

Effects of Including a Graphic Warning Label in Advertisements for Reduced-Exposure Products: Implications for Persuasion and Policy¹

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Considerable interest has focused on making warning labels on tobacco-product packaging more effective in communicating risk to current and potential smokers. However, none of this work to date has involved the communication of risk information about reduced-exposure products, or how a graphic warning label may function in advertisements. Reduced-exposure products pose an interesting public health challenge in light of the fact that many advertisements for such products convey safety claims that may undermine the likelihood that potential consumers will process warnings about the products. The present study examines the influence of graphic warning labels on ratings of advertisements for 3 different types of tobacco products. Results showed that including a graphic picture lowered the appeal ratings for the product.

Warning labels on tobacco advertisements and product packaging are a major way in which people are informed about the risks of tobacco use. There has been considerable interest in determining how to make these labels more effective in communicating health risks to current and potential smokers. A study by Strahan et al. (2002) reviewed ways in which the effectiveness of warning labels on tobacco packaging could be enhanced. One proposed method is to incorporate fear appeals into warning labels, such as graphically discussing or illustrating the consequences of continuing to smoke. By evoking fear in smokers, these labels may reduce unhealthy behavior.

New health warnings on cigarette packaging were introduced in Canada in 2000. At present, 50% of the packaging is covered by a warning label that includes full-color graphics of a diseased lung or heart, as well as warning

¹This research was funded by a pilot grant to Eugene Borgida from the Minnesota Transdisciplinary Tobacco Use Research Center (TTURC), NCI/NIDA P50 DA-13333. None of the authors involved in the research have any competing interests. This work was reviewed and approved by the Institutional Review Board at the University of Minnesota. The authors thank Dorothy Hatsukami and Mitch Zeller for their helpful comments on an earlier version of the manuscript.

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statements about the dangers of smoking. These graphic labels are presented as an example of a fear appeal in warning labels (Strahan et al., 2002).

The influence of these new graphic warning labels on Canadian tobacco products has been evaluated by Hammond and colleagues (Hammond, Fong, McDonald, Brown, & Cameron, 2004, 2006; Hammond, Fong, McDonald, Cameron, & Brown, 2003). In a survey of Canadian smokers that was conducted 9 months after the new labels were introduced, the more smokers reported thinking about and reading the labels, the more likely they were to quit or reduce their smoking. Also, the more negative were the emotions that smokers had in response to the labels, the more likely they were to quit or reduce smoking. In a survey of Canadian smokers who had quit since introduction of the graphic warning labels, 31% reported that the labels had motivated them to quit (Hammond, McDonald, Fong, Brown, & Cameron, 2004). These survey data suggest that graphic warning labels on tobacco products may well serve as an effective smoking-cessation and reduction intervention.

Graphic warning labels also contribute to smokers' knowledge of health risks. A survey conducted with smokers in the United States, Great Britain, Canada, and Australia assessed how graphic warning labels on tobacco packaging may impact smokers' awareness of the health risks associated with smoking (Hammond, Fong, McNeill, Borland, & Cummings, 2006). This survey, which was completed in 2002, found that there are gaps in smokers' knowledge of some health risks related to smoking, particularly the risk of strokes. Also, smokers' knowledge of the toxic ingredients included in cigarettes was low. However, this survey also demonstrated that health warnings on tobacco packaging contributed to knowledge about health risks: Over 87% of Canadian smokers (the only country at the time to incorporate large graphic warnings in tobacco packaging) reported the packages as a source of health information, whereas only 47% of U.S. smokers (the country with the smallest and most general warnings) reported the packages as a source of information.

Using a graphic picture in a warning label makes it more likely that smokers will notice that label and use it as a source of information about health risks. Given that this recent survey (Hammond et al., 2006) found gaps in smokers' knowledge of the risks associated with smoking (and that the known risks of smoking continue to grow as new data are analyzed), it is clearly important to examine ways of increasing awareness of these health risks.

