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Tobacco Harm Reduction Advertising in the Presence of a Government-Mandated Warning

Compelling research suggests that smokeless tobacco (SLT) products are safer than cigarettes, but awareness of this potential harm reduction alternative among consumers is low. Therefore, two between-subjects experimental studies explore the potential for allowing the marketing of SLT as a "reduced-risk" alternative to cigarette smoking. Specifically, this article addresses the issue of whether a harm reduction message with the simultaneous presence of the U.S. government-mandated warning would: (1) change intentions of smokers to use SLT products; or (2) attract those who would not otherwise use any tobacco. Results suggest that an advertiser making a harm reduction statement in the presence of the warning leads to limited changes in consumers' risk perceptions of SLT products or intentions to try the product. Exposure to the experimental ads did not make non-smokers significantly more likely to try SLT products, but also did not make smokers indicate that they were likely to switch to SLT products.

Although increased awareness of the dangers associated with smoking has been successful in helping some consumers to quit smoking and preventing others from starting, millions of Americans continue to smoke. As such, viable options for smokers to reduce the harmful effects of smoking should be explored. Among the proposed options is increasing public awareness of the relative health risk of smokeless tobacco (SLT) in comparison to cigarettes (Britton and Edwards 2008; Kozlowski 2007). SLT may refer to a variety of oral tobacco products including tobacco in a pouch, moist snuff, lozenges or strips. However, for the purposes of this research, we examine SLT products low in nitrosamines, a known carcinogen (for a review, see Helliker 2007). A review of the extant literature indicates that a strong majority of scientific evidence suggests that SLT that is low in nitrosamines is considerably

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The Journal of Consumer Affairs, Summer 2012: 235–259
DOI: 10.1111/j.1745-6606.2012.01229.x
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less harmful to users than cigarettes (Gartner et al. 2007; Lee 2007). However, research also suggests that a majority of the public is not aware of this difference in risk. Moreover, SLT marketers are currently not allowed to communicate harm reduction information in marketing communications.

The underlying principle of harm reduction is that a product that has adverse health consequences is promoted as a substitute for one that has more severe adverse health consequences (Institute of Medicine 2001). Research suggests that a very substantial portion of the risk associated with smoking might be eliminated with SLT. Although the exact magnitude of reduction in risk gained from substituting use of SLT for cigarette smoking is not easily quantified and is the subject of disagreement, there appears to be a consensus among experts that SLT is considerably safer than cigarettes. Estimates from previous research range from 90% up to 99% reduction in risk (Levy et al. 2004; Rodu and Cole 2002). Specifically, switching to SLT reduces the risk of fatal heart and lung diseases because the tobacco is not incinerated. Hence, the primary question is no longer about whether SLT is considered by the scientific community to be of significantly less risk than cigarette smoking, but whether the population as a whole could benefit from information which communicates the relative risk of using SLT vs. smoking cigarettes.

Studies suggest that Americans are not well informed about the relative risk of SLT and cigarettes (O'Connor et al. 2005). A key issue that has not been addressed in previous research is the potential ramifications of communicating the relative risks associated with SLT vs. cigarettes to consumers. The current regulatory environment does not allow for SLT marketers to communicate harm reduction information in the advertising and promotion of their products. However, the Family Smoking Prevention and Tobacco Act (S.982, H.R. 1256) provides for the possibility that such information could be communicated if several conditions are met. Whether these conditions are likely to be met is the subject of this research.

Specifically, the research examines the potential effectiveness of advertising for SLT that includes both harm reduction messages and warning messages. To this end, the first question examined is the degree to which harm reduction messages can potentially increase public understanding of the relative risk of low nitrosamine SLT vs. cigarettes. For such messages to have any impact, they would need to change public perception. A second question is the degree to which smokers may be prone to switch from cigarettes to SLT when exposed to harm reduction

messages. Again, this question is important in the context of whether allowing harm reduction information to be communicated would have an actual impact on smokers, in this case from a behavioral perspective. A third question is the impact of harm reduction messages on nonsmokers' evaluations and intention to use SLT, as this could be a potential undesirable unintended consequence from a public health standpoint. Finally, the fourth question explored in this research is whether message framing (positive vs. negative) makes a difference in the effectiveness of the harm reduction message. Collectively, these questions allow for an assessment of whether allowing harm reduction information to be communicated through advertising to consumers could be effective and worthwhile in terms of potential harm reduction.

REGULATORY BACKGROUND

As the scientific consensus on the harm reduction properties of SLT is a relatively recent development, the debate over whether harm reduction information should be allowed in SLT advertising is receiving increased attention (Taylor and Capella 2008). Central to any discussion of this debate is the Family Smoking Prevention and Tobacco Act of 2009 (S. 982, H.R. 1256), which grants the Food and Drug Administration (FDA) regulatory authority over the marketing of tobacco.[1] The law offers the possibility for tobacco companies to promote products that can be proven to "significantly reduce harm" to smokers if the products' availability would also benefit the health of "the population as a whole." However, the bill specifies several conditions that would need to be met in order for harm reduction information to be communicated by any marketer of tobacco products. These conditions include establishing that the communication of harm reduction information would lead to positive overall population effects.

Under the law, promoting new SLT products associated with lower health risks as "harm reducing" can be approved only if makers can demonstrate health benefits to society as a whole. The SLT products would need to be sure to not induce nonsmokers or would-be quitters to try SLT rather than abstaining. Consequently, a tobacco product labeled or marketed as being less harmful than any other tobacco product, or as containing less of any substance, or as presenting a reduced exposure to

1. A summary of the required changes required under the Family Smoking Prevention and Tobacco Act is available at: http://www.fda.gov/TobaccoProducts/GuidanceComplianceRegulatoryInformation/ucm246129.htm.

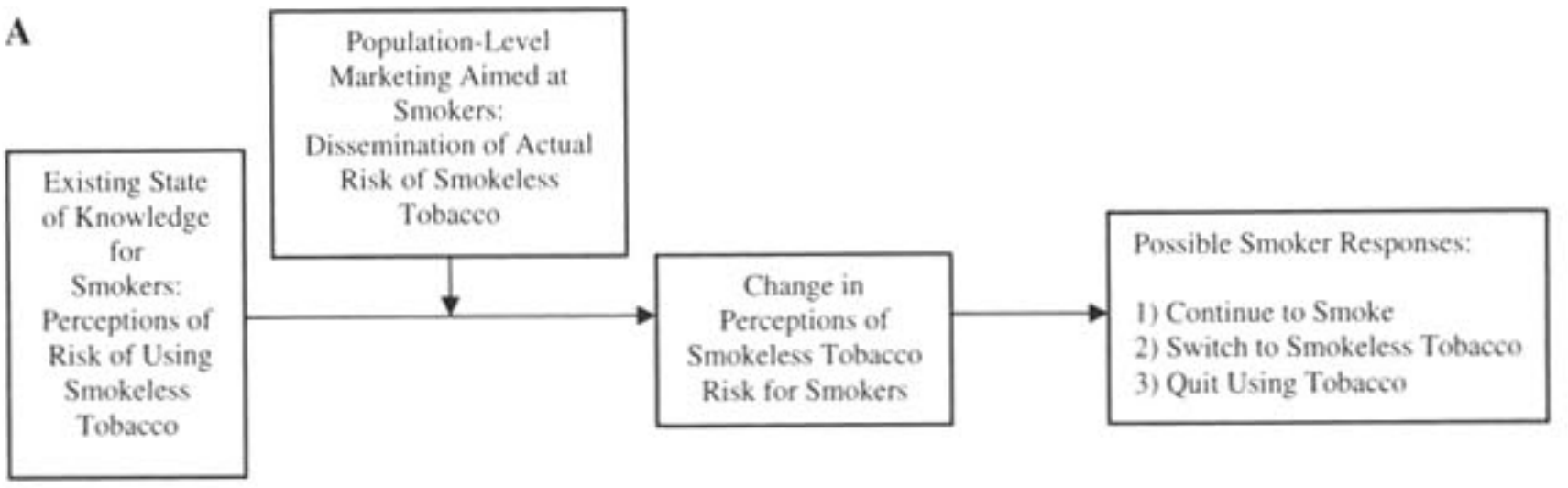
any substance, is subject to FDA regulations. Specifically, any application to market a "modified risk tobacco product" may be approved only if the applicant has demonstrated that the product will significantly reduce harm to individual tobacco users and to the population as a whole. Specifically, products claiming only reduced levels of exposure to specific substances may be approved without epidemiologic study for up to five years if (1) the level/exposure claim is truthful, (2) the product does not increase exposure to other harmful substances, (3) data other than epidemiologic study of the product suggest a health benefit is likely, (4) consumers will not be "misled" into believing the product is less harmful, (5) approval will benefit public health, and (6) the manufacturer conducts and annually submits reports on "post-market surveillance and studies." Furthermore, in the absence of epidemiologic study, the expected health effects of a "modified risk tobacco product" will be compared to the health risks of nicotine dependence products (i.e., gum, patch, lozenges).

