

Why Is Such a Smart Person Like You Smoking? Using Self-Affirmation to Reduce Defensiveness to Cigarette Warning Labels¹

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When researchers communicate the negative health risks of smoking, smokers are likely to minimize such effects. This experiment addressed a way to reduce this defensiveness: allowing smokers to affirm aspects of the self. Smokers ($n = 100$) and nonsmokers ($n = 30$) viewed eight health-warning messages about smoking. Smokers were randomly assigned to view (a) warnings without a self-affirmation manipulation, (b) warnings after a self-affirmation manipulation, or (c) warnings that had a positive self-statement attached to it. Analyses indicated that compared to nonsmokers, no-affirmation smokers rated the warning messages as: (a) communicating less serious consequences, (b) less accurate, and (c) less likely to influence smokers. However, compared to no-affirmation smokers, smokers who affirmed the self were no more likely to rate the messages as serious, accurate, or effective. These data suggest that affirming the self before, or using a self-affirmation within a warning message may not encourage smokers to be more accepting of risk information.

Most smokers hold an optimistic bias about their smoking habit. They view themselves as less vulnerable to health risks than the typical smoker. For example, in one study that assessed smokers' risk perceptions, Ayanian and Cleary (1999) asked 3,031 smokers, nonsmokers, and former smokers about their risk for heart disease and cancer. They found that most current smokers, compared to former smokers, did not believe they were at increased risk for either of these diseases. Other studies have also shown that smokers underestimate their risks. McCoy et al. (1992) had smokers, ex-smokers, and nonsmokers estimate the risk of three smoking-related diseases: lung cancer, emphysema, and heart disease. Compared to smokers who had recently made a quit attempt and smokers who had successfully quit, current smokers showed a stronger optimistic bias for these negative health effects. Consistent with this research, Halpern (1994) found that heavy smokers perceive themselves to be at less risk for illness (from smoking) than do light smokers, and ex-smokers who recently quit rated their health risk lower than ex-smokers who quit a long time ago. Finally, Schoenbaum (1997)

¹The work was supported by grants (KO5 CA92633 & R21 CA098962) from the National Cancer Institute.

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found that whereas never, former, and current light smokers were relatively accurate, heavy smokers underestimated their risk of early death due to smoking.

An important question amid all the evidence of an optimistic bias is why smokers defend against health risk information. This question can be explained with reference to dissonance theory and the importance of personal relevance. Dissonance theory proposes that when cognitive and behavioral self-components are inconsistent, people experience dissonance (Festinger, 1957). A person who engages in the "foolish" and dangerous act of smoking may experience dissonance because his behavior runs counter to his self-image as an intelligent and healthy person. In addition, the more personally relevant a threatening message is, the more threatening it becomes. Therefore, the direct confrontation with the risk of smoking and the threatening nature of smoking risks will lead smokers to recruit various self-protective behaviors (Chaiken, Liberman, & Eagly, 1989; Chen & Chaiken, 1999; Liberman & Chaiken, 1992). These self-protective behaviors will result in biased processing of a threatening health message.

The issues of dissonance and personal relevance have been tested in the smoking context. For example, Falomir and Invernizzi (1999) exposed smokers to antismoking messages. They found that in contrast to smokers who weakly identified with smoking, high relevance smokers experienced the message as threatening and behaved defensively by lowering their intentions to quit and increasing their estimates of peer support of their smoking. Additional support for the relationship between personal relevance and defensive responding toward negative health messages comes from Freeman, Hennessy, and Marzullo (2001). They showed 187 college smokers and nonsmokers eight short antismoking videos. Compared with smokers, nonsmokers consistently rated the antismoking videos as more effective in communicating the negative consequences of smoking. Importantly, participants who saw their future selves as smokers were most likely to respond defensively by rating the antismoking messages as ineffective.

The evidence suggests that warnings about the negative consequences of smoking fail to dispel the optimistic bias most smokers hold. Currently, the warning labels on cigarette packs in the United States use an informational approach, communicating risks without embellishment or vividness. Research on current warning labels has provided little, if any evidence for their effectiveness (Borland, 1997; Cecil, Evans, & Stanley, 1996; Crawford, Balch, & Mermelstein, 2002; Duffy & Burton, 2000; Ho, 1994; Malouff et al., 1992; Robinson & Killen, 1997). A major reason current warning labels may fail to change smokers' beliefs and behavior is because they do not deal with the fundamental motivation to self-protect (Sherman & Cohen, 2002). One way to encourage smokers to accept negative health information is to change the content of warning labels to reduce the need for self-protective behavior. Self-affirmations have been shown to reduce defensive biases in individuals, thus leading to more acceptance of personally relevant negative health information.

