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Evaluating the accuracy of alcohol expectancies relative to subjective response to alcohol

Meghan E. Morean [a,b,*], William R. Corbin [c], Teresa A. Treat [d]

[a] Oberlin College, Department of Psychology, 120 W. Lorain St, Oberlin, OH 44074, United States
[b] Yale School of Medicine, Department of Psychiatry, 34 Park Street, New Haven, CT 06519, United States
[c] Arizona State University, Department of Psychology, 651 E. University Drive, P.O. Box 871104, Tempe, AZ 85287, United States
[d] University of Iowa, Department of Psychology, E11 Seashore Hall, Iowa City, IA 52242, United States

HIGHLIGHTS

- Alcohol expectancies and subjective response are theoretically related constructs.
- New measures of these constructs were scalar measurement invariant.
- Expectancies generally overestimated subjective response to alcohol.
- Inaccurate beliefs for high arousal alcohol effects conferred alcohol-related risk.
- Inaccurate beliefs for low arousal alcohol effects served protective functions.

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ABSTRACT

Introduction: Although limited in empirical support, Alcohol Expectancy (AE) theory posits that AEs may overestimate subjective response (SR) to the positive effects of alcohol, which, in turn, confers alcohol-related risk (e.g., Darkes & Goldman, 1993). The recent development of the Anticipated Effects of Alcohol Scale (AEAS; Morean, Corbin, & Treat, 2012) and the Subjective Effects of Alcohol Scale (SEAS; Morean, Corbin, & Treat, 2013) now permits direct AE–SR comparisons using psychometrically sound assessments designed for this purpose.
Methods: We ran secondary data analyses (Morean et al., 2012, 2013) evaluating measurement invariance of AEs and SR; AE–SR relationships; the accuracy of AEs; and relations between AE–SR discrepancies and binge drinking, driving after drinking, and alcohol-related problems in a sample of 102 young adults (mean age 22.81 [2.25]; 74.5% male; 76.5% Caucasian) who consumed alcohol in a simulated bar setting (target blood alcohol level = .08 g/dL).
Results: The AEAS and SEAS were scalar measurement invariant and that AEs generally overestimated SR (mean Cohen's $d = .48$). Relative to SR, inflated high arousal negative AEs (e.g., aggressive) were associated with frequent binge drinking and alcohol-related problems, whereas exaggerated low arousal negative AEs (e.g., woozy) served protective functions. As blood alcohol levels rose, inflated low arousal positive AEs (e.g., relaxed) and low arousal negative AEs (e.g., wobbly) were associated with less frequent driving after drinking.
Conclusions: Challenging AE–SR discrepancies for high arousal effects may have utility in treatment and prevention efforts, whereas maintaining overestimates of low arousal effects may serve protective functions.

1. Introduction

Reciprocal determinism (Bandura, 2004, 2012), a critical tenet of social learning models of alcohol use, posits that drinkers' expectations about the probable outcomes of drinking (alcohol expectancies; AEs) and their subjective experience of acute alcohol effects during a drinking episode (subjective response; SR) are bidirectionally related determinants of drinking behavior. Specifically, drinking is thought to be motivated, in part, by the expectation that it will result in a positive experience via increasing positive affect or reducing negative affect. If pleasant effects are experienced, positive AEs are reinforced and poised to motivate further drinking. If negative alcohol effects are experienced, AEs should adjust accordingly, deterring future use. If this cycle is reliable, AEs and SR should accurately predict one another, especially with mounting drinking experience. However, relations among AEs, SR, and drinking are likely more complex.

Social Cognitive Theory (Bandura, 2012) suggests that cognitions (in this case AEs) can distort reality, and there is extensive evidence linking

* Corresponding author at: Department of Psychology, Oberlin College, 120 West Lorain St, Oberlin, OH 44074, United States.
E-mail address: meghan.morean@oberlin.edu (M.E. Morean).

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erroneous beliefs to poor outcomes (e.g., depression (Beck, 2008), pathological gambling (Michalczuk, Bowden-Jones, Verdejo-Garcia, & Clark, 2011), and substance use (Shoal & Giancola, 2005)). Of central import, Expectancy Theory posits that AEs likely overestimate the positive effects of alcohol (e.g., Darkes & Goldman, 1993), a claim supported by several expectancy challenge studies in which reductions in drinking accompanied reductions in (presumably) inflated positive AEs (Darkes & Goldman, 1993, 1998; Wiers, van de Luitgaarden, van den Wildenberg, & Smulders, 2005). Drawing upon the tenets of Social Cognitive and Expectancy Theories, it seems plausible that AEs can inaccurately reflect SR, and that discrepant beliefs may confer risk for negative alcohol-related outcomes. However, very few published studies explicitly have evaluated the accuracy of AEs relative to SR. We review the two studies of which we are aware below.

Fromme and Dunn (1992) conducted a placebo-controlled laboratory study examining the influence of beverage condition, social context, drinking environment, and AEs on ad-libitum drinking and SR. AEs and SR were assessed via the Alcohol Effects Scale (Southwick, Steele, Marlatt, & Lindell, 1981), although it had not undergone psychometric evaluation for use as a SR measure. Participants reported their AEs one month prior to the lab session and were randomly assigned into the following conditions: Beverage condition (alcohol vs. placebo), social context (drinking with friendly vs. unfriendly confederates), and environmental setting (simulated bar vs. living room). Participants reported SR at the end of a 33-minute ad-lib consumption period. Only the findings of greatest relevance to the current study are reviewed here.

