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Testing anti-smoking messages for Air Force trainees

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Abstract

Introduction—Young adults in the military are aggressively targeted by tobacco companies and are at high risk of tobacco use. Existing anti-smoking advertisements developed for the general

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LP, RCK, PML, SAG, MVM, and GWT planned the study. BDL led the data collection. ZB conducted data analysis. ML contributed to data analysis, interpretation, and writing. LP wrote the initial draft and submitted the manuscript. All authors contributed to the writing and revision and approved the final version of the manuscript.

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population might be effective in educating young adults in the military. This study evaluated the effects of different themes of existing anti-smoking advertisements on perceived harm and intentions to use cigarettes and other tobacco products among Air Force trainees.

Methods—In a pretest-posttest experiment, 782 Airmen were randomized to view anti-smoking advertisements in one of six conditions: anti-industry, health effects+anti-industry, sexual health, secondhand smoke, environment+anti-industry, or control. We assessed the effect of different conditions on changes in perceived harm and intentions to use cigarettes, electronic cigarettes (e-cigarettes), smokeless tobacco, hookah and cigarillos from pretest to posttest with multivariable linear regression models (perceived harm) and zero-inflated Poisson regression model (intentions).

Results—Anti-smoking advertisements increased perceived harm of various tobacco products and reduced intentions to use. Advertisements featuring negative effects of tobacco on health and sexual performance coupled with revealing tobacco industry manipulations had the most consistent pattern of effects on perceived harm and intentions.

Conclusion—Anti-smoking advertisements produced for the general public might also be effective with a young adult military population and could have spillover effects on perceptions of harm and intentions to use other tobacco products besides cigarettes. Existing anti-smoking advertising may be a cost-effective tool to educate young adults in the military.

Keywords

young adults; military; alternative tobacco products; prevention; health communication; anti-smoking advertisements

INTRODUCTION

Young adults (aged 18–25 years) are a high risk population for tobacco use. In 2013, they had higher past month tobacco use (37%) than youth aged 12–17 years (7.8%) or those 26 years old and older (25.7%).[1] Tobacco companies specifically target this transitional period by positioning tobacco products as accessories to the new life roles and as stress relief for the pressures of new responsibilities.[2]

Young adults comprise the largest group among U.S. military personnel.[3] Tobacco companies have been aggressively targeting military service members[4 5] since at least World War I, providing free tobacco samples in combat rations during World Wars I and II, the Korean War, the Vietnam War,[6 7] and Operation Desert Storm.[8] Due to ongoing tobacco industry lobbying, as of 2015 tobacco was continuing to be sold in military stores at deep discounts,[8–10] despite the U.S. Department of Defense policy that all tobacco products be within 5% of the going market rate.[11] Tobacco products are heavily advertised through in-store merchandising and promotions,[8] print ads historically placed in publications targeted to the military,[12–14] and other creative ways, such as the 1990 Marlboro ‘voice card’[4 15] recording a personal holiday greeting to soldiers stationed in Saudi Arabia.

Aggressive promotions contribute to smoking rates in the military that are consistently 10% higher than the general population.[16] Among branches of service, the Air Force has the

lowest rates of cigarette (16.7%), cigar (18.0%), and smokeless tobacco use (13.3%);[17] even so, among a sample of Air Force trainees, known as “Airmen” regardless of gender or rank, over one quarter (26.7%) reported using tobacco prior to enlistment in 2014.[18] Among this young group of trainees, cigarettes were the most prevalent tobacco product (11.2%) followed by hookah (10.4%), cigarillos (8.7%), smokeless tobacco (8.6%), and electronic cigarettes (e-cigarettes) (6%).[18]

Anti-tobacco media campaigns are effective counters to the tobacco industry’s marketing.[19] However, most anti-tobacco media campaigns focus on youth or the general population and research directly evaluating effectiveness of anti-tobacco media campaigns on young adults in general and the military population in particular is scarce.[13 14 20] There are content analyses studies that found that military installation newspapers devoted the least space to educating about tobacco use compared to other health topics,[13 14] but no studies evaluated the effect of these messages.

Another gap in research on the effects of anti-smoking messages is the lack of information on whether these messages have spillover effects on perceptions of other tobacco products. Most media campaigns focused on cigarette smoking, with a few campaigns including messages about smokeless tobacco, [19] but to our knowledge, effects of anti-smoking messages on perceptions and use of other tobacco products have not been examined. However, declining smoking rates have been accompanied by steady or increasing rates of use of other tobacco products, such as smokeless tobacco, e-cigarettes, hookah, and cigarillos among youth and young adults.[21–24]

Using existing anti-smoking campaigns to educate military personnel may be a cost effective approach to tobacco use prevention. We evaluated responses to existing anti-smoking advertisements with different themes (anti-industry, health effects+anti-industry, sexual health, secondhand smoke, and environment+anti-industry) on perceptions of harm of cigarettes and other tobacco products and intentions to use tobacco products in the future among Air Force personnel.

