Emotion Dysregulation as a Correlate of Alcohol-Related Compensatory Behaviors in Undergraduate Students

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Emotion Dysregulation as a Correlate of Alcohol-Related Compensatory Behaviors in
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Emotion Dysregulation as a Correlate of Alcohol-Related Compensatory Behaviors in Undergraduate Students

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Disordered eating behaviors, including binge eating, food restriction, self-induced vomiting, and laxative use are prevalent within undergraduate male and female students. Problematic alcohol use and related issues, including binge drinking and alcohol-related consequences, are also widespread and these two issues are often comorbid. The unique combination of these behaviors, termed alcohol-related compensatory behaviors (ARCB), has recently come to the attention of researchers. ARCB involve compensatory behaviors performed in response to or in preparation for alcohol use in order to counteract calories consumed from alcohol or to increase intoxication. However, research regarding ARCB is sparse. Specifically, there is a lack of knowledge concerning psychological correlates that may help to explain these behaviors and a lack of consensus regarding potential sex differences in ARCB. Emotion dysregulation is a transdiagnostic psychological correlate implicated in a multitude of psychopathology, including disordered eating and alcohol use. Therefore, the present thesis used a cross-sectional design to examine the association between emotion dysregulation and ARCB in a sample of male and female undergraduate students (N = 417). Further, sex differences in ARCB and in the association between emotion dysregulation and ARCB were also examined. While ARCB were positively associated with emotion dysregulation at the bivariate level, emotion dysregulation was
not a correlate of ARCB after accounting for alcohol use and problems, disordered eating, and BMI. Finally, there were no sex differences in ARCB and the association between emotion dysregulation and ARCB did not vary among males and females. Findings provide the first study on emotion dysregulation and ARCB, and additional knowledge regarding psychological correlates of ARCB and their temporal relationship to these risky behaviors is needed.
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Introduction

Subclinical disordered eating behaviors are exhibited at alarming rates among undergraduate males and females. For example, 49% of college females and 17% of college males engage in at least one form of disordered eating each week, including binge eating, self-induced vomiting, laxative use, fasting, and excessive exercise (Berg et al., 2009; Cain et al., 2012). Likewise, alcohol use and related problems are widespread among college students; approximately 41% of undergraduate students report being drunk within the last month and approximately 30% endorse binge drinking within the last two weeks (i.e., consuming four/five or more drinks per occasion for females/males; Johnston, O’Malley, Bachman, Schulenberg, & Miech, 2016; Patrick & Terry-McElrath, 2016). The extant literature illustrates a positive relationship between disordered eating and substance use and the two often co-occur (Nokleby, 2012). Research also demonstrates a specific association between compensatory eating behaviors (e.g., self-induced vomiting, laxative use, food restriction, and exercise) and alcohol use (Fouladi et al., 2015). Accordingly, alcohol-related compensatory behaviors (ARCB) describe a relatively new construct that captures compensatory behaviors performed in response to or in preparation for calories consumed from alcohol and/or to increase the effects of alcohol and heighten intoxication levels (Bryant, Darkes, & Rahal, 2012; Rahal et al., 2012). Specifically, ARCB includes engagement in self-induced vomiting, laxative use, exercise, and dietary restriction for the purpose of counteracting the caloric effects of alcohol and/or to increase intoxication levels (Bryant et al., 2012; Rahal et al., 2012). Unfortunately, ARCB are associated with a variety of negative consequences, including
increased risk for intoxication and injury, and research suggests that male and female college students frequently endorse these behaviors (Burke, Cremaless, Vail-Smith & Woolsey 2010; Giles, Champion, Sutfin, McCoy, & Wagoner, 2009).

Further, emotion dysregulation is a psychological mechanism that is associated with a variety of psychopathology. Emotion dysregulation involves difficulties regarding emotional awareness, understanding, and acceptance, as well as problems acting in accordance with one’s goals while experiencing negative emotions (Gratz & Roemer, 2004). Existing theories and literature implicate emotion dysregulation in the etiology and maintenance of both disordered eating and alcohol use (Dvorak, Pearson, Sargent, Stevenson, & Mfon, 2016; Engel et al., 2013; Hawkins & Clement, 1984; Khantzian, 1987). Therefore, it is theoretically plausible that emotion dysregulation may also be related to ARCB. However, the available literature concerning ARCB is limited; as a result, little is known about these behaviors overall, including potential psychological correlates of ARCB. Thus, the current study cross-sectionally investigated emotion dysregulation as a potential correlate of ARCB, as well as explored potential sex differences within this relationship.

**Disordered Eating and Alcohol Use**

As mentioned above, disordered eating behaviors among undergraduate students are widespread and are associated with numerous negative outcomes and comorbid health issues. For example, longitudinal studies demonstrate that individuals who endorse subclinical disordered eating and cognitions experience a three to 9-fold increase in the odds of developing a full clinical eating disorder in the future than those who do not
experience subclinical disordered eating (Kotler, Cohen, Davies, Pine, & Walsh, 2001; Liechty & Malesg-Jung Lee, 2013). Individuals exhibiting disordered eating behaviors also experience elevated risk for increased drug and alcohol use and problems (e.g., Barry & Piazza-Gardner, 2012; Solmi, Hatch, Hotopf, Treasure, & Micali, 2014), as well as comorbid substance use, anxiety, and mood disorders (e.g., Piran & Robinson, 2011; Solmi et al., 2014). Finally, the existing literature shows that females are diagnosed with an eating disorder at 10 times the rate of males (APA, 2013), and exhibit more disordered eating behaviors than males in non-clinical samples throughout childhood, adolescence, and adulthood (Forbush, Wildes & Hunt, 2014; Neumark-Sztainer, Wall, Larson, Eisenberg & Loth, 2011). However, recent research has demonstrated a higher prevalence of disordered eating in males than previously believed (e.g., Domine, Berchtold, Akre, Michaud, & Suris, 2009).

Similar to disordered eating, undergraduate students exhibit high rates of subclinical alcohol misuse and related problems. A recent study estimated 29.3% of young adults aged 19/20 who attend college report binge drinking within the past two weeks (i.e., defined in the study as consuming five or more drinks per occasion) and 12.4% endorse high-intensity drinking (i.e., consuming 10 or more drinks per occasion). Further, alcohol use among college students is also associated with a number of negative alcohol-related outcomes, including perpetrating physical and sexual violence, driving while intoxicated, engaging in risky sexual behaviors (e.g., unprotected sex), as well as negative consequences due to the consumption of alcohol, such as impaired academic performance, alcohol poisoning, and accidental death (e.g., Hingson, Heeren, Winter, &
Wechsler, 2005; Hingson, Zha, & Weitzman, 2009; Shorey, Stuart, McNulty, & Moore, 2014; Wechsler, Dowdall, Maenner, Gledhill-Hoyt, & Lee, 1998). In addition, prior research has found undergraduate males drink alcohol more frequently than females (e.g., Ham & Hope, 2003), demonstrate significantly greater rates of binge drinking (Wechsler et al., 1994), and are more likely to meet criteria for an alcohol use disorder than college females (e.g., Hill & Chow, 2002). However, sex gaps in alcohol use and related behaviors are decreasing in undergraduate males and females (Johnston et al., 2016; White & Hingson, 2014).

Finally, research also suggests that disordered eating and alcohol use frequently co-occur. For instance, numerous studies have found consistent associations between disordered eating behaviors and alcohol use and/or alcohol-related problems (e.g., Giles et al., 2009; Landry, Moorer, Madson, & Zeigler-Hill, 2014). Further, the literature also demonstrates bulimic symptoms (i.e., binge eating and purging behaviors) and/or compensatory behaviors are particularly related to alcohol use. For example, multiple studies, as well as a recent meta-analysis, determined individuals with binge eating and purging symptoms were more likely to exhibit drug and alcohol use ($d = .46$) than individuals with restriction ($d = -.16$) or binge eating only behaviors ($d = .25$; Calero-Elvira et al., 2009; Dansky, Brewerton & Kilpatrick, 2000; Fouladi et al., 2015; Nokleby, 2012). Likewise, specific diet-related compensatory behaviors, such as compensatory exercise, food restraint, diet-pill use, and vomiting are related to quantity and/or frequency of alcohol use in undergraduate students and adolescents (Buchholz & Crowther, 2014; Krahn, Kurth, Demitrack, & Drewnowski, 2004; Vidot, Messiah, Prado,
& Hlaing, 2015). Taken together, the extant literature suggests alcohol use and disordered eating behaviors, and compensatory behaviors in particular, are related.

**Alcohol-Related Compensatory Behaviors**

The unique combination of alcohol use and disordered eating is referred to as “alcohol-related compensatory behaviors” (ARCB). In some college health literature, this combination is referred to as “drunkorexia” (Barry & Piazza-Gardner, 2012). ARCB includes compensatory behaviors performed in preparation for, or in response to, alcohol consumption, such as food restriction, vomiting, laxative use, and excessive exercise (Bryant et al., 2012). The compensatory behaviors characteristic of ARCB are identical to those performed in response to food, except that these compensatory actions are used to compensate for calories consumed from alcohol. In addition to weight control purposes, individuals may also use compensatory behaviors to increase the effects of alcohol and heighten intoxication levels (i.e., not eating prior to consuming alcohol to maximize alcohol blood levels; Rahal et al., 2012).

Studies demonstrate approximately 10%-14% of undergraduate males and females report engaging in ARCB, including restricting food intake prior to consuming alcohol (Burke et al., 2010; Roosen & Mills, 2015; Ward, Galante, Trivedi, & Kahrs, 2015). Rahal and colleagues (2012) created and validated the first assessment tool designed to examine ARCB, the Compensatory Eating and Behaviors in response to Alcohol Consumption Scale (CEBRACS). The measure consists of four factors, three of which assess types of compensatory behaviors to control weight in the context of alcohol
While research has been primarily exploratory in nature, the literature has demonstrated that ARCB are positively associated with bulimic symptoms, body shape dissatisfaction, overall disordered eating, alcohol consumption, and episodes of binge drinking (Allen, 2014; Hunt and Forbush, 2016; Pinna et al., 2015; Rahal et al., 2012; Ward, Oswald, & Galante, 2016). Further, individuals who endorse ARCB on the CEBRACS, relative to individuals who do not endorse ARCB, have also been shown to be more likely to experience alcohol-related problems, such as shame or embarrassment while using alcohol or neglecting personal responsibilities due to alcohol use, and greater alcohol consumption. Further, a handful of studies have also explored sex differences in relation to ARCB.

Preliminary investigations concerning sex differences in ARCB are inconclusive, as the few studies that have explored potential sex differences have yielded inconsistent results. Specifically, extant literature suggests there are no differences between males and females in relation to ARCB on the CEBRACS (Diehl, 2017; Galante, 2015; Pinna et al., 2015; Rahal et al., 2012), while studies using other measures have found sex differences (e.g., Bryant et al., 2012; Peralta, 2002). For instance, Peralta’s (2002; $n = 37$ females; $n = 41$ males) early investigation of ARCB found that females more likely than males to exercise (10.8% vs. 0.0%), purge (5.4% vs. 2.4%), restrict food intake (29.7% vs. 7.3%), and alter drinking preferences (27% vs. 9.8%) to minimize or eliminate calories consumed from alcohol. Discrepant findings may be partially explained by the different
methods used to assess for ARCB. For example, the CEBRACS measures the frequency of ARCB, while some studies utilize unstructured interviews or instruments that assess the prevalence or consequences of ARCB among males and females. Finally, uneven sample ratios of males and females may contribute to the differential results observed in studies. Therefore, continued research is needed regarding sex differences in the prevalence and presentation of ARCB.

