an induced-compliance paradigm, which may have resulted in task interruption for some subjects and subsequent evocation of Zeigarnik-based tension [Rhodewalt & Comer, 1979 ; see also Kidd & Berkowitz, 1976 ; Shaffer, 1975]), and disconfirmatory results (Gaes et al., 1986 ; Tedeschi et al., 1986 ; Wixon & Laird, 1976).

2

A total of 57 subjects participated in the study, but 17 individuals—14 in the high-choice conditions (7 in each of the high-choice cells) and 3 in the low-choice condition—refused to generate counterattitudinal arguments. Noncompliant subjects were replaced to ensure a final sample size of 40, 10 subjects per condition.

3

All of the comparisons reported in the text were Fisher's LSD tests.

4

Deviations from 1 may also be indicative of regression to the mean, but this explanation clearly cannot account for systematic shifts in attitude as a function of experimental condition.

5

Pilot subjects ($n = 1,578$) rated the importance of the tuition increase issue on a 15-point (1 = not at all important; 15 = *very important*) scale. The mean importance rating was 12.0, compared with a mean importance rating of 10.48 for whether the drinking age in the state should be lowered from 21 to 19 years of age and 8.49 for whether all students should be required to live in dormitory housing during their first four semesters on campus.

6

A total of 104 subjects participated in the study, but 32 individuals, all in the high-choice conditions (16 in each of the high-choice cells), refused to generate counterattitudinal arguments. These subjects were replaced to ensure a final sample size of 72, 24 subjects per cell.

7

Caution should be heeded in interpreting the obtained factor structure due to the less than optimal case-to-variable ratio (Gorsuch, 1983). However, confidence in the factor analysis is bolstered by the high item-to-factor correlations (mean $r = .73$) and the fact that the factors obtained are highly similar to those obtained in conceptually related research on affective responses to experimental manipulations (e.g., Monteith, 1993; see Tabachnick & Fidell, 1989).

8

It is important to note that the correlations within the high-choice counterattitudinal essay conditions between Choice and the Discomfort and Attitude Change variables were not significant in either of the two experiments. In addition, none of the ANOVA results in either of the two experiments were affected by the use of Choice as a covariate, nor did any of the correlations within the high-choice counterattitudinal essay conditions change when the variance accounted for by Choice was controlled.

Table 1.

Measure	Experimental condition			
	PRE AFF/ ATT	POST ATT/ AFF	PROATT	Baseline
Attitude Change	2.90 _a	6.80 _b	1.40 _a	3.50 _b
Discomfort	3.23 _a	3.93 _a	3.93 _a	1.80 _b
Choice	9.70 _a	11.40 _b	11.70 _b	5.80 _b

Note. Within each dependent measure, means not sharing common subscripts are significantly different from each other ($p < .05$ at minimum, Fisher's LSD). Attitude Change values greater than 1 represent change in the direction of favoring the proposed tuition increase. Discomfort values had a possible range of 1 to 7, with 7 representing the highest level of dissonance affect. Choice values had a possible range of 1 to 15, with 15 representing the highest level of perceived choice.

Table 2
Mean Attitude Change, Discomfort, and Choice Ratings as a Function of Experimental Condition in Experiment 2

Measure	Experimental condition		
	POST AFF/ATT	POST ATT/AFF	Baseline
Attitude Change	5.29 _a	5.50 _a	2.95 _b
Discomfort	5.71 _a	2.61 _b	2.33 _b
Choice	10.78 _a	11.37 _a	6.17 _b

Note. Within each dependent measure, means not sharing common subscripts are significantly different from each other ($p < .05$ at minimum, Fisher's LSD). Attitude Change values greater than 3 represent change in the direction of favoring the proposed tuition increase. Discomfort values had a possible range of 1 to 7, with 7 representing the highest level of discomfort affect. Choice values had a possible range of 1 to 15, with 15 representing the highest level of perceived choice.

Figure 1. Conditions for Experiment 1. (PRE AFF/ATT = pre-essay affect/attitude; POST ATT/AFF = post-essay attitude/affect; PROATT = proattitudinal controls.)

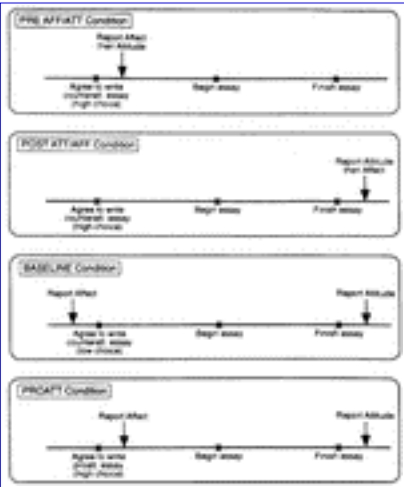


Figure 2. Conditions for Experiment 2. (POST AFF/ATT = post-essay affect/attitude; POST ATT/AFF = post-essay attitude/affect; counteratt. = counterattitudinal.)