The Family Smoking Prevention and Control Act has the goal of improving public health by substantially reducing the disease and death associated with tobacco use through prevention, cessation and harm reduction by conveying broad oversight authority of tobacco to the FDA. The Act's requirements for provision of scientific proof of harm reduction leading to benefits to the population as a condition for promoting such information sets a high bar. An epidemiological study examining the health effects associated with providing harm reduction information is not feasible since it is not a legally accepted form of evidence under the Act.

Taylor and Capella (2008) proposed a model for assessing the population effects of marketing SLT as a harm reduction product (see Figure 1). The model requires clear scientific evidence that low nitrosamine SLT actually reduces harm as compared to cigarettes, and evidence from the literature seems to provide support that SLT is in fact less harmful than cigarettes (Levy et al. 2004; Taylor and Capella 2008). The model also makes clear that in order to meet the FDA standard for the use of a harm reduction statement (HRS), research must show that the provision of harm reduction information would lead consumers exposed to the information to believe and remember that a product provides reduced risk.

Although this step may appear to address a self-evident point, it is in fact critical to document that dissemination of harm reduction information would make a difference in consumers' perception of the degree of risk and confirm that consumers will not be "misled" as specified in the law. Assuming it is documented that public perceptions of risk are modified via advertising or labeling information, the next step is to examine the

FIGURE 1
Impact of Tobacco Harm Reduction Information on Smokers and Nonsmokers. (A) Smoker Population Effects, (B) Nonsmoker/Non-Tobacco User Population Effects



impact of harm reduction information on behavioral intentions of current and potential tobacco users. This study addresses the impact that the provision of harm reduction information has on: (1) beliefs about the relative risk of SLT vs. cigarettes, (2) attitudes toward the advertisement and SLT, and (3) behavioral intentions to use SLT as a result of exposure to harm reduction information.

CONCEPTUAL FRAMEWORK AND HYPOTHESES

The first five hypotheses in the study are based on the persuasion knowledge model of communication while the last two hypotheses are based on framing theory. The rationale for H1–H5 will be provided prior to discussing framing theory and the final two hypotheses.

Consumer Knowledge of the Relative Risk of SLT vs. Cigarettes

Research documents that most Americans view SLT and cigarettes as being similar in terms of risk (O'Connor et al. 2005; Smith, Curbow, and Stillman 2007). These results appear to be consistent across cultures as well, with findings in Canada and Europe demonstrating similar misperceptions of risk among smokers (Heavner, Rosenberg, and Phillips

2009; Wikmans and Ramstrom 2010). As a result of these beliefs of similar risk, it would seem likely that many members of the public exposed to an advertisement containing harm reduction information may be persuaded that SLT is less harmful than cigarettes.

The persuasion knowledge model has been applied to several areas related to persuasive communications, including personal selling (Campbell and Kirmani 2000), product placement (Cowley and Barron 2008), pricing tactics (Hardesty, Bearden, and Carlson 2007) and, most frequently, advertising (Ahluwalia and Burnkrant 2004). In the context of advertising, the persuasion knowledge model (Friestad and Wright 1994) suggests that consumers recognize commercial advertising as having persuasive intent on the part of the advertiser. This, in turn, can lead to skepticism and counter-argumentation. This model suggests a detailed model of the content, structure, and usage of everyday persuasion knowledge that focused on the context of advertising and marketing messages. Specifically, it focuses broadly on how people from childhood through adulthood develop and refine persuasion knowledge continually over time and gain skill in using advertising and persuasive communication. Friestad and Wright (1994) singled out the "change of meaning" as a key event that occurs periodically; this occurs when a message recipient first realizes that some aspect of an advertising message may well be an advertiser's intentional persuasion tactic. As a result, it is worth examining the degree to which a harm reduction message in an ad from an SLT manufacturer can increase consumer knowledge.

At the same time, the persuasion knowledge model suggests that the consumer considers the message itself in the context of the persuasive intent of the advertiser. Because consumers are used to health claims in advertising being regulated by the government and/or self-regulatory bodies, it would seem likely that harm reduction messages in SLT advertising would have good potential to improve consumer knowledge of the lower risk of SLT vs. cigarettes even after the persuasive intent and self-interest associated with the message was considered.

In the current regulatory environment, SLT product packages are required to carry government-mandated warning statements. As such, we include a warning on the study stimuli tested in the two main studies. However, prior to introducing hypotheses we include a research question that will be tested via a pretest in which an HRS is tested in the absence of a warning statement.

RQ1: Exposure to a harm reduction message in an advertisement in the absence of a warning statement will make smokers more likely to believe that SLT products are less harmful than cigarettes.

In the main study, it should be noted that the presence of the government warning statement may further contribute to counter-argumentation and reduce the extent to which the harm reduction message changes consumer perceptions. However, we hypothesize that the overall impact of the HRS will follow a similar pattern:

> H1: Exposure to a harm reduction message in an advertisement for smokeless tobacco in the presence of a warning statement will make a) smokers and b) nonsmokers more likely to believe that SLT products are less harmful than cigarettes.

As our hypothesis is based on the presence or absence of harm reduction information, we believe it is consistent with the protection motivation model which suggests combining the fear appeal (i.e., government warning) with another message (i.e., HRS) oriented toward the efficacy of the recommended response and self-efficacy can have a positive impact (Floyd, Prentice-Dunn, and Rogers 2000; Tanner, Hunt, and Eppright 1991). In other words, switching to SLT reduces the risk of fatal heart and lung diseases and the informed consumer has the ability to do so. However, the potential caveat associated with the presence of a government-mandated warning should be kept in mind with respect to the predictions that follow.

