

Using Cognitive Dissonance to Encourage Water Conservation¹

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In a field experiment on water conservation, we aroused dissonance in patrons of the campus recreation facility by making them feel hypocritical about their showering habits. Using a 2 × 2 factorial design, we manipulated subjects' "mindfulness" that they had sometimes wasted water while showering, and then varied whether they made a "public commitment" urging other people to take shorter showers. The "hypocrisy" condition—in which subjects made the public commitment after being reminded of their past behavior—was expected to be dissonance-arousing, thereby motivating subjects to increase their efforts to conserve water. The results were consistent with this reasoning. Compared to controls, subjects in the hypocrisy condition took significantly shorter showers. Subjects who were merely reminded that they had wasted water, or who only made the public commitment, did not take shorter showers than control subjects. The findings have implications for using cognitive dissonance as means of changing behavior in applied settings, especially those in which people already support the desired goal, but their behavior is not consistent with those beliefs.

Policy makers frequently attempt to modify behavior in a community, often by instituting information-based persuasive campaigns. These appear in various forms including broadcast announcements, newspaper advertisements, signs, mailings, and flyers. In recent years, drought has prompted administrators at the University of California at Santa Cruz (UCSC) to launch a major campaign of just this sort. Campus newspapers contained advertisements from the Water Conservation Office; flyers were posted on public bulletin boards and appeared in mailboxes. Specifically, the UCSC program encouraged people to think of water as a valuable resource and to adopt conservation-oriented behaviors such as flushing toilets less often, stopping the flow whenever possible while brushing teeth or washing dishes, and taking shorter, more efficient showers.

The effectiveness of these types of persuasive messages and information campaigns is not certain. One experiment (Aronson & O'Leary, 1983) found

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that prominent signs asking people to take shorter showers produced mixed results. Indeed, if the message is too heavy-handed, it can even create a backlash. For example, although some subjects in the Aronson and O'Leary study reduced their water use, others showed their annoyance by sabotaging the signs and taking inordinately *long* showers. Moreover, even if people are initially persuaded by signs or flyers that conservation is worthwhile, there is controversy regarding the potency of such straightforward, and sometimes "coercive," appeals. They can produce attitude change, but the effects are frequently short-lived (Aronson, 1980).

Similarly, even when messages praising the value of water conservation are successful in changing people's attitudes, there is no guarantee that new attitudes will translate into new behaviors. Social psychologists have long been aware that the link between attitudes and behavior is problematic (e.g., Wicker, 1969). Thus, simply persuading people that conservation is beneficial might not result in reduced consumption. For example, Bickman (1972) interviewed 500 people about their attitudes concerning responsibility for removing litter. Although 94% of the subjects expressed favorable attitudes toward removing litter, only 2% actually picked up litter that had been intentionally left outside of the experimental setting by the experimenter.

We reasoned that a more effective means of promoting water conservation on campus might involve dissonance-generated self-persuasion, rather than informational or coercive appeals to save water. The motivating influence of cognitive dissonance has been shown to promote changes in attitudes as well as behavior (Aronson, 1969, 1980; Brehm & Wicklund, 1976; Freedman, 1965). Dissonance-related techniques have been utilized successfully in a number of applied situations: for example, to improve weight loss (Axson & Cooper, 1981), reduce snake phobia (Cooper, 1980; Cooper & Axson, 1982), and as a component of programs designed to promote energy conservation (e.g., Gonzales, Aronson, & Costanzo, 1988). Moreover, Pallak and his colleagues have demonstrated that dissonance-related interventions can produce enduring behavior change. Longitudinal studies have shown that a public commitment manipulation can cause people to reduce their energy consumption for six months or more (Pallak, Cook, & Sullivan, 1980; Pallak & Cummings, 1976; Pallak, Sullivan, & Cook, 1976).

