

## DISSONANCE AND THE PILL: AN ATTRIBUTION APPROACH TO STUDYING THE AROUSAL PROPERTIES OF DISSONANCE<sup>1</sup>

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A study was designed to test the notion that dissonance has arousal properties. In a  $2 \times 3$  design, experimental subjects were induced to write counterattitudinal essays under either high- or low-choice conditions. One third of the subjects were led to believe that a pill, which they had just taken in the context of a separate experiment, would lead them to feel tense. Another third were led to believe that the pill would cause them to feel relaxed. The final third expected the pill to have no side effects whatsoever. In this last condition, the results yielded the usual dissonance effect: High choice produced more attitude change in the direction of the essay than low choice. When subjects could attribute their arousal to the pill, this effect was virtually eliminated; when subjects felt they should have been relaxed by the pill, this effect was significantly enhanced. The implications of these results for Festinger's original statement that dissonance is a driveline state were discussed.

In most investigations on the effects of cognitive dissonance, one can generally find terms like dissonance arousal, dissonance reduction, and tensions due to dissonance. These follow directly from Festinger's (1957) original statement of dissonance theory which indicated that dissonance has driveline properties and is experienced as psychological discomfort or tension. Yet very few investigations have addressed themselves to the question of whether there actually is any arousal attached to the observed fact that inconsistency among cognitions often leads to efforts to reduce that inconsistency.

Perhaps spurred on by Bem's (1965) behavioristic explanation of dissonance results, Waterman and Katkin (1967) devised an ingenious paradigm to obtain some evidence for arousal. They argued that if dissonance is truly a driveline state, then it should have energizing effects similar to other drive states such as hunger. Therefore, they first aroused dissonance by inducing subjects to write counterattitudinal essays and then had

subjects learn either a simple or a complex assignment. Since Spence, Farber, and McFann (1956) had shown that high-drive states have an energizing effect upon dominant, well learned responses, Waterman and Katkin predicted enhanced learning of the simple task and diminished learning of the complex task by dissonance-aroused subjects. The results, however, provided only partial support for the hypotheses. Enhancement of simple learning was obtained, but there was no obtained interference with complex learning on the part of subjects who had gone through the dissonance procedure.

Subsequent experiments using this paradigm (Cottrell & Wack, 1967; Waterman, 1969) have tended to support the arousal notion—but not unequivocally. Moreover, as Pallak and Pittman (1972) have aptly pointed out, none of the earlier studies have obtained evidence that their dissonance-provoking procedures ever produced dissonance. That is, there is no evidence of dissonance-produced attitude change in any of those experiments. Of all of the research using this paradigm, only one of two recent experiments reported by Pallak and Pittman demonstrated both the attitude-change and learning-interference effects and then only in a complex learning situation.

In the present research, we would like to

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suggest a new approach to the study of arousal in dissonance. We take our lead from the work of Schachter and Singer (1962) who investigated the labeling of emotion. Those investigators reasoned that emotion was a combination of physiological arousal and cognitive labeling. They demonstrated that subjects who were aroused with epinephrine, but did not know the reason for that arousal, used external cues to label it as either anger or euphoria. Several years later, Ross, Rodin, and Zimbardo (1969) reasoned that subjects who were aroused by a given stimulus could reduce that arousal if they were able to attribute it to a different external cause. Specifically, they found that subjects who were frightened of electric shocks could reduce their fear and tolerate more shocks if they were able to attribute their naturally occurring arousal to the effects of a loud noise.

Finally, Storms and Nisbett (1970) suggested that subjects who were suffering from the arousal state of insomnia might find it easier to fall asleep if they were able to attribute their physiological arousal to some external agent—such as a pill. The investigators told a group of insomniacs that they were participating in a “drug and fantasy” experiment. They were instructed to take a pill prior to bedtime and were warned that the pill might cause them to feel tense, aroused, etc. Another group of insomniacs was told that the pill would have no side effects, while a third group believed that the pill would make them calm and relaxed. Storms and Nisbett reasoned that if insomniacs could attribute their arousal to the pill, they would find it easier to fall asleep, while subjects who believed they should experience relaxation might become more upset than ever when they found themselves as aroused as usual at bedtime. The results indicated that subjects given the “tension due to pill” label for their arousal actually fell asleep more quickly than control subjects who, in turn, fell asleep more quickly than subjects who believed they should be relaxed.

