



# Difficulties regulating positive emotions and alcohol and drug misuse: A path analysis<sup>☆</sup>



Nicole H. Weiss<sup>a,\*</sup>, Shannon R. Forkus<sup>a</sup>, Ateka A. Contractor<sup>b</sup>, Melissa R. Schick<sup>a</sup>

<sup>a</sup> University of Rhode Island, United States

<sup>b</sup> University of North Texas, United States

## HIGHLIGHTS

- Difficulties regulating positive emotions were related to alcohol and drug misuse.
- Greater drug (but not alcohol) use was related to difficulties regulating positive emotions.
- If replicated, treatments may consider targeting difficulties regulating positive emotions.

## ARTICLE INFO

### Keywords:

Emotion dysregulation  
Emotion dysfunction  
Difficulties regulating positive emotions  
Alcohol misuse  
Drug misuse  
Substance use

## ABSTRACT

**Introduction:** Alcohol and drugs are widely used among college students. Emotion dysregulation has been identified as a key mechanism in the etiology, maintenance, and treatment of alcohol and drug misuse. Yet, research in this area has been limited by its narrow focus on dysregulation stemming from negative emotions. The goal of the current study was to extend past research by examining the relation of difficulties regulating positive emotions to alcohol and drug misuse.

**Methods:** Participants were 311 college students ( $M_{age} = 19.24$ ; 66.1% female; 66.0% White) who completed measures assessing difficulties regulating positive emotions and alcohol and drug misuse.

**Results:** Structural equation modeling was used to model the relation between difficulties regulating positive emotions and alcohol and drug misuse. In a hypothesized structural model, higher levels of difficulties regulating positive emotions were found to relate to greater alcohol and drug misuse. Moreover, an alternative model provided support for an association of greater drug (but not alcohol) misuse to higher levels of difficulties regulating positive emotions.

**Conclusions:** If replicated, findings may suggest the utility of targeting difficulties regulating positive emotions in treatments aimed at reducing alcohol and drug misuse among college students.

## 1. Introduction

Alcohol and drugs are widely used among college students. According to the National Survey on Drug Use and Health (Substance Abuse and Mental Health Services Administration, 2014), 39.0% and 12.7% of college students endorse 30-day binge drinking (i.e., five or more drinks on the same occasion) and heavy drinking (i.e., five or more days of binge drinking), respectively; These rates are significantly higher than those for same-aged individuals who are not enrolled in college or only enrolled in college part-time. Moreover, roughly one in four (22.3%) college students report past 30-day drug use (Substance Abuse and Mental Health Services Administration, 2014). Alcohol and drug use among college students represent major public health

problems. They have been linked to higher rates of adverse consequences in an array of domains (e.g., physical and mental health, legal, educational, occupational, social), the most serious outcome being death (e.g., from overdose, traffic accidents, suicide, homicide; Dennhardt & Murphy, 2013; White & Hingson, 2014). These findings highlight the need for further research on the correlates of alcohol and drug use in this population.

One important factor related to alcohol and drug use is emotion dysregulation. Emotion dysregulation is a multi-faceted construct involving maladaptive ways of responding to emotions, regardless of their intensity or reactivity, including: (a) a lack of awareness, understanding, and acceptance of emotions; (b) the inability to control behaviors when experiencing emotional distress; (c) lack of access to

<sup>☆</sup> Work on this paper by the first author (NHW) was supported by National Institute on Drug Abuse grants K23DA039327 and L30DA038349

\* Corresponding author at: Department of Psychology, University of Rhode Island, 142 Flagg Rd., Kingston, RI 02881, United States.

E-mail address: [nhweiss7@gmail.com](mailto:nhweiss7@gmail.com) (N.H. Weiss).

situationally appropriate strategies for modulating the duration and/or intensity of emotional responses in order to meet individual goals and situational demands; and (d) an unwillingness to experience emotional distress as part of pursuing meaningful activities in life (Gratz & Roemer, 2004; Gratz & Tull, 2010). Problems in any or all of these areas are indicative of emotion regulation difficulties.

Emotion dysregulation is considered a key mechanism in the etiology, maintenance, and treatment of alcohol and drug use (for literature reviews, see Weiss, Sullivan, & Tull, 2015; Weiss, Tull, & Sullivan, 2015). Individuals with problematic levels of alcohol (Fox, Hong, & Sinha, 2008) and drug (Fox, Axelrod, Paliwal, Sleeper, & Sinha, 2007) use report more emotion regulation difficulties. Further, emotion regulation difficulties are positively related to alcohol and drug use outcomes, including alcohol consumption (Dvorak et al., 2014; Messman-Moore & Ward, 2014), alcohol and drug use severity (Tull, Bardeen, DiLillo, Messman-Moore, & Gratz, 2015), and alcohol-related consequences (Dvorak et al., 2014; Messman-Moore & Ward, 2014). Finally, difficulties regulating emotions predict treatment outcomes, including alcohol use during and after cognitive-behavioral treatment for alcohol use disorder (Berking et al., 2011), and alcohol and drug use following dialectical behavior therapy (Axelrod, Perepletchikova, Holtzman, & Sinha, 2011).

However, a key limitation of extant research in this area has been its narrow focus on dysregulation stemming from negative emotions. Preliminary work suggests that individuals experience difficulties regulating positive emotions that parallel the difficulties observed in negative emotions (Cyders & Smith, 2007; Weiss, Gratz, & Lavender, 2015). For instance, drawing on Gratz and Roemer's (2004) comprehensive measure of difficulties regulating negative emotions, Weiss, Gratz, and Lavender (2015) developed and validated a measure of clinically-relevant difficulties related to the regulation of positive emotions, specifically, nonacceptance of positive emotions (Non-acceptance; e.g., "When I'm happy, I become scared and fearful of those feelings"), difficulties controlling impulsive behaviors when experiencing positive emotions (Impulse; e.g., "When I'm happy, I have difficulty controlling my behaviors"), and difficulties engaging in goal-directed behaviors in the context of positive emotions (Goals; e.g., "When I'm happy, I have difficulty focusing on other things"). The role of difficulties regulating positive emotions in alcohol and drug misuse may be particularly relevant among emerging adults given some evidence that positive affect may play a more significant role in the beginning stages of the development of alcohol and drug misuse (Baker, Piper, McCarthy, Majeskie, & Fiore, 2004). Specifically, alcohol and drug use that serves to elicit, maintain, or prolong positive emotional experiences (i.e., serves a positive reinforcement function) may be more salient to the initiation of alcohol and drug (mis)use. Indeed, such alcohol and drug use is common in developmentally at-risk populations (e.g., college students; Németh et al., 2011) and related to their elevated use and substance-related problems (Kuntsche & Kuendig, 2005; Merrill & Read, 2010). Finally, alcohol and drugs are often used to manage emotional symptoms/disorders, and low positive affect is linked to depression and social phobia (Brown, Chorpita, & Barlow, 1998), whereas positive affect is linked to mania (Gruber, 2011). This suggests that – for some individuals – alcohol and drug use may be used to cope with positive affective experiences, whether low or high in intensity. These above findings underscore the need for research on the role of positive emotional experiences (e.g., difficulties regulating positive emotions) in alcohol and drug misuse, particularly given that positive emotional experiences are often overlooked in clinical settings, where negative emotions are often emphasized and considered most pressing.

