A Secondary Audience’s Reactions to “The Real Cost” Advertisements: Results From a Study of U.S. Young Adult Smokers and Susceptible Nonsmokers

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Introduction: Exposure to “The Real Cost” campaign has prevented smoking initiation among its target audience (U.S. youth aged 12–17 years). This study examines reactions to “The Real Cost” advertisements among a potential secondary audience: U.S. young adults.

Methods: An online convenience sample of young adult (ages 18–29 years) smokers (n=225) and susceptible nonsmokers (n=339) participated in a within-subjects experiment in 2017. Participants viewed three TV ads from “The Real Cost” campaign and reported their past exposure to, conversations about, and reactions to the ads. In 2017, analyses examined message-level and person-level predictors of perceived message effectiveness using multilevel modeling.

Results: About half of smokers (47%) and susceptible nonsmokers (51%) had seen at least one of the three ads in the past 3 months. About one in four smokers (23%) and susceptible nonsmokers (24%) had at least one conversation about the ads in the past 3 months. Susceptible nonsmokers rated the ads higher on perceived message effectiveness than smokers (p<0.01), but lower on message relevance and negative affective reactions to the ads (both p<0.05). In both samples, ads that elicited higher negative affective reactions and message relevance, and lower message reactance (i.e., resistance) received higher perceived message effectiveness ratings (all p<0.05).

Conclusions: “The Real Cost” ads have reached and generated conversations among a convenience sample of young adult smokers and susceptible nonsmokers. Increasing the perceived relevance and emotional reactions of campaigns may increase their impact. Future studies should examine reactions to “The Real Cost” campaign and effects on smoking behavior using nationally representative samples of young adults.

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have found that “The Real Cost” has had high reach, is associated with changes in smoking-related attitudes and beliefs, and is associated with reduced smoking initiation. “The Real Cost” is likely reaching a wider audience than solely youth, which could increase the cost effectiveness of the campaign. For example, The Tips From Former Smokers campaign, which was designed for adult smokers, reached most U.S. adolescents and had a positive influence on smoking-related outcomes among this secondary audience. Young adults may be an important secondary audience of “The Real Cost,” given that their media preferences and exposures may partially overlap with youth. In addition, the age of smoking initiation has increased in recent years, and some young adults are at risk of initiating tobacco use.

One way that mass media campaigns like “The Real Cost” may exert their effects is by sparking conversations. Social interactions can extend campaign reach and may also be associated with subsequent changes in behavior. However, studies have not yet explored social interactions about “The Real Cost” campaign. It is also important to assess predictors of young adults’ ratings of perceived effectiveness of “The Real Cost.” Perceived effectiveness is often used to evaluate messages in the early stages of development or to examine the receptivity of campaigns in the field. Perceived effectiveness ratings of tobacco prevention ads have been shown to prospectively predict smoking-cessation behavior and therefore may hold utility as an indicator of the likely success of tobacco-prevention messages. Prior studies of “The Real Cost” have demonstrated high perceived effectiveness among youth, but research is needed to understand predictors of perceived effectiveness of campaign ads among young adults (both smokers and susceptible nonsmokers).

Although ultimately it is of interest whether “The Real Cost” campaign has impacted smoking-related outcomes, the current study provides more proximal data on exposure and message reactions to “The Real Cost” ads among a potential secondary audience: young adults. Specifically, the study aims to characterize the frequency, nature, and content of recent conversations about “The Real Cost” among young adult smokers and nonsmokers susceptible to starting smoking. The study also aims to describe young adult smokers’ and susceptible nonsmokers’ ratings of the perceived effectiveness of “The Real Cost” ads. Finally, the study explores message-level and person-level predictors of perceived effectiveness.

METHODS

Study Sample and Procedures

In July 2017, a total of 1,107 young adults (ages 18–29 years) participated in a within-subjects experiment about “The Real Cost” campaign. The initial sample included 225 current smokers (defined as having smoked ≥100 cigarettes in their lifetime and now smoking every day or some days) and 882 nonsmokers. Non-smokers who were not susceptible to smoking (n=543) were excluded from the study (coded as answering definitely not to the following three questions: (1) Do you think that you will try a cigarette soon? (2) Do you think you will smoke a cigarette in the next year? (3) If one of your best friends were to offer you a cigarette, would you smoke it?). Thus, the analytic sample consisted of 225 current smokers and 339 susceptible nonsmokers.

