

Manuscript Details

Manuscript number	ABREP_2019_179_R2
Title	The role of negative urgency in risky alcohol drinking and binge-eating in United Kingdom male and female students
Article type	Research Paper

Abstract

Identifying students at risk of developing binge-eating and alcohol use disorders is a priority in the United Kingdom (UK). Although relationships between negative urgency (impulsive behavior during times of negative emotion), risky drinking, and binge-eating have been established in students from other countries, these links have yet to be replicated in male and female UK students. UK students aged 18-30 (n=155) completed the: (1) the Urgency, Pre-meditation, Perseverance, Sensation Seeking (UPPS-P) negative urgency subscale; (2) Alcohol Use Disorders Identification Test (AUDIT); and (3) Binge-Eating Scale (BES). For categorical analysis, participants were assigned to one of four groups as a function of AUDIT and BES clinical cut-off scores: (1) no risk (28%); (2) risky drinkers (47%); (3) binge-eaters (6%); and (4) risky drinkers + binge-eaters (19%). For dimensional analysis, across students with non-zero AUDIT and BES scores (n=141), BES, AUDIT, gender, and their interactions were entered as predictors in the same block of a regression. UPPS-P negative urgency was the dependent variable. Categorical results indicated that binge-eaters with and without risky drinking endorsed significantly higher negative urgency than students with no risk. Dimensional results showed that although higher BES and AUDIT scores were positively linked to higher negative urgency, but only the BES was significantly associated. Furthermore, BES shared substantially more variance with negative urgency than the AUDIT, and the BES-negative urgency relationship was stronger in male students than female students. High risk students may benefit the most from interventions that help regulate negative emotion.

Keywords negative urgency; binge-eating; risky drinking; alcohol problems; hazardous drinking; students

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Suggested reviewers Andrew Cooper, Alan Pickering, Anna Bardone-Cone, Sarah Fischer, Rajita Sinha

Submission Files Included in this PDF

File Name [File Type]

Risky drinking and binge-eating_Revision_Response_FINAL.docx [Response to Reviewers]

Risky drinking and binge-eating_Highlights.docx [Highlights]

Risky drinking and binge-eating_Abstract_ABR_Revised_FINAL.docx [Abstract]

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Risky drinking and binge-eating_Figure1.docx [Figure]

Risky drinking and binge-eating_Conflict of Interest.docx [Conflict of Interest]

Risky drinking and binge-eating_Authors Statement.docx [Author Statement]

Risky drinking and binge-eating_Authors Agreement.docx [Author Agreement]

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There are no linked research data sets for this submission. The following reason is given:
The authors do not have permission to share data

Ref: ABREP_2019_179_R1

Title: The role of negative urgency in risky alcohol drinking and binge-eating in United Kingdom male and female students

Journal: Addictive Behaviors Reports

Dear Dr. Ralph-Nearman,

Thank you for submitting your manuscript to Addictive Behaviors Reports.

I have completed my evaluation of your manuscript. The reviewers recommend reconsideration of your manuscript following revision. I invite you to resubmit your manuscript after addressing the comments below.

When revising your manuscript, please consider all issues mentioned in the reviewers' comments carefully: please outline in a cover letter every change made in response to their comments and provide suitable rebuttals for any comments not addressed. Please note that your revised submission may need to be re-reviewed.

If you would like to revise your manuscript, you first need to accept this invitation:

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Upon agreeing to revise your manuscript, your revision deadline will be displayed in your 'My Author Tasks' view.

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Addictive Behaviors Reports values your contribution and I look forward to receiving your revised manuscript.

Kind regards,

Marcantonio M. Spada, PhD
Editor-in-Chief
Addictive Behaviors Reports

2 April, 2020

Dear Dr. Spada,

Thank you for the opportunity to make this minor revision to our manuscript (ABREP_2019_179) entitled "The role of negative urgency in risky alcohol drinking and binge-eating in United Kingdom male and female students," for consideration in *Addictive Behaviors Reports*. We are very pleased that the reviewers have identified merit in the content of our manuscript, and that both agree that we have addressed all of their constructive and valuable recommendations. We are grateful that both reviewers have expressed that they are satisfied with our changes, and have addressed Reviewer 1's final suggestion. We are grateful for our reviewers' suggestions and changes, which we believe have helped to strengthen the manuscript. We believe all suggestions have now been addressed in detail.

