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## Effects of Ads from a Drug and Alcohol Prevention Campaign on Willingness to Engage in Alcohol-Related Risky Behaviors

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### Abstract

Behavioral willingness is conceptualized as a pathway to behavior that is non-deliberative, yet traditional measures require thoughtful deliberation to complete. This study explored non-deliberative measures of alcohol-related willingness to complement recent work on marijuana-related willingness. The study also examined whether ads from a field-tested drug-and-alcohol prevention campaign may have operated by influencing alcohol-related willingness. Participants viewed campaign ads or consumer ads (control). Outcomes were reaction times to make speeded judgments about whether one would engage in risky alcohol-related behaviors. Results showed that campaign ads lowered willingness to play drinking games and (for males) to drive while intoxicated.

### Introduction

A key task in the evaluation of health campaigns is the testing of psychological mechanisms via which messages may have effects (Cappella, 2006; Slater, 2006). Such efforts are diagnostic in that they can confirm the extent to which message strategies had the intended impact on psychological variables that are hypothesized to lead to behavior. Further, for campaigns targeting multiple behavioral objectives, the exploration of psychological mechanisms may help explain varying degrees of success in achieving behavioral change.

The present study addresses these concerns for a multipurpose drug and alcohol prevention campaign aimed at middle school youth that was tested in a randomized community trial (Slater et al., 2006). The campaign was developed to prevent uptake of multiple substances (marijuana, alcohol, and other drugs). To complement work already done on the psychological impact of the campaign on marijuana-related outcomes (Comello & Slater, 2011), the present study examined impact with respect to alcohol-related constructs.

We focus on non-deliberative processing of messages, which occurs when there is little motivation or opportunity to process (Fazio, 2001). Because non-deliberative processing of messages is difficult to assess in the field, we conducted this study to probe the psychological impact of the campaign in ways that are not feasible in the field but are nonetheless important to understanding campaign effects. The key non-deliberative measure employed in this study was designed to assess behavioral willingness (Gibbons, Gerrard, Blanton, & Russell, 1998), an antecedent to risky behavior that is reactive rather than reasoned. In contrast to previous studies that have measured behavioral willingness using deliberative items (i.e., requiring thoughtful deliberation to answer), we utilize a non-deliberative measure based on speeded judgment tasks that, in our view, is more conceptually congruent with the cue-sensitive reactivity that is fundamental to behavioral willingness.

The campaign that served as the source of stimuli for this experiment is the “Be Under Your Own Influence” campaign, a general purpose drug and alcohol prevention campaign aimed at middle-school youth that was tested in a randomized community trial involving eight treatment and eight control communities throughout the U.S. (Slater et al., 2006). Results from the randomized community trial showed fewer users at final post-test for marijuana, alcohol, and cigarettes in intervention communities; growth trajectory results demonstrating reduction in uptake were significant for marijuana, marginally significant for alcohol, and non-significant for cigarettes.

A lab experiment (Comello & Slater, 2011) examining the effects of exposure to ads from the campaign showed that treatment ads were more effective (relative to comparison and control ads) at lowering behavioral willingness to use marijuana at a party with friends. Although these results point to plausible mechanisms for reduction in marijuana use, alcohol-related outcomes deserve consideration given that the results of the randomized community trial also had measurable impact on alcohol use. Exploration of alcohol outcomes is further warranted by public health concerns over alcohol use among young people, given recent increases in the proportions of college students who reported heavy episodic drinking (Hingson, Zha, & Weitzman, 2009).

Although other mass media prevention campaigns have been studied in terms of psychological mechanisms (Flynn et al., 2006; Komro et al., 2001; Palmgreen, Donohew, Lorch, Hoyle, & Stephenson, 2001; Evans, Price, & Blahut, 2005; Zhao et al., 2006), one issue that remains largely unexplored is the non-deliberative processing of messages, which may occur when there is little motivation or opportunity to carefully consider the consequences of a behavior. In these situations, automatically activated attitudes can guide behavior without an individual’s active consideration of the situation or even awareness that an attitude has been activated (Fazio, 2001). This may well be the case for youth exposed to a health campaign in a school environment.

Once a construct is made accessible, accessibility may influence behavior in a number of ways. Accessibility moderates the link between a construct and behavior relevant to that construct, with greater accessibility associated with greater correspondence between construct and behavior (Fazio, Powell, & Williams, 1989). Further, accessibility of beliefs about an object influences formation of attitudes about the object (Roskos-Ewoldsen & Fazio, 1997). Thus, even ads that are processed in a non-deliberative manner may have effects on future actions through the route of accessibility.

