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J Adolesc Health. 2017 March ; 60(3): 299–305. doi:10.1016/j.jadohealth.2016.10.007.**Believability of Cigar Warning Labels among Adolescents****Sarah D. Kowitt, MPH¹, Kristen Jarman, MSPH², Leah M. Ranney, PhD, MA³, and Adam O. Goldstein, MD, MPH^{2,3}**¹Department of Health Behavior, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, 135 Dauer Drive, 170 Rosenau Hall, CB # 7400, Chapel Hill, NC 27599²Lineberger Comprehensive Cancer Center, University of North Carolina at Chapel Hill, 101 Manning Dr, Chapel Hill, NC 27514³Department of Family Medicine, University of North Carolina at Chapel Hill, 590 Manning Drive, Chapel Hill, NC 27599**Abstract**

Purpose—Despite high rates of cigar use among youth, little information exists about how cigar warnings are received by youth. We examined believability of different cigar warning messages with different sources among adolescents in a national phone survey.

Methods—Adolescents (age 13-17) in the US ($N=1,125$; total response rate, 66%) were randomized to receive one of three health messages (“cigar smoking can cause cancers of the mouth and throat, even if you do not inhale”, “cigar smoking can cause lung cancer and heart disease”, “cigars are not a safe alternative to cigarettes”) and one of four warning sources (FDA, Surgeon General, CDC, no source). Believability was assessed with “how believable is this warning” and responses were dichotomized for “not at all or somewhat” vs. “very”.

Results—Weighted logistic regression results indicated that most youth found the cigar warnings very believable (60.5%). Messages about mouth and throat cancer (regardless of inhalation) and the safety of cigars in comparison to cigarettes were rated as significantly less believable than messages about lung cancer and heart disease related to cigars. There were no significant differences by source or other demographics. However, youth susceptible to using cigarettes were less likely to report the cigar warnings to be very believable.

Conclusions—The messages of cigar warning labels are not viewed as equally believable among adolescents. Future studies should examine how youth process messages about health effects of cigars and the impact of different cigar warnings on youth experimentation with and use of cigars.

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Keywords

cigars; tobacco prevention and control; warning labels; adolescents; smoking

Cigars are one of the most widely used tobacco products among adolescents in the United States (1). In the 2014 National Youth Tobacco Survey (NYTS), a nationally representative survey of adolescents, the prevalence of current cigar use was 8.2% among high school students, which closely mirrored that of cigarettes (9.2%) (1). Cigar use is especially concerning among African Americans, among whom cigars are the most commonly used tobacco product (1). Moreover, dual use of cigars and cigarettes is one of the most popular two-product combinations among youth and young adults (2), which is worrisome given that there is evidence suggesting that youth who use both cigars and cigarettes are more likely to use both products more frequently (3). While risks to health from using cigars are related to frequency and extent of inhalation, even without inhalation, cigar users are at increased risk of oral, pharyngeal, laryngeal, and esophageal cancers (4, 5). Despite these negative effects on health, studies have shown that some youth report cigars to be less harmful than cigarettes (6, 7).

Before 2016, most cigars sold in the U.S. carried a warning message as a result of settlements in 2000 between the Federal Trade Commission (FTC) and the seven largest U.S. Cigar manufacturers (8). Effective August 2016 with new regulations from the FDA, all cigars will also carry two additional warning statements, in addition to four of the already existing warning statements from the Federal Trade Commission (9). The warnings are as follows:

1. Warning: Cigar smoking can cause cancers of the mouth and throat, even if you do not inhale.
2. Warning: Cigar smoking can cause lung cancer and heart disease.
3. Warning: Cigars are not a safe alternative to cigarettes.
4. Warning: Tobacco smoke increases the risk of lung cancer and heart disease, even in nonsmokers.
5. Warning: This product contains nicotine derived from tobacco. Nicotine is an addictive chemical.
6. Warning: Cigar use while pregnant can harm you and your baby.

The first four warning statements were created to counter false beliefs that cigars do not carry health risks regardless of inhalation; that cigars are safer than cigarettes; and that cigar smoke does not affect non-smokers (8). The fifth cigar warning statement regarding nicotine, an addictive chemical, has been required for inclusion on all FDA covered tobacco products, including cigars (8). This warning is intended to help reduce consumers' beliefs that certain tobacco products are safe for use and that quitting tobacco products is easy (8). The final cigar warning statement is new and reflects the dangers of tobacco smoke during pregnancy (9).

