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How Broadcast Volume and Emotional Content Affect Youth Recall of Anti-Tobacco Advertising

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Abstract

Background—Televised anti-tobacco advertising has been shown to be effective for discouraging smoking initiation; however, purchasing broadcasting time is very costly. This study investigated the relative impact of the broadcast volume (media weight) and the emotional content of an ad as predictors of advertising recall.

Methods—The data come from a random-digit-dialed survey conducted in 2001 and 2002 of 3863 youth aged 12–17. Media weight was based on commercial TV ratings data. The emotional intensity of advertisements was derived from the ratings made by independent youth judges.

Results—Data analyses were conducted between 2005 and 2007. Results indicated that media weight was a significant predictor of recall, but the emotional content of the ad was an even stronger predictor. Also, ads low in emotional intensity required more media weight than those high in emotional intensity to achieve the same amount of increase in recall.

Conclusions—This study extends prior research that highlights the importance of emotional intensity for effective anti-tobacco advertising. It also indicates that, relative to unemotional advertisements, emotionally arousing advertisements require fewer broadcasts to achieve the same level of recall, and hence are likely to be less costly to a public health campaign.

Introduction

As the seriousness of the global tobacco epidemic becomes more and more apparent, public health agencies have funneled resources into interventions designed to reduce tobacco use. Televised anti-tobacco advertisements have been shown to be effective for reducing both adult smoking^{1–3} and youth smoking.^{4–7} A downside is their great expense.⁸ In light of the high cost of such campaigns, it is important for programs to make evidence-based decisions regarding the design of advertisements for particular audiences (i.e., what themes and execution styles are likely to be most effective).

The question of effective anti-tobacco advertisement characteristics has been addressed by a number of investigators. A series of studies by Wakefield and colleagues^{9,10} compared

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audience response to advertisements that varied in theme, emotional tone, and executional style, demonstrating that the ads rated as most effective and the ads most likely to be recalled 1 week later were those that included either personal testimonials or visceral negative imagery. Similar results have been reported by Biener and colleagues,^{11–13} who found that both youth and adults rate more highly ads that deal with the negative consequences of smoking in an emotionally evocative way than those that focus on normative issues (e.g., teenagers shouldn't smoke) or cessation tips that use humor. These findings seem to contradict a large body of consumer research that, while supporting the notion that emotional responses to ads are an important determinant of their effectiveness,^{14,15} focuses on the goal of eliciting positive emotions such as warmth and pleasure.^{16,17} The discrepancy is likely due to the difference between trying to sell a product versus trying to “unsell” a behavior. Much of the research on emotion in health communications has focused on fear appeals, which have been shown to be effective as long as the audience members can see an appropriate action to take to reduce their vulnerability to harm.¹⁸ It has been argued that since the appropriate action—to reduce or quit smoking—is quite obvious in anti-tobacco advertisements, fear appeals would be expected to be effective.¹³

It is not always the case that the negative affect evoked in anti-tobacco advertisements is fear. It is often sadness, empathy for another's loss, or perhaps even guilt for exposing family members to the dangers of secondhand smoke. It seems likely, however, that the underlying dimension of importance in anti-tobacco advertising is the level of emotion aroused in the audience when viewing the advertisement. Several studies that have explicitly assessed the perceived emotional intensity in anti-tobacco advertisements, as well as the valence of the emotion and the predominant message, have shown that (1) the level of emotional intensity is the strongest predictor of perceived effectiveness and (2) it is correlated with messages either of the negative health impacts of smoking or of loss, fear, anger, or sadness resulting from tobacco use.^{12,13}

The body of research investigating message sensation-value—the degree to which a message elicits sensory, affective, and arousal responses¹⁹—supports the hypothesis that the arousal properties of advertisements (usually anti-drug advertisements) are the key to their effectiveness. Although theoretically the most effective messages should be those with arousal properties that match the audience's biologically based level of optimal arousal,²⁰ studies tend to show that highly arousing messages are more effective (i.e., lead to better attention, recall, and comprehension) regardless of audience members' individual level of need for sensation.^{21–24}