Recruitment took place through Amazon Mechanical Turk (MTurk), an opt-in web-based platform commonly used for social science research. Although MTurk uses nonprobability-based methods, MTurk samples are typically more representative of the U.S. population than other convenience samples commonly used for social science and health research. After providing free and informed consent, participants started the survey and then viewed three smoking prevention video ads from “The Real Cost” campaigns presented in a random order. Two ads were selected that had aired on TV in the 5 months prior to the survey launch (Straw City and Hacked), as well as the ad with the most YouTube views from “The Real Cost” 2015 campaign cycle (Science Class). The ads encompassed all three of “The Real Cost” message themes: health consequences (Straw City), loss of control (Hacked), and dangerous chemicals (Science Class). Each video lasted 30 seconds and participants could not advance the survey until after the video ended. After viewing each ad, participants reported their responses to that specific ad before moving onto the next ad. Participants received $4 after completing the survey. The University of North Carolina at Chapel Hill IRB approved this study (#17-0017).

Measures

Prior to viewing the ads, participants answered survey questions assessing quit intentions among smokers and smoking susceptibility among nonsmokers. After participants viewed each ad, the survey assessed prior exposure to that ad (i.e., ad recognition). These variables were recoded into a dichotomous variable representing whether participants had seen any of the three ads. The survey also assessed frequency of conversations about the ads, conversation partners, and conversation topics using close-ended measures from previous studies. The survey then assessed several message reactions, including negative affect elicited by each ad directly after exposure (three items, average α=0.87 across three ads, e.g., How much did this ad make you feel anxious?). message relevance (two items, average α=0.84, e.g., This ad speaks to people like me), and message reactance using the Brief Reactance to Health Warnings Scale (three items, average α=0.72, e.g., This ad is trying to manipulate me).

The survey assessed the primary outcome of perceived message effectiveness (PME) using the University of North Carolina PME scale. This scale has demonstrated high reliability (α≥0.70) among adolescents, young adults, and adults, and convergent validity with the established Davis PME scale through a strong positive correlation (r=0.84). The scale contains three items: (1) This ad makes me concerned about the health effects of smoking; (2) This ad makes smoking seem unpleasant to me; and (3) This ad discourages me from wanting to smoke. The 5-point response scale
ranged from strongly disagree (coded as 1) to strongly agree (5). The average of these three items formed a composite PME score (average $\alpha=0.87$). Finally, the survey concluded by assessing demographic characteristics.

**Statistical Analysis**

Analyses in 2017 used Stata/SE, version 14.1, with two-tailed tests and a critical $\alpha$ of 0.05. A mean centering approach for each message reaction construct was used to tease out person-level and message-level effects.\textsuperscript{16,33} Using negative affect as an example, the three negative affect items were averaged to create mean scores for each message rating. Then, each person’s mean negative affect score was computed across the three ads (i.e., person-level negative affect). Finally, each person’s mean negative affect score was subtracted from their negative affect score for each of the three videos, resulting in a variable representing whether an individual’s negative affect score for a particular video was higher or lower than their mean negative affect score (i.e., message-level negative affect). This process was repeated to create person-level and message-level variables for both message relevance and message reactance.

Descriptive statistics about social interactions about the ads included frequency of conversations, types of conversation partners, and the content of conversations. Then, independent sample $t$-tests examined whether, across all ads, negative affect, message relevance, message reactance, and PME differed among smokers and susceptible nonsmokers.

Multilevel models, stratified by smoking status, identified message-level and person-level predictors of PME. These models used random intercepts but not random slopes. The multilevel analyses used listwise deletion for missing data, excluding cases with incomplete data on the variables of interest from the model. There were no instances of harmful multicollinearity based on the variance inflation factor (all variance inflation factors $<10$). An intercept-only model was used to compute the intraclass correlation. The intraclass correlation for smokers was 0.55, meaning that 55% of the variability in PME was at the person level and the remaining 45% was from the message effects and error. Among susceptible nonsmokers, 50% of the variability was at the person level and 50% was from the message effects and error.

Next, bivariate models individually examined each message-level characteristic (Level 1) and person-level characteristic (Level 2) as predictors of PME (Appendix Table 1, available online). Finally, an adjusted model was run, including any variables with $p$-values $<0.10$ in the unadjusted models as predictors. Building on models of health communication\textsuperscript{4–36} and prior research,\textsuperscript{25,26,37} the predictions were that—at both the message and individual level—negative affect and message relevance would be associated with higher PME, whereas message reactance would be associated with lower PME. The remaining variables were included as controls. Findings from the models are reported as unstandardized regression coefficients ($b$).