Previous research has shown that tobacco control messages, including warnings, that produce negative emotions or that highlight the negative aesthetic effects of smoking may be associated with believability of the messages, recall of health risks, and cessation behavior, especially among youth (10). Moreover, recent meta-analyses of warning experiments (11) and observational studies (12) have demonstrated a greater impact of pictorial vs. text-only warnings on various outcomes, including warning believability. However, no research to date has examined the believability of any specific warning labels for cigars among youth, which we investigate in this study.

Methods

Sampling

Data utilized in this research come from a national phone survey administered by the Center for Regulatory Research on Tobacco Communication (CRRTC) between November, 2014 and June, 2015. The survey included questions on tobacco regulatory constructs. Three independent and non-overlapping frames were used for sampling, ensuring coverage to approximately 98% of U.S. households. The weighted sample is nationally-representative of 13-17 year olds living in the U.S., with cell or landline access, who could expect to obtain consent from a guardian for a tobacco use phone survey. Both parent/guardian consent and adolescent assent were required for all adolescent participants. The sample resulted in 1,125 interviews and a weighted response rate of 66%, which is comparable to the 2014 NYTS response rate of 73% (1). Participation was voluntary and anonymous. All procedures were approved by the UNC Chapel Hill Institutional Review Board (IRB # 13-2779).

Experimental data

Using a 4×3 experimental design, participants were told “imagine seeing this cigar warning” and then randomly assigned to receive one of twelve conditions. These included three of the six proposed cigar health messages that focused exclusively on cigars and were available at the time of this experiment: cigar smoking can cause lung cancer and heart disease, cigar smoking can cause cancers of the mouth and throat, even if you do not inhale, and cigars are not a safe alternative to cigarettes. Warnings began with one of four randomly assigned sources: FDA Warning, Surgeon General Warning, Centers for Disease Control and Prevention (CDC) Warning, or Warning (no source). This experiment was preceded by questions assessing awareness of the CDC and FDA (but not the Surgeon General) and recall of tobacco prevention campaigns. To control for previous exposure to the source of the warnings and previous health messages about tobacco, these variables were included as covariates, described below.

Believability was assessed with “how believable is this warning?” with responses for “very”, “somewhat”, or “not at all”. We used this item since previous studies have demonstrated the importance of believability in assessing how warning labels are processed by adolescents (13, 14) and demonstrating warning label impact (15, 16). For instance, in an experimental study examining affective and cognitive mediators of cigarette warning label impact, Emery et al. demonstrated that believability of warning label text was associated with decreased desire to smoke, increased feelings toward quitting, and heightened risk perceptions of

cigarettes (17). We used cognitive interviewing to determine if adolescents understood the measure; no problems were reported.

Measures

Survey questions included demographic characteristics (i.e., age, sex, race, and ethnicity). Additional covariates used in our study included self-reported health status, awareness of the FDA and CDC, susceptibility to cigarette use, any tobacco use, and mean exposure to tobacco prevention campaigns.

Self-reported health status—Self-reported health status was measured with the item: “Would you say that in general your health is...”. Responses were dichotomized into “excellent or very good” or “good or fair”.

Awareness of the CDC and FDA—Awareness of the CDC and FDA were measured with two questions: “Have you ever heard of the CDC or the Centers for Disease Control and Prevention?” and “Have you ever heard of the FDA or the Food and Drug Administration?”. Responses included: “yes”, “no”, and “don't know / not sure / maybe”. Missing responses were excluded from analyses.

Susceptibility to cigarette use—Since susceptibility to cigarettes has been shown to predict adolescents at risk for future smoking (18), we included it as a covariate in this study. Two validated susceptibility items were used from Pierce et al.'s original four-item measure of adolescent smoking susceptibility (18). Using two of the four validated items has successfully identified adolescents susceptible to smoking cigarettes (19). The two questions we used were asked of all youth who had not used cigarettes in the past 30 days (regardless if they had ever tried a cigarette before). The questions were: “do you think you will smoke a cigarette in the next year?” and “if one of your best friends were to offer you a cigarette, would you smoke it?”. For both items, response options included: “definitely yes”, “probably yes”, “definitely not”, and “probably not”. If a participant chose anything but “definitely no” in response to any of the two questions, then he or she was classified as susceptible to cigarette smoking. Adolescents who reported using cigarettes in the past 30 days were considered to be susceptible (since they already use cigarettes) and were not asked the two questions, in line with Pierce et al.'s classification of susceptibility (18). Our study therefore labeled adolescents as susceptible to cigarette use if they a) were classified as susceptible according to Pierce et al.'s items or b) reported using cigarettes in the past 30 days.

