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Selective Invalidation of Ambivalent Pro-marijuana Attitude Components

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Abstract

Introduction: Attitudes of drug-abstinent youth considering marijuana initiation can be highly ambivalent. Invalidating pro-usage elements (i.e., opinions) of ambivalent marijuana attitudes, while leaving anti-marijuana elements intact, may create stronger, less ambivalent marijuana-resistant attitudes and lower usage intentions, while concurrently elucidating the role of ambivalence in persuasive prevention.

Method: From an initial pool of marijuana-abstinent middle-school students ($N = 538$), the quintile expressing the most negative attitudes toward a marijuana prevention appeal ($N = 101$) were randomly assigned to one of three conditions designed to invalidate pro-marijuana opinions. Analyses then tested their susceptibility to a second marijuana prevention appeal.

Results: Personally threatening messages were found ineffective, but appeals contesting resistant responses significantly decreased ambivalence ($p < .01$). Mediation analyses showed that this decreased ambivalence was associated with less favorable attitudes and lower marijuana usage intentions (both $p < .001$). An attribution-based manipulation increased ambivalence ($p < .05$), which was associated with positive usage intentions mediated through positive attitudes (both $p < .001$).

Conclusion: Analyses elucidated the role of attitude ambivalence in prevention, providing a more complete understanding of potential facilitative use of ambivalence in prevention models based on prevention. Results support the further examination and use of methods that invalidate pro-marijuana opinions, thereby leading to greater susceptibility to subsequent prevention appeals.

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Contributors

William Crano conceptualized the study with contributions from Drs. Donaldson, Siegel, Alvaro, and O'Brien. Drs. Crano, Siegel, and Alvaro were primary on literature searches and summarization of prior work. All authors contributed to the data analysis plan. Drs. Donaldson and O'Brien were responsible for data analysis. Crano wrote the first draft of the manuscript, and edited the final version after contributions from all other authors. All authors have approved the final manuscript.

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Keywords

Marijuana; Attitude; Opinion; Ambivalence; Adolescents; Selective Invalidation

1. Introduction

Considerable research has investigated the role of ambivalence on attitude-behavior consistency and susceptibility to attitude change (e.g., Conner and Armitage, 2008; Conner and Sparks, 2002). We believe ambivalence holds promise for developing effective approaches to prevention. Ambivalence arises from the “simultaneous presence of positive and negative reactions to the same attitude object” (Snyder and Tormala, 2017, p. 555). It affects susceptibility to persuasion (Conner and Armitage, 2008; Conner et al., 2002; Schneider and Schwarz, 2017), a fundamental goal of many prevention appeals (Crano, Alvaro, & Siegel, 2019). Hovland, Janis, and Kelley (1953) identified the conflicting “reactions” noted by Snyder and Tormala (2017) as *opinions*, lower level beliefs whose combination reflected the holder’s *attitude*. In their classic model of social influence, Sherif and Hovland (1961) anticipated the role of ambivalence with their conception of latitudes of acceptance and rejection, which referred to their position that an attitude was not best reflected by a single scale point, but by a range of acceptable (or unacceptable) opinion positions, some of which might be mutually inconsistent. It follows that the greater the range of a latitude, the more ambivalent the resultant attitude. This must be so because at the extreme, in which the latitude of acceptance (or rejection) covers the entire attitude range, the resultant ambivalence would be extreme. Applying Hovland and colleague’s approach to marijuana prevention suggests an approach different from standard gain-framed models, which focus on the positive outcomes of abstinence (Tversky and Kahneman, 1981).

