The Impact of Canadian Versus United States Cigarette Warning Labels on Smoking Attitudes

Ellen Peters, Ph.D.
Decision Research and University of Oregon, Institute of Cognitive and Decision Sciences

Daniel Romer, Ph.D.
Director, Adolescent Risk Communication Institute
Annenberg Public Policy Center
University of Pennsylvania

Paul Slovic, Ph.D.
Decision Research and University of Oregon, Department of Psychology

Kathleen Hall Jamieson, Ph.D.
Elizabeth Ware Packard Professor, Annenberg School for Communication and
Director, Annenberg Public Policy Center, University of Pennsylvania

Leisha M. Wharfield
Decision Research

C. K. Mertz, M.R.C.P.
Decision Research

Stephanie M. Carpenter, B.A.
University of Oregon, Department of Psychology

Corresponding Author:
Ellen Peters, Ph.D.
Decision Research
1201 Oak Street, Suite 200
541 485 2400
541 485-2403 FAX
empeters@uoregon.edu

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Abstract

Context. Cigarette smoking is a major source of mortality and medical costs in the United States. Efforts to make warning labels for cigarettes more graphic and salient may help to reduce smoking initiation and increase quit attempts.

Objective. To determine whether exposure to Canadian versus U.S. cigarette warning labels would result in more negative attitudes towards smoking among U.S. smokers and nonsmokers.

Design. Smokers and nonsmokers were randomly assigned to receive exposure to Canadian or U.S. cigarette warning labels. Affective reactions to cigarette warning labels and towards a variety of smoking-related cues were measured.

Setting. A nonprofit research firm in the United States.

Participants. Adult volunteers recruited from the community included smokers (n = 88; 30% female; mean age = 37) and nonsmokers (n = 81; 54% female; mean age = 34). Each group was randomly assigned to either the Canadian or U.S. cigarette warning label condition.

Intervention. Participants were exposed either once each to 16 Canadian cigarette warning labels or four times each to four U.S. warning labels.

Main Outcome Measures. Affective reactions towards smoking cues, the smoker image, and cigarette warning labels were the main outcome measures.

Results. Canadian labels produced more negative affective reactions to smoking and to the smoker image among smokers and nonsmokers compared to current U.S. labels. Smokers did not show signs of defensive avoidance after exposure to the Canadian labels. Both smokers and
1 nonsmokers rated the Canadian labels as producing more negative feelings toward smoking but
2 rated both label types as credible. Exposure to Canadian labels led to support for their use in the
3 United States among both smokers and nonsmokers.

4 Conclusions. Large, graphic warning labels such as those used in Canada are more likely to
5 induce negative feelings towards cigarette smoking among both smokers and nonsmokers than
6 the current U.S. warning labels.

7 Abstract word count = 300
Introduction

Smoking remains the largest preventable source of mortality in the United States. A recent review of successful programs for prevention and cessation of tobacco use indicates that apart from raising the price of tobacco products through taxation, several effective strategies involve dissemination of advice and information. In particular, media campaigns have successfully reduced the uptake of smoking among adolescents and encouraged cessation among adults. In addition, reminders from health providers to their patients about the hazards of smoking and the benefits of quitting also have been found to reduce smoking. However, increasing the rate of quitting among those who either use or are beginning to use cigarettes will require a range of strategies.

One potentially effective way of reaching cigarette users is through warning labels on cigarette packaging. The United States pioneered the use of such warnings when Congress mandated, in 1965, that the statement “cigarette smoking may be hazardous to your health” be placed on the side of all cigarette packs. A few years later the statement was changed to “The Surgeon General has determined that cigarette smoking is dangerous to your health.” The only major change made since then was in 1984 when the labels were diversified to include four statements warning of health hazards in somewhat more specific terms (e.g., “Surgeon General’s Warning: Quitting smoking now greatly reduces serious risks to your health”).

Evidence concerning these labels suggests that they have had little influence on tobacco sales. They have become unnoticeable and lack persuasive power compared to the more salient colorful packaging and various other forms of tobacco promotion. Indeed, one study with adolescents found that users were virtually unaffected by their presence. An expert panel
commissioned by the National Academy of Sciences described the warnings as “woefully deficient when evaluated in terms of proper public health criteria.”