Smokers' Attitudes Toward SLT and Intention to Switch from Cigarettes to SLT

The persuasion knowledge model would also suggest that consumer skepticism related to a commercial message would make consumers factor skepticism into any decision related to changing their behavior. As a result, smokers would weigh the fact that any harm reduction information is in the interest of the SLT manufacturer (e.g., source credibility) in considering whether they like the ad and in considering whether to switch from cigarettes to SLT. As is the case with perception of risk, it is likely that consumers would weigh the believability of the message against skepticism of the ad. Again, it seems likely that many smokers would find the message believable in the context of an ad and, as a result, this would outweigh the impact of skepticism. Thus, among smokers, the following prediction is made:

> H2: Exposure to a harm reduction message in an advertisement that also includes a government warning will increase smokers' positive a) attitude toward the ad, and b) attitude toward smokeless tobacco.

H3: Exposure to a harm reduction message in an advertisement for smokeless tobacco that also includes a government warning will make smokers more likely to indicate that they would switch from cigarettes to smokeless tobacco.

Nonsmokers' Attitudes Toward SLT and Intention to Use SLT

From a public policy standpoint, a key question relating to the desirability of harm reduction information for SLT being communicated in advertising is whether providing such information would make nonsmokers more likely to use tobacco. If this were the case, some have argued that the presentation of harm reduction information could serve as a "gateway" to smoking (Haddock et al. 2001).

However, there is little evidence that promotion of harm reduction information would attract nonusers to the category. For instance, Swedish researchers examining usage data find that snus (Swedish SLT) has served as a pathway *from* smoking rather than a gateway to smoking among Swedish men (Foulds et al. 2003; Furberg et al. 2005; Ramstrom and Foulds 2006). Similar conclusions are reached in a comprehensive review of the existing evidence by Broadstock (2007), who concluded that SLT has a positive effect on smoking cessation and a negative impact on smoking initiation.

The persuasion knowledge model is, therefore, not as applicable in this case since it is unlikely that any message would convince a nonuser to smoke tobacco. While persuasion knowledge would still lead to the nonsmoker weighing the commercial aspect of the message, it remains likely that the nonsmoker would find the message believable (just as smokers do) based on the overall regulatory environment. However, it is unlikely that it would have any impact on changes in behavioral intent. Thus:

H4: Exposure to a harm reduction message in an advertisement that also includes a government warning will increase nonsmokers' positive a) attitude toward the ad, and b) attitude toward smokeless tobacco.

H5: Exposure to a harm reduction message in an advertisement for smokeless tobacco that also includes a government warning will not make nonsmokers more likely to indicate that they would use smokeless tobacco.

Framing of the Message

An extensive literature suggests that the way in which a message is framed has the potential to significantly influence the degree to which the message is effective in achieving its goals. This is particularly true with respect to health-related messages and those aimed at changing

health-related behaviors (Block and Keller 1995). In its widest sense, framing can be defined as the context within which information is presented. However, when it has been used by psychologists and others studying decision making, framing generally refers to presenting value outcomes, where one outcome is presented in positive (or gain terms) or in negative (or loss terms) (Donovan and Jalleh 1999). Specifically, a "gain-framed" appeal emphasizes the desirable consequences associated with compliance with the advocated viewpoint; a "loss-framed" appeal emphasizes the undesirable consequences associated with noncompliance. This concept of framing has wide explanatory power concerning a variety of concepts in consumer behavior and suggests that the framing of informational material affects the formation of paradigms in consumer decision making (Bazerman 1984).

However, past research yields contradictory and inconsistent predictions as to whether positive or negative frames are more persuasive (Chang 2007). In principle, greater fear arousal is associated with greater engagement with persuasive messages, and negative information and events are more potent than their positive counterparts. Hence loss-framed persuasive appeals, which emphasize the undesirable outcomes of noncompliance with the communicator's recommendations, should elicit greater message processing than do gain-framed appeals, which emphasize the desirable outcomes of compliance. But a meta-analytic review (O'Keefe and Jensen 2008) finds that gain-framed messages engender slightly, but significantly greater, message engagement than do loss-framed messages. What is important about this result is not the small, but statistically significant advantage for gain-framed appeals but rather the failure to find a significant advantage for loss-framed appeals. Given that negative information and events are more potent than their positive counterparts and given that fear-arousing messages commonly evoke greater message processing, the absence of any advantage for loss-framed appeals is notable.

So, it seems apparent that there is no empirical basis for supposing that loss-framed appeals will be more engaging to recipients than are gain-framed appeals. Thus, we predict:

> H6: A positively framed harm reduction message is more effective in increasing smokers' positive a) attitude toward the ad, and b) attitude toward smokeless tobacco.

> H7: Among smokers, a positively framed harm reduction message is more likely to increase the intent to switch from cigarettes to SLT.

Pilot Tests

Two pilot tests were conducted prior to the main studies. In the first pilot test, we examined the impact of brand by testing two real brands and a fictitious brand. The participants were 134 undergraduate business students (mean age = 20 years) at a major university in the United States. Study participants were shown various cigarette ad mock-ups with different real and fictitious brands. Brand effects did not impact study-dependent variables, nor did brand interact with the independent variables. The pilot test was also used to refine the HRS and measures used in the two main studies.

An additional data collection effort was undertaken to examine the initial research question regarding the potential effect of an HRS on smokers' risk perceptions in the absence of a government warning. Members of a professionally managed, nationwide, Internet research panel served as participants in the pilot study. Participants were 100 adult smokers (mean age = 20 years). Half of the participants were shown an SLT ad without any warning information or HRS. The other half of participants were shown the same ad but with an HRS that stated "This product is 90% less dangerous than cigarettes." The key dependent measure was a scale that asked participants to rate the risk associated with SLT products vs. cigarettes (e.g., "It is safer to use SLT products than it is to smoke cigarettes" and "SLT products are less harmful to a tobacco user's health than cigarettes"). Results show that participants in the HRS condition reported higher beliefs that SLT products were safer than cigarettes (mean = 3.96) than participants in the control condition with no HRS (mean = 3.23, $t = 1.51$, $p < .05$). This finding supports the first research question and confirms that an HRS in an ad (in the absence of warning information) does have the potential to impact smokers' beliefs of SLT relative to cigarettes.

Study 1—The Impact of Warnings and HRS on Adult Smokers and Nonsmokers

Sample and Procedure

Study 1 is designed to test the effects of different types of warning statements and HRSs on a general population sample of adult smokers and nonsmokers. Members of an Internet research panel served as participants. They ranged in age from 16 to 81 (mean and median age = 47). Sixty-six percent of the participants were female. Seventy-five percent of the sample had at least a high school diploma and the modal education level was "some college." The total number of participants

across the experimental conditions was 379. One hundred and eighty-five participants (49%) had smoked more than 100 cigarettes in their lifetime and at least once in the past 30 days. Consistent with previous research (Mowery et al. 2004), these participants were considered "smokers" for the purposes of this study. Nonsmokers made up the remaining 51% of the sample.

Participants were recruited by the panel company and sent to the URL containing the study. After completing some screening questions and an informed consent, participants were shown instructions encouraging them to examine the ad stimuli and to respond to all questions. The mock advertisement conditions were randomly presented to participants. Study participants then responded to the study measures and were debriefed and thanked for their participation in the study. These copy-testing procedures are consistent with previous research (Maronick 1991; Richards, Andrews, and Maronick 1995).

Experimental Design and Stimuli

A 3 (Warning: [1] no warning control, [2] current small warning, and [3] new larger warning) × 3 (HRS: [1] control with no HRS available, [2] loss-framed HRS, and [3] gain-framed HRS) × 2 (Smoker Status: [1] nonsmoker, and [2] smoker) between-subjects design was used in the study. The warning conditions were designed to include the warnings currently required by law prior to 2011 (smaller warning) vs. the new larger warnings required under the Family Smoking Prevention and Tobacco Control Act. The HRS conditions were designed to test the relative effects of a loss-framed HRS message (i.e., Using this product is 90% less dangerous than cigarettes) vs. a gain-framed HRS message (i.e., Using this product is 90% safer than cigarettes). Examples of the ad stimuli used in this study are shown in the Appendix 1. To capture baseline smoking and SLT risk perceptions, a control condition was utilized. Participants in the control condition (n = 45) did not see any ad stimuli and only responded to the risk perception measures.