Steele (1988, p. 290) proposed that, "Self-affirming thoughts may be an effective means of reducing thought distorting defense mechanisms such as denial and rationalization." Self-affirmation theory proposes that cognitions and behaviors are motivated by a desire to view the self as moral, adaptive, and capable (Aronson, Cohen, & Nail, 1999; Steele, 1988). When individuals are faced with negative information, they will seek to maintain their positive image, and thus react defensively toward the information (Ditto & Lopez, 1992). However, if an individual is allowed to affirm his or her positive self-image through some other means, defensiveness to the negative information will be reduced because he or she can accept the information and still maintain a positive self-image (Sherman et al., 2000).

Self-affirmation in the health context has been shown to make participants less defensive about health information that threatens the self (Kunda, 1987; Reed & Aspinwall, 1998; Sherman et al., 2000). Reed and Aspinwall (1998), for example, had one half of their participants complete a self-affirmation task (a questionnaire about kind acts participants had performed in the past) after hearing information linking caffeine consumption to fibrocystic breast disease. Caffeine drinkers who affirmed the self were more accepting of the information than caffeine drinkers who had not affirmed the self. Similarly, Sherman et al. (2000) recruited coffee drinkers and found that those who received a self-affirmation were more accepting of the caffeine-fibrocystic disease link. In addition, when they had sexually active students affirm the self before watching an AIDS educational video, the students perceived themselves to be at higher risk for the disease (compared to students who did not affirm the self). Students who affirmed the self were also more likely to take behavioral steps to reduce their risk (e.g., buy condoms, take an AIDS brochure). Thus, individuals given a chance to affirm positive aspects of the self before being presented with threatening information respond more openly.

In the present study, we tested whether self-affirmation in the content of warnings would reduce defensiveness to negative health messages about smoking. Self-affirmation was manipulated in two ways. In one condition, a self-affirmation was presented separately from the warning, so that it was disconnected from the warning. This condition is consistent with self-affirmation manipulations in previous research. In a second condition, a self-affirmation introduced the warning message, directly preceding it. It is conceivable that if the threatening information and the affirmation are presented concurrently, dissonance will be exacerbated. Connecting both the positive (affirmation) and the negative information (health consequences due to smoking) forces individuals to focus on the dissonance between how they think about themselves and their maladaptive behavior (Stone, Aronson, Crain, & Winslow, 1994).

We proposed three hypotheses. First, nonsmokers should be less defensive toward the warning messages than smokers. Second, we expected smokers who

affirmed the self before viewing negative health messages to be less defensive than smokers who did not affirm the self. Third, we expected smokers who affirmed the self before viewing the messages would be less defensive than smokers who view the affirmation connected to the message. Although no research has been conducted on these so-called connected affirmations, we proposed that such a contrast between positive and negative information would arouse the most dissonance.

In addition to the main hypotheses, we also explored whether smoking behavior, smoker self-concept, or motivation to quit smoking moderated the relationship between the self-affirmation manipulation and defensiveness. Specifically, we asked: (a) Are light smokers more likely than heavy smokers to respond to the affirmation?; (b) are smokers who view smoking as personally relevant to their self-concept less likely to respond to the affirmation?; and (c) are smokers who are more motivated to quit smoking more likely to respond to the affirmation?

Method

Overview

The experiment included four between-subjects conditions. Smokers and nonsmokers were brought into the lab individually or in small groups (≤ 5). After pretest questionnaires were completed, participants worked on a computer task in which they viewed eight warning messages. After viewing each warning, participants rated the seriousness, accuracy, and effectiveness of the warning. Following the computer task, participants completed posttest questionnaires.

