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Anxiety Sensitivity, Non-Acceptance, and Coping Motives for Alcohol Use

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ALCOHOL USE

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ABSTRACT

The present study probed the concurrent relation of two theoretically associated risk factors for coping-motivated substance use – non-acceptance of negative affect and anxiety sensitivity – with coping-motivated drinking frequency (drinking to cope). A two-factor model of coping-motivated substance use put forth by Brown, Lejuez, Kahler, Strong, and Zvolensky (2005) suggests that both non-acceptance and the physical and social dimensions of anxiety sensitivity might be related to coping motives for substance use broadly. The present study represents a particularly stringent test of this model in the field of alcohol use motives. It was hypothesized that the individual facets of AS (physical and social) and non-acceptance would predict coping-motivated drinking frequency, controlling for gender, negative affect, and the cognitive facet of AS. Data was obtained from a sample of 253 (51% Women; 89% Caucasian, Mage = 19.30, SD =1.39, range = 18-25) college students. Contrary to hypotheses, the results of hierarchical regression analyses suggested that the predicted AS facets and non-acceptance were unrelated to *coping*-motivated drinking. Trend-level findings suggested that the cognitive dimension of AS and non-acceptance might influence drinking to cope indirectly by increasing levels of trait anxiety and negative affect, respectively. Moreover, the physical facet of AS was significantly associated with comformity-motivated drinking and non-acceptance evidenced a strong trend-level relation with conformity-motivated drinking. Findings are discussed in relation to Brown and colleagues' (2005) model, the broader body of literature on the relation between AS and drinking to cope, and the findings contained in Bonn-Miller et al. (2008). Limitations are presented and future work is proposed.

This thesis is approved for recommendation

to the Graduate Council.

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Anxiety Sensitivity, Non-Acceptance, and Coping Motives for Alcohol Use

Alcohol misuse is highly prevalent in the United States (U.S.). Nationwide, one study estimated that approximately 7% of U.S. citizens met criteria for alcohol abuse and approximately 5% met criteria for alcohol dependence in the year prior to the survey (Grant et al., 2006). Further, both men and women have begun to show signs of disordered alcohol use at younger ages than previous generational cohorts within the past decade (Nelson, Heath, & Kessler, 1998). These statistics are alarming, given that alcohol use is associated with a wide array of physical ailments (e.g., Adrian & Barry, 2003) and is believed to be involved in hundreds of thousands of emergency room visits every year (Substance Abuse and Mental Health Service Administration [SAMHSA], 2008b). Further, the fiscal costs of disordered alcohol use are borne by every U.S. taxpayer, as the majority of treatment cases are funded at least in part by governmental agencies (SAMHSA, 2009).

College-aged young adults appear to be particularly at risk for alcohol misuse (i.e., alcohol use disorders and sub-threshold problematic patterns of alcohol use; SAMHSA, 2009) as compared to older and younger age cohorts (Dawson, Grant, Stinson, & Chou, 2005; 2006; SAMSHA, 2008a). In the twelve months leading up to their participation in a 2007 survey, young adults of college-age (18 to 25 years) evidenced between two and three times higher rates of alcohol use disorders (i.e., alcohol dependence and alcohol abuse), as compared with both adolescents (ages 12-18 years) and adults above the age of 26 (SAMHSA, 2008a). An estimated 17% of young adults in

the U.S. between the ages of 18 and 25 met criteria for alcohol abuse or dependence within the previous year, which was substantially greater than all other age groups.

Additionally, data suggest that young adults between the ages of 18 and 25 may be both more likely to need treatment for alcohol misuse and less likely to receive needed treatment for alcohol misuse than other age groups. In 2007, an estimated 7.8% of U.S. citizens across all age groups were likely to need treatment for alcohol misuse, while only 8.1% of these individuals actually received treatment (SAMHSA, 2009).

Given the high prevalence of alcohol misuse, and the financial and human expenses associated with the sequelae of problem drinking (e.g., SAMHSA, 2008a; 2008b; 2009), continued research dedicated to elucidating individual difference risk and maintenance factors for problematic patterns of drinking is needed. Furthermore, given the high rates of problem alcohol use in college-aged populations (SAMHSA, 2009), research focusing upon risk factors for problematic drinking in college-aged young adults is warranted.

Drinking Motives

A particularly fruitful avenue for alcohol use research over the past two decades has explored motives for drinking (e.g., Cooper, 1994) and the relationships of these motives to alcohol misuse (e.g., Grant et al., 2007; Simons, Correia, Carey, & Borsari, 1998). According to motivational models of alcohol use, individuals use alcohol to achieve a specific goal or goals (Cox & Klinger, 1988). *Drinking motives,* then, are defined as the reasons underlying the decision to drink alcohol at any particular moment. According to Cooper, Russell, Skinner, and Windle (1992), drinking motives are the

conduit by which more distal factors exert influence on drinking behaviors and therefore represent the most proximal risk factors for problem drinking.

According to Cox and Klinger (1988; 1990), drinking motives vary along two dimensions. Specifically, on any given occasion (and even within individual occasions), an individual may elect to imbibe in response to external or internal stimuli and may drink alcohol in order to enhance or avoid certain experiences (i.e., positive or negative reinforcement). Crossing these dimensions, Cox and Klinger (1990) delineate four types of drinking motives: social (i.e., drinking to obtain social rewards), conformity (i.e., drinking in order to avoid ostracism), enhancement (i.e., drinking in order to increase enjoyable affective states), and coping (i.e., drinking in order to avoid negative affective states). On a given occasion, a particular individual may imbibe for one or all of these reasons. However, according to Cooper (e.g., Cooper, 1994; Cooper et al., 1992; 2008), the two internally oriented motives--enhancement and coping--form a conduit from individual personality traits to overt drinking behaviors, such that individuals with certain personality traits might drink more frequently for these reasons.

Insofar as personality traits are often thought to be cross-situationally stable, Cooper (1994) predicts that the frequency with which an individual drinks with internally oriented motives (i.e., coping and enhancement) might predict the likelihood that that individual would evidence a more stable pattern of alcohol use and thereby increase the opportunity for that individual to incur negative consequences due to drinking. As far as it pertains to coping motives, Cooper's prediction is in concordance with both the tension-reduction theory (TRT; Conger, 1956) and the stress response dampening model (SRD; Sher & Levenson, 1982) of alcohol use. TRT and SRD posit that alcohol may be

used to modulate negative affective experiences and that alcohol's anxiolytic effects can reinforce coping-motivated use, resulting in a stable and problematic pattern of drinking (for a review, see Morris, Stewart, & Ham, 2005). Therefore, current theories of alcohol use and misuse seem to point to internal drinking motives in general, and coping motives in particular, as conveying risk for alcohol misuse (Conger, 1956; Cooper, 1994; Sher & Levenson, 1982).

Indeed, empirical data collected over the past fifteen years have largely borne out Cooper's (1994) predictions: more frequent drinking for enhancement and coping-motivated drinking has been associated with an increased likelihood of problematic patterns of alcohol use (Carpenter & Hasin, 1998; 1999; Cooper, 1994; Cooper, Frone, Russell, & Mudar, 1995; Grant et al., 2007; Ichiyama & Kruse, 1998). However, coping and enhancement motives have been shown to follow different paths to problematic drinking outcomes. While more frequent enhancement-motivated alcohol use appears to convey risk for alcohol use disorders because it is related to heavier and more frequent drinking episodes, more frequent coping-motivated drinking (drinking to cope) has been directly associated with alcohol-related problems (Ichiyama & Kruse, 1998). That is, even when controlling for quantity and frequency of alcohol use, more frequent drinking to cope has been associated with alcohol-related problems cross-sectionally (Cooper, 1994; Cooper et al., 1995; Simons, Correia, Carey, & Borsari, 1998) and has been shown to convey risk for alcohol use problems and symptoms of alcohol dependence in prospective designs (Carpenter & Hasin, 1999; Grant et al., 2007; Nolen-Hoeksema & Harrell, 2002). Thus, coping motives appear to represent particularly problematic motives

for drinking, in agreement both with Cooper's (1994) predictions and with the TRT (Conger, 1956) and SRD (Sher & Levenson., 1982) models of alcohol use.

Given the high prevalence of college-age alcohol misuse and the apparent link between coping motives and problematic patterns of alcohol use, it may be important to identify factors associated with such drinking motives in college drinkers in particular. As Cooper (1994) predicted that individual difference personality variables may be causally related to the frequency with which an individual imbibes with internally-oriented motives, much work over the past decade and a half has been dedicated to probing the relations between personality facets and internally-oriented drinking motives. In general, an individual's levels of certain personality traits associated with emotion or emotional vulnerabilities seem to relate to the frequency with which that individual may drink to cope. In particular, negative affectivity/neuroticism (Cooper, 1994; Cooper et al., 1992, 1995; Cooper, Agocha, & Sheldon, 2000; Stewart, Loughlin, & Rhino, 2001; Stewart & Devine, 2000; Wills, Sandy, Shinar, & Yaeger, 1999) and theoretically associated lower-order constructs (Lilienfeld, 1996) such as trait anxiety (Comeau, Stewart, & Loba, 2001; Stewart & Zeitlin, 1995), distress tolerance (Howell et al., 2010; Simons & Gaher, 2005), anxiety sensitivity (Comeau et al., 2001; Stewart, Karp, Pihl, & Peterson, 1997; Stewart & Zeitlin, 1995; Stewart, Zvolensky, & Eifert, 2001; 2002) and fear of negative evaluation (Stewart, Morris, Mellings, & Komar, 2006) appear to be cross-sectionally associated with more frequent drinking to cope in studies sampling from a variety of age cohorts.

Anxiety Sensitivity, Non-Acceptance, and Coping Motives

Of the personality variables that appear to be related to more frequent coping-motivated substance use, anxiety sensitivity (i.e., a tendency to fear physical [e.g., rapid heart beat], psychological [e.g., racing thoughts], and outward/social [e.g., blushing] symptoms of anxiety; Reiss, Peterson, Gursky, & McNally, 1986; Taylor et al., 2007) has received considerable attention and support in the literature (Bonn-Miller, Zvolensky, & Bernstein, 2007; Comeau et al., 2001; Mitchel, Zvolensky, Marshall, Bonn-Miller, & Vujanovic, 2007; Stewart et al, 1997; Stewart & Zeitlin, 1995; Stewart, Zvolensky et al., 2001, 2002; Zvolensky et al., 2009). The hypothesized link between AS and coping motives is fairly intuitive. Specifically, researchers have posited that individuals who react fearfully to symptoms of anxious arousal (i.e., those with heightened AS) may be more motivated to utilize substances to ameliorate those symptoms (i.e., may be more likely to use substances to cope) than individuals who react less fearfully (for a review, see Stewart et al., 1997). Thus, AS might be positively associated with coping-motivated substance use frequency. Interestingly, a model of coping-motivated substance use by Brown, Lejuez, Strong, and Zvolensky (2005) suggests that two facets of AS, the fear of interoceptive cues signifying potential negative health outcomes and those signifying potential embarrassment (the physical and social dimensions of AS), may account for this documented relation between AS and coping-motivated substance use. Further, the Brown et al. (2005) model suggests that these dimensions of AS may not be the only emotional vulnerability factors related to more frequent coping-motivated substance use.

Building in part upon the work of Stewart and colleagues (1997), Brown and colleagues (2005) have recently proposed a model of substance use (in particular,

nicotine withdrawal-driven smoking) that suggests individuals who tend to experience (1)

secondary negative affect in response to negative emotion and (2) negative affect in

response to aversive physiological sensations may be more motivated than individuals

who do not react in these ways to use substances (i.e., to smoke in response to such

sensations) in order to ameliorate such experiences. Such individuals would likely use

substances for coping reasons (in particular, to cope with symptoms of nicotine

withdrawal) more often than individuals who do not tend to respond to aversive physical

or emotional experiences in this fashion. Negative affective (fear) responses to perceived

physiological responses associated with anxiety (physical and social dimensions of AS--

but not the cognitive dimension of AS, which assesses responses to cognitive, rather than

physical symptoms of anxiety) arguably encompass the second factor in Brown and

colleagues' two-factor model. However, AS does not tap into Brown and colleagues' first

factor.

The other factor in Brown and colleagues' (2005) model--the tendency to have

negative affective responses to primary negative affect, referred to as *non-acceptance*

(Gratz & Roemer, 2004)--has not been explored in the drinking motives literature to date.

The lack of research on drinking motives and non-acceptance is surprising, given that

non-acceptance has been theoretically and empirically linked to more frequent

engagement in other maladaptive coping behaviors, including deliberate self-harm

(Chapman, Gratz, & Brown, 2006; Gratz & Gunderson, 2006; Gratz & Roemer, 2004;

Gratz & Tull, 2010; Slee, Garnefski, Spinhoven, & Arensman, 2008) in individuals with

and without borderline personality disorder. Further, non-acceptance has been linked with

severity of alcohol dependence symptoms in individuals with borderline personality disorder (James & Taylor, 2008).

Although research examining non-acceptance in the field of drinking motives is currently sparse, researchers in the related field of marijuana use motives have begun to probe the relation between non-acceptance and coping motives for marijuana use. As with coping motives for alcohol use, researchers have found a positive relation between an individual's level of AS and his or her frequency of coping-motivated marijuana use (Bonn-Miller et al., 2007; Comeau et al., 2001; Mitchel, et al., 2007; Zvolensky et al., 2009). Building upon these findings and extending Brown and colleagues' (2005) two-factor model to marijuana use, Bonn-Miller and colleagues (2008) found that non-acceptance predicted unique variance in coping-motivated marijuana use frequency above the variance accounted for by AS. Furthermore, non-acceptance did not significantly predict the frequency with which an individual smoked marijuana for any of the other marijuana use motive studied (Bonn-Miller et al., 2008). Because the Marijuana Motives Measure (MMM; Simons et al., 1998) was developed based on the Drinking Motives Questionnaire-Revised (DMQ-R; Cooper, 1994), the coping subscales of both measures are identical, with the exception that the MMM's items have been altered to refer to marijuana use. Thus, Bonn-Miller and colleagues' (2008) findings in community samples suggest the utility of similar work in the field of drinking motives, and available data on alcohol misuse (e.g., SAMHSA, 2009) suggest the need for research in college populations, in particular. As such, a primary goal of the present research is to build upon the findings of Bonn-Miller and colleagues and extend Brown and colleagues' (2005)

model of withdrawal-driven smoking to the field of coping-motivated alcohol use in a college population.