In summary, to examine the effects of the warning, the HRS, and the combination of both, multiple control conditions were used. First, a "no-ad control" condition was used where study participants were not shown any ad stimuli at all. We also used a "warning control" where participants saw the ad stimuli without any warning message. Finally, we used an "HRS control" where participants saw the ad stimuli without any HRS. All aspects of the advertisement were consistent across all experimental conditions except for the manipulation of the warning and HRS.

Dependent Measures

Two sets of dependent measures are used to test the hypotheses: (1) perceptions of risk for SLT relative to cigarettes and (2) attitudes and intentions related to the ad and SLT. All participants answered the first set of risk questions, whereas only participants assigned to one of the ad conditions answered the second set of questions related to attitudes and intentions.

To measure risk perception for SLT relative to cigarettes, a scale was developed similar to risk measures in previous studies (Kees 2011; Keller, Lipkus, and Rimer 2003; Menon, Block, and Ramanathan 2002). For the relative risk measure, participants responded to six 7-point scale items anchored with Strongly Disagree and Strongly Agree. These statements included "It is safer to use SLT products than it is to smoke cigarettes," "SLT products are less harmful to a tobacco user's health than cigarettes," "Compared to cigarettes, SLT products reduce the chance of diseases related to smoking," "Using SLT products provides benefits to health over smoking cigarettes," "Using SLT products are safer to one's health than are cigarettes," and "SLT products are less harmful than cigarettes." This scale was reliable ($\alpha = .90$).

Participants assigned to any one of the ad conditions reported their evaluations of the ad and their attitudes toward SLT. Drawing from past attitude research, attitude toward the ad was measured with three traditional items using scale endpoints of "unfavorable–favorable," "negative–positive" and "bad–good." Coefficient α is .98 for this summated measure. Attitude toward SLT was measured using a similar scale ($\alpha = .99$). Participants were also asked directly how much the ad might influence their personal choice to use SLT. The three 7-point scales used were "The information presented in this ad would encourage you personally to try SLT" (*Strongly Disagree/Strongly Agree*), "How likely are you to try SLT based on the ad?" (*Very Unlikely/Very Likely*) and "Are you more or less likely to try SLT than before you saw the ad?" (*Much less likely/Much more likely*). The α for this measure was .92. Smokers were asked to respond to a similar intentions measure, but specifically with regard to their likelihood of switching from cigarettes to SLT.

Study 1 Results

Risk Perceptions

The first set of analyses was run to examine any potential changes in SLT risk perception from exposure to the SLT ad stimuli (i.e., warning and HRS manipulations) vs. the true no-ad control condition. Recall that the no-ad control condition did not present any ad stimuli and thus

TABLE 1
Results for Studies 1 and 2

Independent Variables	df	Univariate *F* Values: Risk of SLT vs. Cigarettes	Attitude Toward Ad	Attitude Toward SLT	Intentions
Study 1					
Warning Statement (WS)	(2,315)	0.80	0.01	0.49	0.49
Harm Reduction Statement (HRS)	(2,315)	1.45	0.84	1.30	0.38
Smoker Status (SS)	(1,315)	9.31**	61.74**	36.38**	24.02**
WS × HRS	(4,315)	1.06	0.39	0.22	1.19
WS × SS	(2,315)	2.31	1.70	0.40	1.31
HRS × SS	(2,315)	3.60*	3.57*	2.57*	0.58
WS ×HRS × SS	(4,315)	1.77	0.56	1.35	0.98
Study 2					
Ad Condition (AC)	(1, 74)	0.81	7.81*	0.38	0.00
Smoker Status (SS)	(1, 74)	3.35*	20.56**	32.09**	10.91**
AC × SS	(1, 74)	2.63*	0.02	0.84	3.78*

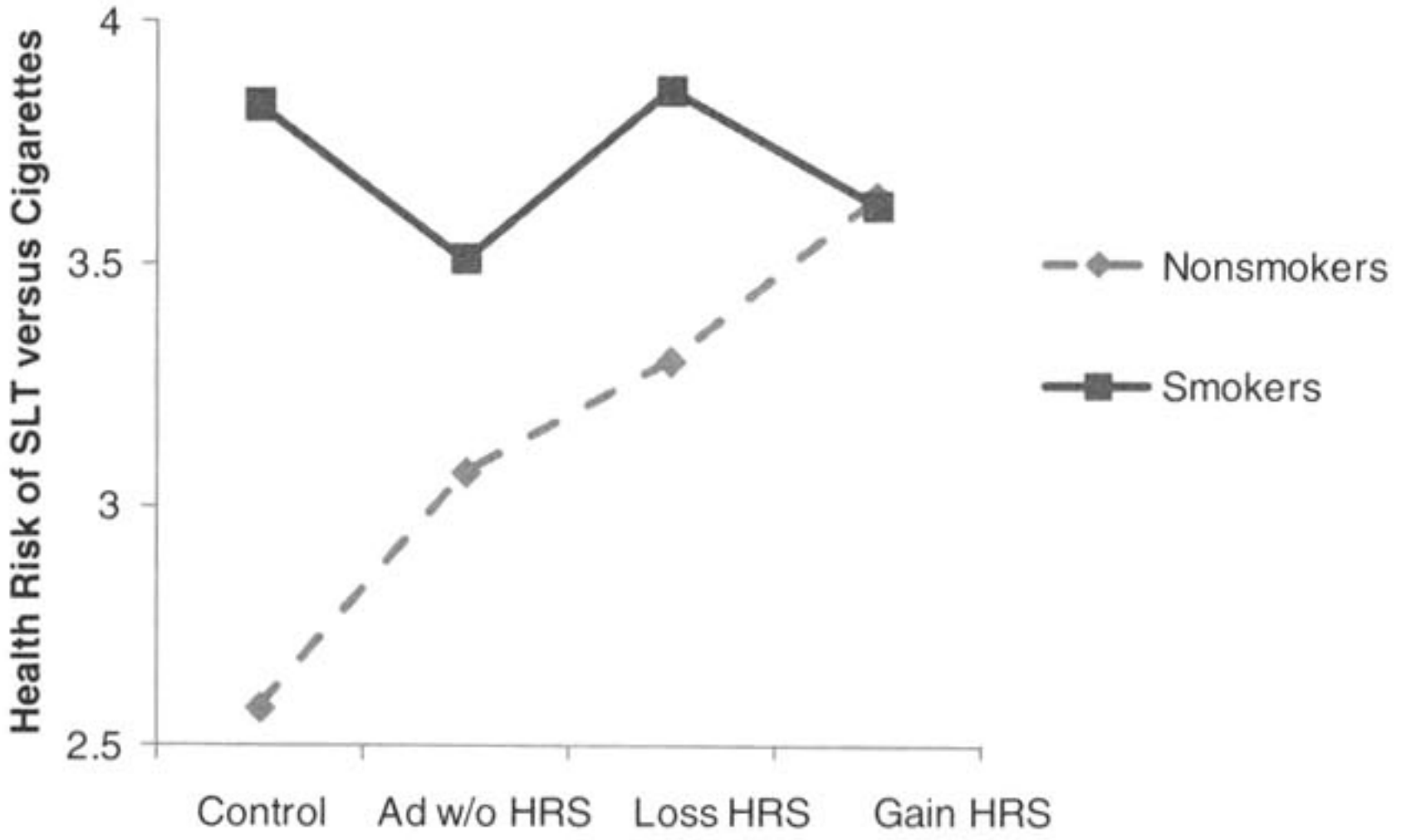
*$p < .05$, **$p < .01$.

provided a baseline level of SLT risk perceptions. A summary of findings is shown in Table 1.

