

Experimental Study on Warning Statements for Cigarette Graphic Health Warnings: Study 1 Report

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Executive Summary of Methods and Results for Experimental Study on Warning Statements for Cigarette Graphic Health Warnings (OMB# 0910-0848)

Background: To fulfill its statutory obligation under Section 201 of the Tobacco Control Act (TCA) (Pub. L. 111-31), FDA is developing, refining, and testing new Cigarette Health Warnings (CHW) that depict the negative health consequences of cigarette smoking. Pursuant to Section 202(b) of the TCA, the Secretary may adjust the text of the CHW label requirements if doing so would “promote greater public understanding of the risks associated with the use of tobacco products.” As part of the CHW development process, FDA developed 15 new textual warning statements (“revised warning statements”) for testing in this study. These 15 revised warning statements focus on lesser-known health consequences of cigarette smoking (e.g., blindness), whereas the 9 warning statements listed in the TCA cover more commonly known health consequences (e.g., addiction). FDA chose to study lesser-known health consequences of smoking in the revised warning statements because one way to increase public understanding is to provide consumers with information that teaches them something new.

Purpose of the Study: The main goal of this study is to assess which, if any, of the revised warning statements (statements alone, no images) promote greater public understanding of the risks associated with cigarette smoking as compared to the TCA statements across a range of outcomes. Additionally, results from this study may inform the selection of health topics and specific textual warning statements that, when paired with images depicting those health topics, may be included in an eventual CHW rule after being tested further.

Participants Included: This study included 2,505 participants recruited through an existing online panel called Lightspeed. There were 836 adolescents (ages 13-17 years); half were current smokers and the rest had never smoked but were at risk for starting smoking. There were 833 young adult (ages 18-24 years) current smokers and 836 older adult (ages 25 years and older) current smokers.

Design of the Study: Participants in all age groups were randomly assigned to a condition that determined which warning statements they viewed during the study. All warning statements appear in Table 1. Participants in the control condition viewed the 9 TCA warning statements. Participants in each of the treatment conditions viewed 1 of 15 revised warning statements plus 8 TCA warning statements.

Table 1. TCA and Revised Warning Statements

TCA Warning Statements	Revised Warning Statements
WARNING: Cigarettes are addictive.	WARNING: Secondhand smoke causes respiratory illnesses in children, like pneumonia.
WARNING: Tobacco smoke can harm your children. WARNING: Cigarettes cause fatal lung disease.	WARNING: Smoking causes COPD, a lung disease that can be fatal.
WARNING: Cigarettes cause cancer.	WARNING: Smoking causes serious lung diseases like emphysema and chronic bronchitis.
WARNING: Cigarettes cause strokes and heart disease.	WARNING: Smoking can cause heart disease and strokes by clogging arteries.
WARNING: Smoking during pregnancy can harm your baby.	WARNING: Smoking causes mouth and throat cancer.
WARNING: Smoking can kill you.	WARNING: Smoking causes head and neck cancer.
WARNING: Tobacco smoke causes fatal lung disease in nonsmokers.	WARNING: Smoking causes bladder cancer, which can lead to bloody urine.
WARNING: Quitting smoking now greatly reduces serious risks to your health.	WARNING: Smoking during pregnancy causes premature birth.
	WARNING: Smoking during pregnancy stunts fetal growth.
	WARNING: Smoking during pregnancy causes premature birth and low birth weight.
	WARNING: Smoking reduces blood flow, which can cause erectile dysfunction.
	WARNING: Smoking reduces blood flow to the limbs, which can require amputation.
	WARNING: Smoking causes type 2 diabetes, which raises blood sugar.
	WARNING: Smoking causes age-related macular degeneration, which can lead to blindness.
	WARNING: Smoking causes cataracts, which can lead to blindness.

Study Procedure: The study had two phases, both of which were completed during a single session lasting approximately 15 minutes. In Phase 1, all participants viewed 9 warning statements, one at a time, presented in a random order. Participants in the control condition viewed the 9 TCA warning statements. Participants in each of the treatment conditions viewed 1 of 15 revised warning statements plus 8 TCA warning statements. Each revised statement either replaced a more general TCA statement on the same or similar health topic (e.g., a revised statement on head and neck cancer replaced the TCA general cancer statement) or replaced a randomly selected TCA statement when the revised statement did not have a TCA counterpart (e.g., a revised statement on diabetes replaced the TCA statement on fatal lung disease in smokers).

After viewing each warning statement, participants answered questions about that statement before viewing and answering questions about the next assigned warning statement. Questions were designed to measure several study outcomes, including:

- whether the warning statement was new information to participants ("*New information*");
- whether participants learned something from the warning statement ("*Self-reported learning*");
- whether the warning statement made participants think about the health risks of smoking ("*Thinking about risks*");
- Assessment of health beliefs; and
- Other perceptions of the statements including believability, informativeness, and factuality.

After viewing and answering questions about all 9 warning statements individually, participants answered questions about another study outcome: beliefs about the link between smoking and each of the health consequences presented in the warning statements they viewed ("*Health beliefs*").

In Phase 2, all participants viewed 9 warning statements presented at the same time. Participants assigned to the control condition viewed the 9 TCA warning statements again. Participants assigned to the treatment conditions viewed a set of 9 revised warning statements that included statements that focused on different health conditions. After viewing the 9 warning statements, all participants answered a set of questions about their beliefs about the link between smoking and the health consequences presented in the warning statements.

Overview of Statistical Analyses: Analyses compared the responses from participants in each of the treatment conditions to responses from participants in the control condition for the Phase 1 outcomes to assess effects associated with the revised statements and the TCA statements. These analyses examined whether, relative to viewing a TCA warning statement, viewing a revised warning statement resulted in statistically significantly higher levels of the outcomes measured (e.g., *New information*, *Self-reported learning*).

Analyses of Phase 2 outcomes compared responses from all participants in the treatment conditions to the responses from all participants in the control condition. These analyses examined whether, relative to viewing all 9 TCA warning statements, viewing any combination of 9 revised warning statements resulted in statistically significantly higher levels of the outcome measured (e.g., *Health beliefs*).

Aligning Interpretation of Results with Study Purpose: Because the purpose of the study was to determine which, if any, revised warning statements promote greater public understanding of the risks associated with cigarette smoking when compared to a TCA

warning statement, the study was not designed to “rank order” the revised warning statements or compare individual results of one revised warning statement to another. Rather, we interpreted the presence of a statistically significant finding in a positive direction as support for the revised warning statement over its comparator TCA statement, without comparing the size of each effect. This interpretation approach also recognizes that 5 of the 15 revised warning statements did not have a comparator TCA warning statement on the same health topic and were compared to a randomly selected TCA statement on a different health topic, which may have resulted in larger effects for these revised statements.

While the study was designed to measure a range of outcomes related to public understanding, *New information* and *Self-reported learning* are predictive for the task of determining which, if any, of the revised warning statements would promote greater public understanding of the risks associated with cigarette smoking as compared to a TCA statement. An important first step in promoting public understanding of health risks is to raise public awareness of those risks, particularly if the risks are not commonly known.^{1,2} Measuring whether information is new helps identify opportunities to improve public understanding through increased awareness. Additionally, communication science research has found that people are more likely to pay attention to information that is new, and attention plays a vital role in message comprehension and learning.³ Thus, *New information* and *Self-reported learning* are often linked and are both potential indicators of improved understanding.

Additionally, these two outcomes can show greater effects after a single exposure, whereas communication science research indicates repeated exposures over time are typically required to change beliefs (i.e., *Health beliefs*).

Summary of Results: In general, TCA warning statements were new information to relatively few participants; revised warning statements on the same health topics as those included in the TCA warning statements were new information to more participants than the TCA warning statements; and revised warning statements that focused on health topics not included in the TCA were new information to most participants. For example, fewer than 24% of participants reported that the TCA warning statements were new information to them,⁴ whereas more than 66.2% of participants that viewed revised warning statements

¹ CDC. Best practices for comprehensive tobacco control programs—2014. Atlanta, GA: US Department of Health and Human Services, CDC; 2014. Available at http://www.cdc.gov/tobacco/stateandcommunity/best_practices/index.htm.

² Weiss JA, Tschirhart M. Public information campaigns as policy instruments. *J Policy Anal Manage*. 1994; 13(1), 82-119.

³ e.g., Duke JC, Alexander TN, Zhao X, Delahanty JC, Allen JA, MacMonegle AJ, Farrelly, MC. Youth's awareness of and reactions to the real cost national tobacco public education campaign. *PLoS One*. 2015;10:e0144827

⁴ There was one exception: the statement focusing on lung disease in nonsmokers was new information to 41.9% of participants.

that focused on health topics not included in the TCA (e.g., blindness, diabetes) reported the statements were new information to them. When a specific health topic was covered by both a revised and TCA warning statement (e.g., cancer), the revised warning statement was new information to more participants than the TCA warning statement. For *Thinking about risks* and *Health beliefs*, levels of both outcomes were generally high for both TCA and revised warning statements, with a few differences demonstrating that the revised statements had higher levels of these outcomes than the TCA statements overall. However, as previously noted, the *New information* and *Self-reported learning* outcomes measured in Phase 1 of the study are more closely aligned with the purpose of this study and provide the most useful data for determining whether a revised warning statement would promote greater understanding of the risks associated with cigarette smoking.

At the level of the individual warning statement, 10 of the 15 revised warning statements tested demonstrated statistically significant higher levels of both *New information* and *Self-reported learning* when compared to a TCA warning statement. Those 10 revised warning statements focused on the following health consequences of cigarette smoking: age-related macular degeneration, cataracts, type 2 diabetes, peripheral vascular disease (amputation), bladder cancer, erectile dysfunction, head and neck cancer, heart disease and stroke, stunted fetal growth, and COPD. There were 2 revised warning statements that had statistically significant higher levels of *New information* but not *Self-reported learning*, both of which focused on pregnancy-related health consequences (premature birth; premature birth and low birth weight). An additional 2 revised warning statements had statistically significant higher levels of *Self-reported learning* but not *New information* (emphysema and chronic bronchitis; pneumonia). One revised warning statement did not have statistically significant higher levels of either of these two outcomes (mouth and throat cancer). Of the 5 revised warning statements that did not have statistically significant higher outcomes for both *New information* and *Self-reported learning*, 4 focused on a health topic for which there was another revised warning statement that had statistically significant higher levels of *New information* and *Self-reported learning* (e.g., premature birth vs. stunts fetal growth); only the revised warning statement on pneumonia did not.

For the other Phase 1 outcomes, both the TCA and revised warning statements made many participants think about the risks of smoking (50-70% of participants), but only 4 of the 15 revised statements were rated statistically significantly higher for *Thinking about the risks* when compared to a TCA warning statement, and 1 revised warning statement was rated statistically significantly lower than its comparator TCA warning statement. Similarly, health beliefs were overall high for both the TCA and revised warning statements, but only 4 of the 15 revised statements were rated statistically significantly higher for *Health beliefs* when compared to a TCA statement. However, when looking at the Phase 2 outcome results that compared sets of 9 revised warning statements to the 9 TCA warning statements, the revised warning statements demonstrated higher levels of *Health beliefs* overall compared

to the TCA warning statements. For *Believability*, 1 of the 15 revised statements was rated statistically significantly higher than its comparator TCA statement, and 2 of the 15 were rated statistically significantly lower. For *Informativeness*, 2 of the 15 revised statements were rated statistically significantly higher than their comparator TCA statements, for *Perceived factuality*, 3 of the 15 revised statements were rated statistically significantly higher than their comparator TCA statements.

1. Background and Purpose

On June 22, 2009, Congress enacted the Family Smoking Prevention and Tobacco Control Act ("Tobacco Control Act"; Public Law 111-31). The Tobacco Control Act (TCA) granted the US Food & Drug Administration (FDA) new authority to regulate the manufacture, marketing, and distribution of tobacco products to protect the public health and reduce tobacco use by minors. Section 201 of the Tobacco Control Act, which amends section 4 of the Federal Cigarette Labeling and Advertising Act (FCLAA) (15 USC 1333), requires FDA to issue "regulations that require color graphics depicting the negative health consequences of smoking to accompany the label statements specified in subsection (a)(1)." Section 202(b) of the Tobacco Control Act further amends section 4 the FCLAA by adding that the Secretary, through a rulemaking, may adjust the "text of any of the label requirements... if the Secretary finds that such a change would promote greater public understanding of the risks associated with the use of tobacco products."

FDA's Center for Tobacco Products requires data on how consumers may respond to various textual warning statements about the negative health consequences related to cigarette smoking to determine the appropriate final set of textual warning statements to be further tested and evaluated in support of a future rulemaking. The results will inform the Agency's efforts to finalize the development of cigarette health warnings to be tested in future studies and ultimately to implement the mandatory cigarette warning label statement as required by section 4(d) of FCLAA.

To this end, RTI International is collaborating with FDA to conduct a set of studies using theory-driven approaches based upon communication and social science theories (McGuire, 2001; Noar et al., 2015; Wogalter et al, 1999) . This report describes the methods and results used in Study 1, the goal of which was to identify if any revised warning statements promoted greater public understanding of the risks associated with the use of tobacco products compared to the statements listed in the Tobacco Control Act. The warnings tested come from a pool of 24 possible warnings: the 9 text warnings enumerated in Section 202 of the Tobacco Control Act and 15 revised warnings. Topics for revised warning statements were developed by FDA after reviewing the risks associated with cigarette smoking, with a focus on negative health effects that are less well-known, less understood, or about which the public holds misperceptions. After considering this information, FDA developed initial versions of revised textual warning statements that were tested in qualitative studies, after which the warning statements were revised for the present study. The primary purpose of Study 1 was to assess whether revised statements represent an improvement over TCA statements in terms of improving understanding of smoking-related health consequences, thus revised warning statements were compared to TCA statement directly to inform this study purpose.

2. Study Design

2.1 Experimental Design

Participants from 4 groups (adolescent smokers, adolescent nonsmokers susceptible to smoking, young adult smokers, and older adult smokers) were randomized to 1 of 16 experimental conditions or a control condition. Within each group, assignment to condition was conducted using a least-fill quota methodology whereby participants were iteratively assigned to the condition with the lowest current quota count, with quota thresholds set to achieve approximately the same number of participants per condition.

In Part 1 of Phase 1 of the study, participants in the control condition viewed all nine TCA text warning statements presented in a random order. Participants in each of the 16 experimental conditions viewed 8 of the TCA statements, plus 1 of the revised statements in a random order. This approach was used done to control for the number of warning statements viewed by participants in each condition and allow for the effects to be attributed to only the revised warning statement. The warning statements were presented as simple black text on a white background (Figure 1 provides an example of one warning statement). The warning statements and study conditions are summarized in Tables 2 and 3. After viewing each statement, participants completed measures assessing new knowledge gained about a health effect, learning as a result of exposure to the warning statement, and the degree to which the statement makes them think about the health risks of smoking. The individual warning statement remained on the screen as they answered these questions, and the series of questions was repeated for each of nine warning statements in their assigned condition.

Figure 1. Example Warning Statement



Table 2. Warning Statements

#	Statement
TCA	
S1	WARNING: Cigarettes are addictive.
S2	WARNING: Tobacco smoke can harm your children.
S3	WARNING: Cigarettes cause fatal lung disease.
S4	WARNING: Cigarettes cause cancer.
S5	WARNING: Cigarettes cause strokes and heart disease.
S6	WARNING: Smoking during pregnancy can harm your baby.
S7	WARNING: Smoking can kill you.
S8	WARNING: Tobacco smoke causes fatal lung disease in nonsmokers.
S9	WARNING: Quitting smoking now greatly reduces serious risks to your health.
Revised	
R1A	WARNING: Smoking causes mouth and throat cancer.
R1B	WARNING: Smoking causes head and neck cancer.
R1C	WARNING: Smoking causes bladder cancer, which can lead to bloody urine.
R2A	WARNING: Smoking during pregnancy causes premature birth.
R2B	WARNING: Smoking during pregnancy stunts fetal growth.
R2C	WARNING: Smoking during pregnancy causes premature birth and low birth weight.
R3A	WARNING: Secondhand smoke causes respiratory illnesses in children, like pneumonia.
R4A	WARNING: Smoking can cause heart disease and strokes by clogging arteries.
R5A	WARNING: Smoking causes COPD, a lung disease that can be fatal.
R5B	WARNING: Smoking causes serious lung diseases like emphysema and chronic bronchitis.
R6A	WARNING: Smoking reduces blood flow, which can cause erectile dysfunction.
R6B	WARNING: Smoking reduces blood flow to the limbs, which can require amputation.
R7A	WARNING: Smoking causes type 2 diabetes, which raises blood sugar.
R8A	WARNING: Smoking causes age-related macular degeneration, which can lead to blindness.
R8B	WARNING: Smoking causes cataracts, which can lead to blindness.

Note: In warning number, S = statutory and R = Revised.

Table 3. Study Conditions

Condition	Stimuli Slot (Randomize Order)									
	1	2	3	4	5	6	7	8	9	
0 (CONTROL)	S1	S2	S3	S4	S5	S6	S7	S8	S9	
1	S1	S2	S3	R1A	S5	S6	S7	S8	S9	
2	S1	S2	S3	R1B	S5	S6	S7	S8	S9	
3	S1	S2	S3	R1C	S5	S6	S7	S8	S9	
4	S1	S2	S3	S4	S5	R2A	S7	S8	S9	
5	S1	S2	S3	S4	S5	R2B	S7	S8	S9	
6	S1	S2	S3	S4	S5	R2C	S7	S8	S9	
7	S1	R3A	S3	S4	S5	S6	S7	S8	S9	
8	S1	S2	S3	S4	R4A	S6	S7	S8	S9	
9	S1	S2	S3	S4	S5	S6	S7	R5A	S9	
10	S1	S2	R5A	S4	S5	S6	S7	S8	S9	
11	S1	S2	R5B	S4	S5	S6	S7	S8	S9	
12	RANDOM SELECTION OF 8 OF 9 TCA ("S") STATEMENTS									R6A
13	RANDOM SELECTION OF 8 OF 9 TCA ("S") STATEMENTS									R6B
14	RANDOM SELECTION OF 8 OF 9 TCA ("S") STATEMENTS									R7A
15	RANDOM SELECTION OF 8 OF 9 TCA ("S") STATEMENTS									R8A
16	RANDOM SELECTION OF 8 OF 9 TCA ("S") STATEMENTS									R8B

In Part 2 of Phase 1, respondents were asked a series of questions assessing beliefs about the negative health consequences of smoking contained in the warning statements. This set of questions was asked once after viewing all nine of the statements in Part 1 of Phase 1, and the warning statements were not visible as the questions were presented.

In Phase 2, participants viewed a set of warning statements in a single exposure and then indicated their beliefs about the negative health consequences of smoking contained in the warning statements by selecting relevant health consequences from a list. The use of different measures of health beliefs in Phase 2 minimized potential issues with bias in response after having responded to Phase 1 health belief items on similar topics and allowed for a broader assessment of the effect of the warning statements on participants' beliefs about the scope of smoking-related harms. In this phase, respondents were split into two groups: (1) a treatment group comprised of respondents in any of the experimental conditions from Phase 1; and (2) a control group comprised of respondents who were in the Phase 1 control group.

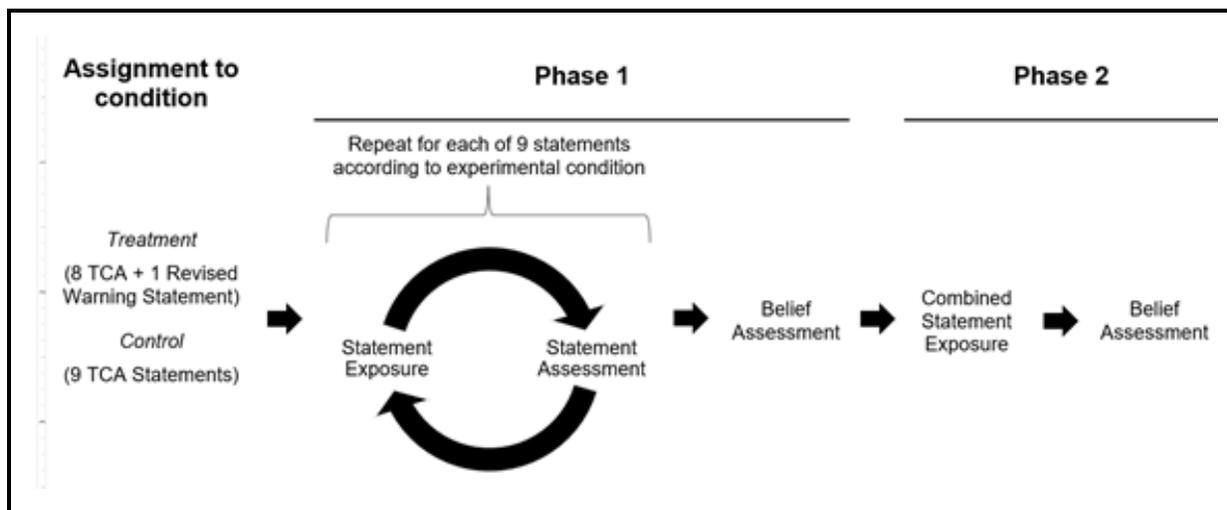
The Phase 2 treatment group respondents viewed a set of nine revised warning statements including one randomly selected statement per topic area. For the statements focused on cancer (revised statements R1A, R1B, and R1C), participants viewed two of the three randomly selected statements. The eight topic areas, which are indicated in the statement number, were (1) cancer, (2) pregnancy, (3) secondhand smoke, (4) heart disease and stroke, (5) lung disease, (6) blood flow, (7) diabetes, and (8) vision-related.

Table 4 summarizes the procedure for selection of warning statements for the treatment group. Respondents in the control group viewed the same nine TCA warning statements they previously viewed, also presented as a set. After viewing their assigned set of statements, all respondents completed a final set of measures assessing beliefs about the health consequences of smoking contained in the warning statements. The use of different measures of beliefs in Phase 1 and Phase 2 was to avoid potential concerns with assessing the same beliefs in the same way multiple times during a relatively short time period. Figure 2 illustrates the study flow from condition assignment through Phase 1 and 2.

Table 4. Phase 2 Treatment Group Stimuli Selection

Stimuli Slot	Selection (Labels in the Set)
1-2	Random selection of 2 of: R1A; R1B; R1C
3	Random selection of 1 of: R2A; R2B; R2C
4	R3A
5	R4A
6	Random selection of 1 of: R5A; R5B
7	Random selection of 1 of: R6A; R6B
8	R7A
9	Random selection of 1 of: R8A; R8B

Figure 2. Study Flow



2.2 Sampling Frame and Sampling Methodology

Study participants were recruited from a national online panel of adults managed by Lightspeed. The Lightspeed panel is a non-probability convenience sample recruited via social media, online recruitment (e.g., via banner placements), and affiliate corporate networks. For the current study, Lightspeed recruited adult panelists and parents of potential adolescent respondents using information from panelists' user profiles related to study eligibility (i.e., age, smoking status, and whether the panelist has a child in the eligible age range). Recruitment focused on four groups (adolescent current smokers, adolescent susceptible smokers, young adult smokers, and older adult smokers) based on the criteria listed in Table 5 to achieve a large diverse sample of consumers that included a variety of age groups and tobacco use statuses. For this study, adult nonsmokers were not included. Although they are a population of potential interest, in this initial quantitative study, we chose to focus on adult smokers, adolescent smokers, and adolescents susceptible to smoking because those group are the most likely to be exposed to tobacco products and consequently the warnings on them. The large heterogeneous sample that can be obtained through the Internet panel allowed FDA to test outcomes across a range of individuals, thus strengthening the conclusions and generalizability of the study. Data were not weighted.

Table 5. Age and Smoking-Related Criteria for Inclusion in Group

Group	Age	Smoking-Related Criteria
Adolescent smokers	13–17	Smoked a cigarette in past 30 days
Adolescent susceptible nonsmokers	13–17	Never tried cigarettes and responded anything <u>other</u> than “definitely not” to ≥ 1 of 4 questions assessing susceptibility.
Young adult smokers	18–24	Smoked 100 cigarettes in lifetime and now smoke every day or some days
Older adult smokers	≥ 25	Smoked 100 cigarettes in lifetime and now smoke every day or some days

Potentially eligible Lightspeed panel members received an email inviting them to participate in the study. Adolescent children of adult panel participants were invited to complete the survey through an email invitation to their parents asking for consent to solicit their child’s opinions. After completing a brief screener to determine study eligibility, participants completed a consent form that included information about the study sponsor (U.S. Food and Drug Administration’s Center for Tobacco Products) and general study topic (to “help researchers understand what people think about tobacco use”). Panel members and children of panelists who met the study eligibility criteria and chose to participate were randomly assigned to an experimental condition and completed the questionnaire.

Lightspeed maintains a quality control program for their data. The components of that program, some details of which are proprietary, include the following:

- Honesty detector: an online, statistical approach to remove over-reporters by analyzing panelists’ responses to high and low probability statements as well as a benchmark question.
- Identity validation: matching personally identifying information to financial and social network databases to authenticate individuals before they are admitted to the panel.
- Internet Protocol (IP) address validation: checking IP addresses to confirm location and ensure they do not match a known list of fraudulent surveys.
- Unique survey responders: identifying and eliminating duplicate respondents using “digital fingerprinting” technology.
- Engagement assessment: ensuring that respondents are thoughtful and engaged by including speeding checks and survey satisfaction ratings.

Online panels of consumers are well suited for experimental designs because they allow data to be collected from very specific study populations in a short period of time and enable consumers to easily view multimedia materials. However, because respondents were recruited using non-probability, convenience sampling methods, results from this study are not necessarily representative of the populations from which the sample was drawn.

2.3 Instrument Development

FDA and RTI collaborated on instrument design which was informed by communication and social science theories (McGuire, 2001; Noar et al., 2015; Wogalter et al., 1999). Many survey items were adapted from the existing literature (Bann et al., 2012; Bansal-Travers et al., 2011; Byrne et al., 2015; Fathelrahman et al., 2010; Hammond et al., 2007; Herz-Roiphe, 2015; Magnan & Cameron, 2015; Pierce et al., 1995). Survey content was the same for adolescents (aged 13–17) and adults (aged 18 and over) with a few exceptions based on established practice for assessing tobacco use status among adolescents versus adults:

- Only adolescents responded to items ever smoking, smoking in the past 30 days, and smoking susceptibility.
- Only adults responded to items about smoking 100 cigarettes in lifetime, current smoking (defined by every day, some days, or not at all), income, education, sexual orientation, and health literacy.

Adolescents and adults were eligible for the survey if they met the criteria in Table 5 and did not work or have household members who worked for a tobacco company, tobacco-related community organization, or FDA in the past 5 years.

3. Data Collection Timeline and Final Disposition

3.1 Data Collection Timeline

Lightspeed sent invitations to panel members on January 30, 2018. Data collection continued until sufficient numbers of participants in each group completed the survey on March 5, 2018.

3.2 Disposition of Sample

Tables 6 through 10 provides information about the final disposition of the sample by group, condition, gender, age, and smoking status.