We have documented our changes in the manuscript in **highlighted text** for addressing Reviewer 1's final suggestion and have also indicated the changes below their comment in our Response to Reviewers letter (see below).

Thank you again for your insightful recommendations, and we appreciate your consideration to publish our work in *Addictive Behaviors Reports*. We hope that the newly revised manuscript is now acceptable for publication in *Addictive Behaviors Reports*.

Kind regards,

Dr. Christina Ralph-Nearman (Corresponding author), Dr. Jennifer Stewart, and Dr. Katy Jones

Editor and Reviewer Comments:

Reviewer 1: The authors replied to all my comments. On the other hand, I still have doubts about the interpretation of the p value = 0.06 of the regression model as marginally significant. By convention a P value greater than 5% ($p > 0.05$) is called "not significant." Thus, the authors should be interpreting the correlation as not statistically significant and change discussion accordingly.

Response: Thank you! We have now been explicit that this relationship was not statistically significant throughout the manuscript: Abstract (lines 49-50), Results (lines 204-205), and Discussion (lines 217-219).

Reviewer 2: Thank you to the authors for the revisions. I am satisfied with the changes and recommend this article for publication.

Response: Thank you very much!

Highlights

- Identifying at-risk students for binge-eating and alcohol use disorder is priority
- Negative urgency relationship to risky drinking and binge-eating is key
- High levels of risky drinking, binge-eating, and both were identified
- Effects were particularly strong related to male students' binge-eating
- Important to identify key mechanisms of binge-eating and drinking in students

Abstract

Identifying students at risk of developing binge-eating and alcohol use disorders is a priority in the United Kingdom (UK). Although relationships between negative urgency (impulsive behavior during times of negative emotion), risky drinking, and binge-eating have been established in students from other countries, these links have yet to be replicated in male and female UK students. UK students aged 18-30 ($n=155$) completed the: (1) the Urgency, Pre-meditation, Perseverance, Sensation Seeking (UPPS-P) negative urgency subscale; (2) Alcohol Use Disorders Identification Test (AUDIT); and (3) Binge-Eating Scale (BES). For categorical analysis, participants were assigned to one of four groups as a function of AUDIT and BES clinical cut-off scores: (1) no risk (28%); (2) risky drinkers (47%); (3) binge-eaters (6%); and (4) risky drinkers + binge-eaters (19%). For dimensional analysis, across students with non-zero AUDIT and BES scores ($n=141$), BES, AUDIT, gender, and their interactions were entered as predictors in the same block of a regression. UPPS-P negative urgency was the dependent variable. Categorical results indicated that binge-eaters with and without risky drinking endorsed significantly higher negative urgency than students with no risk. Dimensional results showed that although higher BES and AUDIT scores were positively linked to higher negative urgency, but only the BES was significantly associated. Furthermore, BES shared substantially more variance with negative urgency than the AUDIT, and the BES-negative urgency relationship was stronger in male students than female students. High risk students may benefit the most from interventions that help regulate negative emotion.

Key words: negative urgency; binge-eating; risky drinking; alcohol problems; hazardous drinking; students

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**The role of negative urgency in risky alcohol drinking and binge-eating
in United Kingdom male and female students**

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Short title: **RISKY DRINKING AND BINGE-EATING**

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Abstract

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52 AUDIT, and the BES-negative urgency relationship was stronger in male students than
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59 **The role of negative urgency in risky alcohol drinking and binge-eating**
60 **in United Kingdom male and female students**

