

Masthead Logo

University of Rhode Island
DigitalCommons@URI

Psychology Faculty Publications

Psychology

2016

A new paradigm for credibly administering placebo alcohol to underage drinkers

Michael H. Bernstein

Mark D. Wood

See next page for additional authors

Creative Commons License

[Creative Commons License](#)

This work is licensed under a [Creative Commons Attribution-Noncommercial-No Derivative Works 4.0 License](#).

Follow this and additional works at: https://digitalcommons.uri.edu/psy_facpubs

Authors

Michael H. Bernstein, Mark D. Wood, and Suzanne M. Colby



HHS Public Access

Author manuscript

Addict Behav. Author manuscript; available in PMC 2017 January 01.

Published in final edited form as:

Addict Behav. 2016 January ; 52: 22–27. doi:10.1016/j.addbeh.2015.08.004.

A New Paradigm for Credibly Administering Placebo Alcohol to Underage Drinkers

Michael H. Bernstein^a, Mark D. Wood^{a,*}, and Suzanne M. Colby^b

Michael H. Bernstein: MBernstein11@my.uri.edu; Suzanne M. Colby: suzanne_colby@brown.edu

^aUniversity of Rhode Island, Department of Psychology, Kingston, RI, USA 02881

^bBrown University, Center for Alcohol & Addiction Studies, Department of Psychiatry and Human Behavior Providence, RI, USA 02912

Abstract

Background—The primary goal of this study was to establish a paradigm for credibly administering placebo alcohol to underage drinkers. We also sought to create a new, valid procedure for establishing placebo alcohol believability.

Method—Participants were 138 American college students (66.7% female) predominantly (90.0%) under the legal drinking age. Groups of 2–3 participants and one same-sex confederate consumed mixed drinks, purportedly containing alcohol, *ad-lib* in a naturalistic bar-laboratory for 20 minutes. All beverages, however, were non-alcoholic but we used visual, olfactory, and taste cues to maximize placebo credibility. Also, the confederate made two scripted statements designed to increase the perception of drinking real alcohol. After the drinking portion, participants responded to survey items related to alcohol consumption and intoxication. Next, they were individually debriefed, with open-ended responses used to make a determination of whether the participant was deceived with respect to placebo alcohol.

Results—All participants estimated consuming some amount of alcohol. However, using a more conservative criteria for estimating alcohol believability based on the debrief, 89.1% of participants were classified as deceived. Deceived participants were much more likely to estimate having a positive Blood Alcohol Content, and to say their current level of intoxication was typical given the amount of alcohol consumed than non-deceived participants.

Correspondence regarding this article should be sent to the firstauthor at mbernstein11@my.uri.edu; 401-874-5025; University of Rhode Island, Cancer Prevention Research Center, 130 Flagg Rd, Kingston RI 02881.

Author disclosure

Statement 1: This project was supported in part by the National Center for Research Resources of the National Institutes of Health under Award G20RR030883

Statement 2: Michael Bernstein was the primary writer for all sections of the manuscript. Michael Bernstein and Mark Wood designed the study as part of the first-author's master's thesis. Mark Wood and Suzanne Colby provided extensive feedback on several drafts of the paper. All authors approve the final manuscript.

Statement 3: No authors have any actual or apparent conflict of interest.

Statement 4: This study would not be possible without the help of the following Research Assistants (listed in alphabetical order): Sara Atash, Sara Balestrieri, Alexander Bethune, Samantha Dubois, Lauren Erickson, Ashley Hebert, Gina Kinan, Amanda Lampe, Chelsea Martini, and Ariana Wakeman. The authors are grateful for their hard work.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Discussion—Credibly administering placebo alcohol to underage drinkers is possible. This approach carries great potential for future laboratory work. In addition, the methodology used here to classify participants as deceived or not deceived appears valid based on self-reported BAC estimation and intoxication levels.

Keywords

Alcohol; Placebo; Confederate; Bar-laboratory; College

1. Introduction

Placebo alcohol has been widely used in experimental studies for participants of legal drinking age. It is almost exclusively administered as an experimental control condition to disentangle the pharmacological and psychological effects of alcohol administration on a range of emotions and behaviors, such as: stress (Sayette, Breslin, Wilson, & Rosenblum, 1992), sexual risk taking (George et al, 2009), panic (Kushner et al., 1996), and aggression (Chermack & Taylor, 1995; Lang, Goeckner, Adesso, & Marlatt, 1975). To our knowledge, placebo alcohol consumption has only been used once solely as a dependent variable (Morrison et al., 2012), even though this approach has great potential for laboratory studies, particularly among underage drinkers who cannot legally consume alcohol. Whether used as an independent or dependent variable, it is crucial that placebo alcohol beverages are convincing, otherwise internal validity is severely compromised. In spite of this, relatively little attention, particularly recently, has been given to the procedures used to administer placebo alcohol and evaluate the credibility of placebo administration. Below, we briefly summarize this body of research. Ultimately, the goal of the current study is to propose a novel paradigm for administering placebo alcohol, which has great utility for research involving underage drinkers.