Table 6. Final Disposition of Sample

Disposition	Adolescent	Young Adult	Older Adult	Total
Total sample (unique invites sent)	356,700	172,467	200,333	729,500
Total entering study	10,701	5,174	6,010	21,885
Screen outs	6,517	4,174	3,846	14,537
Quits (qualified but did not complete)	182	114	85	381
Over quotas	3,166	53	1,243	4,462
Completed survey	836	833	836	2,505

Table 7. Completed Surveys by Group and Study Condition

Study Condition	Adolescents Respondents	Young Adult Respondents	Older Adults Respondents	Total
0 (CONTROL)	50	49	49	148
1	49	49	49	147
2	50	49	49	148
3	49	49	49	147
4	49	49	50	148
5	49	49	49	147
6	49	49	49	147
7	49	49	50	148
8	49	49	49	147
9	49	49	49	147
10	49	49	49	147
11	49	49	49	147

(continued)

Table 7. Completed Surveys by Group and Study Condition (continued)

Study Condition	Adolescents Respondents	Young Adult Respondents	Older Adults Respondents	Total
12	49	49	49	147
13	49	49	50	148
14	49	49	49	147
15	49	49	49	147
16	50	49	49	148
Total	836	833	836	2,505

Table 8. Completed Surveys by Group and Gender

Gender	Adolescent	Young Adult	Older Adult	Total
Male	314	562	366	1,242
Female	522	271	470	1,263
Total	836	833	836	2,505

Table 9. Completed Surveys by Group and Age

Age	Adolescent	Young Adult	Older Adult	Total
13-17	836	N/A	N/A	836
18-24	N/A	833	N/A	833
25-34	N/A	N/A	179	179
35-44	N/A	N/A	196	196
45-54	N/A	N/A	171	171
55-64	N/A	N/A	161	161
65+	N/A	N/A	129	129
Total	836	833	836	2,505

N/A = Not applicable

Table 10. Completed Surveys by Smoking Status Among Adolescents

Smoking Status	Adolescent
Susceptible nonsmoker	419
Current smoker	417
Total	836

4. Analysis Plan

4.1 Measures and Coding

4.1.1 Theory-based Approaches to Inform Study Variables

Our selection of study variables was guided by communication and social science theories (McGuire, 2001; Noar et al., 2015; Wogalter et al, 1999) which show that warning message characteristics (e.g., use of pictorials, content of the textual warning statement) impacts consumer understanding of the warning. A large body of scientific evidence demonstrates that pictorial cigarette warnings promote greater public understanding about the health consequences of smoking as they: (1) increase the noticeability of the warning's message, resulting in increased consumer attention to, reading, and recall of the message; and (2) increase knowledge, learning, reactions to the message, information processing, and thinking about the negative health consequences of smoking. Because understanding is multifaceted and encompasses many processes such as the ones described, there is no "gold standard" measure or other conventions used to capture understanding. As such, our theory-driven selection of study items relies on a robust body of literature and/or validated instruments (Bann et al., 2012; Bansal-Travers et al., 2011; Byrne et al., 2015; Fathelrahman et al., 2010; Hammond et al., 2007; Herz-Roiphe, 2015; Magnan & Cameron, 2015; Pierce et al., 1996).

4.1.2 Components of Understanding and Selected Study Outcomes

Selection of survey items for understanding was guided by communication and social science theories (McGuire, 2001; Noar et al., 2015; Wogalter et al, 1999). Because understanding is multifaceted, we selected multiple components of understanding based upon the literature. We briefly describe these various components of understanding and the items that were chosen as study outcomes below:[Note: Items selected for each component of understanding are bulleted and their citations reflect the source of the original or adapted survey item.]

Initial Reactions: This component of understanding captures participants' initial and immediate reactions to warnings. Initial perceptions that the source of a message (i.e., the warning) is effective (e.g., perceptions that a warning provides new information and can contribute to learning) serves as a necessary precursor to message comprehension and learning (McGuire, 2001; Noar et al., 2015; Wogalter et al., 1999). As such, we believe this component to be a *necessary* component of understanding. We selected the following items to reflect this component of understanding:

- Whether the health effect in the warning was new information (Magnan & Cameron, 2015)

- Self-reported learning (Magnan & Cameron, 2014)

Message Reactions: This component of understanding captures participants’ reactions to and judgement of a message (Noar et al., 2015). An individual’s judgement of a message is linked to actual effectiveness of the message (e.g., perceiving a warning to be understandable is linked to increased likelihood that the warning is understood) (Dillar et al., 2007; Noar et al., 2018). We selected the following items to reflect this component of understanding:

- To what extent the warning was informative (Atkin & Beltramini, 2007)
- To what extent the warning was believable (Atkin & Beltramini, 2007; Bansal-Travers et al., 2011).
- Whether the warning was a fact or opinion (Herz-Roiphe, 2015)

Learning and Processing: This component of understanding captures participants’ ability to process and think on the information in a message which leads to knowledge acquisition and learning (Wogalter et al. 1999, cite). Warnings that promote health beliefs and thinking about the health risks of smoking are more likely to lead to understanding about the negative health consequences of smoking compared to warnings that fail to promote these indicators (cite). We selected the following items to reflect this component of understanding.

- Beliefs about smoking-related health risks (Byrne, Katz, & Niederdeppe, 2014; Mutti et al., 2013)
- Beliefs about the number of health conditions perceived to be caused by smoking and secondhand smoke (GATS, 2014).
- Thinking about the health risks of smoking (Fathelrahman et al., 2010; Hammond et al., 2007)

Table 11 presents item wording, and details regarding the coding for all of the outcomes of understanding examined in the study. The table also includes an abbreviated term for each warning, which is used in tables and text in this report in lieu of writing the complete item. In the list below, the sources of the items are noted.

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Table 11. Study Outcomes

Survey Section & Item #	Item Wording	Response Options	Coding for Analysis	Abbreviated Wording
<i>Primary Outcomes</i>				

Survey Section & Item #	Item Wording	Response Options	Coding for Analysis	Abbreviated Wording
Phase 1, Part 1: A1	Before today, had you heard about the specific smoking-related health effect described in the warning statement?	1 = Yes 2 = No 3 = I'm not sure	Responses were recoded as dichotomous: Yes (0) vs. No / I'm not sure (1)	New knowledge
Phase 1, Part 1: A2	To what extent did you learn something new from this warning statement that you did not know before?	1 = Not at all 2 3 4 5 6 7 = Very Much	Responses were recoded downward by one point such that 0 = Not at all and 6 = Very much. Item was used as a continuous measure in linear regression.	Learning

(continued)

Table 11. Study Outcomes (continued)

Survey Section & Item #	Item Wording	Response Options	Coding for Analysis	Abbreviated Wording
Phase 1, Part 1: A3	How much does this warning statement make you think about the health risks of smoking?	1 = Not at all 2 = A little 3 = Somewhat 4 = A lot	Responses were recoded as dichotomous: Somewhat / A lot (1) vs. Not at all / A little (0)	Thinking about risks
Phase 1, Part 2: B1_1 through B15_2	Agreement with a health belief statement or statements related to a given warning. For example, agreement with the beliefs "Smoking causes head cancer" and "Smoking causes neck cancer" for the revised statement "WARNING: Smoking causes head and neck cancer."	1 = Strongly disagree 2 = Disagree 3 = Neither agree nor disagree 4 = Agree 5 = Strongly agree 9 = Prefer not to answer	If multiple statements: scaled and means used as a continuous measure in linear regression. If a single statement: maintained the 5 categories for an ordinal regression. "Prefer not to answer" recoded as missing.	Health beliefs (Phase 1 assessment)
<i>Secondary Outcomes</i>				
Phase 1, Part 1: A4_1	This statement is...	1 = Not at all believable 2 3 4 5 6 7 = Very believable	Responses were recoded downward by one point such that 0 = Not at all believable and 6 = Very believable. Item was used as a continuous measure in linear regression.	Believability

Survey Section & Item #	Item Wording	Response Options	Coding for Analysis	Abbreviated Wording
Phase 1, Part 1: A4_2	This statement is...	1 = Not at all informative 2 3 4 5 6 7 = Very informative	Responses were recoded downward by one point such that 0 = Not at all informative and 6 = Very informative. Item was used as a continuous measure in linear regression.	Informativeness
Phase 1, Part 1: A5_1	Would you say that this warning statement is an opinion or a fact?	1 = Opinion 2 = Fact	Coded as dichotomous for logistic regression: Fact (1) / Opinion (0)	Factuality
Phase 2: C1	Which, if any, of the following conditions do you think <u>smoking</u> can cause?	20 possible conditions listed	Summed to create continuous measure (range 0-20) for linear regression	Health beliefs (Phase 2 assessment)

(continued)

Table 11. Study Outcomes (continued)

Survey Section & Item #	Item Wording	Response Options	Coding for Analysis	Abbreviated Wording
Phase 2: C2	Which, if any, of the following conditions do you think <u>secondhand smoke</u> can cause?	2 possible conditions listed	Summed to create ordinal measure (range 0-2) for ordinal logistic regression	Health beliefs (Phase 2 assessment)
Phase 2: C3	Which, if any, of the following conditions do you think <u>smoking during pregnancy</u> can cause?	3 possible conditions listed	Summed to create ordinal measure (range 0-3) for ordinal logistic regression	Health beliefs (Phase 2 assessment)
Phase 2: C1 through C3	Not applicable	Total number of conditions endorsed from the above 3 categories	Summed to create continuous measure (range 0-25) for linear regression	Health beliefs (Phase 2 assessment)

The Phase 1 items being used to measure health beliefs (B1_1 through B15_2) have Likert response scales. Conceptually, the response categories for a Likert response scale represent an underlying belief continuum. For warning statements with multiple corresponding items, we assessed whether or not to scale the items, using the following protocol:

1. Run a test of internal consistency reliability using Cronbach's alpha (Cronbach, 1951) on all of the items in a domain. If the test indicates "modest" reliability of $\alpha \geq 0.70$ (Nunnally & Bernstein, 1994), scale the items.
2. If $\alpha < 0.70$, but all item-total correlations (i.e., the correlation between the item score and the overall scale score) are ≥ 0.4 , scale the items (Item-total correlations of between 0.30–0.40 and greater have been suggested as sufficiently discriminating; Nunnally & Bernstein, 1994; Traub, 1994; Leong & Austin, 2006).
3. If criteria 1 and 2 are not met, determine whether the scale alpha would increase to ≥ 0.70 if any items were deleted from the scale (i.e., using Stata's "alpha" command with "item" option specified).

All health beliefs with multiple items, except for those related to B10, met the first criteria with $\alpha \geq 0.70$ (see Table 12), so these items were all scaled. The health beliefs related to B10 had an alpha of 0.69 but met the second criteria above and thus were also scaled. Table 12 shows the internal consistency reliability scores for each set of health belief items.

Table 12. Internal Consistency of Scaled Responses to Phase 1 Health Belief Items

Scaled Dependent Variables [All 5-level "Strongly disagree" to "Strongly agree" response options]		Cronbach's Alpha
B1_1.	Smoking causes mouth cancer	0.75
B1_2.	Smoking causes throat cancer	
B2_1.	Smoking causes head cancer	0.74
B2_2.	Smoking causes neck cancer	
B3_1.	Smoking causes bladder cancer, which can lead to bloody urine	0.86
B3_2.	Smoking causes bladder cancer	
B3_3.	Smoking can lead to bloody urine	
B7_1.	Secondhand smoke causes respiratory illnesses in children, like pneumonia	0.81
B7_2.	Secondhand smoke causes respiratory illnesses in children	
B7_3.	Secondhand smoke causes pneumonia in children	
B8_1.	Smoking causes heart disease	0.87
B8_2.	Smoking causes strokes	
B8_3.	Smoking clogs arteries	
B8_4.	Smoking clogs arteries, which causes heart disease	
B9_1.	Smoking causes COPD, a lung disease that can be fatal	0.78
B9_2.	Smoking causes COPD	
B9_3.	Smoking causes a lung disease that can be fatal	
B10_1.	Smoking causes serious lung diseases	0.69 (all item- total correlations > 0.4)
B10_2.	Smoking causes emphysema	
B10_3.	Smoking causes chronic bronchitis	

B11_1. Smoking reduces blood flow, which can cause erectile dysfunction	0.78
B11_2. Smoking reduces blood flow	
B11_3. Smoking can cause erectile dysfunction	
B12_1. Smoking reduces blood flow to the limbs, which can require amputation	0.82
B12_2. Smoking reduces blood flow to the limbs	
B12_3. Smoking can lead to amputation	
B13_1. Smoking causes type 2 diabetes, which raises blood sugar.	0.83
B13_3. Smoking can cause Type 2 Diabetes	
B14_1. Smoking causes age-related macular degeneration, which can lead to blindness	0.82
B14_2. Smoking causes age-related macular degeneration	
B14_3. Smoking can lead to blindness	
B15_1. Smoking causes cataracts, which can lead to blindness	0.84
B15_2. Smoking causes cataracts	

4.2 Power Analyses

As part of the planning for this study, we conducted power calculations to determine the optimal allocation of sample across study conditions. Estimates of effect sizes used in the power analysis were derived from previously conducted studies with similar methodologies and relevant outcomes as the present study, including FDA's previous study on warnings conducted in 2011 (Nonnemaker et al., 2015). To control for Type 1 error taking into account multiple testing, power calculations were based on the false discovery rates (FDRs) (Benjamini & Hochberg, 1995). Assuming the tests are independent, the FDR is the expected proportion of significant results that are falsely declared as statistically significant. Controlling the FDR is controlling the expected proportion of falsely declared differences (false discoveries). Controlling the FDR is a more powerful method for dealing with multiple comparisons than other methods which control the family wise error rate (Benjamini & Hochberg, 1995). FDR power calculations were computed using 400 simulations in SAS v9.4. Table 13 provides power sizes to detect a 0.5 difference on a 7-point scale (assuming a standard deviation of 1) for various sample allocations. Additional details about the adjustment for multiple comparisons appear in Section 4.3.1.

For the overall study sample size and within each study group (i.e., adolescent, young adult, adult) and sub-group (i.e., adolescent smoker, adolescent susceptible to smoking) sample size, we calculated power under two scenarios: (1) assuming equal sample sizes for control and treatment groups; and (2) using an imbalanced control and treatment allocation that yields optimal power (Table 13).

For the overall sample of 2,500, we calculated that there would be high power whether the control and treatment groups were equal in sample size or optimized for all FDRs, assuming the anticipated effect size (difference of 0.5 and standard deviation of 1). For the subsample of 833, we found we would be able to achieve a power of 0.63 for equal sample sizes between the control and the treatment and a power of 0.77 for optimized sample allocation using an FDR of 0.05. Equal sample size allocation would achieve a power of 0.82 using an FDR of 0.15, and optimized sample size allocation would achieve a power of 0.87 using an FDR of 0.1.

For the adolescent subsample of 417, we would only be able to achieve power of 0.2 and 0.42 for equal and optimized sample allocations, respectively. Using an FDR of 0.25 would achieve power less than 0.8 for both sample allocations (0.63 for equal sample sizes and 0.77 for optimized sample sizes).

Based on this analysis showing that higher power is achieved with an unbalanced allocation, we planned to allocate 548 to the control group and 122 to each treatment group.

Table 13. Power of Difference of 0.5 and Standard Deviation of 1 Using False Discovery Rates

Sample	Sample Size		False Discovery Rate				
	Control	Treatment	0.05	0.1	0.15	0.2	0.25
2,500	147	147	0.99	0.99	1.00	1.00	1.00
	548	122	1.00	1.00	1.00	1.00	1.00
833	49	49	0.63	0.76	0.82	0.86	0.89
	161	42	0.77	0.87	0.92	0.94	0.95
417	24	24	0.20	0.36	0.49	0.57	0.63
	81	21	0.42	0.57	0.65	0.73	0.77

However, due to an error in the programming instructions provided to the data collection vendor, allocation of the sample between treatment and control groups was not optimized as planned but rather was done as equal allocation between treatment and control groups (see Table 14 for planned versus actual allocation of sample into condition).

Random assignment did occur in accordance with the instructions given to the data collection vendor (even though those instructions differed from the intended plan). Subjects were randomly assigned with equal allocation between treatment and control within each age sample. Lightspeed uses least-fill quota logic for assignment to condition. Thus, given

this procedure we achieved roughly equivalent Ns across study conditions within each age group. As expected, this matches the final distribution as seen in Table 14.

It is important to note the following regarding the error in programming instructions that led to equal allocation to condition:

- Participants were still randomly assigned to condition; the error did not introduce a bias between treatment and control.
- There is less power to detect a statistically significant difference between treatment and control, so findings are conservative (See Table 13).

Table 14. Planned Versus Actual Allocation of Sample

Study Condition	Planned Allocation				Actual Allocation			
	Adolescents	Young Adults	Older Adults	Total	Adolescents	Young Adults	Older Adults	Total
0 (CONTROL)	183	183	182	548	50	49	49	148
1	41	40	41	122	49	49	49	147
2	40	41	41	122	50	49	49	148
3	41	41	40	122	49	49	49	147
4	41	40	41	122	49	49	50	148
5	40	41	41	122	49	49	49	147
6	41	41	40	122	49	49	49	147
7	41	40	41	122	49	49	50	148
8	40	41	41	122	49	49	49	147
9	41	41	40	122	49	49	49	147
10	41	40	41	122	49	49	49	147
11	40	41	41	122	49	49	49	147
12	41	41	40	122	49	49	49	147
13	41	40	41	122	49	49	50	148
14	40	41	41	122	49	49	49	147
15	41	41	40	122	49	49	49	147
16	41	40	41	122	50	49	49	148
Total	834	833	834	2,500	836	833	836	2,505

4.3 Analyses

4.3.1 General Approach to All Analyses, Including Adjustment for Multiple Comparisons and Indications of Statistical Significance in Results

Before beginning analyses, we examined whether participant characteristics differed between the treatment and control conditions, both in the overall sample and within each group (adolescents, young adults, and adults). We used t-tests or chi square tests to examine potential differences by age, gender, race/ethnicity, education (adults only), income (adults only), sexual orientation (adults only), smoking status (susceptible versus smoker; adolescents only), health literacy (adults only), and region. In the overall sample, none of these tests was statistically significant. The lack of differences in the distribution of participant characteristics into treatment versus control conditions is another indication that random assignment occurred as intended.

In all analyses, we used the Benjamini-Hochberg procedure to account for multiple comparisons. The Benjamini-Hochberg procedure involves ranking all the p-values from a family of tests from smallest to largest. The smallest p-value has a rank of $i=1$, the next smallest has $i=2$, etc. The next step is comparing each individual p-value to its Benjamini-Hochberg critical value, $(i/m)Q$, where i is the rank, m is the total number of tests, and Q is the FDR you choose. The largest p-value that has $P < (i/m)Q$ is statistically significant, and all of the p-values smaller than it are also statistically significant, even the ones that are not less than their Benjamini-Hochberg critical value. In other words, once a p-value in the list satisfies $P \geq (i/m)Q$, then no other p-values of that value or larger are considered statistically significant (and all less than that value are statistically significant).

There is little guidance on the best FDR to use in a study. Note that for an FDR of 0.05, the smallest p-value needs to be less than what would be the conservative Bonferonni correction ($0.05/m$), i.e., when $i=1$, then the Benjamini-Hochberg critical value is $(1/m)*0.05$. At an FDR of 0.05, the Benjamini-Hochberg critical value becomes slightly less conservative than a Bonferonni cut-off if p-values are less than this cut-off. However, if no p-values are less than $0.05/m$, then no results are statistically significant. Thus, an FDR of 0.05 is conservative, like a Bonferonni correction. In our original power calculations, we calculated power for several different values of the FDR (see Table 13). In the Results Report, rather than use multiple FDRs, we report the results indicating statistical significance using an FDR of 0.05 (most conservative) and using no adjustment for multiple comparisons (least conservative).

All regressions were estimated in Stata version 14.1 and using Stata's robust standard errors. Each model included indicator variables for age group (i.e., adolescents aged 13–17; young adults aged 18–24; and adults aged 25+) as covariates, to account for potential associations between age and outcomes of interest. Additionally, we conducted parallel analyses stratified by age group, to examine potential effects within each age group. These

findings are reported in Appendix B of the Results Report. Of note is that this study was not powered to detect within-age-group differences, and so results from the stratified analyses should be interpreted with caution (i.e., a non-statistically significant finding within an age group may reflect lack of statistical power).

We examined the data for issues of item nonresponse and differential item nonresponse. Because there was no substantial item nonresponse or differential item nonresponse, we used pairwise deletion for missing data in order to include all available data for each analysis. In all analyses described below, the term “significant” refers to statistical significance.

4.3.2 Phase 1, Part 1: Hypotheses and Analyses

As described above, in Phase 1, participants were randomized to 1 of 16 experimental conditions or a control condition. Participants in the control condition viewed all nine TCA text warning statements presented in a random order. Participants randomized into each of the 16 experimental conditions viewed 8 of the TCA statements, plus 1 of the revised statements in a random order.

After viewing each statement, respondents completed measures assessing new knowledge (question A1), learning (question A2), and thinking about the health risks of smoking (question A3). The individual warning statement remained on the screen as they answered these questions, and the process was repeated for each of nine warning statements in their assigned condition.

We conducted statement-level comparisons of means and proportions for key measures related to the warning statements. Table 15 illustrates which statements were compared in analyses for Phase 1, Part 1.

Table 15. Phase 1, Part 1 Analysis Comparisons

Comparison		
Analysis #	Experimental Condition Statement	Control Condition Statement
1	R1A	S4
2	R1B	S4
3	R1C	S4
4	R2A	S6
5	R2B	S6
6	R2C	S6
7	R3A	S2
8	R4A	S5
9	R5A	S8

Comparison		
Analysis #	Experimental Condition Statement	Control Condition Statement
10	R5A	S3
11	R5B	S3
12	R6A	Random Selection of S1-S9
13	R6B	Random Selection of S1-S9
14	R7A	Random Selection of S1-S9
15	R8A	Random Selection of S1-S9
16	R8B	Random Selection of S1-S9

Each analysis was conducted at the statement level among the subset of respondents in the control group and relevant study condition. For example, to examine the knowledge gain from statement R1A relative to its corresponding TCA statement (S4), we examined differences in A1 scores for these statements among those in the control group and Study Condition 1. The comparisons operated differently for revised statements without corresponding TCA statements: these statements were compared with both a randomly selected control statement and to a value of zero (i.e., if there is a knowledge gain, above and beyond an individual's baseline knowledge as would be expected in the absence of a statement).

A total of 48 statistical tests were conducted in Part 1 of Phase 1 for our 3 primary dependent variables (3 primary dependent variables across 16 comparisons) and 48 for the 3 secondary dependent variables (3*16), not including the additional tests that compared statements without matching comparison statements to a "no control" condition. To account for the possibility of falsely detecting a significant result (i.e., Type 1 error) arising from multiple statistical tests, we controlled for the FDR using the Benjamini-Hochberg procedure, assuming a two-tailed test and FDR of 0.05 (Benjamini & Hochberg, 1995). This was applied separately to each family of tests (the 48 tests of the primary dependent variable and the 48 tests of the secondary dependent variables). We consider these to be two separate families of tests because the primary variables represent the tests that determine if the revised statements are an improvement over the TCA statements, whereas the secondary dependent variables provide additional information to contextualize the results from the analyses of the primary dependent variables.

Revised Statements Compared with Corresponding TCA Statements

Statements R1A, R1B, R1C, R2A, R2B, R2C, R3A, R4A, R5A, and R5B are revisions to TCA statements focused on similar health effects. Thus, hypotheses and tests for these statements are of the form where we directly compare the revised statement to the TCA

statement in terms of the effect of exposure to these statements on differences in specific outcomes.

For new knowledge (A1), our hypothesis was of the following form:

- H_0 : proportion (%) responding that the statement provides new knowledge (had not heard of the information contained in the statement prior to the experimental exposure) for those in the treatment condition = proportion (%) responding that statement provides new knowledge for those in the control condition.
- H_a : proportion (%) responding that statement provides new knowledge for those in the treatment condition \neq proportion (%) responding that statement provides new knowledge for those in the control condition.

Since new knowledge (A1) is a dichotomous outcome, we tested this hypothesis using a logistic regression. The logistic regression included a treatment indicator (=1 for those in the treatment group and =0 for those on the control group). A two-sided test of the significance of the coefficient on the treatment indicator is a test of the level of the outcome being different in the treatment group versus the control group. If the coefficient is positive (or $OR > 1$) and significant, then the revised statement is significantly associated with providing more new knowledge. If the coefficient is negative (or $OR < 1$) and significant, then the revised statement would be significantly associated with fewer in the treatment group reporting the statement provided new knowledge than in the control group (the TCA statement being reported to provide new information). If the coefficient on the treatment indicator is not significant ($OR = 1$), then those in the treatment group did not report the revised statement to have provided new knowledge compared with the control group.

For learning (A2), which is measured on a 7-point scale, our hypothesis was of the following form:

- H_0 : the mean level of learning for those in the treatment group = the mean level of learning for those in the control group.
- H_a : the mean level of learning for those in the treatment group \neq the mean level of learning for those in the control group.

Since learning (A2) is being treated as a continuous variable, this hypothesis was tested using linear regression. The linear regression included a treatment indicator (=1 for those in the treatment group and =0 for those on the control group). A two-sided test of the significance of the coefficient on the treatment indicator is a test of the level of the outcome being different in the treatment group versus the control group. If the coefficient is positive and significant, then the revised statement is significantly associated with greater learning. If the coefficient is negative and significant, then the revised statement would be significantly associated with less learning. If the coefficient on the treatment indicator is not significant (not significantly different from 0), then the revised statement does not result in more or less learning.

Thinking about risks (A3) is a dichotomized measure of whether participants report that the warning statement made them think about the health risks of smoking somewhat or a lot (compared with a little or not at all). For this variable, our hypothesis was of the following form:

- H_0 : proportion (%) responding that the statement made them think about the health risks of smoking somewhat or a lot for those in the treatment condition = proportion (%) responding that statement made them think about the health risks of smoking somewhat or a lot for those in the control condition.
- H_a : proportion (%) responding that the statement made them think about the health risks of smoking somewhat or a lot for those in the treatment condition \neq proportion (%) responding that statement made them think about the health risks of smoking somewhat or a lot for those in the control condition.

Since thinking about risks (A3) is a dichotomous outcome, we tested this hypothesis using logistic regression. The logistic regression included a treatment indicator (=1 for those in the treatment group and =0 for those on the control group). A two-sided test of the significance of the coefficient on the treatment indicator is a test of the level of the outcome being different in the treatment group versus the control group. If the coefficient is positive (or $OR > 1$) and significant, then the revised statement is significantly associated with making the participant think about the health risks of smoking somewhat or a lot more compared with the control group. If the coefficient is negative (or $OR < 1$) and significant, then the revised statement is significantly associated with making the participant think about the health risks of smoking somewhat or a lot less compared with the TCA statement. If the coefficient on the treatment indicator is not significant ($OR = 1$), then the revised statement does not have an effect on the participant's thinking about the health risks of smoking.

For believability (A4_1), our hypothesis was of the following form:

- H_0 : the mean level of statement believability among those in the treatment group = the mean level of statement believability among those in the control group.
- H_a : the mean level of statement believability among those in the treatment group \neq the mean level of statement believability among those in the control group.

Since believability (A4_1) was treated as a continuous variable, this hypothesis was tested using linear regression. The linear regression included a treatment indicator (=1 for those in the treatment group and =0 for those on the control group). A two-sided test of the significance of the coefficient on the treatment indicator is a test of the level of the outcome being different in the treatment group versus the control group. If the coefficient is positive and significant, then the revised statement is significantly associated with being more believable compared with the control group. If the coefficient is negative and significant, then the revised statement is significantly associated with being less believable than the TCA statement. If the coefficient on the treatment indicator is not significant (not

significantly different from 0), then the revised statement is not more or less believable than the control group (TCA statement).

For informativeness (A4_2), our hypothesis was of the following form:

- H_0 : the mean level of statement informativeness among those in the treatment group = the mean level of statement informativeness among those in the control group.
- H_a : the mean level of statement informativeness among those in the treatment group \neq the mean level of statement informativeness among those in the control group.

Since informativeness (A4_2) was treated as a continuous variable, this hypothesis was tested using linear regression. The linear regression included a treatment indicator (=1 for those in the treatment group and =0 for those on the control group). A two-sided test of the significance of the coefficient on the treatment indicator is a test of the level of the outcome being different in the treatment group versus the control group. If the coefficient is positive and significant, then the revised statement is significantly associated with being more informative than the control group. If the coefficient is negative and significant, then the revised statement is significantly associated with being less informative than the TCA statement. If the coefficient on the treatment indicator is not significant (not significantly different from 0), then the revised statement is not more or less informative than the control group (TCA statement).

For factuality (A5), our hypothesis was of the following form:

- H_0 : proportion (%) responding that the statement is factual for those in the treatment condition = proportion (%) responding that statement is factual for those in the control condition.
- H_a : proportion (%) responding that statement is factual for those in the treatment condition \neq proportion (%) responding that statement is factual for those in the control condition.

