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Yahui Kang [a]; Joseph N. Cappella [a]; Martin Fishbein [a]
[a] Annenberg School for Communication, University of Pennsylvania,

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The Effect of Marijuana Scenes in Anti-Marijuana Public Service Announcements on Adolescents' Evaluation of Ad Effectiveness

Yahui Kang, Joseph N. Cappella, and Martin Fishbein

Annenberg School for Communication
University of Pennsylvania

This study explored the possible negative impact of a specific ad feature—marijuana scenes—on adolescents' perceptions of ad effectiveness. A secondary data analysis was conducted on adolescents' evaluations of 60 anti-marijuana public service announcements that were a part of national and state anti-drug campaigns directed at adolescents. The major finding of the study was that marijuana scenes in anti-marijuana public service announcements negatively affected ad liking and thought valence toward the ads among adolescents who were at higher levels of risk for marijuana use. This negative impact was not reversed in the presence of strong anti-marijuana arguments. The results may be used to partially explain the lack of effectiveness of the anti-drug media campaign. It may also help researchers design more effective anti-marijuana ads by isolating adverse elements in the ads that may elicit boomerang effects in the target population.

Marijuana is the most commonly used illicit drug in the United States. According to the report based on The Youth Risk Behavior Survey, 22 % of high school students currently use marijuana and one tenth of them first tried marijuana before age 13 (Grunbaum et al., 2004). Marijuana use poses a serious health threat to adolescents because it is related to negative health consequences, including defects in the immune system, lung damage, depression, and anxiety (Palmgreen, Donohew, Lorch, Hoyle, & Stephenson, 2001). Moreover, although not necessarily a gateway drug, those who use marijuana may be more likely than others to use cocaine or other hard drugs (Merrill, Kleber, Shwartz, Liu, & Lewis, 1999).

Several nationwide anti-drug media campaigns have been carried out to reduce and prevent drug use among youth. By far the largest anti-drug media effort in history is the National Youth Anti-Drug Media Campaign, initiated by the White House Office for National Drug Control Policy. Through 2003, this campaign cost $1.2 billion (House Report 107-575, 2003). The president's fiscal year 2006 budget proposed an additional $120 million for this media campaign (Walters, 2005). Eighty-two percent of this budget was required to be used for advertising time and placement (Walters, 2005). Currently, anti-drug public service announcements (PSAs) comprise the centerpiece of these anti-drug media efforts (Varshavsky, 2003). Despite the huge amount of money spent on the National Youth Anti-Drug Media Campaign, researchers evaluating the effectiveness of this media campaign have found no evidence that exposure to the anti-marijuana campaign for youth 12 to 18 years old reduced their marijuana use between 2002 and 2003. Instead, there was an increase in the past-month and past-year marijuana use in the target audience of 14- to 16-year-olds during this period, although this upward trend appears to have already been in place before the start of the marijuana initiative (Hornik et al., 2003). This finding is not surprising. In fact, a meta-analysis of 72 anti-substance abuse media campaigns has revealed mostly inconclusive results (Derzon & Lipsey, 2002).

Correspondence should be addressed to Yahui Kang, Bell Falla and Associates, 383 Main Avenue, Norwalk, CT 06851. E-mail: kangyahui_2000@yahoo.com

Careful attention to these media messages can be critical for understanding the lack of effectiveness of the campaign. Recent behavioral science theory and research have pointed out the importance of message content in the success of behavioral-change interventions (Fishbein, Hall-Jamieson, Zimmer, von Haeften, & Nabi, 2002). Prior studies have identified certain content and format features in anti-drug PSAs that appear to be conducive to positive or negative effects. For example, PSAs emphasizing social implications are more effective than those focusing on physical harms of drug usage (Shoenbachler & Whittler, 1996). Anti-marijuana ads targeting the belief that marijuana is a gateway to stronger drugs were counterproductive, actually increasing positive attitudes and intentions toward marijuana use (Yzer, Cappella, Fishbein, Hornik, & Ahern, 2003). Ads that use deliberate fear appeals may be risky because they may elicit psychological reactance from the viewers, which can reduce an ad's effectiveness (Shoenbachler & Whittler, 1996). In fact, it has been suggested that by alarming the audience through portraying the proscribed behaviors, the PSAs may serve to normalize the unhealthy behavior, and promote competition and imitation from the audience (Wagner & Sundar, 1999) because the audience "becomes curious, learns it is fun, or regards it as challenging" (Atkin, 2001, p. 31). This is especially the case for high-risk adolescents (Atkin, 2001).

In addition to the content components, the executional styles of the messages also contribute to varied levels of ad effectiveness. For example, anti-drug ads with high sensation value (i.e., ads that can elicit higher levels of sensory, affective, and arousing reactions from the target audience) are found to attract more attention and increase message processing in high-sensation-seeking adolescents (Donohew, Lorch, & Palmgreen, 1991, Lorch et al., 1994). Controlled community trials also show that anti-drug PSAs embedded in high-sensation-value TV programs are able to reverse upward trends in 30-day marijuana use among high-sensation-seeking adolescents (Palmgreen et al., 2001). High message sensation value of anti-drug PSAs may also attract more attention to the executional features and thus interfere with one's processing of the anti-drug argument of the ad (Kang, Cappella, & Fishbein, 2006).