In summary, research regarding ARCB is scant, and has primarily focused on frequency, individual relationships with disordered eating and alcohol use, and sex differences. Further, research concerning sex differences in ARCB is inconclusive. Finally, literature has yet to examine psychological correlates that may potentially explain ARCB, such as emotion dysregulation.

**Emotion Dysregulation and Alcohol-Related Compensatory Behaviors**

Emotion dysregulation has increasingly been examined as a unifying etiological and maintenance factor for a variety of psychopathology and maladaptive behaviors (Moses & Barlow, 2006; Gross & Munoz, 1995). Emotion regulation is conceptualized as the ability to control impulsive behaviors and act in accordance with one’s goals while experiencing distressing emotions, as well as having awareness, understanding and acceptance of emotions (Gratz & Roemer, 2004). As such, emotion dysregulation involves difficulties with or a lack of the above skills (e.g., difficulties with emotional clarity; impulsive behaviors when experiencing negative emotions). Multiple studies support the role of emotion dysregulation in the etiology of numerous symptom sets and diagnoses, including disordered eating and alcohol use. For example, the dual-pathway
model of BN (Stice, Nemeroff, & Shaw, 1996) and the affect regulation model uses affect regulation components to describe the etiology and maintenance of disordered eating (Hawkins and Clement, 1984). Similarly, various theoretical models have also been proposed to explain the association between emotion dysregulation and alcohol use, including the self-medication model (Khantzian, 1987) and the stress-negative affect model (Wills & Shiffman, 1985). These models posit that substance use functions as a means to mitigate negative affect and/or stress. Research has supported the efficacy of the dual-pathway and affect regulation models in describing the development and maintenance of disordered eating (e.g., Engel et al., 2013; Haedt-Matt & Keel, 2011; Stice et al., 1996), as well as the self-medication and stress-negative affect models in depicting the association between emotion dysregulation and alcohol use (Dermody, Cheong, & Manuck, 2013; Dvorak et al., 2016; Norberg et al., 2010; Swendsen et al., 2000).

Research has also more broadly supported the relationship between emotion dysregulation and disordered eating, as well as alcohol use. For example, literature has demonstrated that various facets of emotion dysregulation, including difficulties engaging in goal-directed behaviors when distressed ($\beta = 0.27$), lack of emotional awareness ($\beta = -0.20$), and impulsivity ($\beta = 0.20$), are significantly related to eating disorder symptom severity in female undergraduate students (Cooper et al., 2014; Racine & Horvath, 2018), and are associated with disordered eating in male samples, even after controlling for the variance associated with negative affect (Ambwani, Slane, Thomas, Hopwood, & Grilo, 2014; Lavender & Anderson, 2010). Relevant to the outcome variable of interest, male
and female college students who engage in compensatory behaviors, such as vomiting, food restriction, exercise, laxative use, or diuretic use endorse greater negative affect before binge episodes than those who did not engage in compensatory behaviors (Lynch et al., 2000) Further, research also demonstrates impulsivity is related to both binge eating and purging behaviors in undergraduate populations (Peterson & Fischer, 2012) and is able to prospectively predict the occurrence of binge eating and purging (Anestis, Selby, & Joiner, 2007).

Emotion dysregulation is also broadly related to subclinical alcohol use and alcohol-related problems. Studies demonstrate that individuals who drink to cope with emotion are more likely to experience negative consequences of drinking, such as feeling guilty about their drinking, intense negative affect, driving while under the influence, risky sexual behavior, and loss of memory, as compared to those who drank to feel good, relax, or facilitate social situations (Veilleux, Skinner, Reese, and Shaver, 2014; Weybright et al., 2016). Pertinent to the measure of emotion dysregulation used in the current study, research exhibits a positive association between emotion dysregulation, as assessed by the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), and alcohol use and related problems ($r = .13-.26, p < .01$) in undergraduate students (Oritz, Shorey & Cornelius, 2015; Veilleux et al., 2014). Further, the extant literature suggests that difficulty controlling impulses, or impairment in behavioral inhibition, predicts alcohol consumption patterns and engagement in risky alcohol-related behaviors in undergraduate males and females, including driving while intoxicated,
getting into physical altercations, or experiencing legal problems due to drinking alcohol (Henges & Marczinski, 2012; Jones, Chryssanthakis & Groom, 2014).

The above literature suggests emotion dysregulation is a transdiagnostic risk factor for a variety of psychopathology and serves as a psychological correlate for both maladaptive eating behaviors and alcohol use in non-clinical populations. Further, compensatory actions in response to alcohol use are identical to those used in relation to food, but are instead triggered by the caloric and/or intoxication value of alcohol, rather than calories consumed from food. As such, a potential relationship may exist between emotion dysregulation and the combination of these behaviors (i.e., ARCB). In addition, given that the literature consistently demonstrates a relationship between disordered eating and impulsivity, as well as alcohol use and impulsivity, this specific facet of emotion dysregulation may also be related to ARCB, due to the similarities between ARCB and these individual behaviors. However, research has yet to explore the role of emotion dysregulation in relation to ARCB, as the theoretical underpinnings of ARCB are underdeveloped. Indeed, no studies have investigated the relationship between emotion dysregulation and ARCB. In a related study, Roosen and Mills (2015) explored psychological correlates of ARCB using the Beck Depression Inventory-II (Beck, Steer, & Brown, 1996) and Beck Anxiety Inventory (Beck & Steer, 1990). The author found that individuals who endorsed restricting food intake prior to drinking alcohol reported significantly more anxiety and depressive symptoms, as compared to those who did not endorse restricting food intake prior to drinking. Likewise, Miracle and colleagues (2016) demonstrated a positive relationship between restrictive emotionality (i.e., a tendency to
conceal emotions) and ARCB reported before and during alcohol use, as well as the CEBRACS subscales of alcohol effects and diet and exercise.

The above studies suggest that individuals who engage in ARCB may be more likely to experience negative affect and/or difficulty expressing emotions and, therefore, accompanying emotion dysregulation. Other than the limited information provided by Roosen and Mills (2015) and Miracle and colleagues (2016), the extant literature has neglected to investigate the association between ARCB and emotion dysregulation. However, based on the current literature and existing theoretical considerations, emotion dysregulation may be related to ARCB.

Aims and Hypotheses

Based on the extant literature reviewed above, the following aims and hypotheses were proposed.

Aim 1: Examine the association between emotion dysregulation and ARCB.

Hypothesis 1: Greater emotion dysregulation would be positively associated with more frequent ARCB after controlling for BMI, alcohol use and related problems, and disordered eating.

Aim 2. Examine potential sex differences in ARCB.

Hypothesis 2: Based on prior literature, it was not expected there would be any sex differences in the frequency of ARCB.

Aim 3. Examine whether the association between emotion dysregulation and ARCB varies across males and females.
Given the mixed findings concerning sex differences in ARCB and the lack of research regarding the association between emotion dysregulation and ARCB, this aim was exploratory in nature and no a priori hypothesis was proposed.

Aim 4. Examine whether the association between impulse control difficulties, an individual facet of emotion dysregulation, and ARCB varies across males and females.

Given the mixed findings concerning sex differences in ARCB and the lack of research regarding the association between emotion dysregulation and ARCB, this aim was exploratory in nature and no a priori hypothesis was proposed.
Method

Participants

The present thesis utilized cross-sectional, pre-existing data from 506 undergraduate students. Because the present thesis is concerned with alcohol-related compensatory behaviors, only participants who indicated they consumed alcohol in the past 12 months on the Alcohol Use Disorders Identification Test (AUDIT; discussed below) were included. Therefore, 79 participants who indicated they had not consumed alcohol in the past 12 months were removed from the sample, leaving a final sample of 427. Participants were 205 males and 222 females between the ages of 18 and 36 (Mean age = 19.32, SD = 1.85) who were enrolled in psychology courses at a large midwestern university. Eighty-seven percent of participants identified as White, 5.4% as multiracial, 4.9% as Black/African American, 1.9% as Asian, and 0.2% as Middle Eastern. The racial composition of the current sample is consistent with those of the university’s undergraduate population as a whole. Further, 90.9% of the sample identified as heterosexual. Finally, the majority of the sample was comprised of first year undergraduate students (56.7%), followed by sophomores (24.4%), juniors (10.3%), and seniors (8.4%).

Procedure

Participants were recruited via the Psychology Department’s Human Subjects Pool during the Fall 2016 and Spring 2017 semesters. Although the data are archival in nature, the current author functioned as a co-investigator during the period of data collection. Participants were required to be at least 18 years of age in order to participate
and there were no additional inclusion or exclusion criteria for participation. Participants provided informed consent (Appendix A) before starting the study and received research credit as compensation. After providing consent, participants completed a series of questionnaires via Qualtrics.com, an online survey system that uses encryption to protect participant responses. After completing the series of online questionnaires, participants received a debriefing form (Appendix B) that described the purpose of the study and provided contact information for the primary investigator and resources for local mental health services. Prior to data collection, the university’s Institutional Review Board approved all procedures.

**Measures**

**Demographic questionnaire (Appendix C).** A series of questions was completed to obtain demographic information, including sex, age, ethnicity, and self-reported body weight and height (i.e., to calculate BMI).

**Emotion dysregulation (Appendix D).** The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) was used to examine emotion dysregulation. The DERS assesses distinct components of emotion dysregulation using 36 self-report items and consists of six subscales: (1) lack of emotional clarity (5 items), (2) lack of emotional awareness (6 items) (3) non-acceptance of emotional responses (6 items), (4) impulse control difficulties when upset (6 items), (5) difficulties engaging in goal-directed behavior when upset (5 items), and (6) limited access to emotion regulation strategies (8 items). Items are rated from 1 (almost never [0-10%]) to 5 (almost always [91-100%]), with higher scores indicating greater emotion dysregulation. Subscales are summed to
produce a total emotion dysregulation score. The initial validation and development study determined that the DERS subscales and total score exhibit high internal consistency (αs = .80-.93) and adequate test-retest reliability over 4-8 months. In the current sample, the internal consistency estimates of the DERS total and subscale scores are as follows: total score, $\alpha = .81$; clarity, $\alpha = .78$; awareness, $\alpha = .83$; non-acceptance, $\alpha = .90$; impulse, $\alpha = .86$; goal, $\alpha = .85$; and strategies $\alpha = .90$. The DERS subscales also demonstrate good convergent validity with other measures of emotion regulation and depression in high school and college students (Gratz & Roemer, 2004; Cooper et al., 2014).