METHODS

Materials

We used existing print and video anti-tobacco advertisements developed by the California Department of Public Health Tobacco Control Program and Rescue Social Change Group (Figure 1 and Appendix 1 in the Online Only Supplement). All of these ads have undergone rigorous qualitative and quantitative testing by the respective agency. The California’s campaign [25 26] has used messages exposing tobacco industry as a manipulative threat to public health in combination with other campaign messages such as the effects of smoking and secondhand smoke. This combination of themes in the existing advertisements made it more difficult to classify messages into mutually exclusive categories. However, there have been calls to avoid categorizing anti-tobacco messages along narrow lines that do not fully capture the blend of thematic approaches used in real-life campaigns.[27] Therefore, the advertisements were categorized into five conditions based on the themes used by the

California Tobacco Control Program with anti-industry messaging featured in three of them (anti-industry, health effects+anti-industry, and environment+anti-industry):

1. Anti-industry: highlight tobacco industry's use of deception and unethical tactics in order to get rich
2. Health effects+anti-industry: focus on negative health effects of tobacco use. (Advertisements in this category also mentioned tobacco industry as the knowing propagator of the ill effects.)
3. Sexual health effects: portray smoking as a cause of male impotence
4. Secondhand smoke: emphasize the negative health effects of secondhand smoke
5. Environment+anti-industry: present the negative effects of the tobacco industry on the environment and the cigarette-caused pollution.

Each condition contained four advertisements with at least one print and one video, but this ratio varied by condition. All advertisements explicitly focused on cigarettes or on tobacco in general; none of the advertisements mentioned or featured any other tobacco products. Participants in the control condition saw four advertisements for bottled water.

Participants and Procedure

All active duty Air Force personnel who entered Air Force Technical Training at Joint Base San Antonio-Lackland Air Force Base (AFB)/Ft. Sam Houston in September and October 2014 were offered study participation. Data were collected during orientation week of Technical Training (Week 0). Study details, as well as the potential risks and benefits of participation, were described to all Airmen; they were given opportunity to ask questions and decline participation. Consent rate was 98% resulting in 782 participants. All study procedures were reviewed and approved as exempt by the Wilford Hall Ambulatory Surgical Center Institutional Review Board (IRB). No names or other personally identifying information were collected in the study, guaranteeing anonymity.

Four Technical Training squadrons at Joint Base San Antonio-Lackland AFB/Ft. Sam Houston were divided into 19 briefing groups of 30–50 participants, which were randomly assigned to one of five intervention conditions or a control condition (Figure 2). All intervention conditions contained Airmen from at least three of the four training squadrons and the control condition covered two out of four squadrons.

Each briefing group was seated in a classroom where they completed a pre-test questionnaire, watched four ads on a 50-inch flat screen television, completed questions after each ad, and then completed a post-test questionnaire. Participation took 45 minutes. In an actual intervention with a military populations it is likely that ads will be shown under similar conditions, for example, at the beginning or ending of briefings.

Measures

The main outcomes were changes from pretest to posttest in perceived harm and intentions to use for each of the following tobacco products: cigarettes, e-cigarettes, smokeless tobacco (chewing tobacco, snuff), hookah, and cigarillos or little cigars. One question measured

perceived harm, “Please rate how harmful you think each of these products are?” with answers on a 9-point Likert scale (1=“Not at all harmful” to 9=“Extremely harmful”). We also asked about perceived harm of secondhand smoke. Intentions to use were measured with two questions, “What is the likelihood that you will use these products sometime over the next 12 months?” and “If your friend handed you one of these products when you’re first allowed to use tobacco (2.5 weeks into Technical Training), what is the chance you would use it?” with answers on an 11-point scale (“0%” to “100%” chance of use in 10% increments). Perceived harm and intentions to use were measured twice with the same questions before and after exposure to all the advertisements because we wanted to determine the amount of change in the dependent variables attributable to different themes and relative to the control group, for which the pre-test was necessary.[28] Questions were asked about each tobacco product separately.

Secondary outcomes were evaluations of individual advertisements which are reported in the online supplement (Appendix 2, Supplement Table 1 and Supplement Table 2).

We asked participants if they have ever used tobacco cigarettes, e-cigarettes, smokeless tobacco, hookah, and cigarillos. Current use of tobacco was not measured because tobacco abstinence is strictly enforced during the 8.5 weeks of Basic Military Training that preceded the data collection. We also measured demographics (gender, age, ethnicity, race).

Data Analysis

Data were examined for distributional normality prior to any analyses, and appropriate methods described below were applied to normal and skewed outcomes. Randomization validity was assessed by comparing conditions on demographic characteristics and ever tobacco product use at baseline, using a chi-square test, and multivariable analyses described below controlled for any significant differences found.