**RESULTS**

Smokers’ mean age was 25 years and susceptible nonsmokers’ mean age was 24 years (Appendix Table 2, available online). About one in five participants identified as gay, lesbian, or bisexual. Most (55% of smokers and 67% of nonsmokers) had $<$S300 in spending money per month. Among susceptible nonsmokers, 27% were former smokers, defined as having smoked $\geq$100 cigarettes in one’s lifetime but not smoking currently. About half of the samples (47% of smokers and 51% of nonsmokers) had seen at least one of the three ads in the past 3 months.

About one in four participants (23% of smokers and 24% of nonsmokers, $p=0.83$) had talked about one of the three ads in the past 3 months. Among smokers who had at least one conversation, the average number of conversations in the past 3 months was 3.6 for Hacked, 2.4 for Straw City, and 2.7 for Science Class. Non-smokers had an average of 2.7 conversations about Hacked, 1.7 about Straw City, and 2.6 about Science Class. Both smokers and susceptible nonsmokers talked about the ads with a variety of people (Figure 1). The most common conversation partners were friends and spouses/significant others, followed by parents, coworkers, other family members, and siblings. When asked about the content of conversations, most participants (60% of smokers and 65% of nonsmokers) reported talking about whether the ads would discourage people from starting to smoke (Table 1). Most smokers talked about whether the ads would encourage them to quit smoking (63%) and whether the ads would encourage other smokers to quit (60%). About half of participants (44% of smokers and 53% of nonsmokers) reported making fun of the ads in conversations. Participants or their conversation partners frequently described the ads as interesting or engaging (56% of smokers and 53% of nonsmokers); fewer described the ads as judgmental or controlling (29% of smokers and 27% of nonsmokers).

Negative affect elicited by the ads was higher among smokers compared with susceptible nonsmokers (mean: 2.2 vs 1.9, $p<0.001$), as was message relevance (3.4 vs 2.8, $p<0.05$; Figure 2). However, smokers rated ads lower on PME than nonsmokers (3.3 vs 3.6, $p<0.05$). Message reactance did not differ (2.8 for both smokers and nonsmokers). In adjusted analyses, Straw City and Science Class were perceived as more effective than Hacked among both smokers and nonsmokers (all $p<0.05$). In both samples, messages that elicited relatively higher personal negative affect had higher PME ratings (smokers: $b=0.38$, $p<0.001$, nonsmokers: $b=0.28$, $p<0.001$; Table 2). Messages perceived as more relevant also received higher PME ratings (smokers: $b=0.54$, $p<0.001$, nonsmokers: $b=0.40$, $p<0.001$). By contrast, message reactance was associated with lower PME ratings (smokers: $b=-0.10$, $p<0.05$, nonsmokers: $b=-0.22$, $p<0.001$).

Several person-level variables were also associated with higher PME. Among smokers, those with stronger
quit intentions ($b=0.09$, $p<0.05$), generally higher negative affect ($b=0.22$, $p<0.001$), and generally higher relevance ($b=0.63$, $p<0.001$) reported higher PME. Among susceptible nonsmokers, males ($b=-0.18$, $p<0.05$), those who talked about the ads in the past 3 months ($b=-0.22$, $p<0.05$), and those with generally higher reactance ($b=-0.19$, $p<0.001$) had lower PME. Among susceptible nonsmokers, generally higher negative affect ($b=0.29$, $p<0.001$) and relevance ($b=0.40$, $p<0.001$) were both associated with higher PME. Sensitivity analyses, at the ad level, found that having seen any ad was not associated with PME among smokers ($b=0.01$, $p>0.05$) or nonsmokers ($b=0.10$, $p>0.05$). Likewise, having seen an individual ad was also not associated with PME among smokers ($b=0.10$, $p>0.05$) or nonsmokers ($b=0.01$, $p>0.05$) for that ad. Results stratifying the susceptible young adults into former and never smokers are presented in Appendix Table 3 (available online); the pattern of findings was similar for the two groups.

Finally, sensitivity analyses investigated why, among nonsmokers, talking about the ads was associated with higher PME ($b=0.19$, $p=0.08$; Appendix Table 1, available online) but associated with lower PME in adjusted analyses ($b=-0.22$, $p<0.05$; Table 2). Only the addition of both general negative affect and general relevance to the model resulted in talking about the ads becoming statistically significant. In other words, talking about the ads was associated with lower PME only after accounting for individuals’ general negative affect and relevance.

