

## Science Education Collection

# Misattribution of Arousal and Cognitive Dissonance

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## Overview

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A host of research in psychology suggests that feelings of psychological arousal may be relatively ambiguous, and under certain circumstances, can lead us to make inaccurate conclusions about our own mental states. Much of this work flows from seminal research conducted by Stanley Schacter and Jerome Singer. If someone experiences arousal and does not have an obvious, appropriate explanation, they may attempt to explain their arousal in terms of other aspects of the situation or social context.

For example, in one classic study, participants were told they were receiving a drug called “Suproxin,” in an attempt to test their vision.<sup>1</sup> In reality, they received shots of epinephrine, which typically increases feelings of psychological arousal. While some participants were told that the drug would have side effects similar to epinephrine, others were not informed of the side effects, others were misinformed, and others received a placebo with no arousing side effects. Participants then interacted with a confederate, who was either behaving in a euphoric or an angry manner. The authors observed that participants who had no explanation for their feelings of arousal (e.g., the uninformed condition) were most susceptible to the confederates. In other words, these participants took on the confederates’ emotion (either euphoria or anger) most strongly.

A subsequent study generalized this effect to the domain of interpersonal attraction in a natural setting.<sup>2</sup> Researchers had male participants meet an attractive female experimenter by walking across either a high, narrow suspension bridge (high arousal), or a lower, more stable bridge (low arousal). After the participants completed a questionnaire in which they were asked to describe an ambiguous picture, the experimenter provided them with her phone number, which they were instructed to call if they had any further questions. Notably, the men who walked across the arousing suspension bridge provided descriptions with more sexual content, and they were more likely to call the experimenter after the study. The authors concluded that these men misattributed their psychological arousal arising from the bridge-crossing to the interaction with the female experimenter, and subsequently interpreted their arousal as a sign of attraction towards her.

Zanna and Cooper (1974)<sup>3</sup> applied these principles to the study of cognitive dissonance. They predicted that people who experience cognitive dissonance, but are able to attribute their psychological arousal towards some other, external influence, would be less likely to change their attitudes about a topic, compared to people who lack a source of external explanation. This work follows in the tradition of earlier research on cognitive dissonance by Leon Festinger in 1962, suggesting that dissonance itself is a psychologically arousing phenomenon, which can be experienced as discomfort or tension.<sup>4</sup>

## Principles

The investigation by Zanna and Cooper is based on several principles sitting at the core of social psychology. It draws upon the **two-factor theory of emotion**, as originally conceived by Schacter and Singer, which suggests that our emotions are a constructed product of the states of arousal we experience and the labels which we subsequently apply to that arousal. Within this framework, **misattribution of arousal** can occur, in cases where an individual incorrectly interprets their experience of arousal as stemming from some internal or external cause, as a result of some situational factor or factors.

In general, these ideas support a view that we typically lack direct access to our awareness of the mental processes underlying our perceptions and behavior (see Nisbett & Wilson, 1977),<sup>5</sup> and also highlight the **power of the situation** to influence our mental states.

Finally, Zanna and Cooper apply these principles to the study of **cognitive dissonance**, the idea that in cases where an individual holds two (or more) opposing beliefs or attitudes, they may feel psychological discomfort, and as a result, may be motivated to relieve that discomfort (perhaps through changing their attitudes).

## Procedure

### 1. Participant Recruitment

1. Conduct a power analysis and recruit a sufficient number of participants and obtain informed consent from the participants.