Participants

Participants included 135 undergraduate students at North Dakota State University. We recruited smokers ($n = 100$) and nonsmokers ($n = 35$) in three ways. First, participants were recruited from a screening questionnaire distributed to undergraduates enrolled in low-level psychology courses. The screening questionnaire, administered at the beginning of the semester, asked, "Which statement best describes your current use of cigarettes?" Responses were on a 4-point scale and ranged from "I have never smoked cigarettes," to "I smoke cigarettes every day." Students who reported currently smoking and those who had never smoked were contacted by phone and invited to participate. Second, we distributed posters around campus and sign-up sheets outside the department office. Third, we sent an email out to the student listserv with information about the study. In exchange for participating, students received either extra credit for class ($n = 96$) or money ($n = 39$).

Five nonsmokers were dropped from the study. Four were dropped because they reported at pretest, "I used to smoke but I quit," and 1 because he reported, "I smoke, but not everyday." The final sample included 100 smokers and 30 nonsmokers. Of these 130 (78 females, 52 males) participants, the average age was 20.5 ($SD = 2.7$), and the majority were freshman or sophomores (68.2%), white (95.4%), and single (97.0%). Of the 100 smokers, the average age of initiating smoking was 15.8 ($SD = 2.0$). Many smokers ($n = 62$) reported that they planned to quit smoking in the next six months or 30 days. In addition, the smokers had previously tried to quit smoking an average of 2.3 times ($SD = 4.1$), and were able to abstain for an average of 34.1 days ($SD = 59.2$).

Procedure

Participants were told that the study concerned thoughts and behaviors that center on smoking advertisements. In addition, they were told, "We want to learn about your reactions to different types of warning labels." Participants learned that they would complete questionnaires and a computer task.

After participants signed a consent form, they completed pretest questionnaires assessing smoking behavior, nicotine dependence, motivation to quit, and smoker self-concept. While completing the pretest, smokers were randomly assigned to one of three conditions. After they were finished with the pretest, the smokers began the computer task. One-third of the smokers viewed warning messages about smoking without self-affirmations (no affirmation condition), one-third completed self-affirmations and then viewed warning messages (disconnected affirmation condition), and one-third viewed the warning messages connected to a self-affirmation (connected affirmation condition). All nonsmokers viewed the warning messages without self-affirmations.

During the computer task, participants rated the effectiveness, accuracy, and seriousness of each warning. We also measured the time participants spent reading each warning. After the computer task, participants completed posttest questionnaires that assessed mood and self-feelings, motivation to quit, and memory for the warnings. Following these questionnaires, participants completed open-ended items that asked for their thoughts about each warning. Finally, participants were debriefed and told the purpose of the study.

Computer Task

When participants finished the pretest, the experimenter explained, "You are about to be presented with various smoking warning labels and we would like you to evaluate the warning labels as to how powerful they will be in influencing smokers to quit smoking." Participants were instructed to spend as much or as little time as they wanted viewing the warning label. In addition, participants were



Figure 1. Connected condition example of a warning. Marlboro is a trademark of Philip Morris USA.

told, “In order to make sure you have ample time to think about and evaluate each warning label, the warning labels will be separated in time by an unrelated task that you will complete before each warning message.” For participants in the disconnected condition, the “unrelated task” consisted of completing the self-affirmations. For participants in the connected and no-affirmation conditions, the task consisted of completing a neutral behavior-recall task so that they would be actively engaged at the same time as those in the disconnected self-affirmation condition.

When the task began, participants saw two practice trials unrelated to smoking or affirmations. Then, participants in the disconnected condition were presented with a self-affirmation (e.g., “You are an honest person”). Instructions on the screen read, “Think about a time when you felt this way and write it down.” Participants were instructed to take no more than a few minutes to complete this task and to press the spacebar when they were finished. Participants in the connected and no-affirmation conditions were presented with a behavior (e.g., “You read the newspaper”). Instructions on the screen read, “Think about the last time you did this and write it down.” Participants were instructed to take no more than a few minutes to complete this task and to press the spacebar when they were finished. When participants pressed the spacebar, the computer screen went blank for 1 second, and then a warning message appeared (Figure 1). After participants finished reading the warning message, they rated the seriousness, accuracy, and effectiveness of the message. After they completed the ratings, participants pressed the spacebar and the next trial began.