1.1. Placebo Alcohol Procedures

Various types of placebo alcoholic beverages have been studied. Although some research supports non-alcoholic beer (Corcoran & Segrist, 1993; Keane et al., 1980; Martin, Earleywine, & Young, 1990) or placebo gelatin shots as credible (Ralevski et al., 2006), most studies have used mixed drinks. With these beverages, participants are led to believe that liquor is mixed with juice or soda, although no alcohol is actually given. As reviewed at length elsewhere (Marlatt & Rohsenow, 1980; Martin & Sayette, 1993), a number of administration strategies have been suggested to enhance credibility, such as: taste/olfactory cues; chilling beverages; mixing drinks in front of participants with real liquor bottles that actually hold flattened tonic water; engaging in a distracter task that focuses participants away from introspective cues; adding strong flavoring; using a sham breathalyzer test; and having participants use mouthwash prior to consumption. Even though these procedures are strongly recommended (Marlatt & Rohsenow), they are infrequently followed. For instance, in one review of alcohol administration research (Breslin & Sobell, 1999), only 8% of placebo studies reported having participants view an experimenter mix drinks, and only 23% reported providing olfactory cues.

While past research has focused on the physical context when trying to increase placebo alcohol credibility, to our knowledge, no work has studied the social context. In particular, there is a long tradition of research that suggests people are heavily influenced by the judgments of others (e.g., Asch, 1956; Cialdini & Griskevicius, 2010). Drawing on this body of work, we propose that using an experimental confederate who convincingly behaves as though he/she were drinking real alcohol could influence study participants into believing the same.

1.2. Manipulation Checks and Deception Rates

Even though a great deal of experimental research has been conducted using placebo alcohol administration, there is no “gold standard” for determining whether participants were actually deceived. This is a critical factor to address, since research indicates that placebo alcohol is not always believable. One meta-analysis (Schlauch et al., 2010) of 44 alcohol administration studies with both alcohol and placebo conditions found that subjective intoxication and estimated number of drinks consumed was much lower among those in the placebo condition as compared to those in the alcohol condition.

Manipulation checks designed to assess placebo credibility also vary widely. One common approach is to ask participants whether or not they received alcohol during the experiment, with those indicating “yes” considered deceived. Using this dichotomous criterion, deception rates in published studies have ranged from 59% to 100% (Abrams & Wilson, 1979; Gilbertson, Prather, & Nixon, 2010; Kreusch, Vilenne, & Quertemont, 2013). Other studies have evaluated placebo deception by asking participants to estimate how much alcohol they consumed, or the alcohol content of their drink. Using these indices, placebo credibility was considered to be demonstrated if participants estimated that they drank **any** amount of alcohol, or if they estimated their drink had an alcohol content above 0%. At least two published studies employing these criteria have observed 100% rates of deception (Fillmore, Carscadden, & Vogel-Sprott, 1998; Morrison et al., 2012).

One concern about the methods described above for evaluating placebo alcohol credibility is that participant responses may be influenced by experimenter demand (Orne, 1962). To be classified as non-deceived, participants have to say they did not get alcohol after being informed by the experimenter that they did. To explore this, some studies have used an alternative approach in which the researcher informed participants at the end of an experiment that some people received alcohol while others actually received a non-alcoholic beverage despite being told it contained alcohol. Participants were then asked which condition they believed they were in. Those who thought they received alcohol were classified as deceived, and this procedure has yielded deception rates of 58–60% (Knight, Barbaree, & Boland, 1986; Martin, Earlywine, Finn, & Young, 1990). While this approach does minimize experimenter demand, it may be overly conservative. During the study, it is possible that people believed the alcohol was real, but responded otherwise since the experimenter voluntarily suggested they may have received a placebo (see Martin & Sayette, 1993).

As such, a middle ground between the more conservative (Knight et al., 1986; Martin et al., 1990) and less conservative (e.g. Abrams & Wilson, 1979; Fillmore et al., 1998)

manipulation checks may be appropriate. For example, some participants may think they received less alcohol than told by an experimenter, yet believe that some alcohol was still consumed. Sher, Bartholow, Erickson, Peuser, and Wood (2007) reported that participants assigned to alcohol (target BAC .08) reported consuming an average of 4.80 ($SD = 1.67$) drinks versus an average of 2.55 ($SD = 1.48$) for those in the placebo group. To better capture where participants fall on this continuum, there is a need for the use of more nuanced approaches, such as a funnel debrief, where an experimenter carefully probes participants for suspicion on study deception (Bargh & Chartrand, 2000; Wilson, Aronson & Carlsmith, 2009). Due to its gradual nature, funnel debriefs, which are widely used in Social Psychology, minimize the chance a participant is not disclosing their true impression of the study because he/she is placating the experimenter or embarrassed to look gullible (Wilson et al., 2009). Additionally, funnel debriefs minimize the possibility of emotional harm by allowing an experimenter to explain study deception (an important tool frequently used in experimental work), and address any participant concerns.