Since factuality (A5) is a dichotomous outcome, we tested this hypothesis using logistic regression. The logistic regression included a treatment indicator (=1 for those in the treatment group and =0 for those on the control group). A two-sided test of the significance of the coefficient on the treatment indicator is a test of the level of the outcome being different in the treatment group versus the control group. If the coefficient is positive (or $OR > 1$) and significant, then more participants in the treatment group than in the control group consider the revised statement a fact. If the coefficient is negative (or $OR < 1$) and significant, then fewer participants in the treatment group than in the control group consider the revised statement a fact. If the coefficient on the treatment indicator is not significant ($OR = 1$), then the percent considering the revised statement a fact does not differ between the treatment group and the control group.

Revised Statements with No Corresponding TCA Statements Compared with Random Control or a Value of Zero (No Control)

Statements R6A, R6B, R7A, R8A, and R8B are revised statements focusing on health consequences not represented in a corresponding TCA statement, and thus have no TCA statement to facilitate a direct comparison. For these statements, we conducted two types of analyses, described below.

1. Comparison of treatment statement to randomly selected control statement

For revised statements without corresponding TCA statements, we randomly selected a TCA statement to serve as a control statement. We tested hypotheses of the following forms:

- For continuous outcomes (i.e., learning, believability, informativeness):
 - H_0 : the mean response for those in the treatment group = the mean response to a randomly selected statement for those in the control group.
 - H_a : the mean response for those in the treatment group \neq the mean response to a randomly selected statement for those in the control group.
- For dichotomous outcomes (i.e., new knowledge, thinking about risks, factuality):
 - H_0 : the proportion (%) responding in a manner indicative of being better informed about the health risks of smoking (e.g., reporting that the statement provided new knowledge) for those in the treatment group = the proportion with respect to a randomly selected control statements for those in the control group.
 - H_a : the proportion (%) responding in a manner indicative of being better informed about the health risks of smoking (e.g., reporting that the statement provided new knowledge) for those in the treatment group \neq the proportion with respect to a randomly selected control statements for those in the control group.

2. Comparison of treatment statement to a value of zero (no control statement)

We also assessed the extent to which respondents reported that the revised statements without corresponding TCA statements enhanced their learning, knowledge, etc. above and beyond what would be expected in the absence of a statement. To do this, we tested hypotheses of the following forms:

- For continuous outcomes (i.e., learning, believability, informativeness):
 - H_0 : the mean response for those in the treatment group = 0.
 - H_a : the mean response for those in the treatment group > 0 .
- For dichotomous outcomes (i.e., new knowledge, thinking about risks, factuality):
 - H_0 : the proportion (%) responding in a manner indicative of being better informed about the health risks of smoking (e.g., reporting that the statement provided new knowledge) for those in the treatment group = 0.
 - H_a : the proportion (%) responding in a manner indicative of being better informed about the health risks of smoking (e.g., reporting that the statement provided new knowledge) for those in the treatment group > 0 .

For continuous outcomes, we conducted a one-sample t-test on the equality of means. For dichotomous outcomes, we conducted a one-sample test of the equality of proportions. For each set of analyses, we compared the mean or proportion in the treatment group with zero. In this case, zero represents an individual's baseline knowledge or beliefs as would be expected in the absence of a statement.

4.3.3 Phase 1, Part 2: Hypotheses and Analyses

As described previously, in Part 2 of Phase 1, respondents were asked a series of questions assessing beliefs about the negative health consequences of smoking contained in the warning statements. This set of questions was asked one time, and the warning statements were not visible as the questions were presented.

For the analysis, we conducted condition-level comparisons for key measures assessing beliefs about the negative health consequences of smoking contained in the warning statements. For each experimental condition, the survey included an item or series of items in which respondents were asked to rate their level of agreement with a statement about a negative health consequence corresponding to the warning statement for that condition.

The number of items associated with a particular warning statement ranged from 1 to 4. These items were asked once following viewing of warning statements for all respondents.

For the health beliefs, we tested hypotheses of the following general form:

- H_0 : Health belief scores for those in the treatment condition = health belief scores in the control condition.
- H_a : Health belief scores for those in the treatment condition \neq health belief score in the control condition.

For those statements with multiple corresponding belief items, we scaled into a single continuous variable according to the procedure described in Section 4.1 and conducted two-sided tests using linear regression. For statements with single ordinal Likert-type belief items (e.g., R2A, R2B, R2C), we tested hypotheses of the form that treatment (being exposed to revised statements) is associated with a higher level on the ordinal dependent variable than being in the control group (being exposed to the TCA statements). Thus, for these items we used ordinal logistic regression. This approach assumes that an explanatory variable has the same effect across all the ordinal categories of the dependent variable, referred to as the proportional odds or parallel regression assumption (Brant, 1990). We confirmed that the proportional odds assumption was not violated using the Brant test in Stata's Gologit2 program (Williams, 2005). We had no a priori hypotheses regarding different effects of treatment across the different levels of the ordinal variables.

Each model included indicator variables for group (i.e., adolescents, young adults, and older adults) as covariates, to account for potential associations between age and outcomes of

interest. Additionally, we conducted parallel analyses stratified by group, to examine potential effects within each group. Of note is that this study was not powered to detect within-group differences, and so results from the stratified analyses should be interpreted with caution (i.e., a non-significant finding within an age group may reflect lack of statistical power).

A total of 16 statistical tests were conducted in Part 2 of Phase 1. To account for the possibility of falsely detecting a significant result (i.e., Type 1 error) arising from multiple statistical tests, we controlled for the FDR using the Benjamini-Hochberg procedure, assuming a two-tailed test and FDR of 0.05 (Benjamini & Hochberg, 1995). Table 16 provides a summary of the comparisons, dependent variables, and analysis approach for each of the Part 2 analyses.

Table 16. Phase 1, Part 2 Analyses

Comparison #	Comparison	Dependent Variable(s) [All 5-level "Strongly disagree" to "Strongly agree" response options]	Analysis
1	Condition 1 (R1A) vs. Control	B1_1. Smoking causes mouth cancer B1_2. Smoking causes throat cancer	Linear regression
2	Condition 2 (R1B) vs. Control	B2_1. Smoking causes head cancer B2_2. Smoking causes neck cancer	Linear regression
3	Condition 3 (R1C) vs. Control	B3_1. Smoking causes bladder cancer, which can lead to bloody urine B3_2. Smoking causes bladder cancer B3_3. Smoking can lead to bloody urine	Linear regression
4	Condition 4 (R2A) vs. Control	B4_1. Smoking during pregnancy causes premature birth	Ordinal logistic regression
5	Condition 5 (R2B) vs. Control	B5_1. Smoking during pregnancy stunts fetal growth	Ordinal logistic regression
6	Condition 6 (R2C) vs. Control	B6_1. Smoking during pregnancy causes low birth weight	Ordinal logistic regression
7	Condition 7 (R3A) vs. Control	B7_1. Secondhand smoke causes respiratory illnesses in children, like pneumonia B7_2. Secondhand smoke causes respiratory illnesses in children B7_3. Secondhand smoke causes pneumonia in children	Linear regression
8	Condition 8 (R4A) vs. Control	B8_1. Smoking causes heart disease B8_2. Smoking causes strokes B8_3. Smoking clogs arteries B8_4. Smoking clogs arteries, which causes heart disease	Linear regression

Comparison #	Comparison	Dependent Variable(s) [All 5-level "Strongly disagree" to "Strongly agree" response options]	Analysis
9	Condition 9 (R5A) vs. Control	B9_1. Smoking causes COPD, a lung disease that can be fatal B9_2. Smoking causes COPD B9_3. Smoking causes a lung disease that can be fatal	Linear regression
10	Condition 10 (R5A) vs. Control	B9_1. Smoking causes COPD, a lung disease that can be fatal B9_2. Smoking causes COPD B9_3. Smoking causes a lung disease that can be fatal	Linear regression
11	Condition 11 (R5B) vs. Control	B10_1. Smoking causes serious lung diseases B10_2. Smoking causes emphysema B10_3. Smoking causes chronic bronchitis	Linear regression

(continued)

Table 16. Phase 1, Part 2 Analyses (continued)

Comparison #	Comparison	Dependent Variable(s) [All 5-level "Strongly disagree" to "Strongly agree" response options]	Analysis
12	Condition 12 (R6A) vs. Control	B11_1. Smoking reduces blood flow, which can cause erectile dysfunction B11_2. Smoking reduces blood flow B11_3. Smoking can cause erectile dysfunction	Linear regression
13	Condition 13 (R6B) vs. Control	B12_1. Smoking reduces blood flow to the limbs, which can require amputation B12_2. Smoking reduces blood flow to the limbs B12_3. Smoking can lead to amputation	Linear regression
14	Condition 14 (R7A) vs. Control	B13_1. Smoking causes type 2 diabetes, which raises blood sugar. B13_3. Smoking can cause Type 2 Diabetes	Linear regression
15	Condition 15 (R8A) vs. Control	B14_1. Smoking causes age-related macular degeneration, which can lead to blindness B14_2. Smoking causes age-related macular degeneration B14_3. Smoking can lead to blindness	Linear regression
16	Condition 16 (R8B) vs. Control	B15_1. Smoking causes cataracts, which can lead to blindness B15_2. Smoking causes cataracts	Linear regression

4.3.4 Phase 2: Hypotheses and Analyses

In Phase 2, participants viewed a set of nine warning statements in a single exposure and then responded to a series of questions assessing beliefs about the negative health consequences of smoking contained in the warning statements. In this phase, respondents were split into two groups: (1) a treatment group comprised of respondents in any of the experimental conditions from Phase 1; and (2) a control group comprised of respondents who were in the Phase 1 control condition.

The Phase 2 treatment group respondents viewed a set of nine warnings comprised only of revised warning statements, with one randomly selected statement per topic area, with the exception of statements focused on cancer. For statements focused on cancer (revised statements R1A, R1B, and R1C), they viewed two of the three randomly selected statements. Table 17 summarizes the procedure for selecting warning statements for the treatment group. Respondents in the control group viewed the same nine TCA warning statements they previously viewed, also presented as a set rather than individually.

Table 17. Phase 2 Treatment Group Stimuli Selection (Single Page Exposure)

Stimuli Slot	Selection of Statements in Set
1-2	Random selection of 2 of: R1A; R1B; R1C
3	Random selection of 1 of: R2A; R2B; R2C
4	R3A
5	R4A
6	Random selection of 1 of: R5A; R5B
7	Random selection of 1 of: R6A; R6B
8	R7A
9	Random selection of 1 of: R8A; R8B

After viewing the set of warning statements, respondents were presented with three series of questions assessing beliefs about the negative health consequences related to (1) smoking, (2) secondhand smoke, and (3) smoking during pregnancy. Table 18 summarizes each of these question series. Using responses from these question series, we created variables representing the sum of all negative health consequences selected within each series and overall:

1. Total number of smoking-related health consequences selected [range = 0-20]
2. Total number of secondhand-smoke-related health consequences selected [range = 0-2]
3. Total number of smoking-during-pregnancy-related health consequences selected [range = 0-3]

4. Total number of smoking-, secondhand-smoke-, and smoking-during-pregnancy-related health consequences selected [range = 0-25]

We tested the following hypotheses:

- H_0 : # health conditions selected by those exposed to set of revised statements = # health conditions selected by those exposed to set of TCA statements.
- H_a : # health conditions selected by those exposed to set of revised statements > # health conditions selected by those exposed to set of TCA statements.

These hypotheses were examined in four separate but parallel tests: (1) beliefs about smoking-related health consequences, (2) beliefs about secondhand-smoke-related health consequences, (3) beliefs about smoking-during-pregnancy-related health consequences, and (4) beliefs about the total number of health consequences.

Table 18. Health Belief (Phase 2) Question Series

C1 Stem: Which, if any, of the following conditions do you think <u>smoking</u> can cause?	C2 Stem: Which, if any, of the following conditions do you think <u>secondhand smoke</u> can cause?	C3 Stem: Which, if any, of the following conditions do you think <u>smoking during pregnancy</u> can cause?
C1_1. Mouth cancer	C2_1. Respiratory illnesses in children	C3_1. Premature birth
C1_2. Throat cancer	C2_2. Pneumonia in children	C3_2. Stunted fetal growth
C1_3. Head cancer		C3_3. Low birth weight
C1_4. Neck cancer		
C1_5. Bladder cancer		
C1_6. Bloody urine		
C1_7. Heart disease		
C1_8. Strokes		
C1_9. Clogged arteries		
C1_10. COPD		
C1_11. Emphysema		
C1_12. Chronic bronchitis		
C1_13. Reduced blood flow		
C1_14. Erectile dysfunction		
C1_15. Reduced blood flow to the limbs		
C1_16. Amputation		
C1_17. Type 2 Diabetes		
C1_18. Age-related macular degeneration		
C1_19. Blindness		

C1 Stem: Which, if any, of the following conditions do you think <u>smoking</u> can cause?	C2 Stem: Which, if any, of the following conditions do you think <u>secondhand smoke</u> can cause?	C3 Stem: Which, if any, of the following conditions do you think <u>smoking during pregnancy</u> can cause?
C1_20. Cataracts		

The variables assessing beliefs about smoking-related health consequences and total combined health consequences have ranges of 0–20 and 0–25, respectively. Thus, we treated these variables continuously and used linear regression to conduct two-sided tests of the effect of the treatment indicator on beliefs (as indicated by the number of health consequences selected).

The secondhand-smoke-related and smoking-during-pregnancy-related statements have dependent variables with ranges of 0–2 and 0–3, respectively. We treated these outcomes ordinally, representing an underlying continuum of more accurate health beliefs corresponding to greater numbers of health consequences selected. Thus, we used ordinal logistic regression models to test the effect of the treatment indicator on beliefs about health consequences. The procedure for conducting these analyses followed the same approach as described above with respect to the Phase 1, Part 2 analyses.

We conducted separate tests for each of the summary variables described above. Each model included indicator variables for age group (i.e., adolescents, young adults, and older adults) as covariates, to account for potential associations between age and outcomes of interest. Additionally, we conducted parallel analyses stratified by age group, to examine potential effects within each age group. Of note is that this study was not powered to detect within-age-group differences, and so results from the stratified analyses should be interpreted with caution (i.e., a non-significant finding within an age group may reflect lack of statistical power).

A total of 4 statistical tests were conducted in Phase 2. To account for the possibility of falsely detecting a significant result (i.e., Type 1 error) arising from multiple statistical tests, we controlled for the FDR using the Benjamini-Hochberg procedure, assuming a two-tailed test and FDR of 0.05 (Benjamini & Hochberg, 1995).

5. Results

5.1 Participant Characteristics

Participant characteristics appear in Table 19. In the total sample, approximately half (49.6%) of participants were male, and the majority (67.9%) were non-Hispanic white. Adult respondents' education levels spanned from less than a high school degree to college or more; the modal category was completing high school or a GED (39.7%). The modal category for annual household income was \$20,000-\$49,999 (35.3%). The sample included participants from all regions of the country. Most adults identified as heterosexual (85.5%) and responded correctly to the health literacy item (60.9%). Per the study design, half of adolescents in the sample were susceptible nonsmokers (50.1%) and half were current smoker (49.9%).

Table 19. Participant Characteristics

	Overall: n (%)	Adolescent (Aged 13–17):	Adult Smokers, n (%) or mean (SD)	
			Young Adult (Aged 18–24)	Older Adult (Aged ≥25)
Total sample makeup	2,505 (100%)	836 (33.4% of total sample)	833 (33.2% of total sample)	836 (33.4% of total sample)
Gender				
Male	1,242 (49.6%)	314 (37.6%)	562 (67.5%)	366 (43.8%)
Female	1,263 (50.4%)	522 (62.4%)	271 (32.5%)	470 (56.2%)
Age	28.38 (16.12)	15.60 (1.30)	21.72 (1.86)	47.78 (13.78)
Race/ethnicity				
White, non-Hispanic	1,702 (67.9%)	517 (61.8%)	516 (61.9%)	669 (80.0%)
Black, non-Hispanic	263 (10.5%)	84 (10.0%)	118 (14.2%)	61 (7.3%)
Other or multiracial, non-Hispanic	209 (8.3%)	101 (12.1%)	65 (7.8%)	43 (5.1%)
Hispanic	331 (13.2%)	134 (16.0%)	134 (16.1%)	63 (7.5%)
Education ^a				
Less than HS	118 (7.1%)	—	83 (10.0%)	35 (4.2%)
HS or GED	663 (39.7%)	—	362 (43.5%)	301 (36.0%)
Some college	563 (33.7%)	—	274 (32.9%)	289 (34.6%)
College or more	325 (19.5%)	—	114 (13.7%)	211 (25.2%)

(continued)

Table 19 Participant Characteristics (continued)

	Overall: n (%)	Adolescent (Aged 13–17):	Adult Smokers, n (%) or mean (SD)	
			Young Adult (Aged 18–24)	Older Adult (Aged ≥25)
Annual household income ^a				
\$0–\$19,999	463 (27.8%)	—	287 (34.6%)	176 (21.1%)
\$20,000–\$49,999	587 (35.3%)	—	266 (32.0%)	321 (38.5%)
\$50,000–\$74,999	293 (17.6%)	—	123 (14.8%)	170 (20.4%)
\$75,000 or more	320 (19.2%)	—	154 (18.6%)	166 (19.9%)
Region				
Northeast	476 (19.0%)	168 (20.1%)	152 (18.2%)	156 (18.7%)
South	981 (39.2%)	322 (38.5%)	336 (40.3%)	323 (38.6%)
Midwest	584 (23.3%)	204 (24.4%)	174 (20.9%)	206 (24.6%)
West	464 (18.5%)	142 (17.0%)	171 (20.5%)	151 (18.1%)
Sexual orientation ^a				
Heterosexual	1,426 (85.5%)	—	662 (79.7%)	764 (91.4%)
LGB or other ^b	241 (14.5%)	—	169 (20.3%)	72 (8.6%)
Health literacy ^{a,c} (correct response)	1,015 (60.9%)	—	517 (62.2%)	498 (59.6%)
Smoking status ^d				
Susceptible nonsmoker	—	419 (50.1%)	—	—
Current smoker	—	417 (49.9%)	—	—

^aItem only asked of young adult and older adult respondents (aged ≥18). ^b“LGB or other” includes identifying as homosexual, or gay or lesbian; bisexual; or something else. ^cParticipant correctly answers the question “If a person is at high risk for heart disease, which of the following levels of low density lipoprotein (LDL) cholesterol is best?” after reading facts about cholesterol. ^dItem only asked of adolescent respondents (aged 13–17).

Note: GED = general education diploma. HS = high school. LGB = lesbian, gay, or bisexual. SD = standard deviation.

5.2 Warning Statements and Conditions

Table 20 lists the 9 TCA statements (indicated with an “S” for “statutory”) and 15 revised warning statements (indicated with an “R”). This table also includes abbreviated versions of the statement wording, which will be used in tables and text in this report in lieu of the full wording.

Table 20. TCA and Revised Warning Statements

Statement Number	Statement Text	Abbreviated Version of Statement
TCA statements		
S1	WARNING: Cigarettes are addictive.	Addictive
S2	WARNING: Tobacco smoke can harm your children.	Harm children
S3	WARNING: Cigarettes cause fatal lung disease.	Fatal lung disease in smokers
S4	WARNING: Cigarettes cause cancer.	Unspecified cancer
S5	WARNING: Cigarettes cause strokes and heart disease.	Strokes and heart disease
S6	WARNING: Smoking during pregnancy can harm your baby.	Harm your baby
S7	WARNING: Smoking can kill you.	Kill you
S8	WARNING: Tobacco smoke causes fatal lung disease in nonsmokers.	Fatal lung disease in nonsmokers
S9	WARNING: Quitting smoking now greatly reduces serious risks to your health.	Quit now
Revised statements		
R1A	WARNING: Smoking causes mouth and throat cancer.	Mouth and throat cancer
R1B	WARNING: Smoking causes head and neck cancer.	Head and neck cancer
R1C	WARNING: Smoking causes bladder cancer, which can lead to bloody urine.	Bladder cancer
R2A	WARNING: Smoking during pregnancy causes premature birth.	Premature birth
R2B	WARNING: Smoking during pregnancy stunts fetal growth.	Stunt fetal growth
R2C	WARNING: Smoking during pregnancy causes premature birth and low birth weight.	Low birth weight
R3A	WARNING: Secondhand smoke causes respiratory illnesses in children, like pneumonia.	Respiratory illness in children
R4A	WARNING: Smoking can cause heart disease and strokes by clogging arteries.	Clogged arteries
R5A	WARNING: Smoking causes COPD, a lung disease that can be fatal.	COPD
R5B	WARNING: Smoking causes serious lung diseases like emphysema and chronic bronchitis.	Emphysema and bronchitis
R6A	WARNING: Smoking reduces blood flow, which can cause erectile dysfunction.	Erectile dysfunction
R6B	WARNING: Smoking reduces blood flow to the limbs, which can require amputation.	Amputation
R7A	WARNING: Smoking causes type 2 diabetes, which raises blood sugar.	Diabetes
R8A	WARNING: Smoking causes age-related macular degeneration, which can lead to blindness.	Macular degeneration
R8B	WARNING: Smoking causes cataracts, which can lead to blindness.	Cataracts

Table 21 describes each of the 17 conditions (1 control and 16 treatment conditions), along with the number of participants in each condition.

Table 21. Conditions and Allocation of Participants

Condition	All Statements Viewed in Condition	Number of Participants			Total
		Adolescents	Young Adults	Older Adults	
0 (control)	S1-S9	50	49	49	148
1	R1A, S1-S3, S5-S9	49	49	49	147
2	R1B, S1-S3, S5-S9	50	49	49	148
3	R1C, S1-S3, S5-S9	49	49	49	147
4	R2A, S1-S5, S7-S9	49	49	50	148
5	R2B, S1-S5, S7-S9	49	49	49	147
6	R2C, S1-S5, S7-S9	49	49	49	147
7	R3A, S1, S3-S9	49	49	50	148
8	R4A, S1-S4, S6-S9	49	49	49	147
9	R5A, S1-S7, S9	49	49	49	147
10	R5A, S1-2, S4-S9	49	49	49	147
11	R5B, S1-2, S4-S9	49	49	49	147
12	R6A, random selection of 8 "S" statements ^a	49	49	49	147
13	R6B, random selection of 8 "S" statements ^a	49	49	50	148
14	R7A, random selection of 8 "S" statements ^a	49	49	49	147
15	R8A, random selection of 8 "S" statements ^a	49	49	49	147
16	R8B, random selection of 8 "S" statements ^a	50	49	49	148
Total #		836	833	836	2,505

^aThe TCA "S" statement used in analytic comparison was drawn at random from pool of nine potential TCA statements viewed by participant. NOTE: TCA statements are indicated with an "S" prefix (for "statutory") and revised warning statements are indicated with an "R" prefix (for "revised").

5.3 Phase 1, Part 1 Results: Statement-Level Comparisons of Revised Statements to Corresponding or Randomized TCA Statements

5.3.1 Learning (Primary Outcome)

As shown in Table 22, participants’ reports of learning new information were significantly higher for revised statements in 12 of 16 comparisons of revised to TCA statements. After controlling for age group, all of the following revised statements received higher ratings for learning than their control (TCA) statements: head and neck cancer (R1B), bladder cancer (R1C), stunt fetal growth (R2B), respiratory illness in children (R3A), clogged arteries (R4A), COPD (R5A; only when compared with fatal lung disease in smokers [S3]), emphysema and bronchitis (R5B), erectile dysfunction (R6A), amputation (R6B), diabetes (R7A), macular degeneration (R8A), and cataracts (R8B). All 12 statistically significant comparisons were significant both unadjusted and adjusted for multiple comparisons.

Table 22. Linear Regression of Learning (Primary Outcome) Comparing Revised Statements with Corresponding or Randomized TCA Statements

Comparison	Statements Being Compared	Learning: Mean (SD)	Regression Coefficient (95% CI)
1	Unspecified cancer (S4)	2.39 (2.08)	REF
	Mouth and throat cancer (R1A)	2.51 (2.09)	0.13 (−0.39 - 0.65)
2	Unspecified cancer (S4)	2.39 (2.08)	REF
	Head and neck cancer (R1B)	3.92 (1.77)	1.52 (1.05 - 1.99) ^{a,b}
3	Unspecified cancer (S4)	2.39 (2.08)	REF
	Bladder cancer (R1C)	4.19 (1.86)	1.81 (1.33 - 2.28) ^{a,b}
4	Harm your baby (S6)	2.43 (2.17)	REF
	Premature birth (R2A)	2.94 (2.24)	0.52 (−0.01 - 1.04)
5	Harm your baby (S6)	2.43 (2.17)	REF
	Stunt fetal growth (R2B)	3.17 (2.22)	0.75 (0.21 - 1.28) ^{a,b}
6	Harm your baby (S6)	2.43 (2.17)	REF
	Low birth weight (R2C)	2.93 (2.17)	0.52 (0 - 1.03)
7	Harm children (S2)	2.56 (2.15)	REF
	Respiratory illness in children (R3A)	3.30 (1.95)	0.73 (0.25 - 1.21) ^{a,b}
8	Strokes and heart disease (S5)	2.70 (1.96)	REF
	Clogged arteries (R4A)	3.36 (2.03)	0.66 (0.19 - 1.13) ^{a,b}
9	Fatal lung disease in nonsmokers (S8)	2.86 (1.99)	REF
	COPD (R5A)	3.26 (2.03)	0.41 (−0.07 - 0.88)

(continued)

Table 22. Linear Regression of Learning (Primary Outcome) Comparing Revised Statements with Corresponding or Randomized TCA Statements (continued)

Comparison	Statements Being Compared	Learning: Mean (SD)	Regression Coefficient (95% CI)
10	Fatal lung disease in smokers (S3)	2.33 (2.07)	REF
	COPD (R5A)	3.38 (2.00)	1.05 (0.56 - 1.53) ^{a,b}
11	Fatal lung disease in smokers (S3)	2.33 (2.07)	REF
	Emphysema and bronchitis (R5B)	3.19 (2.22)	0.86 (0.35 - 1.38) ^{a,b}
12	Harm your baby (S6) ^c	2.43 (2.17)	REF
	Erectile dysfunction (R6A)	3.85 (1.87)	1.42 (0.93 - 1.9) ^{a,b}
13	Strokes and heart disease (S5) ^c	2.70 (1.96)	REF
	Amputation (R6B)	4.23 (1.78)	1.53 (1.09 - 1.97) ^{a,b}
14	Fatal lung disease in smokers (S3) ^c	2.33 (2.07)	REF
	Diabetes (R7A)	3.90 (1.92)	1.56 (1.09 - 2.03) ^{a,b}
15	Addictive (S1) ^c	2.25 (2.17)	REF
	Macular degeneration (R8A)	4.38 (1.72)	2.12 (1.64 - 2.6) ^{a,b}
16	Harm your baby (S6) ^c	2.43 (2.17)	REF
	Cataracts (R8B)	4.28 (1.81)	1.85 (1.38 - 2.33) ^{a,b}

^aSignificant at $p < .05$ in unadjusted analyses. ^bSignificant after adjustment for multiple comparisons.

^cStatement was randomly selected from the set of TCA statements.

Note: Regression controls for age group. CI = confidence interval. SD = standard deviation.

Out of 16 comparisons, the number of statistically significant comparisons showing greater learning for revised versus TCA statements was 13 for adolescents, 9 for young adults, and 7 for older adults. Complete results for the adolescent, young adult, and older adult groups appear in Appendix Tables B-1 through B-3.

5.3.2 New Knowledge (Primary Outcome)

As shown in Table 23, participants were more likely to describe the smoking-related health conditions in the revised warnings as new knowledge in 12 of 16 comparisons of revised to TCA statements. Specifically, after controlling for age group, respondents were more likely to say that the health effect was new knowledge for each of the following revised statements relative to the TCA statements: head and neck cancer (R1B), bladder cancer (R1C), premature birth (R2A), stunt fetal growth (R2B), low birth weight (R2C), clogged arteries (R4A), COPD (R5A; only when compared with the control statement about fatal lung disease in smokers), erectile dysfunction (R6A), amputation (R6B), diabetes (R7A), macular degeneration (R8A), and cataracts (R8B). In all cases, comparisons were statistically significant even after controlling for multiple comparisons.