The new international Framework Convention on Tobacco Control sponsored by the World Health Organization encourages the use of larger warnings on cigarette packs that contain color pictures to illustrate health hazards. Canada has had such a system in place since late 2000 with warning labels covering over 50% of cigarette packs, front and back, with additional information on the inside about resources for quitting. The European Union, Australia, and several Latin American countries have now followed suit with similar labeling requirements.

Survey research in Canada suggests that the larger labels with color pictures and separate messages about specific risks of smoking create more negative emotional reactions toward cigarettes and increase smokers’ attempts to quit. See Figure 1 for an example of one Canadian warning label. However, this research relies on smokers’ reports of exposure to the labels. Furthermore, even though sales of cigarettes have declined since the introduction of the labels, taxes on cigarettes also increased, and new laws were passed restricting smoking in public places, making causal inferences regarding the role of the labels difficult. In this study, we examine exposure to warning labels in a controlled laboratory setting with both smokers and nonsmokers in the United States in order to compare the effects of the Canadian-style labels versus the current U.S. labels:

One of the ways that warning labels can reduce attraction to cigarettes among nonusers or motivate quitting among users is to create unfavorable emotional associations with the behavior. Bland descriptions of the health hazards of smoking, such as those currently on cigarette packs in the United States, are unlikely to create such associations, either because they fail to attract attention or because they fail to make the health danger sufficiently compelling. Affective
associations, whether achieved through learning or simple primes, are important determinants of judgments and choice behavior\textsuperscript{13-15} and are highly related to initiation and quitting of smoking.\textsuperscript{16-18} These affective associations are easily accessed and need not require deliberation to be effective.\textsuperscript{19-21}

Smoking research has shown that the associations also should be sufficiently wide-ranging to influence the many smoking-related cues that elicit craving in smokers attempting to quit the habit.\textsuperscript{22,23} They should undermine the attractiveness of the smoker image, the favorableness of which has been a key goal of cigarette advertising.\textsuperscript{24,25} At the same time, there is the risk that overly graphic warnings will cause users to avoid exposure to the labels and may even reinforce favorable reactions to smoking.\textsuperscript{26,27} Although a study of the effects of Canadian labels\textsuperscript{28} found no evidence for such defensive avoidance, the possibility for such effects should be considered.

The present study assessed potential reactions to smoking resulting from experimentally controlled exposure to Canadian and U.S. labels. To determine the breadth of effects of such exposure, we assessed the emotional impact of each set of labels as well as the effects of exposure on affect, both to smoking-related images and words and to the smoker image. We assessed the acceptability of the Canadian-style labels by asking both smokers and nonsmokers to evaluate the credibility of the labels and whether they should be employed in the U.S. market.

Methodology

Participants

Participants \((N = 169)\) were recruited through advertisements in local papers and fliers distributed in the local community (Eugene, Oregon). We employed a two-way factorial design in which smokers and nonsmokers were randomly assigned to either a Canadian warning label
condition \( n = 84 \), with 43 smokers and 41 nonsmokers) or a U.S. warning label condition \( n = 85 \), with 45 smokers and 40 nonsmokers). Each participant received $10 for completing the experiment individually in a one-hour session.

**Procedure**

Participants were asked, "Do you ever smoke cigarettes?" in order to be randomly assigned to either the Canadian or U.S. label condition. Participants were seated at a computer and responded to an overall measure of attitude toward smoking: "What is your attitude or opinion about cigarette smoking?" on a 9-point scale ranging from -4 (extremely negative) to +4 (extremely positive), and then commenced to Phase I of the task. In Phase I, those in the Canadian label condition viewed 16 different Canadian labels that appeared in a random order, while those in the U.S. condition viewed 4 different labels, each randomly appearing 4 times. The participant controlled the exposure duration of each label, which was measured in milliseconds by the computer.