**DISCUSSION**

This study of young adults found relatively high exposure to “The Real Cost” ads in a convenience sample of both smokers and nonsmokers susceptible to smoking; about half had seen at least one of three ads in the past 3 months. About one in four participants had talked about the ads in the past 3 months with a mixture of conversation partners, including friends, spouses/
significant others, coworkers, other family members, and siblings. Although population estimates cannot be inferred from these data, the results suggest that “The Real Cost” ads may be reaching young adults as well as their social contacts via conversations, which could amplify the reach and impact of the campaign. Future research should assess exposure to and conversations about “The Real Cost” campaign in representative samples of young adults, qualitatively explore the content and nature of conversations, and examine whether conversations predict changes in intentions and behavior as has been found in studies about cigarette pack warnings.15

On average, susceptible nonsmokers had slightly higher PME ratings than smokers. The Science Class ad had the highest PME ratings, followed by Straw City and then Hacked. Prior studies have not examined the newer ads (Straw City and Hacked), but one study with more than 3,000 adolescents found that Science Class received the highest PME ratings of all 14 ads evaluated in the study. Several message-level characteristics were

Figure 2. Reactions to “The Real Cost” campaign ads, n=223 smokers, n=334 susceptible nonsmokers.
Note: Analyses excluded two smokers and five nonsmokers with missing data on at least one of the variables. Error bars show SEs. Response options for all variables ranged from 1 (low amount of construct) to 5 (high) (*p<0.05; **p<0.001).

Table 2. Multilevel Model Predicting Perceived Message Effectiveness of Ads From “The Real Cost” Campaign

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Smokers, b (SE) (i=669, n=223)</th>
<th>Susceptible nonsmokers, b (SE) (i=1,002, n=334)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message characteristics (Level 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ad</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hacked (ref)</td>
<td>ref</td>
<td>ref</td>
</tr>
<tr>
<td>Straw City</td>
<td>0.12* (0.05)</td>
<td>0.13* (0.05)</td>
</tr>
<tr>
<td>Science Class</td>
<td>0.18* (0.05)</td>
<td>0.12* (0.05)</td>
</tr>
<tr>
<td>Negative affect, deviation from person’s M score</td>
<td>0.38** (0.04)</td>
<td>0.28** (0.04)</td>
</tr>
<tr>
<td>Message relevance, deviation from person’s M score</td>
<td>0.54** (0.04)</td>
<td>0.40** (0.03)</td>
</tr>
<tr>
<td>Message reactance, deviation from person’s M score</td>
<td>-0.10* (0.04)</td>
<td>-0.22** (0.03)</td>
</tr>
<tr>
<td>Person characteristics (Level 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>—</td>
<td>-0.01 (0.01)</td>
</tr>
<tr>
<td>Male (vs female and transgender)</td>
<td>—</td>
<td>-0.18* (0.07)</td>
</tr>
<tr>
<td>Gay, lesbian, or bisexual</td>
<td>-0.11 (0.10)</td>
<td>-0.09 (0.09)</td>
</tr>
<tr>
<td>White (vs all other racial groups)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Hispanic ethnicity</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Low maternal education, less than college graduate (vs all others)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Low income, &gt;$200 spending money per month (vs ≥$200)</td>
<td>-0.03 (0.08)</td>
<td>—</td>
</tr>
<tr>
<td>Quit intentions</td>
<td>0.09* (0.04)</td>
<td>n/a</td>
</tr>
<tr>
<td>Former smoker</td>
<td>n/a</td>
<td>-0.15 (0.08)</td>
</tr>
<tr>
<td>Saw an ad in past 3 months</td>
<td>0.01 (0.09)</td>
<td>0.10 (0.08)</td>
</tr>
<tr>
<td>Talked about an ad in past 3 months</td>
<td>0.09 (0.10)</td>
<td>-0.22* (0.09)</td>
</tr>
<tr>
<td>Negative affect, person’s M score</td>
<td>0.22** (0.04)</td>
<td>0.29** (0.05)</td>
</tr>
<tr>
<td>Relevance, person’s M score</td>
<td>0.63** (0.05)</td>
<td>0.40** (0.04)</td>
</tr>
<tr>
<td>Reactance, person’s M score</td>
<td>0.01 (0.04)</td>
<td>-0.19** (0.04)</td>
</tr>
</tbody>
</table>