Any current tobacco use—Participants were classified as any current tobacco product users if in the past 30 days they had used an e-cigarette or other vaping device; a little cigar or cigarillo; tobacco in a hookah; a cigarette; or any other tobacco product, such as chewing tobacco, dip, snus, premium cigars or any other product.

Mean exposure to tobacco prevention campaigns—Mean exposure to tobacco prevention campaigns was measured with 5 items that asked participants about specific FDA and CDC sponsored national tobacco prevention advertisements occurring at the time of the

survey (e.g., have you ever seen or heard an anti-smoking ad where a young man pulls his tooth out with pliers?). All 5 items about specific anti-cigarette smoking advertisements included response options for “yes”, “no”, “don't know / not sure / maybe”. For these analyses, “don't know / not sure / maybe” were coded as “no”. All 5 items were summed to create an overall index score, ranging from 0-5, with higher scores indicating more exposure to tobacco prevention campaigns.

Data analysis

Analyses for this study were conducted with SAS version 9.3 to account for the complex survey design and sampling weights (20). Descriptive analyses and cross-tabulations were used to generate weighted percentages and confidence intervals of independent and dependent variables. Collinearity among the the demographic characteristics and other covariates was low, with variance inflation factor values less than 2 for all predictors.

Since there were three ordered response options to the outcome variable (i.e., very, somewhat, not at all believable), we initially conducted an ordinal logistic regression analysis to assess predictors associated with warning believability. However, since the proportional odds assumption was violated ($X^2 = 45.50$, $DF = 25$, $p=0.007$) and few respondents chose the option “not at all believable” ($n=70$, 6.3%) (21), we conducted analyses utilizing a multivariable logistic regression model, comparing adolescents who reported the warnings to be very believable with adolescents who reported the warnings to be somewhat or not at all believable. We entered all predictors simultaneously into the multivariate logistic regression model to identify variables significantly associated with believability of the warnings.

We also conducted two sets of additional analyses. First, to determine if messages with any source (i.e., Surgeon General, FDA, CDC) were more believable than messages with no source, we conducted a separate multivariable logistic regression model with the four-level source condition dichotomized as any source vs. no source. Additionally, we examined an interaction between susceptibility status and message warning and stratified results from the multivariable logistic regression model by susceptibility status to determine if youth categorized as susceptible to using cigarettes found different messages to be very believable. Results from the logistic regression models include weighted percentages, adjusted odds ratios (AOR) and confidence intervals (CI). For all analyses, statistical significance was set at $p < 0.05$.

Results

A total of 1,125 adolescents (ages 13-17) completed the survey (66% response rate). Only individuals with complete data across all relevant variables were included in analyses. In our final logistic regression model, 64 observations (approximately 5.2% of the sample) were deleted because of missing responses to one or more of the variables used.

Descriptive statistics

Table 1 includes the weighted percentages for all demographic and additional covariates used in our logistic regression model. Participants (aged 13-17 years) were half female

(48.7%); majority White (73.1%) and non-Hispanic (90.2%). Most adolescents reported being in excellent or very good health (80%), and a majority reported awareness of the CDC (57.7%) and FDA (83.7%). 7.5% of adolescents reported current use of any tobacco product and 16.9% were determined to be susceptible to smoking cigarettes. Out of a possible range of 0 to 5, mean exposure to tobacco prevention campaigns was 3.1, which means that on average, youth reported seeing 3 of the 5 national tobacco prevention advertisements assessed.