A growing body of research has linked difficulties controlling impulsive behaviors when experiencing positive emotions to alcohol and drug use (for literature and meta-analytic reviews, see Berg, Latzman, Bliwise, & Lilienfeld, 2015; Coskunpinar, Dir, & Cyders, 2013; Cyders & Smith, 2007, 2008). Positive emotional states may increase

distractibility (Dreisbach & Goschke, 2004) and lead to less discriminative use of information (Forgas, 1992), which may increase the risk for disadvantageous decision-making focused on short- versus long-term goals (Slovic, Finucane, Peters, & MacGregor, 2004). It is also possible that positive emotional states may reduce one's capacity to control alcohol and drug use in the context of urges or cues for such behaviors. According to the ego-depletion model (Baumeister, Bratslavsky, Muraven, & Tice, 1998), the capacity for self-regulation is a limited resource. Thus, situations that require self-regulation will deplete this resource, temporarily limiting one's capacity in this regard. Elevated levels of positive emotions may rapidly deplete self-regulatory resources, subsequently interfering with the ability to control impulses to engage in alcohol and drug use when faced with cues for these behaviors. Consistent with this theory, meta-analytic studies document a medium effect of difficulties controlling impulsive behaviors when experiencing positive emotions (measured by the positive urgency scale of the UPPS-P) on substance use (i.e., alcohol and drug use and related problems;  $r = 0.30$ ; Berg et al., 2015) as well as alcohol use ( $r = 0.29$ ) and problems ( $r = 0.34$ ) in particular (Coskunpinar et al., 2013).

Conversely, a relative dearth of literature has explored the relations of the other domains of difficulties regulating positive emotions – nonacceptance of positive emotions and difficulties engaging in goal-directed behavior when experiencing positive emotions – to alcohol and drug use. These domains may also play an important role in alcohol and drug use. For instance, there is evidence that some individuals are non-accepting of positive emotional states, judging them to be undesirable, unpredictable, and/or frightening (Beblo et al., 2013; Kissen, 1986). Other research has found some individuals to avoid the physiological arousal associated with positive emotional states (Roemer, Litz, Orsillo, & Wagner, 2001; Tull, 2006), indicating that positive emotional states may be distressing to some people. Individuals who are nonaccepting of positive emotions and respond to positive emotions judgmentally may use alcohol or drugs in an attempt to alleviate or distract themselves from positive emotional states perceived as aversive, consistent with negative reinforcement models of alcohol and drug use (Baker et al., 2004). These efforts to control, suppress, or avoid positive emotional states often have paradoxical effects (Hayes, Luoma, Bond, Masuda, & Lillis, 2006), increasing distress and motivation to use maladaptive emotion regulation strategies (Chapman, Gratz, & Brown, 2006; Gratz & Tull, 2010), such as alcohol and drugs, in the future.

Regarding the relation of difficulties engaging in goal-directed behavior when experiencing positive emotions to alcohol and drug use, problems focusing attention and completing tasks when experiencing positive emotions may interfere with one's implementation of adaptive strategies for regulating positive emotional experiences (Gratz & Tull, 2010). By increasing distractibility (Dreisbach & Goschke, 2004), positive emotional states may increase the risk for disadvantageous decision-making focused on short- versus long-term goals (Slovic et al., 2004). Consequently, individuals may be more likely to rely on maladaptive strategies that have immediate benefits but negative long-term consequences, such as alcohol and drug use, to modulate positive emotional experiences. Alcohol and drug use in this context likely exacerbates distress and increases motivation for alcohol and drugs in the long-term (Hayes et al., 2006).

Extending extant research, the goal of this study was to examine the contribution of difficulties regulating positive emotions to alcohol and drug misuse. Consistent with research on difficulties regulating negative emotions (for literature reviews, see Weiss, Sullivan, & Tull, 2015; Weiss, Tull, & Sullivan, 2015), we hypothesized that difficulties regulating positive emotions would be significantly positively related to alcohol and drug misuse.

## 2. Methods

### 2.1. Procedure and participants

All procedures were reviewed and approved by the University of New Haven Institutional Review Board. Participants were recruited using a psychology subject pool and completed measures through an online survey. As compensation, participants received extra credit.

Participants were 311 young adults enrolled in a large private university located in the northeast United States. Participants were predominantly female (66.1%) and their average age was 19.24 ( $SD = 3.60$ ). In terms of race, 66.0% of participants self-identified as White, 10.4% as Black, 9.4% as Latinx, 4.9% as Asian, 6.5% as more than one racial group, and 2.9% as other. Further, 14.3% reported Hispanic ethnicity. Participant's average annual family income was \$67,200 ( $SD = \$33,280$ ). Most were full-time students (92%) and unemployed (60.7%).

## 3. Measures

### 3.1. Demographic information

Participants reported on age, race, ethnicity, employment, and income.

### 3.2. Difficulties regulating positive emotions

The *Difficulties in Emotion Regulation Scale – Positive* (DERS-P; Weiss, Gratz, & Lavender, 2015) is a 13-item self-report measure that assesses individuals' typical levels of emotion dysregulation in response to positive emotions across three domains: Acceptance, Impulse, and Goals. Participants rate each item using a 5-point Likert-type scale (1 = *almost never*, 5 = *almost always*). Higher scores for each subscale indicates greater difficulties regulating positive emotions. The DERS-P has been found to demonstrate adequate psychometric properties (Weiss, Gratz, & Lavender, 2015). Of note, the original DERS (Gratz & Roemer, 2004) has six domains; two domains (emotional clarity and awareness) do not reference emotion valence; items assessing a third domain (limited access to effective emotion regulation strategies) were not included in the DERS-P. Cronbach's  $\alpha$ s in the current study were 0.88, 0.94, and 0.81 for Acceptance, Impulse, and Goals, respectively.

### 3.3. Drug misuse

The *Drug Abuse Screening Test* (DAST; Skinner, 1982) is a 10-item self-report measure designed to assess drug misuse, including occupational or relational problems, illegal activities, or regret. Participants are asked to report on involvement in non-medical drugs (e.g., marijuana, cocaine) as well as use of prescribed or over-the-counter medications/drugs in excess of the directions or for reasons other than prescribed. Responses to each item have 1 (yes) and 0 (no) options. The DAST has been found to demonstrate adequate psychometric properties (Yudko, Lozhkina, & Fouts, 2007). A drug misuse score was obtained by summing all items. A cutoff score of 3 indicates possible drug use disorder (Skinner, 1982). Cronbach's  $\alpha$  in the current study was 0.63.