Operationally, how should researchers examine the impacts of non-deliberative processing? One method is through the use of measures that do not rely on conscious self-assessment. Although there are many such measures, what they have in common “is that they all seek to provide an estimate of the construct of interest without having to directly ask the participant for a verbal report” (Fazio & Olson, 2003). A primary benefit is that such measures minimize the pressure some participants may feel to provide socially desirable answers, which is a nontrivial issue when assessing outcomes related to risky or illegal behaviors. The measures we are introducing here in an alcohol-related context (and that have already been used in a drug-prevention context [Comello, 2011; Comello & Slater, 2011]) are non-deliberative in that the primary indicator of interest is quickness to respond to a yes/no question. Although the manifest content of the response is important as well, the speed with which the answer is given is considerably more revealing, because it reflects the degree to which the construct represented by the response is available to guide behavior – and it is precisely this aspect of responding that is beyond the conscious control of most participants.

The key non-deliberative outcome we examine in this study is behavioral willingness, which has been described as an openness to engage in risky behaviors that is related to but different from intention (Gibbons et al., 1998; Gibbons, Gerrard, & Lane, 2003). Whereas intention is a product of deliberative thought, willingness can be characterized as reactivity to behavioral cues that may be present in risk-conducive situations. Such a construct makes intuitive sense, because it is easy to imagine that most respondents would report intentions to avoid risky behaviors but may nevertheless be willing to engage in the behaviors if they found themselves in an environment that made the behavior attractive, easy, and expected. Gibbons and colleagues (1998) demonstrate that while willingness is correlated with intention, willingness predicts behavior independent of intention.

The conceptualization of behavioral willingness as a non-deliberative vs. deliberative pathway to behavior would imply an operationalization using non-deliberative measures. However, the original measures of willingness are deliberative in that participants are asked to estimate the probability of engaging in acts at varying levels of risk. A non-deliberative measure of behavioral willingness, however, was recently introduced in the context of evaluating the “Be Under Your Own Influence” ads for impact on marijuana related risk behaviors (Comello & Slater, 2011); the measure proved sensitive to the effects of condition, with lower willingness to use marijuana after exposure to campaign vs. comparison and control ads. In the same study, a deliberative measure of intention was not sensitive to the effect of condition, demonstrating greater sensitivity of the non-deliberative measure of willingness. Other recent work (Goodall, 2009) showed the effects of alcohol advertisements on a non-deliberative measure of willingness but not on a traditional deliberative measure of alcohol attitude. Although it is acknowledged that the ideal comparison would be between deliberative vs. non-deliberative versions of behavioral willingness in the same study, measuring both in the same study would likely sensitize participants to the construct and would thus reduce measurement quality. However, the studies cited above provide reason to think that non-deliberative measures of willingness may have advantages over deliberative measures as outcomes in studies of substance-related message effects (see also Czyzewska & Ginsburg, 2007).

The findings suggest that we might expect effects on willingness to engage in alcohol-related risky behaviors in the current study. Such a prediction is further indicated by the impact of the “Be Under Your Own Influence” ads on reducing alcohol use in the field and the possibility that the effects may be explained by reductions in willingness. Thus, it was hypothesized that exposure to the treatment (vs. control) ads will be associated with lower willingness to engage in a variety of risky behaviors involving alcohol.

## Method

### Participants

The sample was composed of 105 undergraduates at a large Midwestern university. The mean age was 20.12 ( $SD = 1.97$ ), and 61% were female. The breakdown by ethnicity was White (88%), Black (4%), Asian (6%), and other (2%). The data for the present study were gathered at the same time as the data used in the previously described study on marijuana-related outcomes. The protocol and materials were approved by the Institutional Review Board at the university where data collection took place. To recruit participants, announcements were made in large classes about the opportunity to participate in a lab experiment for a small amount of course credit. Participants provided informed consent by signing a consent form before beginning the experiment.

## Design and Stimuli

The study used a post-test-only experimental design with random assignment to treatment or control conditions. Stimuli for the treatment condition featured all four ads from the first year of the two-year campaign. These ads conveyed the desirability of making the right choices and of working toward future goals, and that drug and alcohol use would undermine such efforts. An example of copy from one of the print ads demonstrates the autonomy theme: “Tougher. Smarter. I want to get there now. Not later. I’m living out loud. In the fast lane. And I’m doing it without drugs and alcohol. I’m under my own influence. How about you?” This particular copy was accompanied by young athletes involved in a competition, along with the tagline “Be Under Your Own Influence.” The other ads conveyed a similar message and depicted youth engaged in other fun activities. In both conditions, the advertisements were presented in random order.

