Explicit and implicit effects of anti-marijuana and anti-tobacco TV advertisements

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Abstract

Effects of anti-tobacco and anti-marijuana TV advertisements on explicit (i.e., semantic differential ratings) and implicit (i.e. Implicit Association Test, IAT) attitudes toward tobacco and marijuana were compared. Two hundred twenty nine, 18- to 19-year-old U.S. college students were randomly assigned to anti-tobacco or anti-marijuana PSA viewing conditions. Participants completed a short survey on attitudes to tobacco and marijuana. Afterwards they watched 15 PSAs embedded in a 15-min science program. At the end, all participants completed IAT for marijuana, IAT for tobacco and the assessment of explicit attitudes. Results of ANCOVA revealed a significant interaction between type of TV PSAs watched and implicit attitudes, $F(1,223)=7.12, p<0.01$ when controlling for preexisting attitudes to both substances; the implicit attitudes were more negative toward the substance that corresponded to the content of advertisements watched (i.e., anti-tobacco or anti-marijuana). However, analogical analysis on explicit measures showed that attitudes to marijuana became less negative among students that watched anti-marijuana ads than the group with anti-tobacco ads, $F(1,222)=5.79, p<0.02$. The discussion focused on the practical and theoretical implications of the observed dissociation between implicit and explicit attitudes to marijuana after the exposure to anti-marijuana PSAs.

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1. Introduction

Anti-drug advertising is a frequent component of large-scale health campaigns to change public attitudes toward drugs. Despite the long-standing use of mass media for education and prevention
is still limited data available on the direct effects of televised public service announcements (PSA) targeting substances such as marijuana or other drugs on peoples’ opinions and relevant behaviors. Critics of the anti-drug media campaign launched by the U.S. government’s Office of National Drug Control Policy (ONDCP) suggested that such campaigns might be successful in bringing public attention to the problem and encouraging participation in community-based programs but expressed doubts about their potential to produce desired behavioral change (DeJong & Wallack, 1999). Meta-analysis of 72 outcome assessments of various anti-substance use media interventions across the world conducted by Derzon and Lipsey (2002) revealed mostly inconclusive results. The outcomes appear to depend on the selection of variables included in the assessment (e.g., relevant knowledge, attitudes or behavior), targeted substance and specific characteristics of media messages, targeted audience, and campaigns context. As the authors pointed out, the interpretation of existing results is further complicated by various methodological weaknesses of reviewed studies such as a frequent luck of adequate control groups, difficulties with isolating specific effects of media interventions from other, simultaneously applied forms of community-based preventive efforts and the correlational nature the findings (i.e., inferring effectiveness of the media intervention from correlations between self-reported exposure to media messages and selected outcome measures).

In addition to concerns related to a potential low effectiveness, some researchers argued that anti-drugs messages used in national anti-drugs campaigns in the U.S. might evoke reactions opposite to intended campaign goals by increasing rather than discouraging interest in illegal drugs (e.g., Fishbein, Hall-Jamieson, Zimmer, von Haeften, & Nabi, 2002; Reinerman & Levine, 1989). Fishbein et al. (2002) cautioned that the ONDCP anti-marijuana PSAs may produce a boomerang effect. Subsequently, the National Youth Anti-drug Media Campaign outcome assessment revealed data trends that might indicate such unintended effects on teenagers’ attitudes; increased exposure to anti-drug advertising was significantly correlated with increased interest and future intent to use marijuana in subgroups of teens (Hornik et al., 2002, 2003). While a risk of boomerang effects, in some viewers might be difficult to avoid, every effort should be made to prevent them. Currently, there is a considerable data available on viewers’ response to preventive advertising targeting such harmful substances as tobacco (e.g., Beaudoin, 2002; Biener, 2000, 2002; Biener, McCallum-Keeler, & Nyman, 2000; Farrelly et al., 2002; Goldman & Glantz, 1998; Grandpre, Alvaro, Burgoon, Miller, & Hall, 2003; Hafstad et al., 1997; Henriksen & Fortmann, 2002; Hersey et al., 2005; Hill, Chapman, & Donovan, 1998; Johnston, Terry-McElrath, O’Malley, & Wakefield, 2005; Pechmann & Reibling, 2000; Pechmann, Zhao, Goldberg, & Reibling, 2003; Shadel, Niaura, & Abrams, 2002; Siegel & Biener, 2000; Terry-McElrath et al., 2005; Wakefield, Flay, Nichter, & Giovino, 2003a, 2003b) but similar research on viewers’ reactions to anti-marijuana advertising is very limited (e.g., Harrington et al., 2003; Palmgreen et al., 2001). The need for such research appears to be especially urgent considering the fact that in the U.S., marijuana was selected as a primary target of an ongoing national anti-drug media campaign. The last evaluations of this campaign revealed worrisome trends suggesting possibility of a boomerang effect. The more anti-marijuana ads teens watched, the more interested they became in using marijuana (Hornik et al., 2002, 2003).