1.3. Current Study

The current study is part of a broader investigation with two primary goals: 1) To develop a new approach for credibly administering placebo alcohol as a dependent variable to underage college students; and 2) To examine the effect of anticipatory social anxiety on *ad-lib* placebo alcohol consumption in a bar-laboratory. Results related to the latter goal are presented elsewhere (Bernstein & Wood, 2015). Here, we focus on the methodological aspect of the study (goal one). Participants in groups of two or three, along with one confederate were given the opportunity to drink placebo alcohol *ad-lib* in a naturalistic bar-laboratory. To assess placebo credibility, we used a novel manipulation check consisting of a brief semi-structured interview during a funnel debrief.

There were two primary aims for the present study: Aim 1 was to determine the rate of placebo alcohol believability with our approach. Aim 2 was to assess the validity of our manipulation check procedure by comparing participants classified as deceived and non-deceived. A tertiary aim was to examine whether placebo alcohol credibility was related to age, gender, quantity of typical alcohol consumption outside the laboratory, or alcohol consumption consumed during the experiment.

2. Method

2.1. Participants and Recruitment

Participants were recruited from 100- and 200- level psychology classes¹ in exchange for class credit at a medium-sized New England public university. Announcements were made for a study examining the effects of “alcohol on language fluency.” Interested students were instructed to email the research staff and were subsequently contacted to query eligibility and arrange a study session if eligible. Participants were ineligible if they: were under 18 ($n=1$), did not consume alcohol in the past three months ($n=10$), thought they might be pregnant ($n=1$), or ever attended alcohol/drug treatment ($n=1$)². Of the 153 who participated,

¹One participant was also recruited from a 100-level gender studies class.

15 were excluded from analyses because they: terminated the study early ($n=2$), had prior knowledge of the experiment ($n=9$), were skeptical about our cover story in a manner that compromises their data ($n=1$), or did not order “alcoholic” beverages ($n=3$), leaving a sample of $n=138$. Participants were predominantly underage (90.0% under 21), female (66.7%) and White (80.4%). See Table 1 for more information.

All study procedures were approved by the IRB. We obtained a waiver of informed consent, since it would not be feasible to disclose certain elements of the study to participants. Instead, we created a “study information form,” as discussed below.

2.2. Materials

2.2.1. Demographics—Participants indicated their age, gender, race, and residence.

2.2.2. Daily alcohol drinking questionnaire (DDQ)—This self-report measure asks participants to record the number of standard drinks typically consumed each day of the week within the past three months (Collins, Parks, & Marlatt, 1985). From participants’ responses, we computed average number of drinks per week.

2.2.3. Placebo Alcohol Manipulation Check—Participants were asked “How many alcoholic drinks did you have?” as an open-ended question. Participants were also asked “Please estimate your current Blood Alcohol Content (BAC) by circling the appropriate number below.” Response options ranged from .00 to .10 in increments of .01 with an anchor of “intoxicated” for .08.

2.2.4. Movie Rating Sheet—This form asked participants “what was the best and worst part of the film clip,” and to indicate how interesting, engaging, funny, and realistic the segment was on a 5-point scale.

2.3. Procedure

All participants were scheduled in same-sex groups of 2–3 between 4:15 and 8:35 pm Sunday – Wednesday. Sessions were not run if only one participant arrived. Prior to arriving, participants were given standard pre-session alcohol administration instructions. They were told to: refrain from alcohol for 12 hours before their session, avoid eating a large meal earlier in the day, verify that it was safe to consume alcohol with any medications they might be taking, and to immediately cancel prior to their scheduled time if they think they might be pregnant.

Upon arriving to the laboratory, participants were joined by a same-sex confederate. After being greeted by a female experimenter, each person was brought to an individual interview room, and signed a study information document stating: “you will be given the opportunity to drink alcohol in a supervised setting.” Next, participants were breathalyzed to verify

²Exclusions related to non-drinking status, pregnancy, and alcohol/drug treatment are typical in alcohol-administration studies for ethical reasons. Incorporating these exclusions into the current study therefore served to increase the credibility of the alcohol deception.

abstinence, and asked to verbally confirm they were not taking medication, nor did they have a medical condition, that would contraindicate alcohol consumption.

Following the individual completion of a social anxiety or control task (data not reported herein; see Bernstein & Wood, 2015), participants completed a pencil-and-paper survey including the demographic questions and DDQ. Next, they assembled in a common area and were escorted to a bar-laboratory. While walking, the confederate said “I’m excited – my friend did this study last week and came back to [name of freshmen/sophomore residence hall] pretty buzzed.”