As formulated by Festinger (1957), dissonance theory proposes that when a person holds two cognitions that are psychologically inconsistent, the person will experience cognitive dissonance, an unpleasant drive state akin to hunger or thirst. Once dissonance is aroused, an individual is motivated to reduce it, primarily through attitudinal or behavioral changes designed to reestablish consistency. Soon after Festinger's initial conceptualization, Aronson (1960, 1968) proposed that dissonance theory makes its clearest predictions when expectancies about the self are involved—that is, when people have done

something that violates their self-concepts. Most of us share certain general beliefs about ourselves: for example, that we are good, moral, competent individuals. Therefore, choosing to engage in a behavior that is at odds with these important beliefs about the self should produce dissonance.

Given the central role of the self-concept in dissonance arousal, Aronson (1980) has argued that dissonance-related persuasion is likely to be much more effective than straightforward persuasive appeals. In a typical persuasion situation, such as those involving informational campaigns, people change their opinions because they have been convinced by an external source to do so. An unfortunate feature of this type of attitude change is that it is often impermanent. For example, if I change my attitude because I hear a persuasive argument supporting one stance, I am likely to change it again if I hear a better argument supporting another position. There is very little of myself invested in the attitude.

In contrast, dissonance-generated persuasion is highly involving because it entails a challenge to a person's self-concept. Dissonance would occur, for example, if I believed I was a moral person, and then found myself in the uncomfortable position of having done something I considered immoral. To reduce this dissonance, I would need to rethink, or "justify," my actions in order to make them more consistent with my self-concept—typically through changes in relevant attitudes or behaviors. This subtle form of self-persuasion is powerful because the individual's self-concept is directly engaged in the process of attitudinal or behavioral change (Aronson, 1980).

Perhaps the most dramatic demonstration of dissonance-related persuasion is evidenced in the counter-attitudinal advocacy paradigm (e.g., Cohen, 1962; Festinger & Carlsmith, 1959; Nel, Helmreich, & Aronson, 1969). In this procedure, subjects are induced, under conditions of high choice or low incentive, to persuade others to believe something that they themselves do not believe. These subjects subsequently come to believe their own rhetoric; that is, they reduce dissonance by persuading *themselves* that their counter-attitudinal statements were, in fact, a reflection of their true beliefs.

The counter-attitudinal advocacy paradigm, by definition, requires that experimenters induce people to defend a position that they were initially against. This requirement posed a problem for our effort to harness the power of the technique to promote water conservation. Conservation is an example of an "apple-pie and motherhood" issue that everybody already believes in, even though not everyone practices. Recently, however, Aronson and his colleagues (see Aronson, in press) have developed a modified version of the procedure so that it can be used in pro-attitudinal situations. The new technique involves creating feelings of hypocrisy. This is accomplished by inducing subjects to encourage other people to perform certain worthwhile behaviors. Subjects are then reminded that, on occasion, their own behavior has

not been consistent with those goals. Essentially, subjects are confronted with the realization that they do not always practice what they preach. This realization is expected to generate dissonance because being a hypocrite would be inconsistent with most people's self-concepts as persons of integrity. As a result, subjects should be motivated to reduce dissonance by behaving in a manner more consistent with their espoused attitudes.

In an experiment on AIDS prevention, Aronson, Fried, and Stone (1991) explored the dissonance-arousing properties of this new procedure. Using a 2×2 factorial design, they induced feelings of hypocrisy regarding condom use. All subjects wrote pro-attitudinal speeches advocating condom use during all sexual encounters. Then, half the subjects simply rehearsed the arguments of the speech. The rest videotaped their prepared speeches, which they believed were going to be shown to high school students as part of an AIDS prevention program. Before taping their speeches, however, half the subjects were also reminded of the occasions when they had failed to use condoms in the past. Thus, all subjects believed that condom use was important, and all had composed a speech arguing that point. However, only those who both made a videotape and were reminded that they had engaged in unsafe sexual behavior were expected to feel hypocritical. These subjects were expected to reduce dissonance by strengthening their intentions to use condoms in the future. Aronson et al.'s (1991) results were consistent with this reasoning. Compared to subjects in the other conditions, those who received the hypocrisy manipulation expressed significantly greater intentions to increase their use of condoms, relative to their past behavior.

