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ORIGINAL ARTICLE

Examining the role of body esteem and sensation seeking in drunkorexia behaviors

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Abstract

Purpose The purpose of the present study was to examine the role of body esteem (BE), sensation seeking (SS), and their interaction in drunkorexia, a behavior pattern marked by calorie restriction/compensation in the context of alcohol consumption. While previous research on drunkorexia has focused on a range of variables, the present study examined two novel variables and their potential interaction: body esteem (weight, appearance) and sensation seeking.

Methods A sample of college students (n = 488) completed the Body Esteem Scale for Adolescents and Adults, the Brief Sensation Seeking Scale, and the Compensatory Eating and Behaviors in Response to Alcohol Consumption Scale, which measures overall drunkorexia engagement as well as four dimensions: alcohol effects, bulimia, dietary restraint and exercise, and restriction.

Results Moderated linear regression analyses indicated that SS and BE (weight, appearance) did not interact in predicting drunkorexia. Rather, only main effects were observed; SS, weight esteem (WE), and appearance esteem (AE) were significant in predicting overall drunkorexia engagement. In terms of the drunkorexia dimensions, AE was a significant predictor in the alcohol effects, dietary restraint and exercise, and restriction models. WE was significant in the dietary restraint and exercise model as well as the restriction model. SS was a significant predictor across all drunkorexia dimensions.

Conclusions Our findings suggest that both elevated SS and lowered BE are associated with drunkorexia engagement. Implications for practice are discussed. Drunkorexia is a complex and multifaceted behavior pattern; therefore, further research is needed in this area of study.

Level of evidence Level V (descriptive study).

Keywords Drunkorexia · Sensation seeking · Body esteem · Weight esteem · Appearance esteem · Alcohol use

Introduction

Drunkorexia is a term originally coined by the media to describe a pattern of behavior marked by calorie restriction and/or compensation in the context of alcohol use [1]. Over the past decade, research has emerged attempting to understand drunkorexia, its correlates, and risk factors for engagement in the behavior [e.g., 2, 3–5]. While not currently considered a DSM-diagnosable condition, there has been some discussion as to whether drunkorexia should be more broadly defined as "food and alcohol disturbance" [6], and whether it should be classified as a psychological disorder, given its strong link to both disordered eating and substance use [7].

Regardless of a possible clinical classification, it is apparent that drunkorexia is a health risk behavior marked by both disordered eating tendencies and alcohol consumption. While some research on the topic has measured drunkorexia with a single item [2], multiple psychometric scales have since been developed to help capture the complexity of the behavior pattern [8–10]. One of these measures is the Compensatory Eating and Behaviors in Response to Alcohol Consumption Scale [CEBRACS; 9], which was developed to assess overall drunkorexia engagement as well as drunkorexia engagement across the following dimensions: alcohol effects (calorie restriction/limitation to become more drunk

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or drunk more quickly), bulimia (severe calorie compensation strategies including vomiting, laxative, or diuretic use), dietary restraint and exercise (cutting down on calories or exercise to compensate for alcohol-related calories), and restriction (skipping meals to compensate for alcohol-related calories).

There seem to be various motivations for engaging in drunkorexia behaviors—with some individuals engaging in the behavior pattern related to their wish to become drunker or drunk more quickly, and others engaging in the behavior pattern to help compensate for alcohol-related calories [11]. One theme that has emerged is that poor body image and disordered eating are risk factors associated with drunkorexia engagement [9, 12–14]. While various studies have examined weight control behaviors and drive for thinness as correlates of drunkorexia [9, 12, 14–16], no research to date has examined body esteem (BE)—the dimension of self-esteem that captures an individual's perceptions of and attitudes toward their weight and appearance [17]. Specifically, poor weight esteem (WE) and appearance esteem (AE)—both falling under the broader umbrella of BE—are likely motivators for decreasing one's caloric intake prior to drinking for various reasons: (a) to prevent weight gain, consistent with previous drunkorexia research [e.g., 9, 12] and (b) to self-medicate with alcohol use—to become drunker/drunk more quickly (in relation to poor body/appearance esteem). Indeed, previous research has linked attempting to lose weight with an increased risk of binge drinking [18], and appearance concerns have been associated with problematic alcohol use—a relationship that was partially mediated by positive alcohol expectancies [19].