### 3.4. Alcohol misuse

The *Alcohol Use Disorder Identification Test* (AUDIT; Saunders, Aasland, Babor, De la Fuente, & Grant, 1993) is a 10-item self-report measure that assesses alcohol consumption, drinking behaviors, adverse reactions to drinking, and alcohol-related problems. Participants rate each item using a 5-point Likert-type scale (0 = *never*, 4 = *daily or almost daily*). Higher scores indicate greater likelihood of alcohol misuse. The AUDIT shows good reliability and validity (Saunders et al., 1993). A score of 8 or higher for men and 7 or higher for women is related to

hazardous or harmful drinking patterns, defined as an alcohol consumption pattern that increases the risk of harmful consequences (Babor, Higgins-Biddle, Saunders, Monteiro, & World Health Organization, 2001). Of note, while the AUDIT demonstrates favorable sensitivity and specificity in detecting alcohol use disorder (see Allen, Litten, Fertig, & Babor, 1997), it does not comprehensively assess the DSM-5 criteria for alcohol use disorder (e.g., craving, tolerance; American Psychiatric Association, 2013). Cronbach's  $\alpha$  in the current study were 0.83, 0.69, and 0.59 for each of the Hazardous Consumption, Dependence, and Consequences subscales, respectively.

### 3.5. Data analysis

Descriptive information and Pearson correlations were calculated to examine intercorrelations among the primary study variables. Structural equation modeling was used to evaluate the relation between difficulties regulating positive emotions and alcohol and drug misuse. Difficulties regulating positive emotions were modeled as a latent (exogenous) variable in the structural model, and were measured with three indicators derived from the DERS-P scale (three domains of Acceptance, Goals, and Impulse). The latent outcome variable, alcohol misuse was modeled as a latent (endogenous) variable measured with the three AUDIT subscales of Hazardous Consumption, Dependence, and Consequences. Drug misuse was modeled as a single observed (endogenous) variable (given evidence that the DAST is best characterized by a single factor structure; Carey, Carey, & Chandra, 2003). Given the established empirical relationship of certain demographic factors to alcohol and drug misuse (e.g., Grant et al., 2017; Hasin et al., 2016; Kerridge et al., 2015), analyses were first conducted to examine whether gender (male versus female), race (white versus non-White), and age were significantly associated with the latent alcohol and manifest drug misuse variables. Any demographic factor found to be significantly associated with alcohol and drug misuse was included as a covariate in the hypothesized model. Further, to confirm the direction of the mediated effect, we also tested an alternative model switching the exogenous and endogenous variables. Switching the predictor and outcome variables is one method for strengthening the interpretation of analyses conducted with cross-sectional data; significant paths in the hypothesized (but not alternative) model improve the confidence in the directionality of the observed relations (Preacher & Hayes, 2004; Shrout & Bolger, 2002).

Analyses were conducted using the EQS 6.3 statistical package (Bentler, 2006), which uses the maximum likelihood (ML) method of estimation to handle missing data, obtain maximum likelihood parameter estimates, and provide goodness-of-fit indices (Bentler, 2006). The adequacy of the hypothesized model was evaluated by examining several fit indexes, including chi-square, the root mean square error of approximation (RMSEA; Steiger, 1990), the standardized root mean square residual (SRMR), and the comparative fit index (CFI; Bentler, 1990). The chi-square value was used to evaluate the overall model fit by assessing the magnitude of difference between the observed and proposed covariance matrix (Hu & Bentler, 1999). A good fit was indicated by a non-significant  $p$ -value ( $p > .05$ ); such an estimate is sensitive to sample size, hence, the ratio of chi-square to degrees of freedom ( $\chi^2/df$ ) was also evaluated, with values  $< 2.0$  considered acceptable. The RMSEA assessed closeness of fit with preferred values  $< 0.05$ , and values between 0.05 and 0.08 considered a moderate fit, and values between 0.08 and 0.10 an adequate fit (Browne & Cudeck, 1993). The CFI, an incremental fit index, assessed fit relative to a null model, by comparing the  $\chi^2$  value of the hypothesized model to an appropriately specified null model (e.g., a model with all variables uncorrelated); a suggested rule of thumb for determining goodness of fit is a CFI value  $> 0.95$ . The SRMR is the standardized difference between the observed and predicted covariance matrix, with values closer to zero indicating better fit, and values  $< 0.10$  considered acceptable (Hu & Bentler, 1999).

**Table 1**

Descriptive data and intercorrelations among difficulties regulating positive emotions and alcohol and drug misuse.

	1	2	3	4	5	6	<i>M</i>	<i>SD</i>
1. DAST	–	–	–	–	–	–	1.62	1.35
2. AUDIT – Consequences	0.38***	–	–	–	–	–	1.27	2.26
3. AUDIT – Dependence	0.41***	0.64***	–	–	–	–	0.54	1.31
4. AUDIT – Consumption	0.34***	0.44***	0.30***	–	–	–	3.02	2.98
5. DERS-P Accept	0.29***	0.12*	0.27***	0.06	–	–	4.70	2.05
6. DERS-P Goals	0.29***	0.22***	0.20***	0.17**	0.54***	–	5.89	2.59
7. DERS-P Impulse	0.30***	0.15***	0.23***	0.09	0.73***	0.69***	6.02	2.68

\*  $p < .05$ .\*\*  $p < .01$ .\*\*\*  $p < .001$ .

## 4. Results

### 4.1. Descriptive data

Approximately one-quarter (26.6%) and one-fifth (19.6%) of participants reported AUDIT and DAST scores consistent with a hazardous pattern of drinking and drug use disorder, respectively. Descriptive data and intercorrelations for the primary variables are presented in Table 1. Drug misuse was significantly positively associated with Non-acceptance, Impulse, and Goals. Alcohol Dependence and Consequences were significantly positively associated with Nonacceptance, Impulse, and Goals. Alcohol Consumption was only significantly positively associated with Goals.

### 4.2. Structural model

Preliminary analyses examined the relations among specific demographic factors (i.e., age, gender, and race) and the proposed outcomes (i.e., alcohol and drug misuse) using structural equation modeling. Findings revealed that age ( $\beta = -0.115$ , 95% CI  $[-0.14, -0.09]$ ,  $R^2 = 0.013$ ,  $p = .09$ ), race ( $\beta = 0.12$ , 95% CI  $[-0.15, 0.39]$ ,  $R^2 = 0.014$ ,  $p = .09$ ), and gender ( $\beta = -0.07$ , 95% CI  $[-0.30, 0.16]$ ,  $R^2 = 0.005$ ,  $p = .30$ ) were not significantly related to alcohol misuse, and that age ( $\beta = -0.03$ , 95% CI  $[-0.07, 0.01]$ ,  $R^2 = 0.001$ ,  $p = .62$ ), race ( $\beta = 0.01$ , 95% CI  $[-0.32, 0.34]$ ,  $R^2 = 0.0001$ ,  $p = .84$ ), and gender ( $\beta = 0.02$ , 95% CI  $[-0.31, 0.35]$ ,  $R^2 = 0.0004$ ,  $p = .72$ ) were not significantly related to drug misuse. As a result, these demographic factors were not included in the hypothesized model.