The results of this experiment are provocative in suggesting that a "hypocrisy" manipulation can arouse dissonance. Moreover, a follow-up experiment was conducted (Stone, Aronson, Crain, Winslow, & Fried, 1992), using a behavioral measure rather than self-reported behavioral intentions. Specifically, in each of the above conditions, subjects were subsequently given an opportunity to purchase condoms at a huge discount. Fully 83% of the subjects in the hypocrisy condition purchased condoms; this was a significantly greater percentage than in each of the other three conditions.

Did subjects, in fact, increase their condom use as a result of the hypocrisy manipulation? Obviously, it is impossible to know for sure. After all, one cannot follow people into the bedroom to observe their condom-using behavior. However, one *can* follow people into the shower-room—at least at public physical education facilities. The present experiment explores the utility of the hypocrisy-induction procedure in a field setting, using water conservation as the target behavior. In a conceptual replication of Aronson et al. (1991), public commitment endorsing water conservation was crossed with feedback intended to make subjects aware that they had wasted water in the past. After acknowledging that they supported conservation efforts, half the

subjects agreed to help persuade other people to conserve water. Additionally, half the subjects were reminded that they did not live up to their own standards, and had sometimes been wasteful. The condition in which subjects both committed publicly to encourage other people to conserve and were reminded that they had wasted water was designed to make subjects feel hypocritical. These subjects were expected to reduce dissonance by reducing their water use while showering.

Method

Overview of the Procedure

Female swimmers were recruited as they exited the pool area, on their way to the locker room. A female experimenter (Experimenter 1), posing as a member of a campus water conservation office, approached each potential subject and asked if she could spare a few moments to help with a water conservation project. Then, depending on the experimental condition, subjects either answered some questions, signed a flyer, or both. Subjects were thanked for their participation, and their interaction with the first experimenter was terminated. However, unbeknown to subjects, a second female experimenter (Experimenter 2) was waiting in the shower room where she unobtrusively timed the length of each subject's shower and noted whether subjects turned the water flow off while soaping up.

Experimental Design

Two factors were manipulated: subjects' "mindfulness" of their sometimes wasteful showering habits, and subjects' "commitment" to pro-conservation behaviors. This 2×2 factorial design yielded the following conditions: 1) mindful-plus-commitment (hypocrisy), 2) mindful-only, 3) commitment-only, and 4) unmindful/no commitment (no-treatment control). Our primary dependent variable was actual water use, as reflected in the length of subjects' showers. As a rougher measure of subjects' intentions to conserve water, we also noted whether subjects turned the shower off while applying soap, shampoo, or conditioner.

Subjects

Participants in the study were 80 female swimmers who used the showers after exercising in the campus pool. Females were selected for this study because we intended to gather data only in the women's locker room. We used swimmers because pretesting indicated that swimmers could most reliably be

expected to shower and shampoo before leaving the recreational facilities. Although the majority of swimmers used shampoo and/or soap when showering (to remove chlorine from their hair and skin), those few who simply rinsed off under the shower were excluded from the study in order to reduce extraneous within-group variance. This exclusion was minimal and did not occur with differential frequency in any of the treatment conditions.

Experimental Setting

The particular configuration of the shower room is crucial to the design of this field study. The swimming pool and women's locker room are part of the same complex, with direct access to the showers available from poolside. The shower room is a large open room, approximately 15' wide by 25' long, without separate shower stalls or curtains. There are 13 showerheads, spaced along the walls of the shower room, and there are usually a number of people showering at any given time during operating hours. Typically, at least two or three other women were using the shower room at the same time as the subject and Experimenter 2. Frequently, there were more than five other women in the shower. These circumstances made it very easy to collect the dependent measures without attracting attention or arousing suspicion. Furthermore, it ensured that Experimenter 2's presence was unlikely to have detectable influence on the subject's behavior.

Procedure

While en route from the pool to the shower room, subjects were approached individually by Experimenter 1, who introduced herself as a representative of the campus water conservation office. After asking the subject if she had a few moments to spare, Experimenter 1 asked the subject whether she was on her way to the shower, and whether she was in favor of water conservation. If subjects answered "yes" to these questions, Experimenter 1 consulted a randomization chart and then introduced the experimental manipulations.