Upon arriving at the bar-lab, the experimenter introduced participants to a female bartender (Research Assistant). Consistent with other research (Bot, Engels, & Knibbe, 2005), popular music was played, snacks were provided, and the room was furnished with a bar and bar décor. The experimenter explained that “this is the alcohol portion of the study,” where participants could consume non-alcoholic or alcoholic beverages prior to the fluency procedure. The bartender presented everyone with a menu that included the following alcoholic options: rum and coke/diet coke, tequila and orange juice, gin and tonic, vodka and cranberry juice, gin and ginger ale³. The menu also had a non-alcohol section, which stated “Feel free to order any of these sodas or juices without alcohol.” Participants were allowed to deviate from the menu only when the requested drink included one type of liquor and one non-alcoholic mixer (e.g., vodka and tonic). As done by Bot et al. (2005), the bartender said “you must personally ask for all beverages, since it would be unethical for us to ask participants directly.” This was done to keep interactions between the bartender and study participants minimal and constant across sessions.

No alcoholic drinks were actually provided. Placebo “alcoholic” beverages were chilled soda or juice mixed with flattened tonic water poured from real liquor bottles in a 5:1 ratio. To provide taste cues, we surreptitiously floated 1 mL of McCormick rum extract and 1mL of Souza tequila on top of each drink. For olfactory cues, we used tequila to rim glasses and spritz the room prior to each session. We also soaked lemons in tequila and added them to each “alcoholic” beverage. The bartender unobtrusively recorded the quantity of beverages consumed.

At the beginning of the drinking portion, the experimenter mentioned that materials were being developed for a different study. Consistent with Marlatt & Rohsenow’s (1980) suggestion of having participant’s engage in a distractor task while consuming placebo alcohol, participants were asked to watch a 17-minute movie clip (*Happy Gilmore*), which contained no references to alcohol, and answer a few questions. Next, the experimenter handed out the movie rating sheet and played the clip. Three minutes were provided to complete the rating form. All beverages were collected after the 20-minute drinking period. Finally, to avoid having participants stand and walk, they were asked to complete the manipulation check questionnaire in the bar-lab (without conferring among each other) and were escorted back to their original interview room for one-on-one debriefing.

³The soda/juice brands are as follows: Coca-cola for coke and diet coke; Minute Maid for orange juice and cranberry juice; Schweppes for tonic water and ginger ale.

2.3.1. Confederate's Behavior in Bar-Laboratory—Upon receiving the menu, the confederate ordered an alcoholic drink, took a sip, looked disgusted, and said, “I hate the taste of [name of liquor].” Shortly afterwards, he/she got the bartender’s attention and said “Sorry, I forgot I don’t like [liquor in initial drink]. Would it be OK to get a [new drink] instead?” The confederate received and consumed this beverage in 10 minutes. Next, he/she ordered another drink, and after a few sips, said: “I’m definitely feeling this – good to be a lightweight sometimes!” The confederate consumed half of this drink in the remaining time. All sips were paced evenly. Other than these statements, the confederate was generally pleasant but did not initiate conversation. In the rare event (approximately 3 of 54 sessions) of a participant openly expressing doubt about receiving alcohol, the confederate would say something to the effect of: “Well, they only put one shot in these drinks. I guess that’s typical at bars, but we usually make them stronger in our dorm.”

2.4. Debriefing

All participants were administered a partially scripted one-on-one funnel debrief by the experimenter. The debrief was adapted from Wood (1996) and is explained at greater length in the Appendix. In brief, participants were asked a series of questions relating to placebo alcohol credibility. Of particular interest, we asked whether the level of intoxication they experienced was typical given the amount of alcohol consumed. Ultimately, their level of suspicion was judged on a 9-point scale from 1.0 to 5.0 (in increments of 0.5) with the following anchors: 1) “No suspicion surrounding the alcohol”; 2) “Some suspicion the alcohol was weaker than usual”; 3) “Moderate suspicion the alcohol was weaker than usual”; 4) “Thought alcohol was fake”; 5) “Strongly suspected alcohol was fake.”

3. Results

We first examined the distribution for all variables of interest. All fell within an acceptable range of skewness (<2) and kurtosis (<4), so no transformations were needed. On average, participants drank 13.40 oz ($SD=5.89$) in the laboratory; 21.8% had 1–9 ounces (one drink or less), 64% had 9.1–18 oz. (1–2 drinks), and 15.0% had 18.1 or more oz (3+ drinks). Across all participants, the mean estimated BAC rating was .024 ($SD=.200$). The frequencies are presented in Table 2. BAC rating was positively correlated with the amount of “alcohol” consumed in the laboratory, $r(136)=.312, p<.001$.

Regarding Aim 1, based on the funnel debriefing, 89.1% of participants were considered deceived, established by a score of 3.0 or lower on the alcohol suspicion rating ($M=1.72, SD=1.12$). In fact, most participants (55.1%) received the lowest possible score of 1.0. See Table 3 for a frequency distribution.

To examine Aim 2, we compared participants classified as deceived ($n=123$) to those classified as non-deceived ($n=15$) on three self-report items related to placebo alcohol credibility (Table 4) including: whether they estimated having a positive BAC, the extent to which the intoxication reported in the laboratory was consistent with how they were normally affected by an equivalent amount of alcohol, and if they indicated consuming at least some portion of an alcoholic drink. Deceived participants were more likely to estimate a positive BAC (95.9% v. 13.3%), $\chi^2(1, N=138)=80.73, p<.001$ and report that their level of

intoxication was typical (89.8% v. 41.7%), $\chi^2 (1, N=130)=20.25, p<.001$, relative to those who were non-deceived. Notably, all participants in both the deceived and non-deceived groups reported consuming some amount of an alcoholic drink.