The hypothesized structural model fit the data well,  $\chi^2$  (12,  $N = 284$ ) = 16.94,  $p = .15$ ;  $\chi^2/df = 1.41$ ; RMSEA = 0.04, with 90%CI [0.00, 0.08]; CFI = 0.99; SRMR = 0.04 (see Fig. 1). As is shown in Table 2, difficulties regulating positive emotions were significantly related to alcohol ( $\beta = 0.16$ , 95% CI [0.004, 0.32],  $R^2 = 0.03$ ,  $p = .038$ ) and drug misuse ( $\beta = 0.32$ , 95% CI [0.20, 0.44],  $R^2 = 0.10$ ,  $p < .001$ ).<sup>1</sup>Of note, the effect of difficulties regulating positive emotions on both alcohol and drug misuse was small.

An alternative model was tested to examine the reverse directionality with alcohol and drug misuse being related to difficulties regulating positive emotions. This model fit equally well,  $\chi^2$  (12,  $N = 284$ ) = 16.92,  $p = .15$ ;  $\chi^2/df = 1.41$ ; RMSEA = 0.04, with 90%CI [0.00, 0.08]; CFI = 0.99; SRMR = 0.04 (see Fig. 2). In this model, as is shown in Table 2, drug misuse significantly related to difficulties regulating positive emotions ( $\beta = 0.32$ , 95% CI [0.14, 0.50],  $R^2 = 0.10$ ,  $p < .001$ ), but alcohol misuse did not significantly relate to difficulties

regulating positive emotions ( $\beta = -0.01$ , 95% CI  $[-0.14, 0.12]$ ,  $R^2 = 0.0001$ ,  $p = .942$ ). Of note, the effect of alcohol and drug misuse on difficulties regulating positive emotions was small.

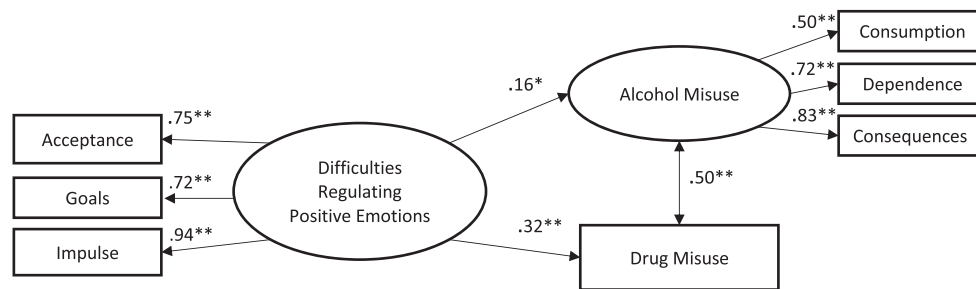
## 5. Discussion

The goal of the current study was to examine the relation of difficulties regulating positive emotions to alcohol and drug misuse among college students, a population at heightened risk for these behaviors. At zero-order, each of the domains of difficulties regulating positive emotions were significantly positively associated with drug misuse and Alcohol Dependence and Consequences, however, only difficulties engaging in goal-directed behaviors when experiencing positive emotions was significantly positively associated with Alcohol Consumption. Further, findings provided initial support for a hypothesized structural model, whereby higher levels of difficulties regulating positive emotions were related to greater alcohol and drug misuse. While preliminary, these findings suggest that difficulties regulating positive emotions could play a role in etiology, maintenance, and treatment of alcohol and drug misuse.

Findings highlighting the relevance of difficulties regulating positive emotions to alcohol and drug misuse are consistent with theory. For some individuals, positive emotional states may be experienced as distressing (Beblo et al., 2013; Kissen, 1986). Negative evaluations of positive emotions (e.g., experiencing them as dangerous or bad) may result in secondary emotional responses, such as fear or guilt (Gratz & Tull, 2010). Moreover, nonacceptance of positive emotions may increase distress and related efforts to avoid positive emotions (Hayes et al., 2006), which, in turn, may increase risk for maladaptive strategies for regulating positive emotions (Chapman et al., 2006; Gratz & Tull, 2010), such as alcohol and drug misuse. Regarding the contributions of difficulties controlling impulsive behaviors and engaging in goal-directed behaviors when experiencing positive emotions to alcohol and drug misuse, positive emotional states have been found to result in disadvantageous decision-making focused on short- versus long-term goals (Slovic et al., 2004); they increase distractibility (Dreisbach & Goschke, 2004), narrow attention (Gable & Harmon-Jones, 2008), and lead to less discriminative use of information (Forgas, 1992) and underestimation of threat (Johnson & Tversky, 1983). These factors have been shown to be associated with increased risk for alcohol and drug misuse (De Wit, 2009; Farris, Ostafin, & Palfai, 2010; Steele & Josephs, 1990). Indeed, several items on the AUDIT and DAST reflect regretted behaviors indicative of poor decision-making (e.g., guilt or remorse about behaviors linked to alcohol and drug use). Future research is needed to better understand the role of difficulties regulating positive emotions in alcohol and drug misuse. For instance, studies are needed to identify individuals who are more likely to exhibit difficulties regulating positive emotions. Initial work indicates that individuals with (versus without) posttraumatic stress disorder (PTSD) are more likely to exhibit difficulties regulating positive emotions (Weiss, Dixon-Gordon, Peasant, & Sullivan, in press), possibly because positive emotions

<sup>1</sup> We modeled drug misuse as a single-factor manifest variable in our model for two reasons. First, most research supports a single factor structure for the DAST-measured drug misuse variable (e.g., Carey et al., 2003). Second, creating a latent one-factor DAST variable via item parceling (despite some controversy in the literature regarding this approach; e.g., see Marsh, Lüdtke, Nagengast, Morin, & Von Davier, 2013) indicated poor model fit,  $\chi^2$  [101,  $N = 284$ ] = 258.38,  $p < .001$ ; RMSEA = 0.09, with 90%CI [0.07, 0.10]; CFI = 0.79; SRMR = 0.07.