**Alcohol-related compensatory behaviors (Appendix E).** The Compensatory Eating and Behaviors in Response to Alcohol Consumption Scale (CEBRACS; Rahal et al., 2012) was used to examine ARCB. The CEBRACS consists of 21 items that assess compensatory behaviors in response to calories consumed from drinking alcohol or to maximize the effects of alcohol. Items are rated using a Likert-type scale ranging from 1 (never) to 5 (almost all of the time) and responses are obtained for three time periods: before drinking, during drinking (while under the influence of alcohol), and after drinking (after the effects of alcohol have ended). Examples of behaviors assessed include skipping meals, eating less food, laxative and diuretic use, vomiting, and exercising. The CEBRACS has seven subscales: alcohol effects (7 items; e.g., “In the past 3 months, I have eaten less than usual during one or more meals before drinking to feel the effects of alcohol FASTER”), bulimia (6 items; e.g., “In the past 3 months, I have made myself vomit to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol”), diet and exercise (6 items; e.g., “In the past 3 months, I
have eaten low-calorie or low-fat foods while I was drinking to make up for the calories in alcohol that I was consuming” and “In the past 3 months, I have made myself vomit to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol”), restriction (2 items; e.g., “In the past 3 months, I have skipped one or more meals before drinking to make up for the number of calories in alcohol that I anticipated consuming”), before drinking (6 items; i.e., engagement in the above behaviors “before drinking” alcohol), during drinking (8 items; i.e., engagement in the above behaviors “while [one] was drinking” alcohol), and after drinking (7 items; i.e., engagement in the above behaviors “previously while [one] was under the effects of alcohol”). Subscales are summed to produce a CEBRACS total score, with higher scores corresponding to greater frequency of ARCB.

Due to the recentness of its development, there are a limited number of studies that have established the psychometric properties of the CEBRACS. However, the existing research supports the reliability and validity of the CEBRACS for assessing ARCB. For example, in a sample of undergraduate male and female students, the CEBRACS total and subscale scores exhibited satisfactory internal consistency (α’s = .79 to .95; Rahal et al., 2012). In addition, the CEBRACS total and subscale scores demonstrated good internal consistency (α’s = .73 - .89) and excellent test-retest reliability over a period of one month (ICC = 0.806) in a large sample of Italian high school students, as well as concurrent validity with multiple eating disorder risk measures and a measure of high-risk drinking (Pinna et al., 2015). Further, correlations with measures of body dissatisfaction, drive for thinness, and bulimia symptoms demonstrated
convergent validity ($r = .20; r = .41; r = .43$; Rahal et al., 2012). In the current sample, the internal consistency estimates of the CEBRACS total and subscale scores are as follows: total score, $a = .93$; alcohol effects, $a = .95$; bulimia, $a = .94$; diet and exercise, $a = .90$; restriction, $a = .73$; before drinking, $a = .88$; during drinking, $a = .91$; after drinking, $a = .89$.

**Disordered eating (Appendix F).** The Eating Disorder Examination-Questionnaire (EDE-Q; Fairburn & Beglin, 1994) was used to examine pathological eating behaviors. The EDE-Q is a self-report version of the Eating Disorders Examination, a semi-structured clinical interview, and measures severity of global eating psychopathology and frequency of specific disordered eating behaviors. The EDE-Q consists of 36 self-report items that participants rate based on the past 4 weeks using a 7-point Likert-type scale ranging from 0 (no days) to 6 (every day). The EDE-Q is comprised of a Global Score and four cognitive subscales: weight concern (5 items), shape concern (8 items), eating concern (5 items), and restraint (5 items). The Global Score was used for the current thesis and is computed by averaging the scores on the four subscales, with higher scores indicating greater severity of disordered eating. Pertinent to the sample of the current study, the EDE-Q has demonstrated good test-retest reliability across a time period of two weeks ($r’s = .81 - .94$) and high internal consistency ($a’s = .81 - .92$) in a sample of undergraduate females (Luce & Crowther, 1999). Finally, the EDE-Q has demonstrated convergent validity with measures of BMI, as well as discriminant validity with measures of depression and self-esteem in a large sample of
undergraduate males and females \( p < .001; a's = .83 \) to \(.91; \) Grilo, Reas, Hopwood, & Crosby, 2015).

**Alcohol use and problems (Appendix G).** The Alcohol Use Disorders Identification Test (Saunders et al., 1993) was used to examine alcohol use and problems. The AUDIT consists of 10 items that assess alcohol use and alcohol-related problems during the past year, with higher scores indicating more alcohol use and problems. The first three items assess overall drinking frequency and typical quantity of alcohol consumed, while the final seven items measure symptoms of alcohol dependence and negative alcohol-related consequences from alcohol. The first eight items are rated on a 5-point scale (ranging from “never” to “4 or more times a week”, “0, 1, or 2” to “10 or more” or “never” to “daily or almost daily”) and the last two items are rated on a 3-point scale (i.e. “no,” “yes, but not in the last 12 months,” or “yes, during the last 12 months”). Each item score is summed to produce a total score ranging from 0-40. The AUDIT has demonstrated good internal consistency among undergraduate populations \( \alpha = .80; \) Allen, Litten, Fertig, & Babor, 1997) and excellent temporal stability across a period of two weeks in a sample of college students \( r = .92; \) Lennings, 1999). The AUDIT has also shown good criterion validity through good sensitivity \( .91 \) and specificity \( .60 \) for detecting high risk-drinking (i.e., drinking more alcohol per occasion or monthly than recommended levels) in male and female college students (Kokotailo et al., 2004), as well as convergent validity with other alcohol screening measures (see Reinert & Allen, 2002; Thomas & McCambridge, 2008; \( a = .83 \)).
Sample Size Determination

An appropriate sample size for the current study was determined using G*Power software (Faul, Erdfelder, Buchner, & Lang, 2009). Based on the aims and hypotheses, a power analysis was conducted including 5 predictors (emotion dysregulation, alcohol use and related problems, disordered eating, BMI, and sex), with a power of .80, a two-tailed test with an alpha of .05, and a small-to-medium (.05-.15) effect size ($f^2$). Small-to-medium effect sizes were chosen based on the reviewed literature on emotion dysregulation and disordered eating/alcohol use, which suggested small-to-medium associations. Using standard regression models and the above parameters, a sample size between 92 and 263 participants would be necessary. As such, the available sample of 427 participants was adequate for the data analytic plan to have sufficient power to detect hypothesized effects.

Statistical Analyses

First, data were examined to identify questionable responding, such that participants who provided a large number of repetitive answers or completed the survey in an unreasonably short time (i.e., under 20 minutes) were excluded ($n = 10$). The final sample consisted of 417 participants (i.e., 201 males, 216 females). Variables were also examined for skew and kurtosis prior to conducting the analyses. Due to non-normality of the distribution, negative binomial regression analyses were used in subsequent analyses.

Next, a series of bivariate correlations were conducted in SPSS version 23 to explore the relationship between the predictor (i.e., emotion dysregulation as measured the DERS total score), covariate variables (i.e., alcohol use and problems, disordered
eating, and BMI) and the outcome variable (i.e., ARCB as measured by the CEBRACS total score). A series of *t*-tests were then conducted to examine potential sex differences in ARCB, emotion dysregulation, alcohol use and related problems, disordered eating, and BMI.

Following the above analyses, a series of negative binomial regression analyses were conducted to examine whether emotion dysregulation was a correlate of ARCB in the presence of the other covariate variables (i.e., alcohol use and related problems, disordered eating, and BMI). Consistent with prior literature concerning disordered eating, BMI was entered as a covariate variable in the regression analyses, as BMI is associated with both disordered eating and alcohol use (Berner, Shaw, Witt, & Lowe, 2013; Fan, Li, Liu, Hu, Ma, & Xu, 2010; Kleiner et al., 2004). In addition, predictor variables were mean centered in the model to reduce multicollinearity among variables, consistent with prior research (Aiken & West, 1991). To examine the association between emotion dysregulation (i.e., DERS total and subscale scores) and ARCB (i.e., CEBRACS total and factor scores) in the presence of the other variables, alcohol use and related problems (i.e., AUDIT total score), disordered eating (i.e., EDE-Q score), and BMI were entered in the first step of the regression models, and emotion dysregulation was entered in the second step of the models.

The potential moderating effect of sex on the association between emotion dysregulation (i.e., DERS total score) and ARCB (i.e., CEBRACS total and factor scores) was also examined. In order to determine whether the association between emotion dysregulation and ARCB varies as a function of sex, while controlling for the covariate
variables, a 2-way interaction term between emotion dysregulation and sex was entered in the third step of the regression model. For the purpose of the current study, sex was considered a binary, categorical variable (i.e., male or female).

Finally, additional negative binomial regression analyses were conducted to examine the potential moderating effect of sex on the association between impulse control difficulties, a facet of emotion dysregulation (i.e., DERS impulse subscale) and ARCB (i.e., CEBRACS total score), in the presence of the covariate variables (i.e., alcohol use and related problems, disordered eating, and BMI). As such, alcohol use and related problems (i.e., AUDIT total score), disordered eating (i.e., EDE-Q global score), and BMI were entered in the first step of the regression model, and impulse control difficulties was entered in the second step of the model. In order to determine whether the association between impulse control difficulties and ARCB varies as a function of sex, while controlling for the covariate variables, a 2-way interaction term between impulse control difficulties and sex was entered in the third step of the regression model. Predictor variables were again mean centered in the model to reduce multicollinearity. After conducting the above analyses, the Benjamini-Hochberg procedure was used to adjust for multiple comparisons for aims one, three, and four (Benjamini & Hochberg, 1995). This method corrects for multiple comparisons by controlling the false discovery rate, or the rate of false positives.
Results

Descriptive Statistics

Approximately 58% of participants reported engaging in alcohol-related compensatory behaviors (i.e., as assessed by the CEBRACS) at least once within the last three months (Table 1). Specifically, the prevalence of the CEBRACS subscales was as follows: ARCB-alcohol effects, 45%; ARCB-bulimia, 16%; ARCB-diet and exercise, 47%; ARCB-restriction, 25%. Prior to running analyses, study variables were analyzed for skew and kurtosis (Table 2 and Table 3). Due to the non-normal distribution of the outcome variable, negative binomial regression analyses were used to investigate study aims, as described above.

Bivariate correlations were conducted between all variables of interest (Table 2 and Table 3). Prior to running correlations, ARCB was log transformed (i.e., CEBRACS Total and subscale scores), as the distribution of all ARCB variables was positively skewed. Overall emotion dysregulation (i.e., as assessed by the DERS Total score) was positively related to overall ARCB (i.e., as assessed by the CEBRACS Total score), as well as alcohol use and problems and disordered eating. There was also a positive association between overall ARCB and alcohol use and related problems, as well as disordered eating. However, BMI was not significantly related to overall ARCB. Further, analyses showed that different types of ARCB (i.e., CEBRACS subscales) were positively related to alcohol use and problems and disordered eating, but were not significantly associated with BMI. While BMI was positively correlated with disordered
eating, there was no significant association between BMI and alcohol use and problems.

Finally, alcohol use and problems and eating pathology were not significantly related.

Table 1.