Another risk factor that has not been examined in the context of drunkorexia is sensation seeking (SS). SS is largely considered an individual difference variable characterized by a propensity to seek out novel or varied experiences [20]. In college students, the trait is a well-established risk factor for heavier drinking [21, 22]. Magid, McLean, and Colder [23] found that the association between SS and alcohol use among college students was strongly influenced by enhancement motives—defined as the drive to enhance pleasurable emotions and sensations associated with drinking. Thus, individuals with elevated levels of SS might be likely to engage in drunkorexia—intentionally modifying their eating behaviors to help enhance the effects of alcohol.

Overall, the aim of the present study was to examine the role of BE, SS, and their interaction in drunkorexia engagement. We have focused on both BE and SS due to (a) their previously established relationship with drinking and/or disordered eating, and (b) assessing both SS and BE addresses an important gap in the drunkorexia literature. In our study, we hypothesized that both risk factors under examination (BE, SS) would be predictive of drunkorexia engagement. Furthermore, we hypothesized that the risk factors would interact in that drunkorexia engagement would be highest among individuals with poor BE along with elevated SS. This hypothesis was developed based on previous research illustrating that there are both disordered eating and substance use-oriented motivations underlying the behavior pattern [3, 11]. Therefore, we hypothesized that poor BE and elevated levels of SS operate on distinct motivations—and having both characteristics would increase an individual's likelihood of engaging in drunkorexia behaviors.

Methods

Participants and procedure

Participants were 488 undergraduate students enrolled in introductory psychology courses who took part in the study for credit toward their course research requirement. The study was titled "Body Image, Personality, and Health Behaviors," and participants were informed that the study would take approximately 20 min to complete. Participants completed the consent form, study questions, and questionnaires via Qualtrics. At the end of the study, participants were provided with information about on-campus and online health resources. The study protocol was approved by the authors' institutional review board.

Measures

Sensation seeking

The Brief Sensation Seeking Scale [8-item; 24] was used to measure SS in the present study. An example item is "I prefer friends who are excitingly unpredictable." In completing the scale, participants responded to each item on a five-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5). In computing an overall score, the mean response was computed. The scale had adequate reliability ($\alpha = 0.737$) in the present study.

Body esteem

The Body Esteem Scale for Adolescents and Adults [BESAA; 17] was used to measure BE in the present study. The scale consists of 23 items that assess BE across three subscales: appearance (10 items), weight (8 items), and attribution (5 items). The internal consistency of the attribution subscale was low in the present study ($\alpha = 0.424$); therefore, it was not included in the analyses. For the present study, only the AE and WE subscales were used. Example items include "I like what I look like in pictures" (appearance), and "I am satisfied with my weight" (weight). Participants responded to each item on a five-point scale ranging

from 0 (never) to 4 (always). Negative items were reverse-scored and the mean was computed for each subscale. Both subscales had good reliability in the present study (AE: $\alpha = 0.825$; WE: $\alpha = 0.852$).

Drunkorexia

The Compensatory Eating and Behaviors in Response to Alcohol Consumption Scale [CEBRACS; 9] was used to measure drunkorexia engagement in the present study. The scale is a 21-item measure that assesses drunkorexia across four dimensions: alcohol effects (7 items), bulimia (6 items), dietary restraint and exercise (6 items), and restriction (2 items). In completing the questionnaire, participants responded to each item on a five-point scale: 1 (never), 2 (rarely, about 25% of the time), 3 (sometimes, about 50% of the time), 4 (often, about 75% of the time), and 5 (almost all the time). In computing subscale scores, item responses were summed. A total overall drunkorexia score was also computed by summing all item responses. In the present study, three of the four subscales had adequate reliability (alcohol effects: $\alpha = 0.935$; bulimia: $\alpha = 0.877$; diet and exercise: $\alpha = 0.873$). The restriction subscale had low reliability ($\alpha = 0.580$), likely related to it being comprised of only 2 items. The overall CEBRACS score had excellent reliability ($\alpha = 0.924$).