The control condition featured four informational ads for consumer products such as mattresses and air travel that appeared in national publications. The treatment and control conditions were comparable in that both contained print ads of sufficient production quality to be used for national dissemination. Additionally, the stimulus materials were comparable in overall levels of arousal produced. Previous research has shown that higher levels of arousal are associated with slower reaction times (Lang, Bolls, Potter, & Kawahara, 1999). Thus, if the conditions differed in arousal capacity, one would expect to see differences in baseline reaction speed in the practice task that was administered immediately after exposure. However, there were no group differences on this task,  $F(1,103) = .97, p = .33$ . (Additional information on the baseline measure is provided in the following sections.)

## Measures

**Dependent variables**—Our general approach in measuring constructs was to use response latency in speeded categorization tasks. For this study, participants had to respond to a single word or phrase (described in more detail for each outcome below) on a computer screen by pressing one of two buttons on the keyboard to indicate “yes” or “no.” Thus, the outputs of the task are response (yes/no) as well as reaction time (measured in milliseconds), with quicker reaction times indicating greater accessibility.

Alcohol-related behavioral willingness was operationalized using speeded dichotomous judgments of whether one would participate in a risky behavior, consistent with the conceptualization of willingness as reactive rather than reasoned (Gibbons et al., 1998), and consistent with recent operationalizations of willingness in the context of marijuana use (Comello, 2011; Comello & Slater, 2011). Participants were asked to imagine themselves at a party with friends and to decide how they would act in three potentially risky situations that might arise in such a context. The situations involved opportunities to get drunk by playing shots, to get drunk by playing beer pong, and to drive while intoxicated. After reading each scenario (which was not a timed task), participants viewed another screen that contained a single risky action, and participants had to decide quickly whether or not they would act as described by pressing “yes” or “no.”

The situation involving shots asked “Suppose you are with friends who start playing a drinking game involving repeated shots of hard liquor. What would you do?” The single behavioral choice was “I would play until I was very drunk,” and the choices were “yes” and “no.” For willingness to play beer pong, participants were asked “Suppose you are with friends who start playing beer pong. This game includes two teams, and members of each team try to throw ping pong balls across a table into full cups of beer. If a ball lands in a person's cup, that person must quickly drink the entire contents. What would you do?” The risky action choice was the same as for willingness to play shots. Finally, to assess

willingness to drink and drive, participants were asked “Suppose you have been drinking with friends at a party several miles from campus. You and your friends are ready to go home, and you are the one who drove. You are buzzed, but not as much as your friends. What would you do?” The choice was “I would drive my friends home.” The order of presentation of items was randomized.

**Other variables taken into account**—Given the reaction-time measures of the present study, it was critical to account for individual differences in ability to respond quickly to prompts (Fazio, 1990). The measure of baseline reaction speed was participants’ mean reaction time in a practice categorization task that preceded all other tasks in the study. Because the correlations between average quickness and all outcomes were significant and moderate in strength, it was included as a covariate. Condition had no effect on baseline reaction speed, thus fulfilling the requirement of independence between the covariate and independent variable.

Gender was examined for potential interactions with condition in light of the gender differences that have emerged in alcohol-related research among young adults (Wechsler, Dowdall, Davenport, & Rimm, 1995) and in advertising information processing (Wolin, 2003).

## Procedure

The study used DirectRT (Jarvis, 2008a) and MediaLab (Jarvis, 2008b) software programs for presenting stimuli and recording responses. After signing consent forms, participants were randomly assigned to condition and were seated at individual computer stations. In each condition, participants viewed four print ads for 20 seconds each. After each ad, participants were asked to give a one-sentence description of the ad as a check that participants had viewed it. After viewing all of the ads, participants received onscreen instructions and went through a practice run to gain familiarity with the reaction-time task. (As previously noted, condition had no effect on mean baseline reaction speed from the practice run.) The practice run was followed by the reaction-time tasks assessing behavioral willingness to use alcohol, followed by deliberative questions measuring demographics. After answering these items, participants were debriefed and dismissed with thanks.

## Data Cleaning and Analysis Plan

Reaction-time data, which tend to have a strong positive skew, were handled based on guidelines from Fazio (1990). Data were transformed using a negative reciprocal transformation ( $-1000/x$ ). The transformed data correspond to the raw data, in that lower transformed scores indicate lower raw scores; in other words, more negative scores indicate faster reaction times. These data were used in subsequent analyses, although Table 1 reports untransformed data for easier interpretation.