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62 **Introduction**

63 A growing number of students are diagnosed with binge-eating disorder (BED),
64 which has a higher lifetime prevalence than other eating disorders (Guerdjikova, et al., 2017;
65 Hudson, et al., 2007), and a lower gender discrepancy in diagnosis, with 40% of BED
66 diagnosed in men (Hay, et al., 2015; Westerberg & Waltz, 2013). BED is characterized by
67 binge-eating without compensation (i.e. purging), accompanied by feelings of loss of control,
68 distress, and intense negative emotions (DSM-5; American Psychiatric Association, 2013).
69 Although BED is distinguishable from alcohol use disorder (AUD), both problems reflect
70 substance over-consumption, have been suggested to share some key features such as
71 impulsivity, neuroticism, and reward dysfunction, and have the potential for overlapping
72 negative emotional (e.g., anxiety, depression, guilt) and physical harm (e.g., gastrointestinal
73 and sleep problems) (see for example: Bjuanda, 2000; Ferriter & Ray, 2011; Olguin et al.,
74 2017; Rolland et al., 2017; Schulte, Grilo, & Gearhardt, 2016).

75 Problem alcohol consumption is common for students residing in the United Kingdom
76 (UK), with 70-85% reporting weekly binge-drinking and 63-84% endorsing hazardous
77 drinking; moreover, the gender gap in risky alcohol use appears to be closing, with women
78 catching up to men (Davoren et al., 2016). Although women and men aged 16-24 report
79 disconcerting binge-drinking rates in England (26% and 29% respectively), alcohol-related
80 deaths are 2:1 male to female (15 compared to 7 per 100,000; National Health Service, 2019).
81 Alarmingly, between 2007-2017, there was a 16% increase in UK alcohol-specific deaths
82 (National Health Service, 2019).

83 It is estimated that up to half of individuals who abuse alcohol also engage in
84 problematic binge-eating behaviors (Bahji et al., 2019; Gregorowski, Seedat, & Jordaan,
85 2013; Ulfvebrand et al., 2015). Although a multilevel approach (Penny & Armstrong-Hallam,
86 2010) advocates identifying those at risk for developing multiple problems and intervening
87 based on their specific needs, there appears to be a dearth of appropriate screenings for eating
88 disorders in the UK (BEAT, 2014). Early identification of AUD and BED is crucial, and
89 since over 50% of UK patients wait for 3+ months to begin mental health treatment (Mind,
90 2013), development of effective screening measures should be prioritized to facilitate early
91 intervention.

92 Heightened negative urgency, or the tendency of behave impulsively when
93 experiencing (and/or attempting to avoid) negative emotions, appears to characterize both
94 problem eating and drinking behaviors and may be an effective screening tool for AUD and
95 BED vulnerability (Bardone-Cone et al., 2016; Cyders, 2013; Fischer et al., 2004; Fischer et
96 al., 2007; Fischer et al., 2008; Jones et al., 2014; Lynam et al., 2017; Verdejo-Garcia et al.,
97 2007). UK students who experience negative consequences from their drinking endorse
98 higher levels of negative urgency (Jones et al., 2014). As such, students higher in negative
99 urgency may be at risk of both AUD and BED, as both alcohol and food may be used as a
100 maladaptive method to cope with negative emotions (Fisher et al., 2004). Within student
101 samples in the United States (US): (1) women with heightened negative urgency endorse
102 greater symptoms of BED and substance use disorders (Fischer et al., 2012); (2) men and
103 women may share similar levels of negative urgency (Cyders, 2013); and (3) negative
104 urgency is linked to both problem drinking and eating behaviors (Dir, Karyadi, & Cyders,
105 2013). As AUD and eating disorders show high rates of comorbidity (Khaylis et al., 2009;
106 Mikheeva & Tragesser, 2016; Sinha et al., 1996; Stewart et al., 2006), negative urgency may

132 **Negative urgency.** The Urgency, Pre-meditation, Perseverance, Sensation Seeking
133 (UPPS-P) Scale (Lynam et al., 2007) contains 59 items to measure impulsivity traits. This
134 study only collected data on the negative urgency subscale (Cronbach's alpha = .95), as it has
135 been linked to alcohol abuse and binge eating (e.g., Fischer et al., 2012; VanderVeen et al.,
136 2016). Items relate to regretted impulsive behavior, or lack of self-control, deriving from
137 emotional distress (e.g., "Sometimes when I feel bad, I can't seem to stop what I am doing
138 even though it is making me feel worse."). Scores are based on a scale from 1 (agree
139 strongly) to 4 (disagree strongly).