Increasing the effectiveness of warnings in tobacco advertising, rather than packaging, is not a priority in many countries, as they already have agreed to the terms of the World Health Organization's Framework Convention on Tobacco Control Treaty (FCTC, 2003), which calls for a ban on all tobacco advertising. The United States, which has signed but not yet ratified the FCTC, would have difficulty enacting this requirement, given the

legitimate Constitutional issues discussed in Article 13 of the treaty. For this reason, improving the effectiveness of warning labels in advertising remains an important goal in the U.S. Further, with the introduction of new products claiming reduced exposure to toxins, the importance of conducting research on how people respond to advertisements for reduced-harm tobacco products has been enhanced (see Hatsukami et al., 2007).

Research to date has focused on surveys of smokers, but has not addressed experimentally how including a graphic warning label in advertising for reduced-harm tobacco products affects how consumers view that product. This is an especially interesting arena, given that warning labels emphasize potential harm, whereas products that claim reduced exposure often make explicit safety claims in their advertising. This feeds into the key public health issue concerning these products; namely, that potential or current smokers may believe that using these products is safe, and thereby initiate smoking or fail to quit smoking.

Parascandola, Marcus, and Augustson (2005) analyzed data from a national survey of over 6,000 adults—of whom 1,200 were smokers—and examined their current use and interest in trying reduced-exposure tobacco products, such as reduced carcinogen cigarettes (e.g., Omni™, Accord™). They found that although only 4.8% of current smokers reported trying a reduced-exposure cigarette, 59.2% of current smokers reported being *interested* in trying a reduced-exposure cigarette, and 29.1% of current smokers reported being *very interested* in trying a cigarette advertised as less harmful than current cigarettes.

Although current use of new reduced-exposure products is apparently quite modest, these data suggest that large numbers of current smokers are interested in trying reduced-exposure products, as may former smokers or even nonsmokers. This high level of interest also shows the importance of research examining how current and potential smokers respond to advertisements about these products that claim reduced exposure to carcinogens, and how they may balance the different sources of information in these advertisements, such as product claims or warning labels. Also, the Food and Drug Administration (FDA) does not currently regulate advertising for reduced-exposure (or regular) tobacco products, making it even more essential for researchers and policymakers to understand how people respond to and evaluate these advertisements.

The focus of the present paper is to extend work on graphic warning labels to an experimental paradigm incorporating advertisements for reduced-exposure tobacco products. We examine how college-age smokers and nonsmokers respond to advertisements that include a graphic picture in the warning label. We predict that including a picture will override reduced-harm claims in the advertisement language and will make the product seem less

appealing, especially to smokers, to whom it holds more relevance. We also test whether the size of the warning label and picture might influence how people respond to the advertisement. We predict that a larger warning label and a graphic picture will be even more influential on participants' responses to advertisements than will a small warning label. Finally, we include three types of reduced-exposure tobacco products (oral tobacco, nicotine lozenge, and reduced-harm cigarettes) in order to examine whether the effects of including a graphic picture and the size of the warning label are consistent across different types of products.

All of these products are considered reduced-exposure products by the Institute of Medicine. However, the products differ in their levels of true safety. The nicotine lozenge is the only product of the three to be FDA-approved as a quitting aid, and it has not been shown to contain toxicants other than nicotine (Henningfield & Slade, 1998). It is expected that participants will perceive this product as safer than the other two, perhaps even disregarding the information in the warning label and the graphic picture.

Method

Participants

The participants were 92 undergraduate students (25 male, 67 female) at a large midwestern university who participated in exchange for extra credit in an introductory psychology course. Participants' mean age was 23 years (range = 18–60 years). Of the participants, 24 were identified as smokers through their affirmative responses to the question "Have you smoked in the last 30 days?" Those who identified themselves as smoking in the past 30 days indicated that they smoked more regularly (on a separate question assessing regularity of smoking on a 7-point scale) than those who had not smoked in the past month.