Demographic and health information

Participants also completed questions about their demographic information (age, gender, ethnicity), college information (year of study, Greek affiliation), and health information and behaviors, including their weight, height, and typical weekday and weekend alcohol consumption. Body mass index was computed using self-reported weight and height to gather information about the weight status of the sample.

Data screening

A total of 794 participants consented to taking part in the study. Of the 794 participants, 46 individuals completed less than 30% of the study and were, therefore, assumed to have withdrawn from the study. Although the original dataset included both non-drinkers and drinkers, due to the examination of drunkorexia as the primary outcome of the present study, only drinkers ($n = 489$) were included in the analyses. Data were screened for missing values, response sets, and regression assumptions. One case was removed (leaving $n = 488$) due to the presence of response sets. Using expectation maximization, missing values for the CEBRACS were computed for one case on two items. Data were not missing at random for one of the participant's missing items, and, therefore, not imputed. As a result, for the CEBRACS dietary restraint and exercise subscale and total score, the sample size is slightly smaller ($n = 487$) than the main sample ($n = 488$). Outliers were identified in the data, but according to Cook's distance, they were not influential cases; therefore, all cases were kept in the data for analyses.

Results

Descriptives and correlations

Descriptive statistics in terms of the sociodemographic variables and alcohol use are presented in Table 1. Participants in the present study ranged in age from 18 to 36 years ($M = 19.16$, SD=1.80). The majority of the sample identified as female ($n = 339$; 69.5%) were in their first

Table 1 Sociodemographics of the sample

Variable	Category	*n*	(%)
Gender	Male	149	30.5
	Female	339	69.5
Year	First year	283	58.0
	Sophomore	103	21.1
	Junior	66	13.5
	Senior	36	7.4
Ethnicity	White American	414	84.8
	Hispanic/Latino American	19	3.9
	Native American/Alaska Native	1	0.2
	African American	32	6.6
	Native Hawaiian or Pacific Islander	1	0.2
	Asian	2	0.4
	Other	19	3.9
Greek affiliation	Sorority	27	5.5
	Fraternity	15	3.1
	No involvement	446	91.4
Living situation	On-campus (e.g., residence halls)	328	67.2
	Off-campus (e.g., with roommates)	105	21.5
	At home with family	52	10.7
	Other	3	0.6
Alcohol consumption on a typical weekday	0 drinks	370	75.8
	1–2 drinks	79	16.2
	3–4 drinks	20	4.1
	5–6 drinks	8	1.6
	7 or more drinks	11	2.3
Alcohol consumption on a typical weekend	0 drinks	3	0.6
	1–4 drinks	265	54.3
	5–8 drinks	136	27.9
	9–12 drinks	61	12.5
	13 or more drinks	23	4.7

year of university (n =283; 58.0%), were not affiliated with Greek life (n =446; 91.4%), and lived on-campus (n =328; 67.2%). Most participants did not drink alcohol on the typical weekday (n =370; 75.8%), and the majority consumed 1–4 drinks on the typical weekend (n =265; 54.3%). Descriptive statistics for the study variables for the overall sample and across gender are presented in Table 2. Females had significantly higher scores on the dietary restraint and exercise drunkorexia dimension, while males had significantly higher scores on SS, AE, and WE. Bivariate correlations for BMI and the study variables are presented in Table 3.

Regression analyses

Hierarchical linear regression analyses were conducted to examine the role of SS, BE, and their interaction in drunkorexia engagement (see Table 4). Drunkorexia subscales and the overall CEBRACS score were used as outcome variables. In the first block, SS and the BE variables were entered, and in the second block, the interaction terms were added (SS × AE, SS × WE). All final models were statistically significant ($p < 0.05$). Standardized coefficients and corresponding p values for the models are presented in Table 4. Notably, none of the interaction terms were significant in the models ($p > 0.05$); therefore,

Table 2 Descriptive statistics for the study variables across sample and by gender