In separate analyses, we compared alcohol suspicion scores according to gender, minimum legal drinking age (under 21 versus 21 or older), quantity of “alcohol” consumption in the laboratory, and typical drinks per week. *T*-tests and Pearson’s *r* were used for dichotomous and continuous independent variables, respectively. Alcohol suspicion scores did not vary by any of these variables, *ps*>.14.

4. Discussion

The major aims of the present study were to: 1) examine placebo alcohol credibility for a new procedure that could include underage participants, and 2) assess its validity with a funnel debrief. Using a sample that was 90.0% underage, we observed an 89.1% rate of successful deception. There was strong support for the validity of our procedure since participants classified as deceived, relative to those classified as non-deceived, were significantly more likely to estimate their BAC as positive, and to indicate their degree of intoxication was consistent with how they were normally affected by an equivalent amount of alcohol. Furthermore, the quantity of placebo alcohol consumed was correlated with estimated BAC ratings. Also of note, the degree of alcohol suspicion did not vary by gender, legal drinking age, or alcohol consumption, suggesting the approach is broadly applicable to underage drinkers.

Prior work on placebo alcohol credibility is highly varied both with respect to manipulation checks used and deception rates (Martin & Sayette, 1993; Testa et al., 2006). In spite of this general heterogeneity, many studies purport successful placebo deception when participants indicate they consumed any quantity of alcohol (Abrams & Wilson, 1979, Gilbertson et al., 2010; Kreusch et al., 2013; Morrison et al., 2012). Using that criterion, we would have achieved a 100% rate of successful deception. However, as Knight and colleagues (1986) argue, that approach may not be conservative enough due to experimenter demands. Qualitative observations in the debriefing procedure generally support that conclusion here. For instance, one participant (classified as non-deceived) who reported having two alcoholic drinks stated “I don’t feel any different than before [I drank]. Maybe there wasn’t alcohol.” The approach used in the present study allowed for a more fine-grained and conservative estimation of placebo alcohol efficacy, with good evidence of validity since deceived and non-deceived participants scored very differently on questions related to alcohol consumption and subjective alcohol intoxication.

4.1. Implications

Research on placebo alcohol to date has been done exclusively with individuals of legal drinking age, presumably because deceiving underage participants is not considered feasible. To our knowledge, the inclusion of underage participants in experimental work has been limited to alcohol challenge studies where they **knowingly** receive a placebo beverage (e.g. Darkes & Goldman, 1993; 1998; Wood, Capone, Laforge, Erickson, & Brand, 2007). However, since there is no expectation of receiving alcohol, these studies do not employ a

placebo in the traditional sense. Developing an effective placebo for people under the legal drinking age would constitute a significant advancement in the field, since college students (who are predominantly under 21) face substantial alcohol-related harms such as sexual assault and driving while intoxicated (Hingson, Zha, & Witzman, 2009). As such, this procedure would allow researchers to examine alcohol consumption among a high-risk group that has gone uninvestigated in experimental work. A substantial limitation of etiologic alcohol research with underage participants to date is that these studies rely on correlational data, precluding causal inferences that can be drawn from experimental designs. Finally, researchers may wish to consider using placebo alcohol as a dependent variable with individuals of legal drinking age. Doing so would reduce risks associated with administering real alcohol (National Advisory Council on Alcohol Abuse and Alcoholism, 2005; Wood & Sher, 2000), and mitigate the burden on research staff and participants, since people receiving alcohol have to remain in the laboratory until their BAC reach near zero levels, necessitating greater participation incentives.

4.2 Limitations and Future Directions

One limitation of the current study is that some IRBs may be reluctant to approve this method given the deception regarding placebo alcohol administration. However, consistent with the American Psychological Association's (1992) code of ethics, deception is 1) necessary because researchers cannot feasibly give real alcohol to underage participants, and 2) highly unlikely to cause distress. No participant in the present study expressed any objection or distress in response to this deception. In fact, there may be participation benefits, since some debriefing sessions led to a discussion of alcohol expectancies, which has been supported as an effective preventive intervention in alcohol challenge research (Scott-Sheldon, Terry, Carey, Garey, & Carey, 2012). While we achieved a high rate of placebo believability, the relatively modest estimated BAC ratings suggest participants may not have fully experienced the psychological effects of alcohol. Nonetheless, it is likely that most participants were unfamiliar with the BAC metric, and other indices of alcohol credibility (as presented in Tables 3 and 4) indicate greater deception.

Finally, a limitation of our study is that the design did not provide for a systematic comparison between our novel procedure and other, more traditional methods for enhancing placebo credibility. A fruitful direction for further research would be to directly compare the efficacy of various placebo administration methods (e.g. the confederate, visual cues, taste cues, etc.). Other studies aimed at further exploring this methodology could video-record debrief sessions and have multiple experimenters independently rate alcohol believability to establish inter-rater reliability of the scale.