While Bonn-Miller and colleagues' (2008) findings are informative, extend Brown and colleagues' (2005) model to non-withdrawal related marijuana use, and therefore suggest the possible extension of Brown and colleagues' model to the relation between non-acceptance and non-withdrawal-driven coping-motivated use of other substances, such as alcohol, there are also reasons to suspect that their results might not replicate when considering alcohol use motives. Specifically, Bonn-Miller and colleagues did not find a significant relation between AS and coping-motivated marijuana use when non-acceptance was included in the regression model. While marijuana smokers often report that marijuana has anxiolytic effects (e.g., Hathaway, 2003) and AS has been associated with coping-motivated marijuana use (Bonn-Miller et al. 2007), there are some plausible explanations for the Bonn-Miller et al. (2008) finding that coping-motivated marijuana use was unrelated to AS. For example, marijuana use has also been associated with increased levels of anxiety (Ashton, 2001) and increased anxious responding, specifically panic symptomology, in a CO_2 challenge (Zvolensky, Cougle, Johnson, Bonn-Miller, & Bernstein, 2010), particularly in high-AS women (Buckner, Leen-Feldner, Zvolensky, & Schmidt, 2009). Notably, these studies on the relation between AS, marijuana use, and anxious responding neither administered marijuana, nor assessed symptoms of marijuana withdrawal. For these reasons, it is presently unclear whether marijuana intoxication or marijuana withdrawal leads to increased anxious responding and symptoms of panic. Moreover, it is unclear whether marijuana might be used to relieve symptoms of panic or generate such symptoms. While these relations are

presently ambiguous, it does appear possible that marijuana intoxication might have anxiolytic effects for some forms of anxiety (e.g., social anxiety, Buckner, Bonn-Miller, Zvolensky, & Schmidt, 2007), and it might have anxiogenic effects for other forms of anxiety (in particular panic, Buckner et al., 2009; Zvolesnky, et al., 2010). In addition, marijuana's potency is variable between plants, making it difficult to estimate the amount of THC in a given volume of marijuana (McLaren, Swift, Dillon, & Allsop 2008), and contributing to variability and less predictability in marijuana's behavioral effects. By contrast, in part due to its legality, it is possible to estimate the amount of alcohol in a given volume and, while withdrawal from alcohol can have anxiogenic effects (Kushner, Sher, & Beitman, 1990) and appears more intense in high-AS individuals (Kushner et al., 2001), there is presently no evidence that alcohol intoxication commonly is associated with anxiogenesis. In fact, there has been some evidence that alcohol's anxiolytic effects are stronger for high-AS than for low-AS individuals (MacDonald, Baker, Stewart, & Skinner, 2000; Stewart & Pihl, 1994). Therefore, one might expect the relation between AS and coping-motivated marijuana use to be less reliable than that between coping-motivated alcohol use and AS. Because the relation between AS and alcohol use motives is likely more robust than that between AS and marijuana motives, one would not anticipate Bonn-Miller et al.'s (2008) findings to replicate when considering alcohol use motives. Thus, a secondary goal of the present study was to test the hypothesis that anxiety sensitivity would be significantly related to drinking to cope in the presence of non-acceptance, contrary to evidence in the field of marijuana use motives (Bonn-Miller et al., 2008).

Moreover, given recent evidence suggesting that the individual AS dimensions might be malleable with targeted response retraining techniques (Steinman & Teachman, 2010), it behooves researchers to extend Bonn-Miller et al.'s (2008) findings and consider the relation of individual AS facets and coping-motivated substance use. Thus, work that applies Brown and colleagues' (2005) model to the field of college-aged drinking research that considers the physical and social facets of AS individually, rather than considering AS as a global construct, represents a novel extension of the extant knowledge base on potentially malleable psychological and affective factors associated with coping-motivated drinking in a high-risk population. Finally, given that the 3 facets of AS appear related to one another (Bernstein et al, 2010; Taylor et al., 2007), work investigating the relation between the social and physical facets of AS with other variables should covary for the effects of the third AS facet, fear of cognitive dyscontrol, particularly if this facet also appears related to the criterion under investigation. A tertiary goal of this study was to examine the relation of the physical and social AS facets and coping-motivated drinking frequency while controlling for the influence of non-acceptance and fear of cognitive dyscontrol.

Present Study

The present study probed the relationship between the two factors in the model proposed by Brown et al. (2005), non-acceptance and AS, with coping motives for alcohol use in a sample of undergraduate drinkers. This study was developed to enhance the understanding of factors associated with coping-motivated drinking in college populations and thereby contribute to the larger body of research on the correlates of alcohol misuse in this age demographic. Furthermore, as pointed out by Brown and

colleagues, such work could have implications for prevention and treatment in college-aged populations. Because this study represents an initial investigation of the relations among AS (specifically the social and physical AS facets), non-acceptance, and drinking motives, a cross-sectional design was employed.

Based on emerging theory (Bernstein et al., 2009; Brown et al., 2005) and empirical findings (e.g., Bonn-Miller, et al., 2008), it was expected that AS—in particular the physical and social facets—and non-acceptance would be moderately to strongly positively correlated with one another, but also unique predictors of more frequent drinking to cope. Figure 1 depicts the hypothesized model for coping-motivated drinking frequency. Specifically, it was hypothesized that levels of non-acceptance (as measured by the Non-Acceptance subscale of the Difficulties in Emotion Regulation Scale [DERS]; Gratz & Roemer, 2004), and concerns about negative internal and external symptoms of anxiety (measured by Physical and Social dimensions of the 3rd version of the Anxiety Sensitivity Inventory [ASI-3]; Taylor et al., 2007) would be positively associated with coping-motivated drinking frequency (measured by the coping motives subscales of the Drinking Motives Questionnaire- Revised [DMQ-R]; Cooper, 1994), even when covarying for one another. Furthermore, it was expected that non-acceptance and AS would be positively correlated with coping-motivated drinking frequency even after controlling for demographic covariates, negative affect (measured by the negative affect subscale of the Positive Affect Negative Affect Schedule [PANAS]; Watson, Clark, & Tellegen; 1988), quantity and frequency of alcohol use (indexed by the quantity and frequency subscales of the Alcohol Use Disorders Identification Test [AUDIT]; Babor, Higgings-Biddle, Saunders, & Monteiro, 2001; Saunders, Aasland, Babor, & de la

Fuente. 1993), and the cognitive facet of AS (measured by the cognitive subscale of the

ASI-3; Taylor et al., 2007). The present study was designed to provide a stringent test of

these hypotheses.

<div align="center">**Method**</div>

Participants

Participants ($N = 277$) from the undergraduate psychology research pool at a large

mid-southern university completed a web-based questionnaire battery for research credit

from October 2009 - January 2010. Consistent with past research on drinking motives in

college samples (e.g., Ham, Zamboanga, Bacon, & Garcia, 2009), participation was

limited to those endorsing at least monthly drinking. Responses from those outside the

typical age range of a college student (18-25 years; $n = 17$) were omitted from analyses,

along with responses from individuals who had refused to complete one or more of the

measures of interest ($n = 7$). The final sample ($N = 253$) was approximately 51% women,

88.5% Caucasian, 3.2% Hispanic, 2.8 % Other/Not Listed, 2.4% African American, 1.6%

Native American/Alaskan Native, .8% Asian American, and .8% Middle Eastern. The

present sample had a mean age of 19.30 years ($SD = 1.39$, range = 18 - 25). Eighty-four

percent of the final sample was under the legal drinking age of 21.

Measures

Drinking motives. The Drinking-Motives Questionnaire-Revised (DMQ-R;

Cooper, 1994; Appendix A) is a 20-item measure that assesses how often an individual's

motivation for drinking alcohol can be classified as: Social (e.g., "Because it helps you

enjoy a party"), Coping (e.g., "To forget your worries"), Enhancement (e.g., "Because it

gives you a pleasant feeling."), or Conformity (e.g., "To fit in with a group you like.").

Each participant is asked to rate how often he or she drinks alcohol for a number of reasons on a 5-point Likert-type scale (1 = *almost never* to 5 = *almost always*). The 5-item subscales of the DMQ-R, which are computed by averaging the sum of all items on each scale, have been found to be highly internally consistent, with Cronbach's alphas ranging between .86 (coping) and .89 (enhancement), and the factor structure of the DMQ-R has been found to be invariant across U.S., Canadian, and Swiss adolescent samples (Kuntsche, Stewart, & Cooper, 2008). Though the majority of existing norms were drawn from adolescent samples (e.g., Cooper, 1994; Kuntsche et al., 2008), Stewart and Devine (2000) provide normative data for college-aged drinkers. In a sample of 256 college students, these authors found that the Coping Motives subscale had a mean of 1.77 (*SD* = 0.77), the Enhancement Motives subscale had a mean of 2.89 (*SD* = 1.05), the Conformity Motives subscale had a mean of 1.35 (*SD* = 0.51), and the Social Motives subscale had a mean of 3.22 (*SD* = 0.91). The 5-item Coping Motives subscale had a mean of 2.20 (*SD* = 0.95, range = 1 - 5) and this subscale demonstrated good to excellent reliability (Cronbach's alpha = .89; Cronbach, 1951) in the present sample. The 5-item Enhancement Motives subscale had a mean of 3.08 (*SD* = 1.09, range = –1 - 25) and demonstrated good to excellent reliability (Cronbach's alpha = .88) in the present sample. The 5-item Conformity Motives subscale had a mean of 1.68 (*SD* = 0.82, range = 1 - 5) and this subscale was demonstrated to have good to excellent reliability (Cronbach's alpha = .89) in the present sample. The 5-item Social Motives subscale had a mean of 3.56 (*SD* = 0.94, range = 1 - 5) and this subscale was demonstrated to have good to excellent reliability (Cronbach's alpha = .86) in the present sample.

Anxiety sensitivity. The Anxiety Sensitivity Index (ASI-3; Taylor et al., 2007;

Appendix B) is an 18-item self-report instrument intended to assess the degree to which

an individual is fearful of anxiety-related sensations and the consequences of such

sensations. This measure was developed to address questions about the reliability of the

postulated 3-factor structure of the original ASI and the ASI-R (Taylor et al., 2007). The

ASI-3 measures the three most commonly found dimensions of AS (e.g., Zinbarg,

Barlow, & Brown, 1997): Physical (i.e., fears of cardiac arrest, smothering, and

gastrointestinal distress), Cognitive (i.e., fear of loss of control of one's thoughts) and

Social (i.e., fear of negative social consequences from physical displays of anxiety, such

as blushing). Each participant was asked to rate on a 5-point Likert-type scale (0 = *very*

little, 4 = *very much*) how much each of 18 statements applied to him or her (e.g., "It

scares me when I feel 'shaky' [trembling]."). In the large multi-national sample used to

develop and validate the ASI-3, the subscales appeared highly internally consistent

(alphas from .72 for Social Concerns to .93 for the Cognitive Concerns subscale; Taylor

et al., 2007). In the large multi-national sample Taylor and colleagues (2007) used to

develop, validate, and norm the ASI-3, US-Canadian college students (*n* = 4,720) had a

mean ASI-Total score of 12.8 (*SD* = 10.8). Within this group, the mean for the AS-

Physical subscale was 4.2 (*SD* = 4.2), the mean of the AS-Cognitive subscale was 2.7

(*SD* = 3.8), and the mean of the AS-Social subscale was 5.9 (*SD* = 4.7), with only trivial

differences based on demographic characteristics. No study to date has presented

normative information for the ASI-3 in a sample of drinkers. In the present sample, AS-

Total had a mean of 18.33 (*SD* = 13.93, range = 0 - 72). Further, the mean of the AS-

Physical subscale was 5.19 (*SD* = 5.4, range = 0– 24, Cronbach's alpha = .91), the mean

of the AS-Cognitive subscale was 4.58 (*SD* = 5.30, range = 0-24, Cronbach's alpha = .92), and the mean of the AS-Social subscale was 8.55 (*SD* = 5.27, range = 0 – 24, Cronbach's alpha = .83).

Non-acceptance of negative affect. The Difficulties in Emotional Regulation Scale (DERS; Gratz & Roemer, 2004; Appendix C) is a 36-item measure that assesses six constructs thought to predict an individual's ability to effectively regulate negative affect: non-acceptance of negative affect (i.e., Non-Acceptance; e.g., "When I'm upset, I feel guilty for feeling that way"), difficulties engaging in goal-directed activity in the presence of negative affect (i.e., Goals; e.g., "When I'm upset, I have difficulty getting work done"), difficulties controlling impulses (i.e., Impulse; e.g., "When I'm upset, I have difficulty controlling my behaviors"), lack of emotional awareness (i.e., Awareness: e.g., "I pay attention to how I feel"), limited emotion-regulation self-efficacy (i.e., Strategies: "When I'm upset, I believe that there is nothing I can do to make myself feel better"), and lack of emotional clarity (i.e., Clarity; e.g., "I am confused about how I feel"). The DERS asks participants to rate on a 5-point Likert-type scale from 1 (*almost never*) to 5 (*almost always*) how often each of the 36 items can be said to be true for them. In one study, the DERS demonstrated adequate convergent validity with other measures of emotion regulation (Gratz & Roemer, 2004). The present study utilized only the Non-Acceptance subscale of the DERS, which contains six items that have previously demonstrated high internal consistency (Cronbach's alpha = .85) and appears to concurrently predict self-harm frequency in men (Gratz & Roemer, 2004). In the sample (*N* = 357) of college students used to validate the DERS, Gratz and Roemer (2004) report that the non-acceptance subscale had a mean of 11.67 (*SD* = 4.72) among women (*n* =

260) and a mean of 11.55 ($SD = 4.20$) among men ($n = 97$), with no significant gender differences. The mean sum for this subscale was 12.07 ($SD = 5.01$, range = 6 - 27) and the subscale demonstrated good to excellent reliability (Cronbach's alpha = .89) in the present sample. In the present sample, the non-acceptance subscale had a mean of 12.20 ($SD = 4.72$, range = 6 - 25) among women and a mean of 11.95 ($SD = 5.29$, range = 6 - 27) among men, with no significant gender differences. The present study validated and utilized a 3-item measure of non-acceptance derived from these six items in order to provide a unidimensional and gender invariant measure of non-acceptance. The **Procedures** section contains the details and results of these endeavors.