Manipulation

The warning information about smoking was identical in all three conditions. In the no affirmation condition, participants were exposed to only the warning information. In the connected self-affirmation condition, a self-affirmation introduced the warnings, appearing as part of the label. In the disconnected self-affirmation condition, a self-affirmation was presented separately from, and before the warnings. The warnings were presented in a single random order. The eight affirmations asked participants to recall a time when they were intelligent, kind, honest, strong-willed and persistent, friendly, good-hearted and caring, a good significant other, and compassionate. Six of the eight warning messages were adopted from the Canadian cigarette warning labels (e.g., cigarettes cause lung cancer; 85% of lung cancers are caused by smoking; 80% of lung cancer victims die within 3 years). We designed two of the eight warnings (e.g., A smoker who smokes one pack per day will spend \$728 a year, two packs will cost \$1,450, and smoking costs the United States about \$100 billion each year in tobacco-related health care costs.).

Measures

Demographic information was gathered at pretest, including the question, "Which statement best describes your current use of cigarettes?" This question provided a measure of smoking status, with responses ranging from "I have never smoked cigarettes" to "I smoke cigarettes every day."

Number of cigarettes smoked per day was assessed by the question, "How many cigarettes a day do you smoke?" Participants responded by choosing one of the following five responses: 1 to 4, 5 to 10, 11 to 15, 16 to 20, or 21 or more.

Motivation to quit was assessed by three questions. One of the questions was, "How motivated are you to try to give up smoking in the next 30 days?" Responses ranged from 1 (*I am definitely not motivated to try to give up smoking*) to 7 (*I am definitely motivated to try to give up smoking*). The motivation to quit items were summed ($\alpha = .79$).

The degree to which smoking is a part of one's self-concept was assessed by Shadel and Mermelstein's (1996) Smoker Self-Concept Scale, a five-item questionnaire that provided a measure of how much a participant's smoking behavior is intertwined with his or her self-concept. Example items include, "Smoking is a part of my self-image," and "Smoking is a part of who I am." Responses range from 1 (*strongly disagree*) to 10 (*strongly agree*). Items were summed ($\alpha = .90$).

After reading each warning message, participants were asked to rate the effectiveness, accuracy, and seriousness of the risks communicated in each message. Three questions on 10-point scales assessed the effectiveness, accuracy, and seriousness of each warning. A rating of 1 represented, "totally ineffective," "not

at all accurate,” and “not at all serious,” and 10 represented, “totally effective,” “extremely accurate,” and “extremely serious,” respectively. These ratings were averaged across the eight warnings.

During the computer task, the amount of time participants spent looking at each warning was recorded by the computer. The time spent reading the warning was averaged (over the eight warnings) and later log-transformed for analysis.

At posttest, mood and feelings about the self were measured using four items adapted from Sherman et al. (2000). To assess mood, participants were asked, two times, “How would you describe your mood right now?” Responses for the questions ranged from 1 (*extremely bad*) to 9 (*extremely good*) and from 1 (*extremely unhappy*) to 9 (*extremely happy*). The items were averaged ($\alpha = .96$). To assess feelings about the self, participants were asked, “How do you feel about yourself right now?”, and “Do you feel good or bad toward yourself right now?” Responses for these two questions ranged from 1 (*extremely negative*) to 9 (*extremely positive*) and from 1 (*extremely bad*) to 9 (*extremely good*). The two items were averaged ($\alpha = .91$).

Motivation to quit was measured again at posttest, but using the “contemplation ladder” (Biener & Abrams, 1991).³ The contemplation ladder asks participants to circle a number (0 to 11) that best describes their thoughts of quitting.

Memory for the warning messages was assessed with a multiple choice task. Participants answered six questions about the warnings. An example of an item on the memory task is “Eighty percent of lung cancer victims die within _____ years.” Participants had five possible answers from which to choose. Items were scored as correct or incorrect and the number of correct items was summed.

Finally, open-ended items assessed participants’ thoughts about the content of the warning messages. Participants wrote about each warning message, indicating whether or not it would be effective at encouraging them (or others) to quit smoking and why. Two research assistants coded the open-ended responses for agreement or disagreement (0 = *disagree*, 1 = *agree*). Participants who described the warning as effective at encouraging people to quit smoking “agreed” with the message, and participants who described the warning as ineffective “disagreed” with the message. Inter-rater reliability was 88%, with the majority of disagreement stemming from one coder’s inability to make an agree–disagree decision. Disagreements were resolved by the experimenter. Agreement/disagreement was averaged across the eight warnings. When participants finished the open-ended items, they were debriefed, thanked for their participation, and excused.