Table 23. Logistic Regressions of New Knowledge and Thinking about Risks (Primary Outcomes) Comparing Revised Statements with Corresponding or Randomized TCA Statements

Comparison	Statements Being Compared	New Knowledge		Thinking About Risks	
		Percent	OR (95% CI)	Percent	OR (95% CI)
1	Unspecified cancer (S4)	12.2	REF	68.9	REF
	Mouth and throat cancer (R1A)	12.9	1.07 (0.54 - 2.15)	68.0	0.96 (0.59 - 1.58)
2	Unspecified cancer (S4)	12.2	REF	68.9	REF
	Head and neck cancer (R1B)	64.2	13.26 (7.20 - 24.4) ^{a,b}	68.9	1.00 (0.61 - 1.64)
3	Unspecified cancer (S4)	12.2	REF	68.9	REF
	Bladder cancer (R1C)	78.9	28.15 (14.74 - 53.72) ^{a,b}	70.8	1.10 (0.66 - 1.81)
4	Harm your baby (S6)	8.8	REF	70.9	REF
	Premature birth (R2A)	17.6	2.28 (1.09 - 4.75) ^{a,b}	64.9	0.76 (0.46 - 1.24)
5	Harm your baby (S6)	8.8	REF	70.9	REF
	Stunt fetal growth (R2B)	19.0	2.49 (1.21 - 5.13) ^{a,b}	68.0	0.87 (0.53 - 1.44)
6	Harm your baby (S6)	8.8	REF	70.9	REF
	Low birth weight (R2C)	19.0	2.47 (1.21 - 5.03) ^{a,b}	68.0	0.87 (0.52 - 1.44)
7	Harm children (S2)	23.0	REF	68.9	REF
	Respiratory illness in children (R3A)	31.8	1.56 (0.93 - 2.63)	74.3	1.31 (0.79 - 2.17)
8	Strokes and heart disease (S5)	16.2	REF	66.9	REF
	Clogged arteries (R4A)	32.0	2.50 (1.41 - 4.43) ^{a,b}	64.6	0.90 (0.56 - 1.47)
9	Fatal lung disease in nonsmokers (S8)	41.9	REF	56.8	REF
	COPD (R5A)	36.7	0.80 (0.50 - 1.29)	71.4	1.94 (1.19 - 3.17) ^{a,b}
10	Fatal lung disease in smokers (S3)	16.2	REF	61.5	REF
	COPD (R5A)	29.3	2.14 (1.22 - 3.77) ^{a,b}	76.9	2.13 (1.27 - 3.56) ^{a,b}

(continued)

Table 23. Logistic Regressions of New Knowledge and Thinking about Risks (Primary Outcomes) Comparing Revised Statements with Corresponding or Randomized TCA Statements (continued)

Comparison	Statements Being Compared	New Knowledge		Thinking About Risks	
		Percent	OR (95% CI)	Percent	OR (95% CI)
11	Fatal lung disease in smokers (S3)	16.2	REF	61.5	REF
	Emphysema and bronchitis (R5B)	22.4	1.50 (0.83 - 2.72)	78.2	2.29 (1.36 - 3.84) ^{a,b}
12	Random TCA statement (S6)	8.8	REF	70.9	REF
	Erectile dysfunction (R6A)	69.4	24.43 (12.26 - 48.66) ^{a,b}	55.1	0.50 (0.30 - 0.81) ^{a,b}
13	Random TCA statement (S5)	16.2	REF	66.9	REF
	Amputation (R6B)	66.2	10.79 (6.10 - 19.08) ^{a,b}	77.7	1.75 (1.04 - 2.96) ^a
14	Random TCA statement (S3)	16.2	REF	61.5	REF
	Diabetes (R7A)	75.5	16.01 (8.97 - 28.57) ^{a,b}	56.5	0.81 (0.51 - 1.30)
15	Random TCA statement (S1)	8.8	REF	55.4	REF
	Macular degeneration (R8A)	75.5	36.90 (17.66 - 77.07) ^{a,b}	71.4	2.01 (1.24 - 3.26) ^{a,b}
16	Random TCA statement (S6)	8.8	REF	70.9	REF
	Cataracts (R8B)	79.7	42.61 (20.73 - 87.55) ^{a,b}	64.2	0.73 (0.45 - 1.20)

^aSignificant at $p < .05$ in unadjusted analyses. ^bSignificant after adjustment for multiple comparisons. Note: Regressions control for age group. CI = confidence interval. OR = odds ratio.

Out of 16 comparisons, the number of statistically significant comparisons showing new knowledge for revised versus TCA statements was 14 for adolescents, 7 for young adults, and 8 for older adults. Complete results for the adolescent, young adult, and older adult groups appear in Appendix Tables B-4 through B-6.

5.3.3 Thinking About Risks (Primary Outcome)

In 5 of the 16 comparisons also shown in Table 23, respondents were statistically significantly more likely to say that the revised warning statement made them think about the relevant health risk more than the TCA statement: COPD (R5A; when compared with both the statement about fatal lung disease in smokers and the statement about fatal lung

disease in nonsmokers), emphysema and bronchitis (R5B), amputation (R6B), and macular degeneration (R8B). Four of those five results were significant both unadjusted and adjusted for multiple comparisons; one (amputation (R6B)) was significant only unadjusted. For the warning statement related to erectile dysfunction (R6A), participants were significantly less likely to say that the statement made them think about the health condition than were participants who saw the randomly assigned TCA statement; this result was significant before and after adjustment for multiple comparisons.

Out of 16 comparisons, the number of statistically significant comparisons showing greater likelihood of thinking about health risks for revised versus TCA statements was 0 for adolescents, 2 for young adults, and 1 for older adults. Among adolescents, 1 comparison indicated lower likelihood of thinking about health risks for revised versus TCA statements. Complete results for the adolescent, young adult, and older adult groups appear in Appendix Tables B-4 through B-6.

5.3.4 Believability (Secondary Outcome)

As shown in Table 24, respondents regarded one revised statement (COPD [R5A]) as significantly more believable than its paired TCA statement (fatal lung disease in nonsmokers). They perceived seven statements as less believable than their paired control statements: head and neck cancer (R1B), bladder cancer (R1C), erectile dysfunction (R6A), amputation (R6B), diabetes (R7A), macular degeneration (R8A), and cataracts (R8B). All significant associations maintained significance after adjusting for multiple comparisons.

Table 24. Linear Regressions of Believability and Informativeness (Secondary Outcomes) Comparing Revised Statements with Corresponding or Randomized TCA Statements

Comparison	Statements Being Compared	Believability		Informativeness	
		Mean (SD)	Regression Coefficient (95% CI)	Mean (SD)	Regression Coefficient (95% CI)
1	Unspecified cancer (S4)	4.80 (1.37)	REF	4.04 (1.81)	REF
	Mouth and throat cancer (R1A)	4.77 (1.33)	-0.03 (-0.33 - 0.28)	4.10 (1.69)	0.06 (-0.34 - 0.46)
2	Unspecified cancer (S4)	4.80 (1.37)	REF	4.04 (1.81)	REF
	Head and neck cancer (R1B)	3.72 (1.81)	-1.08 (-1.44 - -0.7) ^{a,b}	3.87 (1.73)	-0.17 (-0.57 - 0.23)
3	Unspecified cancer (S4)	4.80 (1.37)	REF	4.04 (1.81)	REF
	Bladder cancer (R1C)	3.69 (1.85)	-1.11 (-1.48 - -0.7) ^{a,b}	4.15 (1.80)	0.11 (-0.3 - 0.52)

(continued)

Table 24. Linear Regressions of Believability and Informativeness (Secondary Outcomes) Comparing Revised Statements with Corresponding or Randomized TCA Statements (continued)

Comparison	Statements Being Compared	Believability		Informativeness	
		Mean (SD)	Regression Coefficient (95% CI)	Mean (SD)	Regression Coefficient (95% CI)
4	Harm your baby (S6)	4.89 (1.30)	REF	4.14 (1.72)	REF
	Premature birth (R2A)	4.78 (1.37)	-0.10 (-0.4 - 0.2)	4.48 (1.54)	0.34 (-0.03 - 0.71)
5	Harm your baby (S6)	4.89 (1.30)	REF	4.14 (1.72)	REF
	Stunt fetal growth (R2B)	4.87 (1.39)	-0.01 (-0.31 - 0.29)	4.33 (1.72)	0.19 (-0.2 - 0.58)
6	Harm your baby (S6)	4.89 (1.30)	REF	4.14 (1.72)	REF
	Low birth weight (R2C)	4.77 (1.41)	-0.12 (-0.42 - 0.19)	4.43 (1.55)	0.29 (-0.08 - 0.66)
7	Harm children (S2)	4.49 (1.54)	REF	3.85 (1.75)	REF
	Respiratory illness in children (R3A)	4.59 (1.50)	0.11 (-0.23 - 0.45)	4.39 (1.50)	0.54 (0.17 - 0.91) ^{a,b}
8	Strokes and heart disease (S5)	4.51 (1.40)	REF	4.04 (1.70)	REF
	Clogged arteries (R4A)	4.55 (1.47)	0.04 (-0.28 - 0.37)	4.39 (1.52)	0.35 (-0.01 - 0.72)
9	Fatal lung disease in nonsmokers (S8)	3.74 (1.77)	REF	3.84 (1.82)	REF
	COPD (R5A)	4.69 (1.42)	0.95 (0.58 - 1.32) ^{a,b}	4.44 (1.55)	0.60 (0.21 - 0.99) ^{a,b}
10	Fatal lung disease in smokers (S3)	4.60 (1.48)	REF	3.93 (1.84)	REF
	COPD (R5A)	4.88 (1.20)	0.28 (-0.02 - 0.59)	4.72 (1.20)	0.79 (0.42 - 1.16) ^{a,b}
11	Fatal lung disease in smokers (S3)	4.60 (1.48)	REF	3.93 (1.84)	REF
	Emphysema and bronchitis (R5B)	4.85 (1.41)	0.26 (-0.07 - 0.58)	4.37 (1.63)	0.44 (0.05 - 0.84) ^a
12	Random TCA statement (S6)	4.89 (1.30)	REF	4.14 (1.72)	REF
	Erectile dysfunction (R6A)	3.93 (1.65)	-0.95 (-1.28 - -0.6) ^{a,b}	4.00 (1.74)	-0.14 (-0.53 - 0.25)

(continued)

Table 24. Linear Regressions of Believability and Informativeness (Secondary Outcomes) Comparing Revised Statements with Corresponding or Randomized TCA Statements (continued)

Comparison	Statements Being Compared	Believability		Informativeness	
		Mean (SD)	Regression Coefficient (95% CI)	Mean (SD)	Regression Coefficient (95% CI)
13	Random TCA statement (S5)	4.51 (1.40)	REF	4.04 (1.70)	REF
	Amputation (R6B)	3.96 (1.68)	-0.55 (-0.9 - -0.1) ^{a,b}	4.37 (1.54)	0.33 (-0.03 - 0.7)
14	Random TCA statement (S3)	4.60 (1.48)	REF	3.93 (1.84)	REF
	Diabetes (R7A)	3.72 (1.93)	-0.87 (-1.26 - -0.4) ^{a,b}	4.01 (1.92)	0.08 (-0.35 - 0.5)
15	Random TCA statement (S1)	4.74 (1.64)	REF	3.57 (1.98)	REF
	Macular degeneration (R8A)	3.93 (1.69)	-0.82 (-1.19 - -0.4) ^{a,b}	4.21 (1.68)	0.63 (0.21 - 1.05) ^{a,b}
16	Random TCA statement (S6)	4.89 (1.30)	REF	4.14 (1.72)	REF
	Cataracts (R8B)	3.76 (1.79)	-1.13 (-1.48 - -0.7) ^{a,b}	4.17 (1.76)	0.03 (-0.37 - 0.42)

^aSignificant at $p < .05$ in unadjusted analyses. ^bSignificant after adjustments for multiple comparisons. Note: Regressions control for age group. CI = confidence interval. SD = standard deviation.

Out of 16 comparisons, the number of statistically significant comparisons showing lower believability for revised versus TCA statements was 7 for adolescents, 5 for young adults, and 5 for older adults. In 1 comparison for adolescents, 1 comparison for young adults, and 1 comparison for older adults, revised statements were rated as more believable than TCA statements. Complete results for the adolescent, young adult, and older adult groups appear in Appendix Tables B-7 through B-9.

5.3.5 Informativeness (Secondary Outcome)

Also shown in Table 24, respondents considered the revised statement to be more informative in 5 of the 16 comparisons of revised to TCA statements: respiratory illness in children (R3A), COPD (R5A; compared with both of its control statements), emphysema and bronchitis (R5B), and macular degeneration (R8A). Aside from the revised statement on emphysema and bronchitis, all of these results were still significant after adjustment for multiple comparisons.

Out of 16 comparisons, the number of statistically significant comparisons showing that revised versus TCA statement was more informative was 1 for adolescents, 2 for young

adults, and 0 for older adults. Complete results for the adolescent, young adult, and older adult groups appear in Appendix Tables B-7 through B-9.

5.3.6 Factuality (Secondary Outcome)

Also shown in Table 25, within each experimental condition, most respondents reported that the statements were factual, ranging from a low of 56.1% thinking that the statement on head and neck cancer was factual to a high of 92.5% for COPD. Respondents were less likely to consider the following revised statements to be factual, compared with the TCA statements: head and neck cancer (R1B), bladder cancer (R1C), erectile dysfunction (R6A), amputation (R6B), diabetes (R7A), macular degeneration (R8A), and cataracts (R8B). Respondents were more likely to consider the revised statement about COPD (R5A) factual than the statement about fatal lung disease in nonsmokers. All findings were significant before and after adjustment for multiple comparisons.

Table 25. Logistic Regression of Factuality (Secondary Outcome) Comparing Revised Statements with Corresponding or Randomized TCA Statements

Comparison	Statements Being Compared	Factuality	
		Percent	OR (95% CI)
1	Unspecified cancer (S4)	87.2	REF
	Mouth and throat cancer (R1A)	88.4	1.13 (0.56 - 2.3)
2	Unspecified cancer (S4)	87.2	REF
	Head and neck cancer (R1B)	56.1	0.18 (0.1 - 0.33) ^{a,b}
3	Unspecified cancer (S4)	87.2	REF
	Bladder cancer (R1C)	69.4	0.32 (0.17 - 0.59) ^{a,b}
4	Harm your baby (S6)	87.8	REF
	Premature birth (R2A)	83.1	0.68 (0.35 - 1.31)
5	Harm your baby (S6)	87.8	REF
	Stunt fetal growth (R2B)	79.6	0.54 (0.28 - 1.01)
6	Harm your baby (S6)	87.8	REF
	Low birth weight (R2C)	87.8	1.00 (0.49 - 2.02)
7	Harm children (S2)	75.7	REF
	Respiratory illness in children (R3A)	82.4	1.52 (0.86 - 2.7)
8	Strokes and heart disease (S5)	83.8	REF
	Clogged arteries (R4A)	81.0	0.82 (0.44 - 1.51)
9	Fatal lung disease in nonsmokers (S8)	61.5	REF
	COPD (R5A)	83.0	3.20 (1.82 - 5.61) ^{a,b}

(continued)

Table 25. Logistic Regression of Factuality (Secondary Outcome) Comparing Revised Statements with Corresponding or Randomized TCA Statements (continued)

Comparison	Statements Being Compared	Factuality	
		Percent	OR (95% CI)
10	Fatal lung disease in smokers (S3)	85.8	REF
	COPD (R5A)	92.5	2.06 (0.95 - 4.5)
11	Fatal lung disease in smokers (S3)	85.8	REF
	Emphysema and bronchitis (R5B)	91.8	1.90 (0.89 - 4.06)
12	Random TCA statement (S6)	87.8	REF
	Erectile dysfunction (R6A)	65.3	0.24 (0.13 - 0.44) ^{a,b}
13	Random TCA statement (S5)	83.8	REF
	Amputation (R6B)	68.9	0.42 (0.24 - 0.74) ^{a,b}
14	Random TCA statement (S3)	85.8	REF
	Diabetes (R7A)	61.2	0.25 (0.14 - 0.45) ^{a,b}
15	Random TCA statement (S1)	79.7	REF
	Macular degeneration (R8A)	65.8	0.49 (0.29 - 0.83) ^{a,b}
16	Random TCA statement (S6)	87.8	REF
	Cataracts (R8B)	61.5	0.20 (0.11 - 0.37) ^{a,b}

^aSignificant at $p < .05$ in unadjusted analyses. ^bSignificant after adjustment for multiple comparisons. Note: Regression controls for age group. CI = confidence interval. OR = odds ratio.

Out of 16 comparisons, the number of statistically significant comparisons in which participants rated the revised statement as less factual than the TCA statements was 6 for adolescents, 5 for young adults, and 6 for older adults. In 1 comparison for young adults and 1 comparison for older adults, participants rated the revised statements as more factual than the TCA statements. Complete results for the adolescent, young adult, and older adult groups appear in Appendix Tables B-10 through B-12.

5.4 Phase 1, Part 1 Results: Statement-Level Comparisons of Revised Statements to No Statements

We conducted additional analyses for the five revised statements without matching control statements (erectile dysfunction, amputation, diabetes, macular degeneration, and cataracts). Based on results from linear regression models, the mean ratings for all five statements were significantly higher than zero (i.e., “not at all”) for learning, believability, and informativeness. Based on results from logistic regression models, the proportion of respondents indicating that the statement was new knowledge, thought about the health risks of smoking, and believed the statement to be factual was also significantly greater

than zero for all five of the revised statements. In all cases, the results were still statistically significant after controlling for multiple comparisons. The same pattern occurred within each of the groups (adolescent, young adult, and older adult): all comparisons between revised statements and zero (i.e., no statement) were significantly different in the expected direction both before and after controlling for multiple comparisons.

5.5 Phase 1, Part 2 Results: Condition-Level Comparisons of Health Beliefs

For the Phase 1, Part 2 analysis, we conducted condition-level comparisons for key measures assessing beliefs about the negative health consequences of smoking contained in the warning statements. For each experimental condition, the survey includes an item or series of items in which respondents are asked to rate their level of agreement with a statement about a negative health consequence corresponding to the warning statement for that condition. The number of items associated with a particular warning statement ranges from 1 to 4, and the items were asked once following viewing of warning statements for all respondents.

The health belief items in Phase 1 have Likert response scales. Conceptually, the response categories for a Likert response scale represent an underlying belief continuum. For warning statements with multiple corresponding items, we assessed whether the items could be appropriately scaled for use in linear regressions.

As part of our assessment on items' scalability, we ran a test of internal consistency reliability using Cronbach's alpha for all of the warning statements with multiple corresponding items (Cronbach, 1951). If this test indicated modest reliability (alpha greater than or equal to 0.70), we scaled the items (Nunnally & Bernstein, 1994). Furthermore, if the alpha was less than 0.70, but all item-total correlations are greater than or equal to 0.40, we also scaled the items. This decision was based on evidence in the literature that item-correlations between 0.30 and 0.40 have been suggested as sufficiently discriminating (Nunnally & Bernstein, 1994; Traub, 1994; Leong & Austin, 2006).

There were 12 warning statements that were potentially scalable (i.e., had multiple items). Of these 12 warning statements with multiple items, 11 had an alpha of greater than 0.70 and were thus scaled (Appendix Table B-13). The revised warning statement related to smoking and development of emphysema and bronchitis had an alpha of 0.69 but had item-total correlations of greater than 0.40. Therefore, the items corresponding to the revised emphysema and bronchitis statement were also scaled.

Three warning statements (premature birth [R2A], stunt fetal growth [R2B], and low birth weight [R2C]) could not be scaled because there was only one associated health belief per statement. We used the Brant test (Brant, 1990; Williams, 2005) to confirm that the proportional odds assumption (i.e., the explanatory variable has the same effect across all

the ordinal categories of the dependent variable) was not violated (all chi-square statistics non-significant at $p > .05$). Because the assumption was not violated, we analyzed these items using ordinal logistic regression.

5.5.1 Results of Linear Regressions for Scaled Outcomes

Of our 13 linear regression models, 8 produced significant results indicating that the revised warning statement was associated with higher health belief scores than the control (Table 26). The following eight revised statements all had higher mean health belief scores than their control statements: mouth and throat cancer (R1A), COPD (R5A; only when compared with fatal lung disease in smokers), emphysema (R5B), erectile dysfunction (R6A), amputation (R6B), diabetes (R7A), macular degeneration (R8A), and cataracts (R8B). Four comparisons were significant both before after adjusting for multiple comparisons and four comparisons were only significant before adjustment.

Out of 13 comparisons, the number of statistically significant comparisons showing higher health belief scores for revised versus TCA statements was 1 for adolescents, 5 for young adults, and 1 for older adults. Complete results for the adolescent, young adult, and older adult groups appear in Appendix Tables B-14 through B-16.

5.5.2 Results of Ordinal Logistic Regressions for Non-Scaled Outcomes

Table 27 shows the results of the ordinal regressions for the revised statements (i.e., premature birth [R2A], stunted fetal growth [R2B], and low birth weight [R2C]) that only involved one health belief. For all three, there were no significant differences between the revised and control statements in the proportion of respondents endorsing each response category.

Out of 3 comparisons, there was 1 comparison for young adults and 1 comparison for older adults in which respondents endorsed higher levels of agreement with the health belief for revised compared to TCA statements. There were no statistically significant differences for comparisons among adolescent respondents. Complete results for the adolescent, young adult, and older adult groups appear in Appendix Tables B-17 through B-19.

Table 26. Linear Regressions for Condition-Level Comparisons of Health Beliefs in Phase 1

Comparison	Statements Being Compared	Mean (SD) Health Belief Score		Regression Coefficients (95% CI)
		Treatment ^c	Control ^c	
1	Mouth and throat cancer (R1A) vs. Unspecified cancer (S4)	4.27 (0.74)	3.98 (0.93)	0.29 (0.1 - 0.48) ^{a,b}
2	Head and neck cancer (R1B) vs. Unspecified cancer (S4)	3.43 (1.00)	3.33 (1.05)	0.10 (-0.14 - 0.33)
3	Bladder cancer (R1C) vs. Unspecified cancer (S4)	3.41 (1.01)	3.26 (0.97)	0.15 (-0.07 - 0.38)
7	Respiratory illness in children (R3A) vs. Harm children (S2)	3.98 (0.87)	3.82 (0.90)	0.17 (-0.03 - 0.37)
8	Clogged arteries (R4A) vs. Strokes and heart disease (S5)	4.00 (0.88)	3.89 (0.83)	0.12 (-0.08 - 0.32)
9	COPD (R5A) vs. fatal lung disease in nonsmokers (S8)	4.32 (0.64)	4.18 (0.80)	0.14 (-0.03 - 0.3)
10	COPD (R5A) vs. fatal lung disease in smokers (S3)	4.38 (0.71)	4.18 (0.80)	0.19 (0.02 - 0.37) ^a
11	Emphysema and bronchitis (R5B) vs. fatal lung disease in smokers (S3)	4.25 (0.60)	4.06 (0.78)	0.19 (0.03 - 0.35) ^a
12	Erectile dysfunction (R6A) vs. random TCA statement (S6)	3.74 (0.91)	3.52 (0.81)	0.22 (0.02 - 0.42) ^a
13	Amputation (R6B) vs. random TCA statement (S5)	3.75 (0.84)	3.48 (0.93)	0.27 (0.07 - 0.47) ^{a,b}
14	Diabetes (R7A) vs. random TCA statement (S3)	3.48 (0.98)	3.10 (1.01)	0.38 (0.15 - 0.61) ^{a,b}
15	Macular degeneration (R8A) vs. random TCA statement (S1)	3.57 (0.95)	3.21 (0.93)	0.35 (0.14 - 0.57) ^{a,b}
16	Cataracts (R8B) vs. random TCA statement (S6)	3.37 (1.10)	3.13 (1.02)	0.24 (0.00 - 0.48) ^a

^aSignificant at $p < .05$ in unadjusted analyses. ^bSignificant after adjustments for multiple comparisons.

^cSpecific health belief items vary by condition: see Appendix A with study instrument for specific items.

Note: CI = confidence interval. SD = standard deviation.

Table 27. Ordinal Regressions for Condition-Level Comparisons of Health Beliefs in Phase 1

Comparison	Comparison and Level of Endorsement for Health Belief	Proportion Endorsing Each Response Level, %		OR (95% CI)
		Treatment ^a	Control ^a	
4	Premature birth (R2A) vs. Harm your baby (S6)			0.94 (0.62 - 1.45)
	1 "Strongly disagree" (Ref)	4.0	2.0	—
	2 "Disagree"	2.0	5.4	—
	3 "Neither agree nor disagree"	17.6	17.6	—
	4 "Agree"	38.5	33.1	—
	5 "Strongly agree"	37.2	41.2	—
5	Stunt fetal growth (R2B) vs. Harm your baby (S6)			1.46 (0.95 - 2.25)
	1 "Strongly disagree" (Ref)	2.7	2.7	—
	2 "Disagree"	2.7	6.1	—
	3 "Neither agree nor disagree"	8.9	16.2	—
	4 "Agree"	40.8	35.8	—
	5 "Strongly agree"	42.9	37.8	—
6	Low birth weight (R2C) vs. Harm your baby (S6)			1.48 (0.96 - 2.27)
	1 "Strongly disagree" (Ref)	1.4	2.7	—
	2 "Disagree"	4.1	5.4	—
	3 "Neither agree nor disagree"	17.0	15.5	—
	4 "Agree"	29.9	39.9	—
	5 "Strongly agree"	47.6	34.5	—

Note: CI = confidence interval. OR = odds ratio.

5.6 Phase 2 Results: Comparison of Health Beliefs between Treatment and Control

In most cases, the number of health effects believed to be associated with smoking and secondhand smoke was significantly larger among respondents in the treatment versus control condition (Table 28). Specifically, respondents who saw only revised statements in this phase endorsed 10.00 of 20 possible smoking-related conditions (versus 8.71 for those seeing only TCA statements), 1.46 of 2 possible secondhand-smoke-related conditions (versus 1.34 for those seeing only TCA statements), and 13.79 of the 25 possible total health conditions (versus 12.42 for those seeing only TCA statements). These results were all significant both before and after adjusting for multiple comparisons. However, there were no differences in health beliefs when examining only the pregnancy-related health conditions (2.33 of 3 possible conditions for revised statements versus 2.37 for TCA statements).

There were no differences between treatment and control among adolescents. The young adult group endorsed a greater number of smoking-related health conditions and total health conditions in the treatment versus control condition. The older adult group endorsed a greater number of smoking-related health conditions, secondhand smoke-related health conditions, and total health conditions in the treatment versus control condition. Complete results for the adolescent, young adult, and older adult groups appear in Appendix Tables B-20 through B-22.

Table 28. Comparison of Health Beliefs (Phase 2) in Treatment vs. Control Condition

Condition	Smoking-Related Conditions (Range 0-20)	Regression Coefficient for Smoking-Related Conditions: B (95% CI)	SHS-Related Conditions (Range 0-2)	Regression Coefficient for SHS-Related Conditions: B (95% CI)	Pregnancy-Related Conditions (Range 0-3)	Regression Coefficient for Pregnancy-Related Conditions: B (95% CI)	Total Number of Conditions (Range 0-25)	Regression Coefficient for Total Number of Conditions: B (95% CI)
TCA statements	8.71 (5.11)	Ref	1.34 (0.71)	Ref	2.37 (0.98)	Ref	12.42 (6.08)	Ref
Revised statements	10.00 (5.57)	1.29 (0.45 – 2.13) ^{a,b}	1.46 (0.68)	1.42 (1.04 – 1.93) ^{a,b}	2.33 (0.96)	0.88 (0.62 – 1.25)	13.79 (6.46)	1.37 (0.37 – 2.37) ^{a,b}

^aSignificant at $p < .05$ in unadjusted analyses. ^bSignificant after adjustment for multiple comparisons.