Drug-abstinent youth considering marijuana initiation often are highly ambivalent (Hohman et al., 2014); thus, invalidating pro-usage opinions while leaving abstinence-supportive opinions intact may produce greater susceptibility to preventive appeals, less positive attitudes, and lower usage intentions. Reducing ambivalence of marijuana-relevant attitudes is expected to mediate the relation between a persuasive intervention and usages, long established as predictors of behavior (Conner, 2015; Conner & McMillan, 1999; Steinmetz et al., 2016; Sheeran et al., 2016; Webb & Sheeran, 2006). This research is designed to facilitate understanding the role of ambivalence in attitude change and prevention. Conversely, persuasive appeals that fail to invalidate pro-drug opinions may exacerbate ambivalence, given adolescents’ normative drift toward marijuana use (Crano et al., 2008). Unsuccessful preventive messages may cause iatrogenic effects on attitudes (Miech et al., 2018), but even this result could add to our understanding of ambivalence’s role in the overall persuasion/prevention process.

1.1. Approach and expectations

The current study was designed to selectively invalidate the anti-abstinence opinion components of adolescents’ marijuana-related attitudes, thereby decreasing ambivalence, depressing favorability of attitudes toward marijuana, and rendering receivers more receptive to subsequent persuasive appeals (Crano et al., 2017). To test this possibility, at-risk students

(i.e., those responding unfavorably to marijuana-preventive appeals) were identified and exposed to one of three video messages designed to invalidate pro-drug opinions. Feedback 1 contested negative responses to the marijuana-preventive ad through strong *personal* confrontation (see Table 1). Feedback 2 was not personally provocative, but strongly contested *reasons* subjects gave for negative responses. This tactic was designed to weaken pro-marijuana opinions and lead to lower resistance to subsequent preventive appeals. Subjects in Feedback 3 were to list eight arguments justifying their negative evaluations. Weiner's (2012) attribution theory suggests participants would appraise their reactions less sound if they could not create more than a few counter-arguments. Most could not, leading to the expectation that subjects might discount their pro-marijuana opinions. We realized Feedback 3 ran the risk of prompting participants to persevere on self-generated negative responses. Such "rehearsal" could bolster these opinions, resulting in more favorable marijuana attitudes and stronger usage intentions (Holland, Verplanken, and von Knippenberg, 2003).

2. Methods

2.1 Participants

Participants were recruited from four middle schools in Southern California. Across the sample ($N = 538$), we isolated the most negative quintile of responders ($N = 109$). This number was determined by power analysis, which indicated a need for approximately 110 subjects (given three groups with $f = .30$, $\alpha = .05$, power = .80; Faul, Erdfelder, Buchner, and Lang, 2009). Of the total, six participants who had used marijuana in the past 30 days and two with missing data were removed from analyses, resulting in a final sample of 101 participants, aged from 11 to 15 years ($M = 13.20$, $SD = .84$). Females comprised 62.4% of the sample. Ethnic composition included Hispanic (53.5%), African American (11.9%), White non-Hispanic (12.9%), Asian American (5.9%), "mixed race" (5.9%), and 8.9% self-identified as "other." The majority reported good grades (29.7% "Mostly A," and 37.6% "Mostly B"). Students were in the 6th through 8th grade (5.9%, 40.6%, and 53.5%, respectively). Most (83.2%) were eligible for free school lunches, a proxy for SES.

2.2 Procedure

Procedures were deemed acceptable by the University's IRB. Parental consent and student assent were obtained. To minimize experimenter bias, study procedures were conducted on laptops programmed to identify the approximate quintile of most negative participants, randomly assign them to experimental conditions, and administer measures. Participants viewed one of four taped advertisements from the National Youth Anti-drug Media Campaign (NYAMC: <https://www.ncjrs.gov/pdffiles1/ondcp/171694>). They evaluated ads with four six-point items (*1 Strongly Disagree to 6 Strongly Agree*). The items read: This ad is: important; good; smart; interesting. Alvaro et al. (2013) found marijuana-abstinent adolescents who responded negatively to prevention appeals were more likely than positive responders to initiate use in the following year. Data from those with more positive ad evaluations were not analyzed in this study.¹ Students were assigned randomly to one of three feedback interventions that systematically varied the commentary they received in response to their ad evaluations.