References

- Abrams DB, Wilson GT. Effects of alcohol on social anxiety in women: Cognitive versus physiological processes. *Journal of Abnormal Psychology*. 1979; 88:161–173.10.1037/0021-843X.88.2.161 [PubMed: 447899]
- American Psychological Association. Ethical principles of psychologists and code of conduct. *American Psychologist*. 1992; 47:1597–1411.
- Asch SE. Studies of independence and conformity: I. A minority of one against a unanimous majority. *Psychological Monographs: General and Applied*. 1956; 70(9):1–70.

- Bargh, JA.; Chartrand, TL. The mind in the middle: A practical guide to priming and automaticity research. In: Reis, HT.; Judd, CM., editors. *Handbook of research methods in social and personality psychology*. New York: Cambridge University Press; 2000. p. 253-285.
- Bernstein MH, Wood MD. The effect of acute anticipatory social anxiety on *ad-lib* placebo alcohol. 2015 Manuscript in preparation.
- Bot SM, Engels RCME, Knibbe RA. The effect of alcohol expectancies on drinking behavior in peer groups: Observations in a naturalistic setting. *Addiction*. 2005; 100:1270–1279. [10.1111/j.13600443.2005.01152.x](https://doi.org/10.1111/j.13600443.2005.01152.x) [PubMed: 16128716]
- Breslin FC, Sobell SL. Alcohol administration methodology 1994–1995: What researchers do and do not report about subjects and dosing procedures. *Addictive Behaviors*. 1999; 24:509–520. [http://dx.doi.org/10.1016/S0306-4603\(99\)00002-7](http://dx.doi.org/10.1016/S0306-4603(99)00002-7). [PubMed: 10466846]
- Chermack ST, Taylor SP. Alcohol and human physical aggression: Pharmacological versus expectancy effects. *Journal of Studies on Alcohol and Drugs*. 1995; 56:449.
- Cialdini, RB.; Griskevicius, V. Social influence. In: Baumeister, R.; Finkel, E., editors. *Advanced Social Psychology*. New York: Oxford Univ. Press; 2010. p. 385-417.
- Collins RL, Parks GA, Marlatt GA. Social determinants of alcohol consumption: The effects of social interaction and model status on the self-administration of alcohol. *Journal of Consulting and Clinical Psychology*. 1985; 53:189–200. [10.1037/0022-006X.53.2.189](https://doi.org/10.1037/0022-006X.53.2.189) [PubMed: 3998247]
- Corcoran KJ, Segrist DJ. In search of an alternative placebo: estimating alcohol content of nonalcoholic, light, and regular beer. *Addictive Behaviors*. 1993; 18:259–262. [PubMed: 8342438]
- Darkes J, Goldman MS. Expectancy challenge and drinking reduction: Experimental evidence for a mediational process. *Journal of consulting and clinical psychology*. 1993; 61:344–353. <http://dx.doi.org/10.1037/0022-006X.61.2.344>. [PubMed: 8473588]
- Darkes J, Goldman MS. Expectancy challenge and drinking reduction: Process and structure in the alcohol expectancy network. *Experimental and Clinical Psychopharmacology*. 1998; 6:64–76. <http://dx.doi.org/10.1037/1064-1297.6.1.64>. [PubMed: 9526147]
- Fillmore MT, Carscadden JL, Vogel-Sprott M. Alcohol, cognitive impairment and expectancies. *Journal of Studies on Alcohol*. 1998; 59:174–179. [PubMed: 9500304]
- Lang AR, Goeckner DJ, Adesso VJ, Marlatt GA. Effects of alcohol on aggression in male social drinkers. *Journal of Abnormal Psychology*. 1975; 84:508–518. <http://dx.doi.org/10.1037/h0077055>. [PubMed: 1194512]
- George WH, Davis KC, Norris J, Heiman JR, Stoner SA, Schacht RL, Kajumulo KF. Indirect effects of acute alcohol intoxication on sexual risk-taking: The roles of subjective and physiological sexual arousal. *Archives of Sexual Behavior*. 2009; 38:498–513. [10.1007/s10508-008-9346-9](https://doi.org/10.1007/s10508-008-9346-9) [PubMed: 18431618]
- Gilbertson R, Prather R, Nixon SJ. Acute alcohol administration and placebo effectiveness in older moderate drinkers: Influences on cognitive performance. *Journal of Studies on Alcohol and Drugs*. 2010; 71:345–350. [PubMed: 20409427]
- Keane TM, Lisman SA, Kreutzer J. Alcoholic beverages and their placebos: An empirical evaluation of expectancies. *Addictive Behaviors*. 1980; 5:313–328. [PubMed: 7211529]
- Knight LJ, Barbaree HE, Boland FJ. Alcohol and the balanced-placebo design: The role of experimenter demands in expectancy. *Journal of Abnormal Psychology*. 1986; 95:335–340. [PubMed: 3805495]
- Kushner MG, Mackenzie TB, Fiszdon J, Valentiner DP, Foa E, Anderson N, Wangenstein D. The effects of alcohol consumption on laboratory-induced panic and state anxiety. *Archives of General Psychology*. 1996; 53:264–270. [10.1001/archpsyc.1996.01830030086013](https://doi.org/10.1001/archpsyc.1996.01830030086013)
- Kreusch F, Vilenne A, Quertemont E. Assessing the stimulant and sedative effects of alcohol with explicit and implicit measures in a balanced placebo design. *Journal of Studies on Alcohol and Drugs*. 2013; 74:923–930. [PubMed: 24172120]
- Marlatt, GA.; Rohsenow, DJ. Cognitive processes in alcohol use: Expectancy and the balanced placebo design. In: Mello, N., editor. *Advances in substance abuse*. Vol. 1. Greenwich CT: JAI Press; 1980. p. 159-199.
- Martin CS, Earleywine M, Finn PR, Young RD. Some boundary conditions for effective use of alcohol placebos. *Journal of Studies on Alcohol and Drugs*. 1990; 51:500–505.