Weighted logistic regression results

Table 2 includes the weighted logistic regression results. A majority of adolescents reported the warning labels to be very believable (n=695, 60.5%), with fewer adolescents reporting the warning labels to be somewhat believable (n=359, 33.2%) or not at all believable (n=70, 6.3%). More adolescents reported the message, “cigar smoking can cause lung cancer and heart disease” to be very believable (76.7%), compared to the message, “cigar smoking can cause cancers of the mouth and throat, even if you do not inhale” (53.4%), and the message, “cigars are not a safe alternative to cigarettes” (49.8%). Weighted logistic regression results confirmed that adolescents were significantly less likely to report the last two messages to be very believable compared to the first (AOR: 0.36; 95% CI: 0.25, 0.51 and AOR: 0.34; 95% CI: 0.24, 0.48, respectively). The source for the warning was not statistically significantly related to believability of the warning labels. When source was collapsed into categories for any source (i.e., CDC, Surgeon General, and FDA), vs. no source, no statistically significant effects on believability occurred (AOR: 1.03; 95% CI: 0.74, 1.44; results not shown).

The cigar warnings were widely believable for different adolescent sub-populations. Overall, there was little effect of demographic or additional covariates altering cigar warning believability. Specifically, race, ethnicity, age, sex, awareness of the FDA and CDC, health status and current any tobacco use were not significantly associated with believability of the cigar warnings. However, adolescents susceptible to using cigarettes were significantly less likely to report the messages to be very believable compared to adolescents not susceptible to using cigarettes (AOR: 0.57, 95% CI: 0.38, 0.86).

When we further analyzed the interaction between susceptibility status and message warning type (p=0.01), we found several differences between susceptible youth and non-susceptible youth. Compared to non-susceptible youth, significantly fewer susceptible youth reported the messages, “cigar smoking can cause lung cancer and heart disease” (AOR: 0.31, 95% CI: 0.16, 0.63; results not shown) and “cigar smoking can cause cancers of the mouth and throat, even if you do not inhale” (AOR: 0.45, 95% CI: 0.24, 0.83; results not shown) to be very believable. Moreover, similar proportions of susceptible and non-susceptible youth reported the message, “cigars are not a safe alternative to cigarettes” to be very believable (55.7% vs. 48.7%) and the difference in odds of susceptible or non-susceptible youth reporting this message to be very believable was not significant (AOR: 1.16, 95% CI: 0.62, 2.17; results not shown).

In a separate set of analyses, we also stratified results by susceptibility status (Table 3). These results further confirmed differences in message believability between non-susceptible youth and susceptible youth. Specifically, for susceptible youth, message type

was *not* significantly associated with message believability and similar proportions of susceptible adolescents reported the three messages to be very believable.

Discussion

In this study, we found slightly more than 60% of adolescents in a U.S. national survey reported three different cigar warnings to be very believable. Messages emphasizing lung cancer and heart disease as risks caused by cigars were reported to be the most believable, compared to messages about mouth and throat cancer (regardless of inhalation) and the safety of cigars in comparison to cigarettes. There was no effect by source and little to no effect of demographic variables, indicating widespread believability of these messages, particularly among non-susceptible youth. Adolescents susceptible to using cigarettes, however, were less likely to report the warnings to be very believable.

This is the first study examining believability of warning labels for cigars among youth. All three of the cigar warnings we examined will be implemented in 2016 (9). We found one message “cigar smoking can cause lung cancer and heart disease” to be substantially more believable than the other two messages regarding mouth and throat cancer regardless of inhalation and the safety of cigars in comparison to cigarettes. There are several reasons why the latter two messages may be perceived as less believable. First, previous research has shown that some youth and young adults perceive cigars to be less harmful than cigarettes because of beliefs that they can modify cigars to make them safer (6), they can choose not to inhale, or they can decide to not inhale as much (22). Moreover, it is likely that only providing information on cigar warning that counters these misconceptions may not be enough to change how youth view these messages. In other words, more targeted messages or campaigns *explaining* the links between mouth and throat cancer (regardless of inhalation) and why cigars are not a safe alternative to cigarettes may be needed (17).

Mean exposure to the tobacco prevention campaigns was not significantly associated with believability of the cigar warnings. Since all of the tobacco prevention advertisements were about cigarettes, it is possible that with more targeted campaigns for cigars, believability of cigar warning labels could increase. Maryland was one of the first states to implement a campaign addressing youth cigar use through billboards, transit media, radio / print ads, and social media (23). While Maryland's “cigar trap” campaign has not been evaluated, it is possible that such a campaign could positively influence believability of cigar warning labels. If proven effective, similar campaigns could be considered for dissemination across the U.S.