Note: Regressions control for age group. CI = confidence interval. SHS = secondhand smoke.

6. Summary and Limitations

The goal of this study was to assess whether revised statements improved understanding of the risks associated with tobacco use relative to TCA statements. Below we describe key findings about the 15 revised statements and the 9 TCA statements.

6.1 Summary of Findings

We compared the revised statements to TCA statements on several primary outcomes: learning, new knowledge, thinking about health risks, and believing in the health risks described in the statements. Participants' reports of learning were significantly higher for revised statements in 12 of 16 comparisons of revised to TCA statements (Table 29). Participants were more likely to state that the smoking-related health conditions described in the revised warnings were new knowledge in 12 of 16 comparisons of revised to TCA statements. In 5 of the 16 comparisons (4 of the 16 when adjusting for multiple comparisons) respondents were significantly more likely and in 1 of the 16 comparisons respondents were significantly less likely to say that the revised warning statement made them think about the relevant health risk more than the TCA statement. The revised warning statement was associated with higher health belief scores in Phase 1 in 8 of 16 comparisons of revised to TCA statements (4 of 16 when adjusting for multiple comparisons).

We also examined secondary outcomes that assessed the revised statements' believability, informativeness, and factuality compared to corresponding TCA statements. Respondents regarded one revised statement as more believable than its paired TCA statement and perceived 7 statements as less believable than their paired TCA statements. Respondents considered the revised statement to be more informative in 5 of the 16 comparisons of revised to TCA statements. Respondents were less likely to consider 7 revised statements to be factual, compared to the TCA statements. Respondents were more likely to consider one revised statement factual compared to a TCA statement.

Though the revised statements were often considered to provide new information or improve understanding of the health effects of smoking compared to the TCA statements based on the primary outcomes, some statements were reported to be less believable or factual than TCA statements based on secondary outcomes. This pattern could be because a statement that provides new information that the respondent has not heard before might be viewed with some skepticism.

For the five revised statements that did not have corresponding health conditions in the TCA statements, we conducted additional analyses assessing the extent to which each statement was an improvement over no statement (i.e., essentially asking if the revised statement resulted in learning, provided new knowledge, made one think about health effects of

Table 29. Summary of Significant Results by Revised Statement Among All Participants

Statement Number	Warning Statement	Primary Outcomes					Secondary Outcomes		
		New knowledge (OR)	Learning (B)	Thinking about risks (OR)	Health beliefs (B)	Health beliefs (OR)	Believability (B)	Informativeness (B)	Factuality (OR)
R1A	WARNING: Smoking causes mouth and throat cancer.	ns	ns	ns	0.29 ^{a,b}	—	ns	ns	ns
R1B	WARNING: Smoking causes head and neck cancer.	13.26 ^{a,b}	1.52 ^{a,b}	ns	ns	—	-1.08 ^{a,b}	ns	0.18 ^{a,b}
R1C	WARNING: Smoking causes bladder cancer, which can lead to bloody urine.	28.15 ^{a,b}	1.81 ^{a,b}	ns	ns	—	-1.11 ^{a,b}	ns	0.32 ^{a,b}
R2A	WARNING: Smoking during pregnancy causes premature birth.	2.28 ^{a,b}	ns	ns	—	ns	ns	ns	ns
R2B	WARNING: Smoking during pregnancy stunts fetal growth.	2.49 ^{a,b}	0.75 ^{a,b}	ns	—	ns	ns	ns	ns
R2C	WARNING: Smoking during pregnancy causes premature birth and low birth weight.	2.47 ^{a,b}	ns	ns	—	ns	ns	ns	ns
R3A	WARNING: Secondhand smoke causes respiratory illnesses in children, like pneumonia.	ns	0.73 ^{a,b}	ns	ns	—	ns	0.54 ^{a,b}	ns
R4A	WARNING: Smoking can cause heart disease and strokes by clogging arteries.	2.50 ^{a,b}	0.66 ^{a,b}	ns	ns	—	ns	ns	ns
R5A(S8)	WARNING: Smoking causes COPD, a lung disease that can be fatal.	ns	ns	1.94 ^{a,b}	ns	—	0.95 ^{a,b}	0.60 ^{a,b}	3.20 ^{a,b}

(continued)

Table 29. Summary of Significant Results by Revised Statement Among All Participants (continued)

Statement Number	Warning Statement	Primary Outcomes					Secondary Outcomes		
		New knowledge (OR)	Learning (B)	Thinking about risks (OR)	Health beliefs (B)	Health beliefs (OR)	Believability (B)	Informativeness (B)	Factuality (OR)
R5A(S3)	WARNING: Smoking causes COPD, a lung disease that can be fatal.	2.14 ^{a,b}	1.05 ^{a,b}	2.13 ^{a,b}	0.19 ^a	—	ns	0.79 ^{a,b}	ns
R5B	WARNING: Smoking causes serious lung diseases like emphysema and chronic bronchitis.	ns	0.86 ^{a,b}	2.29 ^{a,b}	0.19 ^a	—	ns	0.44 ^a	ns
R6A	WARNING: Smoking reduces blood flow, which can cause erectile dysfunction.	24.43 ^{a,b}	1.42 ^{a,b}	0.50 ^{a,b}	0.22 ^a	—	-0.95 ^{a,b}	ns	0.24 ^{a,b}
R6B	WARNING: Smoking reduces blood flow to the limbs, which can require amputation.	10.79 ^{a,b}	1.50 ^{a,b}	1.75 ^a	0.27 ^{a,b}	—	-0.55 ^{a,b}	ns	0.42 ^{a,b}
R7A	WARNING: Smoking causes type 2 diabetes, which raises blood sugar.	16.00 ^{a,b}	1.56 ^{a,b}	ns	0.38 ^{a,b}	—	-0.87 ^{a,b}	ns	0.25 ^{a,b}
R8A	WARNING: Smoking causes age-related macular degeneration, which can lead to blindness.	36.90 ^{a,b}	2.12 ^{a,b}	2.01 ^{a,b}	0.35 ^{a,b}	—	-0.82 ^{a,b}	0.63 ^{a,b}	0.49 ^{a,b}
R8B	WARNING: Smoking causes cataracts, which can lead to blindness.	42.61 ^{a,b}	1.85 ^{a,b}	ns	0.24 ^a	—	-1.13 ^{a,b}	ns	0.20 ^{a,b}

^aSignificant at $p < .05$ in unadjusted analyses. ^bSignificant after adjustment for multiple comparisons.

Note: Regressions control for age group. "B" values are regression coefficients from linear regressions. Note: OR = odds ratio. ns = non-significant.

smoking, was believable, was informative, or was factual). The mean ratings for all 5 statements were significantly higher than 0 (i.e., “not at all”) for learning, believability, and informativeness. The proportion of respondents indicating that the information was new knowledge, made them think about the health risks of smoking, and was factual was also significantly greater than zero for all five of the revised statements without corresponding health conditions in the TCA warnings.

Finally, the Phase 2 results, comparing health beliefs for the set of revised statements to the set of TCA statements, suggests that the revised statements led to improved understanding of the health effects of smoking and secondhand smoke.

Summaries of the results for the adolescent, young adult, and older adult groups appear in Appendix Tables B-23 through B-25.

6.2 Limitations

Some limitations of this study are common to many online studies. For example, the stimuli being tested (in this case, warning statements) were not displayed in a naturalistic fashion but rather on a computer screen. A single session of exposure to stimuli may not be enough to generate change in knowledge or beliefs. Further, conclusions from this study can only be drawn about the stimuli presented, not about warnings in general. However, we note that many studies demonstrate that even single-exposure online pre-implementation studies do approximate effects of warnings once they are implemented (e.g., Huang et al., 2016).

There are also additional, study-specific limitations. Although the universe of respondents included four groups (adolescents susceptible to smoking, adolescent current smokers, young adult current smokers, and older adult current smokers), we did not have power to look for within-group differences. A deviation from protocol in how respondents were allocated to condition (described in more detail in the Methodology Report) resulted in fewer people in the control condition than originally planned, although it did not compromise randomization. Because of the error, there was less power to detect differences and results are conservative.

In addition, the survey used a convenience sample rather than a probability sample, and the results are not nationally representative. Generating a representative sample of the size necessary for this study would have been cost prohibitive. Despite the attempt to match the study’s sample and the respondent universe in four demographic characteristics, matching was used solely to produce a sample with a reasonable degree of diversity in key demographic characteristics. Despite best efforts to have the study population reflect the demographic makeup of the larger population, the nature of convenience samples still limits the generalizability of the results from this study. These limitations in generalizability do not affect the internal validity of the study.

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Appendix A: Survey Instrument

STUDY SCREENER, ASSENT, AND CONSENT

[DISPLAY INTRO_TEXT, SA1, AND PRA_STAT ON SINGLE PAGE]

[DISPLAY TEXT "OMB # 0910-0848, expires 1/31/2021" IN OPENING PAGE OF SCREENER]

INTRO_TEXT. Thank you for your interest in this survey. To get started, we first need to ask you a few questions to see if you are eligible to take the survey.

[INCLUDE THE STATEMENT BELOW IN SMALLER FONT AT THE BOTTOM OF THE FIRST PAGE—SAME PAGE AS INTRO_TEXT AND SA1]

PRA_STAT. Paperwork Reduction Act Statement: The public reporting burden for this information collection has been estimated to average 2 minutes per response to complete this screener survey (the time estimated to read and complete). Send comments regarding this burden estimate or any other aspects of this information collection, including suggestions for reducing burden, to PRASStaff@fda.hhs.gov.

SECTION SA: AGE SCREENER

SA1. How old are you?

_____ [NUMERIC TEXT FIELD, WHOLE NUMBERS ONLY]

[IF SA1 < 13, TERMINATE]

[IF SA1 ≥ 13 AND ≤ 17, GO TO YOUTH SCREENER (SB1)]

[IF SA1 ≥ 18, GO TO ADULT SCREENER (SC1)]

SECTION SB: YOUTH SCREENER

SB1. Have you ever tried cigarette smoking, even one or two puffs?

1. Yes [GO TO SB2]
2. No [GO TO SB3]

SB2. In the past 30 days, have you smoked a cigarette?

1. Yes [GO TO SB7]
2. No [TERMINATE]

SB3. Have you ever been curious about smoking a cigarette?

1. Definitely yes
2. Probably yes
3. Probably not
4. Definitely not

SB4. Do you think that in the future you might experiment with cigarettes?

1. Definitely yes
2. Probably yes
3. Probably not
4. Definitely not

SB5. At any time during the next year, do you think you will smoke a cigarette?

1. Definitely yes
2. Probably yes
3. Probably not
4. Definitely not

SB6. If one of your best friends offered you a cigarette, would you smoke it?

1. Definitely yes
2. Probably yes
3. Probably not
4. Definitely not

[IF SB3 = 4 AND SB4 = 4 AND SB5 = 4 AND SB6 = 4, TERMINATE]

SB7. In the past 5 years, have you or any member of your household worked for any of the following?

	Yes [1]	No [2]	I don't know [3]
SB7_1. A tobacco or cigarette company			
SB7_2. A public health or community organization involved in communicating the dangers of smoking or the benefits of quitting			
SB7_3. The U.S. Food and Drug Administration (FDA)			

[IF SB7_1 = 1 OR SB7_2 = 1 OR SB7_3 = 1, TERMINATE]

[IF (SB7_1 = 2 OR 3) AND (SB7_2 = 2 OR 3) AND (SB7_3 = 2 OR 3) AND SB2 = 1, ASSIGN TO YOUTH SMOKER GROUP]

[IF (SB7_1 = 2 OR 3) AND (SB7_2 = 2 OR 3) AND (SB7_3 = 2 OR 3) AND [(SB3 = 1, 2, OR 3) OR (SB4 = 1, 2, OR 3) OR (SB5 = 1, 2, OR 3) OR (SB6 = 1, 2, OR 3)], ASSIGN TO YOUTH SUSCEPTIBLE GROUP]

SECTION SC: ADULT SCREENER

SC1. Have you smoked at least 100 cigarettes in your entire life?

1. Yes
2. No [TERMINATE]

SC2. Do you now smoke cigarettes every day, some days, or not at all?

1. Every day
2. Some days
3. Not at all [TERMINATE]

SC3. In the past 5 years, have you or any member of your household worked for any of the following?

	Yes [1]	No [2]
SC3_1. A tobacco or cigarette company		
SC3_2. A public health or community organization involved in communicating the dangers of smoking or the benefits of quitting		
SC3_3. The U.S. Food and Drug Administration (FDA)		

[IF SC3_1 = 1 OR SC3_2 = 1 OR SC3_3 = 1, TERMINATE]

[IF SA1 ≥ 18 AND ≤ 24, ASSIGN TO YOUNG ADULT SMOKER GROUP]

[IF SA1 ≥ 25, ASSIGN TO ADULT SMOKER GROUP]

SECTION SD: DEMOGRAPHICS

SD1. What is your sex?

1. Male
2. Female

[ASK IF SA1 ≥ 18]

SD2. What is the highest level of school you have completed or the highest degree you have received?

1. Never attended school or only attended kindergarten
2. Grades 1 through 8
3. Grades 9 through 11
4. High school graduate or GED
5. Post high school training other than college (vocational or technical training)
6. Some college or 2-year degree
7. College degree (4-year degree)
8. Postgraduate degree

SD3. Are you Hispanic, Latino/a, or of Spanish origin?

1. Yes
2. No

SD4. What is your race? (One or more categories may be selected)

- | | |
|-------------------------------------|----------------------------|
| 1. White | 8. Korean |
| 2. Black or African American | 9. Vietnamese |
| 3. American Indian or Alaska Native | 10. Other Asian |
| 4. Asian Indian | 11. Native Hawaiian |
| 5. Chinese | 12. Guamanian or Chamorro |
| 6. Filipino | 13. Samoan |
| 7. Japanese | 14. Other Pacific Islander |

[IF YOUTH SMOKER OR YOUTH SUSCEPTIBLE, GO TO YOUTH ASSENT]

[IF YOUNG ADULT SMOKER OR ADULT SMOKER, GO TO ADULT CONSENT]

[TERMINATE SCRIPT: You do not qualify for this survey. Thank you for your time.]

[SCRIPT IF QUESTION IS SKIPPED: It looks like you missed a question on this page. To participate in the survey, we need to know your answer to this question. Please select a response.]

SECTION YA: YOUTH ASSENT

[DISPLAY TEXT "OMB # 0910-0848, expires 1/31/2021" IN THE YOUTH ASSENT PAGE]

[DISPLAY ON SINGLE SCREEN]

We are talking to kids about a survey sponsored by the U.S. Food and Drug Administration's Center for Tobacco Products.

Your parent or legal guardian has given permission for you to take this survey. The survey asks people what they think about tobacco use. About 2,500 people are being asked to take this survey. This survey is part of a research study conducted by RTI International. The survey will take about 15 minutes.

There are minimal psychological, social, or legal risks to participating in this study. You may or may not feel comfortable answering some of the questions in this survey, such as those about tobacco use. There is no direct benefit to you from participating. However, your responses are very important because they will help researchers understand what people think about tobacco use.

Every effort will be made so that that no one will be able to know how you answered the questions, not even your parents. However, protection of your information cannot be guaranteed. If you don't want to take the survey, that is okay. If you get to a question you do not want to answer, you can skip it. You can drop out of the survey at any time, for any reason. If you complete the survey, your parent or guardian's Global Test Market account will be credited with 100 Lifepoints.

If you have any questions about this study, you can call the Study Coordinator, James Nonnemaker at 919-541-7064. If you have a question about your rights as a study participant, you can call RTI's Office of Research Protection at (866) 214-2043.

Y_ASSENT. Do you agree to participate in the study?

1. Yes
2. No

[IF YES, GO TO STUDY]

[IF NO, GO TO END]

END

Thank you for your time.

[DISPLAY STATEMENT BELOW IN SMALLER FONT AT BOTTOM OF PAGE]

Paperwork Reduction Act Statement: The public reporting burden for this information collection has been estimated to average 15 minutes per response to complete this survey (the time estimated to read and complete). Send comments regarding this burden estimate or any other aspects of this information collection, including suggestions for reducing burden, to PRStaff@fda.hhs.gov.

SECTION AC: ADULT CONSENT

[DISPLAY TEXT "OMB # 0910-0848, expires 1/31/2021" IN THE ADULT CONSENT PAGE]

[DISPLAY ON SINGLE SCREEN]

We are talking to adults about a survey sponsored by the U.S. Food and Drug Administration's Center for Tobacco Products.

The survey asks people what they think about tobacco use. About 2,500 people are being asked to take this survey. This survey is part of a research study conducted by RTI International. The survey will take about 15 minutes.

There are minimal psychological, social, or legal risks to participating in this study. You may or may not feel comfortable answering some of the questions in this survey, such as those about tobacco use. There is no direct benefit to you from participating. However, your responses are very important because they will help researchers understand what people think about tobacco use.

Every effort will be made so that that no one will be able to know how you answered the questions. However, protection of your information cannot be guaranteed. If you don't want to take the survey, that is okay. If you get to a question you do not want to answer, you can skip it. You can drop out of the survey at any time, for any reason. If you complete the survey, your Global Test Market account will be credited with 100 Lifepoints.

If you have any questions about this study, you can call the Study Coordinator, James Nonnemaker at 919-541-7064. If you have a question about your rights as a study participant, you can call RTI's Office of Research Protection at (866) 214-2043.

AC_CONSENT. Do you agree to participate in the study?

1. Yes
2. No

[IF YES, GO TO STUDY]

[IF NO, GO TO END]

[DISPLAY STATEMENT BELOW IN SMALLER FONT AT THE BOTTOM OF PAGE]

Paperwork Reduction Act Statement: The public reporting burden for this information collection has been estimated to average 15 minutes per response to complete this survey (the time estimated to read and complete). Send comments regarding this burden estimate or any other aspects of this information collection, including suggestions for reducing burden, to PRStaff@fda.hhs.gov.

END

Thank you for your time.

SURVEY INSTRUMENT

SECTION A: WARNING STATEMENT PERCEPTIONS

PROTOCOL

WITHIN EACH AGE GROUP (YOUTH SUSCEPTIBLE OR SMOKER, YOUNG ADULT SMOKER, ADULT SMOKER), RANDOMLY ASSIGN PARTICIPANTS INTO A CONTROL CONDITION OR ONE OF 16 EXPERIMENTAL CONDITIONS.

IN EACH CONDITION, RESPONDENTS WILL VIEW 9 OF 26 WARNING STATEMENT STIMULI (TABLE 1), WITH VARIATION IN THE STIMULI INCLUDED ACCORDING TO THE STUDY CONDITION (TABLE 2).

TABLE 1. WARNING STATEMENTS

#	STATEMENT
ORIGINAL	
S1	WARNING: Cigarettes are addictive.
S2	WARNING: Tobacco smoke can harm your children.
S3	WARNING: Cigarettes cause fatal lung disease.
S4	WARNING: Cigarettes cause cancer.
S5	WARNING: Cigarettes cause strokes and heart disease.
S6	WARNING: Smoking during pregnancy can harm your baby.
S7	WARNING: Smoking can kill you.
S8	WARNING: Tobacco smoke causes fatal lung disease in nonsmokers.
S9	WARNING: Quitting smoking now greatly reduces serious risks to your health.
REVISED/NEW	
R1A	WARNING: Smoking causes mouth and throat cancer.
R1B	WARNING: Smoking causes head and neck cancer.
R1C	WARNING: Smoking causes bladder cancer, which can lead to bloody urine. 8
R2A	WARNING: Smoking during pregnancy causes premature birth.
R2B	WARNING: Smoking during pregnancy stunts fetal growth.
R2C	WARNING: Smoking during pregnancy causes premature birth and low birth weight.
R3A	WARNING: Secondhand smoke causes respiratory illnesses in children like pneumonia.
R4A	WARNING: Smoking can cause heart disease and strokes by clogging arteries.
R5A	WARNING: Smoking causes COPD, a lung disease that can be fatal.
R5B	WARNING: Smoking causes serious lung diseases like emphysema and chronic bronchitis.
R6A	WARNING: Smoking reduces blood flow, which can cause erectile dysfunction.
R6B	WARNING: Smoking reduces blood flow to the limbs, which can require amputation.
R7A	WARNING: Smoking causes type 2 diabetes, which raises blood sugar.
R8A	WARNING: Smoking causes age-related macular degeneration, which can lead to blindness.
R8B	WARNING: Smoking causes cataracts, which can lead to blindness.

TABLE 2. STUDY CONDITIONS

CONDITION	STIMULI SLOT (RANDOMIZE ORDER)								
	1	2	3	4	5	6	7	8	9
0 (CONTROL)	S1	S2	S3	S4	S5	S6	S7	S8	S9
1	S1	S2	S3	R1A	S5	S6	S7	S8	S9
2	S1	S2	S3	R1B	S5	S6	S7	S8	S9
3	S1	S2	S3	R1C	S5	S6	S7	S8	S9
4	S1	S2	S3	S4	S5	R2A	S7	S8	S9
5	S1	S2	S3	S4	S5	R2B	S7	S8	S9
6	S1	S2	S3	S4	S5	R2C	S7	S8	S9
7	S1	R3A	S3	S4	S5	S6	S7	S8	S9
8	S1	S2	S3	S4	R4A	S6	S7	S8	S9
9	S1	S2	S3	S4	S5	S6	S7	R5A	S9
10	S1	S2	R5A	S4	S5	S6	S7	S8	S9
11	S1	S2	R5B	S4	S5	S6	S7	S8	S9
12	RANDOM SELECTION OF 8 OF 9 ORIGINAL ("S") STATEMENTS								R6A
13	RANDOM SELECTION OF 8 OF 9 ORIGINAL ("S") STATEMENTS								R6B
14	RANDOM SELECTION OF 8 OF 9 ORIGINAL ("S") STATEMENTS								R7A
15	RANDOM SELECTION OF 8 OF 9 ORIGINAL ("S") STATEMENTS								R8A
16	RANDOM SELECTION OF 8 OF 9 ORIGINAL ("S") STATEMENTS								R8B

[DISPLAY THE STATEMENT BELOW ON A SINGLE PAGE]

[DISPLAY TEXT “OMB # 0910-0848, expires 1/31/2021” IN THE SAME PAGE]

Paperwork Reduction Act Statement: The public reporting burden for this information collection has been estimated to average 15 minutes per response to complete this survey (the time estimated to read and complete). Send comments regarding this burden estimate or any other aspects of this information collection, including suggestions for reducing burden, to PRASStaff@fda.hhs.gov.

[DISPLAY THIS STATEMENT ONLY ON A SINGLE PAGE]

INTRO_TEXT_1. In this survey, we are going to ask you to read some warning statements that might someday be placed with an image showing that health effect of smoking on a pack of cigarettes and on advertisements for cigarettes. Please read each statement carefully and answer the questions that follow to the best of your ability.

[FOR EACH OF 9 STATEMENTS, DISPLAY INTRO_TEXT_2 WITH THE WARNING STATEMENT BELOW ON A SINGLE SCREEN. KEEP WARNING STATEMENT VISIBLE THROUGH SECTION A. ASK SECTION A ITEMS ON FOLLOWING SCREENS. REPEAT SECTION A FOR EACH OF 9 STATEMENTS ACCORDING TO RESPONDENT’S ASSIGNED CONDITION. RANDOMIZE ORDER OF STATEMENTS PRESENTED.]

INTRO_TEXT_2. Please read the warning statement below. After reading the statement, you will be asked a few questions about the warning statement.

[DISPLAY STATEMENT X]

A1. Before today, had you heard about the specific smoking-related health effect described in the warning statement?

1. Yes
2. No
3. I’m not sure

A2. To what extent did you learn something new from this warning statement that you did not know before?

Not at all [1]	[2]	[3]	[4]	[5]	[6]	Very much [7]
<input type="radio"/>						

A3. How much does this warning statement make you think about the health risks of smoking?

1. Not at all
2. A little
3. Somewhat
4. A lot

A4. This statement is...

A4_1. Not at all believable [1]	[2]	[3]	[4]	[5]	[6]	Very believable [7]
A4_2. Not at all informative [1]	[2]	[3]	[4]	[5]	[6]	Very informative [7]

A5_INTRO. Next, we would like to know whether you think this warning statement is an opinion or a fact. Opinions are judgments or feelings that cannot be proven true or false. Facts are statements that can be proven true or false.

A5_1. Would you say that this warning statement is an opinion or a fact?

1. Opinion
2. Fact

SECTION B: POST-TEST OUTCOMES

Next, we would like to ask you some questions about your beliefs about smoking-related health effects.

Please tell us how much you agree or disagree with the following statements.

[RANDOMIZE ORDER OF ITEM "BLOCKS" ACCORDING TO ITEM PREFIX (I.E. RANDOMIZE B1_, B2_, B3_ SERIES, ETC.). ALSO RANDOMIZE ORDER OF QUESTIONS WITHIN BLOCKS. DISPLAY AS SCROLLING LIST.]

[DO NOT DISPLAY: WARNING: Smoking causes mouth and throat cancer]

B1_1. Smoking causes mouth cancer

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

B1_2. Smoking causes throat cancer

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

[DO NOT DISPLAY: WARNING: Smoking causes head and neck cancer]

B2_1. Smoking causes head cancer

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

B2_2. Smoking causes neck cancer

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

[DO NOT DISPLAY: Smoking causes bladder cancer, which can lead to bloody urine]

B3_1. Smoking causes bladder cancer, which can lead to bloody urine

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

B3_2. Smoking causes bladder cancer

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

B3_3. Smoking can lead to bloody urine

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

[DO NOT DISPLAY: WARNING: Smoking during pregnancy causes premature birth]

B4_1. Smoking during pregnancy causes premature birth

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

[DO NOT DISPLAY: WARNING: Smoking during pregnancy stunts fetal growth]

B5_1. Smoking during pregnancy stunts fetal growth

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

[DO NOT DISPLAY: WARNING: Smoking during pregnancy causes premature birth and low birth weight]

B6_1. Smoking during pregnancy causes low birth weight

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

[DO NOT DISPLAY: WARNING: Secondhand smoke causes respiratory illnesses in children, like pneumonia]

B7_1. Secondhand smoke causes respiratory illnesses in children, like pneumonia

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

B7_2. Secondhand smoke causes respiratory illnesses in children

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

B7_3. Secondhand smoke causes pneumonia in children

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

[DO NOT DISPLAY: WARNING: Smoking can cause heart disease and strokes by clogging arteries]

B8_1. Smoking causes heart disease

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

B8_2. Smoking causes strokes

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

B8_3. Smoking clogs arteries

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

B8_4. Smoking clogs arteries, which causes heart disease

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

B8_5. Smoking clogs arteries, which causes strokes

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

[DO NOT DISPLAY: WARNING: Smoking causes COPD, a lung disease that can be fatal]

B9_1. Smoking causes COPD, a lung disease that can be fatal

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

B9_2. Smoking causes COPD

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

B9_3. Smoking causes a lung disease that can be fatal

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

[DO NOT DISPLAY: WARNING: Smoking causes serious lung diseases like emphysema and chronic bronchitis]

B10_1. Smoking causes serious lung diseases

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

B10_2. Smoking causes emphysema

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

B10_3. Smoking causes chronic bronchitis

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

[DO NOT DISPLAY: WARNING: Smoking reduces blood flow, which can cause erectile dysfunction]

B11_1. Smoking reduces blood flow, which can cause erectile dysfunction

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

B11_2. Smoking reduces blood flow

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

B11_3. Smoking can cause erectile dysfunction

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

[DO NOT DISPLAY: WARNING: Smoking reduces blood flow to the limbs, which can require amputation]

B12_1. Smoking reduces blood flow to the limbs, which can require amputation

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

B12_2. Smoking reduces blood flow to the limbs

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

B12_3. Smoking can lead to amputation

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

[DO NOT DISPLAY: WARNING: Smoking causes type 2 diabetes, which raises blood sugar]

B13_1. Smoking causes type 2 diabetes, which raises blood sugar.