The purpose of our study was to examine, in a controlled experimental research design, immediate effects of a representative sample of anti-marijuana advertising from the 2004 ONDCP anti-drugs media campaign on young adults, college freshmen 18–19 years old. We decided to include comparable anti-smoking television PSAs for a comparison condition, determining whether the boomerang effect to anti-marijuana public statement announcements is specific to that substance or reflects a generalized tendency among youth to respond with reactance to any preventive messages targeting substance use.
Reactance theory predicts that people are threatened by any perceived restrictions to their freedom and the attempt to restore sense of freedom often results in increased attractiveness of potentially restricted behavior (Brehm, 1966; Brehm & Brehm, 1981). Adolescents, with their need for independence, might be especially predisposed to respond with reactance to any forms of persuasion advocating change in their health-risk behavior (e.g., marijuana use or tobacco smoking). Another rationale for comparing effects of anti-marijuana and anti-tobacco advertisements is that they appear to share many common features. Both substances were targets of national campaigns in the U.S. (e.g., Office of National Drug Control Policy, ONDCP for anti-marijuana advertisements and Centers for Disease Control, CDC for anti-tobacco advertising). Both campaigns were primarily directed toward youth. Moreover, both substances have been culturally stigmatized as dangerous and risky. In varying degrees, today’s teenagers and young adults have been exposed to ubiquitous anti-marijuana and anti-tobacco messages throughout their lives. Self-reported use of both marijuana and tobacco among youth has been declining in most recent U.S. national surveys. However, since tobacco and marijuana use peaked in mid 1990s, self-reported tobacco use among youth has declined 27%, proportionally nearly ten times more than self-reported marijuana use (Johnson, O’Malley, & Bachman, 2003). Although young adults have still the highest percentage of smokers in the population (CDC, 2004) even among smokers, attitudes to tobacco appear to be predominantly negative (e.g., Grandpre et al., 2003; Stockdale, Hayley, Dawson-Owens, & Sagrestano, 2005). This trend suggests a growing perception in society that tobacco is a clear health threat, while perceived health risks of marijuana may be less profound and this difference might be contributing to youths’ potential more negative response to anti-marijuana public statement announcements than anti-tobacco.