140 **Alcohol use.** The Alcohol Use Disorders Identification Test (AUDIT; Saunders et al.,
141 1993) contains ten questions used to generate consumption (e.g., 'How often do you have six
142 or more drinks?'), harm (e.g., 'How often during the last year have you had a feeling of guilt
143 or remorse after drinking?') and dependence (e.g., 'How often during the last year have you
144 found you were not able to stop drinking once you started?') subscales and a total score.
145 Items are rated on a 5-point Likert scale from 0 ("never") to 4 ("4 or more times a week"),
146 with higher scores indicating a greater level of alcohol use. A score of 8 or more indicates an
147 'at risk' drinker (Babor et al., 2001). Cut-offs applied to this sample were: 0-7 low or no risk,
148 8-15 increasing risk, 16-19 high risk and 20-40 possible dependence (Cronbach's alpha =
149 .86).

150 **Binge-eating.** The Binge-Eating scale (BES; Gormally et al., 1982) is a 16-item
151 questionnaire assessing presence and severity of BED behaviors, emotions, and cognitions
152 (Burton et al., 2015; Greeno et al., 1995; Ricca et al., 2000) (e.g., 'Usually about once a
153 month, I eat such a quantity of food, I end up feeling very stuffed'). Individual items have
154 three to four responses, which are rated on a continuum from 0 (no severity of binge-eating
155 symptoms), to 3 (severe binge-eating symptoms). Based on the BES total score, which ranges
156 from 0 to 46, participants were categorized into three groups according to established severity

157 cut-offs, which are: none (score ≤ 17), mild-moderate (score of 18–26), and severe (score \geq
158 27; Marcus et al., 1988). The BES was used as a screening measure to classify those with
159 scores greater than or equal to 17 as “binge-eaters” (Cronbach’s alpha = .88).

160 **Procedure**

161 Ethical approval for the study was obtained from the Faculty Ethics Committee. The
162 survey was created using Qualtrics (Qualtrics.com). Informed consent was obtained from all
163 participants. Participants completed the survey (average time = 20 min) and were debriefed
164 and signposted to appropriate support services.

165 **Statistical Analysis**

166 Statistical analyses were performed in SPSS Version 24. Categorical and dimensional
167 analyses were computed, with categorical analyses based on established clinical cut-offs to
168 evaluate percentage of participants meeting criteria for comorbid binge-eating and drinking
169 problems. Dimensional analyses evaluated relationships between binge-eating/drinking and
170 negative urgency across the entire sample who had non-zero values for all measures.

171 **Categorical.** Risk groups were produced for binge-eating, alcohol use and presence
172 of both based on BES and AUDIT cut-off scores. A one-way analysis of variance (ANOVA)
173 tested differences on UPPS-P negative urgency between four groups: (1) no risk of binge-
174 eating or alcohol problems (BES < 17 and AUDIT < 8 ; $n = 44$); (2) risky drinkers (AUDIT $>$
175 8 but BES < 17 ; $n = 73$); (3) binge-eaters (BES > 17 but AUDIT < 8 ; $n = 9$), and (4) risky
176 drinkers + binge-eaters (BES > 17 and AUDIT > 8 ; $n = 29$). Levene’s test evaluated the
177 homogeneity of variance assumption, while Scheffe post-hoc tests were conducted to follow-
178 up the overall F test. Partial η^2 is reported as a measure of effect size.