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

B13_3. Smoking can cause type 2 diabetes

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

[DO NOT DISPLAY: WARNING: Smoking causes age-related macular degeneration, which can lead to blindness]

B14_1. Smoking causes age-related macular degeneration, which can lead to blindness

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

B14_2. Smoking causes age-related macular degeneration

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

B14_3. Smoking can lead to blindness

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

[DO NOT DISPLAY: WARNING: Smoking causes cataracts, which can lead to blindness]

B15_1. Smoking causes cataracts, which can lead to blindness

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

B15_2. Smoking causes cataracts

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

[DO NOT DISPLAY: CONTROL STATEMENT – NO ASSOCIATED WARNING LABEL]

BCONT1_1. Smoking causes migraines

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

[DO NOT DISPLAY: CONTROL STATEMENT – NO ASSOCIATED WARNING LABEL]

BCONT2_1. Secondhand smoke causes sleep disorders like insomnia in children

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

[DO NOT DISPLAY: CONTROL STATEMENT – NO ASSOCIATED WARNING LABEL]

BCONT3_1. Smoking during pregnancy causes hearing loss in babies

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree
9. Prefer not to answer

SECTION C: COMBINED STIMULI OUTCOMES

PROTOCOL

RESPONDENTS IN CONDITION 0 (CONTROL) OF PHASE 1 WILL VIEW ALL 9 ORIGINAL (“S”) STATEMENTS ON A SINGLE PAGE (TABLE 3). RESPONDENTS IN CONDITIONS 1-16 OF PHASE 1 WILL VIEW A SELECTION OF 9 OF THE 16 REVISED STATEMENTS ON A SINGLE PAGE, ACCORDING TO THE PROTOCOL IN TABLE 4. FORCE 10 SECOND VIEWING FOR THIS SCREEN. ASK SECTION C QUESTIONS ONCE FOLLOWING EXPOSURE.

TABLE 3 PHASE 2 CONTROL GROUP STIMULI SELECTION (SINGLE PAGE EXPOSURE)

STIMULI SLOT	SELECTION
1	S1
2	S2
3	S3
4	S4
5	S5
6	S6
7	S7
8	S8
9	S9

TABLE 4. PHASE 2 TREATMENT GROUP STIMULI SELECTION (SINGLE PAGE EXPOSURE)

STIMULI SLOT	SELECTION
1-2	RANDOM SELECTION OF 2 OF: R1A; R1B; R1C
3	RANDOM SELECTION OF 1 OF: R2A; R2B; R2C
4	R3A
5	R4A
6	RANDOM SELECTION OF 1 OF: R5A; R5B
7	RANDOM SELECTION OF 1 OF: R6A; R6B
8	R7A
9	RANDOM SELECTION OF 1 OF: R8A; R8B

INTRO_TEXT_3. Please read the set of warning statements below. After reading the statements, you will be asked a few questions.

[DISPLAY STATEMENT SET X; FORCE 10 SECOND VIEWING]

Next, we would like to ask you some questions about your beliefs about the health effects of smoking.

C1. Which, if any, of the following conditions do you think smoking can cause? (Select all that apply) [RANDOMIZE ORDER OF QUESTIONS]

- C1_1. Mouth cancer
- C1_2. Throat cancer
- C1_3. Head cancer
- C1_4. Neck cancer
- C1_5. Bladder cancer
- C1_6. Bloody urine
- C1_7. Heart disease
- C1_8. Strokes
- C1_9. Clogged arteries
- C1_10. COPD
- C1_11. Emphysema
- C1_12. Chronic bronchitis
- C1_13. Reduced blood flow
- C1_14. Erectile dysfunction
- C1_15. Reduced blood flow to the limbs
- C1_16. Amputation
- C1_17. Type 2 Diabetes
- C1_18. Age-related macular degeneration
- C1_19. Blindness
- C1_20. Cataracts
- C1_CONT. Migraines
- C1_NONE. None of the above [EXCLUSIVE]

C2. Which, if any, of the following conditions do you think secondhand smoke can cause? (Select all that apply) [RANDOMIZE ORDER OF QUESTIONS]

- C2_1. Respiratory illnesses in children
- C2_2. Pneumonia in children
- C2_CONT. Sleep disorders like insomnia in children
- C2_NONE. None of the above [EXCLUSIVE]

C3. Which, if any, of the following conditions do you think smoking during pregnancy can cause? (Select all that apply) [RANDOMIZE ORDER OF QUESTIONS]

- C3_1. Premature birth
- C3_2. Stunted fetal growth
- C3_3. Low birth weight
- C3_CONT. Hearing loss in babies
- C2_NONE. None of the above [EXCLUSIVE]

SECTION D: DEMOGRAPHICS

D1_INTRO. Now we are going to ask you a few questions that are not about cigarettes or smoking.

[ASK IF SA1 ≥ 18]

D1. Thinking about members of your family living in this household, what is your combined annual income, meaning the total pre-tax income from all sources earned in the past year?

- 1. \$0 to \$9,999
- 2. \$10,000 to \$14,999
- 3. \$15,000 to \$19,999
- 4. \$20,000 to \$34,999
- 5. \$35,000 to \$49,999
- 6. \$50,000 to \$74,999
- 7. \$75,000 to \$99,999
- 8. \$100,000 or more

D2. How many adults (age 18 or older) and children (aged 17 or younger), including yourself, live in your household?

D2_1. Adults (age 18 or older): _____ [DROP-DOWN MENU, RANGE 1-20]

D2_2. Children (age 17 or younger): _____ [DROP-DOWN MENU, RANGE 0-20
(FORCE RESPONSE OF 1-20 FOR YOUTH RESPONDENTS)]

D3. Please indicate your state of residence.

[INSERT DROP DOWN MENU WITH STATES]

[ASK IF SA1 ≥ 18]

- D4. Do you think of yourself as...
1. Heterosexual or straight
 2. Homosexual, or gay or lesbian
 3. Bisexual
 4. Something else (Other)

<p>Cholesterol: What Your Level Means</p> <p>What is cholesterol?</p> <p>Cholesterol is a waxy substance the body uses to protect nerves, make cell tissues and produce certain hormones.</p> <p>Are there different types of cholesterol?</p> <p>Yes. Cholesterol travels through the blood in different types of packages, called lipoproteins.</p> <p>Low-density lipoproteins (LDL) deliver cholesterol to the body. High-density lipoproteins (HDL) remove cholesterol from the bloodstream.</p>	<p>Total cholesterol level</p> <ul style="list-style-type: none"> • Less than 200 is best. • 200 to 239 is borderline high. • 240 or more means a person is at increased risk for heart disease. <p>LDL cholesterol levels</p> <ul style="list-style-type: none"> • Below 100 is ideal for people who have a higher risk of heart disease. • 100 to 129 is near optimal. • 130 to 159 is borderline high. • 160 or more means a person is at a higher risk for heart disease. <p>HDL cholesterol levels</p> <ul style="list-style-type: none"> • Less than 40 means a person is at higher risk for heart disease. • 60 or higher greatly reduces a person's risk of heart disease.
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[ASK IF SA1 ≥ 18]

D5. Please answer the following question based on the information in the text above.

If a person is at high risk for heart disease, which of the following levels of low density lipoprotein (LDL) cholesterol is best?

1. 102
2. 86
3. 129
4. 155
5. Not sure

ENDSCREEN: You've reached the end of the survey. Thank you for your participation.

[DISPLAY THE STATEMENT BELOW ON THE END SCREEN]

Paperwork Reduction Act Statement: An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The public reporting burden for this information collection has been estimated to average 15 minutes per response to complete the Survey (the time estimated to read, review, and respond). Send comments regarding this burden estimate or any other aspects of this information collection, including suggestions for reducing burden, to PRASStaff@fda.hhs.gov.

Appendix B: Additional Analyses

This appendix reports additional analyses not contained in the main body of the report. Table B-13 displays the Cronbach’s alphas for the scaled health belief items. All other tables in this appendix correspond to tables in the main body of the report but provide detailed information about each group separately (i.e., individual tables for the adolescent, young adult, and older adult groups) rather than including the entire sample in one table.

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Results by Group for Table 3-4

Table B-1. Adolescent Group: Linear Regression of Learning (Primary Outcome) Comparing Revised Statements with Corresponding or Randomized TCA Statements

Comparison	Statements Being Compared	Learning: Mean (SD)	Regression Coefficient (95% CI)
1	Unspecified cancer (S4)	2.02 (2.09)	REF
	Mouth and throat cancer (R1A)	2.52 (1.85)	0.50 (−0.36 - 1.36)
2	Unspecified cancer (S4)	2.02 (2.09)	REF
	Head and neck cancer (R1B)	3.70 (1.91)	1.68 (0.82 - 2.53) ^{a,b}
3	Unspecified cancer (S4)	2.02 (2.09)	REF
	Bladder cancer (R1C)	4.06 (1.95)	2.04 (1.18 - 2.90) ^{a,b}
4	Harm your baby (S6)	2.41 (2.36)	REF
	Premature birth (R2A)	3.60 (1.97)	1.19 (0.28 - 2.11) ^{a,b}
5	Harm your baby (S6)	2.41 (2.36)	REF
	Stunt fetal growth (R2B)	3.20 (2.07)	0.79 (−0.13 - 1.71)
6	Harm your baby (S6)	2.41 (2.36)	REF
	Low birth weight (R2C)	3.49 (2.14)	1.08 (0.15 - 2.00) ^{a,b}
7	Harm children (S2)	2.57 (2.03)	REF
	Respiratory illness in children (R3A)	3.53 (1.86)	0.96 (0.16 - 1.76) ^{a,b}
8	Strokes and heart disease (S5)	2.81 (2.01)	REF
	Clogged arteries (R4A)	3.94 (1.75)	1.13 (0.36 - 1.90) ^{a,b}
9	Fatal lung disease in nonsmokers (S8)	2.85 (1.87)	REF
	COPD (R5A)	3.60 (1.91)	0.75 (−0.03 - 1.53)
10	Fatal lung disease in smokers (S3)	2.08 (2.09)	REF
	COPD (R5A)	3.65 (1.88)	1.57 (0.76 - 2.38) ^{a,b}
11	Fatal lung disease in smokers (S3)	2.08 (2.09)	REF
	Emphysema and bronchitis (R5B)	3.40 (2.12)	1.32 (0.46 - 2.18) ^{a,b}
12	Random TCA statement (S6)	2.41 (2.36)	REF
	Erectile dysfunction (R6A)	3.81 (1.73)	1.40 (0.54 - 2.25) ^{a,b}
13	Random TCA statement (S5)	2.81 (2.01)	REF
	Amputation (R6B)	4.45 (1.75)	1.64 (0.87 - 2.41) ^{a,b}
14	Random TCA statement (S3)	2.08 (2.09)	REF
	Diabetes (R7A)	4.10 (1.65)	2.02 (1.26 - 2.78) ^{a,b}

(continued)

Table B-1. Adolescent Group: Linear Regression of Learning (Primary Outcome) Comparing Revised Statements with Corresponding or Randomized TCA Statements (continued)

Comparison	Statements Being Compared	Learning: Mean (SD)	Regression Coefficient (95% CI)
15	Random TCA statement (S1)	1.98 (2.17)	REF
	Macular degeneration (R8A)	4.65 (1.51)	2.68 (1.86 - 3.50) ^{a,b}
16	Random TCA statement (S6)	2.41 (2.36)	REF
	Cataracts (R8B)	4.40 (1.75)	1.98 (1.13 - 2.84) ^{a,b}

^aSignificant at $p < .05$ in unadjusted analyses. ^bSignificant after adjustment for multiple comparisons. Note: CI = confidence interval. SD = standard deviation.

Table B-2. Young Adult Group: Linear Regression of Learning (Primary Outcome) Comparing Revised Statements with Corresponding or Randomized TCA Statements

Comparison	Statements Being Compared	Learning : Mean (SD)	Regression Coefficient (95% CI)
1	Unspecified cancer (S4)	2.67 (2.11)	REF
	Mouth and throat cancer (R1A)	2.21 (2.28)	-0.46 (-1.45 - 0.54)
2	Unspecified cancer (S4)	2.67 (2.11)	REF
	Head and neck cancer (R1B)	4.19 (1.42)	1.52 (0.74 - 2.31) ^{a,b}
3	Unspecified cancer (S4)	2.67 (2.11)	REF
	Bladder cancer (R1C)	4.04 (1.78)	1.38 (0.53 - 2.22) ^{a,b}
4	Harm your baby (S6)	2.51 (2.22)	REF
	Premature birth (R2A)	2.73 (2.38)	0.22 (-0.77 - 1.20)
5	Harm your baby (S6)	2.51 (2.22)	REF
	Stunt fetal growth (R2B)	3.63 (2.24)	1.12 (0.12 - 2.12) ^a
6	Harm your baby (S6)	2.51 (2.22)	REF
	Low birth weight (R2C)	3.23 (1.98)	0.72 (-0.21 - 1.65)
7	Harm children (S2)	2.75 (2.35)	REF
	Respiratory illness in children (R3A)	3.47 (1.90)	0.72 (-0.18 - 1.61)
8	Strokes and heart disease (S5)	2.71 (2.02)	REF
	Clogged arteries (R4A)	2.87 (2.09)	0.15 (-0.72 - 1.02)
9	Fatal lung disease in nonsmokers (S8)	3.00 (2.01)	REF
	COPD (R5A)	3.55 (1.93)	0.55 (-0.31 - 1.41)
10	Fatal lung disease in smokers (S3)	2.51 (2.09)	REF
	COPD (R5A)	3.58 (2.04)	1.07 (0.18 - 1.95) ^a

(continued)

Table B-2. Young Adult Group: Linear Regression of Learning (Primary Outcome) Comparing Revised Statements with Corresponding or Randomized TCA Statements (continued)

Comparison	Statements Being Compared	Learning: Mean (SD)	Regression Coefficient (95% CI)
11	Fatal lung disease in smokers (S3)	2.51 (2.09)	REF
	Emphysema and bronchitis (R5B)	3.19 (2.45)	0.67 (-0.31 - 1.66)
12	Random TCA statement (S6)	2.51 (2.22)	REF
	Erectile dysfunction (R6A)	4.11 (1.82)	1.60 (0.73 - 2.47) ^{a,b}
13	Random TCA statement (S5)	2.71 (2.02)	REF
	Amputation (R6B)	4.19 (1.75)	1.47 (0.68 - 2.27) ^{a,b}
14	Random TCA statement (S3)	2.51 (2.09)	REF
	Diabetes (R7A)	4.02 (2.07)	1.51 (0.63 - 2.39) ^{a,b}
15	Random TCA statement (S1)	2.65 (2.25)	REF
	Macular degeneration (R8A)	4.33 (1.85)	1.68 (0.78 - 2.59) ^{a,b}
16	Random TCA statement (S6)	2.51 (2.22)	REF
	Cataracts (R8B)	4.13 (2.00)	1.61 (0.72 - 2.51) ^{a,b}

^aSignificant at $p < .05$ in unadjusted analyses. ^bSignificant after adjustment for multiple comparisons. Note: CI = confidence interval. SD = standard deviation.

Table B-3. Older Adult Group: Linear Regression of Learning (Primary Outcome) Comparing Revised Statements with Corresponding or Randomized TCA Statements

Comparison	Statements Being Compared	Learning: Mean (SD)	Regression Coefficient (95% CI)
1	Unspecified cancer (S4)	2.48 (2.05)	REF
	Mouth and throat cancer (R1A)	2.77 (2.15)	0.29 (-0.59 - 1.17)
2	Unspecified cancer (S4)	2.48 (2.05)	REF
	Head and neck cancer (R1B)	3.85 (1.93)	1.37 (0.55 - 2.19) ^{a,b}
3	Unspecified cancer (S4)	2.48 (2.05)	REF
	Bladder cancer (R1C)	4.46 (1.87)	1.98 (1.18 - 2.78) ^{a,b}
4	Harm your baby (S6)	2.38 (1.95)	REF
	Premature birth (R2A)	2.52 (2.24)	0.14 (-0.72 - 1.01)
5	Harm your baby (S6)	2.38 (1.95)	REF
	Stunt fetal growth (R2B)	2.77 (2.32)	0.39 (-0.49 - 1.27)
6	Harm your baby (S6)	2.38 (1.95)	REF
	Low birth weight (R2C)	2.16 (2.16)	-0.21 (-1.05 - 0.62)
7	Harm children (S2)	2.38 (2.09)	REF
	Respiratory illness in children (R3A)	2.89 (2.05)	0.52 (-0.32 - 1.36)

(continued)

Table B-3. Older Adult Group: Linear Regression of Learning (Primary Outcome) Comparing Revised Statements with Corresponding or Randomized TCA Statements (continued)

Comparison	Statements Being Compared	Learning: Mean (SD)		Regression Coefficient (95% CI)	
		Mean	SD	Mean	95% CI
8	Strokes and heart disease (S5)	2.59	(1.88)	REF	
	Clogged arteries (R4A)	3.24	(2.13)	0.66	(-0.15 - 1.47)
9	Fatal lung disease in nonsmokers (S8)	2.74	(2.13)	REF	
	COPD (R5A)	2.69	(2.13)	-0.05	(-0.92 - 0.82)
10	Fatal lung disease in smokers (S3)	2.42	(2.06)	REF	
	COPD (R5A)	2.94	(2.07)	0.52	(-0.32 - 1.36)
11	Fatal lung disease in smokers (S3)	2.42	(2.06)	REF	
	Emphysema and bronchitis (R5B)	2.98	(2.13)	0.56	(-0.30 - 1.42)
12	Random TCA statement (S6)	2.38	(1.95)	REF	
	Erectile dysfunction (R6A)	3.65	(2.06)	1.28	(0.46 - 2.10) ^{a,b}
13	Random TCA statement (S5)	2.59	(1.88)	REF	
	Amputation (R6B)	4.06	(1.86)	1.47	(0.71 - 2.23) ^{a,b}
14	Random TCA statement (S3)	2.42	(2.06)	REF	
	Diabetes (R7A)	3.56	(2.02)	1.15	(0.32 - 1.97) ^{a,b}
15	Random TCA statement (S1)	2.17	(2.10)	REF	
	Macular degeneration (R8A)	4.19	(1.76)	2.01	(1.22 - 2.81) ^{a,b}
16	Random TCA statement (S6)	2.38	(1.95)	REF	
	Cataracts (R8B)	4.33	(1.71)	1.95	(1.20 - 2.70) ^{a,b}

^aSignificant at $p < .05$ in unadjusted analyses. ^bSignificant after adjustment for multiple comparisons. Note: CI = confidence interval. SD = standard deviation.

Results by Group for Table 3-5

Table B-4. Adolescent Group: Logistic Regressions of New Knowledge and Thinking about Health Risks (Primary Outcomes) Comparing Revised Statements with Corresponding or Randomized TCA Statements

Comparison	Statements Being Compared	New Knowledge		Thinking About Risks	
		Percent	OR (95% CI)	Percent	OR (95% CI)
1	Unspecified cancer (S4)	10.0	REF	78.0	REF
	Mouth and throat cancer (R1A)	18.4	2.03 (0.62 - 6.58)	73.5	0.78 (0.31 - 1.97)
2	Unspecified cancer (S4)	10.0	REF	78.0	REF
	Head and neck cancer (R1B)	76.0	28.50 (9.16 - 88.64) ^{a,b}	74.0	0.8 (0.32 - 2.02)
3	Unspecified cancer (S4)	10.0	REF	78.0	REF
	Bladder cancer (R1C)	73.5	24.92 (8.08 - 76.87) ^{a,b}	77.6	0.97 (0.38 - 2.53)

(continued)

Table B-4. Adolescent Group: Logistic Regressions of New Knowledge and Thinking about Health Risks (Primary Outcomes) Comparing Revised Statements with Corresponding or Randomized TCA Statements (continued)

Comparison	Statements Being Compared	New Knowledge		Thinking About Risks	
		Percent	OR (95% CI)	Percent	OR (95% CI)
4	Harm your baby (S6)	8.0	REF	82.0	REF
	Premature birth (R2A)	32.7	5.58 (1.70 - 18.31) ^{a,b}	65.3	0.41 (0.16 - 1.05)
5	Harm your baby (S6)	8.0	REF	82.0	REF
	Stunt fetal growth (R2B)	32.7	5.58 (1.70 - 18.31) ^{a,b}	77.6	0.76 (0.28 - 2.04)
6	Harm your baby (S6)	8.0	REF	82.0	REF
	Low birth weight (R2C)	28.6	4.60 (1.38 - 15.28) ^{a,b}	81.6	0.98 (0.35 - 2.72)
7	Harm children (S2)	16.0	REF	74.0	REF
	Respiratory illness in children (R3A)	44.9	4.28 (1.66 - 11.03) ^{a,b}	73.5	0.97 (0.40 - 2.39)
8	Strokes and heart disease (S5)	22.0	REF	74.0	REF
	Clogged arteries (R4A)	44.9	2.89 (1.20 - 6.96) ^{a,b}	63.3	0.61 (0.26 - 1.43)
9	Fatal lung disease in nonsmokers (S8)	36.0	REF	66.0	REF
	COPD (R5A)	46.9	1.57 (0.70 - 3.53)	79.6	2.01 (0.81 - 5.01)
10	Fatal lung disease in smokers (S3)	10.0	REF	72.0	REF
	COPD (R5A)	38.8	5.70 (1.91 - 17.01) ^{a,b}	83.7	1.99 (0.75 - 5.32)
11	Fatal lung disease in smokers (S3)	10.0	REF	72.0	REF
	Emphysema and bronchitis (R5B)	32.7	4.36 (1.44 - 13.18) ^{a,b}	83.7	1.99 (0.75 - 5.32)
12	Random TCA statement (S6)	8.0	REF	82.0	REF
	Erectile dysfunction (R6A)	79.6	44.85 (12.95 - 155.20) ^{a,b}	63.3	0.38 (0.15 - 0.96) ^a
13	Random TCA statement (S5)	22.0	REF	74.0	REF
	Amputation (R6B)	75.5	10.93 (4.28 - 27.94) ^{a,b}	85.7	2.11 (0.76 - 5.87)
14	Random TCA statement (S3)	10.0	REF	72.0	REF
	Diabetes (R7A)	83.7	46.13 (13.88 - 153.2) ^{a,b}	61.2	0.61 (0.26 - 1.43)
15	Random TCA statement (S1)	4.0	REF	58.0	REF
	Macular degeneration (R8A)	85.7	144.00 (28.11 - 737.40) ^{a,b}	67.3	1.49 (0.66 - 3.40)
16	Random TCA statement (S6)	8.0	REF	82.0	REF
	Cataracts (R8B)	80.0	46.00 (13.3 - 159.00) ^{a,b}	70.0	0.51 (0.20 - 1.32)

^aSignificant at $p < .05$ in unadjusted analyses. ^bSignificant after adjustment for multiple comparisons.

Note: CI = confidence interval. OR = odds ratio.

Table B-5. Young Adult Group: Logistic Regressions of New Knowledge and Thinking about Health Risks (Primary Outcomes) Comparing Revised Statements with Corresponding or Randomized TCA Statements

Comparison	Statements Being Compared	New Knowledge		Thinking About Risks	
		Percent	OR (95% CI)	Percent	OR (95% CI)
1	Unspecified cancer (S4)	12.2	REF	61.2	REF
	Mouth and throat cancer (R1A)	6.1	0.47 (0.11 - 20)	63.3	1.09 (0.48 - 2.48)
2	Unspecified cancer (S4)	12.2	REF	61.2	REF
	Head and neck cancer (R1B)	57.1	9.56 (3.41 - 26.76) ^{a,b}	63.3	1.09 (0.48 - 2.48)
3	Unspecified cancer (S4)	12.2	REF	61.2	REF
	Bladder cancer (R1C)	77.6	24.76 (8.31 - 73.76) ^{a,b}	71.4	1.58 (0.68 - 3.7)
4	Harm your baby (S6)	10.2	REF	63.3	REF
	Premature birth (R2A)	14.3	1.47 (0.43 - 5.01)	69.4	1.32 (0.57 - 3.06)
5	Harm your baby (S6)	10.2	REF	63.3	REF
	Stunt fetal growth (R2B)	14.3	1.47 (0.43 - 5.01)	69.4	1.32 (0.57 - 3.06)
6	Harm your baby (S6)	10.2	REF	63.3	REF
	Low birth weight (R2C)	14.3	1.47 (0.43 - 5.01)	65.3	1.09 (0.48 - 2.51)
7	Harm children (S2)	26.5	REF	65.3	REF
	Respiratory illness in children (R3A)	22.4	0.80 (0.32 - 2.03)	77.6	1.84 (0.75 - 4.50)
8	Strokes and heart disease (S5)	14.3	REF	67.3	REF
	Clogged arteries (R4A)	18.4	1.35 (0.46 - 3.99)	63.3	0.84 (0.36 - 1.93)
9	Fatal lung disease in nonsmokers (S8)	59.2	REF	46.9	REF
	COPD (R5A)	40.8	0.48 (0.21 - 1.07)	63.3	1.95 (0.86 - 4.38)
10	Fatal lung disease in smokers (S3)	22.4	REF	53.1	REF
	COPD (R5A)	24.5	1.12 (0.44 - 2.87)	67.3	1.82 (0.80 - 4.16)
11	Fatal lung disease in smokers (S3)	22.4	REF	53.1	REF
	Emphysema and bronchitis (R5B)	24.5	1.12 (0.44 - 2.87)	77.6	3.06 (1.27 - 7.36) ^{a,b}
12	Random TCA statement (S6)	10.2	REF	63.3	REF
	Erectile dysfunction (R6A)	61.2	13.89 (4.65 - 41.51) ^{a,b}	46.9	0.51 (0.23 - 1.16)
13	Random TCA statement (S5)	14.3	REF	67.3	REF
	Amputation (R6B)	67.3	12.38 (4.54 - 33.75) ^{a,b}	77.6	1.67 (0.68 - 4.13)

(continued)

Table B-5. Young Adult Group: Logistic Regressions of New Knowledge and Thinking about Health Risks (Primary Outcomes) Comparing Revised Statements with Corresponding or Randomized TCA Statements (continued)

Comparison	Statements Being Compared	New Knowledge		Thinking About Risks	
		Percent	OR (95% CI)	Percent	OR (95% CI)
14	Random TCA statement (S3)	22.4	REF	53.1	REF
	Diabetes (R7A)	71.4	8.64 (3.45 - 21.63) ^{a,b}	51.0	0.92 (0.42 - 2.04)
15	Random TCA statement (S1)	8.2	REF	51.0	REF
	Macular degeneration (R8A)	59.2	16.31 (5.03 - 52.90) ^{a,b}	77.6	3.32 (1.38 - 7.98) ^{a,b}
16	Random TCA statement (S6)	10.2	REF	63.3	REF
	Cataracts (R8B)	71.4	22.00 (7.18 - 67.37) ^{a,b}	65.3	1.09 (0.48 - 2.51)

^aSignificant at p<.05 in unadjusted analyses. ^bSignificant after adjustment for multiple comparisons. Note: CI = confidence interval. OR = odds ratio.