In the mindful-only treatment, she asked subjects to respond verbally to a "survey" consisting of a brief set of questions, such as: 1) When showering, do you ALWAYS turn off the water while soaping up or shampooing? 2) When you take showers, do you ALWAYS make them as short as possible, or do you sometimes linger longer than necessary? 3) In your view, about how long does it take an average person to shower and shampoo, without wasting any water? 4) About how long is your average shower at the Field House? These questions were designed to remind subjects that they had sometimes wasted water while showering.

In the commitment-only treatment, the subject was simply asked to help out

with campus conservation efforts by printing her name with a thick black marking pen on a flyer that read: "Please conserve water. Take shorter showers. Turn showers off while soaping up. IF I CAN DO IT, SO CAN YOU!" Experimenter 1 explained that the flyer would be attached to posters that were being created for distribution around campus, and that they were intended to encourage other members of the campus community to conserve water. While making this request, Experimenter 1 drew subjects' attention to the large, colorful "sample" poster on display nearby, and mentioned that another poster was already in place outside of the women's locker room.

In the hypocrisy condition (mindful-plus-commitment), subjects first responded to the brief "mindfulness" survey, then signed the "commitment" flyer as outlined above.

The fourth condition served as a no-treatment control. In essence, the behavior of the subjects in this condition reflects a baseline response to the interventions instituted by the university in an effort to save water. Due to persisting drought conditions in California, UCSC had been quite actively promoting water conservation. Advertisements in the campus newspapers and flyers posted on public bulletin boards urged members of the campus community to reduce their water use. Most pertinent to this study, the university had posted a very large sign inside the actual shower room. The sign read: "Take Shorter Showers. Turn the Water Off While Soaping Up."

Experimenters

Both experimenters were female students. The actions of the two experimenters were carefully coordinated. Experimenter 1 stood near a large doorway leading from the pool deck into the athletic facilities complex. From this vantage point, she was able to intercept all female swimmers who were leaving the pool to enter the locker room. Experimenter 2 sat sunbathing by the pool, near the back door to the woman's locker room. This was approximately 30 feet from Experimenter 1's position. As Experimenter 1 began her interaction with the subject, Experimenter 2 watched, and made sure she could identify the subject later to collect the dependent measures.

As Experimenter 1 approached a potential subject, she asked the subject if she was on her way to the showers, and next, whether she could spare a few moments to participate in a water conservation project. If the subject answered yes to both, Experimenter 1 casually scratched her own knee before continuing the interaction. The knee scratch was a signal to Experimenter 2, who quickly entered the back door of the locker room, and began showering while waiting for the subject. This process enabled Experimenter 2 to remain unaware regarding which manipulation Experimenter 1 had delivered to the subject.

Experimenter 2 was already in the shower room, showering, when the subject entered. Several precautions were taken to guarantee that Experimenter 2 would not influence the subject's behavior. First, as noted above, the setting was a large shower room, and there were frequently a number of women showering. This reduced the possibility that Experimenter 2's presence had any noticeable effect on subjects. Additionally, since Experimenter 2 was often in the shower room for 10 to 15 minutes, she always brought shampoo, conditioner, a shaving razor, and a comb into the shower. These were used as necessary to make her showering appear as natural as possible. Finally, Experimenter 2 always left the water running during her shower. This was to avoid any possibility of influencing subjects to turn their own faucet on and off.

Dependent Measures

Experimenter 2 wore a waterproof sports watch with stopwatch capacity, which she unobtrusively activated as soon as the subject turned on the shower. She also noted whether the subject turned off the shower while applying soap or shampoo. To assess water use accurately, the watch was stopped when the subject turned off the shower and was reactivated if the subject turned it back on to continue her shower.

Results

Manipulation Checks

All subjects answered "yes" to the first question in the survey "Are you in favor of water conservation?"—thus indicating that their attitudes on this issue were positive. In the two conditions in which mindfulness was manipulated, subjects' answers to the brief set of questions confirmed that they were aware of their sometimes wasteful showering habits. That is, all subjects replied that: a) they did not always take the shortest possible showers; b) they sometimes lingered longer than necessary in the shower; and c) they did not always turn the shower off while soaping up or shampooing.