H1 predicted that the exposure to an HRS in an advertisement would result in increased beliefs that SLT is safer than cigarettes. To test this prediction, ANOVA analysis with follow-up univariate contrasts are examined. A significant interaction between HRS and smoker status was found for the SLT vs. cigarettes relative risk measure ($F = 2.30$, $p < .05$). A plot of the interaction for the risk measure is shown in Figure 2. As shown in the figure, the pattern of results suggests that the HRS manipulation (in the presence of a warning label in all conditions) had unexpected mixed results on smokers' risk perceptions regarding SLT vs. cigarettes. The loss-framed HRS (mean = 3.86) had very little impact on risk perceptions vs. the no ad control (mean = 3.83). Similarly, exposure to the ad stimuli with no HRS (mean = 3.52) and with the gain-framed HRS (mean = 3.61) made little difference in the belief that SLT is safer than cigarettes. A priori contrasts show that there were no statistically significant differences between any of the HRS conditions for smokers (all p-values $>.20$).

In contrast, the effect of the HRS on nonsmokers' risk perception was linear in nature. Cell contrasts indicate that exposure to the ad conditions containing the loss-framed HRS (mean = 3.29) and the gain-framed HRS (mean = 3.63) resulted in significant increased beliefs that

FIGURE 2
The Impact of Harm Reduction Statements on Relative Risk Perceptions of SLT Risk vs. Cigarettes for Smokers and Nonsmokers (Study 1)*



*Higher scores represent higher beliefs that SLT is safer than cigarettes.

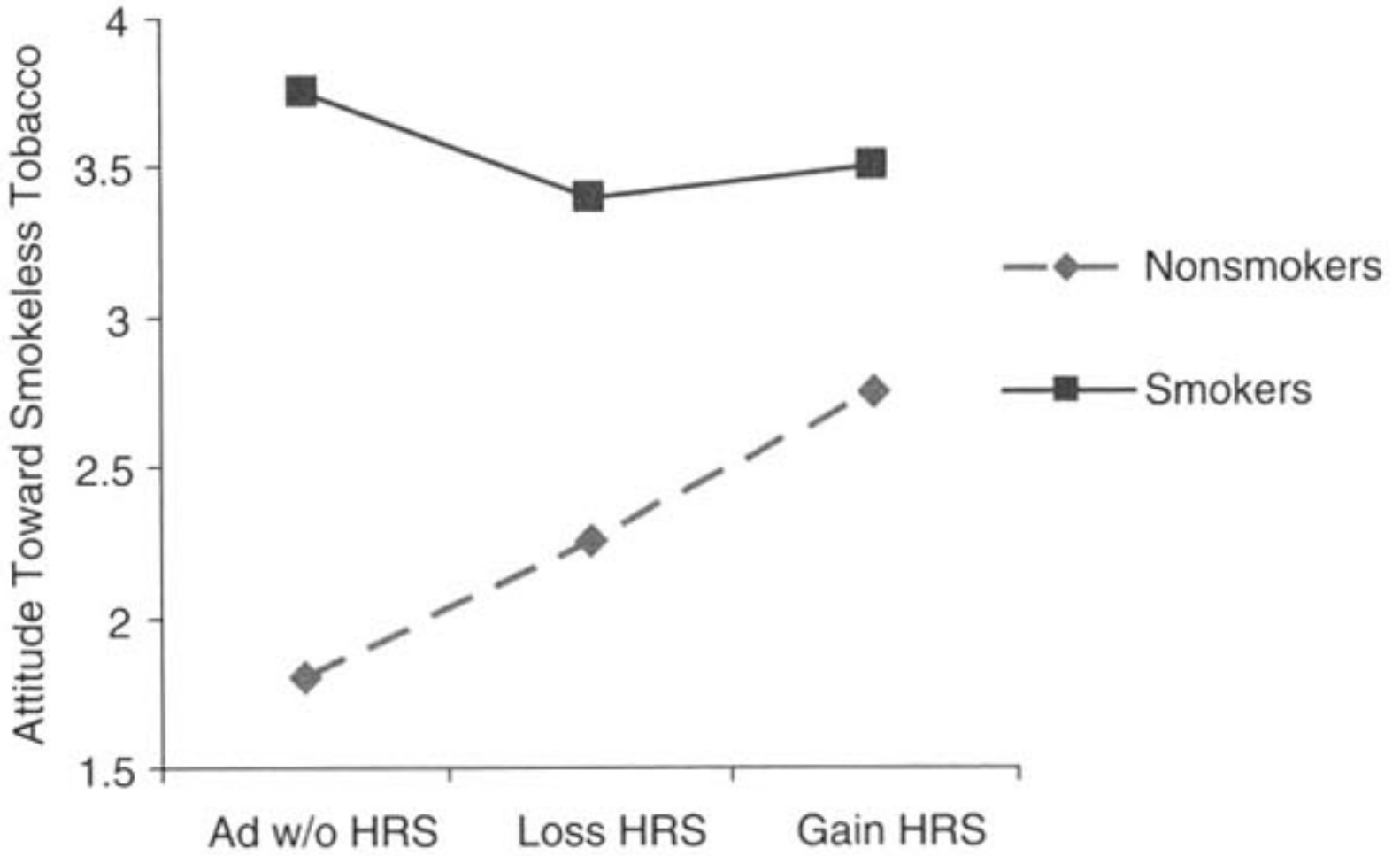
SLT is safer than smoking cigarettes vs. the no ad control condition ($p < .05$ and $p < .01$, respectively). The gain-framed ad resulted in the strongest increase in the belief that SLT is lower risk. These results suggest that the presence of an HRS on an SLT ad has the potential to alter beliefs that SLT is less risky than cigarettes for nonsmokers, which is consistent with H1b. The effect on smokers, while more difficult to interpret, fails to support H1a. Nonsmokers exposed to any HRS in the ad (vs. the no-ad control) reported higher beliefs that SLT is safer than cigarettes, while smokers' beliefs were less affected by the HRSs.

In addition, results show a main effect for smoker status on the relative smokeless risk measure. Nonsmokers were less likely to believe that SLT poses less of a health risk compared to smoking ($F = 9.31$, $p < .01$, mean $= 3.26$) vs. smokers (mean $= 3.68$). Neither the HRS nor the warning had a significant main effect on the risk-dependent variable.

Attitudes and Intentions

H2 predicts that exposure to an HRS in an advertisement will have a positive impact on smokers' (a) attitudes toward the advertisement and (b) attitude toward SLT. H4a and b makes the same prediction for nonsmokers. H6 further predicts that the gain-framed HRS will result

FIGURE 3
The Impact of Harm Reduction Statements on Attitude toward SLT for Smokers and Nonsmokers (Study 1)*



* Higher scores represent more positive attitudes.

in more positive attitudes than loss-framed HRS. To examine these predictions, ANOVA with a priori follow-up contrasts are examined. Results show a significant interaction between HRS and smoker status on attitude toward the ad ($F = 3.57$, $p < .05$) and attitude toward SLT ($F = 2.57$, $p = .05$). The pattern of results is similar for both attitudinal dependent variables, and a plot of the interaction for attitudes toward SLT is shown in Figure 3. Contrary to H2a and H6a, smokers' attitudes toward the ad after being exposed to the loss-framed HRS (mean = 3.75) and gain-framed HRS (mean = 3.88) did not differ significantly from the no-HRS control condition (mean = 4.33). Similarly, and contrary to H2b and H6b, smokers' attitudes toward SLT after being exposed to the loss-framed HRS (mean = 3.28) and gain-framed HRS (mean = 3.56) did not differ significantly from the no-HRS control condition (mean = 3.75).