### 2. Data Collection

1. Meet the participant in a common room outside of the testing room to explain the (alleged) purpose of the experiment.

1. Describe to the participant that they've been "asked to come here today to participate in an experiment on memory processes " and that they will be given a drug in order to investigate its effects on short-term memory. Assure the participant that the drug is perfectly safe.
2. Explain that the participant will complete two memory tasks—one prior to taking the drug, and one after its "total absorption."
2. Take the participant into the testing room and explain that they will now perform the first memory task on the computer.
3. Start the task and leave the room. In this task, the participant should see 12 nonsense words on the computer screen, each displayed for a few seconds. After all 12 words have been displayed, the participant should be prompted to recall as many words as they can. Following this, the participant should be prompted to call the experimenter back into the running room.
4. Upon re-entering the room, instantiate the "drug side effect manipulation," giving the participant a pill capsule and a glass of water.
  1. The capsule is, in reality, a placebo—containing powdered milk.
5. To manipulate the potential side effect of the pill, blind to condition, give the participant one of three drug consent forms to sign.
  1. Randomize the order of the condition-to-participant assignment ahead of time.
  2. In the arousal condition, the drug consent form should state: "This M.C. S771 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 min after ingestion. This side effect will disappear within 30 min."
  3. In the relaxation condition, the drug consent form should be identical, except that "tenseness" should be replaced with "relaxation."
  4. In the no-information condition, the drug consent form should only state that "the total absorption time of the drug is 30 min" and that "there are no side effects."
6. Allow the participant to sign the consent form and ingest their pill capsule.
7. Explain that the study requires 30 min to pass before the second memory task, and that the lab has another study going on, not related to memory but about opinion research, that the participant is invited to participate in.
8. Initiate the "dissonance manipulation" (two conditions: "high choice" and "low choice"), by varying the degree of decision freedom the participant has to write an essay that diverges from their own attitudes.
  1. In the "high-choice" (e.g., high dissonance) condition, the experimenter should say, "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."
  2. In the "low-choice" (e.g., low dissonance) condition, the experimenter should simply say, "During this wait, I am going to ask you to do a small task for this opinion research experiment."
9. In both conditions, explain the task as follows: "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." (NOTE: Change the language depending on the university.)
  1. In the "high-choice" condition, go further and secure the participant's verbal consent, adding after compliance, "Remember, you are under no obligation." (In the original study, all of the subjects agreed to write the essay.)
10. Give the participant 10 min to complete their essay.
11. Subsequently, collect the dependent measures.
  1. First, ask the participant to indicate how they feel "right now" on a 31-point scale with endpoints labeled calm (1) and tense (31).
  2. Next, ask the participant to describe 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).
  3. Finally, to assess the effectiveness of the decision-freedom manipulation, ask participants to indicate "how free [they] felt to decline to participate in this Ivy League Administrators research project" on a 31-point scale with endpoints labeled not free at all (1) and extremely free (31).
12. As a means of obtaining some baseline regarding these dependent measures, a separate group of control subjects were recruited in an identical way as the experimental subjects but were not exposed to the experimental procedures (e.g., neither the "drug side-effect manipulation," nor the "dissonance manipulation"). Instead, these control subjects merely indicated their opinions on the measures described in points 7 through 9 above.
13. After the participant completes these questions, give them a full debriefing concerning the purpose and procedures of the study, with special emphasis placed on the fact that the ingested capsule was, in reality, a placebo.

### 3. Data Analysis

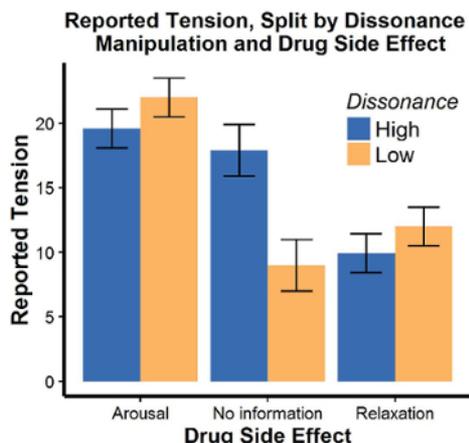
1. After running all participants, compare the amount of agreement with the proposal to adopt a ban against inflammatory speakers on campus as a function of both the degree of dissonance experienced and the side effects ascribed to the pill, via a 2 (dissonance: high choice vs. low choice) x 3 (side effects: arousal, none, relaxation) ANOVA.
2. Moreover, as a manipulation check, also compare participants self-reports of tension as a function of dissonance condition and side effects condition, via a 2 x 3 ANOVA.