Effect of different conditions on changes in perceived harm of tobacco products from pretest to posttest was assessed with multivariable linear ANCOVA regression models that controlled for pretest perceived harm as well as gender, race, ethnicity, and ever use of a product being modeled (e.g., when examining perceived harm of hookah we controlled for ever use of hookah). Change in percent of “Don’t Know” responses for perceived harm from pretest to posttest was assessed using exact McNemar’s test for paired proportions, overall and by condition.

Intentions of future use outcome was zero-inflated (skewed). We compared zero-inflated negative binomial model with zero-inflated Poisson regression model. Findings were similar due to low overdispersion parameter, therefore results that are presented are based on zero-inflated Poisson regression model. We applied zero-inflated Poisson regression model to identify determinants of having some intentions to use tobacco products and change in these intentions. In zero-inflated Poisson regression, two models are estimated. First, the Poisson regression portion models change in intentions among participants who have some intentions. Second, the inflation component uses a logit model to estimate the odds of having zero intentions versus having some intentions. In this model we controlled for the baseline intentions to use along with the same covariates as in the harm model.

Effect of themes on perceived harm and intentions to use relative to control group were considered significant at the alpha level of 0.01, as an adjustment for five comparisons within each outcome, while other results were considered significant at the alpha level of 0.05. For pairwise comparisons between themes regarding all outcomes we applied Bonferroni corrections. All of the analyses were performed with SASv9.4.

RESULTS

The 782 consenting participants were randomized to six conditions, 197 (25%) to anti-industry, 138 (18%) to health effects+anti-industry, 110 (14%) to sexual health, 93 (12%) to secondhand smoke, 127 (16%) to environment+anti-industry, and 117 (15%) to the control condition (Figure 2). Most of the participants were male (72%) and White (69%). Those of Hispanic decent comprised 17%, African American (15%) and Other Race (all other races combined, 16%).

Ever use of cigarettes was reported by 39% of participants, smokeless tobacco by 27%, e-cigarettes by 39%, hookah by 48%, and cigarillos by 47%. Ever use of more than one tobacco product was reported by 53% of participants. There were significant differences between conditions for gender and smokeless tobacco use but no differences for race, ethnicity, or use of other tobacco products. Percent of males ranged from 57 to 86% between conditions, and males have higher rates of smokeless tobacco use (34.4% vs. 7.7% for females; $p<0.001$). We controlled for gender differences in our multivariable models.

Advertisements that were shown had been seen by less than 10% of participating Airmen, with the exception of “Icons” advertisement within the health effects condition that was seen at least few or more times by nearly 50% of respondents.

Perceived harm of tobacco products

At pretest, participants rated cigarettes as the most harmful (8.4 on a 1 to 9-point scale), followed by secondhand smoke (7.7), smokeless tobacco (7.5), cigarillos (7.5), hookah (5.7) and e-cigarettes (5.2). Percent of “Don’t Know” responses at baseline was highest for hookah and e-cigarettes (13% and 9.3% respectively), while for all other products including secondhand smoke it was under 4%, with cigarettes being lowest at 0.5%. We did not detect any significant changes in the proportion of “Don’t Know” responses from pretest to posttest (exact McNemar’s test for paired proportions, data not shown).

Perceived harm of cigarettes increased in the health effects+anti-industry condition compared to the control condition (Table 1). Perceived harm of smokeless tobacco increased in the health effects+anti-industry and the environment+anti-industry condition. Perceived harm of cigarillos increased in the sexual health condition. Perceived harm of secondhand smoke increased in the secondhand smoke condition. Perceived harm of e-cigarettes and hookah did not change significantly in any condition.

Intentions to use tobacco products in the next 12 months

At baseline, intentions to use were highest for hookah and e-cigarettes (17% and 14% chance of using respectively), followed by cigarillos (12%), smokeless tobacco (11%), and

cigarettes (8% chance). Proportion of participants with zero intentions ranged from 64% (for hookah) to 84% (for cigarettes). All conditions except secondhand smoke were associated with significant decrease in intent to use cigarettes and e-cigarettes relative to the control (Table 2). Sexual health condition decreased the intent to use hookah, while both sexual health and secondhand smoke conditions decreased the intent to use cigarillos.

Compared to participants who had some intentions to use tobacco products in the next 12 months, participants who had zero intentions were significantly less likely to have ever used the corresponding tobacco product, less likely to be male (for e-cigarettes, smokeless tobacco, and cigarillos), more likely to be African American (smokeless and cigarillos), and less likely to be Other race (hookah) (Table 2).

Intentions to use tobacco products if offered by a friend

At baseline, mean chance of using tobacco products if offered by a friend was highest for hookah (21% chance), followed by e-cigarettes (17% chance), cigarillos (14% chance), smokeless tobacco (10% chance), and cigarettes (8% chance). Proportion of participants with zero intentions ranged from 64% (for hookah) to 85% (for cigarettes). Health effects advertisements decreased intentions to use cigarettes and hookah if offered by a friend compared to control (Table 3). Secondhand smoke theme decreased the intentions to use hookah. The health effects theme increased intentions to try cigarillos if offered by a friend. No significant changes were observed for intentions to use e-cigarettes or smokeless tobacco if offered by a friend.