A somewhat different pattern of results was found for nonsmokers (a test of H4a and b). Nonsmokers' attitudes toward the ad after being exposed to the gain-framed HRS (mean = 2.89) resulted in a significant increase in positive attitude toward the ad vs. no-HRS control condition (mean = 2.09, $p < .05$). Attitude toward the ad for the loss-framed HRS (mean = 2.39) was not significantly different from the control. This finding shows partial support for H4a and support for H6a. Similar results were found for nonsmokers' attitudes toward SLT. Nonsmokers' attitudes

TABLE 2
Summary of Hypotheses and Results

Hypothesis	Study 1: General Adult Sample	Study 2: Young Adult Sample	Comment
RQ1: Exposure to a harm reduction statement (HRS) *in the absence of a warning* results in higher beliefs that SLT is safer than cigarettes for smokers	Not tested	Not tested	The HRS (in the absence of a warning) resulted in significantly increased beliefs that SLT is safer than cigarettes for smokers.
H1: Exposure to an HRS in an ad *in which a warning appears* results in higher beliefs that SLT is safer than cigarettes for (a) smokers and (b) nonsmokers	Not supported (smokers) Supported (nonsmokers)	Not supported (Smokers) Supported (nonsmokers)	The HRS (in the presence of a warning) did not impact relative risk perceptions for smokers in either study; for nonsmokers, the HRS resulted in significantly increased beliefs that SLT is safer than cigarettes in both studies.
H2: Exposure to an HRS in an ad increases *smokers'* (a) attitude toward the ad; and (b) attitude toward SLT	Not supported	Not supported	Exposure to HRS did not impact smokers' attitude toward the ad or attitude toward SLT in Study 1 or Study 2.
H3: HRS encourages smokers to switch from cigarettes to SLT	Not supported	Not supported	Neither study shows significant increase in smokers' intentions to switch from smoking to SLT for smokers.
H4: HRS increases *nonsmokers'* (a) attitude toward the ad; and (b) attitude toward SLT	Supported	Not supported	In Study 1, exposure to an HRS can significantly impact attitude toward the ad and attitude toward SLT for nonsmokers.
H5: HRS does not impact nonsmokers intent to use SLT	Supported	Supported	Exposure to HRS did not result in significantly increased intentions to try SLT for nonsmokers in Study 1 or Study 2.
H6: Positively framed HRS is more effective in increasing *smokers and nonsmokers'* (a) attitude toward the ad; and (b) attitude toward SLT	Partially supported	Not tested	Results show that the positively framed HRS did significantly increase nonsmokers' attitude toward the ad and attitude toward SLT; effects were not significant for smokers.
H7: Positively framed HRS is more effective than negatively framed HRS in encouraging smokers to switch from cigarettes to SLT	Not supported	Not tested	Results show no significant differences between the positive and negative framed HRS.

toward SLT after being exposed to the gain-framed HRS (mean = 2.68) resulted in a significant increase in attitude toward SLT vs. the no-HRS control condition (mean = 1.86, $p < .05$). Attitude toward SLT for the loss-framed HRS (mean = 2.26) was not significantly different from the control. This finding shows partial support for H4b and support for H6b (Table 2).

H3 predicts that exposure to an HRS in an advertisement will have a positive impact on smokers' intentions to switch from cigarettes to SLT and H5 predicts that exposure to an HRS will *not* impact nonsmokers' intentions to try SLT. H7 predicts that the gain-framed HRS will be more effective at impacting smokers' intentions than the loss-framed HRS. Results from cell contrasts show that, contrary to H3 and H7, smokers' intentions to try SLT after being exposed to the loss-framed HRS (mean = 3.17) and gain-framed HRS (mean = 3.24) did not differ significantly from the no-HRS control condition (mean = 3.21). Similar results were found for nonsmokers. Consistent with H5, nonsmokers' intentions to try SLT after being exposed to the loss-framed HRS (mean = 3.63) and gain-framed HRS (mean = 3.87) did not differ significantly from the no-HRS control condition (mean = 3.56).

Additionally, a main effect of smoker status was found for attitude toward the ad ($F = 61.74$, $p < .01$) and attitude toward SLT ($F = 36.38$, $p = .01$). As expected, smokers reported substantially more positive attitudes toward the ad and toward SLT than nonsmokers. No main effects for warning or HRS were found.

In this study, the presence of an HRS did not significantly influence smokers' attitudes or intentions related to SLT. However, findings do suggest that exposure to an HRS can potentially increase nonsmokers positive attitudes toward an SLT ad, but has no effect on nonsmokers intentions to try SLT.

Study 2—The Impact of Warnings and HRS on Young Adult Smokers and Nonsmokers

The second study focuses on a demographic of prime interest for tobacco researchers and policy makers: young adults. The purpose of Study 2 was to again examine the effects of a warning and an HRS displayed in an SLT ad. However, the sample consists only of young smokers and nonsmokers, aged 18–25. This study also examines a slightly different HRS than that used in Study 1.

Sample and Procedure

Members of a professional, nationwide, Internet research panel served as study participants and ranged in age from 18 to 25 (mean and median age = 21). Fifty-seven percent of the participants were female. Seventy percent of the sample had at least a high school diploma and the modal education level was "some college." The total number of participants across the experimental conditions was 172. Eighty-one participants (47%) had smoked more than 100 cigarettes in their lifetime and at least once in the past 30 days. As in Study 1, these participants were considered "smokers." Nonsmokers made up the remaining 53% of the sample. The study procedure was very similar to that of Study 1.

Experimental Design and Stimuli

Ad stimuli for Study 2 were similar in design to Study 1. Participants were randomly assigned to one of three conditions: (1) a control condition where they did not view any ad stimuli, (2) a warning-only ad condition,[2] or (3) a warning-plus-HRS condition. The warning condition contained the new larger warnings required under the Family Smoking Prevention and Tobacco Control Act. The warning-plus-HRS condition contained the large warning in addition to an HRS that read, "SLT is less risky to your health than cigarettes." In order to capture baseline smoking and SLT risk perceptions for this young sample, a control condition was utilized. Participants in the control condition (n = 92) did not see any ad stimuli and responded only to the risk perception measures. All aspects of the advertisement were consistent across all experimental conditions except for the manipulation of warning and HRS. As in Study 1, dependent variables included: (1) risk perception measures and (2) attitude and intentions measures as used in Study 1 (αs = .75–.96).