In Phase II, participants were asked to quickly and accurately give their impressions of a series of four smoking images (i.e., a close-up picture of a burning cigarette in an ashtray; a distant picture of a cigarette in an ashtray; an extreme close-up of a lit cigarette showing smoke and burning-red tobacco; and a picture of a lit cigarette in a smoker's hand) and four smoking-related words (i.e., nicotine, tobacco, cigarette, and smoking). They provided similar reactions to four food-related images (e.g., meat and vegetables on a plate) and words (e.g., nutrition). For each word and image, participants responded to the question "What is your attitude or opinion?" by pressing one of two buttons for each of four adjective pairs (e.g. good-bad, positive-negative, favorable-unfavorable, and like-dislike). For example, if the word "nicotine" appeared on the screen with the good-bad adjective pair underneath it, and the participant felt good about it, she
would press the button under the word “good.” The adjective pairs were presented in random order for each image with a randomized right-left orientation at the bottom of the screen.

Participants then answered a series of smoking questions on the computer. They were shown a U.S. cigarette label and a Canadian cigarette label and were asked whether Canadian labels should be used in the United States. They were also asked whether the minimum age for buying cigarettes should be raised, and smokers were asked how much they smoked.

Participants next completed a task designed to measure affective images of smokers. Adapted from Haire’s “Shopping List Survey,” participants were shown a shopping list of groceries bought by a student and were asked to “project yourself into the situation as far as possible until you can more or less characterize the University of Oregon undergraduate who bought the groceries. Then write a brief description of his personality and character.” The shopping list contained six food items and a pack of cigarettes.

Participants then viewed all 16 Canadian labels or all 4 U.S. labels again (e.g., if they were originally shown the U.S. labels, they were shown them again) and were asked their affective reaction to each label, “How does this warning label make you think and feel about cigarette smoking?” on a 9-point scale (−4 = extremely negative to +4 = extremely positive). In addition, they were asked to rate the credibility of the labels, “How much do you believe the information in the warning label is true or false?” on a 9-point scale (−4 = completely false to +4 = completely true). Finally, participants provided demographics such as age, gender, and education (1 = 8th grade or less to 7 = more than a four-year college degree).

Results

Age, education, and gender were not significantly different between participants exposed to Canadian and U.S. warning labels (see Table 1; age mean = 37 and 35 for Canadian and U.S.
participants, respectively; education mean = 4.8 and 4.6 for the same two groups, respectively, where 4 = vocational or trade school and 5 = some college or two-year degree). Smokers were less educated than nonsmokers (p < .001). No other differences reached significance.

Looking time at warning labels

In Phase I, participants in the Canadian label condition looked at the warning labels for longer than did participants in the U.S. label condition: means (medians) = 8.4 (8.3) and 4.5 (4.4) seconds; F(1,165) = 115.7, p < .0001. Neither smoker status nor its interaction with the label condition were significant predictors of looking time (smokers’ and nonsmokers’ mean looking times in the Canadian condition were both 8.2 seconds, and were 4.1 and 4.3 seconds, respectively, in the U.S. condition).

Initial attitudes toward cigarette smoking

Not surprisingly, nonsmokers had significantly more negative initial attitudes toward cigarette smoking than smokers (mean attitudes = −3.0 and .5, respectively, p < .0001). The initial attitudes of participants in the Canadian condition were marginally more negative than those in the U.S. condition (p < .10); the interaction of smoker status and condition was not significant (initial-attitude means = −1.0 and −3.1 for smokers and nonsmokers, respectively, in the Canadian condition and 0.0 and −3.0 for smokers and nonsmokers, respectively, in the U.S. condition). A large proportion of nonsmokers gave the most extreme negative rating for their initial smoking attitude (49% and 60% of nonsmokers in the Canadian and U.S. conditions, respectively, rated their attitude towards smoking as −4 compared to 16% and 2% of smokers in the same two conditions). For these participants, exposure to warning labels cannot make their
attitudes more negative. In view of these initial attitude differences, it was important to control for them in all analyses.

Affective reactions to the warning labels

We asked participants how the warning labels made them think and feel about smoking. In this direct measure of affect associated with the labels, Canadian label participants reported that their warning labels made them feel more negative toward smoking than U.S. label participants (mean = -2.9 and -1.5, respectively, \( p < .0001 \); this remained significant after controlling for initial attitude towards smoking). It is noteworthy that the mean ratings of the 16 Canadian labels (see Table 2) were uniformly more negative than any of the four U.S. labels.

Smoking status was not a significant predictor of affective reactions to the labels after controlling for initial attitude (mean affect for the Canadian labels was -2.4 and -3.5 for smokers and nonsmokers, respectively, while mean affect for the U.S. labels was -.9 and -2.1 for smokers and nonsmokers, respectively).