Compared to participants who had some intentions to use tobacco products if offered by a friend, participants who had zero intentions were less likely to have ever used the corresponding tobacco product, less likely to be male (e-cigarettes, smokeless and cigarillos), and more likely to be African American (cigarillos) (Table 3).

DISCUSSION

To our knowledge, this is the first study of effects of anti-smoking advertisements on perceptions and intentions to use different tobacco products among young adult military personnel. Anti-smoking advertisements produced for the general public by the California Tobacco Control Program and Rescue Social Change Group increased perceived harm of smoking and lowered Airmen’s intentions to smoke in the future. Advertisements featuring negative effects of tobacco on health and sexual performance had the largest effects on perceived harm and intentions to use across most tobacco products. It is possible that because health effects and sexual health themes also contained anti-industry sentiments (and were, essentially, two-theme messages) that they were particularly effective. Past studies found benefits of using health effects and anti-industry themes concurrently,[27] and our study adds evidence to support this finding.

Advertisements discouraging smoking had some spillover effects on perceptions and intentions regarding other tobacco products. After seeing the anti-smoking advertisements, perceived harm of smokeless tobacco and cigarillos also increased. Likewise, some anti-

smoking advertisements decreased intentions to use other products, specifically e-cigarettes, hookah, and cigarillos.

E-cigarettes and hookah are gaining popularity in military population,[29] perhaps because of a lack of knowledge and information about danger from these products which is reflected through the reported perceptions of harm (or lack thereof). E-cigarettes are widely advertised as a safer alternative to tobacco [30] and are perceived as relatively harmless.[31] Anti-smoking advertisements that do not mention e-cigarettes might not have an effect on perceived harm of e-cigarettes. However, advertisements focusing on deceptive practices and harms inflicted by the tobacco industry and its products reduced intentions to use e-cigarettes in the next 12 months.

Intentions to use tobacco products were measured with two different questions: intentions to use in the next 12 months and intentions to use if offered by a friend. The two different measures for intentions reflect the differences between two immediate antecedents for risk behavior: behavioral intentions (a reasoned approach) and behavioral willingness (a social reaction approach), or the difference between deliberate and reactive behavior.[32] At pretest, participants had significantly higher intentions to use e-cigarettes, hookah, and cigarillos if offered by a friend (behavioral willingness) as compared to intentions to use in the next 12 months (behavioral intentions), similar to findings in other studies.[32] Anti-smoking advertisements had different effects on these measures. Intentions to use in the next 12 months decreased in four conditions for e-cigarettes, in two conditions for cigarillos, and in one condition for hookah. However, intentions to use if offered by a friend did not change for e-cigarettes, decreased in two conditions for hookah, and actually increased in one condition for cigarillos. It is likely that increases in perceived harm affect the reasoning behind behavioral intentions, and that is why we saw more effects of the ads on both perceived harm and intentions to use products in the next 6 months. This finding highlights the need to measure both behavioral intentions and willingness to use tobacco products. Intentions to use if offered by a friend are more situation-specific and might be more resistant to change than the general intentions. Some research shows that behavioral willingness is a better predictor of actual behavior for younger adolescents and as they age, behavioral intentions become a stronger predictor.[33 34] Future studies should examine whether this is also the case with the young adults in the military.

We evaluated changes in behavioral intentions and perceived harm of tobacco products based on exposure to four ads produced by two different agencies and using different media format (video and print) and different creative executions. While we cannot pinpoint the effects of individual ads, our design has higher external validity as campaigns in real world frequently utilize a variety of media to reach their audiences. A military anti-tobacco campaign, for example, could show videos to trainees as part of the classroom learning and display print posters in the halls and recreational rooms. Furthermore, our findings on the effects of ads on intentions and perceived harm of tobacco products coupled with ratings of perceived effectiveness of individual ads could guide agencies in creating their own campaigns. For example, if an agency wanted to prevent or reduce the use of hookah by the military trainees, they should consider using advertisements portraying effects of tobacco on sexual health (they decreased intentions to use hookah, Tables 3). Based on the results in the

online supplement, among the four sexual health ads, participants rated the video “Gala event” highest on various effectiveness measures. Thus, agencies could consider using this video (by requesting the use from the CDPH) or a similar video (created themselves).

Anti-tobacco messages produced by the state and local health agencies could be a cost-efficient addition to existing military efforts to curb tobacco, such as the “Quit Tobacco – Make Everyone Proud” (https://ucanquit2.org/) educational campaign. Advertisements developed for the general population often target some specific at-risk groups, such as advertisements focused on sexual health targeting young men. Because these at-risk groups might also be represented in the military, these “general audience” advertisements might have effects on at least short-term perceptions of harm and intentions to use tobacco products in the military, and future studies should evaluate their effects on tobacco use behavior.