Note: Boldface indicates statistical significance (*p<0.05, **p<0.001). Analyses excluded two smokers and five nonsmokers with missing data on at least one of the variables. Outcome was three-item perceived message effectiveness scale (range 1–5). Intraclass correlation=0.55 for smokers and 0.50 for nonsmokers.
- not included in model because p>0.10 in bivariate analyses; b, unstandardized regression coefficient; i, total number of observations; n/a, not applicable; M, mean score across ad ratings.
associated with PME, which provides insight regarding ad features that may increase ad effectiveness. Greater negative affect elicited by the ads was associated with higher PME ratings. Negative affect is a key driver of the impact of smoking prevention messages on intentions and behavior; and it appears to similarly influence PME. This study also found that greater message relevance was associated with higher PME, in line with prior research on health campaigns. This finding is also supported by advertising theory, suggesting that message persuasion is unlikely in the absence of personal relevance, as well as the Elaboration Likelihood Model, which posits that message relevance leads to greater message processing and ultimately persuasion. Finally, this study found that greater message reactance was associated with lower PME. Although one study suggests that reactance is associated with greater quit intentions, most prior research and theory indicate that message reactance may partially suppress the impact of persuasive messages. To maximize PME, message designers may consider crafting messages that elicit negative affect and message relevance, but minimize message reactance.

When examining person-level predictors of PME, among nonsmokers, males had lower PME than females and transgender people. However, no other demographic characteristics were associated with PME in either sample, indicating that “The Real Cost” ads were perceived as equally effective among diverse groups of smokers and susceptible nonsmokers. This finding builds on a prior study among youth aged 12−17 years that found no differences in PME of “The Real Cost” campaign by age, gender, or race. The fact that demographic characteristics (with the exception of gender among nonsmokers) did not predict PME suggests that “The Real Cost” was similarly received among diverse demographic subgroups, but longitudinal studies with behavioral outcomes are needed to test this hypothesis. However, smokers with higher quit intentions had higher PME than those with lower quit intentions, in line with prior research. Different campaign themes or complementary interventions may be necessary for smokers who do not want to quit smoking. Similarly, alternative approaches may be useful for discouraging smoking among young adults who have more muted responses to “The Real Cost,” as generally lower negative affect and message relevance were associated with lower PME. Unexpectedly, talking about the ads was associated with lower PME in adjusted analyses among susceptible nonsmokers. Sensitivity analyses revealed that this was only the case after including participants’ own negative affective reactions and personal relevance in the model. Thus, it is possible that conversations do not positively influence PME after accounting for participants’ own responses to the ads.

Limitations
Strengths of this study include a focus on smokers and susceptible nonsmokers, two groups at risk for smoking during adulthood, as well as the use of validated and reliable measures of message reactions. Limitations include the use of a convenience sample, which may limit the generalizability of study findings. For example, 20% of the sample identified as gay, lesbian, or bisexual, a higher prevalence than in previous MTurk samples and in the U.S. population. However, the inclusion of this understudied population at high risk for smoking could also be viewed as a strength of the study. Moreover, the data presented in this paper cannot be used to infer population-level estimates because of the use of convenience samples. The authors were unable to examine random effects of the ad variable due to issues with model convergence. The self-reported measures could also have been subject to socially desirable responding. Another limitation is that the cross-sectional study design precluded the longitudinal assessment of smoking behavior. Some participants may have inaccurately reported exposure to an ad they have not seen before, or had trouble accurately remembering conversations about the ads in the past 3 months. Finally, participants only evaluated three smoking prevention ads from “The Real Cost” campaign; this decision reduced participant burden but limited the ability to draw conclusions about other “The Real Cost” video ads and messages in other campaign channels (e.g., print ads, messages on social media).

CONCLUSIONS
This study is the first to examine reactions to ads from FDA’s “The Real Cost” campaign among young adults, a potential secondary audience of the campaign. The ads reached and generated conversations in a convenience sample of young adult smokers and susceptible nonsmokers. This study also indicates that campaign messages that are both emotionally evocative and personally relevant are perceived as more effective.

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All authors designed the survey instrument, provided critical feedback on manuscript drafts, and approved the final manuscript. AJS was the study principal investigator and oversaw data collection. SMN and MGH were co-investigators on the study. MGH analyzed the data and led the manuscript writing process.

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SUPPLEMENT NOTE

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SUPPLEMENTAL MATERIAL

Supplemental materials associated with this article can be found in the online version at https://doi.org/10.1016/j.amepre.2018.08.005.

REFERENCES