Shower Times

A two-way ANOVA was performed on subjects' shower times, measured in seconds (see Table 1). No main effects for commitment or mindfulness were obtained, nor was the interaction of the two factors statistically significant, model $F(1,76) = 1.48, p < .26$. However, a planned comparison of mean shower times revealed a significant difference between the hypocrisy group

Table 1

Mean Shower Times (in seconds)

Condition	Mean	SD
Mindful-only	248.3	146.07
Commitment-only	247.7	104.05
Mindful/committed (hypocrisy)	220.5	100.62
Unmindful/uncommitted (control)	301.8	142.32

($M = 220.5$ sec) and the control group ($M = 301.8$ sec), $F(1,39) = 4.23, p < .05$. Means for the commitment-only ($M = 247.7$) and mindfulness-only ($M = 248.3$) groups did not differ from each other, nor did either differ from the control or hypocrisy groups.

Turning Off the Shower

We also compared how often subjects in each condition turned off the shower while shampooing or soaping up. An overall chi square analysis yielded a marginally significant difference among all four groups on this dichotomous measure ($\chi^2 = 7.742, df = 3, p < .052$) (see Table 2). Next, a comparison of the hypocrisy and control groups revealed a significant difference in the expected direction, with hypocrisy subjects turning off the shower more often than control subjects ($\chi^2 = 4.912, df = 1, p < .027$).

The frequencies in the hypocrisy condition did not, however, differ from those in the mindful-only and commitment-only conditions. Indeed, the data from these three conditions were identical, with 14 out of 20 subjects in each group turning off the shower, compared to only 7 out of 20 in the control group ($\chi^2 = 7.742, df = 1, p < .005$).

Table 2

Frequency of Turning Off the Shower

Condition	Yes	No
Mindful-only	14	6
Commitment-only	14	6
Mindful/committed (hypocrisy)	14	6
Unmindful/uncommitted (control)	7	13

Discussion

The data from this experiment are consistent with our reasoning that higher levels of dissonance would be aroused for subjects in the hypocrisy condition, leading them to make greater efforts to conserve water than subjects in other conditions. Specifically, it was only subjects in this condition who took significantly shorter showers than subjects in the control condition. Unexpectedly, however, shower times for hypocrisy subjects were not significantly shorter than times for subjects in either the mindful or commitment conditions, both of which fell midway between times for hypocrisy subjects and controls. In addition, subjects in the mindful and commitment conditions were just as likely as those in the hypocrisy condition to turn the water off while showering. In all three conditions, this behavior occurred significantly more often than in the no-treatment condition.

Overall, this pattern of data suggests the possibility that subjects in all three groups were motivated to conserve water, although this effect was strongest for those in the hypocrisy condition. That is, rather than experiencing *no* dissonance, subjects in the mindful and commitment conditions might have experienced some feelings of hypocrisy, albeit of a milder sort than their counterparts in the hypocrisy group. Subjects in the former conditions were exposed to manipulations that could potentially arouse some feelings of hypocrisy. For example, in the commitment condition subjects signed a flyer that stated: "Take shorter showers . . . If I can do it, so can you!" For subjects who had wasted water in the past, this statement might have been experienced as somewhat hypocritical, even without the mindfulness manipulation to heighten its effect. Similarly, subjects in the mindful condition first affirmed their pro-conservation attitudes in the presence of the experimenter (recall that everyone answered "yes" to the initial question: "Are you in favor of water conservation?") and then were made aware of the discrepancy between their attitudes and behavior—that is, the fact that they did not always take the shortest possible showers. This awareness could have aroused mild feelings of hypocrisy, or dissonance, for these subjects.

Why did subjects in these two conditions reduce dissonance by turning the water off, yet did not take shorter showers than controls? One possible reason is that turning the shower off is a fairly vivid and unambiguous way for subjects to demonstrate their commitment to conserve water. As such, it provides a natural "first step" for subjects who are motivated to conserve water, thus affording the clearest and most available route to dissonance reduction. Unlike hypocrisy subjects, however, subjects in the mindful and commitment groups did not take the additional step of significantly reducing the duration of their showers, relative to controls. This finding is consistent with our interpretation that hypocrisy subjects were experiencing the highest

levels of dissonance and, as a result, were more motivated to act in accordance with their principles: both by turning off the shower *and* actually using less water. Finally, it should be noted that our primary dependent variable, length of shower, is a true measure of water conservation—unlike turning off the water, which is simply one method of potentially achieving that goal.