## Results

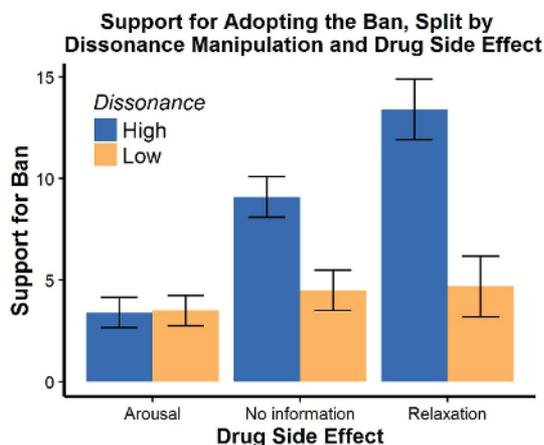
In the original investigation, the authors observed that participants' reports of tension were influenced by the side effects that the experimenters ascribed to the drug (**Figure 1**). Participants in the arousal condition felt *more* tense than participants in the no-information condition, while participants in the relaxation condition would make them feel relaxed felt *less* tense than participants in the no-information condition. Moreover,

within the no-information condition, participants in the high-choice condition reported feeling more tense than participants in the low-choice condition.

With regards to the attitude change results, the authors observed the classic dissonance result in the no-information condition: Participants in the high-choice condition showed larger changes in their attitudes than participants in the low-choice condition (Figure 2). However, in the arousal condition, there were no differences in attitude change between high- and low-choice. Conversely, in the relaxation condition, the effects of dissonance were exaggerated: Individuals in the high-choice condition showed even stronger evidence of attitude change, compared to low-choice participants.



**Figure 1: Reported tension as a function of dissonance manipulation and drug side effect.** Participants' reported feelings of tension are plotted on the y-axis, as a function of both the dissonance manipulation they were exposed to and description of the drug's side effects that they were given. Confirming the side effects manipulation, participants who were told the drug would make them feel aroused felt more tense than participants in the no-information condition, while participants who were told the drug would make them feel relaxed felt less tense than participants in the no-information condition. Moreover, within the no-information condition, participants in the high dissonance condition felt more tension than those in the low dissonance condition.



**Figure 2: Support for adopting the ban as a function of dissonance manipulation and drug side effect.** Participants' support for adopting a ban on inflammatory speakers is plotted on the y-axis, as a function of both the dissonance manipulation they were exposed to and description of the drug's side effects that they were given. The figure shows an interaction between the dissonance manipulation and the side effects ascribed to the drug. While participants who could attribute their arousal to the drug showed no support for the ban in either dissonance condition, participants in the no information condition showed stronger support for the ban in the high dissonance condition than in the low dissonance condition. Furthermore, when participants expected the drug to produce relaxation as a side effect, this effect of the high dissonance condition was even more pronounced.

## Applications and Summary

Based on these results, the authors concluded that dissonance is, indeed, a psychologically arousing, drive-like mental state. As such, offering participants an external cue to ascribe their arousal to (in this case, the drug, as it was described in the arousal condition) reduced feelings of dissonance, and as a result, diminished the degree to which participants changed their attitudes. While the procedure described above has been employed here specifically as a means for studying cognitive dissonance, it could be modified to serve as a general method for inducing feelings of arousal, and more specifically, for examining the misattribution of arousal.

The overarching implication of studies like the one conducted by Zanna and Cooper in 1974 is that we are profoundly influenced by aspects of "the situation." Why we may think that we know how we feel (and why we feel it) at any given moment, our mental states are a product of myriad

external and internal factors. If you want to avoid feeling nervous before a crucial job interview, maybe avoid the (potentially) arousing cup of coffee. Conversely, perhaps taking a first date to a scary movie will cause them to misinterpret their racing heart rate as a sign of attraction.

More specifically with regards to the science of persuasion, this research suggests that psychological discomfort is a necessary condition for an individual to change their minds with respect to a given belief. Moreover, for attitude change to occur, it may be crucial to ensure that the individual is not able to attribute this discomfort to some other environmental attribute.

## References

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