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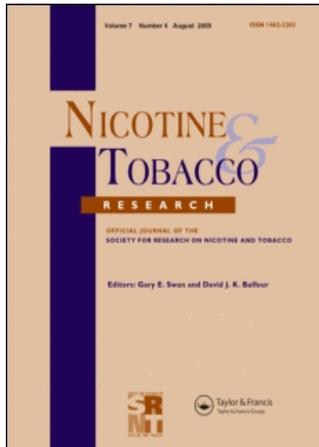
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The impact and acceptability of Canadian-style cigarette warning labels among U.S. smokers and nonsmokers

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Cigarette smoking is a major source of mortality and medical costs in the United States. More graphic and salient warning labels on cigarette packs as used in Canada may help to reduce smoking initiation and increase quit attempts. However, the labels also may lead to defensive reactions among smokers. In an experimental setting, smokers and nonsmokers were exposed to Canadian or U.S. warning labels. Compared with current U.S. labels, Canadian labels produced more negative affective reactions to smoking cues and to the smoker image among both smokers and nonsmokers without signs of defensive reactions from smokers. A majority of both smokers and nonsmokers endorsed the use of Canadian labels in the United States. Canadian-style warnings should be adopted in the United States as part of the country's overall tobacco control strategy.

Introduction

Smoking remains the largest preventable source of mortality in the United States (U.S. Department of Health and Human Services [USDHHS], 2000). A review of successful programs for prevention and cessation of tobacco use indicated that, apart from raising the price of tobacco products through taxation, several effective strategies involve dissemination of advice and information (Hopkins et al., 2001). In particular, media campaigns have 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 have been found to reduce smoking. However, increasing the quit rates among those who either use or are beginning to use cigarettes will require a range of strategies (USDHHS, 2000).

One particularly 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").

Research on the effects of these labels suggests that they have little influence on tobacco sales. They lack salience and persuasive power compared with the more colorful packaging and other forms of tobacco promotion (Fischer, Krugman, Fletcher, Fox, & Rojas, 1993; Fischer, Richards, Berman, & Krugman, 1989). Indeed, one study with adolescents

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found that users were virtually unaffected by the presence of these labels (Robinson & Killen, 1997). 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” (Lynch & Bonnie, 1994).

The new international Framework Convention on Tobacco Control sponsored by the World Health Organization (2005) 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 (see Figure 1 for an example of one such warning). The European Union has plans for similar labeling requirements, and Australia as well as countries in Asia (e.g., Thailand and Singapore) and South America (e.g., Brazil, Venezuela, and Uruguay) have already implemented them. However, the United States has not ratified the treaty, and efforts to regulate cigarette labeling have stalled in Congress.

Any efforts to implement graphic warning labels in the U.S. market will probably be met with stern resistance from the tobacco industry. One argument that may be deployed is that larger warnings violate the industry’s commercial speech rights (Framework Convention Alliance for Tobacco Control, 2005). Unless it can be shown that larger and more graphic warnings provide an effective mechanism to inform cigarette users of the hazards of the product, the industry can claim that the public health benefit of the warnings does not outweigh the burden imposed on the industry. To respond to this concern, it is important to demonstrate that larger graphic labels are appreciated by cigarette users while also communicating more effective information about the

hazards for both users and nonusers than current labels provide.

One of the ways that more graphic warning labels can help consumers appreciate the risks of smoking is to create unfavorable emotional associations with the behavior. Bland descriptions of the health hazards of smoking, such as currently displayed on cigarette packs in the United States, are unlikely to create such associations, because they fail to attract attention (Argo & Main, 2004) or to make the health danger sufficiently compelling (Wogalter & Laughery, 1996). Affective associations, whether achieved through learning or simple primes, are important determinants of judgments and choice behavior (Damasio, 1994; Murphy & Zajonc, 1993; Slovic, Finucane, Peters, & MacGregor, 2004) and are highly related to perceptions of risk and to the initiation and quitting of smoking (Brandon, Juliano, & Copeland, 1999; Romer & Jamieson, 2001; Slovic, 2001). These affective associations are easily accessed and need not require deliberation to be effective (Epstein, 1994; Zajonc, 1980, 2001). More graphic warning labels may attach negative affect to the many smoking cues that elicit craving in smokers (Marlatt & Gordon, 1985; Niaura et al., 1988), thereby supporting their efforts to quit. The labels also could work to undermine the attractiveness of the smoker image, the favorableness of which has been a key goal of cigarette advertising and promotion (Pollay, 1995, 2000).