In our study, we decided to expand traditional explicit assessment of attitudes (i.e., based on self-report) by adding implicit measures. The major limitation of explicit measures in assessing outcomes of anti-drugs prevention is well known; such measures are highly susceptible to social desirability and other forms of reactivity to research situation that can reduce their validity (e.g., Derzon & Lipsey, 2002; Slater & Kelly, 2002). Less obtrusive alternatives to explicit assessment of attitudes are offered by implicit tests designed to measure automatic evaluations of attitude objects that are independent of introspective awareness or conscious control (e.g., Dovidio & Fazio, 1991; Fazio & Olson, 2003; Greenwald, McGhee, & Schwartz, 1998). Research on implicit attitudes was initiated by social psychologists over a decade ago, partially as an attempt to improve accuracy of attitude assessments in the socially sensitive areas such as racial prejudice (e.g., Banaji & Greenwald, 1994; Dovidio, Kawakami, & Beach, 2001; Dovidio, Kawakami, & Gaertner, 2002; Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997). More recently, implicit tests were successfully applied to research on health-risk behavior and substance abuse such as alcohol and tobacco (De Houwer, Crombez, Koster, & Beul, 2004; Huijdinga, De Jonga, Wiers, & Verkooijcen, 2005; Jajodia & Earleywine, 2003; Palffai & Ostafin, 2003; Sherman, Rose, & Koch, 2003; Swanson, Rudman, & Greenwald, 2001; for review Wiers et al., 2004). The Implicit Association Test (IAT), the most frequently used test to assess implicit attitudes, measures the strength of associations between targeted concepts (e.g., smoking vs. exercising) and evaluative valance concepts (e.g., pleasant vs. unpleasant) by comparing response latencies in a double categorization task (e.g., Greenwald et al., 1998; Greenwald, Nosek, & Banaji, 2003). In a computerized version of IAT, a participant is shown a long sequence of stimuli (words or images) in the center of the computer screen and is required to classify each stimulus, as quickly as possible, into one of four classes: attribute category (e.g., pleasant) vs. attribute contrast (e.g., bad) or target category (e.g. smoking) vs. target contrast (e.g., exercising). The labels of one target category (i.e., related to attitude object) paired with
one attribute category (i.e., valance) are presented on both sides of the top of the screen, one pair each side (e.g., left side: smoking or pleasant, right side: exercise or unpleasant). Participants complete the categorization task by pressing keys corresponding to the side of the screen that includes a category label relevant to presented stimuli. It is assumed that on trials in which pairing of the target category and evaluative attribute is congruent with person’s attitude (e.g., smoking and unpleasant) the categorization task is easier and therefore performed faster than if the pairing is incongruent (e.g., smoking and pleasant). The difference in reaction times to congruent and incongruent pairings provides indirect evidence on how the attitude related knowledge is organized (for more details about the IAT procedure, see Greenwald, Banaji, & Rudman, 2002; Greenwald et al., 1998, 2003).

Our study examined the effects of a selected sample of anti-marijuana and anti-tobacco PSAs on explicit (i.e., self-reported) and implicit (i.e. IAT) attitudes in a mixed experimental design. Two groups of 18- to 19-year-old college students were exposed to either anti-tobacco or anti-marijuana advertisements followed by implicit and explicit tests of attitudes to both, marijuana and tobacco.

We predicted that the anti-marijuana ads may evoke relatively more cognitive reactance than anti-tobacco ads and therefore we expected to see attitudes to marijuana change in direction opposite to intended by the ads (i.e., more positive after exposure to anti-marijuana ads as compared to exposure to anti-tobacco ads). Attitudes to tobacco were predicted to change in a direction consistent with the intention of the ads (i.e., more negative after exposure to anti-tobacco ads as compared to exposure to anti-marijuana ads).

2. Method

2.1. Participants

Two hundred and thirty-three Texas State University–San Marcos 18- to 19-year-old undergraduate freshmen volunteered to participate in the study. Seven participants were removed because of an incomplete data (i.e., 3%); the results of remaining 226 participants were included in the final data analysis (age 18–19; 79 men and 147 women). Students were solicited by email and received $20.00 compensation for participation. They were randomly assigned to experimental conditions.

2.2. Material

2.2.1. Stimulus material

This consisted of recorded on DVD 15-min programs with 15 anti-tobacco or anti-marijuana TV commercials, of which ten were youth-directed and five were non-youth-directed ads. Each program comprised of alternating 90-s science film segments, with a 90-s block of three, 30-s ads. The 90-s (i.e., three ads) blocks were all ordered: “youth directed ad, non-youth directed ad, youth directed ad”, including a total of 15 anti-tobacco or anti-marijuana ads (i.e., each version of the program included five science film-ads sequences). There were four versions of recorded program corresponding to four experimental conditions: two types of ads (i.e., anti-tobacco or anti-marijuana) × two orders of ads. The anti-marijuana ads were accessed from Office of National Drug Control Policy Ad Gallery website (2004). The anti-tobacco ads were provided by CDC, Media Campaign Resource Center, Free Anti-Smoking TV Spots videotape (2004).
2.2.2. Survey

Survey consisted of two parts. The first part included a total of 45 items: basic demographic questions (i.e., age, gender and ethnicity) and 10-point Likert scale items to assess participants’ attitudes to different aspects of college life, among them items related to attitudes to tobacco and marijuana (i.e., perceived health hazard of each substance and seriousness of the problem). Only responses to items related to pre-existing attitudes to tobacco and marijuana are reported in this manuscript.