Previous research has found warning label believability to be lower among adolescents who currently use cigarettes (14). In our study, we found that while current tobacco users of any product were not less likely to report the messages as less believable, youth susceptible to using cigarettes were less likely to report warnings as very believable. However, for one message specifically, “cigars are not a safe alternative to cigarettes”, similar proportions of susceptible and non-susceptible youth reported the message to be very believable. There is some evidence that adolescents may be susceptible to smoking because of their strong receptivity to pro-tobacco media (24, 25). This could explain why they would be less likely

to believe the warnings in this current study. However, other reasons could also explain why youth susceptible to using cigarettes reported the warning labels to be less believable, including family, peer, school, community, and policy level influences. New research is needed on how cigar warnings can maximally reach and affect susceptible adolescents.

Few studies have investigated the impact of source credibility (i.e., the perceived credibility or competence of the organization delivering the message) in tobacco communication campaigns (26). Previous research suggests that messages with a credible source are more likely to be positively received and reported as believable than messages without a credible source (27, 28). Our study found limited evidence to suggest that source affects believability of cigar warning labels among youth. It is possible that telling adolescents the source of the warning would produce different results than having adolescents see the source of the warning as in logo-form or text. Moreover, it is unclear if source would significantly affect believability if a credible source was compared to a non-credible source (e.g., tobacco industry) rather than the absence of a source, as was done in this study. More formal testing in tobacco communication campaigns regarding the effects of source credibility on knowledge, attitudes, and beliefs of warnings is warranted.

Lastly, findings from this study have implications for international settings as well as the U.S. For instance, in countries, such as Australia, where cigar warning labels include text warnings along with pictorial graphic warnings (29, 30), believability of warning labels would likely be enhanced, since pictorial warning labels are significantly more likely to engage consumers and increase information processing (10). Increased international research on how to improve cigar warning label effectiveness on adolescents is needed, particularly with regards to how cigar warning message and images interact to influence warning label believability and effectiveness.

Limitations

Several limitations are noted. First, as this was a phone survey, adolescents' reports of believability of the warning labels were based on hearing rather than seeing the warning labels. It is possible that believability would be enhanced when warning labels are seen rather than heard since previous research has found written presentations of messages to be more effective than audio only-presentation of the same information (31). Second, it is likely that some of the participants may have had prior exposure to cigar warning labels, and it is unclear what impact this could have had on believability. Lastly, there was no measure to assess awareness of the Surgeon General (as there was for FDA and CDC), and we were unable to assess additional covariates of interest, such as parent smoking status, peer smoking status, and opinions about the harms of cigars. Despite these limitations, our study relied on experimental data from a large, national sample of adolescents, 13-17 years old living in the U.S., and it is the first data on cigar warning perceptions among adolescents.

Conclusions

Our study demonstrated that several cigar warning labels are very believable, and that believability relates to adolescent susceptibility to cigarette use. Public health interventions and campaigns that target cigars may be useful in increasing believability of cigar warning

labels, dispelling common myths about the safety of cigars, and decreasing frequency and duration of cigar use among youth. Future research should examine how believability of text and text combined with pictorial cigar warning labels may be associated with tobacco-related outcomes, such as experimentation and quit intentions.

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Abbreviations

AOR	Adjusted odds ratios
CDC	Centers for Disease Control and Prevention
CRRTC	Center for Regulatory Research on Tobacco Communication
CI	Confidence interval
FTC	Federal Trade Commission
FDA	Food and Drug Administration
IRB	Institutional Review Board

NYTS National Youth Tobacco Survey
U.S. United States

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Implications and Contributions

This study empirically examines the believability of FDA proposed cigar warning labels among adolescents. Results show that while many adolescents find cigar warnings very believable, some messages are more believable than others and that youth susceptible to using tobacco report messages as less believable.

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Table 1
Percentages for demographic and smoking-related variables, $N = 1125$

Variable	<i>n</i>	Weighted % or mean (standard deviation)
Gender		
Female	564	51.34
Male	561	48.66
Age		
13 years	184	17.43
14 years	236	22.01
15 years	246	20.80
16 years	238	20.74
17 years	220	19.03
Race		
White	900	73.06
Black or African American	119	13.05
American Indian or Alaska Native	18	2.10
Asian	22	2.96
Pacific Islander	3	0.45
Other	61	8.39
Ethnicity		
Not Latino	1040	90.17
Latino	84	9.83
Parent Education		
Less than high school	75	6.85
High school graduate	169	13.20
Some college	193	17.51
Associate's degree	115	10.28
Bachelor's degree	338	29.99
Graduate or professional degree	233	22.17
Susceptibility to cigarette use		
Not susceptible	924	83.06
Susceptible	199	16.94
Any tobacco product use		
Not current user	1030	92.54
Current user	93	7.45
Health		
Good or fair	236	21.01
Excellent or very good	889	78.99
Awareness of the CDC		
No	432	42.27
Yes	655	57.73
Awareness of the FDA		