Compared to the number of studies on the effectiveness of anti-smoking messages on audience reactions (e.g., Biener, 2000, 2002; Pechmann, Zhao, Goldberg, & Reibling, 2003), studies on anti-drug, and specifically anti-marijuana messages, are limited. This may partly reflect the difficulty of finding significant impacts of these anti-marijuana messages, which further calls for innovative ways to explore message features that may affect ad effectiveness. This study responds to this need and explores one ad feature that may negatively affect an ad's effectiveness, given sufficient exposure. A secondary data analysis is conducted to test the hypothesized effects of this ad feature. The results may help us understand the conditions under which anti-drug ads are ineffective. It may also help us to design more effective anti-marijuana PSAs, by isolating adverse elements in the ads and reducing the likelihood that certain PSAs may elicit boomerang effects in the target population.

MARIJUANA SCENES IN ANTI-MARIJUANA PSAS

The ad feature examined in this study is the presence of marijuana scenes. These are defined as any visual scene that portrays (a) the mere presence of marijuana-related materials (e.g., marijuana cigarette); (b) holding and handling of marijuana cigarettes (e.g., preparing the cigarette for smoking, holding, ignition), or (c) actual marijuana smoking behavior (e.g., puffing, inhaling). Compared to the first category of "mere presence," which presents the possibility of marijuana use, the second category of "holding and handling scenes" is more explicit because it directly portrays a character's "identity as a user" while implicitly suggesting, but not showing, current use of marijuana. The last category, of "actual marijuana smoking scenes," is most explicit because it directly illustrates active use of marijuana. Similar drug-use cues in the context of tobacco and other hard drugs have been used in cue-reactivity studies (Juliano & Brandon, 1998; Sayette & Hufford, 1994). Although the three types of marijuana scenes may be different in terms of the strength of effects, they have often been examined as a group in prior studies. To our knowledge, no study has specifically linked the marijuana scenes in anti-marijuana PSAs to adolescents' perceptions of ad effectiveness.

This study explores the role of marijuana scenes in anti-marijuana PSAs by addressing a series of questions: (a) Do marijuana scenes negatively affect adolescents' ad effectiveness evaluation? (b) If so, do strong anti-marijuana arguments help to offset this negative impact? (c) If marijuana scenes indeed negatively affect ad effectiveness evaluations, on which population is the impact more evident? If there is evidence for negative effects of marijuana scenes on message effectiveness, then perhaps the use of marijuana scenes in ad design should be reconsidered. Even if anti-marijuana arguments overcome any negative impact of marijuana scenes, the net effect may still be counterproductive. Therefore it is important to understand the impact of marijuana scenes in anti- marijuana PSAs to exploit their value or to avoid possible boomerang effects. Considering the huge amount of money spent on the war on drugs, understanding which anti-drug messages are most effective and which message features contribute to success and failure in the target population is a requirement.

We first discuss the impact of marijuana scenes. In anti-marijuana PSAs, the presence of marijuana scenes often implies that marijuana is easy to get (e.g., drug dealers are just around the corner), it is not hard to use (e.g., kids similar to you use it), it is widely used or accepted among

adolescents (e.g., a group of kids are passing around the marijuana cigarette), and the users may even look "cool" (e.g., adolescents users are often presented as rebellious, with stylish attire and slouching postures). Although these scenes often lead to an anti-marijuana argument through voiceover, screen verbals, or the languages and behaviors of the actors or actresses, the presence of marijuana scenes nevertheless serves as a direct illustration of marijuana use and may directly affect adolescents' perception of the behavior. To adolescents who are curious to learn new things and to be accepted by their peers, these scenes may arouse curiosity, teach or illustrate details related to marijuana use, create an illusion that everyone else is using marijuana, and even normalize the proscribed behavior and promote competition and modeling from nonusers (Atkin, 2001; Wagner & Sundar, 1999). Thus, the presence of marijuana scenes in anti-marijuana PSAs, despite its benign intention, may negatively affect the effectiveness of the ads. The general assumption of the ad designers is that even if there is possible negative impact from marijuana scenes, the anti-marijuana arguments will counteract and transfer or channel this negative influence into a positive one. This may or may not be a fair assumption. So we test this possible negative impact of marijuana scenes by hypothesizing that:

H1: Ads with marijuana scenes will lead to lower ad effectiveness evaluation than ads without marijuana scenes.

From the audience perspective, the same message features may exert different impacts on different segments of the audience (i.e., different risk groups). The risk status of the adolescent audience may affect how they process the marijuana scenes in the ads. In this study, the risk of marijuana use is specifically defined as a risk index for adolescents' possible marijuana use. Because adolescents often do not truthfully report their marijuana use behavior, this measure is designed to predict their risk of marijuana usage based on predictors obtained in the previous national surveys that have been found to relate to adolescents' marijuana use behavior. These predictors of marijuana use include age, sensation-seeking tendency, and immediate social network, including the number of friends who use marijuana and the number of times marijuana is offered (Yzer et al., 2004).

There are several reasons that high-risk adolescents may be more affected by marijuana scenes than low-risk adolescents. Adolescents who are at a higher risk of marijuana use are more interested in marijuana use, are more likely to be past users, and tend to hold a more positive attitude toward marijuana use (Yzer et al., 2004). Marijuana scenes therefore are more salient and appealing to them and are more likely to affect their ad judgment. Second, this group of adolescents also tends to be high-sensation seekers. According to the activation model of information exposure (Donohew, Lorch, & Palmgreen, 1998; Zuckerman, 1979), high-sensation seekers are more attracted to messages with high sensation values. Ads with marijuana scenes are more sensational than those without such scenes, especially when such scenes portray a proscribed behavior. Thus high-risk adolescents are more likely to be distracted by marijuana scenes and thus less likely to fully process the anti-marijuana arguments embedded in the ads. Third, high-risk adolescents have more marijuana encounters (e.g., more friends using marijuana, more opportunity to be offered marijuana). For them, marijuana scenes may serve as an illustration for marijuana-use details (e.g., how to use it and where to get it), or a reminder of their past experience, or a justification of the behavior, and thus promote more competition and modeling behavior from this segment of the population. Therefore, we expect to see that:

H2: The negative impact of marijuana scenes on ad effectiveness evaluation will be larger among high-risk adolescents than among low-risk adolescents.