   Alcohol use quantity and frequency. The Alcohol Use Disorders Identification Test (AUDIT; Babor et al., 2001; Saunders et al., 1993; Appendix D) is a 10-item measure assessing alcohol use quantity and frequency, alcohol problems, and symptoms of alcohol dependence. This measure can be used to identify problem drinkers as well as drinkers with alcohol use disorders. The AUDIT has adequate reliability and validity among college-aged samples (Kokotailo et al., 2004). In order to allow the researcher to statistically control for the possibility that any observed relations between the predictors and criteria were due to the relation between predictors and more frequent alcohol use, irrespective of motivation, alcohol use quantity and frequency was entered as a covariate in all analyses. In the current sample, the median drinking frequency was 2-4 times per month, the median number of drinks consumed per drinking occasion was between 5 and 6, and the median frequency of binge drinking (i.e., drinking 6 or more standard drinks on one occasion) was "monthly." Approximately 7.7% ($n = 19$) of the present sample responded to the AUDIT in a fashion suggestive of alcohol dependence (i.e., had a total

score of 20 or greater) and 10% (n = 27) reported experiencing symptoms of withdrawal on a monthly-or-greater basis (Babor et al., 2001). In addition, the quantity and frequency subscale of the AUDIT demonstrated acceptable reliability in the present sample (Cronbach's alpha = .78).

Negative affect. The Positive Affect Negative Affect Scale (PANAS; Watson et al., 1988; Appendix E) is a 20-item measure designed to assess the extent to which respondents have experienced positive and negative emotional states over a specified time frame. Respondents were asked to rate on a Likert-type scale from 1 (*very slightly or not at all*) to 5 (*extremely*) to what extent they have felt a number of ways (10 positive feelings and 10 negative feelings) over the past year. Only the negative affect subscale was used in data analyses. Previous work indicates that the negative affect subscale of the PANAS is highly internally consistent (Cronbach's alphas between .84 and .87; Watson et al., 1988) and appears to correlate with appropriate theoretically related factors (Watson et al., 1988; MacKinnon et al., 1999), supporting the measure's validity. Furthermore, Crawford & Henry (2004) provide confirmatory evidence of the factorial validity of this scale. In a college sample (N = 649), Watson, Clark, and Tellegen (1988) reported a mean PANAS-negative affect past-year subscale score of 21.10 (SD = 6.4), with no robust gender differences. Using a large (N = 1,003) representative sample of community dwelling adults residing in England, Crawford and Henry (2004) found gender differences in the PANAS-negative affect subscale, such that women (n = 537) had a mean of 16.68 (SD = 6.37, range = 10 – 42), whereas men (n = 466) had a significantly lower mean of 15.20 (SD = 5.23, range = 10 - 42). The PANAS-negative affect subscale had a mean of 26.39 (SD = 6.70, range = 12 - 46) and demonstrated good

reliability (Cronbach's alpha = .82) in the present sample. In the present sample, the PANAS-negative affect subscale had a mean of 25.00 (*SD* = 6.71, range = 12 – 44) among men and a mean of 27.83 (*SD* = 6.31, range = 16 – 46) in women.

Trait anxiety. Respondent's level of trait anxiety was assessed using the trait form of Spielberger State-Trait Anxiety Inventory-Form Y (STAI-T; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983; Appendix F). The STAI-T is designed to assess the extent to which respondents typically feel anxious. When completing the STAI-T, respondents were asked to rate on a Likert-type scale from 1 (*Not at All*) to 4 (*Very Much So*) how well each of 20 adjectives describes them. Of these items, 11 were positively worded such that higher rankings correspond to greater anxiety and 9 were reverse coded. The STAI-T is a widely used measure of trait anxiety and previous work indicates that the trait scale of the STAI-T is highly internally consistent, with alphas ranging from .89 to .91 in samples of college students, working adults, high school students, and military recruits (Spielberger et al., 1983). Using a sample of 855 (62.10% women, n = 531), Spielberger et al. (1983) provide norms for this measure in college students. Specifically, Spielberger and colleagues list a mean of 38.76 (*SD* = 11.95) for women and a mean of 36.47 (*SD* = 10.02) among men and stipulate that women tend to score slightly, but significantly, higher on this measure. The STAI-T had a mean of 38.49 (*SD* = 8.50, range= 22 - 68) and demonstrated adequate reliability in the present sample (Cronbach's alpha = .74). In the present sample, men (*n* = 126) had a mean STAI-T score of 37.10 (*SD* = 8.99, range = 22. - 68), and women (*n* = 122) had a mean STAI-T score of 39.93 (*SD* = 7.73, range = 22 - 62). The STAI-T was used in follow-up analyses detailed at the end of the results section.

Demographic variables. Participants reported gender, ethnicity, and year in college. These items are included in Appendix G.

Procedures

Data collection. These data were collected utilizing the undergraduate psychology research pool at a large mid-southern university. Interested participants were permitted to sign up for the study on Experimetrix (www.experimetrix.com), at which point they received a link to a secure SurveyMonkey webpage (www.surveymonkey.com) containing the informed consent. The informed consent provided participants with information about the aims of the study and informed participants of their rights to elect not to respond to any items or discontinue participation at any point during the survey without loss of credit. After having provided their name to indicate that they understood the information presented to them in the informed consent, the participants were forwarded to the first page of the survey and were free to complete the measures at their own pace. The questionnaires took approximately one hour to complete. Credit was assigned based on completion of the informed consent, which was not connected to the survey data in any way.

Power analysis. As pointed out above, no known study to date has included both non-acceptance and AS as predictors of drinking to cope within one regression analysis. Furthermore, while AS has been associated with coping-motivated drinking (e.g., Stewart et al., 1997; Stewart & Zeitlin, 1995), no study within the alcohol use motives literature has included a measure of non-acceptance. Therefore, two separate studies were used to estimate the effect of AS and non-acceptance on coping-motivated alcohol use in power analyses.

Because it is the only known published work to investigate the relation between non-acceptance and coping-motivated substance use of any sort, Bonn-Miller's and colleagues' (2008) paper was used as an estimate of the unique effect of non-acceptance on coping-motivated alcohol use frequency. G*Power (Erdfelder, Faul, & Buckner, 1996) was used to calculate the necessary sample size to replicate Bonn-Miller's findings regarding non-acceptance. According to *a priori* power analysis, in order to have 80% power to detect the anticipated unique effects of non-acceptance ($sr^2 = .05$) within a model that may be roughly anticipated to predict approximately 31% of the total variance in coping motives for alcohol use, a sample size of approximately 112 would be required.

Relatively few studies of the relation between AS and alcohol motives have covaried for temperamental variables, such as trait anxiety or negative affect. One exception can be found in a study by Novak, Burges, Clark, Zvolenksy, and Brown (2003), in which the authors covaried for trait anxiety. Based on the reported omnibus F and degrees of freedom ($F[2, 25] = 12.00$, $B = .47$, $p < .03$), G*Power reported that a sample of 80 would be sufficient to find this effect. Therefore, the present sample size ($N = 277$) was expected to be sufficient to test the primary hypotheses.

Psychometric evaluation of non-acceptance. As the DERS is a relatively new measure and non-acceptance is a construct in its infancy, the DERS was subjected to a confirmatory factor analysis (CFA) in order to ensure that it provides a measure of non-acceptance that is reliable, distinguishable from the other constructs measured by the DERS, and invariant between the genders. Data were drawn from 850 college students ($M_{age} = 20.05$, $SD = 3.99$, 61.30% women) who had completed the DERS in its entirety,

as part of several studies completed in the Laboratory for Anxiety and Substance Abuse Research.

The final model included DERS items #21 ("When I'm upset, I feel ashamed of myself for feeling that way."), #25 ("When I'm upset, I feel guilty for feeling that way."), and #29 ("When I'm upset, I become irritated at myself for feeling that way,"). This model evidenced good fit (Bollen-Stine Chi-Squared [26, $N = 850$] = 30.19, $p = .26$, CFI = .99, SRMR = .02, RMSEA = .02) both within each gender and when averaged across the genders (Kline, 2005: Hu & Bentler, 1999) and the three items included in the final model (items 21, 25, and 29) appeared invariant between the genders. Of the items removed from the final model, one (i.e., #23: "When I'm upset, I feel like I am weak.") was removed due to significant cross-loadings with the Strategies and Goals factors and two more (i.e., #11: "When I'm upset, I become angry at myself for feeling that way." and #12: "When I'm upset, I become embarrassed for feeling that way.") were removed because the error terms of these items were related in women (but not in men).

Convergent and discriminant validity of this 3-item measure of non-acceptance were tested in a separate sample of 262 undergraduate drinkers ($M_{age} = 19.32$, $SD = 1.25$, range = 18-24, 54.0 % women, 88.3% Caucasian). This 3-item measure of non-acceptance was strongly correlated with original 6-item the full-scale score (r [265] = .94, $p < .001$), suggesting both measure the same construct. This reduced 3-item measure of non-acceptance had a mean of 6.02 ($SD = 2.66$, range = $3 - 15$) and demonstrated good reliability (Cronbach's alpha = .87; Cronbach, 1951). As a negative meta-emotional construct and possible component of neuroticism, non-acceptance was expected to be strongly related to negative affect (assessed using the negative affect subscale of the

PANAS) and neuroticism (measured with the neuroticism subscale of the M5-50;

McCord, 2002, Socha, Cooper, & McCord, 2010). These relations were predicted to be

stronger than its relations to positive affect (assessed using the positive affect subscale of

the PANAS) or the other 4 factors of personality (measured using the openness,

agreeableness, extraversion, and conscientiousness subscales of the M5-50; McCord,

2002, Socha, Cooper, & McCord, 2010). Furthermore, non-acceptance was expected to

be most strongly related to acceptance as assessed using the Acceptance and Action

Questionnaire (AAQ; Hayes et al., 2004), and 3 other measures of acceptance authored

by Kollman, Brown, & Barlow (2009; the Method 1 Questionnaire [M1Q], The Method 2

Questionnaire [M2Q] and the Method 3 Questionnaire [M3Q]).

As expected, the 3-item measure of non-acceptance appeared to be strongly

related to, but not isomorphic with, neuroticism (r[265] = .55, p < .001) and negative

affect (r[265] = .52, p<.001). Further, the 3-item measure of non-acceptance appeared

more strongly related to these constructs than to any of the four other personality

dimensions assessed with the M5.50 (rs[265] = -.18 - -.38, ps < .01) or positive affect

(r[265] =- .11, p = .08). Moreover, the 3-item measure of non-acceptance appeared

strongly related to experiential avoidance/ acceptance, r(265) = .54, p < .001. However,

contrary to predictions, the magnitude of the relation between the 3-item measure of non-

acceptance and experiential avoidance/ acceptance did not exceed the magnitude of the

relation between the 3-item measure of non-acceptance and neuroticism. Furthermore, the

3-item measure of non-acceptance was only weakly related to acceptance as assessed

with the M1Q, M2Q, or M3Q, rs(265) = .12 - .17, ps < .05 (Cohen, 1988). These results

provide some support for the construct of non-acceptance and suggest that the Dialectical

Behavior Therapy (DBT; Linehan, 1993)-based non-acceptance construct measured by the DERS (Gratz & Roemer, 2004) might be distinct from what the authors of these Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999)-based measures by Kollman et al (2009) have labeled "acceptance."

Results

Preliminary Analyses

Data screening. Data were first screened for missingness and then the zero-order correlation matrix was probed to identify covariates. Greater than the suggested 5% of participants had failed to respond to at least one item on the negative affect construct (for which approximately 7.5% of individuals were missing one or more items) and these values were not missing completely at random according to Little's Missing Completely at Random (MCAR) test. For this reason, expectancy maximization was used to estimate missing values for all constructs, as it is believed to be robust in cases where missing data are non-ignorable, such as when greater than 5% of values are missing and appear not to be missing completely at random (McKnight, McKnight, Sidani, & Figueredo, 2007; Tabachnick & Fidell, 2007). Zero-order correlations using imputed data were supportive of hypotheses and are listed in Table 1. Tolerance values for each variable were also examined as a gauge of multicolinearity. In addition, the residuals of all regression models were examined for normality and homoscedasticity. These assumptions were met for all tested models, supporting the reliability of the results.

Covariate identification. Prior to conducting hypothesis-driven analyses, zero-order correlations were examined in order to ensure that demographic correlates were included in the regression equations. In order to ensure parity between the four

hierarchical regression models (described below), covariates were identified based on their zero-order relation with the motive of interests (i.e., residual coping motives, which are described below). Table 1 presents the results of these analyses. Table 2 presents zero-order correlations conducted with total drinking motives scores, along with means and standard deviations for all measures in the present sample. Gender appeared to be significantly related to residual coping-motivated drinking, and was included as a covariate in all regression models. Furthermore, the cognitive dimension of AS appeared significantly related to residual coping-motivated drinking and the predictors of interest (the social and physical dimensions of AS and the 3-item measure of non-acceptance) and was entered as an additional covariate.