Study 2 Results

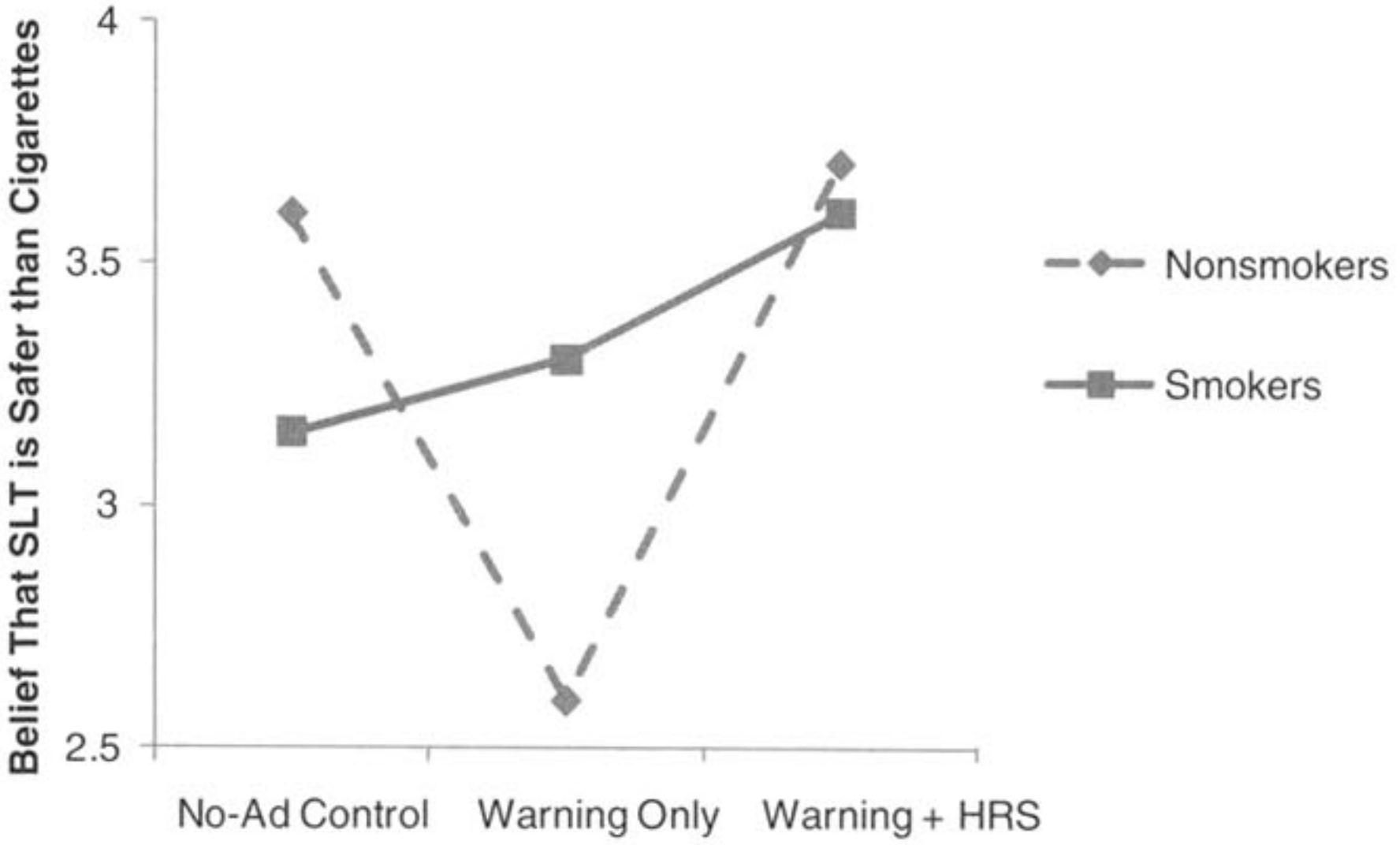
Risk Perceptions

The first set of analyses was run to examine potential changes in SLT risk perception (vs. cigarettes) from exposure to the SLT ad stimuli (i.e., warning and HRS manipulations) vs. the no-ad control condition. Recall that participants in the control condition did not see any ad stimuli and thus provide a baseline level of SLT risk perceptions.

ANOVA with follow-up contrasts were run to examine if the relative risk perception of smokers (H1a) and nonsmokers (H1b) were

2. The "large" warning used in Study 1 was used for the warning condition in Study 2.

FIGURE 4
The Impact of Harm Reduction Statements and Warnings on Relative Risk Perceptions of SLT Risk vs. Cigarettes for Smokers and Nonsmokers (Study 2)*



*Higher scores represent stronger beliefs that SLT is safer than cigarettes.

impacted by the presence of an HRS. Results show a significant interaction between the ad and smoker status on the belief that SLT is less harmful/dangerous than cigarettes ($F = 2.63$, $p = .05$). The plot of this interaction is shown in Figure 4. Contrary to H1a, the pattern of results for smokeless risk measure suggests that smokers' belief that SLT is less harmful than cigarettes is virtually unchanged across the ad stimuli conditions ($mean_{Control} = 3.12$, $mean_{Warning\ Only} = 3.33$, $mean_{HRS} = 3.63$). The differences across the conditions are not significant. Nonsmokers' belief that SLT is less harmful than cigarettes decreases sharply when shown the "warning only" ad (mean = 2.58) vs. the control condition (mean = 3.62, $p < .05$). However, consistent with H1b, when shown the ad condition with the HRS, the belief that SLT is less harmful than cigarettes increases sharply (mean = 3.69, $p < .05$). These results suggest that both the warning and the HRS can be effective at impacting relative risk perceptions for SLT vs. cigarettes for this sample of young nonsmokers. The presence of the HRS seems to mitigate the effects of the warning, especially for nonsmokers. The main effect of the ad manipulation was not statistically significant for the risk-dependent variable.

Attitudes and Intentions

Hypotheses 2 and 4 were not supported in that neither smokers nor nonsmokers reported any changes in attitudes toward the ad or attitudes toward SLT across the experimental conditions. However, the ad conditions did impact the intentions dependent variable for both smokers and nonsmokers. Contrary to what was predicted in H3, smokers reported significantly lower intentions to try SLT in both the warning-only condition (mean = 2.85) and the HRS condition (mean = 2.60) vs. the control condition (mean = 3.78; $p < .05$ in both cases). Nonsmokers reported significantly lower intentions to try SLT in the warning-only condition (mean = 1.83) vs. the control condition (mean = 2.85; $p < .05$). The HRS condition resulted in increased intentions for smokers that did not differ statistically from the control condition ($p = .10$). This finding is consistent with H5.

Additionally, a main effect of smoker status was found for attitude toward the ad ($F = 20.56$, $p < .01$), attitude toward SLT ($F = 32.09$, $p = .01$), and personal intentions to use SLT ($F = 10.91$, $p < .01$). Smokers reported higher positive attitudes toward the ad and toward SLT, and higher personal intentions to try SLT. No main effects for ad conditions were found for SLT attitude or intentions-dependent variables.

DISCUSSION

To date, no study has been developed to adequately measure the impact of tobacco harm reduction communications on tobacco consumption. Therefore, the current research was conducted to begin to examine the overall population impact that would result from information regarding tobacco harm reduction and its promotion. The findings of this study appear to offer mixed results in terms of the potential impacts of allowing harm reduction information to be communicated in advertising. Most notably, the results appear to suggest that if HRSs are delivered in the current environment (where similar government-mandated warnings are required for both SLT and cigarettes) HRSs will have limited impact in changing smokers' perceptions of the relative risk of SLT.

The results do show that consumers exhibited a defense mechanism against persuasive ads which is supported by the protection motivation theory (Rogers 1975); specifically, this theory posits that consumers can be motivated to engage in desirable health behaviors. This appears to be applicable to the provision of harm reduction information, as the study finds that it is difficult for an HRS to change consumer intentions

when a warning message is simultaneously present. Consistent with previous research in this area (Gallopel-Morvan et al. 2011; Pechmann et al. 2003), our results are supportive of the general idea that consumers are dubious of information presented to them by an advertiser in the context of a persuasive communication, thus lessening the impact. In the presence of a conflicting message from the government, it is apparent that consumers are not easily swayed by the presence of an HRS.