Participants then received a new set of items to use in reevaluating the ad. We explained the items would be useful in developing new measures. Four items with the same six-point scoring format as before were used: “The ad is likeable; valuable; useful; enjoyable.” Then, subjects were assigned randomly to view one of two new ads also drawn from the NYAMC. They completed a measure of marijuana attitudes and intentions, were thanked, and debriefed.

2.3. Measures

2.3.1. Message evaluations.—As noted, two four-item evaluative scales of the first ad were administered. The first ($\alpha = .85$, $M = 2.25$, $SD = .65$) identified the most negative responders in the sample. The second scale was administered to assess post-intervention effects on participants’ re-evaluations of the first ad ($\alpha = .82$, $M = 2.87$, $SD = 1.07$).

2.3.2. Marijuana attitudes.—After viewing a second prevention ad, we assessed participants’ attitudes toward marijuana. The scale consisted of seven five-point Likert-type items (*1 strongly disagree* to *5 strongly agree*): “Marijuana is: good; fun; interesting; exciting; pleasant; entertaining; appealing” ($\alpha = .97$, $M = 1.66$, $SD = .97$; see Tormala, 2008).

2.3.3. Intentions.—Marijuana usage intentions were assessed by combining two items used in previous research (Miech et al., 2018): (1) “How likely is it that you will use marijuana, even once, over the next 12 months?” and (2) “Do you think you will ever use marijuana in the future?” Items were evaluated with the same five-point Likert scoring format used in the attitude measure. A mean intention composite was computed ($r = .59$, $p < .001$; $\alpha = .78$, $M = 1.55$, $SD = .76$); higher scores represent stronger intentions.

2.3.4. Ambivalence.—To define attitude ambivalence, we computed the standard deviation across all seven attitude items for each subject; scores ranged from .00 to 1.99 ($Mean\ SD = .27$). This operationalization is relatively novel, although it has been validated in prior research (e.g., Hohman et al., 2014, 2016). It is less obtrusive than standard self-report measures of felt ambivalence, and more obviously indicative of ambivalence than measures of potential ambivalence. If future convergent validation research indicates the utility of the measure, we expect it will become a widely used method of ambivalence measurement.

2.3.5. Analytic plan

2.3.6. Ad evaluations.—The first analysis investigated intervention effects on subjects’ pre- to post-evaluations of the first ad. The covariate set used throughout this and all other analyses included age, gender, race/ethnicity, average grade point average (GPA), receiving cost-reduced lunches, and lifetime marijuana use.

¹Our focus on negative responders also was supported by a secondary analysis of pretest responses to a survey of students ($N = 1004$) from grades seven through 10 from the same school district. Analysis of covariance assessed differences in ambivalence between positive and negative responders, controlling for age, gender, race/ethnicity, GPA, and lifetime marijuana use. Only those reporting that they had not used marijuana in the past 30 days were included in the analysis. Negative responders ($M = .54$, $SD = .43$) were significantly more ambivalent toward marijuana than positive responders ($M = .47$, $SD = .43$), $F(1, 993) = 3.92$, $p < .05$.

2.3.7. Marijuana usage intentions.—Sequential mediation models (Hayes, 2013) were used to examine whether attitude ambivalence (M_1) and attitudes (M_2) mediated the relationship between intervention (X) and marijuana usage intentions (Y). The intervention was posited to influence ambivalence, which was hypothesized to affect marijuana attitudes, which were expected to predict intentions. The mediation chain was hypothesized as follows: $X \rightarrow M_1 \rightarrow M_2 \rightarrow Y$.

2.3.8. Mediation.—Interventions were dummy coded and each was tested against the others. For example, Feedback 1 (direct confrontation) was compared against Feedback 2 and 3, Feedback 2 against Feedback 1 and three, and so on. Regression models investigated the relation between ambivalence with marijuana attitudes and intentions. Variables were standardized (Zscored) prior to model entry to minimize multicollinearity.