Limitations of this study include participants coming from only two of the five major training Air Force facilities, which may limit the generalizability to all Air Force trainees or other service branches (Navy, Army, Marines). However, our sample represented about one third of all Airmen entering technical training in the Air Force for this period, recruited from around the US. Another limitation is the use of self-report measures, but self-report is commonly used in studies of message effectiveness.[19] Our outcome measures were limited to perceived harm and intentions to use various tobacco products. Although both perceived harm[35–37] and behavioral intentions[38] are frequently used as predictors of and proxies for actual behavior, future studies should measure long-term effects of media messages on behavior. Due to the practicality as well as constraints of intervention delivery in the military setting (group delivery by squadron at set times), group sample sizes were uneven and they differed on gender distribution, but not other demographic characteristics. While this can potentially impact the outcome we controlled for all demographics in our models to minimize that. The ratio of print to video ads varied by condition, and video messages were perceived to be more powerful than print ads. However, our findings could not be explained by the difference in this ratio. For example, the anti-industry condition with three videos produced fewer significant effects than sexual health condition with only one video.

Similar to the U.S. young adult civilian population, rates of tobacco use in the Air Force are high. Furthermore, the Air Force is the second largest of the service branches (after the Army) in terms of total active duty personnel. Airmen were intervened on at a point early in their military career, which in our case, is deliberate. It is the one time that active duty personnel are both alcohol and tobacco free. Over 100,000 young adults at high risk for tobacco use are tobacco free in the military every year[39] and we would posit this is an ideal “teachable moment” to intervene. Still, future studies should replicate and extend our findings in samples of military personnel who have been in service for a longer period of time and in other service branches.

In conclusion, anti-smoking advertisements produced for general public also were associated with changes in perceptions of harm and intentions to use tobacco products in a military population. Future communication campaigns aimed at decreasing tobacco use in the

military should consider using messages featuring negative effects tobacco has on health in general and on sexual health in combination with portraying deception and manipulation by the tobacco industry, and employing video as opposed to print advertisements.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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What this paper adds

- Young adults in general and military personnel in particular are heavily targeted by tobacco companies and subsequently use tobacco at higher rates than the general population.
- Anti-tobacco media campaigns have proven effective for counteracting aggressive tobacco marketing in the general population. These antismoking advertisements increase perceptions of harm and reduce intentions to use cigarettes and other tobacco products among Air Force trainees.
- Advertising using themes of negative effects of tobacco on health and sexual performance combined with anti-industry sentiments were particularly effective at increasing perceived harm and reducing intents to use various tobacco products.