The second part of the survey consisted of three sets of seven, 5-point semantic differential scales designed to measure explicit attitudes to marijuana, tobacco and alcohol (i.e., good–bad, pleasant–unpleasant, worthless–valuable, favorable–unfavorable, acceptable–unacceptable, awful–nice, wonderful–horrible). The purpose of including scales related to alcohol was to decrease influences of demand characteristics on participants’ responses to targeted attitudes (i.e., tobacco and marijuana). Order of semantic differential scales was the same for all participants (i.e., alcohol, followed by marijuana and tobacco). At the end of the survey, there were additional Likert scale items (10-point scale) with statements about intent to use tobacco and marijuana and several filler statements unrelated to actual purpose of the study.

2.2.3. Implicit Association Tests

Two computerized Implicit Association Tests (IAT) were designed to assess implicit attitudes to tobacco and marijuana. The attribute (i.e., valence) category for the double categorization task labeled “Bad–Good” was represented by 20 words (10 with negative connotations and 10 with positive connotations); the target category (“Drug vs. Non-Drug” for Marijuana IAT and “Tobacco vs. Non-Tobacco” for Tobacco IAT) was represented by 40 images of which 20 were substance related images (e.g., marijuana leaves, bongs or cigarettes, ashtray with cigarette butts) and 20 were neutral images (i.e., common objects such as pencils, cups etc.). The tests were constructed following the standard IAT sequence (e.g., Greenwald et al., 1998); the only difference to the standard IAT procedure was the extended number of practice trials to 40 in order to reduce the typical effect of order in which the combined categorization tasks are performed (Greenwald et al., 2003). During the practice trial, participants were provided with feedback if they make an error in the categorization task and only RT to correct responses was recorded. The diagram of sequences used in marijuana and tobacco IAT is presented in Table 1. There were four versions of Marijuana IAT in order to counterbalance the pairing of

<table>
<thead>
<tr>
<th>Block</th>
<th>No. of trials</th>
<th>Function</th>
<th>Items assigned to left-key response</th>
<th>Items assigned to right-key response</th>
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<tbody>
<tr>
<td>1</td>
<td>20</td>
<td>Practice</td>
<td>Marijuana images</td>
<td>Neutral images</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
<td>Practice</td>
<td>Good words</td>
<td>Bad words</td>
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<tr>
<td>3</td>
<td>40</td>
<td>Practice</td>
<td>Good words + Marijuana images</td>
<td>Bad words + Neutral images</td>
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<td>4</td>
<td>40</td>
<td>Test</td>
<td>Good words + Marijuana images</td>
<td>Bad words + Neutral images</td>
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<td>5</td>
<td>20</td>
<td>Practice</td>
<td>Neutral images + Marijuana images</td>
<td>Marijuana images</td>
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<td>6</td>
<td>40</td>
<td>Practice</td>
<td>Neutral images + Good words</td>
<td>Marijuana images + Bad Words</td>
</tr>
<tr>
<td>7</td>
<td>40</td>
<td>Test</td>
<td>Neutral images + Good words</td>
<td>Marijuana images + Bad Words</td>
</tr>
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* The position of category labels for word stimuli, “Good” vs. “Bad” were switched in versions 2 and 4; the position of category labels for images (marijuana related or neutral), “Drug” vs. “Non-Drug” were switched in versions 3 and 4. The Tobacco IAT followed the same design; images of marijuana were replaced by images related to tobacco smoking and corresponding category labels to “Tobacco” vs. “Non-Tobacco”.