Survey research in Canada suggests that the larger labels with color pictures and 16 separate messages about specific risks of smoking create more negative emotional associations with cigarettes and increase smokers’ attempts to quit (Hammond, Fong, McDonald, Brown, & Cameron, 2004; Hammond, Fong, McDonald, Cameron, & Brown, 2003). However, this research relies on smokers’ reports of exposure and attention to the labels. As noted by one



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

critic, "Smokers will often say they quit because of their health. Without an experimental design, there is no evidence that warning labels are responsible for these outcomes ..." (Ruiter, 2005). Furthermore, even though sales of cigarettes have declined since the introduction of the labels (Health Canada, 2005), 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 (Mahood, 2004).

An important concern about the use of graphic warnings is the potential that such labels will prove to be too fear-arousing to be effective (Ruiter, Abraham, & Kok, 2001; Witte & Allen, 2000). As a critic of such labels put it, "The evidence in this area suggests that especially those who are most at risk [i.e., smokers] react defensively to these messages ... Defensive reactions serve to get rid of the fear, not necessarily the threat. Policy makers should thus be reluctant to introduce cigarette warning labels ..." (Ruiter, 2005). Based on this reasoning, there is a risk that overly graphic warnings will cause users to avoid exposure to the labels, to derogate the messages, and potentially to reinforce favorable reactions to smoking. Although a study of the effects of Canadian labels (Hammond, Fong et al., 2004) found little evidence for such defensive avoidance, the lack of research with controlled exposure to the labels leaves open the possibility that only those who were predisposed to find the labels helpful reacted favorably to them. It is important therefore to evaluate the potential for adverse effects of introducing Canadian-style labels in the U.S. market with a design that compares exposure to the Canadian labels with exposure to current labels.

The present study randomly assigned a community sample of U.S. smokers and nonsmokers to receive exposure in a controlled laboratory setting to either Canadian or 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 smoking-related cues and the smoker image. We assessed defensive reactions to the Canadian-style labels by unobtrusively measuring time spent examining them and by asking both smokers and nonsmokers to evaluate the credibility of the labels and whether they should be used in the U.S. market.

Method

Participants

Participants ($N=169$) were recruited through advertisements in local papers and fliers distributed in the local community (Eugene, Oregon). We used 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 US\$10 for completing the experiment individually in a 1-hr session.

Procedure

Participants were asked, "Do you ever smoke cigarettes?" so that they could 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 nine-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, whereas those in the U.S. condition viewed the 4 current labels, each randomly appearing four times. The sizes of the two sets of labels as they appeared on the computer screen were roughly comparable. Participants controlled the exposure duration of each label, which was measured in milliseconds by the computer.

In Phase II, participants were asked to quickly but 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 eight 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. Response times (RTs) were recorded from the moment the adjectives appeared on the screen to the moment participants pushed one of the two response buttons. The resolution of the RTs was 16.7 ms. Mean RTs were calculated from three target items for each image and word (RTs for the first target item for each

image and word were deleted). Mean RTs were subjected to a $1/RT$ transformation to correct for skewness in all subsequent analyses (e.g., Fazio & Hilden, 2001). Untransformed mean RTs are reported in milliseconds in the text.