Now, if dissonance is arousing, it should be affected by the use of external labels in the same way as fear was for the Ross et al. (1969) subjects and insomnia was for Storms

and Nisbett's (1970) subjects. If we can allow subjects, who have been aroused by dissonance, to attribute their arousal to an external agent, they should show less of a need to change their attitudes as a means of reducing dissonance.

Suppose that an individual is aroused by choosing to write an essay contrary to his belief. Festinger's theory leads us to believe that he will be in an uncomfortable tension state and will look for some means to reduce that tension; for example, he can change his opinion so as to eliminate the inconsistency. But suppose this individual had just taken a pill which he knew would cause tension and arousal. Then, after writing his essay, he would have an adequate (albeit, false) explanation for his tension. Attributing his tension to the pill, he would not have a need to change his opinion. Consequently, we would expect less opinion change from subjects exposed to a high dissonance manipulation if they could attribute their arousal to a pill than subjects who had no pill to which to attribute their arousal. Similarly, we would expect subjects whose inconsistent essay writing led to arousal *despite* their taking a pill which they believed would relax them to show more of a need to alter their opinion (cf. Storms & Nisbett, 1970).

To test these hypotheses, we established a  $2 \times 3$  factorial design. Subjects wrote counter-attitudinal essays under either high- or low-choice conditions. One third of all subjects were led to believe that a pill which they had just taken in the context of a separate experiment would lead them to feel tense. Another third were led to believe that the pill would cause them to feel relaxed. The final third expected that their pill would have no side effects whatsoever. A control condition, in which subjects simply indicated their attitude toward the experimental issue, was also run. If dissonance is truly arousing, then we predicted (a) a standard dissonance effect (i.e., more attitude change under high- than low-choice conditions) when the pill had no side effects, (b) a diminished dissonance effect when the pill provided a “tense” label, and (c) an enhanced dissonance effect when a “relaxed” label was provided.

## METHOD

*Subjects*

Seventy-seven freshmen males at Princeton University participated in a study on memory. They were each promised \$1.50. Subjects were usually run in groups of 3 or 4. Seven subjects were not used in the analyses. Of these, 6 (comprising two groups) were omitted because at least 1 member of each group refused to take the drug. In addition, 1 subject indicated suspicion as a result of auditing a psychology course and having heard a description of a similar experiment.

*Procedure*

Subjects arrived at a common experimental room where the experimenter began by explaining the alleged purpose of the experiment.<sup>3</sup> She indicated that subjects were "asked to come here today to participate in an experiment on memory processes . . ." and that they would be given a drug in order to investigate its effects on short-term memory. After assuring subjects that "the drug is perfectly safe," the experimenter outlined the supposed design of the study by stating, "you will have two memory tasks to do: one prior to taking the drug, and the second one after its total absorption."

Subjects were then taken to separate experimental cubicles where they performed the first memory task. A straightforward free-recall task was employed. Twelve nonsense words were presented consecutively on a common screen. Immediately after the last presentation, the subjects were asked to recall (in writing) as many words as they could.

*Manipulation of drug side effect.* Next, the experimenter entered each cubicle and gave each subject in turn a capsule and a glass of water. The capsule, in fact, contained powdered milk. In order to manipulate the potential side effect of the drug, the experimenter, blind to condition, gave each subject one of three drug consent forms to sign. In the arousal condition, the form stated:

This M.C. 5771 capsule contains chemical elements that are more soluble than other parts of the compound. In this form of the drug these elements may produce a reaction of tenseness prior to the total absorption of the drug, 5 minutes after ingestion. This side effect will disappear within 30 minutes.

In the relaxation condition, the form was identical, except that "tenseness" was replaced with "relaxation." In the no-information condition the form merely stated that "the total absorption time of the drug is 30 minutes" and that "there are no side effects." Each group always contained at least one subject in each of the three drug side-effect conditions.

*Manipulation of dissonance.* After subjects had signed their consent forms and had ingested their

<sup>3</sup>The authors wish to thank Marie-Claire Kamin for her skillful assistance as the experimenter.

capsules, the experimenter explained that "we now have 30 minutes before the second memory task" and that she had "another study going on, not about memory, but about opinion research."

Dissonance was manipulated by varying the degree of decision freedom which subjects were given to write an attitude-discrepant essay (Linder, Cooper, & Jones, 1967). In the high-choice (or high-dissonance) condition, therefore, the experimenter continued:

"I will leave it entirely up to you to decide if you would like to participate in it, but I would be very grateful if you would . . ."