Using the PROCESS Macro for SPSS (Hayes, 2012: Model 6), we conducted several sequential mediation analyses to assess intervention effects on intentions mediated by ambivalence and attitudes. Following Preacher and Hayes (2008), bias-correcting bootstrapping was used to generate estimates based on the sample data (Fan, 2003). Bootstrapping is recommended over normal-theory techniques because it does not require assumption of normality; it is based on the actual distribution of sampled data. Data were resampled 10,000 times. Confidence intervals examined whether zero was within the interval. If the interval did not contain zero, the indirect effect was deemed significantly different from zero ($p < .05$).

3. Results

3.1. Data were collected from four middle schools.

Participants were assigned randomly to conditions within each school. We calculated an intraclass correlation relating school with initial evaluations of the first anti-marijuana ad. The coefficient indicated minimal association between school and initial ad evaluation ($ICC = .03$, $z_{icc} = .31$; Fisher, 1938; McGraw & Wong, 1996), supporting use of the individual as the unit of analysis (Crano et al., 2015).

3.2. Message 1 evaluation.

Two reliable four-item scales were used to assess subjects' pre- and post-treatment evaluations of the first ad. The first scale operationally defined positive or negative responders. The second scale assessed treatment effects on re-evaluation of the first ad. The analysis was a repeated measures analysis of covariance on ad evaluations; treatment (Feedback 1–3) was the between-groups variable, and measure (pre- and post-treatment) the within-groups variable. The standard covariate set was entered in the analysis. Neither of the independent variables had a statistically significant effect, nor did their interaction; the covariates had no significant relations with ad evaluations.

3.3. Marijuana ambivalence.

Sequential regression models examined the impact of intervention (X) on ambivalence (M_1), controlling for all covariates. Feedback 1 (direct confrontation), $B = .05$, *ns*, did not explain

significant variance in attitude ambivalence, and so further examination of mediation effects on intentions was not performed. Feedback 2 (indirect confrontation) significantly decreased ambivalence, $B = -.27, p < .01$ (Figure 1).

Feedback 3 (see Figure 2) significantly increased ambivalence, a reversal of sought-for effects. This result sometimes is termed a boomerang or contrast effect. Subjects' inability to create the requisite number of reasons for their negative responses to the ad (*Mean* number negative responses = 4.61, *SD* = 2.83) may have been responsible for increased ambivalence, $B = .21, p < .05$, consistent with an explanation based on the normative pressures experienced by adolescents, and the increased accessibility of negative arguments. Participants' pro-marijuana opinions were made more accessible by their rehearsing their own negative ad evaluations in the argument creation phase, enhancing accessibility of negative responses, as anticipated by Fazio (2014) in his MODE model, and supported in considerable research thereafter (Descheemaker, Spruyt, Fazio, and Hermans, 2017; Rhodes and Ewoldson, 2013). This process would have enhanced ambivalence, given the propensity of adolescents to move toward usage and helped to create negative attitudes, which would have prompted usage intentions. The fact that subjects developed arguments on their own also may have reinforced their commitment to opposing the ad, increasing opposition to the next ad to which they were exposed. A final analysis revealed that across all conditions, ambivalence explained significant variance in attitudes, $B = .42, p < .001$, and intentions, $B = .23, p < .01$.

3.4. Marijuana attitudes.

Sequential mediation models were conducted to examine the indirect relationships between Feedback condition 2 and 3 with intentions. As shown in Figure 1, Feedback 2 (X) resulted in *decreased* attitude ambivalence (M_1), $B = -.26, SE = .09, p < .01$. Lower ambivalence found in Feedback condition 2 was associated with less favorable marijuana attitudes (M_2), $B = .42, SE = .08, p < .001$, which were related to diminished intentions to use marijuana (Y), $B = .68, SE = .08, p < .001$.

3.5. Feedback 2 Intentions.

Bias-corrected bootstrapping with 10,000 resamples tested the indirect relationship of intervention on intentions operating through ambivalence and attitudes. Analysis revealed a significant indirect effect of the following path: Intervention (X) \rightarrow Ambivalence (M_1) \rightarrow Attitudes (M_2) \rightarrow Intentions (Y), $B = -.07, SE = .03, 90\% \text{ CI } [-.125, -.031]$.