³We decided to use a different measure to assess motivation to quit at posttest because we did not want participants’ responses about motivation to quit at posttest to be directly influenced by their responses on the same scale from the pretest. Using the same questionnaire at both time points may have made participants more vulnerable to perceived experimenter demand.

Table 1

Pretest Means and Standard Deviations

| Variable | Nonsmokers (no affirmation) <i>n</i> = 30 | Smokers (no affirmation) <i>n</i> = 35 | Smokers (connected) <i>n</i> = 31 | Smokers (disconnected) <i>n</i> = 34 |
|---------------------|--|---|---|--|
| | Cigarettes per day | – – | 1.77 (1.06) | 2.10 (1.30) |
| Smoker self-concept | – – | 14.23 (8.86) | 17.39 (10.39) | 17.38 (10.64) |
| Motivation to quit | – – | 12.86 (3.47) | 15.86 (4.23) | 15.59 (4.82) |

Note. Cigarettes per day was coded as “1” if participants indicated they smoked 1 to 4 cigarettes a day, 2 = 5 to 10, 3 = 11 to 15, 4 = 16 to 20, and 5 = 21 or more.

Results

Table 1 presents means and standard deviations for pretest measures of smoking behavior, motivation to quit, and smoker self-concept. To test for pretest differences, we performed one-way analyses of variance (ANOVAS). For the three smoking-related variables, the ANOVAS included only the three smoking conditions. For cigarettes smoked per day, a one-way ANOVA revealed no differences between the three groups, $F < 1$, and the overall mean was 2.07, indicating between 6 and 10 cigarettes smoked per day. Similarly, no difference was observed for how much smoking was an important aspect of their self concept, $p = .32$.

However, the means for motivation to quit showed a lower score for the no affirmation group ($M = 12.86$) than for the connected ($M = 15.86$) and disconnected groups ($M = 15.59$). The ANOVA revealed an overall significant difference, $F(2, 95) = 5.24$, $p = .007$. Tukey-B post hoc comparisons revealed that, by chance, the smokers in the no affirmation group were less motivated to quit smoking at pretest than smokers in the other two groups. Therefore, we conducted a set of the analyses reported below for the warning ratings and viewing time, but controlling for pretest motivation to quit. These analyses produced no significant differences from the ANOVAS reported next.

Self-Affirmation Manipulation

Inspection of the written responses to the self-affirmation prompts showed that all of the participants in the disconnected group completed the self-affirmation

Table 2

Posttest Means and Standard Deviations for Mood/Feelings About the Self

| Variable | Nonsmokers | Smokers | Smokers | Smokers |
|---------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| | (no affirmation) | (no affirmation) | (connected) | (disconnected) |
| Mood | 7.34 ^a (1.31) | 6.25 ^b (1.69) | 6.26 ^b (1.56) | 6.31 ^b (1.99) |
| Feelings about self | 7.67 ^a (1.06) | 6.29 ^b (1.79) | 6.12 ^b (1.67) | 6.51 ^b (1.75) |

Note. Both mood and feelings about the self were on 9-point scales. The two items forming each measure were averaged, with higher scores indicating more positive mood and more positive feelings about the self. Means not sharing a common superscript differed from each other ($p < .05$).

task. Thus, all participants were able to think of times when they felt a certain way (e.g., intelligent, kind, honest). This is evidence that the self-affirmation manipulation worked insofar as participants were able to complete the task. Table 2 presents the means for smokers' posttest mood, and the means were similar for smokers, although higher for nonsmokers. The means for smokers' good-bad feelings about the self showed a similar pattern, with the mean for nonsmokers higher than the means for all three groups of smokers. One-way ANOVAS on these two measures revealed a significant difference, $F(3, 126) = 3.14, p = .03$, for mood, and, $F(3, 126) = 5.82, p = .001$, for feelings about the self. Tukey-B post hoc comparisons showed that the nonsmokers were significantly different from the three smoking groups. Thus, compared to all of the smokers, nonsmokers experienced better moods and more positive feelings about the self. Smokers who affirmed the self did not report elevated moods or increased positive feelings compared to smokers who did not affirm the self.