*Prevalence of ARCB endorsed on the CEBRACS.*

<table>
<thead>
<tr>
<th>ARCB</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any ARCB</td>
<td>57.79%</td>
</tr>
<tr>
<td>CEBRACS Alcohol Effects</td>
<td>44.84%</td>
</tr>
<tr>
<td>CEBRACS Bulimia</td>
<td>15.83%</td>
</tr>
<tr>
<td>CEBRACS Diet and Exercise</td>
<td>47.00%</td>
</tr>
<tr>
<td>CEBRACS Restriction</td>
<td>24.46%</td>
</tr>
</tbody>
</table>

*Note:* CEBRACS = Compensatory Eating and Behaviors in Response to Alcohol Consumption Scale; ARCB = Alcohol-related compensatory behaviors. Percentage represents the portion of the entire sample, \( N = 417 \), that endorsed each ARC
### Table 2.

Bivariate correlations among CEBRACS and DERS total and subscale scores.

<table>
<thead>
<tr>
<th></th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
<th>10.</th>
<th>11.</th>
<th>12.</th>
</tr>
</thead>
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<tr>
<td>1. CEBRACS Total</td>
<td></td>
<td>.89***</td>
<td>.68***</td>
<td>.85***</td>
<td>.82***</td>
<td>.29***</td>
<td>.25***</td>
<td>.15**</td>
<td>.26***</td>
<td>.07</td>
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<td>.28***</td>
<td>.22***</td>
<td>.10*</td>
<td>.32***</td>
<td>.08</td>
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<td>.20***</td>
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<td>.19***</td>
<td>.10</td>
<td>.18***</td>
<td>.05</td>
<td>.210***</td>
<td>.18***</td>
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<td>.26***</td>
<td>.15**</td>
<td>.32***</td>
<td>.10*</td>
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<td>.25***</td>
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<td>.82***</td>
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<td>.42***</td>
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<td>11. DERS Strategies</td>
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<td>.500**</td>
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</tr>
</tbody>
</table>

| M       | 1.53    | 1.46    | 1.42    | 81.44   | 1.16    | 85.00   | 13.32   | 13.63   | 12.25   | 16.01   | 17.92   | 11.87   |
| SD     | (.01)   | (.04)   | (.03)   | (.04)   | (.10)   | (22.28) | (5.57)  | (4.42)  | (4.87)  | (4.82)  | (7.06)  | (3.81)  |
| Skew   | .97     | .97     | 2.56    | .86     | 1.59    | .32     | .61     | .25     | .82     | .09     | .62     | .38     |
| Kurtosis | -.31    | -.55    | 5.3     | -.79    | 1.03    | -.31    | -.36    | -.45    | .52     | -.29    | -.14    | -.10    |
| N      | 417     | 416     | 417     | 417     | 417     | 417     | 417     | 417     | 417     | 417     | 417     | 417     |

Note: CEBRACS = Compensatory Eating and Behaviors in Response to Alcohol Consumption Scale; DERS = Difficulties in Emotion Regulation Scale. *p < .05, **p < .01, ***p < .001
Table 3.

Bivariate correlations among CEBRACS, AUDIT, EDE-Q, and BMI.

<table>
<thead>
<tr>
<th></th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
</tr>
</thead>
<tbody>
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<td>.89***</td>
<td>.68***</td>
<td>.85***</td>
<td>.82***</td>
<td>.49***</td>
<td>.36***</td>
<td>.05</td>
</tr>
<tr>
<td>2. CEBRACS Alcohol Effects</td>
<td>__</td>
<td>.56***</td>
<td>.56***</td>
<td>.66***</td>
<td>.47***</td>
<td>.27***</td>
<td>.04</td>
<td></td>
</tr>
<tr>
<td>3. CEBRACS Bulimia Diet and Exercise Restriction</td>
<td>__</td>
<td>.54***</td>
<td>.70***</td>
<td>.27***</td>
<td>.26***</td>
<td>.09</td>
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<td>4. CEBRACS Bulimia Diet and Exercise Restriction</td>
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<td>.38***</td>
<td>.34***</td>
<td>.05</td>
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<td>5. CEBRACS Restriction</td>
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<td>.36***</td>
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<td>6. AUDIT</td>
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<td>7. EDE-Q</td>
<td>__</td>
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<tr>
<td>8. BMI</td>
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</table>

\[ M \] 1.53 1.46 1.42 81.44 1.16 8.13 1.66 24.35  
\[ (SD) \] (.01) (.04) (.03) (.04) (.10) (5.71) (1.31) (4.95)  
\[ Skew \] .97 .97 2.56 .86 1.59 1.25 .69 2.15  
\[ Kurtosis \] -.31 -.55 5.3 -.79 1.03 2.22 -.38 7.48  
\[ N \] 417 416 417 417 417 417 417 417

Note: CEBRACS = Compensatory Eating and Behaviors in Response to Alcohol Consumption Scale; AUDIT = Alcohol Use Disorders Identification Test; EDE-Q = Eating Disorder Examination Questionnaire; BMI = Body Mass Index. *p < .05, **p < .01
Aim 1

The first aim was to examine the association between emotion dysregulation and ARCB. First, overall ARCB and each specific ARCB (i.e., CEBRACS Total and subscale scores) were entered as the outcome variables in separate models, with overall emotion dysregulation, BMI, alcohol use and related problems, and disordered eating entered as covariates. After accounting for the covariates, the negative binomial regression analyses revealed no significant relationships between overall emotion dysregulation and overall ARCB. (Table 4). However, there were significant main effects of both alcohol use and problems, $\beta = .03, p < .01, 95\% \text{ CI } [.01, .04]$, and disordered eating, $\beta = .09, p < .05, 95\% \text{ CI } [.01, .18]$, on overall ARCB. In other words, for every one point increase on the measure of alcohol use and problems, the difference in the logs of the expected “counts” of overall ARCB is expected to increase by .03, while holding all other variables constant. Similarly, for every one point increase on the measure of disordered eating, the difference in the logs of the expected “counts” of overall ARCB is expected to increase by .09, while holding all other variables constant. Further, there was a significant main effect of alcohol use and problems on ARCB-alcohol effects, $\beta = .03, p < .001, 95\% \text{ CI } [.02, .05]$, a significant main effect of disordered eating on ARCB-restriction, $\beta = .11, p < .05, 95\% \text{ CI } [.01, .21]$, and significant main effects of both alcohol use and problems, $\beta = .03, p < .01, 95\% \text{ CI } [.01, .05]$, and disordered eating, $\beta = .13, p < .01, 95\% \text{ CI } [.04, .22]$, on ARCB-diet and exercise. There were no significant main effects for ARCB-bulimia.
Table 4.
Negative binomial regression model for aim 1 using the DERS total score.

<table>
<thead>
<tr>
<th>Model</th>
<th>Parameter</th>
<th>B</th>
<th>95% Wald confidence Interval</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
<td>Upper</td>
</tr>
<tr>
<td>Outcome: CEBRACS Total</td>
<td>(Intercept)</td>
<td>3.32</td>
<td>3.22</td>
<td>3.42</td>
</tr>
<tr>
<td></td>
<td>DERS Total</td>
<td>.00</td>
<td>.00</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td>AUDIT Total</td>
<td>.03</td>
<td>.01</td>
<td>.04</td>
</tr>
<tr>
<td></td>
<td>EDE-Q</td>
<td>.09</td>
<td>.01</td>
<td>.18</td>
</tr>
<tr>
<td></td>
<td>BMI</td>
<td>.00</td>
<td>-.03</td>
<td>.02</td>
</tr>
<tr>
<td>Outcome: CEBRACS Alcohol Effects</td>
<td>(Intercept)</td>
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<td>.00</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td>AUDIT Total</td>
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<td>.02</td>
<td>.05</td>
</tr>
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<td></td>
<td>EDE-Q</td>
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<td>-.01</td>
<td>.170</td>
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<tr>
<td></td>
<td>BMI</td>
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<td>-.03</td>
<td>.02</td>
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<td>Outcome: CEBRACS Bulimia</td>
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<td>1.83</td>
<td>2.03</td>
</tr>
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<td>DERS Total</td>
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<td>.00</td>
<td>.01</td>
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<tr>
<td></td>
<td>AUDIT Total</td>
<td>.01</td>
<td>-.01</td>
<td>.03</td>
</tr>
<tr>
<td></td>
<td>EDE-Q</td>
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<td>-.04</td>
<td>.14</td>
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<tr>
<td></td>
<td>BMI</td>
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<td>.02</td>
</tr>
<tr>
<td>Outcome: CEBRACS Diet and Exercise</td>
<td>(Intercept)</td>
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<td>2.03</td>
<td>2.23</td>
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<td>.01</td>
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<tr>
<td></td>
<td>AUDIT Total</td>
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<td>.01</td>
<td>.05</td>
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<td></td>
<td>EDE-Q</td>
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<td></td>
<td>(Intercept)</td>
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<td>.814</td>
<td>1.04</td>
</tr>
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</table>
Note: Bolded items indicate the test is significant after applying the Benjamini-Hochberg procedure to correct for multiple comparisons. CEBRACS = Compensatory Eating and Behaviors in Response to Alcohol Consumption Scale; DERS = Difficulties in Emotion Regulation Scale; AUDIT = Alcohol Use Disorders Identification Test; EDE-Q = Eating Disorder Examination Questionnaire; BMI = Body Mass Index. *p < .05, **p < .01, ***p < .001

<table>
<thead>
<tr>
<th>Outcome: CEBRACS Restriction</th>
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<td>-.03</td>
<td>.02</td>
<td>.52</td>
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</tbody>
</table>
Second, overall ARCB and specific ARCB were entered as the outcome variables in separate models, with each facet of emotion dysregulation, BMI, alcohol use and problems, and disordered eating entered as covariates. Due to severe multicollinearity among the facets of emotion dysregulation (i.e., DERS subscales), the access to emotion regulation strategies facet was removed, as this subscale was correlated the strongest with the other emotion dysregulation subscales. In the presence of the covariates, the negative binomial regression analyses revealed no significant relationships between the individual facets of emotion dysregulation and ARCB (Table 5). Again, there were significant main effects of both alcohol use and problems, $\beta = .03, p < .05$, 95% CI [.01, .04], and disordered eating, $\beta = .09, p < .05$, 95% CI [.01, .18], on overall ARCB. There was also a significant main effect of alcohol use and problems on ARCB-alcohol effects, $\beta = .03, p < .01$, 95% CI [.02, .05], a significant main effect of disordered eating on ARCB-restriction, $\beta = .11, p < .05$, 95% CI [.02, .21], and significant main effects of both alcohol use and problems, $\beta = .03, p < .01$, 95% CI [.01, .05], and disordered eating, $\beta = .13, p < .01$, 95% CI [.04, .22], on ARCB-diet and exercise. There were no significant main effects for ARCB-bulimia.
Table 5.

Negative binomial regression model for aim 1 using DERS subscale scores.