We asked participants how much they believed the information in the labels to be true or false using a scale from completely false (-4) to completely true (+4; see Table 2). Overall, participants in each of the four groups believed their labels to be truthful (mean belief in truth = 2.6 and 3.1 for smokers in the Canadian and U.S. conditions, \( p < .10 \); mean belief in truth = 3.4 and 3.3 for nonsmokers in the Canadian and U.S. conditions, n.s.).

Affect towards smoking words and images after exposure to warning labels

We assessed reactions to smoking-related words and images that might elicit craving in smokers and possible interest in nonsmokers. An index of affect towards smoking cues was...
created in response to 4 smoking-related words and 4 smoking-related images. This index was
calculated from the mean response to each stimulus after deleting the first adjective pair
encountered for each stimulus. As hypothesized, affect towards smoking cues was more negative
for Canadian than U.S. participants (mean affect = −.8 and −.5, respectively, RM ANOVA, p <
.01; eta-squared = .05). After controlling for initial smoking attitude, amount of smoking, age,
and gender, a significant difference remained between the Canadian and U.S. conditions (see
Figure 2). Thus, smokers and nonsmokers reported more negative affect towards smoking cues
after exposure to the Canadian labels than after exposure to U.S. labels. There was no significant
difference between Canadian and U.S. label participants in affect towards the food stimuli.

Affective images of smokers

In the final task, participants described the person who purchased groceries that included
a pack of cigarettes. Two independent coders blind to condition rated the attitude or affective
tone each participant conveyed about the person buying groceries on a 3-point scale (−1 =
negative, 0 = neutral, +1 = positive). The last author, also blind to condition, compared all
responses and calculated the coders' overall reliability as a simple percent by counting the
number of times the coders agreed on the affect rating and dividing by the total number of affect
ratings. With this analysis, coders averaged 82% agreement. The last author resolved any
differences prior to analysis.

In a 2-way ANCOVA controlling for initial attitude towards smoking, participants
exposed to Canadian labels were more negative in their descriptions of the shopper's personality
and character (mean affect = −.3 and −.1, for the Canadian and U.S. conditions, respectively, p <
.05). This main effect was qualified by a significant interaction such that nonsmokers showed a
greater impact of the label condition compared to smokers (Canadian- and U.S.-label means were –.4 and –.1 for nonsmokers and –.2 and –.1 for smokers, respectively, interaction p < .05).

Smoking status was not significant as a main effect.

Beliefs about cigarette policies in United States

Those in the Canadian label condition were marginally more likely to favor raising the minimum purchase age for buying cigarettes to 21 compared to those in the U.S. label condition (60% and 42%, respectively, favored raising the age; p < .10 after controlling for smoking status, its interaction with condition, and initial attitude).

A strong majority of nonsmokers (81%) thought the United States should use warning labels similar to the Canadian labels; a majority of smokers (60%) thought the same. This finding did not differ by condition.

Discussion

Graphic color warning labels, covering over 50% of the cigarette package, were installed in Canada in December, 2000. Surveys beginning in October/November of 2001 indicated that the extent to which smokers reported reading, thinking about, and discussing the new labels were associated with greater intentions to quit smoking and with actual quit attempts. Smokers who quit before and after the introduction of the new labels were asked whether warning labels were a factor in their decision. Those who quit after the introduction of new graphic labels were 2.8 times more likely to cite warning labels as a quitting influence than those who quit prior to their introduction (and would have seen only the old warning labels).
Despite these promising results, the causal influence of the new warning labels remained unclear. Smokers who intended to quit may have been more likely to read the labels and discuss them. Also, as noted earlier, laws requiring all indoor public places in the study region to be smoke-free were implemented prior to the study. Furthermore, reactions to the warnings may not generalize from Canada to the United States. These limitations motivated the present study, conducted in a laboratory setting in the United States where exposure to Canadian and U.S. warning labels could be randomly assigned and closely monitored among both smokers and nonsmokers.