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target and attribute categories and location on the screen position (i.e., position of response key) The four versions of Tobacco IAT followed the same design. The order of IAT (i.e., Marijuana IAT first or Tobacco IAT first) and the version (1–4) of each IAT was systematically counterbalanced forming the total of eight experimental conditions.

2.3. Procedure

The experiment was conducted in small groups (i.e., eight participants per session) by six graduate and undergraduate research assistants. After entering the testing room, participants were seated in front of PC computers. Next to a computer, each person had a survey with a pre-recorded ID number on it. Each session started with participants answering questions of Part I of the survey.

Afterwards, they watched 15 min of a television program comprised of 15 anti-tobacco or anti-marijuana ads presented in five 90-s commercial segments separated with 90s. of educational video about psychologists Pavlov, Thorndike and Skinner. The program was played from a DVD and projected on a 3-ft viewing screen. Next, participants completed two computerized IAT tests designed to measure implicit attitudes toward tobacco and marijuana. The version of IAT tests (Version 1-4) and the order of the type of IAT (i.e., Tobacco or Marijuana) were counterbalanced across participants. At the end of the IAT component, participants answered the Part II of the survey (i.e., semantic differential scales to measure explicit attitudes to tobacco and marijuana). The testing sessions lasted approximately 60 min.

3. Results

The performance on the Marijuana and Tobacco IATs was scored according to the conventional algorithm (Greenwald et al., 2003). The test trials with reaction times below 300 ms or above 3000 ms were recoded to the nearer boundary value and, for each test block, the average was computed on the natural logarithm transformations of individual latencies. The log-transformation of raw results was performed in order to improve normality of the distribution (i.e., reaction times typically produce positively skewed distributions). The final IAT index was computed as a difference between average reaction time obtained from the test block pairing substance-related images with positive attributes and the test block pairing substance-related images with negative attributes. The lower IAT scores indicate more negative implicit attitude toward given substance (i.e., faster reaction time to a negative word/substance image combination than to positive word/substance image combination).

The score representing participants’ pre-existing attitudes was computed as an average of responses to two survey items, for each substance, directly corresponding to the message advocated by anti-tobacco/marijuana ads (i.e., tobacco/marijuana is a serious problem and tobacco/marijuana is a health hazard). The raw averages were reversed by subtracting from 10, so the lower final scores indicate a more negative attitude toward given substance.

Explicit attitudes to marijuana and tobacco were scored by averaging responses to seven semantic differential scales corresponding to each substance. Before scoring, appropriate scales were reversed (i.e., lower value of the final score indicates more negative attitude toward given substance).

The analysis of differences in preexisting attitudes showed that all participants rated tobacco ($M = 1.82$) more negatively than marijuana ($M = 3.53$), $t(225) = -10.79$, $p < 0.001$. However, there were
no significant differences between anti-marijuana ads and anti-tobacco ads groups in their pre-existing attitudes to either marijuana (t(124) = 1.43, p < 0.15) or tobacco (t(224) = 1.24, p < 0.26).

In order to test the effect of the content of the TV ads on viewers’ implicit attitudes (i.e., IAT scores) when controlling for the pre-existing attitudes to both substances, the 2 (Ads Watched: Anti-Marijuana or Anti-Tobacco) × 2 (Implicit Attitudes–IAT: Marijuana or Tobacco) mixed ANCOVA was conducted. The only significant result of this analysis was an interaction effect between the type of TV ads watched and implicit attitudes, F(1, 223) = 7.12, p < 0.01, η² = 0.03. The anti-marijuana ads group show tendency to more negative implicit attitudes to marijuana (adjusted M = -0.16) than anti-tobacco ads group (adjusted M = -0.12), F(1, 223) = 3.31, p < 0.07. The reverse pattern was revealed in implicit attitudes to tobacco; the anti-tobacco ads group show more negative implicit attitudes to tobacco (M = -0.17) than anti-marijuana ads group (M = -0.14) but this difference was not significant (see Fig. 1).