Examination of variables. Zero-order correlations were further examined in order to test the associations among the primary variables and covariates in the present sample. In accordance with theory and research, negative affect was significantly positively related to residual drinking to cope, trait anxiety, AS-Total, AS-Physical, AS-Cognitive, AS-Social, Non-Acceptance, and female gender (see Table 1). Trait anxiety showed similar patterns of relatedness and was significantly positively associated with residual drinking to cope, negative affect, AS-Total, AS-Physical, AS-Cognitive, AS-Social, Non-Acceptance, and female gender. As predicted by research and theory, AS-Total was significantly associated with residual drinking to cope as well as residual conformity-motivated drinking (c.f., Stewart, Zvolensky, et al., 2001). Further, AS-Total, AS-Physical, AS-Cognitive, and AS-Social were strongly positively related to trait anxiety and were moderately positively associated with negative affect. All three dimensions of AS showed the expected significant positive relation with total and

residual conformity motives, as well as the anticipated lack of relation with total or residual social motives and total or residual enhancement motives (see Tables 1 and 2). However, while AS-Total and all three dimensions of AS evidenced significant relations with total coping motives (i.e., coping motives that have not been reduced to residuals, which are explained below; Cooper, 1994), only AS-Cognitive was significantly positively related to residual coping motives in the present sample (see Table 2). Furthermore, as found in recent research (e.g., Taylor et al., 2007), AS-Total and all three dimensions of AS were unrelated to demographics, including age and gender, in the present sample. As anticipated, alcohol use quantity and frequency was significantly positively associated with male gender (c.f., O'Malley & Johnson, 2002) along with coping-motivated drinking frequency and enhancement-motivated drinking frequency (c.f., Cooper, 1994). Interestingly, alcohol use quantity and frequency though related to total coping motives (Table 2), were unrelated to residual coping-motivated drinking in the present sample (see Table 1),

Lastly, for measures for which normative data was available, independent samples t-tests were conducted in order to alert the researchers to any meaningful differences between the present sample and normative groups that might influence findings. Where previous research has found significant gender differences, independent samples t-tests were conducted separately by gender. Negative affect was elevated both overall ($t[902] = 11.04$, p < .001) and among both men ($t[590] = 17.50$, $p < .001$) and women ($t[657] = 17.48$, $p < .001$) compared to normative groups (Crawford & Henry, 2004; Watson et al., 1988). In addition, AS-Total ($t[4973] = 7.83$, $p <. 001$), AS-Physical $(t[4973] = 3.61$, $p < .001$), AS-Cognitive ($t[4973] = 7.51$, $p < .001$), and AS-Social ($t[4973] = 8.71$, $p < .001$)

were significantly elevated in the present sample compared to published norms (Taylor et al., 2007). Such differences were anticipated, based on the fact that the present sample was comprised solely of drinkers and the fact that alcohol use is positively associated with anxiety sensitivity and negative affect (e.g., Stewart, Loughlin, et al., 2001; Stewart ,Zvolensky, et al., 2001). In addition, when contrasted with Stewart and Devine's (2000) sample of drinkers, the present sample of drinkers endorsed less frequent enhancement-motivated drinking (t[509] = -8.55, p <.001) and more frequent drinking for coping (t[509] = 3.26, p = .001), conformity (t[509] = 5.36, p < .001), and social (t[509] = 5.35, p < .001) reasons. Such differences should not influence the present findings. Trait anxiety () and non-acceptance means for this sample were not significant different from normative samples for either men or women (Gratz & Roemer, 2004; Spielberger et al., 1983).

Hypothesis-Driven Analyses

Consistent with recommendations by field experts (e.g., Stewart & Devine, 2000), in order to ensure that any observed relations between predictors of interest and criteria were not artifacts caused by the relatedness of the individual drinking motives, all analyses were performed using the residual (i.e., unique) variance from each of the four motives. Residual motive variances were calculated by regressing each of the motives on the three other motives, saving the unstandardized residuals for these models, and using these unstandardized residual scores as criteria in hypothesis-driven analyses analyses.

In order to test the primary hypotheses, four hierarchical regression models were tested, with each of four residual drinking motives (i.e., DMQ-R social, enhancement, coping, and conformity) as criteria. In all models, covariates (i.e., the cognitive

dimension of AS, negative affectivity, quantity and frequency of alcohol use, and gender)
were entered at the first step, while the predictors of interest (i.e., ASI-3 social and
physical dimensions and the 3-item DERS non-acceptance subscale) were entered at the
second step. This procedure allowed the researcher to investigate the significance of the
set of predictors of interest above and beyond variance accounted for by covariates
(indicated by the ΔF value for the second step), the contribution of the shared variance
between the predictors of interest in predicting residual drinking to cope (evident in the
difference between ΔR^2 and the sum of individual predictors' squared multiple
correlations), and, perhaps more importantly, the significance of individual predictors in
predicting residual drinking to cope (as evidenced by associated t values and squared
multiple correlations). Colinearity diagnostics were examined to ensure that any solutions
reached could be expected to be stable across samples. Tables 2-5 provide a summary of
results. None of the tested models appeared to manifest problems with multicolinearity.

The full model with residual frequency of coping-motivated drinking as the
criterion accounted for approximately 15% of the variance in residual drinking to cope,
$F(7, 245) = 6.26$, $R^2 = .15$, $p < .001$. The block of entered covariates accounted for
approximately 13% of the variance in residual drinking to cope, $\Delta F(4, 248) = 9.52$, $\Delta R^2 =$
.13, $p < .001$. Within this step, approximately 6% of the variance in residual drinking to
cope was accounted for by variance shared between the entered covariates. Of the
covariates, negative affect emerged as the sole unique predictor of residual drinking to
cope and accounted for approximately 7% of the variance in this criterion, $\beta = .29$, $t(248)$
$= 4.55$, $sr^2 = .07$, $p < .001$. The block of predictors of interest did not significantly

contribute to the full model, $\Delta F(3, 245) = 1.78$, $\Delta R^2 = .02$, $p = .15$. Table 3 reports these findings in greater detail.

The full model accounted for approximately 12% of the variance in residual conformity-motivated drinking, $F(7, 245) = 4.82$, $R^2 = .12$, $p < .001$. The block of entered covariates accounted for approximately 6% of the variance in residual conformity-motivated drinking, $\Delta F(4, 248) = 4.92$, $\Delta R^2 = .06$, $p = .001$. Within this step, approximately 1% of the variance in residual conformity-motivated drinking was accounted for by variance shared between the block of covariates and AS-Cognitive emerged as a unique predictor of residual conformity-motivated drinking and accounted for approximately 5% of the variance in this criterion, $\beta = .22$, $t(248) = 3.48$, $sr^2 = .05$, $p = .001$. The block of predictors of interest significantly contributed to the full model and accounted for approximately 5% of the variance in residual conformity-motivated drinking, $\Delta F[3, 245] = 4.42$, $\Delta R^2 = .05$, $p = .005$. Approximately 3% of the variance in residual conformity-motivated drinking was accounted for by variance shared between the predictors of interest. Of the predictors of interest, AS-Physical appeared to be the sole unique predictor and accounted for approximately 2% of the variance in residual drinking to cope, $\beta = .22$, $t(245) = 2.12$, $sr^2 = .02$, $p = .04$. Non-acceptance evidenced a trend-level unique relation with residual conformity-motivated drinking frequency, $\beta = .14$, $t(245) = 1.95$, $sr^2 = 01$, $p = .052$. AS-Social did not evidence a significant unique relation with residual conformity-motivated drinking (see Table 4).

The total model predicted approximately 15% of the variance in residual enhancement-motivated drinking, $F[7, 245] = 6.30$, $R^2 = .15$, $p < .001$. The block of entered covariates accounted for approximately 15% of the variance in the criterion,

$\Delta F(4,248) = 10.73$, $\Delta R^2 = .15$, $p < .001$. Drinking quantity and frequency accounted for approximately 13% of the variance in residual enhancement-motivated drinking, $\beta = .39$, $t(248) = 6.44$, $sr^2 = .13$, $p < .001$. Female gender accounted for approximately 2% of unique variance in the criterion, $\beta = .15$, $t(248) = 2.46$, $sr^2 = .02$, $p = .02$. The block of predictors of interest did not account for significant variance in residual enhancement-motivated drinking, $\Delta F(3, 245) = .47$, $\Delta R^2 = <.01$, $p = .70$. Table 5 provides a synopsis of these results.

Consonant with predictions, full model failed to account for unique variance in residual socially-motivated drinking, $F(7, 245) = 1.44$, $R^2 = .04$, $p = .19$. These data are presented in Table 6.

Follow-Up Analyses

Moderation analyses. Because Brown and colleagues' (2005) model was meant to predict relapse, rather than sustained use, and cites the anxiogenic effects of withdrawal as a precipitating factor in relapse, one might expect AS and non-acceptance to evidence a stronger relation with coping-motivated substance use in the presence of high levels of state or trait anxiety. In fact, such a relation has been found in alcohol motives research previously (Comeau et al., 2001). Therefore, a follow-up analysis was performed including the moderating relationship between AS, non-acceptance, and trait anxiety as additional predictors of coping-motivated drinking frequency. This model was similar to the one tested previously, except that trait anxiety (STAIT) was added as a covariate in the first step, the AS-Cognitive x STAIT interaction term was entered as a third step, and a final forth step contained the interaction terms of interest.

The full model accounted for approximately 20% of the variance in residual coping-motivated drinking $F(12, 235) = 4.92$, $R^2 = .20$, $p < .001$. The block of covariates accounted for approximately 16% of the variance in the criterion, $\Delta F(5, 242) = 9.35$, $\Delta R^2 = .16$, $p < .001$. Approximately 10% of the variance in residual drinking to cope was accounted for by variance shared between covariates. Of the entered covariates, only negative affect and trait anxiety evidenced significant unique relations with residual drinking to cope. Negative affect accounted for approximately 3% of unique variance in residual drinking to cope, $\beta = .21$, $t(242) = 3.10$, $sr^2 = .03$, $p = .002$, Trait anxiety accounted for an additional 3% of the variance in the criterion, $\beta = .20$, $t(242) = 2.82$, $sr^2 = .03$, $p = .005$. The block of predictors of interest failed to account for significant additional variance in residual drinking to cope, $\Delta F(3, 239) = 2.07$, $\Delta R^2 = .02$, $p = .11$. The block of interaction terms also failed to predict significant additional variance in the criterion, $\Delta F(3, 235) = 1.74$, $\Delta R^2 = .02$, $p = .16$. Table 7 provides a summary of these results.

Mediation analyses. Based in part on literature suggesting that the effects of AS on drinking to cope might be mediated by trait anxiety (e.g., Kushner, Thuras, Abrams, Brekke, & Stritar, 2001; Stewart & Kushner, 2001), a second follow-up analysis was conducted in order to test this possibility. Given evidence that that both negative affect (c.f., Cooper et al, 1995) , and trait anxiety (c.f., Comeau et al., 2001; Kushner et al., 2001; Stewart & Zeitlin, 1996) are related to drinking to cope, both constructs were tested as independent mediators. The present study was the first to include both constructs in a single regression equation. Because AS is essentially a response of anxiety to anxiety (Taylor et al., 2007), one might expect AS to lead to increases in an individual's level of

trait anxiety. Therefore, in concordance with previous research (e.g., Kushner et al., 2001), it was predicted that the effect of AS on drinking to cope would be indirect via trait anxiety. By contrast, non-acceptance is not uniquely tied to anxiety in that it does not assess meta-emotional responses to anxiety specifically and does not assess fear or anxiety about "being upset." Instead, non-acceptance (as assessed with the DERS) assesses other negative meta-emotions (such as shame, guilt, or anger at oneself) experienced secondary to "being upset." Therefore, one would expect that non-acceptance might influence generalized negative affect, and not trait anxiety. Thus, it was predicted that non-acceptance would demonstrate and indirect effect on drinking to cope via negative affect. Lastly, because anxiety is a negative affective state, one would expect that it to be positively associated with generalized negative affect. Therefore, it was predicted that trait anxiety would demonstrate both a direct effect on drinking to cope and an indirect effect on drinking to cope via negative affect.

This mediation model was tested through a series of simultaneous multiple regressions. Gender and quantity and frequency of alcohol use were entered as covariates in all models. The effects of trait anxiety and negative affect on drinking to cope were tested by regressing drinking to cope on trait anxiety, negative affect, AS-Physical, AS-Social, AS-Cognitive, and Non-Acceptance. Table 8 contains the results of this analysis. The effects of the AS dimensions and non-acceptance on trait anxiety were ascertained by regressing trait anxiety on negative affect, the AS dimensions, and non-acceptance. Table 9 contains the results of this analysis. The effects of non-acceptance, the three AS dimensions, and trait anxiety on negative affect were ascertained by regressing negative

affect on the three AS dimensions, non-acceptance, trait anxiety, gender, and alcohol use quantity and frequency. Table 10 presents the results of this analysis.

Figure 2 depicts the results of the analyses, including unstandardized beta weights and standard errors for the purposes of the Sobell test. As expected, both trait anxiety and generalized negative affect were independently related to drinking to cope. Trait anxiety accounted for 3% of the variance in drinking to cope, $\beta = .21$, $t(239) .= 2.90$, $sr^2 = .03$, $p < .01$. Negative affect accounted for an additional 3% of the variance in drinking to cope, $\beta = .21$, $t(239) = 2.95$, $sr^2 = .03$, $p < .01$. Furthermore, as expected, non-acceptance was unrelated to trait anxiety, $\beta = .09$, $t(239) = 1.36$, $sr^2 < .01$, $p = .18$. Aside from negative affect, which was entered as a covariate, AS-Cognitive emerged as the sole unique predictor of trait anxiety in the model and accounted for approximately 2% of the variance in trait anxiety, $\beta = .22$, $t(240) = 2.47$, $sr^2 = .02$, $p = .02$. Furthermore, in accordance with predictions, non-acceptance and trait anxiety were both uniquely related to negative affect. Non-Acceptance accounted for 2% of unique variance in negative affect, $\beta = .16$, $t(240) = 2.52$, $sr^2 = .02$, $p = .01$. Trait anxiety accounted for 13% unique variance in negative affect, $\beta = .40$, $t(240) = 6.54$, $sr^2 = .13$, $p < .001$. The three dimensions of AS were not significantly related to negative affectivity when controlling for trait anxiety and negative affect. Table 10 presents these results in greater detail. A Sobel test of significance of indirect effects was conducted to test for the significant of the indirect effects of AS-Cognitive and non-acceptance on residual drinking to cope via trait anxiety and negative affect, respectively. The indirect effect of AS-Cognitive on residual coping-motivated drinking was non-significant, $b' = .03$, $SE_{b'} = .02$, $z' = 1.86$, p

= .06. The indirect effect of non-acceptance on residual coping-motivated drinking via negative affect was also non-significant, $b' = .06$, $SE_{b'} = .03$, $z' = 1.92$, $p = .055$.