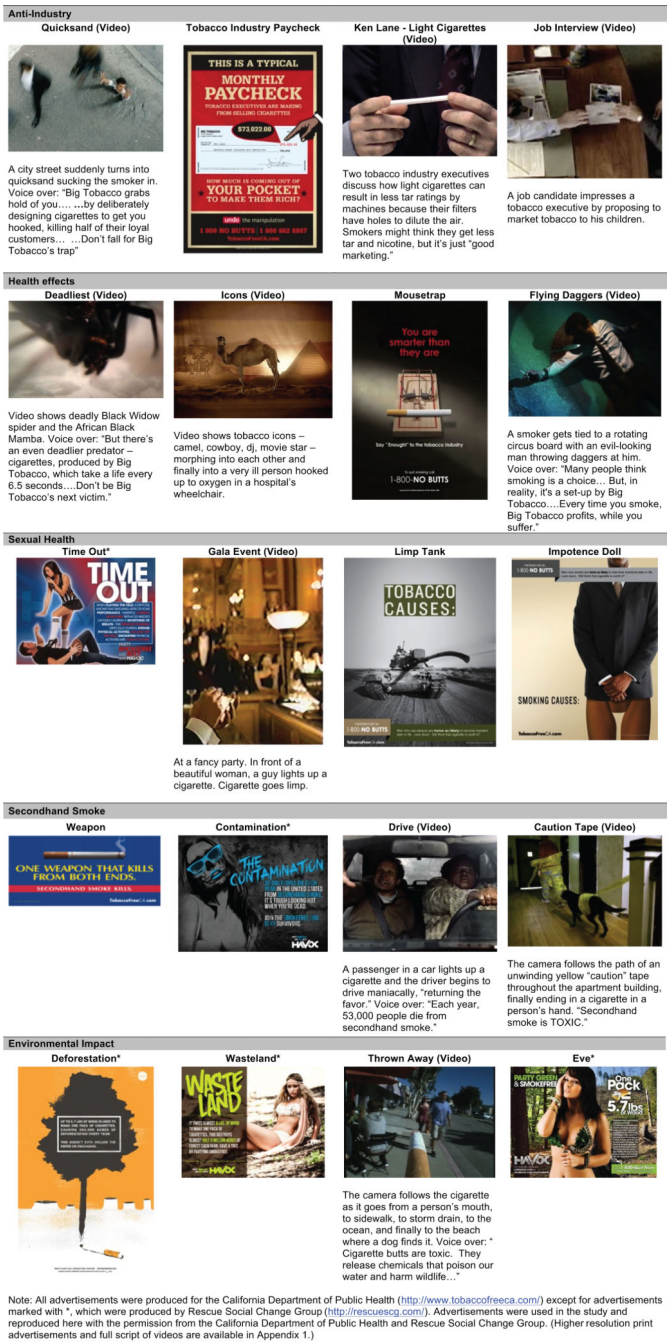

Figure 1.
Anti-tobacco advertisements used in the study

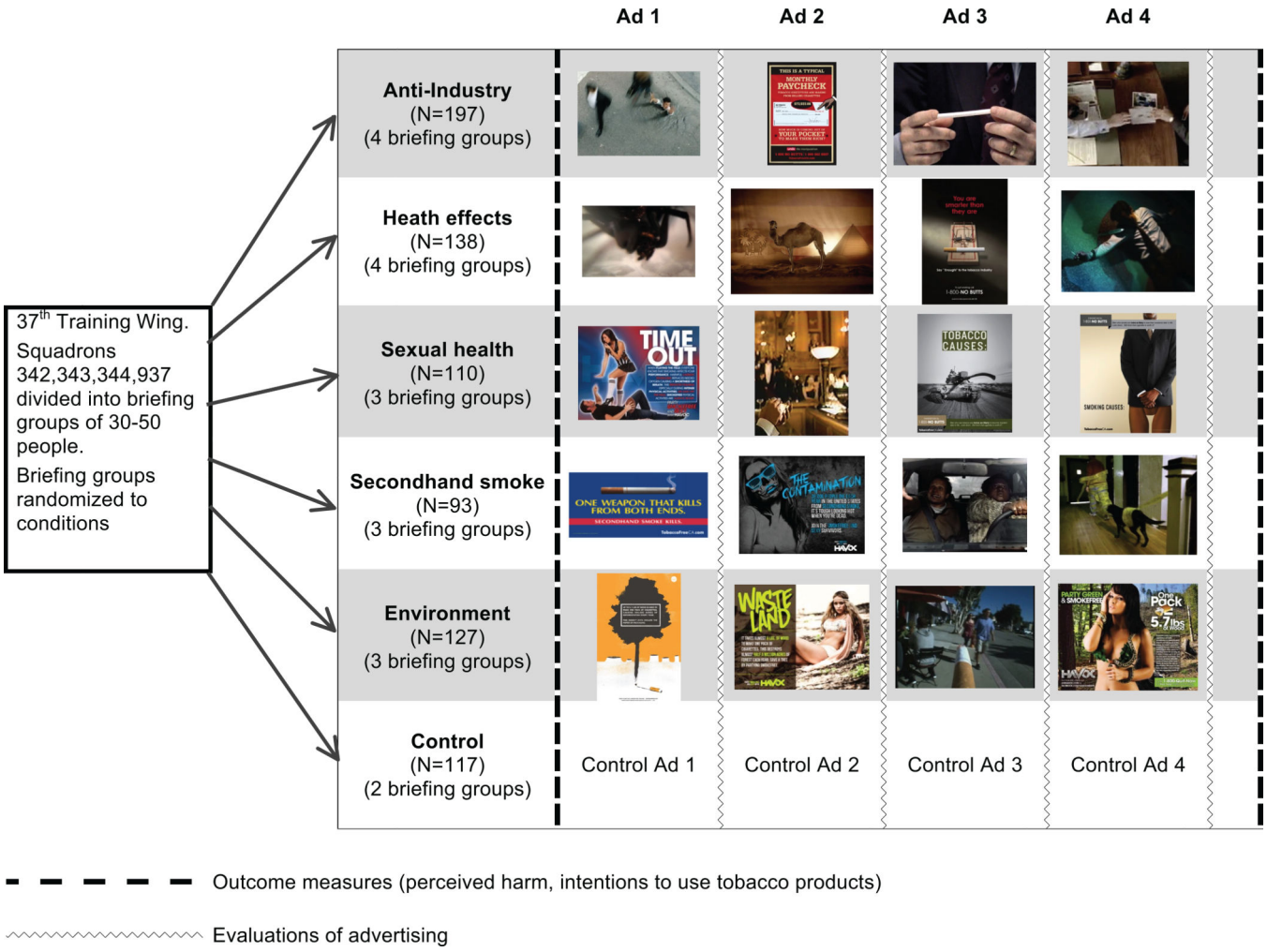

Figure 2.