The proposed mediation model results support our position that the effects of the treatment worked through ambivalence to affect attitudes, which in turn affected usage intentions (ambivalence, in other words, was necessary in the causal chain from treatment to outcome). Alternative models analyzing indirect effects of the intervention (X) on intentions (Y) through attitudes (M_2) were *not statistically significant*. This pattern lends support to the hypothesized role of ambivalence in the persuasion process.

3.6. Feedback 3 Intentions.

Figure 2 illustrates the indirect effect of Feedback 3 (X) on intentions (Y). This intervention was associated with *increased* attitude ambivalence (M_1), $B = .19$, $SE = .09$, $p < .05$, which was related to more positive marijuana attitudes (M_2), $B = .42$, $SE = .08$, $p < .001$. In turn, pro-marijuana attitudes were associated with stronger usage intentions (Y), $B = .68$, $SE = .08$, $p < .001$. Results also revealed a significant indirect effect of Treatment (X) \rightarrow Ambivalence (M_1) \rightarrow Attitudes (M_2) \rightarrow Intentions (Y), $B = .06$, $SE = .03$, 90% CI [.009, .108]. This result, too, helps clarify the manner in which increases in ambivalence may affect subsequent attitudes and usage intentions.

4. Discussion

Study of attitude ambivalence is a consistent feature of research in social psychology and prevention. Early research relating ambivalence to persuasion often equated ambivalence with low attitude strength. In their classic work, Petty and Krosnick (1995) viewed weak attitudes as easily changed, unstable, and having little impact on behavior. Persuasion researchers also viewed ambivalent attitudes in this manner, and persuasive tactics often were developed to induce attitudinal ambivalence to weaken the attitude and thereby foster openness to new beliefs. However, Petty and Krosnick also observed that weak attitudes were not likely to impel behavior, and thus, tactics designed to weaken attitudes through ambivalent induction were built on a logical contradiction, at least for those intent on motivating behavior rather than simple attitude change.

In more recent research, the valence of opposed opinions is viewed as critical, a factor the classic model often did not contemplate. Our recommended method deals with variations in the components that constitute the attitude, a natural fit with the fundamental conceptualization of ambivalence. Studies have challenged the assumption that ambivalent attitudes are inherently unstable, and today's research suggests a more complex picture of the relation of ambivalence and susceptibility to change (e.g., Conner and Armitage, 2008; Luttrell et al., 2016). The current research follows the design of our earlier studies (e.g., Crano et al., 2017). It is designed to provide insight into the psychological processes by which ambivalence affects persuasion. The research examines the mediating role of ambivalence on usage intentions, which Fishbein and Ajzen (2010) identified as crucial precursors of behavior. The study specifically investigates mediation effects in situations in which attitude ambivalence was pronounced – in the present instance, in contexts involving attitudes of marijuana-abstinent adolescents whose negative reactions to preventive appeals suggested openness to marijuana initiation (Alvaro et al., 2013).

To accomplish this goal, we attempted to discover an experimental intervention that invalidated expressed negative opinions toward an anti-marijuana persuasive communication. This intervention was expected to lower subjects' attitude ambivalence, result in less favorable attitudes, and thereby lower usage intentions. The communication tactics that would satisfy this goal were inferred from prior literature, which all-too-often provided only Delphic advice. This being the case, we also hypothesized outcomes in the event of intervention failure. Three promising message-based manipulations based on prior theory and empirical findings were investigated (Crano et al., 2007; Weiner, 2012). Our goal

was to identify one or more tactics that reduced ambivalence by invalidating negative prevention opinions. The tentative nature of the possibilities expressed in the *Approach and expectations* section implied that although the ways in which variations and changes in ambivalence might affect susceptibility to attitude change were studied widely, effective ways of influencing ambivalence were not. The current research was designed to provide insight into an approach whose development might facilitate creation of communications useful in preventing adolescent marijuana use.