179 **Dimensional.** Shapiro-Wilk tests were computed to assess the normality of
180 distributions for men and women separately. A total of 14 participants (13F, 1M) endorsed an
181 AUDIT score of ‘0’ and were therefore removed from analysis. BES distributions did not

182 approach normality for men ($W=.94, p=.02$) or women ($W=.92, p<.001$), while AUDIT
183 distributions approached normality for men ($p=.41$) but not women ($W=.94, p<.001$). Square-
184 root transformations [$\text{SQRT}(\text{variable} + 1)$] were therefore applied to BES and AUDIT scores
185 for the remaining 95 participants (all W tests $p > .22$). Negative urgency scores were normally
186 distributed for both genders and required no transformation. The following independent
187 variables were entered in the same step of a multiple regression to predict negative urgency:
188 BES, AUDIT, gender, BES*gender, AUDIT*gender, BES*AUDIT, and
189 BES*AUDIT*gender. All variables were standardized prior to regression entry and
190 calculation of interaction terms. Residuals were relatively uncorrelated (Durbin-Watson =
191 1.98) and normally distributed (per visual histogram inspection). No multivariate outliers (\pm
192 3 standard deviations) were detected. R^2 is reported as a measure of effect size.

193 Results

194 **Categorical.** Levene's test indicated that groups showed similar variances for
195 negative urgency ($p = .46$). **Figure 1A** demonstrates that groups differed on negative
196 urgency, $F(3, 151) = 16.00, p < .001$, partial $\eta^2 = .24$, and Scheffe tests demonstrated that
197 risky drinkers + binge-eaters endorsed higher urgency scores than risky drinkers and those
198 with no risk (both $p < .001$). Binge-eaters also reported higher urgency scores than those with
199 no risk ($p = .02$) but did not differ from risky drinkers with ($p = .70$) or without binge-eating
200 ($p = .56$). Finally, risky drinkers endorsed higher urgency scores than students with no risk (p
201 = .01).

202 **Dimensional.** The overall regression model significantly related to negative urgency,
203 $F(7, 133) = 13.78, p < .001$, Adjusted $R^2 = .39$), and **Figure 1B** illustrates that higher AUDIT
204 scores ($\beta = .14, t = 1.88, p = .06$) was positively related with higher negative urgency scores,
205 although this was not significant. Main effects of BES scores ($\beta = .54, t = 7.39, p < .001$) and
206 gender ($\beta = -.26, t = -3.33, p < .01$) were qualified by a BES*gender interaction ($\beta = -.18, t =$

207 -2.26, $p = .03$), which showed that the relationship between BES and urgency was stronger in
208 men ($R^2 = .61$; **Figure 1C**) than women ($R^2 = .25$; **Figure 1D**). In contrast, BES*AUDIT ($\beta =$
209 $-.05$, $p = .51$), AUDIT*gender ($\beta = .11$, $p = .18$, and BES*AUDIT*gender ($\beta = .05$, $p = .55$)
210 did not contribute significant variance to urgency.

211 **Conclusions**

212 This is the first study to explore relationships between negative urgency, risky
213 drinking, and binge-eating in UK students. With respect to categorization of AUD/BED risk,
214 two-thirds of our sample screened positive for AUD, one-fourth screened positive for BED,
215 and almost one-fifth screened positive for comorbid AUD/BED. Pure BED and comorbid
216 AUD/BED groups endorsed higher levels of negative urgency than the no-risk group.

217 **Negative urgency was only significantly positively correlated with BES, there was a positive**
218 **association with AUDIT but this was not significant ($p = .06$). This was partially consistent**
219 **with our hypothesis, and BES shared more variance with negative urgency than AUDIT.**

220 Furthermore, the BES-negative urgency relationship shared significantly more variance
221 within male than female students. Taken together, our findings replicate prior work
222 suggesting that heightened negative urgency is associated with (and may underlie)
223 problematic relationships with alcohol and food (Anestis et al., 2011; Fischer et al., 2012;
224 Pearson et al., 2012); we also extend this work to show that negative urgency may be a
225 stronger mechanism involved in binge-eating behaviors within male students. As this is a
226 cross-sectional self-report study with UK University students, longitudinal research including
227 more implicit assessment within a clinical population is warranted to determine whether
228 heightened negative urgency predicts future development of binge-eating behaviors,
229 especially in young men. Additionally, self-report clinical assessment data could be
230 compared with behavioral data on impulsivity in future studies.