- Martin CS, Sayette MA. Experimental design in alcohol administration research: Limitations and alternatives in the manipulation of dosage-set. *Journal of Studies on Alcohol*. 1993; 54:750–761. [PubMed: 8271813]
- Morrison PM, Noel NE, Ogle RL. Do angry women choose alcohol? *Addictive Behaviors*. 2012; 37:908–813.10.1016/j.addbeh.2012.03.018 [PubMed: 22498025]
- National Advisory Council on Alcohol Abuse and Alcoholism. Recommended Council guidelines on ethyl alcohol administration in human experimentation. 2005. Available From: <http://www.niaaa.nih.gov/Resources/ResearchResources/job22.htm>
- Orne MT. On the social psychology of the psychological experiment: With particular reference to demand characteristics and their implications. *American Psychologist*. 1962; 17:776–783.
- Ralevski E, Gueorguieva R, Limoncelli DD, Husain R, Jane JS, Petrakis I. Gelatin “shots” as a new method for alcohol administration in a laboratory setting. *Alcoholism: Clinical and Experimental Research*. 2006; 30:473–479.10.1111/j.1530-0277.2006.00064.x
- Sayette MA, Breslin FC, Wilson GT, Rosenblum GD. An evaluation of the balanced placebo design in alcohol administration research. *Addictive Behaviors*. 1994; 19:333–342. [PubMed: 7942250]
- Scott-Sheldon LA, Terry DL, Carey KB, Garey L, Carey MP. Efficacy of expectancy challenge interventions to reduce college student drinking: A meta-analytic review. *Psychology of Addictive Behaviors*. 2012; 26:393–405. <http://dx.doi.org/10.1037/a0027565>. [PubMed: 22428862]
- Schlauch RC, Waesche MC, Riccardi CJ, Donohue KF, Blagg CO, Christensen RL, Lang AR. A meta-analysis of the effectiveness of placebo manipulations in alcohol-challenge studies. *Psychology of Addictive Behaviors*. 2010; 24:239–253. <http://dx.doi.org/10.1037/a0017709>. [PubMed: 20565150]
- Sher KJ, Bartholow BD, Peuser K, Erickson DJ, Wood MD. Stress-response-dampening effects of alcohol: Attention as a mediator and moderator. *Journal of Abnormal Psychology*. 2007; 11610.1037/0021-843X.116.2.362
- Testa M, Fillmore MT, Norris J, Abbey A, Curtin JJ, Leonard KE, Hayman LW. Understanding alcohol expectancy effects: Revisiting the placebo condition. *Alcoholism: Clinical and Experimental Research*. 2006; 30:339–348.10.1111/j.1530-0277.2006.00039.x
- Wilson, TD.; Aronson, E.; Carlsmith, K. The art of laboratory experimentation. In: Fiske, ST.; Gilbert, DT.; Lindzey, G., editors. *Handbook of Social Psychology*. 5. Hoboken, NJ: John Wiley & Sons; 2009. p. 51-81.
- Wood, MD. Unpublished doctoral dissertation. University of Missouri-Columbia; Columbia, MO: 1996. Alcohol and aggression: An examination of the roles of cognitive functioning and personality.
- Wood MD, Capone C, Laforge R, Erickson DJ, Brand NH. Brief motivational intervention and alcohol expectancy challenge with heavy drinking college students: A randomized factorial study. *Addictive Behaviors*. 2007; 32:2509–2528.10.1037/0893-164X.18.1.19 [PubMed: 17658696]
- Wood MD, Sher KJ. Risks of alcohol consumption in laboratory studies involving human research participants. *Psychology of Addictive Behaviors*. 2000; 14:328–334. <http://dx.doi.org/10.1037/0893-164X.14.4.328>. [PubMed: 11130151]