Across our two studies, the presence of harm reduction information in an ad did not reduce smokers' perceptions of the relative harm of SLT (vs. cigarettes) when a warning was present. The most likely explanation for this is that the simultaneous presence of a government-mandated warning on the dangers of SLT offset the impact of the HRS. Evidence from our second pilot test supports this proposition. When smokers were presented with an HRS in an ad in the absence of any warning information, they reported higher beliefs that SLT is safer than cigarettes. Thus, while the FDA currently mandates warnings similar to those on cigarettes to be present in SLT ads, it appears likely that for harm reduction information to be effective in changing consumer perceptions a different warning might need to appear.

For nonsmokers, the results are supportive of the idea that the provision of harm reduction information will not lead to negative population effects. While perceptions of SLT risk were generally lowered and attitudes toward SLT ads were significantly more positive as a result of exposure to harm reduction messages among nonsmokers, there was not a significant difference in intention to use SLT. Moreover, nonsmokers showed very low raw levels of intention to use SLT in any condition. Thus, the argument that the inclusion of an HRS could help serve as a "gateway" for nonsmokers is not supported by this study.

Our results for message framing are not very conclusive. With the warning statement present, most effects of positive vs. negative framing of the message were insignificant. However, the finding of gain-framed messages being more effective in changing nonsmokers' perceptions of relative harm suggests that it is worth doing additional testing of framing effects either in the absence of a warning statement or the presence of a different warning statement.

A related issue is that in order to arrive at more conclusive results there is a need for the source of the message to be tested. Our results are consistent with the idea that high credibility is assigned to health messages from the government while protection motivation appears to operate when the source of a message is an advertiser. In an environment where smokers are very familiar with government-mandated warnings,

an HRS from tobacco companies might be given less credence regardless of how accurate the statement is or how it is framed. Testing the effectiveness of an HRS from a government source or a public health community source vs. an advertiser would be an important addition to this research.

In addition to consideration of source effects, tests of various warnings (perhaps targeted to the specific risks of SLT) are warranted. Additional tests of whether HRSs are effective in changing perceptions when seen in a context without a warning are needed. Future research should also focus on framing effects and how they interact with various warning messages.

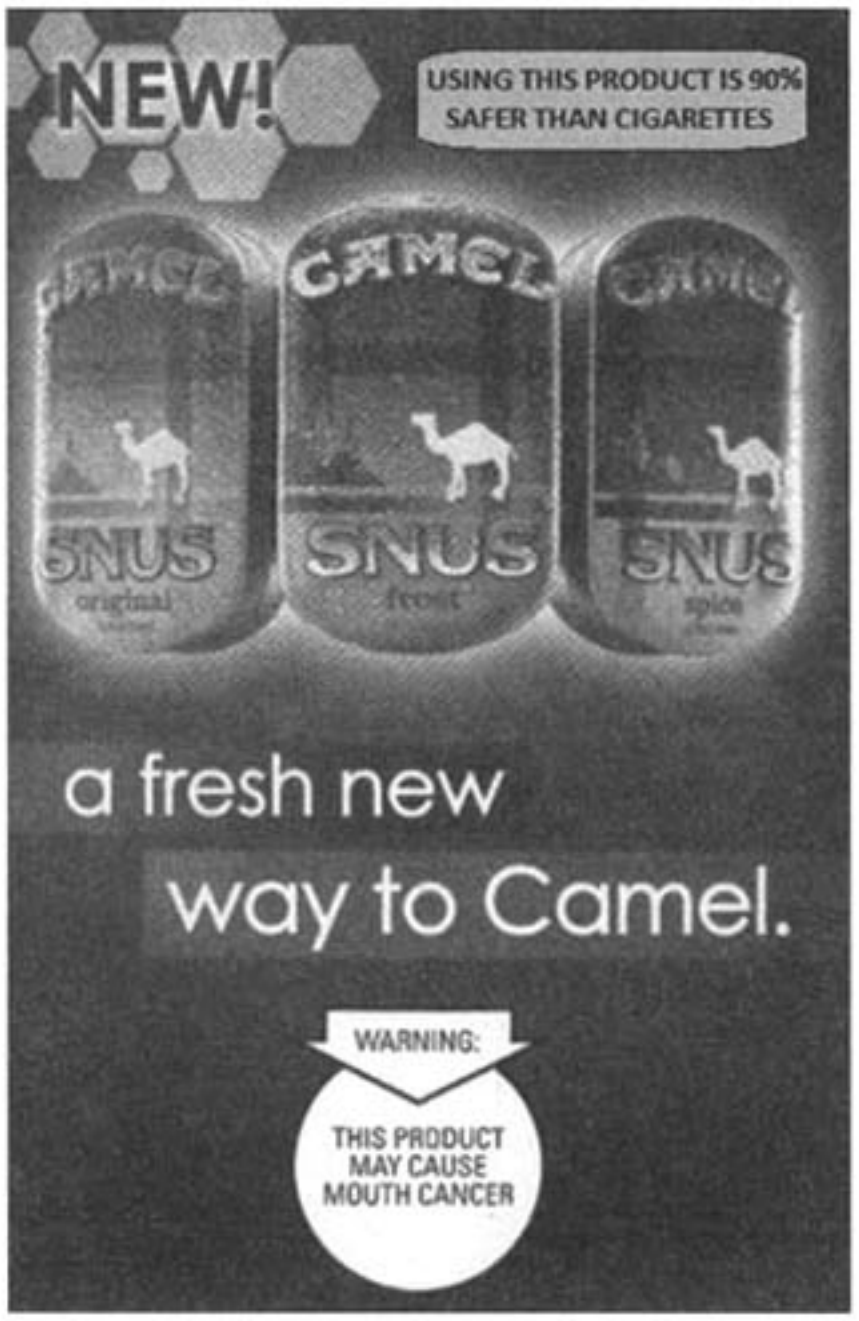
As in any research, results should be interpreted in the context of the limitations of our studies. In general, the experimental context and setting may affect the generalizability of specific findings to the consumer marketplace. Participants viewed the warning stimuli immediately before responding to the measures. Also, our study was limited to the examination of only three specific HRSs and one warning. Future research should test other HRSs and warnings. Finally, a significant portion of the sample in both studies was female. Given that males are much more likely to use SLT, the results should be interpreted with caution.

CONCLUSION

The results of this study suggest that while there is evidence that the inclusion of an HRS in an ad in the absence of a warning statement can lead smokers to more accurately estimate the relative risk of SLT compared to cigarettes, the inclusion of a government-mandated warning that is identical to that for cigarettes seems to limit the ability of the HRS to have a significant impact on smokers' intentions to switch to SLT. Because it is consistent with the protection motivation theory, this finding is not particularly surprising given that the appearance of an HRS and a government warning represent conflicting messages and the message about harm comes from the government, a source viewed by most consumers as having high creditability. The research also examined the impact of current warnings vs. the larger, more prominent warnings required under the Family Smoking Prevention and Tobacco Control Act and found similar results for the two warning formats. Results of this study support the notion that the inclusion of harm reduction information in ads for SLT will not lead nonsmokers to begin using SLT. Finally, results provide some evidence that a positively framed message is more effective than a negatively framed message in terms of relative risk.

APPENDIX 1

Modified Warning Label



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