Reactions to Warnings

Table 3 presents means and standard deviations for the warning message ratings. To analyze the results, we conducted planned contrasts, using the error term generated from a one-way ANOVA. The first contrast was between smokers who were in the no-affirmation condition and the nonsmokers. Consistent with expectations, smokers' and nonsmokers' ratings of the warning messages differed significantly. As Table 3 shows, smokers rated the warnings as less serious, $F(1, 125) = 3.85, p = .05, r = .17$, less accurate, $F(1, 126) = 5.44, p = .02, r = .20$, and as less effective, $F(1, 125) = 6.96, p = .009, r = .23$.

Table 3

Means and Standard Deviations for Ratings of Warning Messages

| Variable | Nonsmokers | Smokers | Smokers | Smokers |
|---------------|------------------|------------------|----------------|----------------|
| | (no affirmation) | (no affirmation) | (connected) | (disconnected) |
| Seriousness | 8.02 (1.38) | 7.28 (1.60) | 7.38 (1.39) | 7.51 (1.66) |
| Accuracy | 8.25 (1.20) | 7.40 (1.64) | 7.61 (1.40) | 7.62 (1.58) |
| Effectiveness | 6.75 (1.48) | 5.48 (2.12) | 5.93 (2.02) | 5.86 (2.02) |

Note. Seriousness, accuracy, and effectiveness ratings are on 10-point scales, with higher ratings meaning more serious, accurate, and effective.

The second contrast was between smokers in the disconnected condition and smokers in the connected conditions. As can be seen from Table 3, disconnected smokers and connected smokers had nearly identical seriousness, accuracy, and effectiveness ratings. Analyses showed that smokers in these two conditions did not differ in their ratings for the warnings, $F_s < 1$. Thus, we collapsed across these two conditions to create a group of affirmed smokers.

For the third contrast, we compared the smokers in the affirmed conditions to smokers in the no affirmation condition. Although the means in Table 3 are in the predicted direction (affirmed smokers had higher average scores for all three measures), the differences were not significant, all $F_s \leq 1$.

After rating the warnings, participants completed a memory task with six multiple choice questions. Compared to the smoking groups (no affirmation $M = 4.79$, connected $M = 4.74$, disconnected $M = 4.97$), nonsmokers recognized 4.30 of the six items. To determine if these differences were significant, we conducted the same planned comparisons used to test for differences in the warning ratings. Only one comparison approached significance: The no-affirmation smokers recognized slightly more items than the nonsmokers, $F(1, 126) = 2.56$, $p = .11$, $r = .14$.

Posttest motivation to quit was assessed using an 11-point scale, with higher numbers representing more motivation to quit. The unadjusted means for the no-affirmation, connected, and disconnected groups were 5.57, 7.31, and 5.69, respectively (nonsmokers were not a part of this analysis). Thus, the mean motivation to quit for participants in the connected group was higher than the means for participants in the two other groups. Because of the pretest differences, we used pretest motivation to quit as a covariate and performed an analysis of

Table 4

Means and Standard Deviations for Secondary Measures

| Variable | Nonsmokers (no affirmation) | Smokers (no affirmation) | Smokers (connected) | Smokers (disconnected) |
|-------------------------------|-----------------------------------|--------------------------------|------------------------------|------------------------------|
| Time spent viewing warning | 16.46 (4.50) | 16.00 (5.70) | 18.50 (4.00) | 16.90 (5.30) |
| Thought process data | 0.56 ^a (0.22) | 0.42 ^b (0.19) | 0.48 ^{ab} (0.23) | 0.43 ^{ab} (0.23) |

Note. Time spent viewing warning *M*s and *SD*s are in seconds. Cognitive response means represent the percentage of warnings that produced “agree” responses. Means not sharing a common superscript differ significantly from each other ($p < .05$).

covariance (ANCOVA) on posttest motivation to quit. The analysis revealed a significant effect for condition, $F(2, 97) = 4.50, p = .01$. A Tukey-B post hoc comparison revealed that smokers in the connected group (adjusted $M = 6.89$) were more motivated to quit at posttest than smokers in the disconnected (adjusted $M = 5.37$) group, but not more motivated than smokers in the no-affirmation group (adjusted $M = 6.24$).