The plan was to conduct preliminary analysis to examine the distribution of “yes” and “no” responses for each outcome. The distribution of “yes” and “no” outcomes across conditions was assessed with chi-square tests to determine whether condition had an effect on valence of response. Such an outcome may be quite unlikely, if it is indeed the case that traditional deliberative measures of willingness are not sufficiently sensitive to non-deliberative message processing effects, as has already been argued. A key objective, however, for inspecting distribution equivalence across conditions would be to establish the independence of the variables, which would indicate that it would be permissible to use valence as a blocking variable in analysis.

Analysis of covariance (ANCOVA) was used for all analyses. Condition, gender, and valence of response were entered as factors. Average reaction-time in the practice task was transformed with a negative reciprocal transformation and then entered as the covariate. For analyses including response valence as a factor, it is important to note that hypothesis support would not be indicated by a significant main effect of condition, which would collapse across “yes” and “no” responses, but rather by a significant interaction of condition with valence, followed up by decomposition of the interaction to examine the effect of condition separately for “yes” and “no” responses. An effect in the hypothesized direction at this level could then be taken for hypothesis support.

## Results

Table 1 reports adjusted raw mean reaction times for each dependent variable by condition, valence, and gender, as well as numbers of participants by condition and valence.

### Preliminary analysis

Inspection of percentages of “yes” and “no” responses for each outcome indicated that half or more of the responses were consistent with non-risky behaviors. For the outcome of getting drunk by playing shots, 57% of participants indicated unwillingness (responded “no” to “I would play until I was very drunk”). With respect to the two other outcomes, 50% indicated unwillingness to get drunk playing beer games, and 76% indicated unwillingness to drive friends home while intoxicated. To see if these distributions were different across conditions, chi-square tests were conducted. The results showed no effect of condition on valence across outcomes: beer games ( $\chi^2 = .01$ ,  $df = 1$ ,  $p = .96$ ), pong ( $\chi^2 = .11$ ,  $df = 1$ ,  $p = .75$ ), and driving while intoxicated ( $\chi^2 = 1.05$ ,  $df = 1$ ,  $p = .31$ ). Given no differences, valence was used as a blocking variable for subsequent analysis, per the analysis plan.

### Main results

It was predicted that exposure to treatment (vs. control) ads would result in lower willingness to engage in risky behaviors involving alcohol, which was operationalized in this study as unwillingness to get drunk playing beer games at a party, to get drunk playing shots at a party, and to drive while intoxicated. The hypothesis was supported for all but one scenario.

For the outcome of playing beer games, responses were first collapsed across gender because preliminary analyses showed no differences by gender. ANCOVA results showed a significant interaction between condition and valence of response,  $F(1,100) = 4.93$ ,  $p = .03$ , partial  $\eta^2 = .05$ . Among those who indicated unwillingness (“no” response to “I would play until I was very drunk”), responses were faster among those who were exposed to treatment vs. control. However, among those who indicated willingness (“yes” response to “I would play until I was very drunk”), the opposite pattern was observed, with faster responses among those who were exposed to control. Further probing showed that the difference in treatment vs. control was significant for those who indicated unwillingness [ $F(1,44) = 4.18$ ,  $p = .05$ , partial  $\eta^2 = .08$ ], but not among those who indicated willingness,  $F(1,55) = 1.14$ ,  $p = .29$ .

For the outcome of playing shots, responses were also collapsed across gender because preliminary analyses showed no differences by gender. However, subsequent analysis showed no significant interaction between condition and valence,  $F(1,100) = .06$ ,  $p = .81$ .

For the outcome of driving friends home while intoxicated, there was a significant three-way interaction among condition, valence, and gender,  $F(1,96) = 7.32$ ,  $p = .008$ , partial  $\eta^2 = .07$ . The pattern of results was such that for males, exposure to the treatment condition vs.



control seemed to quicken “no” responses and delay “yes” responses, with the opposite pattern observed among females. Separate analyses by gender showed that the interaction of condition and valence was significant only for males [ $F(1,36) = 9.01, p = .005$ , partial  $\eta^2 = .2$ ] but not for females [ $F(1,59) = 1.03, p = .32$ ]. Further decomposition of the interaction for males revealed a significant effect of condition only for those who indicated unwillingness to drive while intoxicated [ $F(1,26) = 5.53, p = .03$ , partial  $\eta^2 = .18$ ], with greatly lowered willingness associated with treatment. However, the difference was not significant for males who were willing,  $F(1,9) = 3.07, p = .11$ .

