Changing Intentions to Use Toxic Household Products through Guided Group Discussion

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Abstract

Group discussion has effectively changed attitudes and behaviors even when individual-targeted messages have been unsuccessful. We propose that discussion is effective because it allows individuals to hear other people endorse the communicator's message. Students (n = 300) heard the same message about replacing toxic products with nontoxic alternatives; classes were randomly assigned to hear the message delivered as a lecture or via guided group discussion. Analyses indicated that discussion was more effective than lecture, particularly for students who chose their own products. Additional analyses indicated these effects were mediated by students' perceptions that other students endorsed nontoxics; the presentation style main effect was partially mediated, and the interaction with product choice was fully mediated. Cognitive elaboration did not operate as a mediator, but was related to final attitudes, consistent with views that positive elaboration leads to attitude change. Results support the importance of hearing others' opinions, and underscore the limited value of individually-oriented persuasive messages about socially motivated behaviors.

Introduction

This research addresses attitude and behavior change about use and disposal of toxic home cleaning and landscaping products. Although little studied by psychologists, these behaviors are of concern because overuse and improper disposal contribute to air and water pollution. Health Departments encourage people to use safe and effective nontoxic alternatives instead of toxic home and yard chemicals.

Using Lewin's (1952) discussion strategy, Werner (2003; Werner & Adams, 2001) taught homeowners to protect the environment by reducing use of toxic household products. Werner reasoned that people use chemical products to achieve socially endorsed images of homes and yards. If chemical use is socially motivated, people should be more likely to switch to nontoxics if their social group endorses nontoxics and discourages use of toxic products. In Werner's research, people who attended a guided discussion were more favorable towards nontoxics, compared to people who missed the meeting.

More importantly, people who missed the meeting underestimated their friends' enthusiasm for nontoxics. They underestimated their friends' concerns about toxic products, their willingness to shift to nontoxics, their willingness to share leftover toxics with friends instead of discarding them, and the group's willingness to organize sharing of toxic leftovers instead of discarding them. This supports the idea that using chemical products is socially motivated and can be changed most readily via social processes.

The present project used a true experiment to evaluate the idea that hearing friends' endorsements is key to individual attitude and behavior change. We compared the same message delivered as a lecture versus a guided discussion, and measured the extent to which audience members perceived others agreed with the message. In a lecture, a communicator delivers information to the audience. In guided discussion, the leader introduces the topic and guides the group towards positive statements about nontoxic alternatives. Group members who endorse nontoxics are encouraged to speak, problems or counterarguments raised by the audience are addressed by group members, and pro-chemical statements are treated with respect but given little weight (e.g., "that is a legal product, but it has side effects, so try a nontoxic first"). The message is essentially the same, but discussion involves participants expressing interest, endorsing the material, and so on, whereas lecture does not. We propose that discussion is more persuasive than lecture, and that this effect is mediated by participants' perceptions that the group agrees with the communicator.

Baron and Kenny (1986) distinguished between mediators and moderators. Mediators explain "why" a treatment leads to an outcome, viz, what psychological processes are activated by the treatment. In addition to the proposed mediator of "perceived group endorsement," we propose that attitude change is mediated by students' cognitive elaborations about the message (Petty & Cacioppo, 1986). In numerous studies, Petty and Cacioppo and their colleagues have shown that reactions to a message are mediated by what people think about as they listen to it. Positive thoughts, or positive elaboration, are associated with more agreement with the message, whereas negative reactions, or negative elaboration, are associated with no attitude change and disagreement with the message (hence the name, ELM or Elaboration Likelihood Model).

Moderators indicate "who" is most and least affected by a treatment, yielding treatment by moderator interactions. In the present case, we propose that reactions to our message will be moderated by whether it is relevant to the students. That is, our message will be most relevant to students who choose or buy their own toxic products. Furthermore, this moderator will make students particularly vulnerable to the mediators. Assuming they use these products to impress their friends, students who choose their own items should be particularly sensitive to what their friends think about using nontoxics. Thus,

the presentation style by relevance interaction should be mediated by perceptions the group endorses nontoxics.

The other mediator, cognitive elaboration, should play a similar role. According to ELM theory and research, message relevance activates elaboration (Petty & Cacioppo, 1979). Students who choose or purchase products should process the information more deeply and elaborate on it more thoroughly. In contrast, students who have not begun making purchasing choices should have less interest in the information, and elaborate less. Thus, we expect presentation style effects on attitudes to be strongest for students for whom the information is relevant, and we expect perceived group endorsement and cognitive elaboration to mediate these effects.