<table>
<thead>
<tr>
<th>Model</th>
<th>Parameter</th>
<th>( B )</th>
<th>95% Wald Confidence Interval</th>
<th>( p )-value</th>
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<th>Upper</th>
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<td>3.22</td>
<td>3.42</td>
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<td>DERS Nonaccept</td>
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<td>.03</td>
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<td>DERS Goals</td>
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<td>.67</td>
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*Note: Bolded items indicate the test is significant after applying the Benjamini-Hochberg procedure to correct for multiple comparisons. CEBRACS = Compensatory Eating and Behaviors in Response to Alcohol Consumption Scale; DERS Difficulties in Emotion Regulation Scale; AUDIT = Alcohol Use Disorders Identification Test; EDE-Q = Eating Disorder Examination Questionnaire; BMI = Body Mass Index. *p < .05, **p < .01, ***p < .001
Aim 2

The second aim was to examine potential sex differences in alcohol-related compensatory behaviors. Consistent with the second hypothesis, $t$-tests revealed no significant sex differences on any ARCB (Table 6). However, analyses showed that females demonstrated significantly higher scores within the emotion dysregulation facets of non-acceptance, $t(415) = -2.713, p < 0.01$, and lack of emotional clarity, $t(415) = -2.264, p < 0.05$, than males, while males exhibited greater lack of emotional awareness, $t(415) = 2.260, p < 0.05$. Further, males exhibited greater alcohol use and related problems than females, $t(415) = 3.201, p < 0.01$, while females demonstrated greater levels of disordered eating symptoms, $t(415) = -7.118, p < 0.001$. There were no significant sex differences regarding BMI.
Table 6.

Differences in study variables across males and females.

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Note: CEBRACS = Compensatory Eating and Behaviors in Response to Alcohol Consumption Scale; DERS = Difficulties in Emotion Regulation Scale; AUDIT = Alcohol Use Disorders Identification Test; EDE-Q = Eating Disorder Examination Questionnaire; BMI = Body Mass Index.

*p < .05, **p < .01, ***p < .001
Aim 3

The third aim was to examine whether the association between overall emotion dysregulation and ARCB varied across males and females. Overall ARCB and specific ARCB were entered as the outcome variables in separate negative binomial regression models, with overall emotion dysregulation, sex, BMI, alcohol use and problems, disordered eating, and the interaction term between overall emotion dysregulation and sex entered into the models. The interaction between overall emotion dysregulation and sex was not a significant correlate of overall ARCB or specific ARCB (Table 7). Further, sex was not a significant correlate of ARCB.
### Table 7.

**Negative binomial regression model for aim 3.**

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<td></td>
</tr>
</tbody>
</table>

Note: The main effects for model 2 are not presented for brevity and clarity. Bolded items indicate the test is significant after applying the Benjamini-Hochberg procedure to correct for multiple comparisons. CEBRACS = Compensatory Eating and Behaviors in Response to Alcohol Consumption Scale; DERS = Difficulties in Emotion Regulation Scale; AUDIT = Alcohol Use Disorders Identification Test; EDE-Q = Eating Disorder Examination Questionnaire; BMI = Body Mass Index. *p < .05, **p < .01, ***p < .001
Aim 4

The fourth aim was to examine whether the association between impulse control difficulties, an individual facet of emotion dysregulation, and ARCB varied across males and females. Overall ARCB and specific ARCB were entered as the outcome variables in separate negative binomial regression models, with impulse control difficulties, sex, BMI, alcohol use and problems, disordered eating, and the interaction term between impulse control difficulties and sex entered into the models. The interaction between impulse control difficulties and sex was not a significant correlate of overall ARCB or specific ARCB (Table 8). There was a significant main effect for alcohol use and problems, $\beta = .03, p < .01, 95\% \text{ CI} [0.01, .04]$, and disordered eating, $\beta = .10, p < .05, 95\% \text{ CI} [0.01, .19]$, on overall ARCB. There was also a significant main effect for alcohol use and problems on ARCB-alcohol effects, $\beta = .03, p < .01, 95\% \text{ CI} [0.02, .05]$, a significant main effect for disordered eating on ARCB-restriction, $\beta = .12, p < .05, 95\% \text{ CI} [0.02, .22]$, as well as significant main effect for alcohol use and problems, $\beta = .03, p < .01, 95\% \text{ CI} [0.01, .05]$, and disordered eating, $\beta = .13, p < .01, 95\% \text{ CI} [0.04, .22]$, on ARCB-diet and exercise. There were no significant main effects for ARCB-bulimia.
Table 8.

**Negative binomial regression model for aim 4.**

<table>
<thead>
<tr>
<th>Model</th>
<th>Parameter</th>
<th>B</th>
<th>95% Wald confidence Interval</th>
<th>p-value</th>
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<tr>
<td></td>
<td></td>
<td>Lower</td>
<td>Upper</td>
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<td><strong>Outcome: CEBRACS Total</strong></td>
<td>Step One (Intercept)</td>
<td>3.31</td>
<td>3.17</td>
<td>3.45</td>
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<tr>
<td></td>
<td>Sex</td>
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<td>.24</td>
</tr>
<tr>
<td></td>
<td>DERS Impulse</td>
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<td>.03</td>
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<tr>
<td></td>
<td>AUDIT Total</td>
<td>.03</td>
<td>.01</td>
<td>.04</td>
</tr>
<tr>
<td></td>
<td>EDE-Q</td>
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<td>.01</td>
<td>.19</td>
</tr>
<tr>
<td></td>
<td>BMI</td>
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<td>-.03</td>
<td>.02</td>
</tr>
<tr>
<td></td>
<td>Step Two Sex X DERS Impulse</td>
<td>.00</td>
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<td>.20</td>
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<tr>
<td><strong>Outcome: CEBRACS Alcohol Effects</strong></td>
<td>Step One (Intercept)</td>
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<td>2.15</td>
<td>2.45</td>
</tr>
<tr>
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<td>Sex</td>
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<td>-.25</td>
<td>.20</td>
</tr>
<tr>
<td></td>
<td>DERS Impulse</td>
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<td>-.01</td>
<td>.03</td>
</tr>
<tr>
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<td><strong>.02</strong></td>
<td><strong>.05</strong></td>
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<td>EDE-Q</td>
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<td>-.01</td>
<td>.18</td>
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<td></td>
<td>BMI</td>
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<td>Step Two Sex X DERS Impulse</td>
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<td>-.17</td>
<td>.24</td>
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<tr>
<td><strong>Outcome: CEBRACS Bulimia</strong></td>
<td>Step One (Intercept)</td>
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<td>1.74</td>
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<td>AUDIT Total</td>
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<td>.03</td>
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<td></td>
<td>EDE-Q</td>
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<td>.02</td>
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<tr>
<td></td>
<td>Step Two Sex X DERS Impulse</td>
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<td>.20</td>
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<tr>
<td><strong>Outcome: CEBRACS Diet and Exercise</strong></td>
<td>Step One (Intercept)</td>
<td>2.11</td>
<td>1.96</td>
<td>2.26</td>
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</tbody>
</table>
Table #8: continued

<table>
<thead>
<tr>
<th></th>
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<th>DERS Impulse</th>
<th>AUDIT Total</th>
<th>EDE-Q</th>
<th>BMI</th>
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<tr>
<td>Sex</td>
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<tr>
<td>DERS Impulse</td>
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<td>.83</td>
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<tr>
<td>AUDIT Total</td>
<td>.03</td>
<td>.01</td>
<td>.05</td>
<td>.01</td>
<td></td>
</tr>
<tr>
<td>EDE-Q</td>
<td>.13</td>
<td>.04</td>
<td>.22</td>
<td>.01</td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>-.01</td>
<td>-.03</td>
<td>.02</td>
<td>.56</td>
<td></td>
</tr>
</tbody>
</table>

| Sex X DERS Impulse       | -.02| -.23         | .19         | .85   |     |

**Note:** The main effects for model 2 are not presented for brevity and clarity. Bolded items indicate the test is significant after applying the Benjamini-Hochberg procedure to correct for multiple comparisons.

CEBRACS = Compensatory Eating and Behaviors in Response to Alcohol Consumption Scale; DERS = Difficulties in Emotion Regulation Scale; AUDIT = Alcohol Use Disorders Identification Test; EDE-Q = Eating Disorder Examination Questionnaire; BMI = Body Mass Index. *p < .05, **p < .01, ***p < .001
**Correction for Multiple Comparisons**

Due to the large number of comparisons, the Benjamini-Hochberg procedure was used to correct for multiple testing, as noted above. After applying the method, only the main effect of alcohol use and problems on ARCB-alcohol effects remained significant for aims one, three, and four.
Discussion

The current study examined the association between emotion dysregulation and ARCB, as well as sex differences within this relationship. Based on existing research regarding alcohol use, disordered eating, and ARCB, it was hypothesized that emotion dysregulation would be positively associated with more frequent ARCB, after controlling for BMI, alcohol use and related problems, and disordered eating. It was also posited that there would be no sex differences in the frequency of ARCB. Finally, due to conflicting findings and limited research, two exploratory analyses were conducted that examined 1) whether the association between overall emotion dysregulation and ARCB varied across males and females and 2) whether the association between impulse control difficulties and ARCB varied across males and females.

Aim 1

Findings did not support hypothesis one, which posited that emotion dysregulation would be a correlate of ARCB, after accounting for alcohol use and problems, disordered eating, and BMI. While bivariate correlations demonstrated a positive association between emotion dysregulation and ARCB, the regression analysis showed that emotion dysregulation was not a significant correlate of ARCB, over and beyond the covariates. Further, there were significant main effects of alcohol use and problems and/or disordered eating on ARCB (i.e., CEBRACS Total and all subscales except bulimia), suggesting that these behaviors may be more related to ARCB than emotion dysregulation. The results are consistent with prior exploratory research that has established that both disordered eating and alcohol use are related to ARCB (Allen, 2014; Rahal et al., 2012; Ward, Oswald, & Galante, 2016). Given that emotion dysregulation,
ARCB, alcohol use and problems, and disordered eating are all positively related to one another (Cooper & Wade, 2015; Henges & Markzinksi, 2012; Racine & Horvath, 2018; Weybright et al., 2016), individual variable variances may be difficult to parse apart. Based on the results of the current preliminary investigation, the nature and direction of the associations between these variables should be further examined. For example, future research should examine potential mediating processes, as alcohol use and disordered eating may mediate the relationship between emotion dysregulation and ARCB. Longitudinal research would be needed to examine potential mediation. However, of note, only alcohol use and problems remained a significant correlate of ARCB-alcohol effects, after correcting for multiple analyses.

Further, etiological and maintenance theories implicate emotion dysregulation in the development and maintenance of the individual behaviors of disordered eating and alcohol use (Hawkins & Clement, 1984; Khantzian, 1987; Stice et al., 1996; Wills & Shiffman, 1985). The limited research available has shown that individuals who engage in ARCB report greater anxiety and depressive symptoms than individuals who do not engage in ARCB (Roosen & Mills, 2015), as well as a tendency to exhibit restricted emotionality (Miracle et al., 2016), but has yet to directly examine emotion dysregulation. Although the relationship between emotion dysregulation and ARCB was not significant in the presence of the covariates, the present study extends the literature by being the first study to examine the association between emotion dysregulation and ARCB.
Aim 2

Results supported hypothesis two, as there were no sex differences in ARCB, as demonstrated by a lack of significant differences observed on the CEBRACS Total or subscale scores. In other words, males and females reported no differences in the frequency of various ARCB. These findings are consistent with other studies that found a lack of sex differences between males and females on the CEBRACS (Galante, 2015; Pinna et al., 2015; Rahal et al., 2012). However, as noted previously, research that utilizes other measures of ARCB have noted sex differences (Bryant et al., 2012; Peralta, 2002). As such, it is plausible that sex differences observed in the literature are a result of varying assessment methodologies. Conflicting studies have utilized methods ranging from unstructured interviews (Peralta, 2002) to self-report measures with yes/no responses (Giles et al., 2009). Further, some prior studies only assessed for frequency regarding specific ARCB (e.g., restricting; Eisenberg & Fitz, 2014; Giles et al., 2009), while others examined sex differences regarding multiple ARCB (Bryant et al., 2012; Rahal et al., 2012). These discrepant methodologies make it difficult to make firm conclusions regarding potential sex differences in ARCB.