Discussion

The present study contributes to the extant literature on correlates of coping-motivated drinking in four important respects. The present study is the first to examine the relation between coping-motivated drinking frequency and non-acceptance. Secondly, this study is the first to examine the relation between AS and coping-motivated drinking while statistically controlling for non-acceptance (in addition to negative affect, alcohol use, gender, and the cognitive dimension of AS). Thirdly, the present study is the first to examine the relation between the facets of AS and coping-motivated drinking and does so when controlling for the included covariates. Lastly, the present study is one of few (e.g., Comeau et al., 2001) to examine the relation between AS and drinking to cope utilizing both hierarchical regression and residual drinking motives and is the first to examine the relation between non-acceptance and maladaptive behavior using a validated 3-item measure of non-acceptance. These three modifications were made in order to promote the rigor of the present analyses. Contrary to expectations, neither the physical and social dimension of AS, nor non-acceptance, predicted significant variance in residual coping-motivated drinking frequency above included covariates (see Table 3). Furthermore, contrary to previous research (e.g., Comeau et al., 2001), follow-up analyses suggest that the relation between AS and drinking to cope was not impacted by respondents' levels of trait anxiety (see Table 7).

Instead, the present results indicate that trait anxiety and generalized negative affect were uniquely related to drinking to cope (see Figure 2). Furthermore, AS, in

particular the cognitive dyscontrol dimension, appeared significantly uniquely related to trait anxiety, whereas non-acceptance appeared significantly uniquely related to negative affect. Though not wholly consistent with hypotheses, these results make sense, in that AS is essentially a response of anxiety to anxiety (Taylor et al., 2007), whereas non-acceptance is comprised of various responses to "being upset" (but not specifically to being anxious) and anxiety is not one of the responses specifically assessed (Gratz & Roemer, 2004). The reasons for the cognitive dimension of AS, in particular, to evidence a significant unique relation with trait anxiety are currently unclear. Further, there were not significant indirect effects of either AS or non-acceptance on drinking to cope via either trait anxiety or generalized negative affect. Instead, these indirect effects showed trends towards significance. Thus, the present results failed to replicate previous research that has found indirect effects of AS on drinking to cope via anxiety (Kushner et al., 2001). The current study is the first to probe the indirect effect of non-acceptance on coping-motivated drinking via negative affect. Though disappointing, the present non-significant mediation results are unsurprising, given that Fritz and Mackinnon (2007) estimate a sample of 667 would be required to reach a power of .80 when using a Sobell test to estimate the significance of indirect effect with path coefficients of the small magnitude found in the present sample. Therefore, the present study was underpowered to test mediation, most likely due to the decision to include both the individual facets of AS (rather than a global AS score) and the relatively large number of included covariates. Though the decisions to include the individual facets of AS and to include covariates were made, respectively, in order to increase the clinical utility and stringency of the present findings, these decisions might have reduced the magnitude of the paths of

interest, leading the indirect effects to fail to reach significance.

Though non-acceptance and AS dimensions were not related to *coping*-motivated drinking, the physical dimension of AS appeared to be significantly uniquely associated with *conformity*-motivated drinking and appeared to account for approximately 2% of the variance in this criterion. Non-acceptance also evidenced a trend towards significance and also appeared to account for approximately 2% of the variance in residual conformity-motivated drinking (see Table 4). These results are consistent with other research on conformity-motivated drinking that have assessed AS as a unitary construct (e.g., Howell et al., 2010; Stewart, Zvolensky et al., 2001; 2002) and suggest further that individuals who fear bodily sensations associated with anxiety (i.e., those high in the physical facet of AS) and possibly also those who feel ashamed, guilty, or irritated at themselves for getting upset (i.e., those who have higher levels of non-acceptance) might be more likely to comply with peer pressure to imbibe. Such pressure might be especially prevalent on college campuses, in particular as a component of Greek life, and might be expected to motivate drinking in male students, in particular (c.f., Stewart, Zvolensky et al, 2001). These results suggest the utility of considering AS and non-acceptance in future studies of the predictors of conformity-motivated drinking.

The present results diverge from predictions set out by Brown and colleagues' (2005) model, the larger body of research on the relation between AS and drinking to cope (Comeau et al., 2001; Stewart & Zeitlin, 1995; Stewart, Zvolensky et al. 2001; 2002), and the findings of Bonn-Miller and colleagues (2008). It might, therefore, be helpful to consider the possible causes of these disagreements. Reasons for these seeming disagreements are discussed in the next several paragraphs.

Reasons for Divergence from Brown et al.'s (2005) Model

Broadly, the present results might have been caused by the lack of generalizability of Brown and colleagues' (2005) model of smoking relapse to non-relapse-related drinking behaviors. More specifically, Brown and colleagues' model might only describe smoking behavior (regardless of the presence of absence of withdrawal and both during relapse and outside of it), might only describe withdrawal-related use of any substance, or might apply only to withdrawal-driven smoking. Any of these reasons might have caused the present findings to be null.

If Brown and colleagues'(2005) model were to apply to nicotine use, and not to alcohol use, that would suggest that nicotine might be more effective than alcohol at reducing unpleasant physiological and emotional states. Therefore, one should examine whether nicotine intoxication might be more effective (or perceived as more effective) than alcohol at reducing unpleasant physiological or emotional states. Moreover, one should consider whether Brown and colleagues' model might only apply to withdrawal-related use of any substance. It would, thus, be important to consider whether withdrawal from alcohol might cause intense negative physical and emotional experiences. If alcohol withdrawal is not typically associated with such experiences, one would not anticipate Brown and colleagues' model to extend to withdrawal-driven drinking. Furthermore, even if both alcohol and nicotine withdrawal are associated with negative physiological and emotional experiences, one should also consider whether nicotine withdrawal might be more severe and/or intense (e.g., differences in the delay between discontinuation of use and onset of withdrawal, intensity of withdrawal peak, rate of withdrawal escalation, and length of withdrawal) than alcohol withdrawal). Differences in severity and intensity

of withdrawal might lead Brown et al.'s model to predict withdrawal-driven smoking to a greater degree than withdrawal-driven drinking. Lastly, one might expect Brown et al.'s model to be especially well suited for predicting withdrawal-related substance use if individuals experience more intense withdrawal from a given substance as a result of having elevations in AS or non-acceptance. Therefore, if either AS or non-acceptance is associated with more acute nicotine withdrawal, but is not associated with more intense alcohol withdrawal, that might shed light on the present results. The next several paragraphs examine these possibilities in greater detail.

Intoxication. As summarized above, even if Brown and colleagues' (2005) model can be used as a model of substance use in non-dependent users, one might expect it would not generalize to alcohol if alcohol intoxication is not associated with reductions in unpleasant physical sensations or unpleasant emotional states. Similar to nicotine intoxication (cf., Kassel & Unrod, 2000), alcohol intoxication is associated with decreases in aversive emotional states (c.f., Donohue, Curtin, Patrick, & Lang, 2007; Moberg & Curtin, 2009). While both substances are reported to lead to physiological tension reduction, the two substances do not produce identical physiological states. For example, there is some evidence that acute alcohol intoxication leads to increased heart rate, increased skin conductance, decreased physiological response to stress (Levenson, Sher, Grossman, Newman, & Newlin, 1980) and decreased muscle tension (Steffen, Nathan, & Taylor, 1974). Nicotine intoxication appears to lead to similar, but not identical, effects, including increased heart rate and blood pressure, along with decreased skin temperature (Heishman, Snyder, & Henningfield, 1993; Jones, Garrett, & Griffiths, 1999). The ways in which these physiological responses are associated with tension-

reducing self-reports in both substances is not well understood. Barring further clarification of the exact relation between these individual physiological effects of intoxication and reports of tension-reduction, the physiological effects of either nicotine or alcohol intoxication might be tentatively viewed as congruent with Brown and colleagues' model. Thus, without either further elucidation of the relation between objective physiological effects and perceptions of decreased physical tension, or further specification of Brown et al.'s model, there is little reason to expect that their model would predict non-withdrawal-driven nicotine use to a greater degree than non-withdrawal-driven alcohol use.

Withdrawal. Though it might arguably be extended to non-withdrawal-driven substance use, Brown et al.'s (2005) model was designed as a model of withdrawal-driven smoking. As such, insofar as it can be extended to other substances, Brown et al.'s model might pertain only to withdrawal-driven use of those substances. More specifically, one might expect Brown and colleagues' model to hold for any substance that produces withdrawal symptoms consisting of aversive physical and emotional states and these relationships might only be apparent in substance-dependent samples experiencing withdrawal. Therefore, if nicotine withdrawal, but not alcohol withdrawal, is associated with increased aversive emotions and physiological states, that would imply that Brown et al.'s model might fail to generalize to withdrawal-driven alcohol use. However, both nicotine and alcohol withdrawal are associated with unpleasant physiological sensations, along with "non-specific" aversive emotions, such as anxiety (Hughes, Higgins, & Bickel, 1994), indicating that Brown and colleagues' model might generalize to withdrawal-driven drinking.

While Brown et al.'s (2005) model might be expected to generalize to withdrawal-driven alcohol use based on similarities in withdrawal symptoms, differences in the time course and intensity of withdrawal might lead Brown et al.'s model to more strongly represent withdrawal-driven nicotine use than withdrawal-driven drinking. Specifically, one might expect Brown and colleagues' model to better predict withdrawal-driven use of substances that produce more rapid onset of withdrawal, more intense peak withdrawal symptoms, more rapidly escalating withdrawal symptoms, or longer lasting withdrawal symptoms. Substances that produce more rapid withdrawal will permit users to experience a greater number of withdrawal episodes per length of use, effectively increasing the number of learning trials afforded to those users to learn to lessen withdrawal by re-initiating substance use. Substances that produce more intense withdrawal or that have withdrawal symptoms that escalate rapidly will be more likely to motivate escape by increasing discomfort and decreasing the user's ability to habituate. Substances that produce longer-lasting withdrawal symptoms provide users with a longer interval in which to learn to re-initiate substance use to escape withdrawal. Therefore, if nicotine withdrawal symptoms emerge sooner, are more intense at their peak, escalate more rapidly, or last longer that symptoms of alcohol withdrawal, one might expect Brown et al.'s model to predict withdrawal-driven smoking to a greater degree than withdrawal-driven drinking.

Smokers begin to enter withdrawal within minutes after their last cigarette (c.f., Jarvik et al., 2000). By contrast, alcohol withdrawal typically emerges within 6-12 hours after discontinuation of drinking (Bayard et al., 2004). Furthermore, while alcohol withdrawal symptoms are objectively more severe and can lead disorientation,

hallucinations, or death (Hughes et al,, 1994), nicotine withdrawal symptoms commonly reach their apex in as little as 1 day (Hughes, 1992), whereas alcohol withdrawal typically takes at least 2 days to reach apex (Bayard et al., 2004), providing smokers with a somewhat greater number of trials in which to learn to respond to withdrawal by further use of nicotine. Furthermore, nicotine withdrawal takes longer to fully resolve than alcohol withdrawal (Hughes et al., 1994), possibly providing a longer interval in which nicotine withdrawal can motivate reinstatement of use. Therefore, one might expect that Brown and colleagues' (2005) model might predict smoking-related relapse behaviors more strongly than alcohol-related relapse behaviors. However, the overall greater intensity of alcohol withdrawal symptoms would speak against this conclusion and suggest researchers seek alternate explanations.

Although it is possible that Brown and colleagues' (2005) model might predict withdrawal-related nicotine use to a greater degree than withdrawal-related drinking behavior, it is perhaps more likely that their model would predict withdrawal-driven use for any substance for which withdrawal is associated with aversive physiological states and emotions. In other words, though their model might extend to withdrawal-driven use of any number of substances, formal substance dependence that includes frequent episodes of substance withdrawal might be required in order for subjects to evidence the patterns predicted by Brown and colleagues' model. Given that alcohol dependence might interfere with class attendance to a greater degree than nicotine dependence, one might expect that college samples would be less likely to consist of alcohol dependent individuals than nicotine dependent individuals. Perhaps for this reason, only approximately 9.1% ($n = 23$) of the present sample responded to the AUDIT in a fashion

strongly suggestive of alcohol dependence and only approximately 10% ($n = 27$) reported

experiencing symptoms of withdrawal on a monthly-or-greater basis. Therefore, while

these numbers are rather concerning, the present sample was likely unrepresentative of

the withdrawal-driven substance use described by Brown and colleagues.

Anxiety sensitivity and withdrawal severity. In addition to better predicting

withdrawal-driven use of a substance if withdrawal from that substances causes aversive

physiological sensations and emotional states**,** Brown et al.'s (2005) model might be

particularly apt at predicting withdrawal-driven use of a given substance if anxiety

sensitivity and/or non-acceptance are associated with more intense withdrawal symptoms

from that substance. Therefore, it is important to consider that Brown et al.'s model

might best predict withdrawal-related use of a given substance if withdrawal from that

substance is positively related to either AS or non-acceptance. While there has been no

work to date examining the relation between non-acceptance and withdrawal intensity,

there is evidence that withdrawal from both nicotine (Zvolensky et al., 2004) and alcohol

(Kushner et al., 2001) is intensified in individuals with elevated levels of AS. Hence, it

appears unlikely that Brown and colleagues' model might evidence a stronger relation to

withdrawal-related smoking than withdrawal-related drinking based on expected severity

of withdrawal.