Results indicate that personal confrontation (Feedback 1) is unlikely to succeed. Absence of appreciable effects on ambivalence suggests that personally threatening content was ignored or discounted, demonstrating once again that interventions that practically guarantee resistance are unlikely to succeed, and generally should be avoided (Green and Witte, 2006; Rosenberg and Siegel, 2018).

Although direct personal confrontation (Feedback 1) did not affect ambivalence, the less direct refutation of Feedback 2 attenuated ambivalence in the marijuana attitude by weakening or invalidating anti-abstinence opinions. The analysis showed that the preventive effects of a marijuana preventive communication affected attitudes through attenuated ambivalence, and these more negative attitudes toward marijuana were related significantly to lowered marijuana usage intentions. Other paths through which this result would have obtained were rendered implausible statistically. It is both unusual and noteworthy to find significant effects on intentions after a single persuasive intervention.

Feedback 3 failed to attenuate ambivalence and reduce pro-marijuana attitudes and subsequent usage intentions. Most participants were unable to produce the requested number of objections to the ad they had viewed. Failing to provide reasons for disliking the ads may have increased the accessibility of negative opinions toward the ad. The intervention was associated with greater ambivalence regarding marijuana, which was hypothesized as a possible outcome that would lead to more positive attitudes toward marijuana and stronger intentions to initiate use. This result was found. It suggests the failure of preventive communications might result in greater ambivalence, causing iatrogenic effects on attitudes and stronger usage intentions in contexts involving highly ambivalence audiences. This interpretation is admittedly *post hoc*, but it provides possible insights into the reversals (i.e., iatrogenic or boomerang effects) sometimes found in response to substance-preventive appeals (Hornik et al., 2008).

The success of indirect refutation suggests that selective invalidation may be a useful method of approaching substance-ambivalent youth. The theoretical basis of this possibility is consistent with Hovland and colleagues' (1953) general theory of persuasion, and consistent with the role of ambivalence in the persuasion process, as supported in the current study. Building on this theme, we viewed ambivalent attitudes as involving approximately equivalent positive and negative opinions. Tactics that selectively invalidate opinions favoring marijuana uptake were expected to render attitudes less ambivalent and more negative, leading to lowered usage intentions. This extension of Hovland's model involved a search for approaches that lowered ambivalence selectively by reducing the number or impact of pro- marijuana opinions.

The test of mediation provided an apposite means of assessing expectations and investigating the predicted route of influence through ambivalence and attitudes on youths' usage intentions. We used intentions as a proxy for behavior. This may be seen as a limitation, but it is relatively common practice in prevention research, and has been supported in many metaanalyses of the intention-behavior relation (e.g., Schulze and Wittmann, 2003; Sheeran et al., 2016; Webb and Sheeran, 2006). To apply an actual behavioral measure of marijuana initiation as an indicator of treatment success would require a time lag of months, if not years. Research indicates that few participants in the age range of this study are likely to initiate usage even after a year's time (Crano et al., 2008). Even so, longitudinal studies of effects are desirable and should be encouraged whenever possible..

4.1. Conclusions

Social psychological research on persuasion suggests the wisdom of attacking prosubstance belief components (e.g., as in Feedback 2), rather than attacking the holders of those beliefs (e.g., Feedback 1). We do not contend that Feedback 2, which elicited the sought-for preventive effects on subjects' intentions is the best or only method of developing successful appeals through ambivalence reduction. Although the treatment did operate effectively, the results are best viewed as an impetus that hopefully leads to a greater focus on the utility of exploiting ambivalence and selective invalidation in future prevention research and practice.