231 Results suggest that early screening for negative urgency in UK University students
232 may have some benefits. For example, if further testing established a reliable cutoff score
233 used in screening to flag a consultation with a mental health professional, further assessment
234 and short-term therapy may allow vulnerable students to learn new skills to cope with stress
235 and aversive mood states. Our data suggest this may be particularly beneficial for male
236 students, although further research is needed to support such implementation. In addition to
237 the survey-based assessments available, more implicit tools to detect higher levels of negative
238 urgency could be preventative for those who are vulnerable. Interventions targeting adaptive
239 regulation of negative emotion for those vulnerable to problems with alcohol and food can
240 result in decreased clinical symptoms and successful long-term recovery (Patton et al., 2014;
241 Reas et al., 2000; Rodgers et al., 2014). Understanding the function of maladaptive eating and
242 drinking behaviors may result in a more effective intervention (Jones et al., 2014).
243 Compassion-focused therapy (CFT; Kelly, Cotter, & Mazzeo, 2014; Gilbert, 2005, 2009)
244 could be a useful intervention tool for students engaging in binge-eating. As CFT improves
245 self-compassion in early stages of eating disorder treatment (Kelly, Carter, & Borairi, 2014),
246 techniques could be adapted for students to change a self-critical mindset, leading to
247 awareness of the body's indicators to direct the intake of food (Webb & Hardin, 2016).
248 Engaging with one's emotions may help reduce negative urgency, and the tendency to escape
249 self-awareness or disengage emotionally during binge-eating.

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256 **Acknowledgements:** We thank Phoebe Nicholas for collecting data for this study.

257 **Conflict of Interest:** The authors declare that they have no conflict of interest.