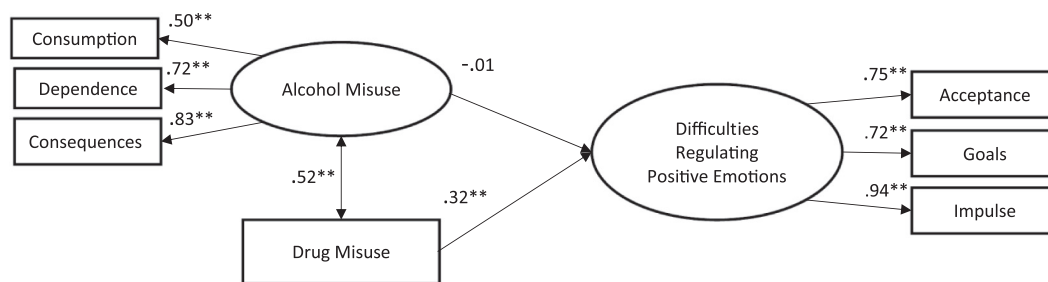
**Fig. 1.** Hypothesized structural equation model examining the relation of difficulties regulating positive emotions to alcohol and drug misuse.  
Note. \* $p < .05$ . \*\* $p < .001$ .

**Table 2**

Standardized coefficients, R-Square, and 95% confidence intervals for hypothesized and alternative models.

	Beta weights (95% CI)	R <sup>2</sup> (95% CI)
Hypothesized model		
DERS-P to AUDIT	0.16 (0.004, 0.32)	0.03 (−0.01, 0.07)
DERS-P to DAST	0.32 (0.20, 0.44)	0.10 (0.03, 0.17)
Alternative model		
AUDIT to DERS-P	−0.01 (−0.14, 0.12)	0.0001 (−0.002, 0.002)
DAST to DERS-P	0.32 (0.14, 0.50)	0.10 (0.03, 0.17)

and engaging in goal-directed behaviors when experiencing positive emotions. Consistent with our findings, prior work provides support for bidirectional relations among emotion regulation strategies and alcohol and drug use (Weiss, Bold, Sullivan, Armeli, & Tennen, 2017) as well as affect lability (one type of emotion dysfunction characterized by fluctuations in affective experiences) and drug (not not alcohol) use (Weiss et al., 2018). It is unclear why drug, but not alcohol, (mis)use may lead to difficulties regulating emotions. One explanation is that the drugs of misuse in our sample may be more strongly linked to impulsive behavior, such as stimulants (e.g., cocaine, Ritalin; Coffey, Gudleski,



**Fig. 2.** Alternative structural equation model examining the relation of alcohol and drug misuse to difficulties regulating positive emotions.  
Note. \*\* $p < .001$ .

induce physiological arousal (Litz, Orsillo, Kaloupek, & Weathers, 2000) that triggers traumatic responses. In addition, research is needed to better understand the mechanisms through which difficulties regulating positive emotions relates to alcohol and drug misuse, such as whether people use drugs to avoid the distress associated with some positive emotions and/or because of higher levels of impulsivity and reward-seeking, as speculated here.

Given the cross-sectional nature of this study, to better clarify the directionality of the study findings, we tested an alternative model whereby the predictor and outcome variables were switched (Preacher & Hayes, 2004; Shrout & Bolger, 2002). Consistent with the hypothesized model, the path from difficulties regulating positive emotions to alcohol misuse, but not from alcohol misuse to difficulties regulating positive emotions, was significant. Conversely, the relation between difficulties regulating positive emotions and drug misuse was found to be bidirectional. This finding suggests two possibilities: (1) difficulties regulating positive emotions may contribute to drug misuse, and/or (2) drug misuse may contribute to difficulties regulating positive emotions. Of note, bidirectional relations among these variables are not entirely surprising. Individuals who misuse drugs are less likely to tolerate discomfort (Moschak, Terry, Daughters, & Carelli, 2018), suggesting that they may be less accepting of positive emotions that are experienced as aversive. Moreover, these individuals are more likely to engage in impulsive, reward-seeking behaviors (Bobova, Finn, Rickert, & Lucas, 2009; Verdejo-García, Bechara, Recknor, & Pérez-García, 2007), which, in turn, may lead to difficulties controlling impulsive behaviors

Saladin, & Brady, 2003; De Wit, 2009), than alcohol. Future research using longitudinal methods is needed to better understand the directionality and causal nature of the relations among difficulties regulating emotions and alcohol/drug misuse.

Finally, it warrants mention that the effect of difficulties regulating positive emotions on both alcohol and drug misuse was small. This finding is consistent with research on difficulties regulating negative emotions. Specifically, studies examining the relation of difficulties regulating negative emotions to alcohol misuse (e.g., problems, consequences) have generally found a small effect (Dvorak et al., 2014; Messman-Moore & Ward, 2014; Veilleux, Skinner, Reese, & Shaver, 2014), with one study finding a medium effect (Chandley, Luebke, Messman-Moore, & Ward, 2014). Fewer studies have examined the association between difficulties regulating negative emotions and drug use, and none, to our knowledge, have explored drug misuse. Among these studies, the effect of difficulties regulating negative emotions on drug use was small (Bonn-Miller, Vujanovic, Boden, & Gross, 2011; Bonn-Miller, Vujanovic, & Zvolensky, 2008; Tull et al., 2015). Taken together, these findings underscore the need for research that explicates the clinical meaning/utility of difficulties regulating emotions (both negative and positive) in alcohol and drug misuse. For instance, existing studies have been conducted with non-clinical samples (e.g., college students). Thus, future investigations examining the effect of difficulties regulating emotions (both positive and negative) on alcohol and drug misuse in clinical samples, such as those with alcohol and drug use disorders, may be more robust. Such findings may add to the clinical

utility of targeting difficulties regulating emotions in treatments aimed at reducing alcohol and/or drug misuse.

Although results of the present study add to the literature on the role of difficulties regulating positive emotions in alcohol and drug misuse, several limitations warrant mention. First, this study is the first to our knowledge to examine the relation of difficulties regulating positive emotions to both alcohol and drug misuse. Given the preliminary nature of this study – as well as the fact that we utilized a homogeneous, nonclinical sample of participants – future research is needed to speak to the robustness and reproducibility of our findings. Although analyses of student-sample obtained data is extremely critical based on the aforementioned research, replication of these findings in larger, more diverse samples is warranted, particularly populations with greater difficulties regulating emotions, such as individuals with substance use disorders (Fox et al., 2007; Fox et al., 2008) or PTSD (Weiss, Tull, Anestis, & Gratz, 2013). Second, the cross-sectional and correlational nature of the data precludes causal determination of the relations examined; however, testing the reverse mediation models by switching the predictor and outcome variables increases confidence a relation from difficulties regulating positive emotions to alcohol misuse. Conversely, our findings suggest a potential bidirectional relation between difficulties regulating positive emotions and drug misuse. Future research is needed to further investigate the nature and direction of these relations through prospective, longitudinal investigations. Third, participants were not asked to report on their use of specific drugs, thus it is unclear which specific drugs or drug classes participant's drug misuse symptoms stemmed from. Investigations are needed to better understand the role of specific drugs/drug classes on the relations of interest. For instance, there is evidence that individuals may use specific drugs to manage particular symptoms (e.g., sleep difficulties, physiological arousal, feelings of detachment; Tull, Gratz, Aklin, & Lejuez, 2010; Najavits et al., 2003; Nishith, Resick, & Mueser, 2001). Finally, this study relied on self-report measures of difficulties regulating positive emotions, responses to which may be influenced by an individual's willingness and/or ability to report accurately on emotional responses. On similar lines, we used an online data collection format which entails challenges such as technological barriers to completing the survey efficiently, low response rates, concerns about privacy issues, lack of sample representativeness limited by those who have access to computers/devices to complete online surveys, and misunderstanding of information without an opportunity to clarify any confusion on the part of the participants (Evans & Mathur, 2005; Lefever, Dal, & Matthiasdottir, 2007). Future studies would benefit from the integration of physiological and behavioral assessments of emotion dysregulation (Gratz, Bornovalova, Delany-Brumsey, Nick, & Lejuez, 2007; Vasiliev, Crowell, Beauchaine, Mead, & Gatzke-Kopp, 2009), and replicated study findings in a sample subjected to in-person data collection.