Summary. It appears unlikely that the present results diverge from predictions

made by Brown and colleagues' (2005) due to differences in the acute intoxication

effects of nicotine and alcohol or the withdrawal effects of either substance. Indeed,

while they do not produce identical effects, both nicotine and alcohol intoxication can

reduce aversive emotional states (Donohuee et al, 2007; Kassel & Unrod, 2000; Moberg

& Curtin, 2009), and both are associated with physiological changes that might be experienced as tension-reducing (Heishman, Snyder, & Henningfield, 1993; Jones, Garrett, & Griffiths, 1999; Levenson, Sher, Grossman, Newman, & Newlin, 1980; Steffen, Nathan, & Taylor, 1974), suggesting that Brown and colleagues' model might fit either substance. Moreover, withdrawal from either substance has been associated with aversive physical and emotional states (Hughes et al., 1994)) and AS appears to lead to more intense withdrawal from either substance (Kushner, et al., 2000; Zvolensky et al., 2004), suggesting, once more, that Brown and colleagues' model might apply to withdrawal-related use of either substance. Lastly, comparison of time-course and intensity of withdrawal syndromes does not overwhelmingly suggest that nicotine users should evidence stronger patterns of withdrawal-driven use than drinkers.

Overall, there is some reason to suspect that Brown and colleagues' (2005) model can be extended to predict withdrawal-related drinking. Unfortunately, the present sample consisted of relatively few individuals who are likely to be alcohol dependent and/or experience withdrawal on a greater-than-monthly basis and was, thus, underpowered to assess the relation between AS, non-acceptance, withdrawal, and re-instatement of alcohol use. Future studies might employ clinical samples and assess for a wider variety of withdrawal symptoms (rather than only a single item, as in the present study), along with the frequency and severity of these symptoms.

Reasons for Divergence From Body of Literature on Relation between AS and Drinking to Cope

In addition to diverging from predictions made by Brown and colleagues' (2005) model, the presents results generally stand at odds with the larger body of work on the

relation between AS and drinking to cope (Comeau, Stewart, & Loba, 2001; Stewart & Zeitlin, 1995; Stewart, Zvolensky, & Eifert, 2001; 2002). Four aspects of the current rigorous analytic strategy might have lead to results that are inconsistent with findings in the broader literature. Firstly, the present study is the first to assess the relation between the individual facets of AS and drinking to cope and covaried for the cognitive facet of AS. Secondly, the present study on the relation between AS and drinking to cope to included non-acceptance. Further, the present study utilized residual coping-motivated drinking as the criterion of interest, in line with expert recommendations (Stewart & Define, 2000). Finally, the present study both employed hierarchical regression and covaried for negative affect (trait anxiety in the follow-up analyses). Each of these decisions was made to promote statistical rigor. The next several paragraphs consider the impact of each of these three analytical decisions upon the present findings.

The inclusion of the individual facets of AS. It should first be stated that the present results do not speak directly to the relation of the global AS construct and drinking to cope. Though there is strong evidence that the three dimensions of AS appear to load on a singular AS construct (Osman et al., 2010), the present study chose to assess the relation between the individual facets of AS and drinking to cope in order to enhance the clinical utility of the findings (c.f., Steinman & Teachman, 2010). Further, only two of the three facets (the physical and social dimensions) were included in the second step of the regression equation. The decision to include these two facets was based on the author's interpretation of Brown and colleagues' (2005) model. Lastly, based on evidence that the cognitive dimension of AS is related to the physical and social dimensions of AS (e.g., Bernstein et al., 2010; Taylor et al, 2007; see Table 1) and was related to residual

drinking to cope in the present sample (see Table 1), the cognitive dimension of AS was

included as a covariate in the first step of the regression equation. This was done in order

to permit the second step to serve as a strict test of the model under investigation. Results

might have been different if either the unitary AS construct or all three dimensions of AS

been included in the second step of the regression equation.

The inclusion of non-acceptance. The present study is the first to include non-

acceptance as a predictor of coping-motivated drinking, and the inclusion of non-

acceptance might have caused the significance of the dimensions of AS to be

underestimated to the extent that an individual dimension of AS is related to non-

acceptance (see Table 1). While the inclusion of non-acceptance might explain the lack of

significant relations between the dimensions of AS and drinking to cope in the second

step of the regression equation, the inclusion of non-acceptance does not explain the non-

significant incremental F-value associated with the second step of the regression

equation. The non-significant incremental F-value for the second step indicates that

neither the unique, nor the shared variance of the block of variables of interest were

significantly related to coping-motivated drinking frequency when controlling for the

included covariates (Cohen, Cohen, West, & Aiken, 2003; Tabachnick & Fidell, 2007).

Instead, these surprising results might have been produced by other decisions made to

promote the rigor of the present investigation. In particular, the present study utilized

residual drinking motive variance as the criterion variables.

The use of residual drinking motives. The decision to use residual drinking

motives as criteria was based on expert recommendations (e.g., Stewart & Devine, 2000)

as well as the desire to be consistent with research on the relation between drinking

motives and drinking behavior. Most research examining the relation between drinking

motives and drinking behavior has covaried for all drinking motives (e.g., Cooper, 1994,

Stewart, Zvolensky et al., 2001), essentially finding that the relation between residual

drinking to cope and drinking outcomes is significant. The significant relation between

residual drinking to cope and drinking behavior has served as the rationale for exploring

drinking to cope further in the literature. However, research on the relation between AS

and drinking to cope has not always focused exclusively on residual drinking to cope.

One study (e.g., Comeau, Stewart, & Loba, 2001) has used residual drinking to cope as

the criterion, but the other three have not done so (e.g., Stewart, Zvolensky et al., 2001;

2002; Stewart & Zeitlin, 1995). The choice to utilize residual drinking motives is a

strength of the present study. Further, given that other studies which have done so have

found significant relations between AS and residual drinking to cope, it is unlikely to be

the reason for present findings to have diverged.

      Hierarchical regression, inclusion of covariates, and order of entry. The

present study employed hierarchical regression and covaried for generalized negative

affect, gender, and the cognitive dimension of AS in the first step of the equation. These

choices were made in order to permit the incremental *F*-value associated with the second

step to provide a clear estimate of the incremental significance of the predictors of

interest (Cohen et al., 2003; Tabachnick & Fidell, 2007). By contrast, previous studies

either have not employed hierarchical regression and have not included covariates (e.g.,

Stewart, Zvolensky et al., 2001), or have employed hierarchical regression but have only

included demographic correlates of drinking to cope (e.g., Comeau et al, 2001 Stewart et

al., 2002). As mentioned above, in addition to controlling for important demographic

covariates, the author chose to include an affective covariate (i.e., negative affect) in the first step of the hypothesis-driven hierarchical regression equations. The choice to control for a trait-like negative affective variable was guided by the following logic: as a response to negative affective states (c.f., Cooper 1994), drinking to cope should be associated with trait-like levels of negative affective states, such as anxiety (c.f., Comeau et al. 2001) or generalized negative affect (c.f., Cooper et al., 1995). Research on meta-affective correlates of drinking to cope (such as AS and non-acceptance) should covary for at least one such affective variable in order to demonstrate unique and meaningful associations with coping-motivated drinking. Moreover, the choice of which particular trait-like primary-affective covariate to include is probably best driven by the particular meta-affective variables of interest. For example, studies on the relation between meta-emotional responses to anxiety (e.g., AS) and drinking to cope should likely covary for trait levels of anxiety, whereas research on the relation between meta-emotional responses to dysthymic/depressed affect and drinking to cope should covary for trait levels of dysthymic/depressive affect. AS is a response to anxiety of anxiety, suggesting that trait anxiety would be an important covariate to be included in studies on the relation between AS and drinking to cope (c.f., Comeau et al, 2001; Kushner et al., 2001). However, as assessed in the present study, non-acceptance is comprised of responses to the ambiguously described primary negative affective state of "being upset.," and anxiety is not one of the meta-affective states assessed (Gratz & Roemer, 2004). Though ambiguous, "being upset" is most likely a negative affective state, suggesting that generalized negative affect would be an important covariate to include in studies on the relation between non-acceptance and drinking to cope. Further, Watson et al.'s (1988)

construct of negative affect includes trait frequency of anxious affect/mood. Thus, for the sake of parsimony, the researcher elected to include negative affect as a covariate in the present study because the researcher judged that negative affect might be an appropriate covariate for both AS and non-acceptance, whereas trait anxiety might not logically be related to non-acceptance.

The present study is not the only one to include trait-like levels of a negative affective state. Comeau et al. (2001) also included the primary affective factor of trait anxiety in their analyses. However, Comeau et al. included trait anxiety as a variable of interest in the second step, rather than as a covariate. Thus, Comeau et al.'s results do not speak to the incremental significance of AS as a predictor of coping-motivated drinking over trait anxiety. Moreover, Comeau et al.'s findings are consistent with the present results in that, while there did appear to be a significant zero-order relation between AS and residual coping motives, regression results suggested AS was no longer significantly related to coping motives when including trait anxiety, similar to results from both the hypothesis-driven analyses (which covaried for negative affect) and follow-up analyses (which covaried for both trait anxiety and negative affect) presented here. However, Comeau et al. found significant moderation of the relation between trait anxiety and coping-motivated drinking by AS, whereas the present study did not. This difference in study findings might be related to the inclusion of negative affect as an additional covariate in follow-up moderation analyses, as Comeau et al. did not include negative affect in their follow-up moderation analyses. While the choices to include negative affect as a covariate in both hypothesis-driven and follow-up analyses and to enter all covariates in the first step of all regression equations are viewed as strengths of the

present study, these choices might also have lead the present findings to diverge from the larger body of research on the relation between AS and drinking to cope and from the results of Comeau et al. in particular..

Summary. The present results most likely diverge from the extant literature related to AS and drinking to cope due to the use of the individual dimensions of AS (in particular the inclusion of AS-Cognitive as a covariate), the decision to assess negative affect, and the decision to include all covariates in the first step of the hierarchical model. The decision to covary for AS-Cognitive and include the social and physical dimensions of AS in the second step was made in keeping with Brown and colleagues' (2005) model and in order to enhance the clinical utility of findings (c.f., Steinman & Teachman, 2010). The choice to covary for negative affect was made in order to ensure that any observed relations between the dimensions of AS and non-acceptance were not spurious and the result of shared variance with negative affect. While these decisions might have caused the present findings to diverge from the broader literature, this analytic strategy adds to the rigor of the present study.

Differences from Bonn-Miller and colleagues (2008)

In addition to the differences of the current findings regarding the larger body of work on the relation between AS and drinking to cope, the present findings are inconsistent with the findings of Bonn-Miller and colleagues (2008) in the field of marijuana use motives. Between-substance differences in the effects of intoxication, in the effects of withdrawal, or in the impact of AS or non-acceptance on withdrawal severity might have contributed to these seemingly discordant findings. Furthermore, the present findings might diverge from Bonn-Miller et al. due to between-study differences

in either the samples or statistical methods employed. The next several paragraphs consider these possibilities in greater detail.

      Between-substance differences. The disagreement between the present findings and the findings in Bonn-Miller et al. (2008) might reflect varying intoxicating or withdrawal effects of marijuana and alcohol, or from between-substance differences in the timing of onset of withdrawal, timing to peak of withdrawal, overall intensity of withdrawal, overall length of withdrawal episodes, or relation between withdrawal intensity and either anxiety sensitivity or non-acceptance. Both marijuana and alcohol intoxication are associated with subjective reports of reductions in physical tension and negative mood states (Ashton, 2001; Levenson, Sher, Grossman, Newman, & Newlin, 1980; Sutker, Allain, Brantley, & Randall, 1982) and withdrawal from either substance has been associated with increases in both negative physiological sensations and negative mood states (Bayard et al., 2004; Budney, Hughes, Moore, & Novy, 2001; Budney, Moore, Vandrey, & Hughes, 2003; Hughes et al., 1994). Furthermore, both alcohol withdrawal and marijuana withdrawal take approximately two weeks to resolve completely (Budney et al., 2003, Hughes et al, 1994) and AS appears to be associated with more intense withdrawal from both substances (Kushner et al., 2001 Bonn-Miller et al., 2007). However, marijuana withdrawal appears to manifest and reach peak slightly more rapidly (e.g., Budney, Novy, & Hughes, 1999; Budney et al., 2003; Budney, Vandrey, Hughes, Moore, & Bahrenburg, 2007; Jones, Benowitz, & Bachman, 1976; Kouri & Pope, 2000) than alcohol withdrawal (Bayard et al., 2004; Hughes et al., 1994), essentially increasing the number of learning trials a regular marijuana user might experience per use, slightly decreasing the marijuana smoker's ability to habituate to

intensifying symptoms, and slightly increasing the smoker's motivation to escape such symptoms. Conversely, marijuana withdrawal is objectively less severe, as it does not involve a risk of death (e.g., Budney et al., 2003; Hughes et al., 1994), which might otherwise suggest that alcohol users would be more likely to relapse to avoid these symptoms. Therefore, similar to nicotine users, marijuana users might have had a greater number of trials to learn to escape withdrawal by re-initiating substance use. The difference in intensity between alcohol and marijuana withdrawal seems to speak against this conclusion and suggest other explanations be considered.