Procedure

The participants viewed three advertisements for tobacco products via the computer program E-prime[®] (Psychological Software Tools, 2002), which controlled presentation of the pictures and questions. One advertisement was for an oral tobacco product and was adapted from an advertisement for Skoal[™] tobacco, which included a picture of a firefighter and the language "A bit braver, a pinch better." A second advertisement was for a nicotine lozenge and was adapted from an ad for Commit[™] lozenges, a pharmaceu-

tical product, and included language emphasizing using the lozenge to help quit smoking, and to fight cravings and irritability. The third advertisement was for reduced-exposure cigarettes, and was adapted from an advertisement for Omni™ cigarettes, with language emphasizing the reduced carcinogens of the cigarette. All of the advertisements included the language from the original ad; only the names of the products were changed so as to be new to participants. The order of advertisements was counterbalanced and did not influence results.

Half of the participants viewed advertisements with the standard Surgeon General's tobacco warning label, and half viewed advertisements with the same label including a graphic picture of a diseased heart or mouth. The text of the warning label read "This product may contain harmful byproducts and is not a safe alternative to regular cigarettes. Quitting smoking now greatly reduces risks to your health." Within these groups, half of the participants viewed a standard-sized warning label (i.e., 10% of the advertisement space), while for the other half the warning label was larger (i.e., 25% of the advertisement space). Therefore, this study involves a 2 (Picture: present vs. absent) \times 2 (Label: large vs. small) \times 3 (Product: lozenges, cigarettes, or oral tobacco) mixed-factorial design.³

Participants were allowed to view each advertisement on the computer screen as long as they wished. After each advertisement, participants first answered free-response, open-ended questions about their impressions of the advertisement. Specifically, they responded to the prompt "Please write down everything you can remember about the advertisement."

Participants next answered questions about the ad's appeal, their interest in trying the product, their intention to purchase the product, perceived safety of the product, perceived trustworthiness of the health claims made in the ad, and overall appeal of the product. All responses were rated on a 7-point Likert scale, with higher values relating to judgments of greater appeal, greater interest in trying and purchasing the product, and greater perceived safety and trustworthiness of the product. Upon completion of these tasks, the participants were debriefed.

Coding of Open-Ended Responses

The content of participants' responses to the open-ended question was coded for the following categories: mention of warning label, product description, and advertisement description. There was also a category for

³Copies of the advertisements and pictures are available upon request from the first author.

responses that did not fit the aforementioned descriptions. This coding process was unambiguous and was completed by three of the authors and one research assistant.

For the category of *mention of warning label*, specific responses included in this category were mention or evaluation of the graphic picture (e.g., “nasty,” “disgusting”); use of the term *Surgeon General*; language from the warning label; and mention of the presence of the warning label. For the category of *product description*, specific responses were use of the terms *lozenge*, *snuff*, *smokeless tobacco*, *chew*, *low tar/nicotine cigarette*, and *reduced carcinogens*. For the category of *advertisement description*, specific responses were mention of the main figure in the advertisement (e.g., “woman,” “red shirt,” “fireman/firefighter”); other details about the advertisement (e.g., “orange background,” “product box,” “tin/canister/container,” “fire/blaze/flame”); and language from the advertisement, including information about how to use the product. Responses that did not fit into these categories (e.g., general evaluations of the advertisement or product, other comments) were placed into a category labeled “Other.”

Results

The size of the label did not influence any of the advertisement ratings and did not interact with presence of a picture or with type of product. Therefore, all of the following results are collapsed across size of label and focus on the effects of including a graphic picture in the warning label for the different types of products.

Including a picture in the warning label changed how participants responded to the advertisement on all questions asked. Advertisements that included a picture in the warning label were viewed as less appealing, $F(1, 90) = 5.62, p < .02$. After viewing these advertisements, participants were less interested in trying the product, $F(1, 90) = 4.37, p < .04$; and found the product less appealing, $F(1, 90) = 9.24, p < .04$. Participants were also marginally less interested in purchasing the product, $F(1, 90) = 3.52, p < .06$. These advertisements were rated as having less trustworthy claims, $F(1, 90) = 5.39, p < .03$; and the product was rated as less safe, $F(1, 90) = 5.81, p < .03$.