Variables	Total			Men			Women		
	M	SD	Range	*M*	SD	Range	*M*	SD	Range
BMI*	23.99	4.14	16.50–49.90	25.15	4.22	18.10–49.90	23.48	4.01	16.50–49.60
SS*	3.35	0.63	1.63–5.00	3.48	0.61	2.00–5.00	3.30	0.63	1.63–4.88
BE-appearance*	2.24	0.69	0–4.00	2.57	0.62	0.90–4.00	2.10	0.68	0–3.70
BE-weight*	2.18	0.86	0–4.00	2.51	0.73	0.25–4.00	2.04	0.87	0–4.00
CEBRACS-alcohol effects	10.09	4.87	7.00–34.00	9.47	4.88	7.00–34.00	10.36	4.85	7.00–33.00
CEBRACS-bulimia	6.59	2.10	6.00–27.00	6.73	2.55	6.00–27.00	6.52	1.87	6.00–20.00
CEBRACS-dietary restraint and exercise*	9.73	4.79	6.00–28.00	8.66	3.81	6.00–25.00	10.19	5.09	6.00–28.00
CEBRACS-restriction	2.57	1.19	2.00–10.00	2.47	1.16	2.00–10.00	2.62	1.20	2.00–9.00
CEBRACS-total	28.99	10.47	21.00–83.00	27.35	10.70	21.00–83.00	29.69	10.31	21.00–81.00

BMI body mass index, *SS* sensation seeking, *BE* body esteem, *CEBRACS* Compensatory Eating Behaviors in Response to Alcohol Consumption Scale

To protect against family wise error rate, a Bonferroni correction was applied in the examination of gender differences. A new alpha level of .00556 (0.05/9 comparisons) was determined

*Gender differences identified at $p \leq 0.00556$. Differences identified for BMI: t (483) = 4.13, $p < 0.001$; SS total: t (486) = 2.89, $p = 0.004$; BE-appearance: t (486) = 7.25, $p < 0.001$; BE-weight: t (486) = 5.71, $p < .001$; CEBRACS-dietary restraint and exercise: t (485) = − 3.27, $p = 0.001$

Table 3 Bivariate zero-order correlations among study variables

Variable	1	2	3	4	5	6	7	8
1. BMI	1							
2. SS	0.026	1						
3. BE-appearance	− 0.148*	− 0.085						
4. BE-weight	− 0.415**	− 0.041	0.673**	1				
5. CEBRACS-alcohol effects	0.063	0.225**	− 0.256**	− 0.226**	1			
6. CEBRACS-bulimia	0.084	0.196**	− 0.143*	− 0.139*	0.453**	1		
7. CEBRACS-dietary restraint and exercise	0.050	0.130*	− 0.261**	− 0.272**	0.468**	0.423**	1	
8. CEBRACS-restriction	0.090*	0.207**	− 0.269**	− 0.288**	0.584**	0.583**	0.687**	1
9. CEBRACS-total	0.079	0.228**	− 0.297**	− 0.290**	0.837**	0.671**	0.838**	0.817**

SS sensation seeking, *BE* body esteem, *CEBRACS* Compensatory Eating Behaviors in Response to Alcohol Consumption Scale

*$p < 0.05$

**$p < 0.001$

Table 4 Linear regressions of SS and BE (appearance, weight) on drunkorexia

	Alcohol effects		Bulimia		Dietary restraint and exercise		Restriction		CEBRACS total	
	β	*p*	*B*	*p*	*β*	*p*	*β*	*p*	*β*	*p*
Block 1										
SS	0.207	**< 0.001**	0.187	**< 0.001**	0.110	**0.012**	0.189	**< 0.001**	0.206	**< 0.001**
BE-appearance	−0.168	**0.004**	−0.070	0.239	−0.130	**0.027**	−0.116	**0.044**	−0.164	**0.004**
BE-weight	−0.104	0.072	−0.083	0.162	−0.180	**0.002**	−0.202	**< 0.001**	−0.170	**0.003**
Block 2										
SS	0.211	**< 0.001**	0.188	**< 0.001**	0.113	**0.009**	0.190	**< 0.001**	0.209	**< 0.001**
BE-appearance	−0.152	**0.010**	−0.066	0.275	−0.116	**0.049**	−0.106	0.068	−0.149	**0.010**
BE-weight	−0.107	0.064	−0.085	0.157	−0.184	**0.002**	−0.208	**< 0.001**	−0.174	**0.002**
SS × BE-appearance	−0.098	0.094	−0.017	0.774	−0.073	0.215	−0.010	0.865	−0.084	0.145
SS × BE-weight	0.001	0.980	−0.011	0.861	−0.014	0.808	−0.061	0.295	−0.015	0.795