Variable	<i>n</i>	Weighted % or mean (standard deviation)
No	166	16.33
Yes	940	83.67
Mean exposure to tobacco prevention campaigns	1125	3.12 (0.04)

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Table 2
Weighted logistic regression results

Variable	Reported very believable, ^a n (%)	Very believable vs. not at all or somewhat believable AOR (95% CI)
Sex		
Female	339 (57.8)	REF
Male	356 (63.2)	1.17 (0.88, 1.57)
Age	NA (continuous)	0.92 (0.82, 1.04)
Race		
White	567 (62.7)	REF
Black or African American	73 (60.5)	0.99 (0.63, 1.56)
AI or AN	11 (56.7)	0.71 (0.19, 2.65)
Asian	8 (37.7)	0.36 (0.13, 1.00)
Pacific Islander	0 (NA)	NA
Other	435 (54.8)	0.86 (0.45, 1.65)
Ethnicity		
Not Latino	648 (61.3)	REF
Latino	46 (53.2)	0.76 (0.43, 1.36)
Parent Education		
Less than high school	48 (64.5)	REF
High school graduate	102 (60.2)	0.74 (0.37, 1.48)
Some college	118 (63.3)	0.78 (0.39, 1.57)
Associate's degree	79 (66.2)	0.96 (0.44, 2.08)
Bachelor's degree	211 (61.4)	0.71 (0.36, 1.37)
Graduate or professional degree	135 (53.4)	0.56 (0.28, 1.10)
Susceptibility to cigarette use		
Not susceptible	594 (62.8)	REF
Susceptible	101 (50.2)	0.57 (0.38, 0.86) [*]
Any tobacco product use		
Not current user	56 (58.9)	REF
Current user	638 (60.7)	1.36 (0.76, 2.44)
Health		
Good or fair	142 (58.1)	REF
Excellent or very good	553 (61.2)	1.18 (0.82, 1.70)
Awareness of the CDC		
No	290 (58.1)	REF
Yes	408 (61.6)	1.26 (0.91, 1.74)
Awareness of the FDA		
No	89 (54.8)	REF
Yes	593 (61.7)	1.26 (0.81, 1.95)
Mean exposure to tobacco prevention campaigns	NA (continuous)	1.08 (0.97, 1.20)
Message		

Variable	Reported very believable, ^a n (%)	Very believable vs. not at all or somewhat believable AOR (95% CI)
Message 1: "Cigar smoking can cause lung cancer and heart disease."	310 (76.7)	REF
Message 2: "Cigar smoking can cause cancers of the mouth and throat, even if you do not inhale"	183 (53.4)	0.36 (0.25, 0.51) *
Message 3: "Cigars are not a safe alternative to cigarettes."	202 (49.8)	0.34 (0.24, 0.48) *
Source		
Source 1: No source	183 (59.9)	REF
Source 2: Surgeon General Warning	168 (60.5)	1.04 (0.69, 1.56)
Source 3: FDA Warning	165 (57.6)	0.91 (0.61, 1.35)
Source 4: CDC Warning	179 (64.1)	1.18 (0.78, 1.78)

Abbreviations: AOR, Adjusted Odds Ratio; CI, Confidence Interval; NA, Not Applicable; AI, American Indian; AN, Alaska Native

* Statistically significant at the $p < 0.05$ level

^aThe percent who reported "very believable" refers to the pooled messages, rather than a specific message.