There were also strong effects for type of product. Of the three types of products, the nicotine lozenge was viewed as the most appealing, both for the advertisement, $F(2, 89) = 9.70, p < .0001$; and for the product itself, $F(2, 89) = 14.86, p < .0001$. With regard to the nicotine lozenge, participants were more interested in trying, $F(2, 89) = 15.20, p < .0001$; and potentially purchasing the product, $F(2, 89) = 11.55, p < .0001$. Lastly, compared to the other two products, participants viewed the lozenge advertisement as having

the most trustworthy claims, $F(2, 89) = 13.47, p < .0001$; and the product as most safe, $F(2, 89) = 41.70, p < .0001$.

There were no interactions with picture. However, examination of the means suggests that including a graphic picture did not alter ratings as strongly for the nicotine lozenge as for the other two types of products. Table 1 presents the means, standard deviations, and effect sizes for all ratings for the three products.

Do smokers and nonsmokers react differently to advertisements based on whether the ads contain a graphic picture in the warning label? Including smoking status in the analyses changed responses to two questions: Smokers were more interested in trying the product ($M = 2.50$) and purchasing the product ($M = 2.26$) than were nonsmokers ($M_s = 1.80$ and 1.65 , respectively), $F_s(1, 90) = 5.39$ and $4.71, p_s < .03$, for smokers and nonsmokers, respectively. Table 2 presents the means and standard deviations of responses to these questions for smokers and nonsmokers. For all other questions, smoking status did not affect responses and did not interact with the variable of presence of a picture.

Finally, the open-ended reports of memory for the advertisement were analyzed. After viewing advertisements that included a picture in the warning label, participants more often mentioned that they noticed the warning label and included more language from the warning label in their memory reports ($M_s = 1.69$ and 1.20 for picture and no picture, respectively), $F(1, 90) = 5.34, p < .02$. Presence or absence of a picture in the warning label did not influence memory for the product or other details of the advertisement. Also, participants remembered more information from the warning label of the oral tobacco advertisement, compared to the other two types of products (oral tobacco, $M = 1.87$; lozenge, $M = 1.27$; cigarettes, $M = 1.77$), $F(2, 89) = 7.11, p < .001$.

Regression analyses show that participants who included more information about the warning label in their open-ended descriptions of the advertisement had lower evaluations of the safety of the reduced-exposure cigarettes ($b = -.267, p < .036$) and oral tobacco ($b = -.181, p < .011$), but not the lozenge ($b = -.082, p < .17$). Mention of information about the warning label did not influence any other ratings of the advertisement or product.

Memory for details of the product and the advertisement influenced ratings of the appeal of the ad. For the lozenge, the more details the participants recalled about the product, the higher were their appeal ratings of the advertisement and the product ($b_s = .573$ and $.670, p < .016$, for appeal of the ad and the product, respectively), the more interested they were in trying and purchasing the product ($b_s = .781$ and $.586, p < .02$, for trying and purchasing the product, respectively), and the more they perceived the product as safe ($b = .671, p < .006$). For the reduced-exposure cigarettes, the more partici-