Adolescents' use of marijuana continues relatively unabated, despite the decreasing usage of other psychotropic substances in this age group (Miech et al., 2017, 2018). It is likely that the issue will become more, rather than less acute with the onslaught of marijuana legalization in many states and the increasing use of electronic nicotine delivery devices, which are easily converted to electronic marijuana delivery devices. The likely increase in teen marijuana use cannot be viewed with equanimity. The National Academies' (2017) analysis indicated functional developmental impairment as a result of early and consistent marijuana usage; further, adolescents' consistent use of marijuana may significantly increase the odds of their later use of opioids and non-prescribed stimulants (Nakawaki and Crano, 2012). Preventive approaches that affect this large, vulnerable group are required. The current results attest to the importance of attitudinal ambivalence in prevention, and suggest a dual-communication strategy that begins with the selective invalidation of negative responses to preventive communications followed by further strong persuasive preventive messaging. Contextual and developmental factors that affect ambivalence may advantage a strategy different from those that tout the rewards of abstinence. Our strategy acknowledges the pressures adolescents face to initiate marijuana use, the ambivalence these pressures may produce, and the opportunistic use of these facts in creating effective preventive materials.

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- *Ambivalence regarding marijuana increases as youth traverse adolescence
- *Ambivalent marijuana attitudes consist of conflicting pro- and anti-marijuana opinions
- *Prevention messages that Invalidated pro-marijuana opinions lowered marijuana attitude favorability
- *Less positive marijuana attitudes reduced usage intentions
- *Prevention messages that invalidated pro-marijuana ambivalence reduced usage intentions

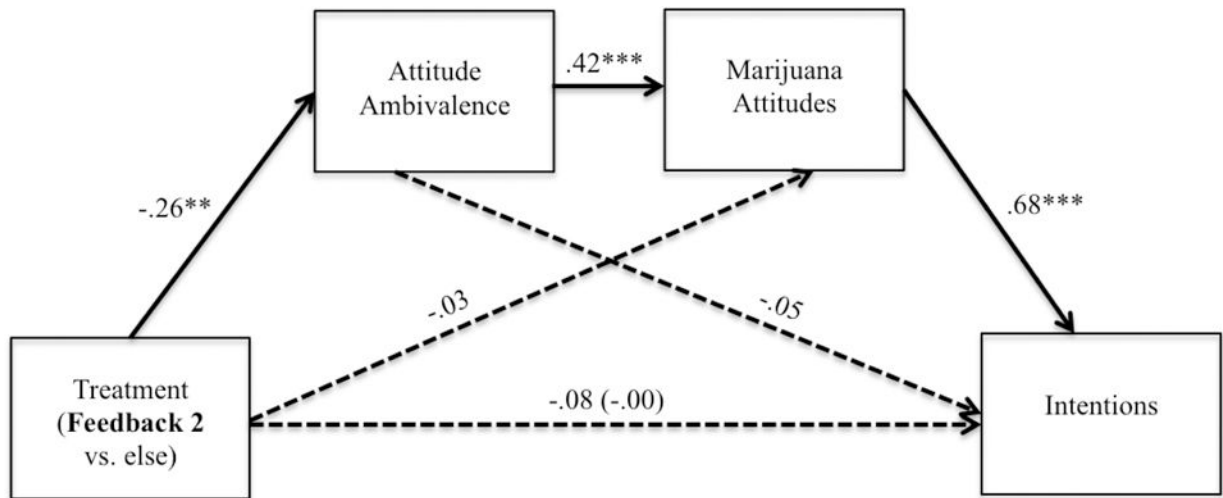


Figure 1.

Indirect effect of Feedback 2 (X) on intentions (Y) through marijuana attitude ambivalence (M_1) and attitudes (M_2). Feedback 2 (indirect confrontation) was coded as 1 ($n = 38$); all other conditions were coded as 0 ($n = 63$). When modeling the relationship between the treatment (x) and intentions (y) total effects are modeled outside parentheses; direct effects are shown inside parentheses. The indirect effect of Treatment (X) \rightarrow Ambivalence (M_1) \rightarrow Attitudes (M_2) \rightarrow Intentions (Y) is statistically significant, $B = -.07$, $SE = .03$, 90% CI $[-.125, -.031]$.