It has been repeatedly demonstrated that media weight (measured in terms of gross rating points [GRPs] or targeted rating points reaching a designated audience segment) is an important determinant of viewer exposure and recall. Both viewer exposure and recall are necessary, but not sufficient, for advertising effectiveness.^{25–27} The costs of achieving a given level of exposure for anti-tobacco advertisements vary with the complexity of the local media markets.²⁸ Presumably, economic constraints would dictate that the minimum exposure consistent with effectiveness would be the best. It seems reasonable to predict that the level of arousal evoked by an advertisement would have an impact on its likelihood of being attended to and recalled. Consequently, highly arousing anti-tobacco advertisements may need fewer exposures than less-arousing ones. To date, that supposition had not been investigated in a real-world setting. It was put to the test in this study, which investigated the relationship among media weight, emotional intensity, and the likelihood of an ad's being recalled by youth. The following hypotheses were tested: (1) holding media weight constant, increases in emotional intensity will result in increases in recall; and (2) for a given rate of increase in recall, advertisements low in emotional intensity will require larger increases in media weight than will advertisements high in intensity.

Methods

Overview

The Massachusetts Tobacco Control Program (MTCP) sponsored an intensive mass-media campaign between 1994 and 2001. Expending an average of \$13 million per year, the campaign over the course of 8 years produced several hundred spots that varied in terms of target audience, emotional intensity, and emotional tone. In addition to the MTCP ads, anti-tobacco ads sponsored by the American Legacy Foundation's *truth*TM campaign were broadcast in Massachusetts, as were campaigns by tobacco companies Philip Morris and Lorillard. From among these ads, nine were selected for study in a statewide telephone survey: four that were produced by the MTCP, two by the American Legacy Foundation, and three by the tobacco companies. The selection of the ads was based on two criteria: the expectation that they would be broadcast during the coming year and the determination that they varied in emotional intensity. The ads were briefly described to survey respondents, and the confirmed recall of each was assessed. Multiple logistic regression evaluated the extent to which recall was associated with the volume of broadcast and the emotional intensity of the ad.

Sample

Data were from the baseline survey of the UMass Tobacco Study (University of Massachusetts) conducted from January 2001 to June 2002 by the Center for Survey Research at the University of Massachusetts Boston. A probability sample of Massachusetts households with telephones was drawn, using random-digit-dialing techniques. After conducting a screening interview with an adult resident, interviewers solicited parental permission to interview all youth aged 12–17. Interviewers successfully screened 66% of all residential households and identified 5987 eligible youth. Permission was obtained to interview 78% of them, and interviews were completed with 83%, yielding a final sample of 3861 adolescents. Survey weights were created by taking the inverse of the probability of selection and adjusting them for the number of telephone lines in a household. No post-stratification adjustments were applied.

Measures

Outcome Variable

The outcome variable was confirmed recall of nine specific anti-tobacco ads. Respondents were given a brief description of the ad and asked if they recalled having seen it; if so, they were asked to provide additional details. Recall was confirmed if the respondent produced recognizable details of the ad in question.

Predictors

Emotional intensity of advertisements—The emotional intensity of an individual ad was assessed by 72 youth who viewed the ads in six middle-school classrooms. They rated each ad on a number of 7-point scales designed to assess various dimensions along which advertisements have been shown to vary. The measure of emotional intensity, comparable to one used in earlier research,^{12,13} was the average of the ratings on three items: emotional, intense, and powerful. The standardized α for the 3-item scale was 0.868. The score was standardized to a mean of 3.5 and an SD of 1.

Media weight—The volume of broadcast of each of the nine advertisements was determined by analyzing media-monitoring data from Nielsen Media Research. Ratings provide an estimate of the percentage of households with teenagers watching a program or advertisement in a given designated market area (DMA). Monthly summaries of target ratings points (TRPs, the summed rating points over a particular period of time) for each of the nine ads for three of the four DMAs in Massachusetts were determined and were merged with individual youth data

based on the interview month and the DMA in which each youth resided. (Although there are four DMAs in Massachusetts, only three are included in the Nielsen data. Youth residing in the fourth DMA are excluded from these analyses.)