For this project, we adapted the message used in Werner's (2003) presentations to a teen-age audience. We included issues of interest to students, such as products that impart pleasant odors (including safer alternatives to air fresheners for automobiles, and alternatives to laundry products that make clothing smell fresh), those that eliminate unpleasant odors (such as baking soda to deodorize shoes), and products that solve cleaning problems teens might encounter (such as removing lipstick from a mirror or wall). To bring more serious issues to students' attention, we covered dangerous household products included in the adult version (such as lye-based drain cleaners and outdoor pesticides).

Method

Message. Identical information was delivered in two ways, either lecture or guided discussion. The topic was substituting nontoxic for toxic household products.

Participants. Design and Analyses. Participants were 300 high school students who participated during a regular class period. Courses were relevant to the topic of substituting nontoxic for toxic products (e.g., child development; health; foods and nutrition). Seven classes heard the lecture and 15 classes participated in discussion; treatment was randomly determined. One-third in each condition was male. Regression analyses were used to test hypotheses regarding presentation style, moderation by relevance, and the mediation of these effects by perceptions of the group's endorsement and by cognitive elaboration. There were nine teachers for the 22 classes, and teacher was included as a variable because teachers can create an atmosphere which supports or discourages interest in our message. A series of dummy contrasts tested for teacher effects as part of the regression analyses (each vector combined all of a teacher's students and contrasted that teacher against all of the others, until n-1 teachers had been tested, cf. Sampson, Raudenbush, & Earls, 1997).

Questionnaires. Baseline questionnaires measured how relevant the topic would be (students' control over purchasing toxic vs. nontoxic products), and an initial attitude toward using nontoxics, which the presenter defined as "things like vinegar and baking soda that people can use instead of chemical products". After administering the baseline questionnaires, the presenter lectured or led the discussion, and then students completed follow-up questionnaires. Responses were made on 7-point scales, half worded positively and half negatively to avoid response biases. Manipulation checks asked how much the group participated, and how likeable the presenter was. Attitudinal items were factor analyzed, yielding a 6-item "attitude towards nontoxics" scale (effectiveness of nontoxics, importance of using nontoxics, likelihood of using a nontoxic, etc.; alpha = .76) and a 5-item "perceived group endorsement" scale (comparable items measuring respondents' estimates of classmates' opinions; alpha = .77). These items were unit weighted and summed to form scales. Mediator scores were centered for analyses.

An open-ended question measuring cognitive elaboration (Petty & Cacioppo, 1986) asked, "what were you thinking about during the presentation?" These answers were coded as positive elaboration (e.g., "This is great"; "I can't wait to tell my mom"), repeating the message (e.g., "vinegar is better than ammonia") and negative elaboration (e.g., "This is dumb"; "There is no way I am making my own cleaning products"). These answers were combined into a single index (positive + repeating – negative), which was centered for analyses. Interrater agreement on the index was r (272) = .84.

Procedure. Teachers at several high schools invited us to provide a presentation appropriate for their course topic. One presenter was the second author, and the other was a former school teacher who gives the community presentations (Werner, 2003; Werner & Adams, 2001). Both women memorized and delivered a prepared script that included props and demonstrations of nontoxic products. In the lecture condition, the presenter asked the students to hold questions until the end, and delivered the information in a lively and entertaining way. In the discussion condition, the same script and positive tone were used, but instead of delivering the information, the presenter led a discussion. She encouraged students to participate in several ways (asking questions, encouraging and waiting for answers, encouraging students to listen to one another, and asking if students had questions). In private and before the class began, the presenter asked the teacher to suggest the names of students who were popular with peers and who represented different social cliques at the high school. These students were asked to do the four nontoxic demonstrations. We used students from different cliques to be inclusive, but also because of Harkness and Petty's (1987) research showing that multiple sources of persuasive information are more effective than a single source. That is, four students from the same social group

would not be as effective as four students representing different groups (cf. Hass, 1981).

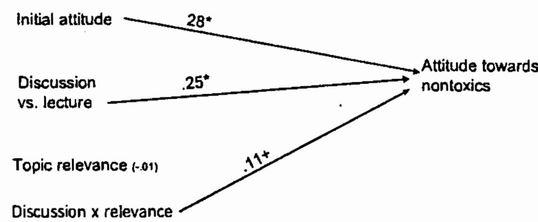
Results

Manipulation checks. As expected, students in the discussion reported more class participation (lecture M = 3.7, discussion M = 4.5), F(1, 282) = 10.27, p < .002, MSE = 1.41, partial $\eta^2 = .04$. However, the groups did not differ in ratings of the presenter (lecture M = 5.1, discussion M = 5.6), F(1, 281) = 2.46, p = .12, MSE = 2.25, partial $\eta^2 = .01$, assuring that group differences emerged from the presentation style, not presenter likeability. Both analyses covaried initial attitude and the 8 teacher contrasts.