Bold indicates statistical significance at $p \leq 0.05$

Block one and block two are statistically significant across all regression models ($p < 0.05$)

SS sensation seeking, *BE* body esteem

block one is treated and presented as the final model in the results presented below.

Drunkorexia dimensions

For the regression with alcohol effects as the outcome, the model was significant [F (3, 484) = 20.57, $p < 0.001$, Adj. $R^2 = 0.108$]. The strongest predictor of alcohol effects was SS ($\beta = 0.207$, $p < 0.001$) followed by AE ($\beta = -0.168$, $p = 0.004$). For the regression with bulimia as the outcome variable, the model was significant [F (3, 484) = 9.99, $p < 0.001$, Adj. $R^2 = 0.052$]. The only significant predictor in bulimia model was SS ($\beta = 0.187$, $p < 0.001$). For the regression with dietary restraint and exercise as the outcome variable, the model was significant [F (3, 483) = 17.34, $p < 0.001$, Adj. $R^2 = 0.092$]. WE ($\beta = -0.180$, $p = 0.002$) was the strongest predictor, followed by AE ($\beta = -0.130$, $p = 0.027$), then SS ($\beta = 0.110$, $p = 0.012$). For the regression with restriction as the outcome variable, the model was significant [F (3, 484) = 23.84, $p < 0.001$, Adj. $R^2 = 0.123$]. WE was the strongest predictor ($\beta = -0.202$, $p < 0.001$), followed by SS ($\beta = 0.189$, $p < 0.001$), then AE ($\beta = -0.116$, $p = 0.044$).

Overall drunkorexia engagement

For the regression with the total CEBRACS score as the outcome variable, the model was significant [F (3, 483) = 27.29, $p < 0.001$, Adj. $R^2 = 0.140$]. The strongest predictor in the final model was SS ($\beta = 0.206$, $p < 0.001$), followed by WE ($\beta = -0.170$, $p = 0.003$), then AE ($\beta = -0.164$, $p = 0.004$).

Discussion

The aim of the present study was to examine the role of BE, SS, and their interaction in drunkorexia engagement. While previous research has examined body image concerns and drive for thinness in relation to drunkorexia [9, 12], our study examined a novel body image-related construct, BE, which captured participants' perceptions of both their weight and overall appearance. Similarly, while SS is well established as a risk factor for alcohol use [22, 25], it has not yet been examined in the context of drunkorexia. In contrast to our hypotheses, SS and BE did not interact in predicting drunkorexia engagement. Rather, in our study, both poor BE and higher SS were independently associated with an increased risk of drunkorexia engagement.

In the present study, BE emerged as a significant predictor of drunkorexia. While the two forms of BE were positively correlated, it is notable that our results suggest that both WE and AE are largely independent predictors in the regression models. AE (and not WE) was significant in the alcohol effects model, and both WE and AE were significant in the dietary restraint and exercise model as well as the restriction model. Further, in predicting overall drunkorexia engagement, both WE and AE were distinct significant predictors. Thus, it is possible that each type of esteem predicts drunkorexia engagement through different mechanisms. For example, it is possible that poor WE could influence drunkorexia via weight control motivations [related to previous drunkorexia research, e.g., 9, 12]. Poor AE may influence drunkorexia via self-worth-related variables—that is, individuals with low AE may engage in the behavior pattern to become drunk/drunk more quickly as a

form of self-medication. However, further research is needed in determining the ways in which WE and AE might separately influence drunkorexia engagement.