A weighted measure was constructed that assigned more influence to exposures in recent months, reflecting the expectation that advertising impact degrades rapidly over time.^{29–31} This measure has been used in other research investigating the impact of exposure to anti-tobacco advertising on youth smoking.^{6,32} The variable represents the aggregated depreciated sum of ad ratings for 4 months—3 months prior to the month of the interview as well as TRPs in the month of the interview. A log of this variable (plus one) was then created to account for the positive skew of the variable distribution due to a large number of zeros.

Because survey data were collected over a period of 18 months, there is a large amount of variation in the TRPs for a given ad for respondents interviewed at different times. Even for respondents interviewed at the same time, there may be large differences in TRPs for a given ad depending on the respondents' DMAs.

Table 1 presents characteristics of the nine ads arranged in the order of their mean emotional intensity scores based on the impressions of independent youth judges (Column 3). Column 4 shows, for each ad, the mean and SD of the weighted sum of TRPs for the 4 months prior to and including the respondent's month of interview. It is noteworthy that four of the nine ads had not been broadcast at all in any of the DMAs during that period, but had been broadcast prior to that time—as is evident in Column 4, the simple sum of TRPs for the 24 months prior to the respondent's interview.

Covariates

Items assessing the following covariates were included on the survey: respondent's age; gender; race/ethnicity (minority versus white); educational attainment of the adult household informant (high school or less versus more than high school); and number of days out of seven that the respondent usually watches TV between 7:00 PM and 10:00 PM. Covariates also included a four-category variable that assessed the respondent's smoking status: committed nonsmoker; ambivalent nonsmoker; experimenter (i.e., had smoked between a "puff" of a cigarette and 99 cigarettes); and established smoker (had smoked at least 100 cigarettes). The committed versus ambivalent distinction was based on how respondents who reported never having puffed on a cigarette answered a series of questions about their expectations of future smoking, items that have been found to reliably predict future smoking.³³

Analyses

Analyses were conducted between 2005 and 2007. All analyses used SPSS release 10.0.0 complex sample procedures, which adjust for the clustering of responses to ads within respondents (each respondent contributed nine recall responses, one for each ad queried) and other survey-sampling design factors. Without such adjustments, SEs would be incorrect, increasing the chances of a Type-1 error.³⁴

Results

The 3332 youth were aged 14.5 years on average; the group was split approximately equally between boys and girls. Seventy-nine percent were non-Hispanic white, and more than two thirds came from households where the adult informant had at least some post-secondary education. On average they reported watching TV between 7:00 PM and 10:00 PM at night 4.3 days a week. Fifty-four percent were committed nonsmokers, 15.6% were ambivalent

nonsmokers, 22.6% were experimenters, and 7.8% were established smokers. Confirmed recall was obtained for an average of 2.26 of the nine anti-tobacco advertisements.

Table 2 shows the results of the multiple logistic regression analysis. The first model, predicting recall of the nine advertisements, indicated that the level of the advertisement's emotional intensity was a significant predictor of recall: For each unit increase on the emotional-intensity scale, a youth was 2.36 times more likely to recall the ad. The volume of broadcast was also a significant predictor of recall (OR=1.97). It is difficult to compare the relative predictive power of the media weight and emotional intensity because the scales of the two variables are so different. Another way to portray the comparison is by calculating the OR associated with the highest versus the lowest level of the two predictors. As TRPs increased from the lowest to the highest value, the odds of recall increased by a factor of 2.38 (95% CI=1.93, 2.94). As emotional intensity increased from the lowest to the highest level, the odds of recall increased by a factor of 3.07 (95% CI=2.86, 3.30), somewhat more than the effect of TRPs.