Next we move to the discussion of the second message feature—argument strength. The impact of argument strength has been studied widely in the persuasion literature. The most prominent theory that gives a relatively deep and thorough discussion of its impact on persuasion is the elaboration likelihood model (ELM, Petty & Cacioppo, 1986). The ELM is a cognitive model widely used to explain information processing. The underlying assumption of the ELM is that people have the motivation to hold correct opinions. The ELM suggests that people may take two alternative routes to message processing: central and peripheral. When one is less capable or willing to conduct elaborative processing, one will look for cognitive shortcuts (or peripheral cues) that allow them to make a quick judgment based on superficial aspects of the message. During this process, argument strength becomes less influential in the final outcome of persuasion. When one's ability and motivation are both strong, one will be involved in central processing, during which argument strength is an important factor in determining the final outcome of persuasion.

Under conditions of elaborative processing, strong arguments will be more effective than weak arguments. This is considered to be an objective thinking process. Alternatively, one may engage in biased message processing. During biased processing, people may judge messages that are consistent with their existing attitudes as fair and objective but consider counterattitudinal messages as unfair and propagandistic. Thus strong arguments by opponents can lead to less effectiveness (Petty & Cacioppo, 1986). Two of the conditions for biased processing are (a) when the message is contradictory to one's prior attitude, beliefs or expectations; and (b) when the message presents a clear persuasive intent and instills "reactance" by restricting one's freedom of choice (Brehm, 1966; Petty & Cacioppo, 1979). Part of the reason that an individual engages in a

biased processing is to defend his or her existing value system. The more involved one is with the topic or with the associated value, the more likely one will be engaged in biased processing toward one's existing values (Johnson & Eagly, 1989).

In this study, the impact of argument strength on ad evaluations may be affected by the individual's involvement with the message or topic. Here we need to refer again to the individual-difference factor introduced earlier in this article, that is, risk status of the adolescents. Based on the formula used to calculate this measure, risk of marijuana use can be considered to be a proxy measure of involvement with marijuana use. Prior studies have found that adolescents with higher risk of marijuana use have a more positive attitude toward marijuana use as well as higher intentions to use, stronger positive-consequence beliefs, and weaker negative-consequence beliefs than their low-risk counterparts (e.g., Yzer et al., 2004). Therefore anti-marijuana arguments may be counterattitudinal for high-risk adolescents. As a result, the high-risk adolescents are more likely to conduct a biased processing that does not give due value to the strong arguments. That is, they are more likely to counterargue the stronger than the weaker anti-marijuana arguments in the ads, which leads to a negative impact of argument strength on ad evaluations. Low-risk adolescents, who have relatively stronger negative attitudes toward marijuana use and are relatively less involved with the issue or topic, are more like to conduct objective processing, or biased processing in the other direction, which gives more value to the stronger than the weaker arguments. This line of reasoning suggests an interaction between argument strength and risk status on ad evaluation. It further implies that ad designers' expectation that anti-marijuana arguments may be able to counteract the possible negative impacts of marijuana scenes, if there any, may be more likely to hold for low-risk than high-risk adolescents.

H3: Argument strength will interact with risk of marijuana use such that stronger arguments will lead to higher ad effectiveness evaluation than weaker arguments for low-risk adolescents, whereas stronger arguments will lead to lower ad effectiveness evaluation than weaker arguments for high-risk adolescents.

It is important to recognize that evaluation of ad effectiveness may or may not relate to the actual ad effect, that is, change in drug-use behaviors. However, judgment of ad effectiveness is often a necessary (although not sufficient) condition for producing actual change in beliefs, attitudes, and behavioral intentions that are important determinants of drug-use behaviors (Fishbein et al., 2002). Moreover, prior studies have shown that perceived ad effectiveness provides important information about audience attitudes and can be a good proxy measure of actual effectiveness (Biener, 2002).

METHOD

A secondary data analysis was conducted on adolescents' evaluations of 60 anti-marijuana and general anti-drug PSAs that were part of national and state anti-drug campaigns directed at adolescents. Three sources of data were employed in this study. The first source provided data on ad effectiveness evaluations. The second source provided information on the strength of the arguments used in the ads. The third source supplied the coding of marijuana scenes. Details about the measures used in each study and each study's sample characteristics are described later. It is important to recognize that the evaluations of argument strength are provided by a sample of adolescents different from the sample that rated the ad effectiveness. Unlike some ad evaluation studies, this study poses and answers its questions at the ad level, in which multiple adolescents' evaluations of the same ad were averaged into a single score. So the new data set contained aggregated ad and argument evaluations, as well as marijuana scene coding for each of the ads (N = 60). In the original studies, individual adolescents' risk of marijuana use was also calculated. Each individual was put into a high- or low-risk category based on the median split for this measure. In addition, the aggregate ratings for each ad were calculated separately for high- and low-risk adolescents. Thus the final data contained aggregate-level ratings for each ad among all adolescents as a whole as well as among high- and low-risk adolescents.