In the low-choice (or low-dissonance) condition, she simply stated:

"During this wait, I am going to ask you to do a small task for this opinion research experiment."

In both conditions the experimenter continued by indicating that

The issue of whether inflammatory speakers should be allowed to speak on a college campus often becomes a problem. . . . The Ivy League Administrators Association is trying to formulate a standard policy on whether or not, and in what circumstances, inflammatory speakers should be allowed to speak on campus. . . . Past experience has indicated that one of the best ways to understand what the relevant arguments are on both sides of any issue is to ask people to write essays favoring one side of the issue. Therefore, what we would like you to do is to write the strongest, the most forceful essay that you can taking the position that inflammatory speakers should be banned from college campuses.

In the high-choice condition, the experimenter then secured each subject's verbal consent, adding after compliance, "Remember, you are under no obligation." All of the subjects agreed to write the essay.

In the control condition, subjects were recruited in an identical way as the experimental subjects but were not exposed to the experimental procedures. Instead, control subjects merely indicated their opinions on the attitudinal dependent measure to be described below.

*Dependent measures.* Subjects were given 10 minutes to complete the essay after which the experimenter collected the dependent measures. Subjects were first asked to indicate how they felt "right now" on a 31-point scale with endpoints labeled calm (1) and tense (31). Next, presumably for the Ivy League Administrators Association, subjects described their present feeling "about the adoption of a ban against inflammatory speakers on campus" on a 31-point scale with endpoints labeled strongly opposed (1) and strongly in favor (31). This served as the major dependent measure. Finally, to assess the effectiveness of the decision-freedom manipulation, subjects indicated "how free [they] felt to decline to participate in this Ivy League Administrators research project" on a 31-point scale with

TABLE 1  
MEAN OF SUBJECTS' REPORTED TENSION

Decision freedom	Potential side effect of the drug		
	Arousal	None	Relaxation
High	19.60	17.90	9.90
Low	22.00	9.00	12.00

Note. Cell  $n = 10$ . The larger the mean, the more tense the response.

endpoints labeled not free at all (1) and extremely free (31).

After subjects completed these questions, they returned to the common experimental room and were debriefed with special emphasis placed on the fact that the ingested capsule was, in reality, a placebo.

## RESULTS

### Decision Freedom

Responses to the question designed to tap perceived freedom in writing the essay revealed that high-choice subjects reported more choice than low-choice subjects ( $\bar{X} = 24.23$  versus  $11.33$ , respectively;  $F = 43.05$ ,  $df = 1/54$ ,  $p < .001$ ). No other effects on the choice measure were significant. Apparently the decision-freedom manipulation was successful.

### Reported Tension

Subjects were also asked to indicate how tense or relaxed they felt immediately after having written their essays. The mean responses are presented in Table 1.

Analysis of variance indicated that only the main effect for the drug side effect ( $F = 10.32$ ,  $df = 2/54$ ,  $p < .001$ ) and the interaction ( $F = 4.08$ ,  $df = 2/54$ ,  $p < .05$ ) were significant. Subjects in the arousal condition reported being *more* tense than subjects in the no-information condition ( $\bar{X} = 20.80$  versus  $13.45$ , respectively;  $F = 10.63$ ,  $df = 1/54$ ,  $p < .01$ ), while subjects in the relaxation condition reported being *less* tense than subjects in the no-information condition ( $\bar{X} = 10.95$  versus  $13.45$ , respectively;  $F = 4.92$ ,  $df = 1/54$ ,  $p < .05$ ). While this main effect may indicate real differences, it seems as reasonable to conclude that it was a result of the demand characteristics of the situation.

More interesting is the interaction which

can best be described as follows: High-choice subjects reported more tension than low-choice subjects ( $t = 2.79$ ,  $p < .01$ ), but only in the no-information condition; in the arousal and relaxation conditions, high-choice subjects reported trivially less tension than low-choice subjects ( $t < 1$ , in both cases).

This interaction is evidence in favor of viewing dissonance as an arousing state. When information was provided about the alleged side effect of the drug, subjects' self-reports tended to parrot the information provided. But when no information was provided, subjects reported being considerably more tense when dissonance was high rather than low.