5. Appendix

To make participants comfortable, and encourage honest reporting, we started each debrief by stating: “Now, we want to ask you a few quick questions. Please be open and honest. This is totally information gathering on our part, and not meant to put you on the spot or make you feel defensive. It’s just very helpful for us to get information from someone with a fresh perspective. Does that sound good?” After eliciting a response from the participant, we asked the following four questions: 1) “What did you think about the drinking portion of the study?”; 2) “Based on the [manipulation check questionnaire], you indicated the alcohol had a strong/moderate/weak effect. Can you explain this further?”; 3) “Is this effect what you would normally experience while drinking that amount?” If participants indicated it was not

typical, this question was followed up with “why do you think it was different?” The final question was: 4) “How strong do you think these drinks were compared to what you usually consume?” The experimenter recorded all responses, and encouraged participants to elaborate when something was unclear. As needed, the experimenter would probe further, based on participants’ earlier responses (e.g., “Why do you think these drinks tasted weak?”).

Based on this conversation, the experimenter rated each participant’s level of deception on a 9-point scale in increments of 0.5 from 1 to 5. The following anchors were provided: 1) “No suspicion surrounding the alcohol”; 2) “Some suspicion the alcohol was weaker than usual”; 3) “Moderate suspicion the alcohol was weaker than usual”; 4) “Thought alcohol was fake”; 5) “Strongly suspected alcohol was fake.” Any participant with a rating of 3 or lower was considered deceived, and participants with a rating higher than 3 were considered not deceived. Borderline cases were discussed between the experimenter and first-author. As necessary, the first and second author also discussed borderline decisions on a case-by-case basis.

At the end of the debriefing, the experimenter asked “Did you know anything about this study prior to arriving, other than what we’ve told you?” If the participant indicated he/she did have prior knowledge, the experimenter probed for what the participant knew. Finally, we explained the true aim of the experiment, and told them, in an explicit attempt to maintain study viability by leaving participants with the belief that some people *did* receive alcohol, that they were “one of the participants who received a placebo.” Before leaving, participants signed an affidavit saying they would not discuss the study for at least one year, and indicated their confidence in keeping the terms of the affidavit on a 4-point Likert scale from “not at all confident” to “extremely confident.”

Highlights

- We created a new procedure for administering placebo alcohol
- The primary methodological innovation was the inclusion of a confederate
- We developed a funnel debrief for measuring deception
- We observed a 90.0% deception rate
- Most participants were under the legal drinking age

Table 1

Sample Characteristics

Demographic	Percent of Sample
<i>Age (M=18.98, SD=2.41)</i>	
18	53.1
19	30.0
20	6.9
21	6.9
22+	3.2
<i>Gender</i>	
Male	33.3
Female	67.7
<i>Race</i>	
White/Caucasian	80.4
Black/African American	2.9
Asian	3.6
Multi-racial	4.3
Other	8.5
<i>Residence</i>	
Residence Hall	70.3
Apartment, house, condo (not with parents)	15.9
Fraternity/Sorority House	5.8
With parents	8.0
<i>Weekly Drinks (M=10.37, SD=7.37)</i>	
0–5.0	25.5
5.1–10.0	35.1
10.1–15.0	18.5
15.1+	21.2

Table 2

Estimated BAC Ratings

Estimated BAC*	Percent of Sample	Cumulative Percent
.08	1.6	1.6
.07	0.8	2.4
.06	0.8	3.2
.05	6.5	9.7
.04	8.1	17.8
.03	22.8	40.6
.02	35.8	76.4
.01	19.5	95.9
.00	4.1	100

Notes:

* No one selected response options of .09 and .10, so those values are not depicted

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Table 3

Alcohol Suspicion Rating Frequency

Deceived	Alcohol Suspicion Rating	Alcohol Suspicion Rating Anchor	Percent
<i>Yes</i>	1.0	No suspicion surrounding the alcohol	55.1
	1.5		12.3
	2.0	Some suspicion the alcohol was weaker than usual	11.6
	2.5		2.9
	3.0	Moderate suspicion the alcohol was weaker than usual	7.2
<i>No</i>	3.5		2.2
	4.0	Thought alcohol was fake	3.6
	4.5		0.0
	5.0	Strongly suspected alcohol was fake	5.1

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Table 4

Comparison Between Deceived and Non-Deceived Participants

	Deceived (<i>n</i> =123)	Non-Deceived (<i>n</i> =15)
Estimated positive BAC	95.9% ^a	13.3% ^b
Intoxication was typical	89.8% ^a	41.7% ^b
Consumed alcoholic drink	100.0%	100.0%

Note: Comparison of participants classified as deceived and non-deceived on items related to placebo alcohol credibility. BAC=Blood Alcohol Content

Varying superscripts refer to deceived and non-deceived participants scoring different at $p < .001$, two-tailed.

“Estimated positive BAC” refers to responses from .01 to .10 on the relevant placebo alcohol manipulation check item. “Intoxication was typical” refers to participants who indicated during the debrief that the intoxication they experienced in the bar-laboratory was typical given the amount of alcohol consumed. “Consumed alcoholic drink” refers to indicating that some portion of an alcoholic beverage was consumed on the manipulation check questionnaire.