Samples

Ad effectiveness evaluation. A total of 601 youths aged 12 to 18 years (M = 15.3) participated in this research in exchange for $10 in cash as compensation for their time. The sample included approximately equal numbers of males (301) and females (300), and was predominantly White (71.9% White, 23.6% African American, and 4.5% other race/ethnicity). Participants were recruited from shopping malls in urban locations throughout the United States, including San Diego, Atlanta, Detroit, and New York, by Opinion One, a market research firm. Signed parental consent and youth assent forms were obtained prior to participation.

Argument strength evaluation. This sample included 322 adolescents, 49.7% of whom were male. Age ranged from 12 to 18 years, with a mean of 15.4 years (SD = 1.95). About two thirds (66.8%) of the sample were White, 22.4% were African Americans, and 10.8% were from other ethnic or racial groups. Respondents were recruited through mall intercept solicitations at 15 locations across the country, including Oakland, California; St. Louis, Missouri; Cincinnati, Ohio; San Antonio, Texas; Charlotte, North Carolina; Washington, DC; and Kansas City, Kansas. Signed parental consent and youth assent forms were obtained prior to participation. Respondents were paid $5 each for their participation.

Measures

Trained coders coded marijuana scenes in the ads. Ads with any of the three types of marijuana scenes (mere presence, holding and handling, and actual smoking of marijuana cigarettes) were coded as 1, and ads without such scenes were coded as 0 (Krippendorff's α = 1.00). The resulting "marijuana scene" variable had two categories: "ads with marijuana scenes" (n = 24) and "ads without marijuana scenes" (n = 36).

Argument strength is conceptualized as the strength of the argument presented in the PSA. One comprehensive argument per ad was extracted by experts using both the verbal claims and visual arguments presented by the ads. Adolescents evaluated the extent to which each argument was convincing, strong, believable, important, made them feel confident to say no to marijuana, kept them away from using marijuana, elicited agreement from them, and put thoughts in their mind about staying away from marijuana. Each of these judgments was measured on a 5-point scale ranging from 0 (*strongly disagree*) to 5 (*strongly agree*). The mean response for each item was used to indicate argument strength (M = 3.70, SD = .15; Cronbach's α =.90). A description of the argument evaluation process, as well as the scale reliability and validity, is presented in Zhao, Cappella, Fishbein, & Barrett (2005). To better illustrate the nature of the possible interaction between argument strength and other message and individual features (both were dichotomous in nature), the argument strength measure was dichotomized at the median in the analyses (see Hayes, 2005, for the pros and cons of the median-split method). The two argument strength conditions (M_{low} = 3.58, SD_{low} = .10 vs. M_{high} = 3.82, SD_{high} = .09) were significantly different from each other, $F(1, 59)$ = 100.34, $p < .001$.

Three measures of ad effectiveness were used: perceived ad effectiveness, ad liking, and the predominant valence of thoughts generated by the ad. These measures originated from different research traditions and are conceptually distinct from each other. Perceived message effectiveness was developed in the area of argument studies to directly measure one's perception and evaluation of the convincingness of a message. Ad liking is commonly used in advertising literature to measure one's overall attitude toward an ad (Brown & Stayman, 1992). An overall positive attitude toward an ad is used as an important antecedent of ad effectiveness, together with positive attitude toward the brand and purchase intention (MacKenzie, Lutz, & Belch, 1986). Thought listing is widely used in attitude-change literature (Petty & Cacioppo, 1986). It looks at the predominant valence of the thoughts generated by the message to indirectly assess message effectiveness (Haugtvedt & Priester, 1997). It is often considered to be a gold standard for assessing message strength. The separation of these three measures helps illustrate the robustness of the patterns observed from the two message features and facilitates our interpretation of ad effects.

Perceived ad effectiveness was measured with four items on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*): "This ad was convincing," "The ad said something important to me," "Watching this ad helped me feel confident about how to best deal with using marijuana," and "If my friends were offered marijuana, this ad would help keep them from using marijuana."[1] The means of the four items were used to indicate the perceived anti-marijuana effectiveness of the ad (M = 3.36, SD = .23, Cronbach's α = .79). A similar scale used in a previous study successfully distinguished between ads with different message features and targeting different types of drugs (Fishbein et al., 2002). Ad liking was measured with a single 7-point item ranging from 1 (*not at all*) to 7 (*very much*): "Do you like the ad?" (M = 4.88, SD = .45). Thoughts about each ad were generated following the conventional thought-listing procedure (Petty & Cacioppo, 1986). Adolescents were asked to report as many as four thoughts per ad after viewing it. Positive and negative thoughts were coded ($\kappa \geq .80$). The number of negative thoughts (M = 14.9, SD = 7.6) was subtracted from the number of positive thoughts (M = 39.1, SD = 7.7) to get a score of the dominant thought valence for each ad (M = 24.0, SD = 13.8). An ad that elicited predominantly positive thoughts was considered to be of a higher quality or effectiveness, following the conventional interpretation of thought-listing procedure (Petty & Cacioppo, 1986). The intercorrelations among the three indicators of ad effectiveness evaluation were .71 between perceived ad effectiveness and thought valence, .78 between perceived ad effectiveness and ad liking, and .82 between ad liking and thought valence. Because of the conceptual distinctiveness and need for interpretation mentioned earlier, we kept them as separate indicators.