### Attitude toward the Speaker Ban

The mean attitudes toward banning speakers on campus are presented in Table 2. Before describing the results in the experimental conditions, it should be noted that the mean attitude reported by the control subjects indicated that the essays which experimental subjects were induced to write were clearly attitude discrepant.

A  $2 \times 3$  analysis of variance presented in Table 3 reveals that the predicted main effects and interaction were highly significant ( $p < .001$ , in each case). This overall analysis of variance, however, does not provide an exact test of the hypotheses. Comparison of individual conditions by the Newman-Keuls procedure indicated that the pattern of results conformed exactly to expectation. In the no-information condition, the standard dissonance effect was replicated: High-choice subjects agreed more with the position taken in

TABLE 2  
MEAN OF SUBJECTS' OPINIONS TOWARD BANNING SPEAKERS ON CAMPUS

Decision freedom	Potential side effect of the drug		
	Arousal	None	Relaxation
High	3.40 <sub>a</sub>	9.10 <sub>b</sub>	13.40 <sub>c</sub>
Low	3.50 <sub>a</sub>	4.50 <sub>a</sub>	4.70 <sub>a</sub>

Note. Cell  $n = 10$ . The larger the mean, the more agreement with the attitude-discrepant essay (Control group  $\bar{X} = 2.30$ ). Cells not sharing a common subscript differ at the .01 level by the Newman-Keuls procedure; cells showing a common subscript do not differ at the .05 level.

their counterattitudinal essays than did low-choice subjects. In the arousal condition, this dissonance effect was virtually eliminated; in the relaxation condition, the effect was magnified.

Intracell correlations between the degree of attitude change and the magnitude of reported tension were also informative. All conditions revealed a positive correlation between tension and attitudes. However, the correlations were not significant in the four conditions in which information was provided regarding the alleged side effect of the pill. As we suggested previously, at least one factor in subjects' reports of tension in these conditions was probably the demand characteristic of parroting back the information that was just given to them. In the no-side-effects-low-choice condition, the reported tension was, as expected, quite low and the correlation with attitude change did not reach significance. However, when dissonance was high and no demand characteristics were present (no-side-effects-high-choice condition), the correlation between the magnitude of tension and the degree of opinion change was highly reliable ( $r = .69$ ,  $p < .05$ ).

Finally, two independent raters were asked to rate each essay in order to assess the possibility that differences in essay performance mediated the final attitude scores. The judges were asked to rate the essays on a 7-point scale according to their degree of "convincingness." The interjudge reliability was quite high ( $r = .88$ ). No differences were found among conditions on the convincingness dimension nor were any differences revealed when the length of each essay was considered.

#### DISCUSSION

The results of the experiment provide support for the notion that dissonance does indeed have arousal properties as Festinger (1957) originally suggested. High-dissonance subjects who could attribute their arousal to a pill showed less of a tendency to change their attitudes, while subjects in the high-dissonance-relaxation condition showed an increased need to deal with their arousal by changing their opinions. Under the low-dissonance conditions, the various side effects made virtually no difference.

TABLE 3

SUMMARY OF THE ANALYSIS OF VARIANCE OF SUBJECTS' OPINIONS TOWARD BANNING SPEAKERS ON CAMPUS

Source	<i>df</i>	<i>MS</i>	<i>F</i>
Decision freedom (A)	1	290.40	40.73*
Side effect (B)	2	158.82	22.29*
A × B	2	96.95	13.60*
Error	54	7.13	

\*  $p < .001$ .

Since previous dissonance research had focused mainly on the attitudinal effects which the drive state was supposed to produce, the way was paved for the appearance of alternative models of attitude change which could predict identical attitudinal results. First, Bem (1965) proposed that the results of previous dissonance experiments could be understood in terms of the mand-tact (Skinner, 1957) quality of the stimulus situation. Kelley (1967) then presented an attributional analysis that incorporated Bem's interpretation within a more general model of information processing. Like Bem, he proposed that dissonance results could be accounted for without recourse to assumptions about arousal or drives within the person. Rather, he viewed attitude change within the dissonance paradigm as a special case of an individual observing his own behavior and logically attributing an attitude to himself.

Research critical of Bem's analysis (Jones, Linder, Kiesler, Zanna, & Brehm, 1968) suggested that the way in which the behavioristic reinterpretation of dissonance theory was stated could not account for all of the data predicted and obtained in dissonance experiments. Similarly, Cooper, Jones, and Tuller (1972) provided evidence which is at variance with Kelley's alternative based upon attribution theory. But because such criticisms do not provide data that bear on the internal process of dissonance arousal, they do not get at the heart of the argument.