Finally, it may be that the consequences for ARCB manifest differently for males and females. Giles and colleagues (2009) found that females who restricted calories on drinking days were more likely to experience negative consequences as a result of ARCB, including memory loss, sexual assault, unprotected sex, and physical injury, while males who restricted calories on drinking days were only more likely to experience a physical fight. Given that females experience more disordered eating symptoms than males (Forbush et al., 2014) and are demonstrating increasing rates of binge drinking
(Johnston et al., 2016), engagement in ARCB is particularly concerning for females. Thus, the implications of ARCB may differ across sexes, even if males and females exhibit similar frequencies of ARCB. However, in sum, the current study supports prior research that indicates a lack of sex differences in ARCB as measured by the CEBRACS and future research should continue to explore potential differences across sex in outcomes of engaging in ARCB.

**Aim 3**

Aim three was exploratory in nature and intended to examine whether the association between emotion dysregulation and ARCB varied across males and females, in the presence of the covariate variables. Although the literature exhibits consistent sex differences concerning disordered eating and alcohol use (Forbush et al., 2014; Ham & Hope, 2003; Lundahl et al., 2015; Norberg et al., 2010), analyses demonstrated that the interaction between overall emotion dysregulation and sex was not a significant correlate of ARCB. Although the current study is the first to investigate sex as a potential moderator of the relationship between emotion dysregulation and ARCB, other studies have demonstrated that the association between emotion dysregulation and various mental health issues, including attachment insecurities (Velotti et al., 2016), relational aggression (Bowie, 2010), and depressive symptoms (Thayer, Rossy, Ruiz-Padial, & Johnsen, 2000), does vary across sexes. As such, future studies should consider examining the role of sex within the association between ARCB and other potential psychological correlates, as discussed below.
Aim 4

Similar to aim three, the fourth aim sought to examine whether the association between impulse control difficulties and ARCB varied across males and females, after controlling for the covariates. Again, analyses demonstrated that the interaction between impulse control difficulties and sex was not significant. Moreover, impulse control difficulties did not exert a main effect on ARCB. While this aim was exploratory in nature, the extant literature suggests that impulse control difficulties may be especially relevant when examining ARCB. Research consistently demonstrates that impulse control difficulties are related to both disordered eating and alcohol use (Anestis et al., 2007; Fischer & Smith, 2008). Indeed, the current study exhibited a positive relationship between impulse control difficulties and ARCB at the bivariate level. As such, it may be that alcohol use and/or eating pathology mediates the relationship between impulse control difficulties and ARCB. Therefore, subsequent research is necessary to determine the nature of the relationship between these variables.

Further, for both aim three and four, there were significant main effects of alcohol use and disordered eating, but not emotion dysregulation (including the impulse control subscale), on ARCB. Consistent with the findings for aim one, alcohol use and disordered eating may be more related to ARCB than sex and emotion dysregulation (i.e., overall or impulse control difficulties). These findings are consistent with prior research that has noted the strong relationship between the constructs of disordered eating and alcohol use with ARCB (Hunt & Forbush, 2016; Ward, Oswald, & Galante, 2016). While, the results from the current study revealed that alcohol use and disordered eating function as significant correlates of ARCB, additional research is needed to understand the nature of
the association between these individual behaviors and ARCB. Specifically, the temporal relationships between disordered eating, alcohol use, and ARCB are largely unknown, which would be pertinent for intervention purposes. Further, it should again be noted that only alcohol use and problems remained a significant correlate of ARCB-alcohol effects, after correcting for multiple analyses.

**Implications and Future Research**

The current study is the first to examine the relationship between emotion dysregulation and ARCB. While emotion dysregulation was positively associated with ARCB at the bivariate level, it was not associated with ARCB over and beyond the covariates of alcohol use, disordered eating, and BMI. However, emotion dysregulation is a multidimensional construct. As such, future research should consider examining other facets of emotion dysregulation and regulation, including others not assessed by the DERS. For example, rumination, or re-cyclic self-focused attention and questioning regarding the causes and consequences of one’s negative affect (Nolen-Hoeksema, 2004), is a maladaptive emotional copying strategy that has been implicated in disordered eating and alcohol use (Caselli et al., 2010; Nolen-Hoeksema, Stice, Wade, & Bohon, 2007). It may also be that a specific component of impulsivity may be more strongly associated with ARCB. Negative urgency, or the tendency to behave rashly when experiencing negative emotions, is a facet of impulsivity that is uniquely related to disordered eating (Pisetsky et al., 2017; Racine & Wildes, 2013) and alcohol use (Anestis, 2007; Aragues, Jurado, Quinto, & Rubio, 2011). For example, research has shown that negative urgency prospectively predicts drinking to cope with negative emotions (Anestis, 2007; Fischer & Smith, 2008), as well as binge eating and purging behaviors (Anestis, 2007; Anthenian et
al., 2016; Fischer & Smith, 2008). Likewise, positive urgency, or the tendency to behave rashly when experiencing positive emotions, is positively associated with quantity and frequency of alcohol consumption and negative alcohol-related consequences (Cyders et al., 2007). Therefore, positive urgency may also function as a correlate of some ARCB that are intended to enhance the intoxication effects of alcohol (i.e., CEBRACS alcohol effects subscale). Thus, as the current study is exploratory in nature, additional research is necessary to understand the psychological underpinnings of ARCB.

As noted above, future research should not neglect the temporal component that is unique to ARCB. Similar to compensatory behaviors performed in response to food, ARCB represent a unique reaction to the caloric value of alcohol and/or are exhibited to enhance the intoxication effects of alcohol. Thus, there is a temporal relationship that exists between compensatory behaviors and alcohol consumption. The CEBRACS acknowledges this time-sensitive relationship, as it includes three subscales for examining the time period the compensatory behavior occurred in relation to the alcohol use: before, during, and after (Rahal et al., 2012). As such, it may be more relevant for intervention purposes to identify the psychological mechanisms that occur before and/or after alcohol use and that facilitate the engagement in compensatory behaviors.

Therefore, although it is known that disordered eating and alcohol use are related to ARCB, additional research is needed that examines temporal factors that predict the unique combination of these individual behaviors. Ecological momentary assessment (EMA), or a method that involves gathering data from participants in their daily lives at repeated assessments, is frequently utilized in eating disorder (Engel et al., 2013; Haedt-Matt & Keel, 2011) and alcohol use research (Wray, Merrill, & Monti, 2014). EMA is
particularly useful for evaluating fluctuating changes in affect that precipitate and follow symptoms of disordered eating and alcohol use. Therefore, EMA may also be useful to investigate psychological mechanisms that function as temporal risk factors for ARCB.

Finally, the extant literature, including the current study, has utilized samples comprised of undergraduate males and females. This population is optimal for investigating ARCB, as undergraduate males and females exhibit high rates of both disordered eating (Berg et al., 2009; Cain et al., 2012) and alcohol use (Berg et al., 2009; Johnston et al., 2016). Indeed, the available literature suggests ARCB are prevalent in college populations (Burke et al., 2010; Peralta, 2002; Rahal et al., 2012). However, there are no existing studies examining ARCB in non-college populations, despite a high prevalence of eating pathology (Latzer, Vander, & Gilat, 2008) and alcohol use among non-college young adults (Johnston et al., 2016). Thus, it would be useful for future research to investigate the presentation and prevalence of ARCB in non-college populations.

**Limitations**

The current study includes a number of limitations that should be addressed. A primary limitation of the current study concerns the methodology used to examine the relationship between emotion dysregulation and ARCB. The study utilized data obtained from self-report measures with a cross-sectional design, which limits the inferences that can be drawn from analyses. Causal and temporal relationships were unable to be examined. As indicated above, determining temporal relationships are important for understanding the specific function of emotion dysregulation and the direction of the relationship between ARCB and emotion dysregulation. Further, the measure used to
assess ARCB, the CEBRACS, is limited. In particular, the Likert scale used to assess the frequency of engagement in ARCB ranges from “never” to “almost all of the time” (i.e., Likert scale ranging from 1 to 5). Thus, using only one method to assess ARCB restricts knowledge regarding more precise frequency and the severity of ARCB. As noted above, prior research has utilized other methodology, including semi-structured interviews, to examine ARCB and found significant sex differences (Peralta, 2002). Thus, it may be more effective to use multiple assessment methods to capture a holistic conceptualization of ARCB, including information regarding their onset, frequency, severity, impairment, and timing. Obtaining additional details may aid in the understanding of and future intervention efforts for ARCB.

Finally, a lack of diversity within the sample hinders the generalizability of the study’s results. The majority of the sample identified as white, heterosexual, and as first year students. The outcome variable of interest, as well as the covariate variables, may differ across various demographic characteristics. For example, studies have found that undergraduates who identify as White exhibit higher rates of alcohol-related problems and a greater average of drinks consumed per occasion as compared to undergraduates who identify as Black or Asian (Clarke et al., 2016). Prior research has also demonstrated that sexual minority populations endorse higher rates of disordered eating behaviors relative to heterosexual peers (Calzo, Argenal, Blashill, & Brown, 2017). Therefore, as prior research on ARCB has primarily utilized undergraduate samples, examination of ARCB in more diverse populations is necessary.
Conclusion

The current study was the first to investigate the relationship between emotion dysregulation and ARCB. The first hypothesis, which posited that emotion dysregulation would be associated with ARCB, while controlling for alcohol use, disordered eating, and BMI, was not supported. However, consistent with the second hypothesis and the existing literature, there were no sex differences observed concerning ARCB. Finally, aims three and four were exploratory in nature and sought to examine whether the relationship between emotion dysregulation and ARCB would vary for males and females. Results demonstrated that the association between emotion dysregulation and ARCB did not vary across males and females. As such, while support for hypotheses was minimal, the study provides some knowledge regarding potential psychological correlates of ARCB. Future research should address the limitations of the current study and examine other potential psychological correlates, as well as their temporal relationships to ARCB.
References


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London Community Health (SELCoH) study. *Social psychiatry and psychiatric epidemiology, 49*(8), 1335-1346.


Appendix A – Informed Consent

Ohio University Consent Form

Title of Research: An Examination of Behavioral Health in College Students

Researcher: Sarah E. Racine, Ph.D.

You are being asked to participate in research. For you to be able to decide whether you want to participate in this project, you should understand what the project is about, as well as the possible risks and benefits in order to make an informed decision. This process is known as informed consent. This form describes the purpose, procedures, possible benefits, and risks. It also explains how your personal information will be used and protected. Once you have read this form and your questions about the study are answered, you will be asked to provide consent by clicking “Continue”. This will allow your participation in this study. You are encouraged to print a copy of this document for your records for future reference.