Secondary Measures

Analyses were performed on time spent reading the warnings and open-ended agreement with the warnings. Table 4 presents means and standard deviations for these secondary measures. As can be seen from Table 4, participants in the connected group ($M = 18.50$) spent a little more time reading the warnings than participants in the other groups (M s = 16.00, 16.90, 16.46). However, a 1×4 ANOVA revealed no significant differences, $F < 1$. Table 4 also presents the means and standard deviations for the cognitive response data. The means suggest that nonsmokers agreed with the warnings more than smokers, and a 1×4 ANOVA was significant, $F(3, 125) = 2.81, p = .04$. A Tukey-B post hoc comparison showed that the nonsmokers differed from the smokers in the no-affirmation group, but not from the smokers in the other two groups.

Moderating Analyses

Additional analyses were performed to test whether any of three variables moderated the effects on warnings. Specifically, we tested whether number of cigarettes smoked, smoker self-concept, or motivation to quit interacted with

condition (affirmation versus no affirmation) to influence the seriousness, accuracy, and effectiveness ratings. Hierarchical regressions were used in which we first entered main effect terms for condition and a single moderator (e.g., number of cigarettes smoked). Then, an interaction term was introduced and the change in R^2 was tested for significance. No significant interactions were found for any of these analyses. However, each of the moderating variables significantly predicted seriousness, accuracy, and effectiveness ratings. The correlation for number of cigarettes smoked and the overall ratings (averaged across the three ratings) was $-.33$, smoker self-concept and the ratings was $-.28$, and motivation to quit and the ratings was $.31$.

Discussion

Past research has shown that smokers respond defensively to health messages about smoking (Freeman et al., 2001; Janis & Terwilliger, 1962). The present paper investigated the differences between smokers' and nonsmokers' responses to messages about smoking. In addition, we tested whether affirming aspects of the self would make smokers less defensive about smoking messages. Consistent with expectations, findings showed that compared to nonsmokers, smokers were less likely to rate negative messages about smoking as serious and accurate. However, a self-affirmation manipulation failed to produce differences in how smokers responded to the messages. Thus, providing smokers a chance to affirm the self, before presenting them with negative health messages about smoking, may not encourage their acceptance of these messages.

Consistent with other studies, the present experiment also showed that smokers, compared to nonsmokers, rated messages about smoking as less effective. Although effectiveness ratings have been used to represent defensiveness in other studies (e.g., Freeman et al., 2001; Ho, 1994), they are probably not the best measure of defensiveness. Smokers are, in fact, in a position to know what is going to work to encourage themselves and other smokers to quit smoking. Smokers may rate messages as less effective at producing behavior change because they *know* the message will not encourage them to quit. In contrast, nonsmokers may not have a good idea as to what kind of message would encourage smokers to quit; they may believe that any negative message about smoking should be effective. Thus, a difference between the two groups' effectiveness ratings could emerge without having to appeal to a defensiveness explanation. Instead, the difference may be a result of smokers' accuracy and nonsmokers' inaccuracy.

Nevertheless, other associations observed in the present study support the notion that smokers are indeed defensive about the risks of smoking. For example, as cigarettes smoked per day increased, the seriousness ($r = -.34, p < .01$), accuracy ($r = -.29, p < .01$), and effectiveness ($r = -.35, p < .01$) ratings for each message decreased. Thus, individuals who reported smoking a greater number of

cigarettes were more likely to psychologically minimize the messages. Smoker self-concept was also negatively associated with the seriousness ($r = -.36, p < .01$), accuracy ($r = -.27, p < .01$), and effectiveness ($r = -.20, p < .05$) ratings. Thus, the more one's self-concept involved the identity of "smoker," the more likely one was to rate the messages as less serious, accurate, and effective. These associations illustrate that smokers for whom the messages were more personally relevant (e.g., those who smoked more cigarettes per day, those who had high smoker self-concepts) were more likely to respond defensively. Taken together, the findings of the present study provide evidence for a defensiveness hypothesis as to why smokers negate the warnings about smoking.

Because past research has shown that self-affirmations encourage acceptance of threatening messages (Sherman et al., 2000), the present study provided a self-affirmation to smokers to test if it would make them more accepting of messages about smoking. Self-affirmation was manipulated in two ways: Some participants completed a self-affirmation before reading negative messages about smoking (disconnected), and some participants viewed an affirmation that was attached to a negative message about smoking (connected). Contrary to expectations, neither self-affirmation manipulation produced a difference between smokers. This suggests that although self-affirmation works in other health contexts (e.g., breast cancer, sexually transmitted disease), it may not work in this context.