Table B-6. Older Adult Group: Logistic Regressions of New Knowledge and Thinking about Health Risks (Primary Outcomes) Comparing Revised Statements with Corresponding or Randomized TCA Statements

Comparison	Statements Being Compared	New Knowledge		Thinking About Risks	
		Percent	OR (95% CI)	Percent	OR (95% CI)
1	Unspecified cancer (S4)	14.3	REF	67.3	REF
	Mouth and throat cancer (R1A)	14.3	1.00 (0.32 - 3.12)	67.3	1.00 (0.43 - 2.34)
2	Unspecified cancer (S4)	14.3	REF	67.3	REF
	Head and neck cancer (R1B)	59.2	8.70 (3.24 - 23.35) ^{a,b}	69.4	1.10 (0.47 - 2.59)
3	Unspecified cancer (S4)	14.3	REF	67.3	REF
	Bladder cancer (R1C)	85.7	36.00 (11.54 - 112.20) ^{a,b}	63.3	0.84 (0.36 - 1.93)
4	Harm your baby (S6)	8.2	REF	67.3	REF
	Premature birth (R2A)	6.0	0.72 (0.15 - 3.42)	60.0	0.73 (0.32 - 1.66)
5	Harm your baby (S6)	8.2	REF	67.3	REF
	Stunt fetal growth (R2B)	10.2	1.28 (0.32 - 5.11)	57.1	0.65 (0.28 - 1.48)
6	Harm your baby (S6)	8.2	REF	67.3	REF
	Low birth weight (R2C)	14.3	1.88 (0.51 - 6.92)	57.1	0.65 (0.28 - 1.48)
7	Harm children (S2)	26.5	REF	67.3	REF
	Respiratory illness in children (R3A)	28.0	1.08 (0.44 - 2.62)	72.0	1.25 (0.53 - 2.96)

Comparison n	Statements Being Compared	New Knowledge		Thinking About Risks	
		Percent	OR (95% CI)	Percent	OR (95% CI)
8	Strokes and heart disease (S5)	12.2	REF	59.2	REF
	Clogged arteries (R4A)	32.7	3.47 (1.22 - 9.90) ^a	67.3	1.42 (0.62 - 3.26)

(continued)

Table B-6. Older Adult Group: Logistic Regressions of New Knowledge and Thinking about Health Risks (Primary Outcomes) Comparing Revised Statements with Corresponding or Randomized TCA Statements (continued)

Comparison n	Statements Being Compared	New Knowledge		Thinking About Risks	
		Percent	OR (95% CI)	Percent	OR (95% CI)
9	Fatal lung disease in nonsmokers (S8)	30.6	REF	57.1	REF
	COPD (R5A)	22.4	0.66 (0.26 - 1.63)	71.4	1.88 (0.81 - 4.36)
10	Fatal lung disease in smokers (S3)	16.3	REF	59.2	REF
	COPD (R5A)	24.5	1.66 (0.61 - 4.54)	79.6	2.69 (1.09 - 6.64) ^a
11	Fatal lung disease in smokers (S3)	16.3	REF	59.2	REF
	Emphysema and bronchitis (R5B)	10.2	0.58 (0.18 - 1.94)	73.5	1.91 (0.81 - 4.5)
12	Random TCA statement (S6)	8.2	REF	67.3	REF
	Erectile dysfunction (R6A)	67.3	23.2 (7.06 - 76.28) ^{a,b}	55.1	0.60 (0.26 - 1.36)
13	Random TCA statement (S5)	12.2	REF	59.2	REF
	Amputation (R6B)	56.0	9.12 (3.27 - 25.43) ^{a,b}	70.0	1.61 (0.70 - 3.71)
14	Random TCA statement (S3)	16.3	REF	59.2	REF
	Diabetes (R7A)	71.4	12.81 (4.79 - 34.26) ^{a,b}	57.1	0.92 (0.41 - 2.06)
15	Random TCA statement (S1)	14.3	REF	57.1	REF
	Macular degeneration (R8A)	81.6	26.67 (9.02 - 78.84) ^{a,b}	69.4	1.70 (0.74 - 3.92)
16	Random TCA statement (S6)	8.2	REF	67.3	REF
	Cataracts (R8B)	87.8	80.63 (21.12 - 307.6) ^{a,b}	57.1	0.65 (0.28 - 1.48)

^aSignificant at $p < .05$ in unadjusted analyses. ^bSignificant after adjustment for multiple comparisons. Note: CI = confidence interval. OR = odds ratio.

Results by Group for Table 3-6

Table B-7. Adolescent Group: Linear Regressions of Believability and Informativeness (Secondary Outcomes) Comparing Revised Statements with Corresponding or Randomized TCA Statements

Comparison n	Statements Being Compared	Believability		Informativeness	
		Mean (SD)	Regression Coefficient (95% CI)	Mean (SD)	Regression Coefficient (95% CI)
1	Unspecified cancer (S4)	4.98 (1.20)	REF	4.18 (1.83)	REF
	Mouth and throat cancer (R1A)	4.67 (1.33)	-0.31 (-0.81 - 0.19)	4.06 (1.66)	-0.12 (-0.81 - 0.57)
2	Unspecified cancer (S4)	4.98 (1.2)	REF	4.18 (1.83)	REF
	Head and neck cancer (R1B)	3.32 (1.80)	-1.66 (-2.26 - -1.00) ^{a,b}	3.65 (1.73)	-0.53 (-1.23 - 0.18)
3	Unspecified cancer (S4)	4.98 (1.20)	REF	4.18 (1.83)	REF
	Bladder cancer (R1C)	3.96 (1.88)	-1.02 (-1.65 - -0.30) ^{a,b}	4.29 (1.88)	0.11 (-0.63 - 0.84)
4	Harm your baby (S6)	5.12 (1.06)	REF	4.38 (1.54)	REF
	Premature birth (R2A)	4.65 (1.52)	-0.47 (-0.99 - 0.05)	4.53 (1.56)	0.15 (-0.46 - 0.76)
5	Harm your baby (S6)	5.12 (1.06)	REF	4.38 (1.54)	REF
	Stunt fetal growth (R2B)	4.94 (1.36)	-0.18 (-0.66 - 0.3)	4.35 (1.87)	-0.03 (-0.71 - 0.64)
6	Harm your baby (S6)	5.12 (1.06)	REF	4.38 (1.54)	REF
	Low birth weight (R2C)	4.78 (1.34)	-0.34 (-0.82 - 0.13)	4.63 (1.35)	0.25 (-0.32 - 0.82)
7	Harm children (S2)	4.64 (1.34)	REF	3.98 (1.60)	REF
	Respiratory illness in children (R3A)	4.59 (1.37)	-0.05 (-0.58 - 0.49)	4.39 (1.43)	0.41 (-0.19 - 1.01)
8	Strokes and heart disease (S5)	4.52 (1.13)	REF	4.06 (1.67)	REF
	Clogged arteries (R4A)	4.49 (1.53)	-0.03 (-0.56 - 0.50)	4.35 (1.52)	0.29 (-0.35 - 0.92)
9	Fatal lung disease in nonsmokers (S8)	4.02 (1.61)	REF	4.16 (1.53)	REF
	COPD (R5A)	4.63 (1.45)	0.61 (0.00 - 1.22) ^a	4.51 (1.56)	0.35 (-0.26 - 0.96)
10	Fatal lung disease in smokers (S3)	4.82 (1.21)	REF	4.12 (1.76)	REF
	COPD (R5A)	5.00 (1.21)	0.18 (-0.30 - 0.66)	4.82 (1.33)	0.70 (0.07 - 1.32) ^a

(continued)

Table B-7. Adolescent Group: Linear Regressions of Believability and Informativeness (Secondary Outcomes) Comparing Revised Statements with Corresponding or Randomized TCA Statements (continued)

Comparison	Statements Being Compared	Believability		Informativeness	
		Mean (SD)	Regression Coefficient (95% CI)	Mean (SD)	Regression Coefficient (95% CI)
11	Fatal lung disease in smokers (S3)	4.82 (1.21)	REF	4.12 (1.76)	REF
	Emphysema and bronchitis (R5B)	4.98 (1.20)	0.16 (-0.32 - 0.63)	4.55 (1.49)	0.43 (-0.21 - 1.07)
12	Random TCA statement (S6)	5.12 (1.06)	REF	4.38 (1.54)	REF
	Erectile dysfunction (R6A)	4.16 (1.50)	-0.96 (-1.47 - -0.40) ^{a,b}	3.84 (1.57)	-0.54 (-1.16 - 0.07)
13	Random TCA statement (S5)	4.52 (1.13)	REF	4.06 (1.67)	REF
	Amputation (R6B)	3.98 (1.53)	-0.54 (-1.07 - 0.00) ^a	4.41 (1.47)	0.35 (-0.27 - 0.97)
14	Random TCA statement (S3)	4.82 (1.21)	REF	4.12 (1.76)	REF
	Diabetes (R7A)	3.82 (1.97)	-1.00 (-1.65 - -0.30) ^{a,b}	4.06 (1.78)	-0.06 (-0.76 - 0.64)
15	Random TCA statement (S1)	4.54 (1.74)	REF	3.44 (1.83)	REF
	Macular degeneration (R8A)	3.6 (1.77)	-0.94 (-1.64 - -0.2) ^a	4.04 (1.65)	0.60 (-0.09 - 1.30)
16	Random TCA statement (S6)	5.12 (1.06)	REF	4.38 (1.54)	REF
	Cataracts (R8B)	4.06 (1.56)	-1.06 (-1.59 - -0.50) ^{a,b}	4.24 (1.61)	-0.14 (-0.76 - 0.49)

^aSignificant at $p < .05$ in unadjusted analyses. ^bSignificant after adjustments for multiple comparisons. Note: CI = confidence interval. SD = standard deviation.

Table B-8. Young Adult Group: Linear Regressions of Believability and Informativeness (Secondary Outcomes) Comparing Revised Statements with Corresponding or Randomized TCA Statements

Comparison	Statements Being Compared	Believability		Informativeness	
		Mean (SD)	Regression Coefficient (95% CI)	Mean (SD)	Regression Coefficient (95% CI)
1	Unspecified cancer (S4)	4.76 (1.45)	REF	3.98 (1.87)	REF
	Mouth and throat cancer (R1A)	5.04 (1.12)	0.29 (−0.23 - 0.80)	4.08 (1.77)	0.10 (−0.62 - 0.83)
2	Unspecified cancer (S4)	4.76 (1.45)	REF	3.98 (1.87)	REF
	Head and neck cancer (R1B)	3.81 (1.67)	−0.94 (−1.57 - −0.30) ^{a,b}	3.94 (1.54)	−0.04 (−0.73 - 0.64)
3	Unspecified cancer (S4)	4.76 (1.45)	REF	3.98 (1.87)	REF
	Bladder cancer (R1C)	3.37 (1.89)	−1.39 (−2.06 - −0.70) ^{a,b}	4.10 (1.72)	0.12 (−0.59 - 0.84)
4	Harm your baby (S6)	5.04 (1.12)	REF	4.04 (1.73)	REF
	Premature birth (R2A)	4.98 (1.33)	−0.06 (−0.55 - 0.43)	4.62 (1.44)	0.58 (−0.05 - 1.22)
5	Harm your baby (S6)	5.04 (1.12)	REF	4.04 (1.73)	REF
	Stunt fetal growth (R2B)	4.92 (1.29)	−0.12 (−0.60 - 0.36)	4.31 (1.53)	0.27 (−0.38 - 0.92)
6	Harm your baby (S6)	5.04 (1.12)	REF	4.04 (1.73)	REF
	Low birth weight (R2C)	4.73 (1.45)	−0.31 (−0.82 - 0.21)	4.18 (1.76)	0.14 (−0.55 - 0.84)
7	Harm children (S2)	4.47 (1.57)	REF	3.86 (1.76)	REF
	Respiratory illness in children (R3A)	4.76 (1.45)	0.29 (−0.32 - 0.89)	4.39 (1.41)	0.53 (−0.10 - 1.16)
8	Strokes and heart disease (S5)	4.67 (1.46)	REF	4.12 (1.80)	REF
	Clogged arteries (R4A)	4.61 (1.44)	−0.06 (−0.64 - 0.52)	4.55 (1.46)	0.43 (−0.22 - 1.08)
9	Fatal lung disease in nonsmokers (S8)	3.41 (1.89)	REF	3.57 (1.95)	REF
	COPD (R5A)	4.57 (1.62)	1.16 (0.46 - 1.87) ^{a,b}	4.43 (1.61)	0.86 (0.14 - 1.57) ^a

(continued)

Table B-8. Young Adult Group: Linear Regressions of Believability and Informativeness (Secondary Outcomes) Comparing Revised Statements with Corresponding or Randomized TCA Statements (continued)

Comparison	Statements Being Compared	Believability		Informativeness	
		Mean (SD)	Regression Coefficient (95% CI)	Mean (SD)	Regression Coefficient (95% CI)
10	Fatal lung disease in smokers (S3)	4.43 (1.65)	REF	3.59 (1.86)	REF
	COPD (R5A)	4.82 (1.24)	0.39 (-0.19 - 0.97)	4.67 (1.42)	1.08 (0.42 - 1.74) ^{a,b}
11	Fatal lung disease in smokers (S3)	4.43 (1.65)	REF	3.59 (1.86)	REF
	Emphysema and bronchitis (R5B)	4.82 (1.58)	0.39 (-0.25 - 1.03)	4.24 (1.79)	0.65 (-0.07 - 1.38)
12	Random TCA statement (S6)	5.04 (1.12)	REF	4.04 (1.73)	REF
	Erectile dysfunction (R6A)	4.02 (1.71)	-1.02 (-1.6 - -0.40) ^{a,b}	4.20 (1.81)	0.16 (-0.54 - 0.87)
13	Random TCA statement (S5)	4.67 (1.46)	REF	4.12 (1.80)	REF
	Amputation (R6B)	3.90 (1.79)	-0.78 (-1.43 - -0.10) ^a	4.53 (1.61)	0.41 (-0.27 - 1.09)
14	Random TCA statement (S3)	4.43 (1.65)	REF	3.59 (1.86)	REF
	Diabetes (R7A)	3.80 (2.00)	-0.63 (-1.36 - 0.10)	4.02 (2.13)	0.43 (-0.37 - 1.22)
15	Random TCA statement (S1)	4.76 (1.67)	REF	3.55 (1.95)	REF
	Macular degeneration (R8A)	4.24 (1.66)	-0.51 (-1.17 - 0.15)	4.20 (1.87)	0.65 (-0.11 - 1.41)
16	Random TCA statement (S6)	5.04 (1.12)	REF	4.04 (1.73)	REF
	Cataracts (R8B)	3.73 (1.78)	-1.31 (-1.90 - -0.70) ^{a,b}	4.08 (1.85)	0.04 (-0.67 - 0.75)

^aSignificant at $p < .05$ in unadjusted analyses. ^bSignificant after adjustments for multiple comparisons. Note: CI = confidence interval. SD = standard deviation.

Table B-9. Older Adult Group: Linear Regressions of Believability and Informativeness (Secondary Outcomes) Comparing Revised Statements with Corresponding or Randomized TCA Statements

Comparison	Statements Being Compared	Believability		Informativeness	
		Mean (SD)	Regression Coefficient (95% CI)	Mean (SD)	Regression Coefficient (95% CI)
1	Unspecified cancer (S4)	4.65 (1.45)	REF	3.96 (1.77)	REF
	Mouth and throat cancer (R1A)	4.59 (1.51)	-0.06 (-0.65 - 0.53)	4.16 (1.66)	0.20 (-0.48 - 0.89)
2	Unspecified cancer (S4)	4.65 (1.45)	REF	3.96 (1.77)	REF
	Head and neck cancer (R1B)	4.04 (1.90)	-0.61 (-1.29 - 0.06)	4.02 (1.91)	0.06 (-0.67 - 0.79)
3	Unspecified cancer (S4)	4.65 (1.45)	REF	3.96 (1.77)	REF
	Bladder cancer (R1C)	3.73 (1.77)	-0.92 (-1.56 - -0.20) ^{a,b}	4.06 (1.83)	0.10 (-0.61 - 0.82)
4	Harm your baby (S6)	4.49 (1.60)	REF	4.00 (1.88)	REF
	Premature birth (R2A)	4.72 (1.26)	0.23 (-0.34 - 0.8)	4.28 (1.63)	0.28 (-0.42 - 0.98)
5	Harm your baby (S6)	4.49 (1.60)	REF	4.00 (1.88)	REF
	Stunt fetal growth (R2B)	4.76 (1.52)	0.27 (-0.35 - 0.89)	4.33 (1.78)	0.33 (-0.40 - 1.06)
6	Harm your baby (S6)	4.49 (1.60)	REF	4.00 (1.88)	REF
	Low birth weight (R2C)	4.80 (1.46)	0.31 (-0.3 - 0.91)	4.47 (1.50)	0.47 (-0.21 - 1.15)
7	Harm children (S2)	4.35 (1.70)	REF	3.69 (1.90)	REF
	Respiratory illness in children (R3A)	4.44 (1.67)	0.09 (-0.57 - 0.76)	4.38 (1.66)	0.69 (-0.02 - 1.39)
8	Strokes and heart disease (S5)	4.33 (1.59)	REF	3.94 (1.65)	REF
	Clogged arteries (R4A)	4.55 (1.47)	0.22 (-0.38 - 0.83)	4.29 (1.58)	0.35 (-0.30 - 0.99)
9	Fatal lung disease in nonsmokers (S8)	3.80 (1.77)	REF	3.78 (1.93)	REF
	COPD (R5A)	4.88 (1.17)	1.08 (0.48 - 1.68) ^{a,b}	4.37 (1.52)	0.59 (-0.10 - 1.28)
10	Fatal lung disease in smokers (S3)	4.53 (1.54)	REF	4.08 (1.88)	REF
	COPD (R5A)	4.82 (1.18)	0.29 (-0.26 - 0.83)	4.67 (1.41)	0.59 (-0.07 - 1.25)
11	Fatal lung disease in smokers (S3)	4.53 (1.54)	REF	4.08 (1.88)	REF
	Emphysema and bronchitis (R5B)	4.76 (1.45)	0.22 (-0.37 - 0.82)	4.33 (1.61)	0.24 (-0.45 - 0.94)

(continued)

Table B-9. Older Adult Group: Linear Regressions of Believability and Informativeness (Secondary Outcomes) Comparing Revised Statements with Corresponding or Randomized TCA Statements (continued)

Comparison	Statements Being Compared	Believability		Informativeness	
		Mean (SD)	Regression Coefficient (95% CI)	Mean (SD)	Regression Coefficient (95% CI)
12	Random TCA statement (S6)	4.49 (1.60)	REF	4 (1.88)	REF
	Erectile dysfunction (R6A)	3.61 (1.71)	-0.88 (-1.53 - -0.20) ^{a,b}	3.96 (1.83)	-0.04 (-0.78 - 0.70)
13	Random TCA statement (S5)	4.33 (1.59)	REF	3.94 (1.65)	REF
	Amputation (R6B)	4.00 (1.74)	-0.33 (-0.99 - 0.33)	4.18 (1.55)	0.24 (-0.39 - 0.87)
14	Random TCA statement (S3)	4.53 (1.54)	REF	4.08 (1.88)	REF
	Diabetes (R7A)	3.55 (1.84)	-0.98 (-1.65 - -0.20) ^{a,b}	3.94 (1.88)	-0.14 (-0.89 - 0.61)
15	Random TCA statement (S1)	4.94 (1.51)	REF	3.74 (2.17)	REF
	Macular degeneration (R8A)	3.94 (1.61)	-1.00 (-1.62 - -0.30) ^{a,b}	4.37 (1.51)	0.63 (-0.11 - 1.38)
16	Random TCA statement (S6)	4.49 (1.60)	REF	4.00 (1.88)	REF
	Cataracts (R8B)	3.47 (1.99)	-1.02 (-1.74 - -0.20) ^{a,b}	4.18 (1.84)	0.18 (-0.56 - 0.93)

^aSignificant at $p < .05$ in unadjusted analyses. ^bSignificant after adjustments for multiple comparisons.

Note: CI = confidence interval. SD = standard deviation.

Results by Group for Table 3-7

Table B-10. Adolescent Group: Logistic Regression of Factuality (Secondary Outcome) Comparing Revised Statements with Corresponding or Randomized TCA Statements

Comparison	Statements Being Compared	Factuality	
		Percent	OR (95% CI)
1	Unspecified cancer (S4)	94.0	REF
	Mouth and throat cancer (R1A)	93.9	0.98 (0.19 - 5.14)
2	Unspecified cancer (S4)	94.0	REF
	Head and neck cancer (R1B)	60.0	0.10 (0.03 - 0.35) ^{a,b}
3	Unspecified cancer (S4)	94.0	REF
	Bladder cancer (R1C)	83.7	0.33 (0.08 - 1.32)
4	Harm your baby (S6)	94.0	REF
	Premature birth (R2A)	83.7	0.33 (0.08 - 1.32)
5	Harm your baby (S6)	94.0	REF
	Stunt fetal growth (R2B)	77.6	0.22 (0.06 - 0.85) ^a
6	Harm your baby (S6)	94.0	REF
	Low birth weight (R2C)	91.8	0.72 (0.15 - 3.42)
7	Harm children (S2)	84.0	REF
	Respiratory illness in children (R3A)	85.7	1.14 (0.38 - 3.46)
8	Strokes and heart disease (S5)	92.0	REF
	Clogged arteries (R4A)	85.7	0.52 (0.14 - 1.92)
9	Fatal lung disease in nonsmokers (S8)	80.0	REF
	COPD (R5A)	85.7	1.50 (0.52 - 4.35)
10	Fatal lung disease in smokers (S3)	94.0	REF
	COPD (R5A)	91.8	0.72 (0.15 - 3.42)
11	Fatal lung disease in smokers (S3)	94.0	REF
	Emphysema and bronchitis (R5B)	98.0	3.06 (0.30 - 30.87)
12	Random TCA statement (S6)	94.0	REF
	Erectile dysfunction (R6A)	75.5	0.20 (0.05 - 0.75) ^a
13	Random TCA statement (S5)	92.0	REF
	Amputation (R6B)	75.5	0.27 (0.08 - 0.91) ^a
14	Random TCA statement (S3)	94.0	REF
	Diabetes (R7A)	69.4	0.14 (0.04 - 0.54) ^{a,b}
15	Random TCA statement (S1)	74.0	REF
	Macular degeneration (R8A)	69.4	0.80 (0.33 - 1.92)
16	Random TCA statement (S6)	94.0	REF
	Cataracts (R8B)	78.0	0.23 (0.06 - 0.87) ^a

^aSignificant at $p < .05$ in unadjusted analyses. ^bSignificant after adjustment for multiple comparisons.
Note: CI = confidence interval. OR = odds ratio.

Table B-11. Young Adult Group: Logistic Regression of Factuality (Secondary Outcome) Comparing Revised Statements with Corresponding or Randomized TCA Statements

Comparison	Statements Being Compared	Factuality	
		Percent	OR (95% CI)
1	Unspecified cancer (S4)	83.7	REF
	Mouth and throat cancer (R1A)	85.7	1.17 (0.39 - 3.54)
2	Unspecified cancer (S4)	83.7	REF
	Head and neck cancer (R1B)	61.2	0.31 (0.12 - 0.80) ^a
3	Unspecified cancer (S4)	83.7	REF
	Bladder cancer (R1C)	75.5	0.60 (0.22 - 1.64)
4	Harm your baby (S6)	93.9	REF
	Premature birth (R2A)	89.8	0.57 (0.13 - 2.57)
5	Harm your baby (S6)	93.9	REF
	Stunt fetal growth (R2B)	81.6	0.29 (0.07 - 1.15)
6	Harm your baby (S6)	93.9	REF
	Low birth weight (R2C)	85.7	0.39 (0.09 - 1.62)
7	Harm children (S2)	71.4	REF
	Respiratory illness in children (R3A)	85.7	2.40 (0.87 - 6.64)
8	Strokes and heart disease (S5)	89.8	REF
	Clogged arteries (R4A)	83.7	0.58 (0.18 - 1.94)
9	Fatal lung disease in nonsmokers (S8)	57.1	REF
	COPD (R5A)	83.7	3.84 (1.49 - 9.94) ^{a,b}
10	Fatal lung disease in smokers (S3)	83.7	REF
	COPD (R5A)	93.9	2.99 (0.74 - 12.12)
11	Fatal lung disease in smokers (S3)	83.7	REF
	Emphysema and bronchitis (R5B)	87.8	1.40 (0.44 - 4.41)
12	Random TCA statement (S6)	93.9	REF
	Erectile dysfunction (R6A)	71.4	0.16 (0.04 - 0.62) ^{a,b}
13	Random TCA statement (S5)	89.8	REF
	Amputation (R6B)	65.3	0.21 (0.07 - 0.64) ^{a,b}
14	Random TCA statement (S3)	83.7	REF
	Diabetes (R7A)	63.3	0.34 (0.13 - 0.88) ^a
15	Random TCA statement (S1)	77.6	REF
	Macular degeneration (R8A)	68.8	0.64 (0.26 - 1.58)
16	Random TCA statement (S6)	93.9	REF
	Cataracts (R8B)	55.1	0.08 (0.02 - 0.29) ^{a,b}

^aSignificant at $p < .05$ in unadjusted analyses. ^bSignificant after adjustment for multiple comparisons.

Note: CI = confidence interval. OR = odds ratio.

Table B-12. Older Adult Group: Logistic Regression of Factuality (Secondary Outcome) Comparing Revised Statements with Corresponding or Randomized TCA Statements

Comparison	Statements Being Compared	Factuality	
		Percent	OR (95% CI)
1	Unspecified cancer (S4)	83.7	REF
	Mouth and throat cancer (R1A)	85.7	1.17 (0.39 - 3.54)
2	Unspecified cancer (S4)	83.7	REF
	Head and neck cancer (R1B)	46.9	0.17 (0.07 - 0.45) ^{a,b}
3	Unspecified cancer (S4)	83.7	REF
	Bladder cancer (R1C)	49.0	0.19 (0.07 - 0.48) ^{a,b}
4	Harm your baby (S6)	75.5	REF
	Premature birth (R2A)	76.0	1.03 (0.41 - 2.59)
5	Harm your baby (S6)	75.5	REF
	Stunt fetal growth (R2B)	79.6	1.26 (0.49 - 3.29)
6	Harm your baby (S6)	75.5	REF
	Low birth weight (R2C)	85.7	1.95 (0.69 - 5.49)
7	Harm children (S2)	71.4	REF
	Respiratory illness in children (R3A)	76.0	1.27 (0.51 - 3.12)
8	Strokes and heart disease (S5)	69.4	REF
	Clogged arteries (R4A)	73.5	1.22 (0.51 - 2.95)
9	Fatal lung disease in nonsmokers (S8)	46.9	REF
	COPD (R5A)	79.6	4.41 (1.80 - 10.81) ^{a,b}
10	Fatal lung disease in smokers (S3)	79.6	REF
	COPD (R5A)	91.8	2.88 (0.83 - 9.99)
11	Fatal lung disease in smokers (S3)	79.6	REF
	Emphysema and bronchitis (R5B)	89.8	2.26 (0.71 - 7.22)
12	Random TCA statement (S6)	75.5	REF
	Erectile dysfunction (R6A)	49.0	0.31 (0.13 - 0.74) ^{a,b}
13	Random TCA statement (S5)	69.4	REF
	Amputation (R6B)	66.0	0.86 (0.37 - 2.00)
14	Random TCA statement (S3)	79.6	REF
	Diabetes (R7A)	51.0	0.27 (0.11 - 0.65) ^{a,b}
15	Random TCA statement (S1)	87.8	REF
	Macular degeneration (R8A)	59.2	0.20 (0.07 - 0.57) ^{a,b}
16	Random TCA statement (S6)	75.5	REF
	Cataracts (R8B)	51.0	0.34 (0.14 - 0.80) ^a

^aSignificant at $p < .05$ in unadjusted analyses. ^bSignificant after adjustment for multiple comparisons.

Note: CI = confidence interval. OR = odds ratio.