Risk of marijuana use in the previous year was assessed in the original studies for both the sample that provided the argument evaluation data and the sample that supplied the ad evaluation measures. It is a behavioral measure developed from a previous independent survey on adolescent marijuana use (N = 600). Based on parameters developed in that survey, risk of marijuana use was calculated as risk = –9.34 + [.19 × (age)] + [.62 × (the number of friends who used marijuana)] + [.66 × (the number of

[1]Although argument strength and perceived message effectiveness adopted similar items in their measurement scales, they represented distinct concepts and were evaluated differently. First, argument strength was an assessment of the argument component of the ads, whereas perceived message effectiveness was an assessment of the ads as a whole, including verbal, audio, and visual components. Second, different samples evaluated argument strength and perceived message effectiveness. Arguments were rated as pure verbal sentences extracted from the ads, whereas ads were evaluated in their audiovisual format. Third, perceived ad effectiveness was a holistic evaluation of the ads and therefore was influenced by not only the arguments but also other message features, including marijuana cues, MSV, and so forth. Thus no significant correlation was found between argument strength and perceived message effectiveness (r = .17, p = ns).

times marijuana was offered)] + [.11 × (sensation-seeking score)] (Yzer et al., 2004). The adolescents in the original sample were put into either a higher or lower risk group based on the median split for this measure. The parameters for the risk measure were calculated in the original studies. This secondary analysis had access to only the aggregated data for the high- and low-risk adolescents. Therefore the statistics for this risk measure were not available in this analysis.

To rule out possible confounders for the impact of marijuana scenes and argument strength, we controlled for two sets of message features in the study. One was a message format variable—message sensation value (MSV). It is a set of message features designed to elicit sensory, affective, and arousal responses (Everett & Palmgreen, 1995; Palmgreen et al., 1991). These structural features, including formal video, audio, and content features (Morgan, Palmgreen, Stephenson, Hoyle, & Lorch, 2003), are found to be able to distract attention away from processing of the central argument (Kang et al., 2006). Therefore MSV was controlled for to make sure that the distraction effect, if any, was due to marijuana scenes rather than to MSV. MSV features were coded using the coding scheme developed by Morgan et al. (2003). The MSV total score was calculated as the sum of all individual MSV features (M = 5.63, SD = 2.55, $\kappa > .79$).

The second set of message features controlled for was argument content. Argument content concerns the different outcomes of marijuana use mentioned in the ad. Four types of argument content related to the consequences of marijuana use were coded on a scale ranging from 1 (*not at all about a certain belief*) to 5 (*strongly about that belief*): health costs (M = 1.40, SD = 1.08), social costs (M = .84, SD = .89), self-esteem costs (M = 1.63, SD = .79), and positive outcomes of using marijuana (M = .24, SD = .35). The intercoder reliability was acceptable ($\kappa > .79$). It was assessed by correlations among raters rather than correlations between items on a scale, following the procedure suggested by Rosenthal (1987). Detailed information about the coding of these variables can be found in the original study by Yzer et al. (2003). Because it is possible that ads with strong arguments mentioned more health consequences of marijuana use, controlling argument content allowed us to separate the impact of argument strength from that of argument content.

RESULTS

Marijuana scene (with two categories: presence versus absence) was not correlated with argument strength ($r = –.05$, $p = .71$), suggesting that the two factors were not confounded. The correlations between marijuana scene and two sets of possible confounding variables (MSV and argument content) revealed one significant relationship. Ads with marijuana scenes were more likely than their counterparts to mention positive outcomes of marijuana use, $r = .33$, $p = .01$. All of the following analyses were conducted with analysis of covariance, with MSV and argument content as covariates. Table 1 presents the means and standard deviations of three dependent measures of ad effectiveness evaluation by ad and participant condition.

Marijuana Scene and Argument Strength on Ad Effectiveness Evaluation

There was a marginally significant main effect of marijuana scene on ad liking, $F(1, 51) = 3.69$, $p = .06$, partial $\eta^2 = .07$. Ads with marijuana scenes were liked less (M = 4.73, SD = .50) than ads without such scenes (M = 4.98, SD = .39). Similar but nonsignificant patterns were found for dominant thought valence and perceived ad effectiveness. H1 received partial support.

Post hoc analyses indicated that the negative effect of marijuana scenes was purely driven by the category of actual marijuana-smoking scenes. After controlling for MSV and argument content, the contrast between ads with

TABLE 1
Means of Perceived Ad Effectiveness, Ad Liking, and Thought Valence by Marijuana Scene, Argument Strength and Risk of Marijuana Use

Risk of Marijuana Use	*Argument Strength*	*Marijuana Scene*	*Perceived ad Effectiveness*	*Ad Liking*	*Thought Valence*	*N*
Low	Low	No	3.57 (.17)	5.17 (.32)	14.71 (5.41)	14
		Yes	3.54 (.35)	5.04 (.65)	14.69 (10.15)	16
	High	No	3.62 (.24)	5.22 (.39)	16.50 (6.60)	22
		Yes	3.60 (.22)	5.18 (.32)	17.50 (4.60)	8
High	Low	No	3.17 (.28)	4.68 (.55)	10.43 (8.30)	14
		Yes	3.11 (.30)	4.33 (.52)	5.81 (9.49)	16
	High	No	3.26 (.27)	4.73 (.56)	10.32 (8.54)	22
		Yes	3.16 (.14)	4.31 (.72)	3.88 (9.91)	8

Note. Values in parentheses are standard deviations.