If replicated in longitudinal investigations, our findings may suggest the potential importance of considering difficulties regulating positive emotions as a potential target for prevention efforts and remedial treatments aimed at reducing alcohol and drug misuse among college students. For instance, mindfulness- and acceptance-based treatments, such as Mindfulness-based Relapse Prevention (Witkiewitz, Marlatt, & Walker, 2005), may elicit a non-judgmental and non-evaluative stance toward positive emotional experiences. Further, Acceptance and Commitment Therapy (Hayes, Strosahl, & Wilson, 1999) may promote value-based acting in the context of positive emotions. Finally, Skills for Improving Distress Intolerance (Bornovalova, Gratz, Daughters, Hunt, & Lejuez, 2012) may facilitate behavioral control in the context of positive emotional states by redirecting attention to non-emotional stimuli and promoting more adaptive actions in the face of emotional arousal. Alternatively, given some evidence here for a bidirectional relation between difficulties regulating positive emotions and drug misuse, if replicated, treatments aiming to improve difficulties regulating positive emotions may target a reduction in drug use.

Lastly, there is evidence that positive emotions may play a more

significant role in the early stages of the development of alcohol and drug misuse (Baker et al., 2004). This suggests that it may be particularly important to identify and intervene with individuals who experience difficulties regulating positive emotions prior to the development of alcohol and drug misuse. Alcohol and drug misuse show systematic age-related patterns, with use generally beginning in adolescence and peaking in emerging adulthood (i.e., 18–25 year olds; Chen & Kandel, 1995). Thus, college students represent one group for whom the effects of prevention and intervention efforts targeting difficulties regulating positive emotions may be particularly robust in reducing risk for alcohol and drug misuse. Future research is needed to test this assertion.

### Role of funding sources

The research described here was supported, in part, by a grants from the National Institute on Drug Abuse (K23DA039327; L30DA038349). NIDA had no role in the study design, collection, analysis or interpretation of the data, writing the manuscript, or the decision to submit the paper for publication.

### Conflict of interest

The authors declare that they have no conflicts of interest.

### Contributors

Author NHW conceptualized the current study, conducted literature searches, and provided summaries of previous research studies. Author SRF conducted the statistical analysis. Authors NHW, AAC, and MRS wrote the first draft of the manuscript and all authors contributed to and have approved the final manuscript.

### References

- Allen, J. P., Litten, R. Z., Fertig, J. B., & Babor, T. (1997). A review of research on the Alcohol Use Disorders Identification Test (AUDIT). *Alcoholism: Clinical and Experimental Research*, 21, 613–619.
- American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders*. Washington, DC: Author.
- Axelrod, S. R., Perepletchikova, F., Holtzman, K., & Sinha, R. (2011). Emotion regulation and substance use frequency in women with substance dependence and borderline personality disorder receiving dialectical behavior therapy. *The American Journal of Drug and Alcohol Abuse*, 37, 37–42.
- Babor, T. F., Higgins-Biddle, J. C., Saunders, J. B., Monteiro, M. G., & World Health Organization (2001). *AUDIT: The alcohol use disorders identification test: Guidelines for use in primary health care*. Geneva, Switzerland: World Health Organization.
- Baker, T. B., Piper, M. E., McCarthy, D. E., Majeskie, M. R., & Fiore, M. C. (2004). Addiction motivation reformulated: An affective processing model of negative reinforcement. *Psychological Review*, 111, 33–51.
- Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology*, 74, 1252–1265.
- Beblo, T., Fernando, S., Kamper, P., Griepentrost, J., Aschenbrenner, S., Pastuszak, A., & Driessen, M. (2013). Increased attempts to suppress negative and positive emotions in borderline personality disorder. *Psychiatry Research*, 210, 505–509.
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107, 238–246.
- Bentler, P. M. (2006). *EQS 6 structural equations program manual*. Encino, CA: Multivariate Software, Inc.
- Berg, J. M., Latzman, R. D., Bliwise, N. G., & Lilienfeld, S. O. (2015). Parsing the heterogeneity of impulsivity: A meta-analytic review of the behavioral implications of the UPPS for psychopathology. *Psychological Assessment*, 27, 1129–1146.
- Berking, M., Margraf, M., Ebert, D., Wupperman, P., Hofmann, S. G., & Junghanns, K. (2011). Deficits in emotion-regulation skills predict alcohol use during and after cognitive-behavioral therapy for alcohol dependence. *Journal of Consulting and Clinical Psychology*, 79, 307.
- Bobova, L., Finn, P. R., Rickert, M. E., & Lucas, J. (2009). Disinhibitory psychopathology and delay discounting in alcohol dependence: Personality and cognitive correlates. *Experimental and Clinical Psychopharmacology*, 17, 51–61.
- Bonn-Miller, M. O., Vujanovic, A. A., Boden, M. T., & Gross, J. J. (2011). Posttraumatic stress, difficulties in emotion regulation, and coping-oriented marijuana use. *Cognitive Behaviour Therapy*, 40, 34–44.
- Bonn-Miller, M. O., Vujanovic, A. A., & Zvolensky, M. J. (2008). Emotional dysregulation: Association with coping-oriented marijuana use motives among current marijuana users. *Substance Use & Misuse*, 43, 1653–1665.