Cronbach's Alpha for Scaled Health Belief Items

Table B-13. Internal Consistency of Scaled Responses to Health Belief Items

Scaled Dependent Variable [All 5-level "Strongly disagree" to "Strongly agree" Response Options]	Cronbach's Alpha
B1_1. Smoking causes mouth cancer	0.75
B1_2. Smoking causes throat cancer	
B2_1. Smoking causes head cancer	0.74
B2_2. Smoking causes neck cancer	
B3_1. Smoking causes bladder cancer, which can lead to bloody urine	0.86
B3_2. Smoking causes bladder cancer	
B3_3. Smoking can lead to bloody urine	
B7_1. Secondhand smoke causes respiratory illnesses in children, like pneumonia	0.81
B7_2. Secondhand smoke causes respiratory illnesses in children	
B7_3. Secondhand smoke causes pneumonia in children	
B8_1. Smoking causes heart disease	0.87
B8_2. Smoking causes strokes	
B8_3. Smoking clogs arteries	
B8_4. Smoking clogs arteries, which causes heart disease	
B9_1. Smoking causes COPD, a lung disease that can be fatal	0.78
B9_2. Smoking causes COPD	
B9_3. Smoking causes a lung disease that can be fatal	
B10_1. Smoking causes serious lung diseases	0.69
B10_2. Smoking causes emphysema	
B10_3. Smoking causes chronic bronchitis	
B11_1. Smoking reduces blood flow, which can cause erectile dysfunction	0.78
B11_2. Smoking reduces blood flow	
B11_3. Smoking can cause erectile dysfunction	
B12_1. Smoking reduces blood flow to the limbs, which can require amputation	0.82
B12_2. Smoking reduces blood flow to the limbs	
B12_3. Smoking can lead to amputation	
B13_1. Smoking causes type 2 diabetes, which raises blood sugar.	0.83
B13_3. Smoking can cause Type 2 Diabetes	
B14_1. Smoking causes age-related macular degeneration, which can lead to blindness	0.82
B14_2. Smoking causes age-related macular degeneration	
B14_3. Smoking can lead to blindness	
B15_1. Smoking causes cataracts, which can lead to blindness	0.84
B15_2. Smoking causes cataracts	

Results by Group for Table 3-8

Table B-14. Adolescent Group: Linear Regressions for Condition-Level Comparisons of Health Beliefs in Phase 1

Comparison n	Statements Being Compared	Mean (SD) Health Belief Score		Regression Coefficients (95% CI)
		Treatmen t ^c	Control ^c	
1	Mouth and throat cancer (R1A) vs. Unspecified cancer (S4)	4.40 (0.65)	4.09 (0.84)	0.31 (0.01 - 0.61) ^a
2	Head and neck cancer (R1B) vs. Unspecified cancer (S4)	3.11 (0.97)	3.40 (1.12)	-0.29 (-0.70 - 0.12)
3	Bladder cancer (R1C) vs. Unspecified cancer (S4)	3.48 (1.15)	3.37 (0.86)	0.10 (-0.30 - 0.51)
7	Respiratory illness in children (R3A) vs. Harm children (S2)	4.16 (0.76)	4.09 (0.70)	0.07 (-0.22 - 0.36)
8	Clogged arteries (R4A) vs. Strokes and heart disease (S5)	3.98 (0.96)	4.08 (0.67)	-0.10 (-0.42 - 0.24)
9	COPD (R5A) vs. Fatal lung disease in nonsmokers (S8)	4.38 (0.63)	4.35 (0.63)	0.03 (-0.21 - 0.29)
10	COPD (R5A) vs. fatal lung disease in smokers (S3)	4.44 (0.72)	4.35 (0.63)	0.09 (-0.18 - 0.36)
11	Emphysema and bronchitis (R5B) vs. fatal lung disease in smokers (S3)	4.20 (0.72)	4.21 (0.62)	0.14 (-0.08 - 0.37)
12	Erectile dysfunction (R6A) vs. random TCA statement	3.44 (0.84)	3.69 (0.69)	0.18 (-0.12 - 0.48)
13	Amputation (R6B) vs. random TCA statement	3.57 (0.83)	3.64 (0.86)	0.12 (-0.24 - 0.48)
14	Diabetes (R7A) vs. random TCA statement	3.15 (0.95)	3.29 (0.97)	0.28 (-0.10 - 0.67)
15	Macular degeneration (R8A) vs. random TCA statement	3.21 (0.79)	3.44 (0.85)	0.02 (-0.31 - 0.36)
16	Cataracts (R8B) vs. random TCA statement	3.23 (0.99)	3.31 (0.98)	0.17 (-0.22 - 0.56)

^aSignificant at $p < .05$ in unadjusted analyses. ^cSpecific health belief items vary by condition: see Appendix A with study instrument for specific items.

Note: CI = confidence interval. SD = standard deviation.

Table B-15. Young Adult Group: Linear Regressions for Condition-Level Comparisons of Health Beliefs in Phase 1

Comparison n	Statements Being Compared	Mean (SD) Health Belief Score		Regression Coefficients (95% CI)
		Treatment ^c	Control ^c	
1	Mouth and throat cancer (R1A) vs. Unspecified cancer (S4)	4.34 (0.72)	3.93 (0.86)	0.41 (0.09 - 0.73) ^a
2	Head and neck cancer (R1B) vs. Unspecified cancer (S4)	3.60 (0.94)	3.36 (1.02)	0.24 (-0.14 - 0.64)
3	Bladder cancer (R1C) vs. Unspecified cancer (S4)	3.43 (0.93)	3.26 (0.99)	0.17 (-0.21 - 0.56)
7	Respiratory illness in children (R3A) vs. Harm children (S2)	4.03 (0.76)	3.73 (0.96)	0.31 (-0.04 - 0.65)
8	Clogged arteries (R4A) vs. Strokes and heart disease (S5)	4.06 (0.67)	3.89 (0.74)	0.18 (-0.10 - 0.46)
9	COPD (R5A) vs. Fatal lung disease in nonsmokers (S8)	4.24 (0.66)	4.09 (0.70)	0.15 (-0.12 - 0.42)
10	COPD (R5A) vs. fatal lung disease in smokers (S3)	4.28 (0.83)	4.09 (0.70)	0.19 (-0.12 - 0.50)
11	Emphysema and bronchitis (R5B) vs. fatal lung disease in smokers (S3)	4.15 (0.53)	3.95 (0.66)	0.20 (-0.04 - 0.44)
12	Erectile dysfunction (R6A) vs. random TCA statement	3.83 (0.92)	3.42 (0.73)	0.41 (0.08 - 0.74) ^a
13	Amputation (R6B) vs. random TCA statement	3.75 (0.71)	3.41 (0.85)	0.33 (0.02 - 0.65) ^a
14	Diabetes (R7A) vs. random TCA statement	3.50 (1.01)	2.99 (0.95)	0.51 (0.12 - 0.90) ^a
15	Macular degeneration (R8A) vs. random TCA statement	3.84 (0.98)	3.22 (0.88)	0.62 (0.24 - 0.99) ^{a,b}
16	Cataracts (R8B) vs. random TCA statement	3.48 (1.16)	3.16 (0.87)	0.32 (-0.09 - 0.73)

^aSignificant at $p < .05$ in unadjusted analyses. ^bSignificant after adjustments for multiple comparisons.

^cSpecific health belief items vary by condition: see Appendix A with study instrument for specific items.

Note: CI = confidence interval. SD = standard deviation.

Table B-16. Older Adult Group: Linear Regressions for Condition-Level Comparisons of Health Beliefs in Phase 1

Compariso n	Statements Being Compared	Mean (SD) Health Belief Score		Regression Coefficients (95% CI)
		Treatment ^c	Control ^c	
1	Mouth and throat cancer (R1A) vs. Unspecified cancer (S4)	4.08 (0.83)	3.93 (1.09)	0.15 (-0.23 - 0.54)
2	Head and neck cancer (R1B) vs. Unspecified cancer (S4)	3.57 (1.04)	3.23 (1.01)	0.34 (-0.07 - 0.76)
3	Bladder cancer (R1C) vs. Unspecified cancer (S4)	3.33 (0.96)	3.14 (1.05)	0.19 (-0.21 - 0.59)
7	Respiratory illness in children (R3A) vs. Harm children (S2)	3.77 (1.02)	3.64 (0.98)	0.13 (-0.27 - 0.53)
8	Clogged arteries (R4A) vs. Strokes and heart disease (S5)	3.98 (0.99)	3.69 (1.02)	0.28 (-0.12 - 0.68)
9	COPD (R5A) vs. Fatal lung disease in nonsmokers (S8)	4.33 (0.64)	4.11 (1.02)	0.22 (-0.11 - 0.57)
10	COPD (R5A) vs. fatal lung disease in smokers (S3)	4.41 (0.57)	4.11 (1.02)	0.31 (-0.02 - 0.64)
11	Emphysema and bronchitis (R5B) vs. fatal lung disease in smokers (S3)	4.24 (0.71)	4.02 (1.01)	0.22 (-0.12 - 0.57)
12	Erectile dysfunction (R6A) vs. random TCA statement	3.52 (0.98)	3.45 (0.98)	0.07 (-0.31 - 0.47)
13	Amputation (R6B) vs. random TCA statement	3.74 (0.85)	3.38 (1.06)	0.36 (-0.02 - 0.74)
14	Diabetes (R7A) vs. control	3.35 (0.97)	3.01 (1.10)	0.34 (-0.07 - 0.76)
15	Macular degeneration (R8A) vs. random TCA statement	3.39 (0.97)	2.97 (1.01)	0.42 (0.02 - 0.82) ^a
16	Cataracts (R8B) vs. random TCA statement	3.15 (1.14)	2.91 (1.17)	0.24 (-0.21 - 0.71)

^aSignificant at $p < .05$ in unadjusted analyses. ^cSpecific health belief items vary by condition: see Appendix A with study instrument for specific items.

Note: CI = confidence interval. SD = standard deviation.

Results by Group for Table 3-9

Table B-17. Adolescent Group: Ordinal Regressions for Condition-Level Comparisons of Health Beliefs in Phase 1

Comparison	Comparison and level of endorsement for health belief	Proportion Endorsing Each Response Level, %		OR (95% CI)
		Treatment ^a	Control ^a	
4	Premature birth (R2A) vs. Harm your baby (S6)			0.63 (0.30 - 1.33)
	1 "Strongly disagree" (Ref)	4.1	2.0	—
	2 "Disagree"	0.0	2.0	—
	3 "Neither agree nor disagree"	16.3	10.0	—
	4 "Agree"	44.9	40.0	—
	5 "Strongly agree"	34.7	46.0	—
5	Stunt fetal growth (R2B) vs. Harm your baby (S6)			0.82 (0.38 - 1.75)
	1 "Strongly disagree" (Ref)	2.2	0.0	—
	2 "Disagree"	2.2	4.08	—
	3 "Neither agree nor disagree"	13.0	12.2	—
	4 "Agree"	45.7	40.8	—
	5 "Strongly agree"	37.0	42.9	—
6	Low birth weight (R2C) vs. Harm your baby (S6)			0.89 (0.42 - 1.88)
	1 "Strongly disagree" (Ref)	2.0	0.0	—
	2 "Disagree"	2.0	10.0	—
	3 "Neither agree nor disagree"	18.4	38.0	—
	4 "Agree"	28.6	48.0	—
	5 "Strongly agree"	49.0	4.0	—

Note: CI = confidence interval. OR = odds ratio.

Table B-18. Young Adult Group: Ordinal Regressions for Condition-Level Comparisons of Health Beliefs in Phase 1

Comparison	Comparison and Level of Endorsement for Health Belief	Proportion Endorsing Each Response Level, %		OR (95% CI)
		Treatment ^a	Control ^a	
4	Premature birth (R2A) vs. Harm your baby (S6)			1.01 (0.48 - 2.13)
	1 "Strongly disagree" (Ref)	8.3	0.0	—
	2 "Disagree"	2.1	4.2	—
	3 "Neither agree nor disagree"	14.6	18.8	—
	4 "Agree"	31.2	37.5	—
	5 "Strongly agree"	43.8	39.6	—
5	Stunt fetal growth (R2B) vs. Harm your baby (S6)			2.58 (1.19 - 50.59) ^a
	1 "Strongly disagree" (Ref)	4.1	4.1	—
	2 "Disagree"	2.0	6.1	—
	3 "Neither agree nor disagree"	4.1	16.3	—
	4 "Agree"	30.6	36.7	—
	5 "Strongly agree"	59.2	36.7	—
6	Low birth weight (R2C) vs. Harm your baby (S6)			1.56 (0.73 - 30.32)
	1 "Strongly disagree" (Ref)	0.0	2.1	—
	2 "Disagree"	2.0	6.4	—
	3 "Neither agree nor disagree"	20.4	12.8	—
	4 "Agree"	38.8	55.3	—
	5 "Strongly agree"	38.8	23.4	—

^aSignificant at $p < .05$ in unadjusted analyses.

Note: CI = confidence interval. OR = odds ratio.

Table B-19. Older Adult Group: Ordinal Regressions for Condition-Level Comparisons of Health Beliefs in Phase 1

Comparison	Comparison and Level of Endorsement for Health Belief	Proportion Endorsing Each Response Level, %		OR (95% CI)
		Treatment ^a	Control ^a	
4	Premature birth (R2A) vs. Harm your baby (S6)			1.27 (0.61 - 2.66)
	1 "Strongly disagree" (Ref)	0.0	4.1	—
	2 "Disagree"	4.0	10.2	—
	3 "Neither agree nor disagree"	22.0	24.5	—
	4 "Agree"	40.0	22.5	—
	5 "Strongly agree"	34.0	38.8	—
5	Stunt fetal growth (R2B) vs. Harm your baby (S6)			1.43 (0.68 - 30.03)
	1 "Strongly disagree" (Ref)	2.0	4.2	—
	2 "Disagree"	4.1	8.3	—
	3 "Neither agree nor disagree"	10.2	20.8	—
	4 "Agree"	49.0	31.3	—
	5 "Strongly agree"	34.7	35.4	—
6	Low birth weight (R2C) vs. Harm your baby (S6)			2.21 (1.03 - 40.71) ^a
	1 "Strongly disagree" (Ref)	2.0	6.3	—
	2 "Disagree"	8.2	6.3	—
	3 "Neither agree nor disagree"	12.22	25.0	—
	4 "Agree"	22.5	29.2	—
	5 "Strongly agree"	55.1	33.3	—

^aSignificant at $p < .05$ in unadjusted analyses.

Note: CI = confidence interval. OR = odds ratio.

Results by Group for Table 3-10

Table B-20. Adolescent Group: Comparison of Health Beliefs (Phase 2) in Treatment vs. Control Condition

Condition	Smoking-Related Conditions (Range 0-20)	Regression Coefficient for Smoking-Related Conditions: B (95% CI)	SHS-Related Conditions (Range 0-2)	Regression Coefficient For SHS-Related Conditions: B (95% CI)	Pregnancy-Related Conditions (Range 0-3)	Regression Coefficient for Pregnancy-Related Conditions: B (95% CI)	Total Number of Conditions (Range 0-25)	Regression Coefficient for Total Number of Conditions: B (95% CI)
TCA statements	10.01 (4.80)	REF	1.50 (0.61)	REF	2.56 (0.76)	REF	14.1 (5.6)	REF
Revised statements	10.39 (5.73)	0.31 (-1.07 - 1.69)	1.50 (0.68)	1.07 (0.64 - 1.79)	2.38 (0.91)	0.68 (0.38 - 1.23)	14.3 (6.6)	0.12 (-1.49 - 1.74)

Note: CI = confidence interval. SHS = secondhand smoke.

Table B-21. Young Adult Group: Comparison of Health Beliefs (Phase 2) in Treatment vs. Control Condition

Condition	Smoking-Related Conditions (Range 0-20)	Regression Coefficient for Smoking-Related Conditions: B (95% CI)	SHS-Related Conditions (Range 0-2)	Regression Coefficient for SHS-Related Conditions: B (95% CI)	Pregnancy-Related Conditions (Range 0-3)	Regression Coefficient for Pregnancy-Related Conditions: B (95% CI)	Total Number of Conditions (Range 0-25)	Regression Coefficient for Total Number of Conditions: B (95% CI)
TCA statements	7.67 (4.99)	REF	1.35 (0.72)	REF	2.49 (0.92)	REF	11.51 (5.8)	REF
Revised statements	9.67 (5.53)	1.99 (0.56 - 3.43) ^{a,b}	1.49 (0.66)	1.51 (0.86 - 2.65)	2.36 (0.92)	0.66 (0.34 - 1.28)	13.52 (6.37)	2.01 (0.34 - 3.68) ^{a,b}

^aSignificant at $p < .05$ in unadjusted analyses. ^bSignificant after adjustment for multiple comparisons.

Note: CI = confidence interval. SHS = secondhand smoke.

Table B-22. Older Adult Group: Comparison of Health Beliefs (Phase 2) in Treatment vs. Control Condition

Condition	Smoking-Related Conditions (Range 0-20)	Regression Coefficient for Smoking-Related Conditions: B (95% CI)	SHS-Related Conditions (Range 0-2)	Regression Coefficient for SHS-Related Conditions: B (95% CI)	Pregnancy-Related Conditions (Range 0-3)	Regression Coefficient for Pregnancy-Related Conditions: B (95% CI)	Total Number of Conditions (Range 0-25)	Regression Coefficient for Total Number of Conditions: B (95% CI)
TCA statements	8.35 (5.33)	REF	1.16 (0.75)	REF	2.06 (1.16)	REF	11.57 (6.50)	REF
Revised statements	9.93 (5.44)	1.59 (0.06 - 3.11) ^a	1.38 (0.69)	1.77 (1.03 - 3.05) ^a	2.26 (1.04)	1.37 (0.76 - 2.46)	13.58 (6.41)	2.00 (0.14 - 3.87) ^a

^aSignificant at p<.05 in unadjusted analyses.

Note: CI = confidence interval. SHS = secondhand smoke.

Results by Group for Table 4-1

Table B-23. Adolescent Group: Summary of Significant Results by Revised Statement

Statement Number	Warning Statement	Primary Outcomes					Secondary Outcomes		
		New knowledge (OR)	Learning (B)	Thinking about risks (OR)	Health beliefs (B)	Health beliefs (OR)	Believability (B)	Informa-tiveness (B)	Factuality (OR)
R1A	WARNING: Smoking causes mouth and throat cancer.	ns	ns	ns	0.31 ^{a, b}	—	ns	ns	ns
R1B	WARNING: Smoking causes head and neck cancer.	28.50 ^{a, b}	1.68 ^{a, b}	ns	ns	—	-1.66 ^{a, b}	ns	0.10 ^{a, b}
R1C	WARNING: Smoking causes bladder cancer, which can lead to bloody urine.	24.92 ^{a, b}	2.04 ^{a, b}	ns	ns	—	-1.02 ^{a, b}	ns	ns
R2A	WARNING: Smoking during pregnancy causes premature birth.	5.58 ^{a, b}	1.19 ^{a, b}	ns	—	ns	ns	ns	ns
R2B	WARNING: Smoking during pregnancy stunts fetal growth.	5.58 ^{a, b}	ns	ns	—	ns	ns	ns	0.22 ^a
R2C	WARNING: Smoking during pregnancy causes premature birth and low birth weight.	4.60 ^{a, b}	1.08 ^{a, b}	ns	—	ns	ns	ns	ns
R3A	WARNING: Secondhand smoke causes respiratory illnesses in children, like pneumonia.	4.28 ^{a, b}	0.96 ^{a, b}	ns	ns	—	ns	ns	ns
R4A	WARNING: Smoking can cause heart disease and strokes by clogging arteries.	2.89 ^{a, b}	1.13 ^{a, b}	ns	ns	—	ns	ns	ns
R5A(S8)	WARNING: Smoking causes COPD, a lung disease that can be fatal.	ns	ns	ns	ns	—	0.61 ^a	ns	ns

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(continued)

Table B-23. Adolescent Group: Summary of Significant Results by Revised Statement (continued)

Statement Number	Warning Statement	Primary Outcomes					Secondary Outcomes		
		New knowledge (OR)	Learning (B)	Thinking about risks (OR)	Health beliefs (B)	Health beliefs (OR)	Believability (B)	Informa-tiveness (B)	Factuality (OR)
R5A(S3)	WARNING: Smoking causes COPD, a lung disease that can be fatal.	5.70 ^{a, b}	1.57 ^{a, b}	ns	ns	—	ns	0.70 ^a	ns
R5B	WARNING: Smoking causes serious lung diseases like emphysema and chronic bronchitis.	4.36 ^{a, b}	1.32 ^{a, b}	ns	ns	—	ns	ns	ns
R6A	WARNING: Smoking reduces blood flow, which can cause erectile dysfunction.	44.85 ^{a, b}	1.40 ^{a, b}	0.38 ^a	ns	—	-0.96 ^{a, b}	ns	0.20 ^a
R6B	WARNING: Smoking reduces blood flow to the limbs, which can require amputation.	10.93 ^{a, b}	1.64 ^{a, b}	ns	ns	—	-0.54 ^a	ns	0.27 ^a
R7A	WARNING: Smoking causes type 2 diabetes, which raises blood sugar.	46.13 ^{a, b}	2.02 ^{a, b}	ns	ns	—	-1.00 ^{a, b}	ns	0.14 ^{a, b}
R8A	WARNING: Smoking causes age-related macular degeneration, which can lead to blindness.	144.00 ^{a, b}	2.68 ^{a, b}	ns	ns	—	-0.94 ^a	ns	ns
R8B	WARNING: Smoking causes cataracts, which can lead to blindness.	46.00 ^{a, b}	1.98 ^{a, b}	ns	ns	—	-1.06 ^{a, b}	ns	0.23 ^a

^aSignificant at $p < .05$ in unadjusted analyses. ^bSignificant after adjustment for multiple comparisons.

Note: "B" values are regression coefficients from linear regressions. OR = odds ratio. ns = non-significant.

Table B-24. Young Adult Group: Summary of Significant Results by Revised Statement

Statement Number	Warning Statement	Primary Outcomes					Secondary Outcomes		
		New knowledge (OR)	Learning (B)	Thinking about risks (OR)	Health beliefs (B)	Health beliefs (OR)	Believability (B)	Informativeness (B)	Factuality (OR)
R1A	WARNING: Smoking causes mouth and throat cancer.	ns	ns	ns	0.41 ^a	—	ns	ns	ns
R1B	WARNING: Smoking causes head and neck cancer.	9.56 ^{a, b}	1.52 ^{a, b}	ns	ns	—	-0.94 ^{a, b}	ns	0.31 ^a
R1C	WARNING: Smoking causes bladder cancer, which can lead to bloody urine.	24.76 ^{a, b}	1.38 ^{a, b}	ns	ns	—	-1.39 ^{a, b}	ns	ns
R2A	WARNING: Smoking during pregnancy causes premature birth.	ns	ns	ns	—	ns	ns	ns	ns
R2B	WARNING: Smoking during pregnancy stunts fetal growth.	ns	1.12 ^a	ns	—	2.58 ^a	ns	ns	ns
R2C	WARNING: Smoking during pregnancy causes premature birth and low birth weight.	ns	ns	ns	—	ns	ns	ns	ns
R3A	WARNING: Secondhand smoke causes respiratory illnesses in children, like pneumonia.	ns	ns	ns	ns	—	ns	ns	ns
R4A	WARNING: Smoking can cause heart disease and strokes by clogging arteries.	ns	ns	ns	ns	—	ns	ns	ns
R5A(S8)	WARNING: Smoking causes COPD, a lung disease that can be fatal.	ns	ns	ns	ns	—	1.16 ^{a, b}	0.86 ^a	3.84 ^{a, b}

(continued)

Table B-24. Young Adult Group: Summary of Significant Results by Revised Statement (continued)

Statement Number	Warning Statement	Primary Outcomes					Secondary Outcomes		
		New knowledge (OR)	Learning (B)	Thinking about risks (OR)	Health beliefs (B)	Health beliefs (OR)	Believability (B)	Informativeness (B)	Factuality (OR)
R5A(S3)	WARNING: Smoking causes COPD, a lung disease that can be fatal.	ns	1.07 ^a	ns	ns	—	ns	1.08 ^{a, b}	
R5B	WARNING: Smoking causes serious lung diseases like emphysema and chronic bronchitis.	ns	ns	3.06 ^{a, b}	ns	—	ns	ns	ns
R6A	WARNING: Smoking reduces blood flow, which can cause erectile dysfunction.	13.89 ^{a, b}	1.60 ^{a, b}	ns	0.41 ^a	—	-1.02 ^{a, b}	ns	0.16 ^{a, b}
R6B	WARNING: Smoking reduces blood flow to the limbs, which can require amputation.	12.38 ^{a, b}	1.47 ^{a, b}	ns	0.33 ^a	—	-0.78 ^a	ns	0.21 ^{a, b}
R7A	WARNING: Smoking causes type 2 diabetes, which raises blood sugar.	8.64 ^{a, b}	1.51 ^{a, b}	ns	0.51 ^a	—	ns	ns	0.34 ^a
R8A	WARNING: Smoking causes age-related macular degeneration, which can lead to blindness.	16.31 ^{a, b}	1.68 ^{a, b}	3.32 ^{a, b}	0.62 ^{a, b}	—	ns	ns	ns
R8B	WARNING: Smoking causes cataracts, which can lead to blindness.	22.00 ^{a, b}	1.61 ^{a, b}	ns	ns	—	-1.31 ^{a, b}	ns	0.08 ^{a, b}

^aSignificant at p<.05 in unadjusted analyses. ^bSignificant after adjustment for multiple comparisons.

Note: "B" values are regression coefficients from linear regressions. OR = odds ratio. ns = non-significant.

Table B-25. Older Adult Group: Summary of Significant Results by Revised Statement

Statement Number	Warning Statement	Primary Outcomes					Secondary Outcomes		
		New knowledge (OR)	Learning (B)	Thinking about risks (OR)	Health beliefs (B)	Health beliefs (OR)	Believability (B)	Informativeness (B)	Factuality (OR)
R1A	WARNING: Smoking causes mouth and throat cancer.	ns	ns	ns	ns	—	ns	ns	ns
R1B	WARNING: Smoking causes head and neck cancer.	8.70 ^{a, b}	1.37 ^{a, b}	ns	ns	—	ns	ns	0.17 ^{a, b}
R1C	WARNING: Smoking causes bladder cancer, which can lead to bloody urine.	36.00 ^{a, b}	1.98 ^{a, b}	ns	ns	—	-0.92 ^{a, b}	ns	0.19 ^{a, b}
R2A	WARNING: Smoking during pregnancy causes premature birth.	ns	ns	ns	—	ns	ns	ns	ns
R2B	WARNING: Smoking during pregnancy stunts fetal growth.	ns	ns	ns	—	ns	ns	ns	ns
R2C	WARNING: Smoking during pregnancy causes premature birth and low birth weight.	ns	ns	ns	—	2.21 ^a	ns	ns	ns
R3A	WARNING: Secondhand smoke causes respiratory illnesses in children, like pneumonia.	ns	ns	ns	ns	—	ns	ns	ns
R4A	WARNING: Smoking can cause heart disease and strokes by clogging arteries.	3.47 ^a	ns	ns	ns	—	ns	ns	ns
R5A(S8)	WARNING: Smoking causes COPD, a lung disease that can be fatal.	ns	ns	2.69 ^a	ns	—	1.08 ^{a, b}	ns	4.41 ^{a, b}

(continued)

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Table B-25. Older Adult Group: Summary of Significant Results by Revised Statement (continued)

Statement Number	Warning Statement	Primary Outcomes					Secondary Outcomes		
		New knowledge (OR)	Learning (B)	Thinking about risks (OR)	Health beliefs (B)	Health beliefs (OR)	Believability (B)	Informativeness (B)	Factuality (OR)
R5A(S3)	WARNING: Smoking causes COPD, a lung disease that can be fatal.	ns	ns	ns	ns	—	ns	ns	ns
R5B	WARNING: Smoking causes serious lung diseases like emphysema and chronic bronchitis.	ns	ns	ns	ns	—	ns	ns	ns
R6A	WARNING: Smoking reduces blood flow, which can cause erectile dysfunction.	23.20 ^{a, b}	1.28 ^{a, b}	ns	ns	—	-0.88 ^{a, b}	ns	0.31 ^{a, b}
R6B	WARNING: Smoking reduces blood flow to the limbs, which can require amputation.	9.12 ^{a, b}	1.47 ^{a, b}	ns	ns	—	ns	ns	ns
R7A	WARNING: Smoking causes type 2 diabetes, which raises blood sugar.	12.81 ^{a, b}	1.15 ^{a, b}	ns	ns	—	-0.98 ^{a, b}	ns	0.27 ^{a, b}
R8A	WARNING: Smoking causes age-related macular degeneration, which can lead to blindness.	26.67 ^{a, b}	2.01 ^{a, b}	ns	0.42 ^a	—	-1.00 ^{a, b}	ns	0.20 ^{a, b}
R8B	WARNING: Smoking causes cataracts, which can lead to blindness.	80.63 ^{a, b}	1.95 ^{a, b}	ns	ns	—	-1.02 ^{a, b}	ns	0.34 ^a

^aSignificant at p<.05 in unadjusted analyses. ^bSignificant after adjustment for multiple comparisons.

Note: "B" values are regression coefficients from linear regressions. OR = odds ratio. ns = non-significant.