Explanation of Study

The purpose of this study is to better understand various aspects of behavioral health among college students, how behavioral health aspects are related to one another, and how these relations may differ between males and females. We are interested in aspects of behavioral health such as eating habits, exercise patterns, emotional functioning, as well as past and present medical conditions. If you agree to participate, you will be asked
to answer questions that pertain to these aspects of behavioral health via an online survey. The survey will take approximately 60 minutes to complete. You must complete the entire survey in one sitting.

At the end of the survey, you will be asked whether you are interested in being contacted about future research. Based on your responses to today’s survey, you may be eligible for future research studies for which you can earn course credit or monetary compensation. It is completely up to you whether you choose to provide contact information so that you can be contacted for future studies. This decision will not influence the assignment of course credit for today’s study.

You should not participate in this study if you are not comfortable reading and responding to questions in English.

**Risks and Discomforts**

Some individuals may experience mild, transient discomfort while reading and answering questions about aspects of behavioral health, such as eating habits and emotional functioning. You may terminate your participation in the study at any time with no negative consequence. If you choose to withdraw from the study, simply click the “Withdraw” button in the top right portion of any page. In addition, you can refuse to give consent by choosing “Discontinue” at the end of the consent form. If you have any questions or concerns regarding the study, you may contact Sarah E. Racine, Ph.D. (see Contact Information below).
**Benefits**

This study is important because it will provide needed information about the behavioral health of college students attending Ohio University. This information can be used to develop programs to help prevent or treat behavioral health concerns in the Ohio University student body.

Individually, you may benefit by learning about how research in psychology is conducted. After completing the study, you will be provided with a debriefing of the hypotheses of the study, and you will learn more about the procedures used in psychological research.

**Confidentiality and Records**

If you choose “no” when asked about your interest in being contacted for future research projects, no identifying information will be stored for any period of time with your responses, and your participation and study responses will remain completely confidential.

If you choose “yes” when asked about your interest in being contacted for future research projects, you will be asked to provide your name, Ohio University email address, and phone number. Once downloaded from the server, your identifying information will be stored separately from your study responses, and both will be linked to an arbitrarily
assigned participant identification number. Your identifying information will be stored in password protected files on secure study computers located in a locked laboratory. Only people directly connected with the study will have access to this information.

All survey responses that you provide will be treated confidentially and stored on a secure server. You will not be personally identified in any reports or publications that may result from the study. However, given that the surveys can be completed from any computer (e.g., personal, work, school), we are unable to guarantee the security of the computer on which you choose to enter your responses. **Please clear the browser history and close the browser if you are working on a publically accessible computer.**

Additionally, while every effort will be made to keep your study-related information confidential (e.g., from parents, officials at OU, police), there may be circumstances where this information must be shared with:

* Federal agencies, for example the Office of Human Research Protections, whose responsibility is to protect human subjects in research;
* Representatives of Ohio University (OU), including the Institutional Review Board, a committee that oversees the research at OU;
* Police, only if subpoenaed

**Compensation**

As compensation for your time/effort, you will receive **1 research credit** for
participating in this study.

**Contact Information**

If you have any questions regarding this study, please contact Sarah E. Racine, Ph.D., Assistant Professor of Psychology, Ohio University, at (740) 593-1086 or racine@ohio.edu.

If you have any questions regarding your rights as a research participant, please contact Chris Hayhow, Director of Research Compliance, Ohio University, (740)593-0664, or hayhow@ohio.edu.

By clicking “continue” below, you are agreeing that:

- you have read this consent form (or it has been read to you) and have been given the opportunity to ask questions and have them answered
- you have been informed of potential risks and they have been explained to your satisfaction.
- you understand Ohio University has no funds set aside for any injuries you might receive as a result of participating in this study
- you are 18 years of age or older
- your participation in this research is completely voluntary
- you may leave the study at any time. If you decide to stop participating in the study, there will be no penalty to you and you will not lose any benefits to which you are otherwise entitled.

Version Date: **09/08/2014**
Appendix B – Debriefing Form

Debriefing Form

An Examination of Behavioral Health in College Students

Thank you for your participation in this research project. You are encouraged to print this page for your records.

This study was designed to examine various aspects of behavioral health, such as eating habits, exercise patterns, and emotional functioning. We were particularly interested in the kinds of eating habits that are associated with dieting disorders (i.e. anorexia nervosa, bulimia nervosa, binge eating disorder) and obesity. Research has shown that these types of eating habits are related to emotional and health related difficulties, even if they are present in individuals without eating disorders or obesity.

The information provided by these questionnaires will help researchers and clinicians understand the types of eating habits that are frequently present in college students and the associations between these eating habits and other aspects of behavioral health (e.g., depression, anxiety, alcohol and substance use). The results of studies such as this one will inform the development of programs designed to prevent and treat unhealthy eating habits in college students, with the goal of reducing the number of individuals suffering from eating and weight disorders.
As a reminder, all of your questionnaire responses will remain confidential. If you have any further questions regarding the nature of this study, or would like to request details of the results, please feel free to contact the principal investigator:

Sarah E. Racine, Ph.D. Porter Hall (740-593-1086)

racine@ohio.edu

If you or someone you know is interested in learning more about, or receiving treatment for, an eating disorder or another psychological problem, please contact one of the offices below.

Ohio University Psychology and Social Work Clinic, (002 Porter Hall), (740) 593-0902

Ohio University Counseling and Psychological Services, (Hudson Health Center), (740) 593-1616

Thank you again for your participation.
Appendix C – Demographics
Demographic Questionnaire

1. What is your age?
   a. 18  
   b. 19  
   c. 20  
   d. 21  
   e. 22  
   f. 23  
   g. 24  
   h. 25  
   i. Other (specify): _________

2. What is your current year in school?
   a. Freshman  
   b. Sophomore  
   c. Junior  
   d. Senior  
   e. Graduate  
   f. Other

3. What is your biological sex?
   a. Male  
   b. Female  
   c. Intersex

4. What is your gender identity?
   a. Male  
   b. Female  
   c. Transsex

5. What is your sexual orientation?
   a. Heterosexual  
   b. Gay
6. What is your ethnicity?
   a. Hispanic or Latino
   b. Not Hispanic or Latino

7. What is your racial identity? (Please circle ALL that apply).
   a. White/Caucasian
   b. Black or African American
   c. Asian
   d. Middle Eastern
   e. Native Hawaiian or Other Pacific Islander
   f. American Indian or Alaska Native
   g. Multiracial
   h. Other (specify): __________________

8. In what religion were you raised?
   a. Protestant (Christian)
   b. Jewish
   c. Catholic (Christian)
   d. Muslim
   e. No Affiliation
   f. Other (specify): __________________

9. Approximately what is your parent’s combined yearly income?
   a. Unemployed or disabled
   b. Under $10,000
   c. $10,000-20,000
   d. $21,000-30,000
   e. $31,000-40,000
   f. $41,000-50,000
   g. $51,000-75,000
   h. $76,000-100,000
   i. $101,000-200,000
   j. Over $200,000
   k. I don’t know

10. What is your current relationship status (circle ALL that apply)?
    a. Never married
    b. Divorced
    c. Widowed
    d. Remarried
c. Widowed
h. Living with significant other (not spouse)
d. Separated
i. Significant other, not living with partner
e. Married once
j. Single

11. What is your height? _________ ft _________ inches

12. What is your current weight? ____________ pounds (lbs).

13. What is the highest weight that you have reached at your current height (excluding pregnancy)? ____________ pounds (lbs)

14. What is the lowest weight that you have reached at your current height? ____________ pounds (lbs)

15. Circle any of these conditions that you have had or currently have:
   a. alcoholism
   b. agoraphobia
   c. anorexia nervosa
   d. attention problems/hyperactivity
   e. social phobia
   f. bipolar disorder
   g. binge eating disorder
   h. Other (specify) ___________________
   h. bulimia nervosa
   i. depression
   j. obsessive-compulsive disorder
   k. panic disorder
   l. non-alcohol drug addiction
   m. post-traumatic stress disorder
   n. generalized anxiety disorder

16. Have you ever received psychotherapy for any behavioral or medical condition?
   Yes  No
If yes, when? ________________________________________________

For what condition? ____________________________________________

17. Have you ever had any treatment with psychological medicines (examples: Prozac, Xanax)?

   Yes    No

   If yes, when?

   ____________________________________________________________

   What medication?

   ____________________________________________________________

   For what condition?

   ____________________________________________________________
Appendix D – Emotion Dysregulation

Difficulties in Emotion Regulation Scale (DERS)

Please indicate how often the following statements apply to you by writing the appropriate number from the scale below on the line beside each item:

________________________________________________________________________

1) I am clear about my feelings.
2) I pay attention to how I feel.
3) I experience my emotions as overwhelming and out of control.
4) I have no idea how I am feeling.
5) I have difficulty making sense out of my feelings.
6) I am attentive to my feelings.

---5

almost never   sometimes   about half the time   most of the time   almost always

(0-10%)   (11-35%)   (36-65%)   (66-90%)   (91-100%)
7) I know exactly how I am feeling.
8) I care about what I am feeling.
9) I am confused about how I feel.
10) When I’m upset, I acknowledge my emotions.
11) When I’m upset, I become angry with myself for feeling that way.
12) When I’m upset, I become embarrassed for feeling that way.
13) When I’m upset, I have difficulty getting work done.
14) When I’m upset, I become out of control.
15) When I’m upset, I believe that I will remain that way for a long time.
16) When I’m upset, I believe that I’ll end up feeling very depressed.
17) When I’m upset, I believe that my feelings are valid and important.
18) When I’m upset, I have difficulty focusing on other things.
19) When I’m upset, I feel out of control.

__________________________

__________________________

1------------------------2------------------------3------------------------4------------------------5
almost never sometimes about half the time most of the time almost always
(0-10%) (11-35%) (36-65%) (66-90%) (91-100%)
20) When I’m upset, I can still get things done.
21) When I’m upset, I feel ashamed with myself for feeling that way.
22) When I’m upset, I know that I can find a way to eventually feel better.
23) When I’m upset, I feel like I am weak.
24) When I’m upset, I feel like I can remain in control of my behaviors.
25) When I’m upset, I feel guilty for feeling that way.
26) When I’m upset, I have difficulty concentrating.
27) When I’m upset, I have difficulty controlling my behaviors.
28) When I’m upset, I believe that there is nothing I can do to make myself feel better.
29) When I’m upset, I become irritated with myself for feeling that way.
30) When I’m upset, I start to feel very bad about myself.
31) When I’m upset, I believe that wallowing in it is all I can do.
32) When I’m upset, I lose control over my behaviors.
33) When I’m upset, I have difficulty thinking about anything else.
34) When I’m upset, I take time to figure out what I’m really feeling.
35) When I’m upset, it takes me a long time to feel better.
36) When I’m upset, my emotions feel overwhelming.
Appendix E – Alcohol Related Compensatory Behaviors

Compensatory Eating and Behaviors in Response to Alcohol Consumption Scale (CEBRACS)

Please read each of the following statements very carefully and respond accurately and honestly. All of these statements reflect actual behaviors you may have done in the past 3 months. You will be asked whether you have done any of the behaviors before, during, or after drinking alcohol. Please read carefully because many of the statements are closely related to each other. Drinking refers to drinking any alcohol beverages such as: beer, wine, wine coolers or spirits, hard liquors, or mixed drinks.