Experimental design and procedure. Participants were randomized to one of five anti-smoking conditions or a control condition. In each condition, participants saw four advertisements. Participants answered questions about perceived harm and intentions to use tobacco products before and after seeing all the advertisements (pretest and posttest). Participants answered questions about perceived advertisement effectiveness after seeing each advertisement.

Table 1

Posttest differences in perceived harm of tobacco products between each anti-tobacco condition and the control condition for various tobacco products

Theme	Cigarettes	E-cigarettes	Smokeless tobacco	Hookah	Cigarillos	Secondhand smoke
Anti-industry	0.11 (0.08)	0.04 (0.17)	0.13 (0.12)	−0.21 (0.17)	0.02 (0.11)	−0.08 (0.1)
Heath effects+ anti-industry	**0.25 (0.08)** **	0.02 (0.19)	**0.44 (0.13)** ***	0.01 (0.18)	0.21 (0.12)	0.05 (0.11)
Sexual health	0.04 (0.09)	0.24 (0.19)	0.11 (0.13)	0.38 (0.19)	**0.32 (0.12)** **	0.04 (0.11)
Secondhand smoke	0.08 (0.09)	−0.14 (0.2)	0.13 (0.14)	0.03 (0.19)	0.12 (0.13)	**0.51 (0.12)** ***
Environment+ anti-industry	0.20 (0.09)	−0.09 (0.2)	**0.36 (0.14)** **	−0.04 (0.19)	0.26 (0.12)	0.08 (0.11)
Control	Reference	Reference	Reference	Reference	Reference	Reference

Responses on a scale from 1="Not at all harmful" to 9="Extremely harmful". Positive numbers indicate greater perceived harm. Numbers in parenthesis are standard errors.

** p<0.01,

*** p<0.001

Multivariable linear ANCOVA regression models adjusted for baseline perceived harm, gender, race, ethnicity, and ever use of corresponding tobacco product.

Significant pairwise comparisons (z-tests) with Bonferroni corrections: For hookah, sexual health had stronger effect than anti-industry theme (p<0.01). For secondhand smoke, secondhand smoke theme had stronger effect than all other themes (all p<0.01).

Table 2

Zero-inflated Poisson regression modeling determinants of having zero intentions to use tobacco products and change in intentions to use tobacco products in the next 12 months

Odds of having no intention to use tobacco products (Model of Excess Zeros)					
	Cigarettes OR (95% CI)	**E-cigarettes OR (95% CI)**	**Smokeless tobacco OR (95% CI)**	**Hookah OR (95% CI)**	**Cigarillos OR (95% CI)**
Ever use	**0.03 (0.01, 0.06)** ***	**0.04 (0.03, 0.07)** ***	**0.03 (0.02, 0.06)** ***	**0.07 (0.05, 0.11)** ***	**0.04 (0.02, 0.06)** ***
Male	0.80 (0.47, 1.38)	**0.59 (0.37, 0.95)** *	**0.15 (0.05, 0.45)** ***	1.15 (0.76, 1.74)	**0.60 (0.36, 0.99)** *
African American	1.01 (0.45, 2.27)	0.69 (0.37, 1.30)	**4.50 (1.22, 16.57)** *	0.87 (0.51, 1.48)	**3.22 (1.52, 6.82)** **
Other race	0.90 (0.48, 1.69)	0.88 (0.50, 1.53)	0.94 (0.43, 2.03)	**0.56 (0.34, 0.94)** *	0.60 (0.33, 1.08)
Differences in post intervention intentions to use tobacco products in the next 12 months for each theme relative to the control [a]					
Theme	Cigarettes	E-cigarettes	Smokeless tobacco	Hookah	Cigarillos
Anti-industry	**−1.73 (−2.58, −0.88)** ***	**−1.04 (−1.73, −0.35)** **	0.28 (−0.39, 0.96)	−0.57 (−1.15, 0.01)	−0.01 (−0.68, 0.66)
Heath effects+ anti-industry	**−2.81 (−3.79, −1.83)** ***	**−2.42 (−3.15, −1.7)** ***	0.28 (−0.66, 1.22)	−0.81 (−1.47, −0.16)	−0.01 (−0.79, 0.78)
Sexual health	**−2.10 (−3.15, −1.04)** ***	**−2.35 (−3.10, −1.60)** ***	0.52 (−0.27, 1.31)	**−2.30 (−2.95, −1.65)** ***	**−3.33 (−4.25, −2.41)** ***
Secondhand smoke	−1.06 (−1.99, −0.13)	−0.56 (−1.31, 0.18)	−0.44 (−1.16, 0.28)	−0.06 (−0.73, 0.62)	**−1.32 (−2, −0.63)** **
Environment+ anti-industry	**−2.03 (−2.93, −1.14)** ***	**−1.53 (−2.27, −0.79)** ***	0.84 (0.02, 1.66)	−0.76 (−1.39, −0.13)	0.01 (−0.73, 0.75)
Ref: Control					

[a] Responses on a scale from 0% to 100% in 10% increments. Negative number indicates less intention to use. Numbers in parenthesis are 95% Confidence Intervals (CI). The numbers indicate how much, in comparison to the control group, each theme decreased intentions. For example, the anti-industry theme decreased intentions to use cigarettes at posttest by 1.73% compared to the control group. (Adjusted for baseline intentions to use in the next 12 months, gender, race, ethnicity, ever use of a specific product.)