Mediation analysis. Three questions are posed in mediation analyses, each asked with a separate regression: (1) Do treatments affect the outcome measure, that is, is there something to be mediated? (2) Do the treatments influence or activate the mediator(s)? (if not, the variable cannot mediate), and (3) Do the mediators absorb variance from the treatments when both treatments and mediators are in the equation?

A series of regression analyses tested whether lecture and discussion differed in persuasiveness, if this difference was moderated by topic relevance, and if these differences were mediated by perceptions the group endorsed nontoxics and/or by cognitive elaboration (Baron & Kenny, 1986). The 8 teacher contrasts were entered first, as controls. To answer the first question, the first analysis regressed final attitude on initial attitude, presentation style, topic relevance, presentation style by relevance, and the teacher contrasts. To answer the second question, two separate analyses regressed the proposed mediators -- perceived group endorsement and cognitive elaboration-- on the same variables. To answer the third question, the final analysis regressed final attitude on the basic model plus the proposed mediators. Moderation would be demonstrated if topic relevance interacted with, or "moderated," presentation style (discussion vs. lecture). Mediation would be demonstrated if presentation style, alone or in combination with relevance, affected both the mediator and the final attitude, and if the presentation style-to-attitude paths were weakened when the mediator was added to the basic model.

Figure 1. Analysis 1, Something to be mediated: Discussion increased attitude change and did so somewhat more when topic was relevant.



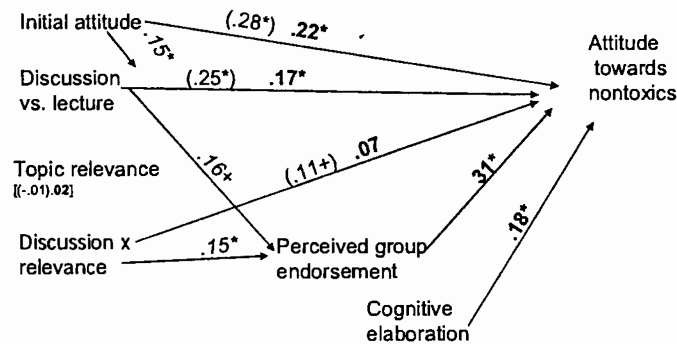
$F(12, 287) = 5.13, p < .001$.
*$p < .05$ +$p < .10$

The first question is whether presentation style affected final attitude (Figure 1). In this analysis, the overall model was significant, $F(12, 287) = 5.13$, $p < .001$, with initial attitude ($\beta = .28$, $p < .001$), presentation style ($\beta = .25$, $p < .007$), and presentation style by relevance ($\beta = .11$, $p < .06$) significant or marginally significant. Predicted attitude scores indicated that discussion was more effective than lecture (lecture = -.26, discussion = +.26), and that this was especially true for students for whom material was relevant (predicted attitudes, high relevance, lecture = -.38, high relevance, discussion = .36; low relevance, lecture = -.14; low relevance, discussion = +.16). Thus, presentation style had a significant effect, the effect is moderated by relevance (at $p < .06$), and the pattern of predicted scores indicated a boomerang, such that students for whom the material is relevant but who received it via lecture were least favorable.

The second question is whether these presentation styles activated the proposed mediator, perceived group endorsement. This overall model was also significant, $F(12, 287) = 3.46$, $p < .001$. Initial attitude ($\beta = .15$), presentation style ($\beta = .16$), and presentation style by relevance ($\beta = .15$) all affected perceptions the group endorsed nontoxics at significant or marginally significant levels, respectively, initial attitude, $t(287) = 2.58$, $p < .01$; presentation style, $t(287) = 1.65$, $p < .10$; and presentation style by relevance, $t(287) = 2.55$, $p < .01$. This analysis indicates that presentation style did activate the mediator, alone and in combination with relevance, setting the stage for the question of whether the presentation style to attitude change paths are mediated by perceptions the group endorsed the message. The analysis predicting the potential mediator, cognitive elaboration, was not significant, $F(12, 287) = 1.58$, $p < .10$.