At least two reasons exist for why the self-affirmation manipulation did not reduce smoker defensiveness. One possibility relates to the self-affirmation manipulation. Other studies (Reed & Aspinwall, 1998; Sherman et al., 2000) have manipulated self-affirmation differently. For example, Reed and Aspinwall had participants complete a self-affirmation task: A questionnaire about 10 kind acts they had performed in the past. Sherman and colleagues asked affirmed participants to agree with statements related to their highest ranked value or to write an essay on their most important value. Participants in the present experiment also briefly wrote on a value statement. However, participants in the present study did not affirm the self just one time; self-affirmation statements were presented multiple times (before each warning) and were different every time (e.g., "you are kind"; "you are friendly"). It is conceivable that the affirmation manipulation would have produced different results if participants had affirmed the self first and then viewed all of the warnings.

Another possible explanation for the failure of the self-affirmation conditions may be related to the smoking context itself. Although affirming the self makes women less defensive to information linking their caffeine consumption to breast cancer and students less defensive to information linking their sexual behavior to AIDS (Sherman et al., 2000), a self-affirmation may not work with smokers. According to self-affirmation theory, the part of the self that is being affirmed needs to be *equally or more* important than the part of the self that is being threatened (Steele, 1988). It is certainly possible that being friendly, being kind, or

being smart is not as important to a participant as being a smoker. Alternatively, it is unlikely that students have well-rehearsed responses to threats concerning caffeine or sexual behavior. In contrast, smokers confront antismoking material frequently, and they may have well-practiced responses that cannot be overcome with a brief experimental manipulation.

It is important to describe our rationale for manipulating self-affirmation differently from the other studies that have shown effects. The research question addressed in the present experiment was: Will a self-affirmation make smokers less defensive to warning messages about smoking? But this was an applied research question. We were interested in whether a self-affirmation that would work in the laboratory could easily be carried to the natural environment. In the real world, it is unlikely that smokers would write at length about how honest or kind they are before reading negative health information about smoking. Thus, even if that type of self-affirmation produced an effect in the laboratory, it would still be necessary to investigate how it might benefit regular smokers in natural settings. Therefore, we designed the two types of affirmations with this applied perspective in mind.

In the present study, we measured both feelings about the self and mood so as to be sensitive to any affect changes. Results showed that smokers who affirmed the self did not experience better moods or more positive feelings about the self. Sherman et al. (2000) obtained the same results for the mood item, but they did find that their self-affirmation manipulation increased ratings on the item concerning positive feelings about the self. Interestingly, smokers in the present study reported less positive feelings about the self than nonsmokers. Given the context, it is conceivable that the warnings about smoking overwhelmed the self-affirmation manipulation for our smoking participants.

It is worth noting that although we did not observe any differences in the defensiveness measures for the two affirmation groups, participants who saw a message with an affirmation attached reported higher levels of motivation to quit at posttest than participants who affirmed the self before reading the messages. This difference was significant even after controlling for pretest motivation to quit. This was an unexpected but potentially important finding. More research needs to be conducted before making any conclusive statements about how a “connected” affirmation may motivate smokers to quit.

In the present experiment, smokers, compared to nonsmokers, responded defensively to messages about smoking. Unfortunately, a self-affirmation did not work to reduce defensiveness toward the warning messages. This is not to suggest that affirming the self will never make smokers less defensive. After all, it is possible that the manipulation, because of its applied design, did not provide a fair test of self-affirmation theory. Nevertheless, the findings of the present study suggest that using a self-affirmation in conjunction with negative health messages about smoking may not increase smokers’ openness to these messages.

The present study was the first to use a self-affirmation with smokers. It also was the first test of an “applicable” self-affirmation. It is important to explore other social psychological manipulations that may increase the effectiveness of messages about smoking. Strahan et al. (2002) have suggested framing messages to emphasize gains rather than losses, and emphasizing social norms. They also believe that increasing self-efficacy and providing action instructions (e.g., a quitting helpline or web address) may enhance the effectiveness of warning labels. Ideas like these may increase the effectiveness of antismoking messages.

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