Analogical statistical analysis was performed on results of the post-viewing explicit attitudes to both substances (i.e., average semantic differential ratings of marijuana and tobacco). The 2 (Ads Watched: Anti-marijuana or Anti-tobacco) × 2 (Explicit Attitudes: Marijuana or Tobacco) mixed ANCOVA with the pre-existing attitudes to both substances as covariates, performed on average semantic differential scores showed a significant main effect of the substance; in both groups of viewers the explicit attitudes were significantly less negative to marijuana (adjusted M = 2.35) than tobacco (adjusted M = 1.65); F(1, 222) = 7.23, p < 0.01, η² = 0.03. In addition, there was a significant interaction between the type of ads watched and type of explicit attitudes, F(1, 222) = 5.79, p < 0.02, η² = 0.03. Participants that watched anti-marijuana ads rated marijuana significantly less negatively (adjusted M = 2.57) than anti-tobacco ads viewers (adjusted M = 2.13), F(1, 222) = 5.14, p < 0.02. However, there was no significant difference between groups in their explicit attitudes to tobacco (anti-marijuana ads group adjusted M = 1.67, anti-tobacco ads group adjusted M = 1.64, F < 1; see Fig. 2).

Fig. 1. Interaction between implicit attitudes and type of TV PSAs watched, F(1, 223) = 7.12, p < 0.01.
Since the results of our analysis on the explicit attitudes to marijuana revealed a negative (i.e., opposite) to intended effect of exposure to anti-marijuana ads, we decided to compare groups of anti-marijuana and anti-tobacco PSA viewers in their declared intention to use tobacco and marijuana (i.e., response to two items from the post-viewing survey). In order to reduce error variance related to pre-existing predispositions the pre-existing attitudes to tobacco or marijuana were included as a covariate in relevant comparisons. The ANCOVA comparing anti-marijuana ads group to anti-tobacco ads group on the intention to use marijuana, with pre-existing attitudes to marijuana as a covariate show significant differences between groups. The declared intention to use marijuana was higher in the anti-marijuana ads group (adjusted $M=4.47$) than anti-tobacco ads group (adjusted $M=3.8$), $F(1,221)=3.9, p<0.05$, $\eta^2=0.02$. The ANCOVA comparing both groups of ads viewers on the intention to use tobacco, with pre-existing attitudes to tobacco as a covariate revealed no significant differences between groups, $F(1,221)=1.06$, n.s.

Finally, we examined a correlation between explicit and implicit measures of attitudes to each of targeted substances; results revealed, significant, but modest, relationships between the implicit and explicit measures of attitudes to marijuana $[r(224)=.23, p<0.01]$ and tobacco $[r(224)=.21, p<0.01]$.

4. Discussion

Our results demonstrated that among 18- to 19-year-old college freshmen in the U.S., explicit attitudes to tobacco were significantly more negative than to marijuana. This trend was consistently revealed by pre-existing and post-manipulation measures of participants’ attitudes. The overall average ratings of tobacco were in close range of the lowest point of the attitude scale (i.e., $M=1.83$ on 10-point scale in pre-existing attitudes and $M=1.65$ on 5-point scale in post-ads viewing attitudes). The overall, explicit pre-existing attitudes to marijuana, although significantly less extreme than to tobacco, were also
negative ($M=3.53$ on 10-point scale). However, the overall, explicit attitudes to marijuana approach neutral in post-ads viewing assessment ($M=2.35$ on 5-point scale). This outcome is explained by observed interaction effect between type of anti-substance ads viewed and post-viewing explicit attitudes to targeted substances. The group expose to anti-marijuana show significantly less negative attitudes to marijuana ($M=2.57$ on 5-point scale) than the group expose to anti-tobacco ads ($M=2.13$ on 5-point scale), while controlling for differences in preexisting attitudes to this substance.