actual marijuana-smoking scenes (n = 15) and ads without marijuana scenes (n = 36) produced a significant main effect on all three ad evaluation measures. Specifically, adolescents perceived ads with actual smoking scenes as less effective (M = 3.19, SD = .23) than ads without marijuana scenes (M = 3.40, SD = .23), $F(1, 42) = 6.15$, $p < .02$. They did not like the ads with actual smoking scenes (M = 4.55, SD = .48) as much as the ads without such scenes (M = 5.00, SD = .39), $F(1, 42) = 8.65$, $p = .005$. They also had fewer net positive thoughts about ads with actual marijuana smoking scenes (M = 18.28, SD = 16.27) than about ads without marijuana scenes (M = 27.10, SD = 12.03), $F(1, 42) = 7.72$, $p = .008$. In contrast, the comparison between ads with the presence, holding, and handling of marijuana cigarettes (n = 9) and ads without marijuana scenes showed no significant effect on any ad evaluation measure.

High-Risk Versus Low-Risk Adolescents

Risk of marijuana use (dichotomized) exhibited a significant main effect on all three ad evaluation measures. Low-risk adolescents perceived the ads to be more effective (M = 3.58, SD = .25) than did high-risk adolescents (M = 3.17, SD = .27), $F(1, 107) = 66.98$, $p < .001$, partial $\eta^2 = .39$. They also liked the ads more ($M_{low\text{-}risk}$ = 5.14, $SD_{low\text{-}risk}$ = .45 vs. $M_{high\text{-}risk}$ = 4.50, $SD_{high\text{-}risk}$ = .59, $F(1, 107) = 44.42$, $p < .001$, $\eta^2 = .29$), and reported more net positive thoughts about the ads ($M_{low\text{-}risk}$ = 15.72, $SD_{low\text{-}risk}$ = 7.19 vs. $M_{high\text{-}risk}$ = 8.28, $SD_{high\text{-}risk}$ = 9.09, $F(1, 107) = 32.50$, $p < .001$, $\eta^2 = .23$) than their high-risk counterparts, regardless of marijuana scenes and argument strength.

The interaction between risk and marijuana scene had a significant effect on thought valence, $F(1, 107) = 4.40$, $p < .05$, partial $\eta^2 = .04$, a marginal effect on ad liking, $F(1, 107) = 3.03$, $p < .09$, partial $\eta^2 = .03$, and no significant effect on perceived ad effectiveness. High-risk adolescents had significantly more net positive thoughts about the no-marijuana-scene ads (M = 10.70, SD = 8.33) than the marijuana-scene ads (M = 3.67, SD = 9.46), $F(1, 51) = 7.69$, $p = .008$, partial $\eta^2 = .13$. High-risk adolescents also liked the ads without marijuana scenes (M = 4.74, SD = .55) more than ads with such scenes (M = 4.26, SD = .58), $F(1, 51) = 8.99$, $p < .005$, partial $\eta^2 = .15$. However, marijuana scenes did not affect any ad evaluation measure among the low-risk group. Figures 1 and 2 present the interactions between risk and marijuana scenes on thought valence and ad liking. H2 was partially supported. For this analysis, ads with actual marijuana smoking scenes and ads with the presence, holding,

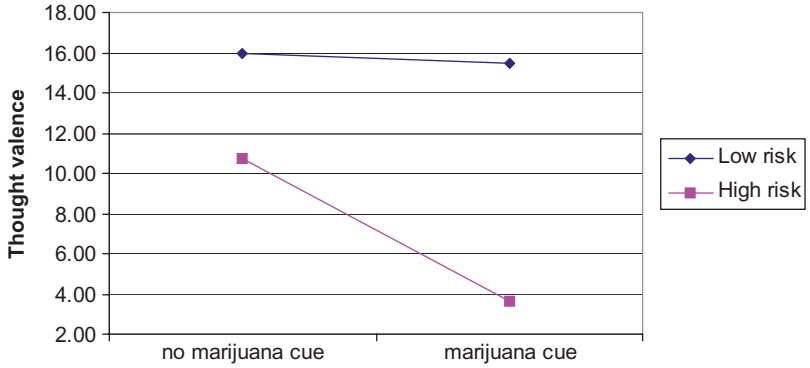

FIGURE 1 Impact of marijuana scenes and risk of marijuana use on thought valence.

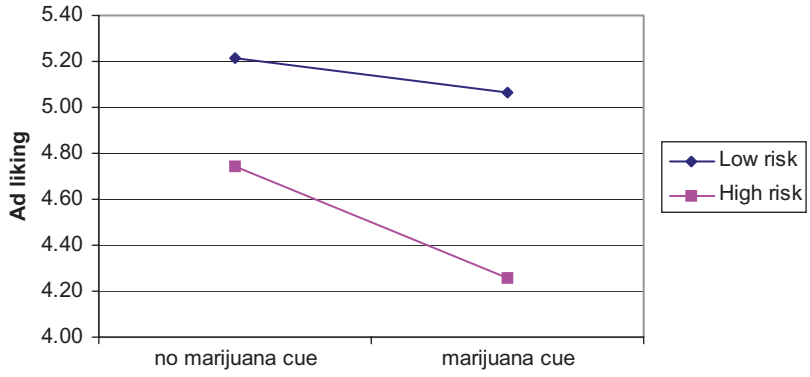

FIGURE 2 Impact of marijuana scenes and risk of marijuana use on ad liking.