- Bornoalova, M. A., Gratz, K. L., Daughters, S. B., Hunt, E. D., & Lejuez, C. W. (2012). Initial RCT of a distress tolerance treatment for individuals with substance use disorders. *Drug & Alcohol Dependence*, 122, 70–76.
- Brown, T. A., Chorpita, B. F., & Barlow, D. H. (1998). Structural relationships among dimensions of the DSM-IV anxiety and mood disorders and dimensions of negative affect, positive affect, and autonomic arousal. *Journal of Abnormal Psychology*, 107, 179–192.
- Browne, M. W., & Cudeck, R. (1993). Alternative Ways of Assessing Model fit. In K. A. Bollen, & J. S. Long (Eds.). *Testing structural equation models* (pp. 136–162). Newbury Park, CA: Sage.
- Carey, K. B., Carey, M. P., & Chandra, P. S. (2003). Psychometric evaluation of the alcohol use disorders identification test and short drug abuse screening test with psychiatric patients in India. *The Journal of Clinical Psychiatry*, 64, 767–774.
- Chapman, A. L., Gratz, K. L., & Brown, M. Z. (2006). Solving the puzzle of deliberate self-harm: The experiential avoidance model. *Behavior Research and Therapy*, 44, 371–394.
- Chen, K., & Kandel, D. B. (1995). The natural history of drug use from adolescence to the mid-thirties in a general population sample. *American Journal of Public Health*, 85, 41–47.
- Coffey, S. F., Gudleski, G. D., Saladin, M. E., & Brady, K. T. (2003). Impulsivity and rapid discounting of delayed hypothetical rewards in cocaine-dependent individuals. *Experimental and Clinical Psychopharmacology*, 11, 18–25.
- Coskunpinar, A., Dir, A. L., & Cyders, M. A. (2013). Multidimensionality in impulsivity and alcohol use: A meta-analysis using the UPPS model of impulsivity. *Alcoholism: Clinical and Experimental Research*, 37, 1441–1450.
- Cyders, M. A., & Smith, G. T. (2007). Mood-based rash action and its components: Positive and negative urgency. *Personality and Individual Differences*, 43, 839–850.
- Cyders, M. A., & Smith, G. T. (2008). Emotion-based dispositions to rash action: Positive and negative urgency. *Psychological Bulletin*, 134, 807–828.
- De Wit, H. (2009). Impulsivity as a determinant and consequence of drug use: A review of underlying processes. *Addiction Biology*, 14, 22–31.
- Dennhardt, A. A., & Murphy, J. G. (2013). Prevention and treatment of college student drug use: A review of the literature. *Addictive Behaviors*, 38, 2607–2618.
- Dreisbach, G., & Goschke, T. (2004). How positive affect modulates cognitive control: Reduced perseveration at the cost of increased distractibility. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 30, 343–353.
- Dvorak, R. D., Sargent, E. M., Kilwein, T. M., Stevenson, B. L., Kuvaas, N. J., & Williams, T. J. (2014). Alcohol use and alcohol-related consequences: Associations with emotion regulation difficulties. *The American Journal of Drug and Alcohol Abuse*, 40, 125–130.
- Evans, J. R., & Mathur, A. (2005). The value of online surveys. *Internet Research*, 15, 195–219.
- Farris, S. R., Ostafin, B. D., & Palfai, T. P. (2010). Distractibility moderates the relation between automatic alcohol motivation and drinking behavior. *Psychology of Addictive Behaviors*, 24, 151–156.
- Forgas, J. P. (1992). Mood and the perception of unusual people: Affective asymmetry in memory and social judgments. *European Journal of Social Psychology*, 22, 531–547.
- Fox, H. C., Axelrod, S. R., Paliwal, P., Sleeper, J., & Sinha, R. (2007). Difficulties in emotion regulation and impulse control during cocaine abstinence. *Drug and Alcohol Dependence*, 89, 298–301.
- Fox, H. C., Hong, K. A., & Sinha, R. (2008). Difficulties in emotion regulation and impulse control in recently abstinent alcoholics compared with social drinkers. *Addictive Behaviors*, 33, 388–394.
- Gable, P. A., & Harmon-Jones, E. (2008). Approach-motivated positive affect reduces breadth of attention. *Psychological Science*, 19, 476–482.
- Grant, B. F., Chou, S. P., Saha, T. D., Pickering, R. P., Kerridge, B. T., Ruan, W. J., & Hasin, D. S. (2017). Prevalence of 12-month alcohol use, high-risk drinking, and DSM-IV alcohol use disorder in the United States, 2001–2002 to 2012–2013: Results from the national epidemiologic survey on alcohol and related conditions. *JAMA Psychiatry*, 74, 911–923.
- Gratz, K. L., Bornoalova, M. A., Delany-Brumsey, A., Nick, B., & Lejuez, C. W. (2007). A laboratory-based study of the relationship between childhood abuse and experiential avoidance among inner-city substance users: The role of emotional nonacceptance. *Behavior Therapy*, 38, 256–268.
- Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment*, 26, 41–54.
- Gratz, K. L., & Tull, M. T. (2010). Emotion regulation as a mechanism of change in acceptance- and mindfulness-based treatments. In R. A. Baer (Ed.). *Assessing mindfulness and acceptance: Illuminating the theory and practice of change* (pp. 105–133). Oakland, CA: New Harbinger Publications.
- Gruber, J. (2011). A review and synthesis of positive emotion and reward disturbance in bipolar disorder. *Clinical Psychology & Psychotherapy*, 18, 356–365.
- Hasin, D. S., Kerridge, B. T., Saha, T. D., Huang, B., Pickering, R., Smith, S. M., & Grant, B. F. (2016). Prevalence and correlates of DSM-5 cannabis use disorder, 2012–2013: Findings from the National Epidemiologic Survey on Alcohol and Related Conditions–III. *American Journal of Psychiatry*, 173, 588–599.
- Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes and outcomes. *Behavior Research and Therapy*, 44, 1–25.
- Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (1999). *Acceptance and commitment therapy: An experiential approach to behavior change*. New York: Guilford Press.
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1–55.
- Johnson, E. J., & Tversky, A. (1983). Affect, generalization, and the perception of risk. *Journal of Personality and Social Psychology*, 45, 20–31.
- Kerridge, B. T., Saha, T. D., Chou, S. P., Zhang, H., Jung, J., Ruan, W. J., ... Hasin, D. S. (2015). Gender and nonmedical prescription opioid use and DSM-5 nonmedical prescription opioid use disorder: Results from the National Epidemiologic Survey on Alcohol and Related Conditions–III. *Drug and Alcohol Dependence*, 156, 47–56.
- Kissen, M. (1986). Characterological aspects of depression in borderline patients. *Current Issues in Psychoanalytic Practice*, 2, 45–63.
- Kuntsche, E. N., & Kuendig, H. (2005). Do school surroundings matter? Alcohol outlet density, perception of adolescent drinking in public, and adolescent alcohol use. *Addictive Behaviors*, 30, 151–158.
- Lefever, S., Dal, M., & Matthiasdottir, A. (2007). Online data collection in academic research: Advantages and limitations. *British Journal of Educational Technology*, 38, 574–582.
- Litz, B. T., Orsillo, S. M., Kaloupek, D., & Weathers, F. (2000). Emotional processing in posttraumatic stress disorder. *Journal of Abnormal Psychology*, 109, 26–39.
- Marsh, H. W., Lüdtke, O., Nagengast, B., Morin, A. J., & Von Davier, M. (2013). Why item parcels are (almost) never appropriate: Two wrongs do not make a right—Camouflaging misspecification with item parcels in CFA models. *Psychological Methods*, 18, 257–284.
- Merrill, J. E., & Read, J. P. (2010). Motivational pathways to unique types of alcohol consequences. *Psychology of Addictive Behaviors*, 24, 705–711.
- Messman-Moore, T. L., & Ward, R. M. (2014). Emotion dysregulation and coping drinking motives in college women. *American Journal of Health Behavior*, 38, 553–559.
- Moschak, T. M., Terry, D. R., Daughters, S. B., & Carelli, R. M. (2018). Low distress tolerance predicts heightened drug seeking and taking after extended abstinence from cocaine self-administration. *Addiction Biology*, 23, 130–141.
- Najavits, L. M., Runkel, R., Neuner, C., Frank, A. F., Thase, M. E., Crits-Christoph, P., & Blaine, J. (2003). Rates and symptoms of PTSD among cocaine-dependent patients. *Journal of Studies on Alcohol*, 64, 601–606.
- Németh, Z., Urbán, R., Kuntsche, E., San Pedro, E. M., Roales Nieto, J. G., Farkas, J., & Demetrovics, Z. (2011). Drinking motives among Spanish and Hungarian young adults: A cross-national study. *Alcohol and Alcoholism*, 46, 261–269.
- Nishith, P., Resick, P. A., & Mueser, K. T. (2001). Sleep difficulties and alcohol use motives in female rape victims with posttraumatic stress disorder. *Journal of Traumatic Stress*, 14, 469–479.
- Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, 36, 717–731.
- Roemer, L., Litz, B. T., Orsillo, S. M., & Wagner, A. W. (2001). A preliminary investigation of the role of strategic withholding of emotions in PTSD. *Journal of Traumatic Stress*, 14, 149–156.
- Saunders, J. B., Aasland, O. G., Babor, T. F., De la Fuente, J. R., & Grant, M. (1993). Development of the alcohol use disorders identification test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption-II. *Addiction*, 88, 791–804.
- Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods*, 7, 422–445.
- Skinner, H. A. (1982). The drug abuse screening test. *Addictive Behaviors*, 7, 363–371.
- Slovic, P., Finucane, M. L., Peters, E., & MacGregor, D. G. (2004). Risk as analysis and risk as feelings: Some thoughts about affect, reason, risk, and rationality. *Risk Analysis*, 24, 311–322.
- Steele, C. M., & Josephs, R. A. (1990). Alcohol myopia: Its prized and dangerous effects. *American Psychologist*, 45, 921–933.
- Steiger, J. H. (1990). Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Research*, 25, 173–180.
- Substance Abuse and Mental Health Services Administration (2014). *Results from the 2013 national survey on drug use and health: summary of national findings*. Rockville, MD: Office of Applied Studies.
- Tull, M. T. (2006). Extending an anxiety sensitivity model of uncued panic attack frequency and symptom severity: The role of emotion dysregulation. *Cognitive Therapy and Research*, 30, 177–184.
- Tull, M. T., Bardeen, J. R., DiLillo, D., Messman-Moore, T., & Gratz, K. L. (2015). A prospective investigation of emotion dysregulation as a moderator of the relation between posttraumatic stress symptoms and substance use severity. *Journal of Anxiety Disorders*, 29, 52–60.
- Tull, M. T., Gratz, K. L., Aklin, W. M., & Lejuez, C. W. (2010). A preliminary examination of the relationships between posttraumatic stress symptoms and crack/cocaine, heroin, and alcohol dependence. *Journal of Anxiety Disorders*, 24, 55–62.
- Vasilev, C. A., Crowell, S. E., Beauchaine, T. P., Mead, H. K., & Gatzke-Kopp, L. M. (2009). Correspondence between physiological and self-report measures of emotion dysregulation: A longitudinal investigation of youth with and without psychopathology. *Journal of Child Psychology and Psychiatry*, 50, 1357–1364.
- Veilleux, J. C., Skinner, K. D., Reese, E. D., & Shaver, J. A. (2014). Negative affect intensity influences drinking to cope through facets of emotion dysregulation. *Personality and Individual Differences*, 59, 96–101.
- Verdejo-García, A., Bechara, A., Recknor, E. C., & Pérez-García, M. (2007). Negative emotion-driven impulsivity predicts substance dependence problems. *Drug & Alcohol Dependence*, 91, 213–219.
- Weiss, N. H., Bold, K. W., Contractor, A. A., Sullivan, T. P., Armeli, S., & Tennen, H. (2018). Trauma exposure and heavy drinking and drug use among college students: Identifying the roles of negative and positive affect lability in a daily diary study. *Addictive Behaviors*, 79, 131–137.
- Weiss, N. H., Bold, K. W., Sullivan, T. P., Armeli, S., & Tennen, H. (2017). Testing bidirectional associations among emotion regulation strategies and substance use: A daily diary study. *Addiction*, 112, 695–704.