To see whether media weight had a differential impact on the recall of ads that were high as opposed to low in emotional intensity, separate analyses were performed for the two ads highest (Rick and Ronaldo) and lowest (Follow the Leader and Piercing) in emotional intensity from among the five ads that had nonzero scores on TRPs, predicting recall as a function of TRPs while controlling for the same covariates used in the complete model. The results are displayed in Columns 2 and 3 of Table 2. TRPs were a significantly stronger predictor of recall of the two ads low in emotional intensity (OR=2.68) than of the two ads high in emotional intensity (OR=1.36) as indicated by the non-overlapping 95% CIs for the two ORs. In spite of the apparently higher impact on recall of increases in TRPs for low-emotion ads, the inclusion of an interaction term—TRPs X Emotional intensity—in the model predicting recall for all nine ads yielded a nonsignificant coefficient (not shown).

Discussion

These findings demonstrate that, independent of media weight, anti-tobacco advertisements high in emotional intensity are more likely to be recalled than are advertisements low in emotional intensity. Furthermore, if the advertisement is high rather than low in emotional intensity, then increases in media weight are less important for generating high rates of recall. The greater recall of emotionally intense advertisements could be the result of two different processes: attending more completely to the advertisement at the time of exposure, or being moved to discuss it after exposure and consequently reinforcing the exposure. There is evidence that intense emotional content enhances both of these activities (attending^{35,36} and discussing after exposure⁹).

It is possible that some unmeasured factor or factors correlated with emotional intensity are the real basis for improved recall. Indeed, previous research using similar rating scales has demonstrated that anti-tobacco ads high in emotional intensity are also rated high in cognitive quality (i.e., they are believable and interesting),¹³ and tend to contain messages about the serious health consequences of smoking. Although it seems quite clear that anti-tobacco advertisements that rate high in emotional intensity are likely to be recalled more often than those that do not, it cannot be concluded that emotional intensity is the sole factor responsible for recall. However, emotional intensity is quite easy to assess, which means that it can be readily employed by program planners as a way to select advertisements for media campaigns.

That the recall of advertisements is necessarily correlated with advertisement effectiveness is an assumption that might reasonably be challenged. It may be that youth are recalling some element of the ads that is not perfectly aligned with, or is even a distraction from, the main message. In the case of anti-tobacco advertising, however, the features that are likely to evoke

emotion tend to be connected to the harmful characteristics of cigarettes: images of illness, stories of loss and sadness, discussions of death. Furthermore, there is independent evidence that—controlling for recall—emotionally intense messages, including several used in the current study, have been perceived as more effective by youth and adults than those that are less intense.^{11,13} Similarly, adolescents shown a series of advertisements featuring tobacco-related disease and suffering (generally found to evoke higher levels of emotion than other messages) were more likely to demonstrate reduced intention to smoke than were adolescents shown ads with counter-industry or social themes.³⁷

Although perceived effectiveness and reports of reduced intention to smoke fall short of behavioral evidence of reduced smoking, a recent national study comparing the levels of broadcast of several types of anti-tobacco advertisements to youth-smoking prevalence has shown that youth living in media markets with high broadcast levels of state-sponsored anti-tobacco advertisements were less likely to be smokers, even controlling for variation in state tobacco-control policies.⁶ State-sponsored campaigns had previously been found to contain a higher proportion of ads with visceral negative images and personal testimonials.⁹

A limitation of this study is that TRPs are not a measure of actual exposure but an estimate of average potential exposure in each media market. Individuals may have more or less exposure, depending on their TV-watching frequency. To account for this, individual TV-watching frequency was included as a covariate in the analyses. A second reason for caution is that the study was conducted in Massachusetts, where youth have had many years of exposure to anti-tobacco advertising messages. As a consequence, youth in Massachusetts may be either more or less responsive to individual anti-tobacco ads, which could reduce the generalizability of these findings. However, Wakefield and colleagues¹⁰ found, in the U.S., Britain, and Australia, that youth who had been previously exposed to variable amounts and types of anti-tobacco advertising responded similarly to the same 50 anti-smoking ads. These findings suggest relatively stable patterns of appraisal of advertising characteristics by youth.