Participants then answered a series of questions on the computer. They were shown a U.S. and a Canadian cigarette label and were asked whether Canadian labels should be used in the United States. They also were asked whether the minimum age for buying cigarettes should be raised. To assess vulnerability to becoming a smoker, we asked a question set developed by Pierce, Farkas, Evans, and Gilpin (1995). Based on their responses, current nonsmokers were classified as either not vulnerable or possibly vulnerable to becoming a smoker. Participants were considered possibly vulnerable if they had ever smoked a cigarette; if they had ever tried or experimented with cigarette smoking, even a few puffs; or if they answered yes to the question "Do you think that you will try a cigarette soon?" Participants who went through the series of questions with a "no" or "definitely not" response to all questions were considered not vulnerable. Current smokers were simply asked how much they smoked using an eight-point scale ranging from less than 1 cigarette/day (1) to 11–14 cigarettes /day (4) to 2 packs/day or more (8).

Participants next completed a task designed to measure affective images of smokers. Using a method inspired by Haire's (1950) "Shopping List Survey," we showed participants a shopping list of groceries bought by a student and asked them 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 (depending on their condition) and were asked their affective reaction to each label, "How does this warning label make you think and

feel about cigarette smoking?" on a nine-point scale ranging from -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 ranging from -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 4-year college degree).

Results

Approximately one-third of the sample was aged 18–24 years. Age, education, gender and amount smoked were not significantly different between participants exposed to Canadian and U.S. warning labels (Table 1). 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)s; $F(1, 165)=115.7, p < .0001$. Neither smoker status nor its interaction with the label condition was a significant predictor of looking time (smokers' and nonsmokers' mean looking times were both 8.2s in the Canadian condition and were 4.1 and 4.3s, respectively, in the U.S. condition).

Initial attitudes toward cigarette smoking

Not surprisingly, nonsmokers had significantly more negative initial attitudes toward cigarette smoking than did smokers (mean attitudes= -3.0 and 0.5 , respectively, $p < .0001$). The initial attitudes of participants in the Canadian condition were marginally more negative than those in the U.S. condition

Table 1. Demographic characteristics by smoking status and warning label condition.

| Characteristic | Status | Canadian | U.S. | Average |
|--------------------------------------------------------------------------------------------------------|-----------|----------|------|---------|
| Age (years) | Smoker | 37 | 38 | 37 |
| | Nonsmoker | 37 | 32 | 34 |
| | Mean | 37 | 35 | 36 |
| Education (1=8th grade or less to 4=vocational or trade school to 7=more than a 4-year college degree) | Smoker | 4.3 | 4.3 | 4.3 |
| | 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 (1=less than 1 cigarette/day to 4=11–14 cigarettes/day to 8=2 packs/day or more) | Smoker | 3.5 | 4.1 | 3.8 |

Note. No significant differences existed between conditions or smoking status except that smokers were significantly less educated than nonsmokers.

($p=.10$); 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 toward smoking as -4 , compared with 16% and 2% of smokers in the same two conditions). In view of these initial attitude differences, it was important to control for them in all analyses.

Affective reactions to 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, participants in the Canadian label condition reported that their warning labels made them feel more negative toward smoking than those in the U.S. label condition (Table 2; mean = -2.9 and -1.5 , respectively, $p < .0001$). This finding remained significant after controlling for initial attitude toward smoking. The mean ratings of the 16 Canadian labels were

Table 2. Mean rated affect toward and truthfulness of warning labels.^a

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

Note. ^aAffect 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 the question: "How much do you believe the information in the warning label is true or false?" (-4 =completely false to $+4$ =completely true). ^bBrief descriptions of graphics are given in parentheses.

uniformly more negative than any of the 4 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, whereas 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, $p = .06$; mean belief in truth = 3.4 and 3.3 for nonsmokers in the Canadian and U.S. conditions, *ns*).