Could the effects found in the present experiment be due to some cause other than dissonance arousal? For example, could subjects have taken steps to conserve water simply because their pro-conservation attitudes were made salient by the experimental manipulations? Although our manipulations may have partly served to “prime” subjects’ attitudes, we think it is unlikely that the shower-time results are due to the mere effects of attitude accessibility or salience. To begin with, subjects in all three experimental conditions were, in one way or another, reminded of their favorable attitudes toward water conservation prior to taking a shower. Yet, only subjects in the hypocrisy condition showed a significant reduction in their actual water use. In addition, data from the condom experiments discussed earlier (Aronson et al., 1991; Stone et al., 1992) do not support a “priming” interpretation of the present findings. The results of these studies, which employed similar manipulations and were conducted under more controlled laboratory conditions, reflected significantly greater dissonance arousal among hypocrisy subjects compared to all other experimental conditions.

Still, it could be argued that in the present study hypocrisy subjects might have experienced a more potent priming effect, given their exposure to both the mindful and commitment manipulations. While this alternative explanation cannot be ruled out, a close look at the details of the procedure makes this interpretation seem less plausible. Specifically, subjects in the hypocrisy condition were treated identically to those in the mindful condition except that the former also signed a leaflet advocating others to conserve water. This leaflet contained no new information above and beyond that already presented in the mindful condition; it simply restated methods of conserving water in the showers. (Indeed, this information is also posted conspicuously in the shower room itself and in other prominent locations within the adjacent locker room.) Thus, it seems doubtful that in the hypocrisy condition this redundant information—presented briefly and only seconds after the more extensive mindfulness manipulation—could have contributed appreciably to any “priming effect” produced by either of the manipulations alone. Rather, we would argue that the impact of signing the leaflet was that it made hypocrisy subjects uncomfortably aware of having preached something they did not always practice, thereby accounting for their greater motivation to conserve water. Future research is necessary, however, to determine conclusively whether these findings are best explained by dissonance arousal or are the effect of increased accessibility of attitudes via priming. In particular,

laboratory studies based on the “misattribution of arousal” paradigm in dissonance research (e.g., Zanna & Cooper, 1974) would shed needed light on this issue.

Although a “priming” interpretation cannot be entirely ruled out, taken together with the findings of Aronson et al. (1991) and Stone et al. (1992) our results suggest that feelings of hypocrisy can be dissonance-arousing, thereby motivating people to bring their behavior into closer alignment with their espoused ideals. In addition, in recent years it has been proposed that individuals must produce “foreseeable aversive consequences” in order to experience dissonance (Cooper & Fazio, 1984; see also Thibodeau & Aronson, in press). Our findings cast doubt on this new formulation of dissonance theory. Any consequences resulting from complying with the experimenter’s requests could only serve to promote water conservation—by encouraging other people to save water, and by helping the “Water Conservation Office” with a survey. Far from being an aversive consequence, saving water was something that all subjects in the present study already supported.

Finally, in the present experiment subjects experienced dissonance in a pro-attitudinal advocacy paradigm. This represents a new twist on the counter-attitudinal advocacy manipulation traditionally employed in dissonance research and opens up new opportunities for applying the theory in real-world settings. In particular, interventions along the lines of our hypocrisy manipulation may prove successful in motivating people to act in accordance with their already favorable attitudes toward a given issue, such as water conservation, condom use, recycling, etc. Clearly, using dissonance arousal as a strategy for changing behavior is somewhat more involved than simply hanging signs or posting flyers. As noted earlier, however, research suggests that changes in attitudes and behavior generated by cognitive dissonance tend to be more permanent and may also transfer to new situations, as compared to changes produced by other means of persuasion (Aronson, 1980). In the long run, then, dissonance-related persuasion may prove to be a cost-effective method for policy makers to employ in a variety of settings, especially those in which the goal is to produce higher levels of consistency between attitudes and beliefs.

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