The present findings serve to underline the utility of anti-tobacco advertisements that are high in emotional intensity. Unfortunately, many health agencies are reluctant to use emotionally intense advertisements that feature graphic disease or authentic depictions of people who are suffering. Such advertisements can make people uncomfortable, or may make smokers feel guilty. Health agencies tend to prefer being associated with upbeat, positive messages, so they prefer spots that are humorous, or that, like the European Union's initiative Feel Free to Say No, use attractive celebrities to give the message *Don't smoke*. This study suggests that those types of upbeat or humorous advertisements are likely to be much less effective. State health departments should note that emotionally intense advertisements not only demonstrate higher levels of effectiveness but also generate higher recall at lower levels of broadcast, consequently making efficient use of scarce public resources for tobacco control.

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Table 1

Anti-tobacco advertisements

Advertisement	Sponsor	Mean emotional intensity	Mean weighted sum of TRPs— 4 months (SD)	Unweighted sum of TRPs (24 months)
Rick	MDPH	4.13	20.33 (41.29)	313.29
Body bags in NYC	American Legacy Foundation	4.12	0.00 (0.00)	34.48
Baby monitor	MDPH	4.02	0.00 (0.00)	1.00
Ronaldo	MDPH	3.94	7.33 (19.43)	208.75
I know you	MDPH	3.20	0.00 (0.00)	228.59
My reasons	Philip Morris Tobacco Co.	3.17	35.51 (27.54)	1346.13
Piercing	Lorillard Tobacco Co.	3.06	5.93 (11.14)	339.53
Follow the leader	Philip Morris Tobacco Co.	2.89	20.27 (19.54)	743.17
Daily dose	American Legacy Foundation	2.82	0.00 (0.00)	3.14

MDPH, Massachusetts Department of Public Health; TRP, target ratings point

Table 2
Adjusted ORs for predicting recall of anti-tobacco TV advertisements among youth in Massachusetts

	Recall of anti-tobacco advertisements (95% CI)	Recall of two high-emotion anti-tobacco advertisements (Rick and Ronaldo) (95% CI)	Recall of two low-emotion anti-tobacco advertisements (Piercing and Follow the Leader) (95% CI)
MAIN PREDICTOR			
TRP depreciated sum (log)	1.97 (1.68, 2.33) ***	1.36 (1.07, 1.73) *	2.68 (2.03, 3.54) ***
Emotional intensity ^a	2.36 (2.23, 2.49) ***	—	—
CONTROL VARIABLES			
Age ^a	1.05 (1.03, 1.07) ***	0.98 (0.95, 1.01)	1.03 (1.00, 1.07) *
Gender			
Male	1.00	1.00	1.00
Female	0.81 (0.77, 0.86) ***	0.73 (0.65, 0.81) ***	0.83 (0.74, 0.93) **
Race/ethnicity			
Nonwhite	1.00	1.00	1.00
White	1.01 (0.95, 1.09)	0.94 (0.82, 1.07)	0.98 (0.85, 1.14)
Informant's education			
High school or less	1.00	1.00	1.00
Some college or more	1.10 (1.04, 1.17) **	1.11 (0.99, 1.24)	1.00 (0.89, 1.14)
Smoking status			
Committed never smokers	1.00	1.00	1.00
Ambivalent never smokers	1.10 (1.01, 1.19) *	1.01 (0.87, 1.18)	1.20 (1.02, 1.41) *
Experimenters	1.19 (1.11, 1.28) ***	1.144 (1.00, 1.31)	1.30 (1.12, 1.51) ***
Established smokers	0.83 (0.74, 0.93) **	0.79 (0.63, 0.99) *	0.95 (0.75, 1.21)
Days watch prime-time TV per week ^a	1.07 (1.05, 1.08) ***	1.08 (1.06, 1.11) ***	1.05 (1.02, 1.08) **

^aDenotes continuous variables (age, emotional intensity, and days watch prime-time TV per week).

*
 $p < 0.05$;

**
 $p < 0.01$;

 $p < 0.001$

TRP, target ratings point