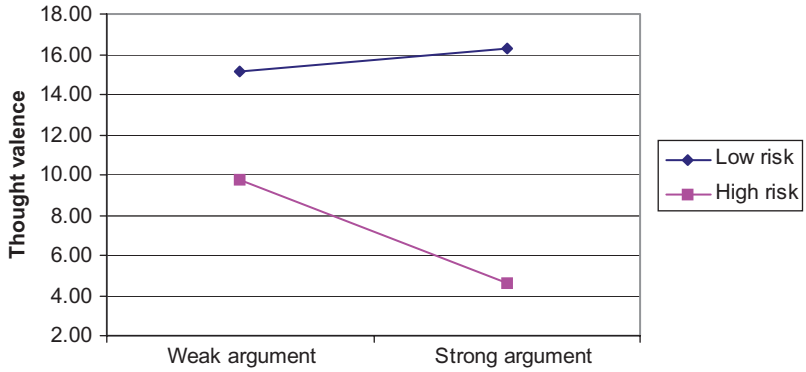

FIGURE 3 Impact of argument strength and risk of marijuana use on thought valence.

and handling of marijuana cigarette scenes revealed similar patterns of effects among low-risk adolescents as well as among high-risk adolescents. Therefore the impacts of marijuana scenes on ad effectiveness evaluation were more driven by the risk level of adolescents than by the type of marijuana scenes.

Risk also interacted with argument strength on thought valence, $F(1, 107) = 4.67$, $p < .04$, partial $\eta^2 = .04$. For high-risk adolescents, stronger arguments received fewer net positive thoughts ($M = 4.58$, $SD = 8.87$) than weaker arguments ($M = 9.79$, $SD = 9.29$), $F(1, 51) = 4.04$, $p = .05$, partial $\eta^2 = .07$. For low-risk adolescents, no significant effect of argument strength was found on thought valence. Figure 3 presents this interaction. No other significant effects were found on the other two ad evaluation measures. H3 received limited support.

In sum, a negative effect for marijuana scenes was revealed only for the high-risk group. The high-risk group responded more favorably to ads without marijuana scenes and ads with weaker arguments. For the low-risk group, marijuana scene and argument strength did not affect ad evaluations. However, their overall evaluation of ad effectiveness was more positive than that of high-risk adolescents.

DISCUSSION

The major finding of the study is that marijuana scenes in anti-marijuana PSAs can negatively affect high-risk adolescents' liking of the ads and their thought valence during ad viewing. Although this study does not have a control group, and therefore cannot show whether there is a boomerang effect associated with marijuana scenes, the study nevertheless suggests that ads with this message feature are significantly less effective than others. This negative impact of marijuana scenes is not reversed in the presence of strong anti-marijuana arguments in the ads and is mainly present for the group of adolescents who are often the targets of such anti-marijuana ads (i.e., high-risk adolescents). For these adolescents, stronger anti-marijuana arguments have in fact produced more negative thoughts about the ads than have weaker arguments. This may be a result of psychological reactance or defensive processing. Because the high-risk adolescents have more positive attitudes toward marijuana use as found both in previous studies (e.g., Yzer et al., 2004) and in this analysis (i.e., high-risk adolescents generally rated the anti-marijuana ads as less effective than low-risk adolescents), they are more likely than low-risk adolescents to be psychologically reactant to the anti-marijuana messages. When facing stronger rather than weaker anti-marijuana arguments, their personal beliefs and values about marijuana use are more challenged and therefore they are more likely to activate defensive processing in the presence of stronger arguments. In contrast, argument strength has shown little effect on low-risk adolescents, who are less involved with the topic. This finding is congruent with the general prediction of the ELM that argument strength is less influential for people less motivated to process the message.

Possible Mechanism for the Negative Impact of Marijuana Scenes

The negative impact of marijuana scenes is found to be stronger among the whole sample for ads with actual marijuana smoking scenes than for ads with other types of marijuana scenes. The difference between three types of marijuana scenes disappeared after taking adolescents' risk levels into account. This suggests that adolescents' risk of marijuana use, more than the type of marijuana scenes, explains the negative impacts of marijuana scenes on ad effectiveness evaluation.

To find out why marijuana scenes negatively affect ad liking and thought valence, we further explored the emotional impacts of these ads. In the original studies, adolescents also rated the ads with regard to whether the ads made them feel fearful ($M = 1.60$, $SD = .23$), sad ($M = 1.72$, $SD = .33$), inspired ($M = 2.30$, $SD = .24$), and sympathetic ($M = 1.89$, $SD = .28$), on a 4-point scale ranging from 0 (*not*

at all) to 4 (*very much*). An aggregate score on each emotion was obtained by averaging across the adolescents who viewed the same ad (the same procedure used for ad evaluation data). Presence of marijuana scenes was negatively correlated with "feeling inspired" for both high-risk ($r = –.41$, $p < .001$) and low-risk adolescents ($r = –.31$, $p = .02$).[2] Feeling inspired was positively correlated with all three ad evaluation measures for both high-risk (r range = .67–.79, $p < .003$) and low-risk adolescents (r range = .39–.52, $p < .003$). The more one feels inspired after viewing the ads, the more one considers the ad as effective or vice versa. When feeling inspired was controlled for in the path analyses, the negative impact of marijuana scenes on ad effectiveness evaluation found among the high-risk group disappeared. Only the effect of argument strength on thought valence remained the same, $F(1, 59) = 3.95$, $p = .05$, partial $\eta^2 = .07$, after controlling for feeling inspired. Moreover, the impact of marijuana scenes on feeling inspired did not change when ad effectiveness measures were controlled for in the analysis. This suggests that feeling inspired fully mediated the impact of marijuana scenes on ad effectiveness evaluation. The presence of marijuana scenes reduced one's feeling of inspiration, which in turn reduced the individual's evaluation of ad effectiveness. Because emotional reactions and ad effectiveness evaluations were collected at the same time, the causal direction is only empirically explored rather than confirmed.