However, the present results do combine with the earlier research using the Waterman and Katkin (1967) paradigm to provide support for the internal process of dissonance arousal. The results of the present investigation could only have been obtained if inconsistent cognitions produced at least the per-

ception of arousal. While Bem's and Kelley's models may be considered useful heuristic devices and while they may accurately reflect the processes employed by observer subjects, the present results suggest that involved subjects do indeed perceive themselves to be aroused when participating in a counter-attitudinal role-playing situation.

In our analysis of arousal in forced-compliance situations, we are not arguing against the veridicality of general attribution phenomena. To the contrary, attribution notions generated the present experiment. Following Storms and Nisbett (1970), for example, our arousal condition was intended to manipulate the perceived source of arousal; our relaxation condition, the perceived level of arousal. We have argued that subjects in the arousal condition mistakenly attributed their dissonance-produced arousal to a non-emotional, external agent (i.e., the pill) and, therefore, experienced less dissonance. Relaxation condition subjects, on the other hand, were assumed to make the mistaken attribution that they were more aroused than they really were and, therefore, to experience more dissonance.

We might speculate on a slightly different attributional process in accounting for the pattern of results. Just as insomniacs appear to "worry about their insomnia," individuals who have freely performed counterattitudinal behavior might be said to "worry about their dissonant cognitions." In this view, the tension pill essentially told the subject not to worry about his inconsistency. The pill which was supposed to produce relaxation, on the other hand, indicated that he should be more worried than usual about his inconsistency. To paraphrase Storms and Nisbett (1970), the subject may have said to himself: "The pill relaxes me  $X$  amount, and the discrepant behavior arouses me  $Y$  amount. If it weren't for the pill, the inconsistency would have bothered me  $X + Y$  amount." Therefore, the subject is more upset by his arousal in the relaxation condition than he would be in the no-information condition in which one only has to worry about  $Y$  amount of arousal.

Whether arousal is due to inconsistency per se or to worry about inconsistency, the

present analysis implies that the amount of arousal which a person must deal with is arrived at by a process of attribution. That is, it seems that once arousal (due to inconsistent behavior) exists, the person begins a series of attributional processes designed toward understanding and possibly eliminating the arousal.

When no external agent exists, the process is straightforward. The arousal is chalked up to the inconsistency between cognitions and is reduced by a change of cognitions. When a tension pill has been taken, the arousal is attributed to the pill and there is less of a need for action directed at the true cause of the arousal (i.e., the inconsistent cognitions). But in the case of relaxation, the subject must deduce the amount of arousal he has by adding the amount he actually experiences to the amount which the pill has supposedly reduced. He then continues his logical deduction toward deciding (perhaps at some unaware level) on the amount of attitude change that is necessary in the situation.

Another interpretation for the results in the relaxation condition deserves comment. Recently, Zanna, Lepper, and Abelson (1973) have demonstrated that focusing a subject's attention on dissonant cognitions apparently increases the dissonance, as indicated by a greater amount of dissonance reduction. In this present case, it is possible that the unexpected arousal in the relaxation condition had the effect of focusing subjects' attention on their cognitive dilemma more than usual. Such focused attention, then, may have increased dissonance and subsequent dissonance reduction.

The results of our study have undoubtedly provoked questions which can only be answered by future research. One question revolves about the awareness that subjects had regarding their arousal and the attributional processes that they undertook to handle that arousal. We have spoken as though subjects were deliberate, logical, and certainly conscious of their attempts to handle arousal. But this has been primarily a heuristic device; the study provides no direct evidence regarding the subjects' degree of

awareness. Indeed, Brock (1968) has discussed evidence which suggests that dissonance processes may take place beyond the subjects' awareness.

In addition, the term arousal needs further clarification. The present results require, at the very least, the perception on the part of the subjects that they were aroused. But were they actually aroused? Would physiological measurement find evidence of heightened autonomic responses? Moreover, if subjects were aroused, was the arousal of a "drivelike" nature, as Festinger suggested, or was it more of the nature of worry or anxiety? Now that we have evidence that dissonance does involve the activation of internal processes involving perceived arousal, future investigations can be directed toward resolving these cloudy but significant issues.

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