- Weiss, N. H., Dixon-Gordon, K. L., Peasant, C., & Sullivan, T. P. (in press). An examination of the role of difficulties regulating positive emotions in posttraumatic stress disorder. *Journal of Traumatic Stress*.
- Weiss, N. H., Gratz, K. L., & Lavender, J. (2015). Factor structure and initial validation of a multidimensional measure of difficulties in the regulation of positive emotions: The DERS-Positive. *Behavior Modification*, 39, 431–453.
- Weiss, N. H., Sullivan, T. P., & Tull, M. T. (2015). Explicating the role of emotion dysregulation in risky behaviors: A review and synthesis of the literature with directions for future research and clinical practice. *Current Opinion in Psychology*, 3, 22–29.
- Weiss, N. H., Tull, M. T., Anestis, M. D., & Gratz, K. L. (2013). The relative and unique contributions of emotion dysregulation and impulsivity to posttraumatic stress disorder among substance dependent inpatients. *Drug and Alcohol Dependence*, 128, 45–51.
- Weiss, N. H., Tull, M. T., & Sullivan, T. P. (2015). Emotion dysregulation and risky, self-destructive, and health compromising behaviors: A review of the literature. In M. L. Bryant (Ed.). *Handbook on emotion regulation: Processes, cognitive effects and social consequences* (pp. 37–56). Hauppauge, NY: Nova Science Publishers.
- White, A. G., & Hingson, R. W. (2014). The burden of alcohol use: Excessive alcohol consumption and related consequences among college students. *Alcohol Research: Current Reviews*, 35, 201–218.
- Witkiewitz, K., Marlatt, G. A., & Walker, D. (2005). Mindfulness-based relapse prevention for alcohol and substance use disorders. *Journal of Cognitive Psychotherapy*, 19, 211–228.
- Yudko, E., Lozhkina, O., & Fouts, A. (2007). A comprehensive review of the psychometric properties of the drug abuse screening test. *Journal of Substance Abuse Treatment*, 32, 189–198.