Participants generally expected more positive and negative alcohol effects than they experienced, leading the authors to conclude that AEs reflect exaggerations of SR. However, this conclusion must be considered cautiously for several reasons. First, the analyses examining AEs as predictors of SR were collapsed across all experimentally manipulated conditions, including beverage condition. Although mean SR levels did not differ by beverage condition, the magnitude of AE–SR discrepancies may have differed. Thus, the authors' approach may have led to underestimates or overestimates of discrepancies between AEs and SR to alcohol. Second, the average blood alcohol level (BAL) in the alcohol condition was .04 g%, approximating 2 drinks. When participants reported their AEs, the experimenters had not specified the number of drinks they should imagine consuming. Given their moderate to heavy drinking status (mean weekly drinks = 18 [range 11–45]), it seems likely that many participants' AEs corresponded to effects associated with consuming more than two drinks. If this were true, we would expect anticipated stimulant and impairing effects, which increase with BAL, to be stronger than the effects experienced.

In a more recent study, Wall, Thrussell, and Lalonde (2003) assessed AEs and SR in a licensed bar. Participants verbally confirmed that they had not consumed alcohol prior to their arrival. Participants stated how many drinks they intended to consume for the evening, reported their corresponding AEs using the Comprehensive Effects of Alcohol questionnaire (CEOA; Fromme, Stroot, & Kaplan, 1993), and proceeded with their nights as planned. As each participant finished drinking for the night, they reported their SR based on the number of drinks they had indicated at the onset of the study using a modified version of CEOA (note: there was a significant difference between the number of drinks participants intended to drink [3.82] and the number they consumed as verified by their bar tabs [4.22], and this effect was magnified for men). On average, participants' AEs and SRs correlated at .76. AE–SR discrepancies were observed on only one subscale; participants expected more risk and aggression than they experienced.

The study by Wall et al. (2003) provided important preliminary information about AE–SR relations in a naturalistic drinking setting, but it relied on a modified AE measure to assess SR that had not undergone appropriate psychometric evaluation. Further, many participants drank more than they had intended and differed with respect to the duration of their drinking episode, the peak BAL achieved, and their location on the BAC when they left the bar, which may have impacted the study results. Given that participants reported their SR immediately before leaving the bar, many reports of SR likely occurred as BALs were descending. In this case, the fact that participants overestimated risk and aggression may be expected given that these types of high arousal effects are less likely to occur as BALs fall.

In sum, although prior research provides preliminary evidence that AEs may exaggerate SR, the studies had a number of limitations including their reliance on assessment tools that had not been validated to assess both AEs and SR. To address this issue, we conducted a series of secondary data analyses (Morean, Corbin, & Treat, 2012; Morean, Corbin, & Treat, 2013) evaluating the relationships between AEs and SR across the ascending and descending limbs of the BAC using psychometrically sound, parallel measures of AEs (the Anticipated Effects and Alcohol Scale [AEAS]; Morean et al., 2012) and SR (the Subjective Effects of Alcohol Scale [SEAS]; Morean et al., 2013). Of note, these measures share a response format and assess 13 overlapping effects that vary with respect to valence (positive, negative) and arousal (stimulant, sedative). Among other strengths, assessing AEs and SRs that sample the full range of affective space affords a level of theoretical and methodological precision with respect to examining relationships between AEs and SR that prior assessment tools have not provided. Within the current study, we made the following hypotheses: 1) the AEAS and SEAS would evidence scalar measurement invariance, given their similarities, thereby ensuring our ability to make statistically meaningful AE–SR comparisons and to evaluate AE–SR discrepancies; 2) AEs and SR would be related yet distinct constructs, consistent with social learning theory; 3) AEs generally would represent nomothetic exaggerations of SR, consistent with Expectancy Theory; and 4) overestimating positive, stimulant alcohol effects would be associated ideographically with heavy drinking, driving after drinking, and the experience of alcohol-related problems, whereas overestimating negative, sedative alcohol effects would protect against these negative drinking outcomes. We did not make predictions regarding AE–SR discrepancies for positive sedative alcohol effects (e.g., relaxation) or negative stimulant alcohol effects (e.g., aggression) given the lack of prior research examining these domains of SR (and consequently their association with AEs).

2. Materials and methods

A detailed description of study participants and procedures can be found in previously published work (Morean et al., 2012, 2013). However, we briefly describe key aspects of the study design below as background for the current study.

2.1. Participants

We recruited 215 individuals from college campuses and the greater communities of New Haven, CT (N = 112) and Tempe, AZ (N = 103) to participate in a placebo-controlled alcohol administration study in a simulated bar setting. Exclusion criteria included drinking <3 drinks/week, adverse reactions to alcohol, lifetime enrollment in abstinence-based alcohol or gambling treatment, and pregnancy. Given the current study's focus on potential discrepancies between AEs and SR to alcohol, analyses were conducted using data from participants in the alcohol condition only (n = 102, mean age 22.81 [2.25]; 74.5% male; 76.5% Caucasian). AE–SR discrepancies were not examined in the placebo condition for the following reasons: 1) examining AE–SR discrepancies in the placebo condition would lack meaning as this condition does not occur in naturalistic drinking settings (i.e., drinkers do not anticipate consuming alcohol and subsequently consume placebo in the real world), 2) individuals' AEs as reported on self-report measures are based on what they expect to experience when they actually consume alcohol, and 3) examining discrepancies within the alcohol and placebo conditions would address a separate research question about the