Between-study variations in sample and statistics. Given that between-substance differences in the effects of intoxication and withdrawal on negative emotions and aversive physiological states are not strongly compelling, it seems more likely that the present results diverge from Bonn-Miller et al. (2008) due to differences in either the samples collected or the statistical methods employed. Given that Brown and colleagues' (2005) model might be expected to predict substance use in individuals with substance dependence in particular, the findings may have differed if the sample in Bonn-Miller et al. included a higher percentage of substance dependent subjects. This does not appear to be the case, however, as Bonn-Miller et al.'s inclusion criteria (a history of at least one instance of marijuana use within the past 30 days) were similar to the inclusion requirements for the present study (typical alcohol use of at least once in thirty days) and Bonn-Miller and colleagues' excluded individuals who met criteria for a current marijuana abuse or dependence diagnosis. However, it is likely that the present study diverges from Bonn-Miller et al. due to differences in the statistical methods employed. Specifically, Bonn-Miller et al. did not use residual marijuana motives, did not utilize the

individual facets of AS, and utilized the original 6-item non-acceptance scale. For reasons previously explained, the present study utilized residual drinking motives and considered the roles of the component facets of AS. Further, in order to promote the validity of the findings, the present study utilized a 3-item measure of non-acceptance that was both adequately unidimensional (i.e., had no items that significantly cross-loaded with other DERS constructs) and gender invariant in structure (i.e., can be thought to represent the same construct in men and women). The net effect of these strategies might have been to decrease the variance in both the predictors of interest and in the criterion under investigation, leading to a reduction in their demonstrable association. While these modifications were perceived to be necessary and are viewed as a strength of the present study, they might explain the disagreement between the findings of the present study and those of Bonn-Miller and collaborators.

Summary. The present findings might have diverged from the findings in Bonn-Miller et al. (2008) due to between-substance differences in alcohol and nicotine intoxication and withdrawal, between-study differences in terms of participant's levels of substance-dependence, or between-study differences in statistical methods employed. While there are some small differences in onset and time-course of withdrawal that might support between-substance differences in the applicability of Brown et al.'s (2005) model, these differences were not overwhelming. Further, Bonn-Miller et al. excluded marijuana-dependent subjects, making it unlikely that between-study differences in sample lead to the divergent findings. Therefore, it seems more likely that the present study disagrees with the findings of Bonn-Miller and colleagues due to differences in the statistical methods employed.

Limitations and Future Directions

The present findings were limited in several respects. Firstly, due to the preliminary nature of the present study, a cross-sectional design was chosen and the constructs of interest were assessed using self-report measures. Future studies might employ either prospective designs or laboratory-based manipulations, in order to permit more confidence in causal attributions. Moreover, there are presently no well-validated self-report instruments, objective measures, or collateral informant measures of non-acceptance. Future research would benefit from the development of such measures. Moreover, further research would benefit from continued efforts to improve the psychometric properties of other included constructs. Further, given that Brown and colleagues' (2005) model might be expected to predict withdrawal-driven drinking, the present study was likely underpowered to find the effects of interest. In fact, only approximately 8% ($n = 19$) of the present sample responded to the AUDIT in a fashion strongly suggestive of alcohol dependence (Babor et al., 2001), only approximately 10% ($n = 27$) reported experiencing symptoms of withdrawal on a monthly-or-greater basis, and alcohol withdrawal was not assessed in great detail. In addition, the present study did not assess for other substance use, misuse, or withdrawal and was not, therefore, able to demonstrate specificity of the relation between alcohol use, misuse, or withdrawal, and either AS, and non-acceptance. Given that Brown and colleagues' model might be expected to generalize to any substance or combination of substances that reduce aversive physical and emotional states or that produce withdrawal that creates aversive emotions and physical states, it might be particularly important to covary for other substance use, abuse, or withdrawal when testing Brown et al.'s (2005) model. This consideration is

further underscored by the fact that withdrawal from some substances (e.g., alcohol) can

be alleviated through use of other substances (e.g., benzodiazepines; Knapp, Overstreet,

& Breese, 2005). Therefore, future work might test Brown et al.'s model in a sample of

alcohol-dependent young adults who do not endorse other substance use and report

experiencing alcohol withdrawal regularly. Such work might also include a standardized

assessment of the number and intensity of withdrawal symptoms experienced during

experimentally-monitored abstinence in order to more fully assess the relation between

AS, non-acceptance, withdrawal symptoms, and re-initiation of drinking. In addition to

being composed largely of non-dependent drinkers, the present sample also consisted

largely of under-aged Caucasian drinkers and was composed solely of college students.

For this reason, it is unclear that the present findings would generalize to adults between

the ages of 21- 25 years, to non-Caucasian ethnic groups, or to young adult drinkers

between the ages of 18-25 who are not enrolled in college. Future studies might endeavor

to selectively sample across the age range of young-adult drinkers aged 18-25 years and

might employ epidemiological sampling techniques to accurately represent non-

Caucasian young adult drinkers and non-college-enrolled young adult drinkers.

Moreover, there is evidence that the effects of alcohol on negative affect are both

dose and context-dependent, such that both substances must be taken in intoxicating

doses in the presence of benign distraction to maximally alter emotional processing

(Kassel & Unrod, 2000; Moberg & Curtain, 2009; Sayette, 1993; Steele & Josephs,

1990). The present study did not consider typical dose of alcohol consumed for coping-

motivated reasons and did not inquire about distraction available in the typical drinking

context. Future studies might consider these factors. Lastly, there is some evidence that

the structure of both AS and drinking motives may be different in highly anxious individuals (Bernstein et al., 2010; Williams et al., 2010). Approximately 30% ($n = 77$) of the present sample might fall into this taxon, as indicated by a combined physical and cognitive AS score of 13 or greater (Bernstein et al., 2010). Hence, the present results might have been affected by the lack of measurement fit in this group of participants. In particular, the surprising lack of significant zero-order relation between the unitary AS construct (or the physical or social facets of AS) and residual drinking to cope (see Table 1) might have been attributable to this measurement issue. Future studies might benefit by either including measurement tools that have been validated for highly anxious respondents or excluding individuals within this taxon.

Conclusions and Summary

The present study was the first to extend Brown and colleagues' (2005) model of coping-related relapse-driven smoking to alcohol use and provided a rigorous test of this model in a sample of college-aged (18-25 years of age) drinkers. The hypothesis that coping-motivated drinking frequency would be positively related to both negative emotional responses to physical sensations of anxiety and negative emotional responses to primary negative affect was not supported. Instead, negative affect and trait anxiety appeared to predict residual drinking to cope, with the cognitive dimension of AS and non-acceptance demonstrating trends towards indirectly influencing drinking to cope via these affective factors (c.f., Kushner et al., 2001). These results suggest that AS-Cognitive and non-acceptance might increase drinking to cope by leading to higher overall levels of trait anxiety and negative affect, respectively. However, these effects were non-significant in the present study and would require a sample of greater than 600

to reach significance under similarly stringent testing conditions (Fritz & Mackinnon, 2007). Moreover, the physical facet of AS was significantly related to conformity-motivated drinking frequency and non-acceptance evidenced a strong trend-level relation with conformity-motivated drinking frequency. These findings suggest the utility of considering AS and non-acceptance when trying to understand drinking in conformity-inducing contexts, such as Greek life, especially among male drinkers (c.f., Stewart, Zvolensky et al., 2001).

The present results likely diverge from Brown et al.'s (2005) model due to the use of a non-dependent sample of drinkers. The results likely diverge from the extant literature on the relation between AS and coping-motivated drinking and from the results presented in Bonn-Miller et al. (2008) due to statistical decisions made to promote rigor. Future work might test Brown et al.'s model in a sample of ethnically representative mono-substance using alcohol-dependent young adults who endorse experiencing withdrawal symptoms on a regular basis and might incorporate prospective, well-validated measurement of the variables of interest, as well as prospective standardized assessment of the number and intensity of withdrawal symptoms experienced on an hourly basis during experimentally-monitored abstinence. Such a design would be well suited to fully assess the relation between AS, non-acceptance, withdrawal symptoms, and re-initiation of drinking.

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Table 1

Zero-Order Correlations with Residual Drinking Motives

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. DMQ-R Coping (R)	1													
2. DMQ-R Conformity (R)	.39***	1												
3. DMQ-R Enhancement (Residual)	-.17**	.05	1											
4. DMQ-R Social (Residual)	-.17**	-.08	-.57***	1										
5. Age	-.08	-.05	-.11	.03	1									
6. Gender	.15*	-.01	.05	-.11	-.23***	1								
7. AUDIT Quant/ Freq	.02	-.16*	.35***	.11	-.03	-.26***	1							

Note. PANAS = Positive Affect Negative Affect Schedule; AUDIT = Alcohol Use Disorders Identification Test; DERS = Difficulties in Emotion Regulation Scale; STAI-T = Spielberger State-Trait Anxiety Inventory, Form Y; ASI-3 = Anxiety Sensitivity Index (3rd Ed.), DMQ-R = Drinking Motives Questionnaire-Revised.

*p < .05 , ** p < .01, ***p < .001 (2-tailed)

Table 1 (cont'd)
Zero-Order Correlations with Residual Drinking Motives

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
8. PANAS Negative Affect	.34***	<.01	.06	-.09	-.07	.21***	.06	1						
9. STAI-T	.34***	.04	-.12	-.08	.02	.17**	<-.01	.49***	1					
10. ASI-3 Physical	.07	.24***	<.01	-.03	-.04	-.03	.06	.19**	.35***	1				
11. ASI-3 Cognitive	.19**	.20**	.02	-.09	-.04	<.01	.09	.22***	.42***	.79***	1			
12. ASI-3 Social	.10	.22***	.03	-.06	-.03	-.04	.05	.16*	.27***	.58***	.54***	1		
13. ASI-3 Total	.14*	.26***	-.02	-.07	-.03	-.02	.07	.23***	.40***	.91***	.89***	.81***	1	
14. DERS Non-Acceptance (Reduced)	.19**	.20**	.07	.09	-.08	.02	.05	.32***	.35***	.41***	.51***	.40***	.50***	1

Note. PANAS = Positive Affect Negative Affect Schedule; AUDIT = Alcohol Use Disorders Identification Test; DERS = Difficulties in Emotion Regulation Scale; STAI-T = Spielberger State-Trait Anxiety Inventory, Form Y; ASI-3 = Anxiety Sensitivity Index (3rd Ed.), DMQ-R = Drinking Motives Questionnaire-Revised. Age = Participant age, in years. Gender = Participant gender (Male = 0, Female = 1).
*p < .05 , ** p < .01, ***p < .001 (2-tailed)

Table 2

Means, Standard Deviations (in parentheses), and Zero-Order Correlations with Total Drinking Motives

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. DMQ-R Coping	2.02 (0.95)													
2. DMQ-R Conformity	.43***	1.68 (0.82)												
3. DMQ-R Enhancement	.36***	.16*	2.08 (1.09)											
4. DMQ-R Social	.39***	.29***	.63***	3.65 (0.94)										
5. Age	-.03	-.06	-.12	-.05	19.30 (1.39)									
6. Gender	.14*	.05	.04	-.04	-.23***	N/A								
7. AUDIT Quant/ Freq	17**	-.06	.53***	.40***	-.03	-.26***	5.66 (2.59)							

Note. PANAS = Positive Affect Negative Affect Schedule; AUDIT = Alcohol Use Disorders Identification Test; DERS = Difficulties in Emotion Regulation Scale; STAI-T = Spielberger State-Trait Anxiety Inventory, Form Y; ASI-3 = Anxiety Sensitivity Index (3rd Ed.), DMQ-R = Drinking Motives Questionnaire-Revised. Age = Participant age, in years. Gender = Participant gender (Male = 0, Female = 1). An average is not provided for the "Gender" variable, due to its categorical nature.

*p < .05 , ** p < .01, ***p < .001 (2-tailed)

Table 2 (cont'd)
Means, Standard Deviations, and Zero-Order Correlations with Total Drinking Motives

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
8. PANAS Negative Affect	.38***	.16*	.14*	.08	-.07	.21***	.06	26.39 (6.70)						
9. STAI-T	.33***	.18**	-.06	-.03	.02	.17**	<-.01	.49***	38.49 (8.50)					
10. ASI-3 Physical	.19**	.31***	.05	.06	-.04	-.03	.06	.19**	.35***	5.19 (5.40)				
11. ASI-3 Cognitive	.29***	.29***	.07	.03	-.04	<.01	.09	.22***	.42***	.79***	4.58 (5.30)			
12. ASI-3 Social	.21**	.29***	.08	.06	-.03	-.04	.05	.16*	.27***	.58***	.54***	8.55 (5.27)		
13. ASI-3 Total	.26***	.34***	.07	.06	-.03	-.02	.07	.23***	.40***	.91***	.89***	.81***	18.33 (13.93)	
14. DERS Non-Acceptance (Reduced)	.31***	.31***	.13*	.07	-.08	.02	.05	.32***	.35***	.41***	.51***	.40***	.50***	12.20 (4.72)

Note. PANAS = Positive Affect Negative Affect Schedule; AUDIT = Alcohol Use Disorders Identification Test; DERS = Difficulties in Emotion Regulation Scale; STAI-T = Spielberger State-Trait Anxiety Inventory, Form Y; ASI-3 = Anxiety Sensitivity Index (3rd Ed.), DMQ-R = Drinking Motives Questionnaire-Revised. Age = Participant age, in years. Gender = Participant gender (Male = 0, Female = 1). An average is not provided for the "Gender" variable, due to its categorical nature.
*p < .05 , ** p < .01, ***p < .001 (2-tailed)

Table 3

Hierarchical Multiple Regression Model Predicting Residual Coping Motives

	R^2 ΔR^2	df df	F ΔF t	ß	sr^2
Full Model	.15	7, 245	6.26**		
Step One	.13	4, 248	9.53**		
Gender			1.45	.09	<.01
Negative Affect			4.55**	.29	.07
Alcohol Use Quantity/ Frequency			0.20	.01	<.01
AS- Cognitive			1.90	.11	.01
Step Two	.02	3, 245	1.78		
AS- Physical			-2.18*	-.22	.02
AS- Cognitive			*2.44**	*.25*	*.02*
AS- Social			.22	.02	<.01
Non-Acceptance			1.11	.08	<.01

Note. *p < .05, **p < .001.

Table 4

Hierarchical Multiple Regression Model Predicting Residual Conformity-Motivated Drinking.