However, there was no similar effect of exposure to anti-substance ads in attitudes to tobacco. This result is consistent with our predictions and confirms trends reported by other researchers (e.g., Hornik et al., 2002, 2003). It appears that in our study, a sample of anti-marijuana public statement announcements used in national anti-drug campaign in the U.S. produced immediate effects opposite to intended by creators of this campaign on the youth’s attitudes to marijuana. This reactance effect was triggered only by anti-marijuana ads but not by anti-tobacco ads. Therefore, it cannot be attributed to a general disposition to respond with reactance (i.e., rebelliousness) to any anti-substance use persuasion in adolescents and young adults population. Moreover, the same pattern of differences in the opposite than intended direction emerged from responses to question about the intention to use marijuana. Students viewing anti-marijuana advertising declared significantly higher intention to use this substance ($M=4.47$ on 10-point scale) than students expose to anti-tobacco ads ($M=3.8$) while controlling for pre-existing differences in attitudes to marijuana. However, there were no significant differences in intention to use tobacco between these two groups. The behavioral intention measures have been frequently included in outcome evaluation of anti-drug campaigns and are considered to be a highly predictive of future behavior (e.g., Harrington et al., 2003; NIDA, 2003). That would suggest that exposure to anti-marijuana advertising might not only change young viewers’ attitudes to more positive toward this substance, but also might directly increase risk of using marijuana.

Our study was not intended to investigate why anti-marijuana PSAs might produce an opposite than expected effect on viewers’ attitudes. We can only speculate about possible causes of this effect. The cognitive response approach to persuasion (for a review see e.g. Petty & Cacioppo, 1996) predicts that viewers’ cognitions and judgments elicited at the time of message will determine the amount and direction of attitude change. If the persuasive communication evokes disagreement with the content of the message, it provokes a recipient to generate counterarguments and the positions opposite to that advocated might be adopted, producing the so-called boomerang effect. A boomerang effect in response to persuasion is increased when the message is perceived as weak, inconsistent with prior knowledge, and when the source’s credibility is suspect (e.g. Petty & Cacioppo, 1986, 1990; Petty & Wegener, 1999). Previous research on preventive communication confirmed that quality of arguments modifies persuasive effect of messages (e.g., Harrington et al., 2003; Stephenson, Benoit, & Tschida, 2001). Past anti-drugs media campaigns in the U.S. have been criticized for exaggerated use of fear-based arguments and some factual inaccuracies, practices that some researchers warned might backfire by enforcing attitudes opposite to intended by the campaigns creators (Buchanan & Wallack, 1998; DeJong & Wallack, 1999). Our preliminary study revealed that college students generated more negative comments to televised anti-marijuana ads than anti-tobacco ads often perceiving them as exaggerated and unbelievable (Ginsburg & Czyzewska, 2005). Participants’ immediate post-viewing written comments about a small sample of anti-marijuana and anti-tobacco television ads appeared consistent with concerns about the weakness of some anti-drug messages. Perhaps, as teens mature they become better able to detect logical discrepancies in arguments and assimilate contradictory, real-life experiences into their attitude formation to marijuana. Moreover, youth may explicitly react to the disparity that while
marijuana is a universally illicit substance for both minors and adults, tobacco is illegal for minors to possess, but legal for adults. Maio, Bell, and Esses (1996) demonstrated that people with ambivalent attitudes scrutinized messages more carefully and exhibited more systematic processing of persuasive messages pertaining to the attitude object. More ambivalent attitudes to marijuana and better ability to process relevant information are possible reasons that college students react to some messages perceived as weak and/or inconsistent by generating counter arguments and unfavorable thoughts, promoting a paradoxical effect of explicit attitude change in the direction opposite to one advocated by the message.

The fact that our results did not support effects consistent with ads’ intention of anti-tobacco PSAs on attitudes to tobacco might be due to a floor effect in the explicit measures of attitudes to this substance. In both groups of PSAs, viewers’ average ratings of tobacco were close to the lowest end of the measurement scale. This consistently negative evaluation of tobacco is congruent with national trends in anti-smoking attitudes (Johnson et al., 2003). Results obtained from our sample are more extreme than previously reported in comparable studies (e.g., Huijdinga et al., 2005; Sherman et al., 2003; Swanson et al., 2001). This outcome might reflect further progression of societal unfavorable attitudes to smoking, strengthened by continuing changes in the U.S. public policies restricting tobacco use in public places.