The results showed that the Canadian labels were voluntarily examined for longer durations than the U.S. labels and also led to consistently more negative affect towards smoking cues and smokers themselves. Nonsmokers appeared to be influenced more by the Canadian labels than were smokers. Smokers, nonetheless, showed evidence of significant transfer of negative associations and feelings from the warning labels to smoking cues and to a shopper who purchased cigarettes after exposure to the Canadian labels. Also noteworthy was greater support by both smokers and nonsmokers for raising the minimum purchasing age for cigarettes and for introducing Canadian-style labels in the United States after exposure to the Canadian labels.

We found no evidence to suggest that the Canadian labels elicited defensive avoidance of the warnings among smokers. Smokers spent as much time viewing the labels as nonsmokers, rated them as equally credible to existing U.S. labels, and supported their use in the U.S. market. At the same time, they reported that the Canadian labels were more emotionally powerful than the U.S. labels and their reactions to smoking words and cues in the Canadian condition were more negative than in the U.S. condition. This pattern of reactions was expected given the careful research conducted by the Canadians in developing the warning labels. These results in
combination with the less favorable images of smokers created by the Canadian labels support
the contention that large, graphic warning labels, such as those used in Canada and proposed for
use in the United States and many other countries, are more likely to contribute to negative
attitudes towards cigarette smoking than current warning labels and also may facilitate more
tries and greater success at smoking cessation.9

There are several reasons why the use of Canadian-style labels may be an important
component of a national smoking-reduction strategy. First, smokers and nonsmokers who are
experimenting with tobacco can be easily and efficiently reached with these warnings whenever
they purchase or use cigarettes. Current warnings in the United States are easily ignored and do
not transmit the same level of emotional impact as the colorful and graphic Canadian warnings.
Indeed, a major moderator of the effectiveness of product warnings is the salience and vividness
of the label.11 Second, considerable psychological research suggests that the mere presentation of
hazard information is not sufficient to motivate perceptions of risk.31 Risk is most readily
communicated by information that arouses emotional associations with the activity.32 The
present results indicate that brief exposure to the Canadian-style labels produces emotional
connotations that transfer to smoking cues and have the potential to reduce attraction to the
activity. Third, emotional associations can be readily accessed from memory by the mere
presentation of the relevant stimulus.20,21 These associations can then work to reduce attraction to
the stimulus and motivate cessation. Indeed, emotional associations to smoking appear to be
powerful predictors of smoking behavior and may well be causally implicated in efforts to either
start or stop smoking.8,17-18,28

One limitation of the present study is the brief level of exposure to the labels. This is
possibly more detrimental to the impact of the Canadian labels, which are new, than to the
impact of the more familiar U.S. labels. Furthermore, although the U.S. labels are smaller and less salient than the Canadian labels, both labels were presented as nearly equal in size on the computer screen. Nevertheless, the Canadian labels had more impact. Another limitation is the fact that all measures were taken very near in time to the exposure to the labels. Effects of long-term exposure and effects at a time distant from exposure were not studied.

Despite these limitations, the present study, combined with similar results from nonlaboratory surveys in Canada, lend support to recommendations to employ Canadian-style warnings on all cigarette packages. Warning labels for tobacco products are controlled by Congress and cannot be mandated by federal regulatory agencies. One step toward achieving this objective would be for the President to submit and for the Senate to ratify the International Framework Convention on Tobacco Control that encourages signatories to employ Canadian-style warnings.
Acknowledgement

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References


Figure Legends

*Figure 1.* One of 16 warning labels used on cigarette packages in Canada.

*Figure 2.* Affect towards smoking cues among smokers and nonsmokers in the Canadian and U. S. conditions.
WARNING

CIGARETTES ARE A HEARTBREAKER

Tobacco use can result in the clogging of arteries in your heart. Clogged arteries cause heart attacks and can cause death.