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Table 3
Weighted logistic regression results, stratified by susceptibility status

Variable	Non-Susceptible Youth		Susceptible Youth	
	Reported very believable, ^a n (%)	Very believable vs. not at all or somewhat believable AOR (95% CI)	Reported very believable, ^a n (%)	Very believable vs. not at all or somewhat believable AOR (95% CI)
Sex				
Female	297 (59.7)	REF	42 (47.6)	REF
Male	297 (65.8)	1.18 (0.85, 1.63)	59 (52.1)	1.13 (0.58, 2.20)
Age				
		0.91 (0.80, 1.03)		0.99 (0.75, 1.31)
Race				
White	488 (65.3)	REF	79 (49.4)	REF
Black or African American	60 (62.9)	0.94 (0.56, 1.58)	13 (53.7)	1.22 (0.46, 3.28)
AI or AN	8 (54.1)	0.46 (0.11, 1.90)	3 (69.4)	3.22 (0.12, 90.45)
Asian	7 (37.8)	0.34 (0.12, 1.01)	1 (36.3)	0.44 (0.04, 4.66)
Pacific Islander	0	NA	0	NA
Other	30 (56.4)	0.66 (0.32, 1.36)	5 (48.1)	NA
Ethnicity				
Not Latino	552 (62.9)	REF	96 (53.9)	REF
Latino	41 (61.3)	1.04 (0.51, 2.12)	5 (23.2)	0.28 (0.08, 0.93)*
Parent Education				
Less than high school	38 (67.0)	REF	10 (55.3)	REF
High school graduate	82 (60.1)	0.72 (0.33, 1.61)	20 (60.9)	1.17 (0.27, 5.05)
Some college	99 (66.7)	0.92 (0.41, 2.03)	19 (48.7)	0.99 (0.24, 4.01)
Associate's degree	69 (71.6)	1.30 (0.52, 3.23)	10 (41.6)	0.62 (0.13, 2.95)
Bachelor's degree	186 (64.0)	0.79 (0.36, 1.70)	25 (48.4)	0.90 (0.22, 3.65)
Graduate / professional degree	118 (54.4)	0.58 (0.26, 1.27)	17 (48.3)	1.17 (0.26, 5.24)
Any tobacco product use				
Not current user	575 (62.7)	REF	63 (46.8)	REF
Current user	19 (65.2)	0.84 (0.34, 2.11)	37 (57.1)	1.57 (0.68, 3.61)
Health				
Good or fair	115 (62.7)	REF	27 (44.3)	REF
Excellent or very good	479 (62.8)	1.05 (0.69, 1.60)	74 (52.5)	1.91 (0.86, 4.24)
Awareness of the CDC				
Yes	341 (64.0)	1.19 (0.82, 1.72)	67 (52.8)	1.21 (0.59, 2.49)
No	228 (60.1)	REF	32 (46.2)	REF
Awareness of the FDA				
Yes	502 (64.5)	1.39 (0.87, 2.23)	91 (49.6)	0.54 (0.16, 1.86)
No	79 (54.7)	REF	10 (55.0)	REF
Mean exposure to tobacco prevention campaigns	NA (continuous)	1.07 (0.95, 1.21)	NA (continuous)	1.23 (0.93, 1.62)
Message				

Variable	Non-Susceptible Youth		Susceptible Youth	
	Reported very believable, ^a n (%)	Very believable vs. not at all or somewhat believable AOR (95% CI)	Reported very believable, ^a n (%)	Very believable vs. not at all or somewhat believable AOR (95% CI)
Message 1: "Cigar smoking can cause lung cancer and heart disease."	277 (79.6)	REF	33 (58.3)	REF
Message 2: "Cigar smoking can cause cancers of the mouth and throat, even if you do not inhale"	156 (57.3)	0.34 (0.22, 0.51)*	27 (38.1)	0.51 (0.22, 1.16)
Message 3: "Cigars are not a safe alternative to cigarettes."	161 (48.7)	0.26 (0.18, 0.39)*	41 (55.7)	0.95 (0.40, 2.24)
Source				
Source 1: No source	155 (62.3)	REF	28 (49.0)	REF
Source 2: Surgeon General Warning	148 (62.3)	1.06 (0.67, 1.67)	20 (44.2)	0.65 (0.26, 1.62)
Source 3: FDA Warning	140 (60.4)	0.98 (0.62, 1.53)	25 (44.7)	0.77 (0.30, 2.00)
Source 4: CDC Warning	151 (64.2)	1.07 (0.68, 1.70)	28 (64.4)	1.87 (0.72, 4.84)

Abbreviations: AOR, Adjusted Odds Ratio; CI, Confidence Interval; NA, Not Applicable; AI, American Indian; AN, Alaska Native

* Statistically significant at the p<0.05 level

^aThe percent who reported "very believable" refers to the pooled messages, rather than a specific message.