## Discussion

The purpose of this study was to evaluate the cross-context applicability of a non-deliberative approach to measuring behavioral willingness, as well as to explore the psychological impact of a general purpose substance-abuse prevention campaign (“Be Under Your Own Influence”) on alcohol-related outcomes. The most striking pattern that emerged was the effect of condition on those who indicated unwillingness, with lower willingness among those exposed to campaign ads to play beer drinking games and (for males) to drive while intoxicated. These effects were in the predicted direction, consistent with the effects of the field-tested campaign on behavior in the field. Taken together with previous experimental findings relative to marijuana use, the present study demonstrates the cross-substance effectiveness of the campaign at the psychological level.

In addition, the results underscore the utility of non-deliberative behavioral willingness measures as outcomes in risk-prevention contexts. Most decisions to engage in risky behavior are often made impulsively in social situations, when there might be pressure to respond quickly to social demands in ways that are perceived as socially desirable (Gibbons et al., 1998; Gibbons et al., 2003). In our view, the non-deliberative measure provides the closest epistemic association to this situation than does the traditional deliberative measure, which is inherently a reasoned and cognitively reflective response. Although it is acknowledged that the traditional measure provides more manifest response options than does the dichotomous non-deliberative measure, we suggest that the sensitivity of the non-deliberative measure lies in the reaction-time component rather than in the valence. This paper therefore contributes to the literature by demonstrating the sensitivity of these measures to media effects, as well as applicability in an alcohol prevention context.

For the three alcohol-related scenarios that were used as behavioral willingness outcomes, there were effects on unwillingness to drive while intoxicated and to play beer games, but not on unwillingness to play shots. It is unclear why this should have been the case. However, it is possible that because hard liquor is involved, drinking shots may be perceived as a more “hard core” behavior than playing beer pong or driving while under the influence. If this is the case, then there may be less ambiguity surrounding decisions to avoid participating and therefore less opportunity for persuasive messages to facilitate quickness of response.

This study has limitations. The convenience sample of college students limits the generalizability of findings. However, it should be noted that the campaign messages tested here were aimed at middle-school students, so this was a conservative test with respect to effects on the intended audience. Although a middle-school sample would have been ideal, the reaction-time measures required computer-administered data collection, and it was not feasible to bring middle-school students to campus or to arrange for equipment and software to be brought to schools. We used a purposive sample of ads (given the campaign-evaluation objective of the study), but doing so limits the generalizability of findings to other campaigns. To increase generalizability, future study should employ random sampling from

predefined populations of ads. In terms of measurement, the reaction-time measures represent a new approach to assessing willingness and have yet to undergo formal reliability and validity testing. Research is planned that will develop multiple-item measures of willingness with high reliability, as well as help establish correspondence of the reaction-time measures with behavior. Another limitation is that there are potential moderators of message effects on alcohol-related willingness that our study was not able to explore. These variables include attitudes, perceived norms, and outcome expectancies related to alcohol, as well as general orientation toward risk (i.e., sensation seeking; Zuckerman, 1979). Future work should examine how these variables may qualify message effects on willingness in order to enhance understanding of the persuasive process.

In summary, this study fulfilled campaign-evaluation objectives of exploring mechanisms underlying behavioral effects and of assessing outcomes pertinent to a campaign goal (alcohol prevention) that have not been studied to date. The results suggest that the campaign had an effect by lowering behavioral willingness to engage in some types of risky alcohol use, such as playing beer pong and (among males) willingness to drive while intoxicated. The study also demonstrated the utility of measuring campaign effects using non-deliberative measures to best capture the automatic processing of messages that may take place, as well as the nature of pressured decision-making in social situations. It is suggested that such measures can be a valuable tool for planning or evaluating campaigns because they can illuminate the psychological processes underlying behavior change.

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**Table 1**

Adjusted Raw Mean Reaction Times in Milliseconds by Condition, Valence, and Gender

<i>Dependent variable</i>	<i>Treatment (n = 54)</i>		<i>Control (n = 51)</i>	
	<i>Males</i>	<i>Females</i>	<i>Males</i>	<i>Females</i>
Get drunk playing shots				
Unwilling (n = 60)	2134 (328)	1971 (241)	1555 (332)	1911 (263)
Willing (n = 45)	1717 (311)	1995 (325)	1668 (407)	1714 (278)
Get drunk playing beer pong				
Unwilling (n = 47)	2719 (493)	1317 (334)	2116 (464)	2024 (381)
Willing (n = 58)	1729 (354)	2418 (368)	1380 (458)	1784 (314)
Drive while intoxicated				
Unwilling (n = 82)	1544 (237)	1321 (180)	2041 (244)	1199 (173)
Willing (n = 23)	1282 (320)	1559 (368)	854 (452)	2192 (406)

*Note.* Reaction times are in milliseconds. Standard errors are in parentheses. Means were adjusted for baseline reaction speed. Raw data are reported in table but were transformed prior to analyses.