BEFORE drinking
Instructions: For the following statements think about behaviors you have engaged in BEFORE you anticipated drinking alcohol. That is, think of situations where you knew you would be drinking alcohol in the future (e.g. planned to go out drinking with friends, attended a wedding or birthday where you planned to drink, or attended any other event or situation where you knew you would be drinking later).

Rate your behaviors using the following scale: consumed previously while I was under the effects of alcohol.

Never  Rarely  Sometimes  Often  Almost all of the time

About 25% of the time  About 50% of the time  About 75% of the time

1  2  3  4  5

___1) In the past 3 months, I have eaten less than usual during one or more meals before drinking to get DRUNKER.
___2) In the past 3 months, I have exercised before drinking to make up for the calories in alcohol that I anticipated consuming.
___3) In the past 3 months, I have eaten less than usual during one or more meals before drinking to feel the effects of alcohol FASTER.
___4) In the past 3 months, I have skipped one or more meals before drinking to make up for the number of calories in alcohol that I anticipated consuming.
___5) In the past 3 months, I have taken laxatives before drinking to make up for the calories in alcohol that I anticipated consuming.
___6) In the past 3 months, I have skipped one or more meals before drinking to feel the effects of alcohol FASTER.

WHILE under the effects of alcohol
Instructions: For each of the following statements, think about behaviors you have engaged in WHILE you were drinking or under the effects of alcohol (e.g. while you were drinking during a wedding reception, party, bar, club, football game). This also includes situations where you may have been done drinking, but the effects of alcohol had not completely worn off. As an example, imagine arriving home from a party where you had been drinking and you could still feel the effects of alcohol even though you had stopped drinking earlier in the night.

Rate your behaviors using the following scale:

<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost all of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

7) In the past 3 months, I have eaten less than usual while I was drinking because I wanted to feel the effects of the alcohol FASTER.
8) In the past 3 months, I have taken diuretics while I was drinking to make up for the calories in alcohol that I was consuming.
9) In the past 3 months, I have not eaten at all while I was drinking because I wanted to feel the effects of the alcohol FASTER.
10) In the past 3 months, I have eaten low-calorie or low-fat foods while I was drinking to make up for the calories in alcohol that I was consuming.
11) In the past 3 months, I drank low-calorie beer or alcoholic drinks to get fewer of the calories that are in alcohol.
12) In the past 3 months, I have eaten less than usual while I was drinking because I wanted to get DRUNKER.
13) In the past 3 months, I have taken laxatives while I was drinking to make up for the calories in alcohol that I was consuming.
14) In the past 3 months, I have not eaten at all while I was drinking because I wanted to get DRUNKER.

AFTER effects from alcohol have worn off

Instructions: For each of the following statements, think about behaviors you have engaged in AFTER you had been drinking alcohol and were no longer under the effects of alcohol. This might include your behavior later that same day, the next day, or several days after the effects of alcohol have worn off.

Rate your behaviors using the following scale:

<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost all of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

7) In the past 3 months, I have eaten less than usual while I was drinking because I wanted to feel the effects of the alcohol FASTER.
8) In the past 3 months, I have taken diuretics while I was drinking to make up for the calories in alcohol that I was consuming.
9) In the past 3 months, I have not eaten at all while I was drinking because I wanted to feel the effects of the alcohol FASTER.
10) In the past 3 months, I have eaten low-calorie or low-fat foods while I was drinking to make up for the calories in alcohol that I was consuming.
11) In the past 3 months, I drank low-calorie beer or alcoholic drinks to get fewer of the calories that are in alcohol.
12) In the past 3 months, I have eaten less than usual while I was drinking because I wanted to get DRUNKER.
13) In the past 3 months, I have taken laxatives while I was drinking to make up for the calories in alcohol that I was consuming.
14) In the past 3 months, I have not eaten at all while I was drinking because I wanted to get DRUNKER.
___15) In the past 3 months, I have taken diuretics to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol.

___16) In the past 3 months, I have eaten low-calorie or low-fat foods during one or more meals to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol.

___17) In the past 3 months, I have taken laxatives to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol.

___18) In the past 3 months, I have exercised to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol.

___19) In the past 3 months, I have made myself vomit to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol.

___20) In the past 3 months, I have eaten less than usual during one or more meals to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol.

___21) In the past 3 months, I have skipped an entire day or more of eating to make up for the calories in alcohol that I had consumed previously while I was under the effects of alcohol.
Appendix F – Disordered Eating

Eating Disorder Examination Questionnaire (EDE-Q)

INSTRUCTIONS

The following questions are concerned with the PAST FOUR WEEKS ONLY (28 days).
Please read each question carefully and circle the appropriate number on the right. Please answer all the questions.

ON HOW MANY DAYS OUT OF THE PAST 28 DAYS……
No days days days days days days days day

1. Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight?

   0 1 2 3 4 5 6

2. Have you gone for long periods of time (8 hours or more) without eating anything in order to influence your shape weight?

   0 1 2 3 4 5 6

3. Have you tried to avoid eating any foods which you like in
order to influence your shape
or weight? 0 1 2 3 4 5 6

4. Have you tried to follow
definite rules regarding your
eating in order to influence
your shape or weight; for
example, a calorie limit, a set
amount of food, or rules about
what or when you should eat? 0 1 2 3 4 5 6

5. Have you wanted your
stomach to be empty? 0 1 2 3 4 5 6

6. Has thinking about food or its
calorie content made it much
more difficult to concentrate
on things you are interested in;
for example, read, watch TV,
or follow a conversation? 0 1 2 3 4 5 6

7. Have you been afraid of losing
control over eating? 0 1 2 3 4 5 6

Continued →
<table>
<thead>
<tr>
<th>Question</th>
<th>No</th>
<th>1-5</th>
<th>6-12</th>
<th>13-15</th>
<th>16-22</th>
<th>23-27</th>
<th>Every</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON HOW MANY DAYS OUT OF THE PAST 28 DAYS.......</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Have you had episodes of binge eating where you ate a lot of food and felt like you couldn’t stop?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>9. Have you eaten in secret? (Do not count binges.)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>10. Have you definitely wanted your stomach to be flat?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>11. Has thinking about shape or weight made it more difficult to concentrate on things you are interested in; for example, read, watch TV or follow a conversation?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>12. Have you had a definite fear that you might gain weight or become fat?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>13. Have you felt fat?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>14. Have you had a strong desire to lose weight?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>
OVER THE PAST FOUR WEEKS (28 DAYS)

15. On what proportion of times that you have eaten have you felt guilty because of the effect on your shape or weight? (Do not count binges.) (Circle the number which applies.)

<table>
<thead>
<tr>
<th></th>
<th>0 – None of the times</th>
<th>1 – A few of the times</th>
<th>2 – Less than half the times</th>
<th>3 – Half of the times</th>
<th>4 – More than half the times</th>
<th>5 – Most of the time</th>
<th>6 – Every time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Over the past four weeks (28 days), have there been any times when you have felt that you have eaten what other people would regard as an unusually large amount of food given the circumstances? (Please put appropriate number in box.)

No

Yes [   ]

How many such episodes have you had over the past four weeks?

[   ] [   ] [   ] [   ]

During how many of these episodes of overeating did you have a sense of having lost control over your eating?
Have you had other episodes of eating in which you have had a sense of having lost control and eaten too much, but have not eaten an unusually large amount of food given the circumstances?

No

Yes

How many such episodes have you had over the past four weeks?

Over the past four weeks have you made yourself sick (vomit) as a means of controlling your shape or weight?

No

Yes

How many times have you done this over the past four weeks?

Have you taken laxatives as a means of controlling your shape or weight?

No

Yes
How many times have you done this over the past four weeks?

[ ] [ ] [ ]

Have you taken diuretics (water tablets) as a means of controlling your shape or weight?

No
Yes [ ]

How many times have you done this over the past four weeks?

[ ] [ ] [ ]

Have you exercised hard as a means of controlling your shape or weight?

No
Yes [ ]

How many times have you done this over the past four weeks?

[ ] [ ] [ ]

Continued →
OVER THE PAST FOUR WEEKS (28 DAYS)  
(Please circle the number which best describes your behaviour.)

<table>
<thead>
<tr>
<th></th>
<th>NOT AT ALL</th>
<th>SLIGHTLY</th>
<th>MODERATELY</th>
<th>MARKEDLY</th>
</tr>
</thead>
<tbody>
<tr>
<td>29. Has your weight influenced how you think about (judge) yourself as a person?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>30. Has your shape influenced how you think about (judge) yourself as a person?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>31. How much would it upset you if you had to weigh yourself once a week for the next four weeks?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>32. How dissatisfied have you felt about your weight?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>33. How dissatisfied have you felt about your shape?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>34. How concerned have you been about other people seeing you eat?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>35. How uncomfortable have you felt seeing your body; for example, in the</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
mirror, in shop window reflections, while undressing or taking a bath or shower?

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
</table>

36. How uncomfortable have you felt about others seeing your body; for example, in communal changing rooms, when swimming or wearing tight clothes?

|   | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
Appendix G – Alcohol Use and Problems

Alcohol Use Disorders Identification Test (AUDIT)

**Instructions:** The following questions ask about your use of alcoholic beverages during the *PAST 12 MONTHS*. For the following questions, 1 standard drink equals one can, glass, or 12 ounce bottle of beer, one shot of liquor or mixed drink, or one glass of wine.

Circle the answer below each item that best describes you.

1. How often did you have a drink containing alcohol during the past 12 months?
   - Never
   - Monthly or Less
   - 2 to 4 times a month
   - 2 to 3 times a week
   - 4 or more times a week

2. How many drinks containing alcohol did you have on a typical day when you were drinking during the past 12 months?
   - 0, 1 or 2
   - 3 or 4
   - 5 or 6
   - 7 to 9
3. How often did you have 4 (for females) / 5 (for males) or more drinks on one occasion during the past 12 months?
   Never
   Less than monthly
   Monthly
   Weekly
   Daily or almost daily

4. How often during the past 12 months did you find that you were not able to stop drinking once you had started?
   Never
   Less than monthly
   Monthly
   Weekly
   Daily or almost daily

5. How often during the past 12 months did you fail to do what was normally expected from you because of drinking?
   Never
   Less than monthly
6. How often during the past 12 months did you need a drink first thing in the morning to get yourself going after a heavy drinking session?
   Never
   Less than monthly
   Monthly
   Weekly
   Daily or almost daily

7. How often during the past 12 months did you have a feeling of guilt or remorse after drinking?
   Never
   Less than monthly
   Monthly
   Weekly
   Daily or almost daily

8. How often during the past 12 months were you unable to remember what happened the night before because you had been drinking?
Never
Less than monthly
Monthly
Weekly
Daily or almost daily

9. In the past 12 months, were you or someone else injured as a result of your drinking?

No
Yes, but not in the last 12 months
Yes, during the last 12 months

10. In the past 12 months, was a relative, friend, doctor, or other health worker concerned about your drinking or suggested you cut down?

No
Yes, but not in the last 12 months
Yes, during the last 12 months