Affect toward 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 toward smoking cues was created in response to four smoking-related words and four 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 toward smoking cues was more negative for participants in the Canadian than in the U.S. condition (mean affect = $-.8$ and $-.5$, respectively, RM ANOVA, $p < .01$; eta-square = $.05$). Smokers and nonsmokers reported more negative affect toward smoking cues after exposure to the Canadian labels than after exposure to U.S. labels. After controlling for initial smoking attitude, amount of smoking, age, and gender, we found that a significant difference remained between the Canadian and U.S. conditions (Figure 2). To examine the effect of the labels on individuals most likely to initiate smoking, we conducted this analysis again with young nonsmokers, aged 18–24 years, who were possibly vulnerable to smoking based on responses to the Pierce et al. (1995) scale. Exposure to Canadian labels was still associated with significantly more negative affect toward smoking cues than was exposure to U.S. labels (mean affect = $-.9$ and $-.76$, respectively, $p = .04$, one-tailed). We found no significant differences between participants in the Canadian and U.S. label conditions in affect toward the food stimuli. Because the novelty of the Canadian warning labels could explain this effect, we conducted a final analysis controlling for the average time participants had spent looking at the labels. Condition remained significant after controlling for looking time.

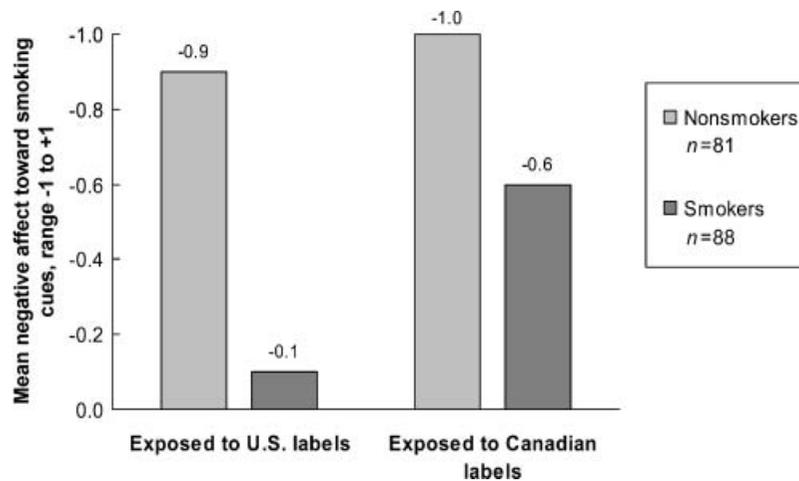


Figure 2. Mean negative affect toward smoking cues among smokers and nonsmokers in the Canadian and U.S. conditions.

The stronger negative associations with smoking cues for participants in the Canadian condition, compared with the U.S. condition, could be the result of responding to perceived experimenter demand to evaluate cigarettes more unfavorably in the Canadian condition. This socially desirable response, however, should take longer because the subject has to first suppress the initial unconsidered response (Fazio & Olson, 2003), suggesting that responses in the Canadian condition should be slower. On the other hand, we hypothesized that the Canadian labels produce greater automatic negative affect, predicting that responses will be accessed faster in the Canadian than the U.S. condition. A MANOVA of response times with condition, initial attitude, age, and gender as independent variables revealed that responses in the Canadian condition were made faster than those in the U.S. condition (mean response times=970 and 1,101 ms, respectively, $p=.04$, one-tailed).

Affect toward the smoker image

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 three-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 percentage 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 two-way ANCOVA controlling for initial attitude toward 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, $p=.03$). This main effect was qualified by a significant interaction such that nonsmokers did not differ from smokers in their reaction to the U.S. labels, but the two groups did differ in their reaction to the Canadian label. Means in the U.S. condition were $-.1$ for both smokers and nonsmokers and were $-.2$ and $-.4$ for smokers and nonsmokers, respectively, in the Canadian condition, $p=.04$. Smoking status was not significant as a main effect. In addition, controlling for the average amount of time spent looking at the labels did not influence the significance of the main effect of condition nor its interaction with smoking status. The results were similar among young nonsmokers, aged 18–24 years, who were possibly vulnerable to smoking.