The third analysis entered all of the variables into a single equation predicting final attitude, thereby allowing the proposed mediators to absorb variance from the initial factors (Figure 2). This analysis indicated that perceived group endorsement partially mediated the presentation style effect, and fully mediated the presentation style by relevance interaction. The overall model was significant, $F(14, 285) = 9.09$, $p < .001$, with significant contributions to final attitude by initial attitude ($\beta = .22$, $p <$ 001), the mediator, perceived group endorsement, ($\beta = .31$, $p < .001$), as well as by cognitive elaboration ($\beta = .18$, $p < .001$). Compared to analysis 1, the effect of presentation style ($\beta = .17$, $p < .05$) was reduced in significance, and the presentation style by relevance interaction ($\beta = .07$, $p > .20$) was eliminated. These changes in significance support the hypotheses that perceived group endorsement would mediate treatment effects; it partially mediated the relationship between presentation style and attitude change, and fully mediated the presentation style by relevance interaction.

Figure 2. Final mediation model.



Coefficients (βs) in **bold** are from the final analysis, those in *italics* are from Step 2, and those in parentheses are from Step 1. The incomplete arrow from initial attitude ($\beta = .15$) targets the mediator, perceived group endorsement.
$F(14, 285) = 9.09$, $p < .001$. $^*p < .05$ $^+p < .10$

Cognitive elaboration did not operate as a mediator, but in the final equation, accounted for significant variance in final attitude. Initial attitude had an independent impact on final attitude and perceptions of group endorsement, and its impact was only weakly mediated by perceived group endorsement.

Several of the teacher contrasts were related to the criterion in each analysis, but there was no clear pattern (different contrasts were significant in each step).

Discussion

Results support the idea that discussion is more effective than lecture, that this effect is particularly strong for students for whom the information is relevant (i.e., make purchase choices), and that these relationships are mediated by students' perceptions that their peers endorse the message. The main effect was partially mediated and the interaction was fully mediated by these perceptions. Although cognitive elaboration was not activated by our factors and does not meet the criteria for acting as a mediator, it did play a role in predicting final attitudes, consistent with the Elaboration Likelihood Model.

Additional analyses and follow-up data will evaluate memory for information and behavioral follow through, including whether students made nontoxics interesting or fun as behavioral maintenance strategies (Sansone & Smith, 2000; Sansone, Weir, Harpster, & Morgan, 1992; Werner & Makela, 1998). Data will also examine the teacher effects more closely by providing detailed content analyses of each meeting, and analyses of whether the teacher effects are related to particular comments or enthusiasm at the meetings. These data will also allow us to ask if and how the lecture and discussion conditions differed. Although we kept the script constant, lectures and discussions are clearly different experiences. The additional analyses will allow us to identify and evaluate the impact of any differences in content due to students' active participation.

Several social-psychological processes could be operating in guided group discussions. One simple view is social proof (Cialdini, 2001), wherein students value the information more when they hear peers endorse it; as Hass (1981) said, peers do not tell us whether something is true, but whether it is good or bad. Other processes address social pressure more directly. Pluralistic ignorance occurs when each individual in a group holds one opinion but believes other group members hold a different opinion and would disapprove of the individual's opinion (Prentice & Miller, 1996). False consensus occurs when people assume that others agree with them even when they do not. Our guided group discussions are designed to dispel the misunderstandings of both phenomena. The discussions reveal that others agree with the individual (or at least disagree with the group), thus reducing social pressures to conform to an imaginary standard. Guided discussion allows people to express their opinions, which may also dispel false consensus as support for one's ideas.

All of these processes could be addressed in future research. For example, Schroeder and Prentice (1998) compared two kinds of informational messages to reduce binge drinking by college students. One emphasized individual control and responsibility, the other explained the power of false consensus to

influence attitudes and behavior. Compared to those given the individualistic message, students who understood the implications of false consensus were less likely to drink to excess, supporting the hypothesis that awareness of false consensus enabled students to resist that perceived group pressure. Future research on nontoxic alternatives may indicate that guided group discussion is enhanced by an open discussion of the roles of group pressure and desires to impress others in the use of toxic household products.

Additional research should also examine the durability of attitude change after guided group discussion. Staats, Harland & Wilke's (2004) research showed that groups who hold monthly meetings to discuss environmental behaviors become more committed to the behaviors. Such social support for long-term behavior change is extremely important, and would benefit those wishing to reduce use of toxic home and yard chemicals.

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