Table 1

Means of Appeal Ratings

Product/Item	Picture		No picture		Effect size (<i>d</i>)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Nicotine lozenges					
Appeal of advertisement	3.28	1.53	3.54	1.49	.17
Interest in trying product	2.18	1.53	2.56	1.83	.22
Intention to purchase product	1.95	1.46	2.33	1.71	.24
Perceived safety of product	3.02	1.55	3.50	1.56	.31
Trustworthiness of health claims in advertisement	2.91	1.27	3.44	1.47	.38
Appeal of product	2.80	1.64	3.27	1.71	.28
Reduced-exposure cigarettes					
Appeal of advertisement	2.58	1.78	3.38	1.57	.47
Interest in trying product	1.82	1.62	2.52	1.90	.39
Intention to purchase product	1.61	1.40	2.25	1.91	.37
Perceived safety of product	1.86	1.23	2.42	1.49	.40
Trustworthiness of health claims in advertisement	2.16	1.22	2.67	1.46	.37
Appeal of product	2.00	1.46	2.96	1.88	.55
Oral tobacco					
Appeal of advertisement	2.21	1.61	2.75	1.51	.34
Interest in trying product	1.20	.67	1.56	1.17	.37
Intention to purchase product	1.23	.68	1.43	.97	.24
Perceived safety of product	1.59	.92	2.08	1.27	.43
Trustworthiness of health claims in advertisement	2.30	1.46	2.79	1.27	.36
Appeal of product	1.59	1.06	2.29	1.54	.51

Note. All items were rated on a Likert scale ranging from 1 to 7, with higher numbers indicating higher appeal.

pants recalled about the product, the more they perceived the product as safe ($b = .590, p < .049$) and the advertisement as making more trustworthy claims ($b = .624, p < .038$). However, for the reduced-exposure cigarettes, the more participants recalled about the advertisement, the lower were their appeal

Table 2

Means for Interest in Trying and Purchasing Products: Smokers and Nonsmokers

Product/Item	<i>Smokers</i>		<i>Nonsmokers</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Nicotine lozenges				
Interest in trying product	3.13	1.83	2.12	1.58
Intention to purchase product	2.79	1.84	1.93	1.45
Reduced-exposure cigarettes				
Interest in trying product	3.00	2.11	1.90	1.59
Intention to purchase product	2.58	2.08	1.72	1.50
Oral tobacco				
Interest in trying product	1.38	1.10	1.40	0.93
Intention to purchase product	1.42	1.10	1.31	0.74

Note. All items were rated on a Likert scale ranging from 1 to 7, with higher numbers indicating greater interest.

ratings of the product ($b = -.363$, $p < .021$). Lastly, for the oral tobacco product, the more participants recalled about the product, the lower were their appeal ratings of the product ($b = -.614$, $p < .036$).

Discussion

Including a graphic picture in an advertisement for a tobacco product not only affected appeal of the product and the advertisement, but also affected perceptions of the claims included in the ad. Participants who viewed advertisements with a graphic picture in the warning label found both the advertisement and the product to be less appealing, as well as less trustworthy and less safe; and they were less interested in trying and purchasing the product.

Across the measures, the effect sizes were impressively moderate, with most showing a medium effect. This effect occurred regardless of the size of the graphic picture. Also, participants found different types of products to be differentially appealing, with the nicotine lozenge rated as more appealing, safer, and with more trustworthy claims, resulting in more interest in the product and higher purchase intention. Also, as shown in Table 1, the effect

sizes for including a graphic picture in the warning label were smallest for this product for all appeal questions. In general, therefore, including a graphic picture in an advertisement does achieve the goal of getting recipients to attend to and process the message included in the warning label of the advertisement.

Including a graphic picture in a warning label also increased participants' memory of the warning label in the advertisement, which, in turn, for the reduced-exposure cigarettes and the oral tobacco, reduced ratings of the safety of the product. Memory for the advertisement and the specific product also influenced ratings of the advertisements and products, with increased memory generally leading to higher appeal for the lozenge, but lower appeal for the oral tobacco product. For the reduced-exposure cigarettes, higher memory for the product increased ratings of trustworthiness and safety, but higher memory for the advertisement lowered ratings of the appeal of the product. It is unclear whether these effects for memory of the product and advertisement are a result of specific details of the specific advertisements used, and whether they would remain the same if different advertisements were used.