Significant pairwise comparisons (z-tests) with Bonferroni corrections: For cigarettes, health effects+anti-industry had stronger effect than secondhand smoke theme ($p<0.05$). For e-cigarettes, health effects +anti-industry and sexual health both had stronger effects than anti-industry and secondhand smoke (all $p<0.01$). For hookah, sexual health theme had stronger effect than all other themes (all $p<0.0001$). For cigarillos, sexual health theme had stronger effect than all others (all $p<0.001$) and secondhand smoke had stronger effect than all others (except sexual health; all $p<0.01$).

* $p<0.05$,

** $p<0.01$,

*** $p<0.001$

OR = odds ratio; CI = confidence interval.

Table 3

Zero-inflated Poisson regression modeling determinants of having zero intentions to use tobacco products and change in intentions to use tobacco products if offered by a friend

Odds of having no intention to use tobacco products if offered by a friend (Model of Excess Zeros)					
	Cigarettes OR (95% CI)	**E-cigarettes OR (95% CI)**	**Smokeless tobacco OR (95% CI)**	**Hookah OR (95% CI)**	**Cigarillos OR (95% CI)**
Ever use	**0.02 (0.01, 0.05)** ***	**0.04 (0.02, 0.06)** ***	**0.03 (0.01, 0.05)** ***	**0.09 (0.06, 0.14)** ***	**0.04 (0.02, 0.07)** ***
Male	0.71 (0.40, 1.23)	**0.60 (0.38, 0.97)** *	**0.16 (0.05, 0.50)** **	1.10 (0.73, 1.64)	**0.51 (0.31, 0.85)** **
African American	0.78 (0.35, 1.75)	0.70 (0.37, 1.33)	2.83 (0.85, 9.39)	1.07 (0.64, 1.79)	**2.30 (1.15, 4.60)** *
Other race	1.10 (0.57, 2.10)	1.10 (0.63, 1.92)	1.01 (0.45, 2.25)	0.73 (0.45, 1.20)	0.91 (0.51, 1.63)
Differences in post intervention intentions to use tobacco products if offered by a friend for each theme relative to the control [a]					
Theme	Cigarettes	E-cigarettes	Smokeless tobacco	Hookah	Cigarillos
Anti-industry	−0.64 (−1.48, 0.19)	0.50 (−0.11, 1.12)	0.22 (−0.44, 0.87)	−0.15 (−0.71, 0.41)	−0.18 (−0.81, 0.45)
Heath effects+ anti-industry	**−1.72 (−2.66, −0.78)** **	0.13 (−0.53, 0.79)	0.48 (−0.41, 1.38)	**−0.89 (−1.50, −0.28)** **	**1.08 (0.32, 1.85)** **
Sexual health	0.13 (−0.91, 1.17)	0.51 (−0.19, 1.21)	0.40 (−0.40, 1.21)	−0.41 (−1.05, 0.23)	0.23 (−0.61, 1.08)
Secondhand smoke	−1.26 (−2.16, −0.36)	0.26 (−0.43, 0.94)	0.26 (−0.46, 0.97)	**−1.38 (−2.04, −0.72)** ***	−0.01 (−0.67, 0.66)
Environment+ anti-industry	−0.52 (−1.39, 0.34)	−0.42 (−1.09, 0.25)	−0.10 (−0.98, 0.77)	−0.62 (−1.23, −0.01)	−0.50 (−1.21, 0.21)
Ref: Control					

[a] Responses on a scale from 0% to 100% in 10% increments. Negative number indicates less intention to use. Numbers in parenthesis are 95% Confidence Intervals (CI). The numbers indicate how much, in comparison to the control group, each theme decreased intentions. For example, the health effects+anti-industry theme decreased intentions to use cigarettes at posttest by 1.72% compared to the control group. (Adjusted for baseline intentions to use in the next 12 months, gender, race, ethnicity, ever use of a specific product.)

Significant pairwise comparisons (z-tests) with Bonferroni corrections: For cigarettes, health effects+anti-industry theme had stronger effect than sexual health theme ($p<0.05$). For hookah, secondhand smoke has stronger effect than anti-industry theme ($p<0.01$). For cigarillos, health effects+anti-industry theme had a stronger effect than anti-industry and environment+anti-industry (both $p<0.01$).

* $p<0.05$,

** $p<0.01$,

*** $p<0.001$

OR = odds ratio; CI = confidence interval.