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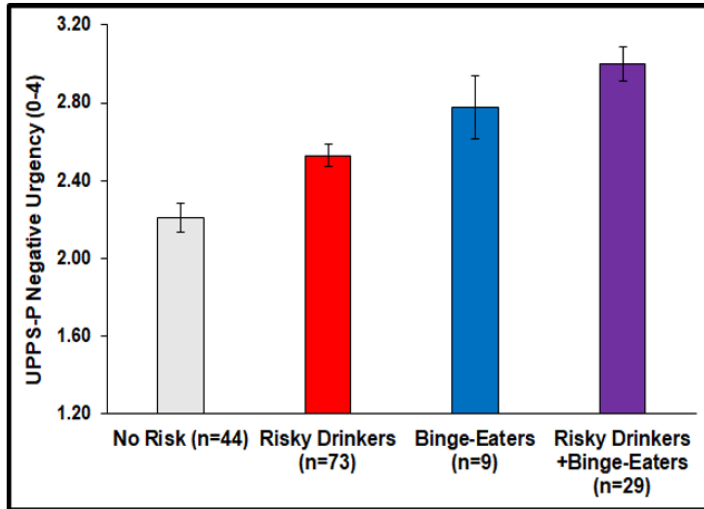
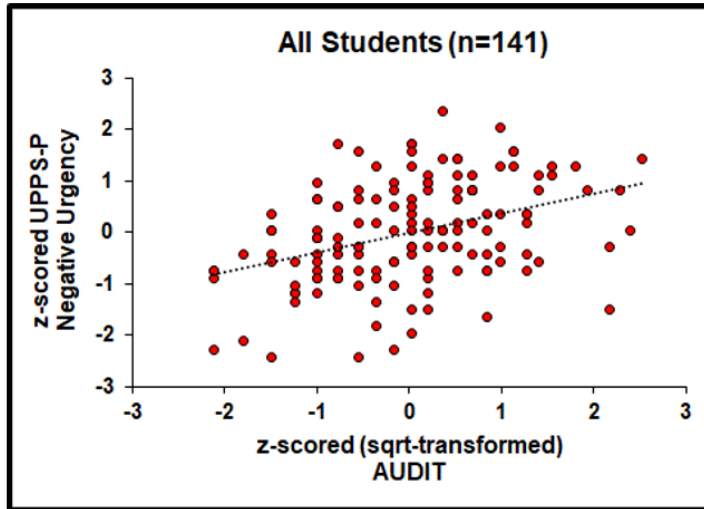
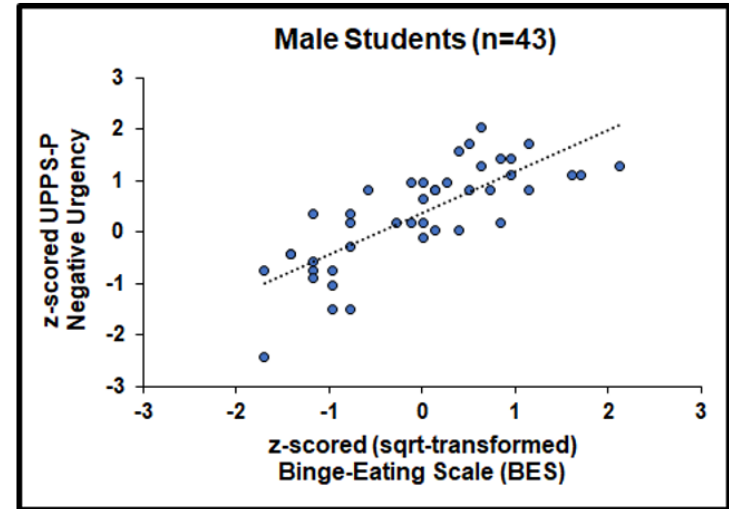
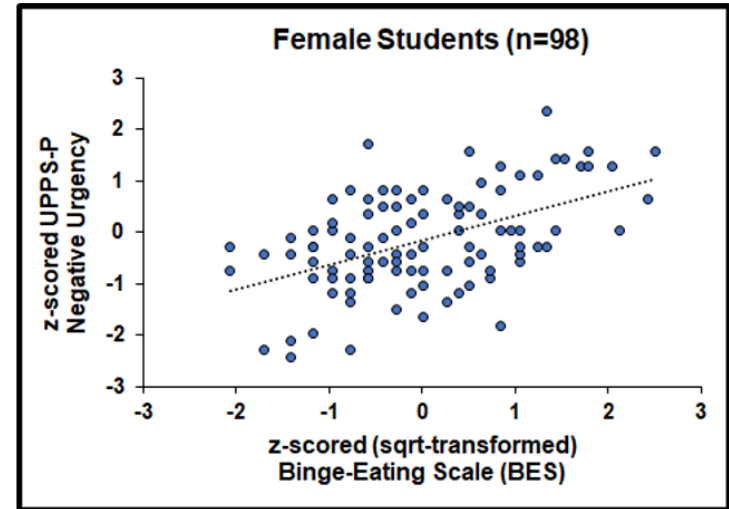
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Figure Caption

Figure 1. (A) Categorical analysis: Group differences in negative urgency. Bars reflect one standard error. (B) Dimensional analysis: Relationship between Alcohol Use Disorders Identification Test (AUDIT) and negative urgency across male and female students. (C) Dimensional analysis: Relationship between Binge-Eating Scale (BES) and negative urgency in male students. (D) Dimensional analysis: Relationship between Binge-Eating Scale (BES) and negative urgency in female students.

A**B****C****D**

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Authors Statement

Statement 1: Role of Funding Sources

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Statement 2: Contributors

Dr. Katy Jones' role was to design and manage the collection of the data., Dr. Jennifer L. Stewart analyzed the data, Dr. Christina Ralph-Nearman and Dr. Katy Jones wrote the initial manuscripts, and all edited the final drafts.

Statement 3: Conflict of Interest

There are no conflicts of interest by any author.

Statement 4: Acknowledgements (optional)

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