Implications for Anti-Marijuana PSAs

On the basis of these findings, the presence of marijuana scenes appears to undermine ad liking and thought valence when the target audience is at a higher risk of marijuana use. The high-risk group is often the primary target of anti-marijuana PSAs with message strategies specially designed for this group of people (e.g., Palmgreen et al., 2001). For this segment of adolescents, including marijuana scenes in anti-marijuana PSAs may not be a good strategy. When the risk level of adolescents is uncertain or not considered, this study suggests that actual marijuana smoking scenes may be more troublesome in comparison to other types of marijuana scenes. Actual marijuana-smoking scenes are most explicit because they directly illustrate active marijuana-using behavior. Their impacts on modeling behaviors should be stronger compared to marijuana scenes that present only the possibility of marijuana use (in the case of mere presence of marijuana cigarettes) or that only suggest an incident of marijuana use (in the case of holding and handling of marijuana cigarettes). However, readers should be cautioned that the results for the different impacts of different types of marijuana scenes are not conclusive and that they may be simply a result of the small number of ads in the latter categories.

This study also suggests that ads that inspire are perceived as effective, especially among high-risk adolescents. However, the presence of marijuana scenes reduces this feeling. It is possible that the marijuana scenes used in a specific context may have reignited high-risk adolescents' positive attitudes about marijuana use or reduced their admiration for the character(s) in the ads, which ultimately reduced the instructive value of the ads and therefore ad effectiveness. Although the specific mechanism still awaits future testing, this result may underline the importance of using certain positive emotional appeals in PSA design. The positive effect of inspiration is similar to that of some other positive emotions such as hope and pride. A prior study on cigarette smoking has reported that the emotions of hope and pride both contribute to one's intention to quit smoking (Cappella, 2007).

Limitations and Future Direction

The study was conducted with a limited set of ads ($N = 60$). The adolescent participants producing these effects cannot be considered a random or a representative sample. This study is concerned only with anti-drug PSAs directed at adolescents. All of these factors limit the generalizability of the findings. Nevertheless, the number of ads per condition classified by argument strength and marijuana scenes was at least 24, and the mean estimates used in the analyses came from a diverse group of adolescents in terms of age, race, gender, residence, and socioeconomic status (as indicated by mother's education).

The study does not test the actual effects of ads on behavioral intention or behaviors. Instead, judgments of ad effectiveness were employed as surrogate measures of more direct consequences. The surrogates we employed allowed us to evaluate many ads simultaneously but run the risk that the ad evaluation judgments employed are only weak predictors of behavioral intention or actual behavior change. We have used three evaluation measures to help reduce this risk. The fact that thought valence has exhibited most significant findings, followed by ad liking, and last by perceived ad effectiveness, may be a direct reflection of the varied levels of range restrictions of each measure ($SD_{\text{thought valence}} = 13.79$, $SD_{\text{ad liking}} = .45$, $SD_{\text{perceived effectiveness}} = .23$). Because these three measures are all indicators of ad effectiveness evaluation, the results suggest that given sufficient variance, the impact of marijuana scenes may be observable on all three ad evaluation measures.

In this secondary data analysis, MSV (as a relatively comprehensive control for the presentational and affective aspects of the message) and argument strength (as a control for the content aspect of the messages) were controlled for to rule out possible confounders of marijuana scenes and argument

[2]For high-risk adolescents, inspiration was the only emotion that was significantly correlated with marijuana scenes. For low-risk adolescents, feeling afraid was the only other emotion that was significantly related to marijuana scenes, $r = .26$, $p < .05$.

strength. Although these are relatively strong controls, there is still the possibility that other message factors not controlled for in this study could explain the impacts observed for marijuana scenes and argument strength. Future studies focused on possible confounders should hypothesize and test these possibilities.

The lack of a strong effect of argument strength in this study may reflect the fact that most anti-marijuana arguments are not strong compared to those directed at hard drugs (e.g., methamphetamine or heroin; Fishbein et al., 2002). What makes this issue more prominent is that these data are aggregate-level data. Averaging across multiple individuals' argument evaluations has further limited the variance of this measure. In this study, argument strength has a moderate mean and a very small range (M = 3.70, SD = .15, on a 5-point scale). The difference between strong and weak arguments (i.e., .24 on a on a 5-point scale) is rather small, and both levels of arguments may be considered to represent a moderate level of argument strength. In the context of much stronger arguments than are available with marijuana or with this set of ads, the effect of argument strength on ad evaluation may be stronger.

As a secondary data analysis, the study only hypothesizes the underlying causal mechanisms of the negative impacts of marijuana scenes on high-risk adolescents' ad evaluations. Feeling inspired was found to be able to account for this negative impact. However, other alternative explanations not explored in this study may also hold (e.g., the presentation of marijuana-use ritual, context, or the consequences of use may be viewed as unreal, reducing the ad's effectiveness; Fishbein et al., 2002), and feeling inspired may be a spurious factor. Subsequent studies should use experimental methods to specifically examine the mechanisms that explain the negative impact of marijuana scenes on ad evaluation and even behavioral intention.

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