However, the expected effect of the anti-tobacco PSAs became evident in participants’ implicit attitudes. Students who watched programs with anti-tobacco PSAs show more negative implicit attitudes to tobacco than anti-marijuana PSAs viewers. A reversed pattern was found among participants watching anti-marijuana ads (i.e., implicit attitudes to marijuana were more negative in anti-marijuana ads viewers than anti-tobacco ads viewers). Our results show that relatively short exposure to anti-substance advertising (anti-tobacco or anti-marijuana) was enough to produce intended changes in implicit attitudes (i.e., strengthen negative associations with targeted substance). This outcome suggests that implicit attitudes might be more malleable than previously thought (see Wiers et al., 2004 for extensive discussion of malleability of implicit, drug-related cognition). However, without further research it is not clear what are the behavioral consequences of these observed changes in implicit attitudes. For example, previous research demonstrated that IAT measures can be sensitive to the associations a person has been exposed to in his/her environment (e.g., repeated messages that drugs or smoking are “bad”) but this knowledge does not necessarily reflect personal endorsement (Karpinski & Hilton, 2001). The explicit and implicit attitudes to tobacco were consistent in that both imply low rates of approval of this substance. This result is consistent with previous findings showing predominantly negative implicit and explicit attitudes to smoking, even though they tend to be relatively less negative in smokers than non-smokers (Sherman et al., 2003; Swanson et al., 2001; Huijdinga et al., 2005). However, our results related to marijuana show dissociation between students’ explicit and implicit attitudes to this substance. The exposure to anti-marijuana ads produced an intended effect of making viewers’ implicit attitudes to marijuana more negative as compared to attitudes of anti-tobacco ads group but the explicit attitudes of anti-marijuana ads viewers’ seemed to change in the opposite direction. The group that watched the anti-marijuana ads reported significantly less negative attitudes toward this drug than anti-tobacco ads group. Despite a profusion of research on implicit attitudes in recent years, a theoretical work addressing a relationship between implicit and explicit attitudes, and their predicted influence on behavior has been proposed only recently (Fazio & Olson, 2003; Perugini, 2005; Rudman, 2004; Wilson, Lindsey, & Schooler, 2000). It has been suggested that the convergence between explicit and implicit attitudes can be expected to be low if they relate to a stigmatized behavior because in such cases overt responses are often modified by various motivational factors (Fazio & Olson, 2003). For example, researchers have shown that the dissociation between implicit and explicit measures frequently occurred in assessments of
racial attitudes, where implicit attitudes tend to be more negative than explicit ones and implicit attitudes are more predictive of behavior, especially if response is automatic as opposed to deliberate (e.g., Dovidio et al., 2001, 1997). A different pattern of interplay between explicit and implicit attitudes emerged from research on smokers. Swanson et al. (2001) showed that smokers and non-smokers did not differ in their negative implicit attitudes to smoking; however, their explicit attitudes were significantly more positive than non-smokers and ultimately the explicit attitudes were more predictive of smoking behavior.

More recently, Perugini (2005) described an empirically supported, interactive model in which explicit attitudes to smoking moderated the influence of corresponding implicit attitudes on smoking behavior. According to this model, if explicit attitudes to smoking are negative the likelihood of engaging in smoking declines even with implicit attitudes changing in positive direction. However, with positive explicit attitudes the probability of becoming a smoker increases rapidly even with a small change of implicit attitudes in positive direction.

At this point, without further research we can only speculate what might be the behavioral consequence of the dissociation pattern in attitudes to marijuana produced in response to anti-marijuana ads. Clearly more research is needed to better understand the interaction between implicit and explicit attitudes in general and more specifically, in the content areas relevant for prevention (e.g., substance use). Nevertheless, findings from research on smoking behavior seem to provide enough evidence to be concerned about our results suggesting that anti-marijuana advertising might produce unintended change in positive direction in explicit attitudes to marijuana among college students.

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References