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 with those in the U.S. label condition (60% and 42%, respectively, favored raising the age; $p=.06$ 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

The use of graphic color warning labels, covering over 50% of the cigarette package, was initiated in Canada in December 2000. Surveys beginning in October/November 2001 indicated that the extent to

which smokers reported reading, thinking about, and discussing the new labels was associated with greater intentions to quit smoking and with actual quit attempts (Hammond et al., 2003). Smokers who quit before and after the introduction of the new labels were asked whether warning labels were a factor in their decision (Hammond, McDonald, Fong, Brown, & Cameron, 2004). 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 already intended to quit may have been more likely to read the larger labels and discuss them. Also, as noted earlier, cigarette taxes were increased and laws requiring all indoor public places in the study region to be smoke-free were implemented prior to the study (Hammond, McDonald et al., 2004). 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 examined voluntarily for longer durations than were the U.S. labels among both smokers and nonsmokers and also led to consistently more negative affect toward smoking cues and smokers themselves. A subset of young nonsmokers, aged 18–24 years, who were more vulnerable to smoking also demonstrated these effects. 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 after exposure to the Canadian warning labels, to smoking cues, and to a shopper who purchased cigarettes. 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.

We found little 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 to nearly the same level as nonsmokers. 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 both more negative and accessed more rapidly

than in the U.S. condition. This pattern of reactions was not unexpected given the careful research conducted by the Canadians in developing the warning labels (Health Canada, 2003; Mahood, 2004). This research also suggested that a majority of smokers are supportive of such labels and appreciate the information they provide. 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 serve as effective warnings against cigarette smoking than current warning labels and also may facilitate more attempts and greater success at smoking cessation (Hammond, McDonald et al., 2004).

The use of Canadian-style labels may be an important component of a national tobacco-control strategy for several reasons. First, current smokers and potential smokers can be easily and efficiently reached with these warnings whenever they purchase or use cigarettes. Indeed, there is no more efficient method of reaching smokers than through the use of graphic and highly visible warning labels. 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 (Argo & Main, 2004). Second, considerable psychological research suggests that the mere presentation of hazard information is not sufficient to motivate perceptions of risk (Slovic, 2000). Risk is most readily communicated by information that arouses emotional associations with the activity (Hibbard & Peters, 2003). 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 convey the appropriate degree of risk associated with the use of the product. Third, emotional associations can be readily accessed from memory by the mere presentation of the relevant stimulus (Zajonc, 2000, 2001). 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 (Hammond, Fong et al., 2004; Hammond et al., 2003; Romer & Jamieson, 2001; Slovic, 2001).

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. At the same time, it is possible that the novelty of the Canadian labels increased

their salience, giving them more impact. This might explain the longer time spent looking at them and provides the alternative hypothesis that the effects we see are related to an experimenter demand effect that was different for Canadian labels than for U.S. labels. Controlling for looking time, however, did not change the significance of condition, suggesting that this factor did not account for the greater impact of the Canadian labels. Furthermore, although 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 and thus may have benefited the U.S. labels. Nevertheless, the Canadian labels had more impact. In addition, all measures were taken very near in time to the exposure to the labels. Effects of long-term exposure (that could result in habituation to the labels) and effects at a time distant from exposure (when demand effects would lessen) were not studied. Of course, as mentioned previously, many of the people in Canada who stopped smoking attributed their quitting to the graphic warning labels; this non-laboratory finding is suggestive of a long-term causal effect. A final limitation is that our design did not allow us to separate the influence of the graphic pictures from the textual risk information provided by the Canadian labels. However, a long line of research on the fear-arousing capacity of health messages suggests that graphic pictures illustrating health risks adds considerably to the emotional reaction to the warning (Ruiter et al., 2001; Witte & Allen, 2000).

Despite these limitations, the present study, combined with similar results from nonlaboratory surveys in Canada, lends support to recommendations to use Canadian-style warnings on all cigarette packages in the United States. 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 U.S. Senate to ratify the International Framework Convention on Tobacco Control that encourages signatories to use Canadian-style warnings.

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