Note. $*p < .05$, $**p < .01$, $***p < .001$.

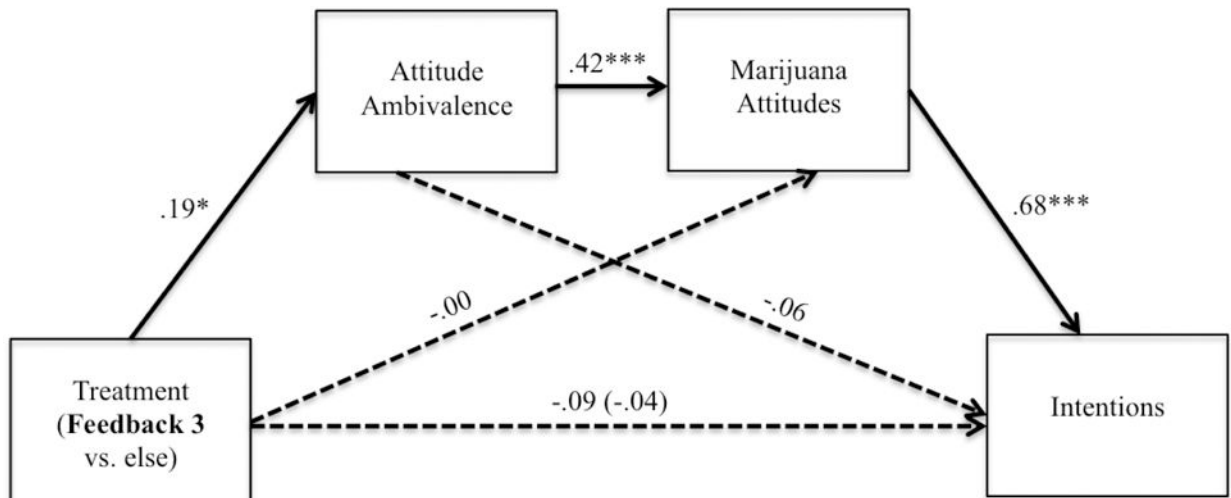


Figure 2.

Indirect effect of Feedback 3 (X) on intentions (Y) through marijuana attitude ambivalence (M_1) and attitudes (M_2). Feedback 3 (attributional reasoning) was coded as 1 ($n = 34$); all other conditions were coded as 0 ($n = 67$). When modeling the relationship between the treatment (x) and intentions (y) total effects are modeled outside parentheses; direct effects are shown inside parentheses. The indirect effect of Treatment (X) \rightarrow Ambivalence (M_1) \rightarrow Attitudes (M_2) \rightarrow Intentions (Y) is statistically significant, $B = .06$, $SE = .03$, 90% CI [.009, .108].

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 1

Description of Experimental Manipulations

Condition	Description	<i>n</i>
F1: Direct confrontation	It seems you didn't like the ad. There are other people who also did not like the ad. Experts have studied these people. The experts have found that these people are very childish.	29
F2: Indirect Confrontation	It seems you didn't like the ad. Please click the top 3 reasons why you feel this way. Then, the computer will analyze your responses and give you feedback. 1. The actors were fake 2. The actors said things that were not true 3. The ad did not make sense 4. The ad was fake 5. The ad was too serious 6. The ad was not well made 7. The ad did not give enough information about marijuana 8. The ad was confusing 9. The ad gave stupid reasons for not using marijuana 10. The ad was boring Participants selected 3 reasons, and were then told the following: "We asked some experts to look at the same ad you did. They studied the different reasons people could have for liking the ad. The experts all graded the reasons you picked as childish."	38
F3: Attributional Reasoning	It looks like you didn't like the ad. Now please list 8 reasons why you think the ad was bad.	34

Note. F = Feedback. True random assignment was used in this experiment. The number of participants that received each experimental condition is represented in the far right column.