Smoking status did not moderate the effectiveness of a graphic picture in the warning label and only affected two responses: Smokers were more likely to indicate interest in trying and purchasing the products. This may be because in our college student sample, most participants who indicated that they smoked in the last 30 days may not be heavy smokers. Even though participants who smoked in the last 30 days also indicated that they smoked more regularly than participants who had not smoked in the last 30 days, they still may only be smoking at a light or social level. Therefore, their smoking status may not be strongly related to their responses to the advertisements and warnings. Indeed, it is important to note that an examination of the means for both smokers and nonsmokers shows that although interest ratings were higher for smokers, all were below the midpoint, indicating relatively low interest in trying or purchasing these products. It would be useful for further research to incorporate a group of heavy smokers, who may be more interested in reduced-exposure products, in order to determine whether they are perhaps less (or more) likely to be affected by viewing a graphic warning label as part of an advertisement for reduced-exposure tobacco products.

Participants' more positive responses to the lozenge are consistent with scientific examination of pharmaceutical nicotine lozenges (Henningfield & Slade, 1998), in that the product has been FDA-approved for use as a quitting aid and has been evaluated as safer than smoking. Even including a graphic picture and a warning on an advertisement for this type of product did not make participants feel that the product was unsafe. For the nicotine

lozenge, participants seemed to put less weight on the (false) information in the warning label and perhaps relied on their implicit knowledge or assumptions about the relative safety of such products, reaching the conclusion that the product is safe, at least as compared to the other two.

If people rely on their own knowledge or assumptions of the safety of products and disregard contradictory information, then they may dismiss information provided in a warning label or in other health communications about such products. The question of whether consumers' perceptions of non-tobacco products (e.g., lozenges) as "safe" block or inhibit their processing of information about possible health risks of these products should be examined, especially in light of increasing development of new products by major tobacco companies. Although these are safer products, effective communication of potential risks is still an important issue to examine. Experimental paradigms are most amenable to studying the processing and inference strategies used by current and potential consumers to respond to advertising and other information about new products.

These findings are especially interesting in that they were obtained in the context of advertisements for reduced-exposure products, which explicitly make claims about decreased risk. Claims in advertisements of reduced harm and reduced carcinogens for reduced-exposure tobacco products are not currently regulated by the FDA, and advertising for these products will continue in the United States until Congress ratifies the FCTC. Incorporating a graphic picture in a warning label seems to be an effective way to present potential safety concerns to the consumer, which otherwise may be ignored. As more and more of the products enter the market with diverse claims about reduced harm, health policymakers may wish to consider incorporating the use of graphic pictures with warnings to ensure balanced information about these products for the consumer.

These are also particularly interesting findings in light of concerns that, under certain circumstances, fear appeals may adversely affect the processing of persuasive communications. Use of a graphic picture in the context of tobacco packaging was considered a fear appeal by Strahan et al. (2002). Potential problems with fear appeals include the concern that consumers will be so upset by the picture that they will ignore the picture and the warning completely.

This very concern was highlighted by Ruiter and Kok (2005), who suggested that a graphic picture might activate defensive processes in the individual, resulting in the consumer ignoring the warning altogether. Our findings suggest the opposite: that viewing a picture in the warning label seems to capture participants' attention and lead to *increased* processing of the warning label claims. Our participants noticed the picture, but were not so overwhelmed emotionally as to ignore the warning label altogether,

judging by their memory data. This experimental investigation clearly suggests that including a graphic picture in the warning label did not activate resistance to persuasion processes (Crano & Prislin, 2006; Knowles & Linn, 2004).

Future research should examine in more detail how consumers react to different types of tobacco products, as graphic pictures may be more effective in changing attitudes about certain types of products (e.g., oral tobacco) than others (e.g., nicotine lozenges). Future research should also include participants who smoke at heavier levels to determine whether heavy smokers may react differently to viewing a graphic warning than lighter smokers. Finally, health policymakers should consider the potential benefits of tobacco advertising that uses a graphic picture in combination with a warning label in order to direct consumers' attention to the content of warning labels.

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