Health Canada
Figure 2. Affect towards smoking cues among smokers and nonsmokers in the Canadian and U.S. conditions

Affect towards smoking cues (range = -1 to +1)

- Exposed to U.S. labels
  - Nonsmokers (n=81)
  - Smokers (n=88)

- Exposed to Canadian labels
  - Nonsmokers (n=81)
  - Smokers (n=88)
| Table 1. Demographic characteristics by smoking status and warning label condition |
|---------------------------------|-----------------|----------------|----------------|
|                                 | Canadian | U.S. | Average |
| Age (years) Smoker              | 37       | 38   | 37       |
| Nonsmoker                       | 37       | 32   | 34       |
| Mean                             | 37       | 35   | 36       |
| Education Smoker                 | 4.3      | 4.3  | 4.3      |
| (1 = 8th grade or less to 4 = vocational or trade school to 7 = more than a 4-year college degree) Nonsmoker | 5.3 | 5.0 | 5.1 |
| Mean                             | 4.8      | 4.6  | 4.7      |
| Gender (% female) Smoker         | 30%      | 29%  | 30%      |
| Nonsmoker                        | 46%      | 63%  | 54%      |
| Mean                             | 38%      | 45%  | 41%      |
| Amount Smoked Smoker             | 3.5      | 4.1  | 3.8      |
| (1 = less than 1 cigarette a day to 4 = 11-14 cigarettes per day to 8 = 2 packs a day or more) Nonsmoker | | | |
| Mean                             |          |      |          |

Note: No significant differences existed between conditions or smoking status except that smokers were significantly less educated than nonsmokers.
Table 2. Rated affect towards and truthfulness of warning labels

<table>
<thead>
<tr>
<th></th>
<th>Affect</th>
<th>Truthfulness</th>
</tr>
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<tbody>
<tr>
<td><strong>U.S. Labels</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking by pregnant women</td>
<td>-2.1</td>
<td>3.2</td>
</tr>
<tr>
<td>Smoking causes lung cancer, etc.</td>
<td>-2.0</td>
<td>3.4</td>
</tr>
<tr>
<td>Cig smoke contains carbon monoxide</td>
<td>-1.1</td>
<td>3.4</td>
</tr>
<tr>
<td>Quitting reduces serious risks</td>
<td>-0.8</td>
<td>2.9</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td>-1.5</td>
<td>3.2</td>
</tr>
<tr>
<td><strong>Canadian labels</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoke hurts babies (baby in ICU)</td>
<td>-3.4</td>
<td>3.3</td>
</tr>
<tr>
<td>Mouth diseases</td>
<td>-3.2</td>
<td>3.1</td>
</tr>
<tr>
<td>Cigarettes hurt babies (pregnant)</td>
<td>-3.1</td>
<td>3.3</td>
</tr>
<tr>
<td>Equivalent of small city dies</td>
<td>-3.1</td>
<td>2.9</td>
</tr>
<tr>
<td>Lung cancer (person in hospital)</td>
<td>-3.1</td>
<td>3.3</td>
</tr>
<tr>
<td>Cigarettes cause strokes (brain)</td>
<td>-3.1</td>
<td>3.0</td>
</tr>
<tr>
<td>Lung cancer (lung)</td>
<td>-3.0</td>
<td>3.2</td>
</tr>
<tr>
<td>Children see children do</td>
<td>-2.9</td>
<td>2.9</td>
</tr>
<tr>
<td>Don’t poison us (children)</td>
<td>-2.9</td>
<td>3.1</td>
</tr>
<tr>
<td>Leaves you breathless (cough)</td>
<td>-2.9</td>
<td>3.3</td>
</tr>
<tr>
<td>Heartbreaker (clogged arteries)</td>
<td>-2.9</td>
<td>2.9</td>
</tr>
<tr>
<td>Idle but deadly</td>
<td>-2.8</td>
<td>3.0</td>
</tr>
<tr>
<td>Highly addictive (heroin or cocaine)</td>
<td>-2.7</td>
<td>3.0</td>
</tr>
<tr>
<td>Hydrogen cyanide</td>
<td>-2.7</td>
<td>2.8</td>
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<tr>
<td>--------------------------</td>
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</tr>
<tr>
<td>You’re not the only one smoking</td>
<td>-2.6</td>
<td>2.7</td>
</tr>
<tr>
<td>Tobacco can make you impotent</td>
<td>-2.6</td>
<td>2.2</td>
</tr>
<tr>
<td>Mean</td>
<td>-2.9</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Note: Affect was rated in response to the question: “How does this warning label make you think and feel about cigarette smoking?” (-4 = extremely negative to +4 = extremely positive). Truthfulness was rated in response to: “How much do you believe the information in the warning label is true or false?” (-4 = completely false to +4 = completely true).