Aside from BE, SS was also associated with drunkorexia engagement in terms of alcohol effects as well as the calorie compensation dimensions. In line with previous research on SS and alcohol use [e.g., 21, 22], SS was positively predictive of the alcohol effects dimension of drunkorexia. However, SS was also associated with the disordered eating components of drunkorexia (bulimia, dietary restraint and exercise, restriction). Research in this domain notes an association between sensation-seeking and bulimia behaviors [26, 27]. Some of this work focuses on the notion that there may be an overlap between addictive and eating disorders—and SS may be a personality trait involved in the comorbidity [26]. Therefore, in a related context—drunkorexia—it could be that SS is influential not only with regard to wanting to enhance the effects of a substance (alcohol effects) but in promoting some of the disordered eating dimensions of drunkorexia (calorie compensation) as well. More research in terms of how and why SS is a predictive factor across the various drunkorexia dimensions would be beneficial in understanding the relationship.

Recommendations for future research

Much of the work on drunkorexia has been cross-sectional in nature [e.g., 2, 3, 5, 12]. Given that it is a complex behavior pattern, longitudinal designs, perhaps across the academic year—or even across the duration of college—would help in elucidating the temporal nature of the relationships between risk factors and drunkorexia engagement. Additionally, this study focused on a select number of risk factors (SS and BE). It is critical to examine possible mediators (e.g., enhancement motives for SS, self-medication for poor AE) that may link the predictor variables to drunkorexia. Future research should also consider other psychosocial variables that may serve as protective or risk factors for drunkorexia engagement.

Recommendations for practice

In helping to curb drunkorexia engagement, it is critical that individuals working in health promotion and clinical settings recognize that it is not only weight concerns that motivate calorie restriction in the content of alcohol consumption. Rather, drunkorexia sits at the intersection of disordered eating and risky alcohol use, and various individual characteristics including WE, AE, and SS might influence an individual's propensity to engage in drunkorexia behaviors. To date, there have not been interventions designed to address drunkorexia behaviors. Both preventive (e.g., campus-wide programs on risky drinking and/or body image) and individual interventions (e.g., cognitive behavioral therapy to address distorted thoughts about body esteem) may be ways to help decrease drunkorexia engagement. Given their demonstrated efficacy in reducing problematic alcohol use [28], an important preventive step may be to include drunkorexia information, including the risks associated with the behavior pattern, in alcohol abuse prevention programs on college campuses. However, research would be needed to examine whether such preventive efforts would be effective in decreasing drunkorexia engagement.

Limitations

The limitations of the present study should be considered in interpreting the results. First and most salient, the present study employed a cross-sectional design; therefore, it is not possible to determine the temporal sequence of the relationships based on our study. Another limitation relates to our sample. We recruited participants through our introduction to psychology participant pool; as such, the majority were female, first-year students, and lived on-campus. Therefore, it is unclear the extent to which our results may generalize to older university students—such as those who live off-campus and may experience greater autonomy in terms of their alcohol use. Furthermore, it is an important consideration that the majority of the participants were not of legal drinking age (21 in the United States) and, therefore, this may have impacted both their alcohol consumption and the degree to which they reported engaging in alcohol use.

In a related vein, all information collected in this study was based on self-report, which should be considered when interpreting the results. For example, participants reported their weight and height, which can be less accurate than more objective assessments (e.g., weight information gathered using a scale). Similarly, questions as part of the study, referred to "drinks" (e.g., number of alcoholic beverages consumed per weekend); it is possible that participants underestimated or underreported their consumption (e.g., not realizing a mixed beverage contains multiple shots). Finally, the reliability coefficient for the restriction subscale was low (0.580) and, therefore, the results for this drunkorexia dimension should be considered with this limitation in mind.

Conclusion

The results of the present study indicate that SS and poor BE are risk factors for drunkorexia engagement—in terms of the alcohol effects dimension as well as the calorie compensation dimensions. Overall, our results suggest that drunkorexia is a complex behavior pattern that may have multifaceted motivations. Given that there are substance use and disordered eating components of the behavior, drunkorexia merits

attention on college campuses—in terms of more research to better understand the behavior pattern as well as both prevention and intervention efforts to help decrease drunkorexia engagement.

Compliance with ethical standards

Conflict of interest Both authors declare no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

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