	R^2 ΔR^2	df df	F ΔF t	ß	sr^2
Full Model	.12	7, 245	5.59**		
Step One	.07	4, 248	4.92**		
Gender			-0.77	-.05	<.01
Negative Affect			-10.19	-.08	<.01
Alcohol Use Quantity/ Frequency			-2.88*	-.17	.03
AS- Cognitive			3.48**	.22	.04
Step Two	.05	3, 245	4.42**		
AS- Physical			2.14*	.22	.02
AS- Cognitive			*-0.64*	*-.07*	*<.01*
AS- Social			1.26	.09	<.01
Non-Acceptance			1.95	.14	.02

Note. *p < .05, **p < .001

Table 5

Hierarchical Multiple Regression Model Predicting Residual Enhancement-Motivated Drinking.

	R^2 ΔR^2	df df	F ΔF t	ß	sr^2
Full Model	.15	7, 245	6.19**		
Step One	.15	4, 248	10.73**		
Gender			2.45	.15	.02
Negative Affect			0 05	<.01	<.01
Alcohol Use Quantity/ Frequency			5.91**	.53	.13
AS- Cognitive			-0.18	-.02	<.01
Step Two	<.01	3, 245	0.47		
AS- Physical			-0.59	-.06	<.01
AS- Cognitive			*-0.24*	*-.03*	*<.01*
AS- Social			0.56	.04	<.01
Non-Acceptance			0.88	.06	<.01

Note. *p < .05, **p < .001.

Table 6

Hierarchical Multiple Regression Model Predicting Residual Socially-Motivated Drinking

	R^2 ΔR^2	df df	F ΔF t	ß	sr^2
Full Model	.04	7, 245	1.44		
Step One	*.03*	*4, 248*	*2.04*		
Gender			-1.07	-.07	<.01
Negative Affect			-0.93	-.06	<.01
Alcohol Use Quantity/ Frequency			1.54	.10	.01
AS- Cognitive			-1.27	-.08	<.01
Step Two	*.01*	*3, 245*	*0.66*		
AS- Physical			1.22	.13	<.01
AS- Cognitive			*-1.34*	*-.15*	*<.01*
AS- Social			-0.42	-.03	<.01
Non-Acceptance			-0.63	- .05	<.01

Note. *p < .05, **p < .001.

Table 7

Hierarchical Multiple Regression Model Predicting Residual Coping-Motivated Drinking For Moderation Analyses

	R^2 ΔR^2	df df	F ΔF		
			t	ß	sr^2
Full Model	.20	12, 235	4.92**		
Step One	.16	5, 242	9.35**		
Gender			1.31	.08	<.01
Negative Affect			3.11*	.29	.03
Trait Anxiety			2.82	.20	.03
Alcohol Use Quantity/ Frequency			-0.18	.01	<.01
AS- Cognitive			0 .54	.04	<.01
Step Two	.02	3,239	2.07		
AS- Physical			-2.42*	-.24	.01
AS- Cognitive			*1.93*	*.20*	*.01*
AS- Social			0.38	.03	<.01
Non-Acceptance			0.38	.03	<.01
Step Three	*<.001*	*1, 238*	*0.01*		
AS- Cognitive x Trait Anxiety			-0.11	<.01	<.01
Step Four	*.02*	*3,235*	*1.74*		
AS- Physical x Trait Anxiety			-0.79	-.07	<.01
AS- Cognitive x Trait Anxiety			*1.03*	*-.08*	*<.01*
AS- Social x Trait Anxiety			0.91	.07	<.01
Non-Acceptance x Trait Anxiety			1.82[t]	.14	.01

Note. *p < .05, **p < .001.

Table 8

Simultaneous Multiple Regression Model Predicting Residual Coping Motives for Mediation Analyses

	R^2	df	F		
			t	ß	sr^2
Full Model	.18	8, 247	6,69***		
Gender			1.24	.08	<.01
Alcohol Use Quantity/ Frequency			0.29	.02	<.01
Trait Anxiety			2.90**	.21	.03
Negative Affect			2.95**	.21	.03
AS- Cognitive			1.92	.20	.01
AS- Physical			-2.43*	-.24	.02
AS- Social			0.38	.03	<.01
Non-Acceptance			0.38	.03	<.01

Note. *p < .05, **p<.01, ***p < .001.

Table 9

Simultaneous Multiple Regression Model Predicting Trait Anxiety for Mediation Analyses

|	R^2	df	F t	ß	sr^2
Full Model	.35	7, 240	*18.10****		
Gender			1.38	.08	<.01
Alcohol Use Quantity/ Frequency			-0.60	.-.03	<.01
Negative Affect			6.54***	.37	.12
AS- Cognitive			2.43*	.22	.02
AS- Physical			0.62	.06	<.01
AS- Social			0.48	.03	<.01
Non-Acceptance			1.36	.09	<.01

Note. *p < .05, **p<.01, ***p < .001.

Table 10

Simultaneous Multiple Regression Model Predicting Negative Affect for Mediation Analyses

|	R^2	df	F t	ß	sr^2
Full Model	.29	7, 240	14.05***		
Gender			2.83**	.16	.02
Alcohol Use Quantity/ Frequency			1.67	..09	<.01
Trait Anxiety			6.54***	.40	.13
AS- Cognitive			0.40	.04	<.01
AS- Physical			-0.37	-.03	.<.01
AS- Social			-0.17	-.01	<.01
Non-Acceptance			2.52*	.16	.02

Note. *p < .05,**p<.01, ***p < .001.

Figure 1.
Brown and Colleagues' (2005) Model and the Model Under Investigation.
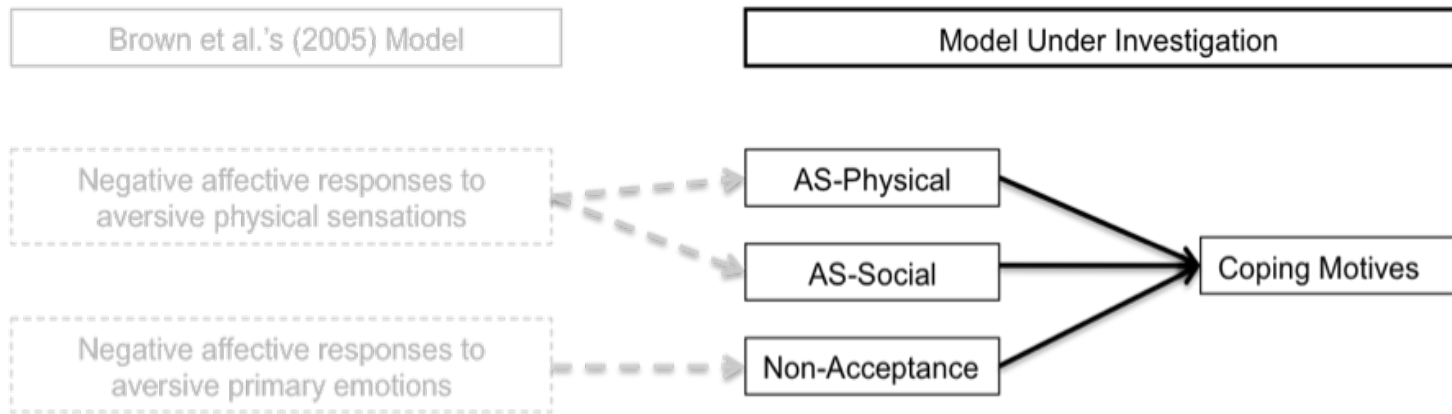
Note: Brown and colleagues' (2005) two-factor model is shown in gray with dotted lines indicating which of the two factors of Brown and colleagues' model has been operationalized by each of the three constructs in the model under investigation.

Figure 2.

Mediation Model Testing the Indirect Effects of AS and Non-Acceptance on Residual Drinking to Cope via Trait Anxiety and Negative Affect (N = 253)
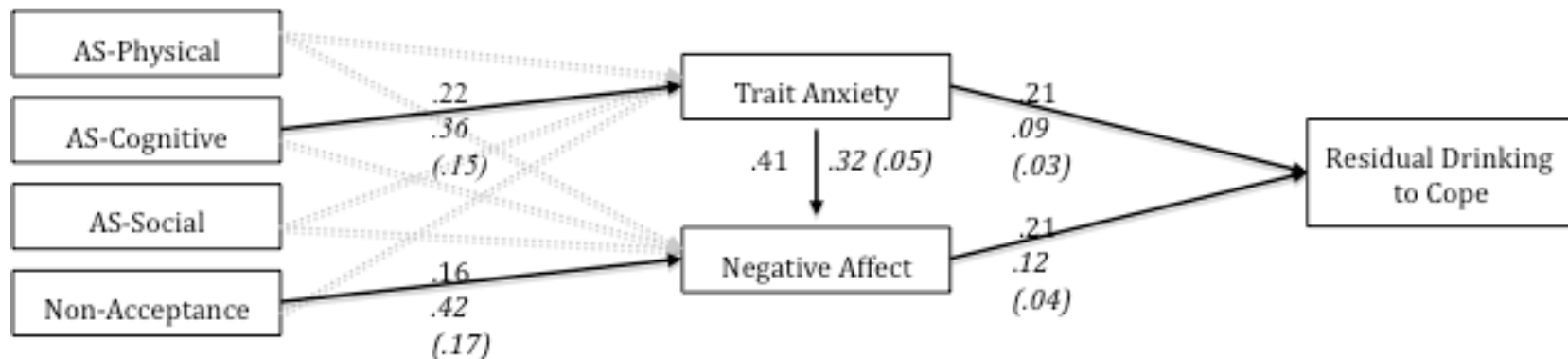
Note: Gender and alcohol use quantity and frequency were entered as covariates and have been omitted from this figure. Non-significant paths are depicted as dotted gray lines. Numbers shown in plan text are standardized path coefficients. Unstandardized path coefficients are shown in italics with associated standard errors in parentheses. AS-Physical = Physical subscale of the Anxiety Sensitivity Index (3rd Ed.), AS-Cognitive = Cognitive subscale of the Anxiety Sensitivity Index (3rd Ed.), AS-Social = Social Subscale of the Anxiety Sensitivity Index (3rd Ed.), Non-Acceptance = Non-Acceptance subscale of the Difficulties in Emotion Regulation Scale, Trait Anxiety = Total score on Form Y of the Spielberger State/Trait Anxiety Inventory, Negative Affect = Total score on the Negative Affect subscale of the Positive Affect Negative Affect Schedule, Residual Drinking to Cope = Unique variance of the coping motives subscale from the Drinking Motives Questionnaire-Revised.

Appendix

DMQ-R

(Cooper, 1994)

Below is a list of reasons people sometimes give for drinking alcohol. Thinking of all the times you drink, how often would you say that you drink for each of the following reasons?

(*If you have never drank alcohol, you do not need to complete the following questions.*)

A = Almost Never / Never

B = Some of the Time

C = Half of the Time

D = Most of the Time

E = Almost Always / Always

1. To forget your worries	A	B	C	D	E
2. Because your friends pressure you to drink	A	B	C	D	E
3. Because it helps you enjoy a party	A	B	C	D	E
4. Because it helps you when you feel depressed or nervous	A	B	C	D	E
5. To be sociable	A	B	C	D	E
6. To cheer up when you are in a bad mood	A	B	C	D	E
7. Because you like the feeling	A	B	C	D	E

8. So that others won't kid you about

   not drinking   A   B   C   D   E

9. Because it's exciting   A   B   C   D   E

10. To get high   A   B   C   D   E

11. Because it makes social gatherings more fun   A   B   C   D   E

12. To fit in with a group you like   A   B   C   D   E

13. Because it gives you a pleasant feeling   A   B   C   D   E

14. Because it improves parties and celebrations A   B   C   D   E

15. Because you feel more self-confident

   and sure of yourself   A   B   C   D   E

16. To celebrate a special occasion with friends A   B   C   D   E

17. To forget about your problems   A   B   C   D   E

18. Because it's fun   A   B   C   D   E

19. To be liked   A   B   C   D   E

20. So you won't feel left out.   A   B   C   D   E

ASI-3

(Taylor, Zvolensky, Cox, Deacon, Heimberg, Ledley, et al., 2007)

Please circle the number that best corresponds to how much you agree with each item. If any items concern something that you have never experienced (e.g., fainting in public) answer on the basis of how you think you would feel *if you had* such an experience. Otherwise, answer all items on the basis of your own experience. Be careful to circle only one number for each item and please answer all items.

	Very Little	A Little	Some	Much	Very Much
1. It is important for me not to appear nervous	0	1	2	3	4
2. When I cannot keep my mind on a task, I worry that I might be going crazy	0	1	2	3	4
3. It scares me when my heart beats rapidly.	0	1	2	3	4
4. When my stomach is upset, I worry that I might be seriously ill.	0	1	2	3	4
5. It scares me when I am unable to keep my mind on a task.	0	1	2	3	4
6. When I tremble in the pretense of others, I fear what people might think of me.	0	1	2	3	4
7. When my chest feels tight, I get scared	0	1	2	3	4

that I won't be able to breathe properly.					
8. When I feel pain in my chest, I worry that I am going to have a heart attack.	0	1	2	3	4
9. I worry that other people will notice my anxiety.	0	1	2	3	4
10. When I feel "spacey" or spaced out I worry that I may be mentally ill.	0	1	2	3	4
11. It scares me when I blush in front of people.	0	1	2	3	4
12. When I notice my heart skipping a beat, I worry that there is something seriously wrong with me.	0	1	2	3	4
13. When I begin to sweat in a social situation, I fear people will think negatively of me.	0	1	2	3	4
14. When my thoughts seem to speed up, I worry that I might be going crazy.	0	1	2	3	4
15. When my throat feels tight, I worry that I could choke to death.	0	1	2	3	4
16. When I have trouble thinking clearly, I worry that there is something wrong with me.	0	1	2	3	4
17. I think it would be horrible for me to	0	1	2	3	4

faint in public.					
18. When my mind goes blank, I worry there is something terrible wrong with me.	0	1	2	3	4

Difficulties in Emotion Regulation

(DERS: Gratz & Roemer, 2004)

Please indicate below how often the items apply to you, using the following scale:

1 = Almost never

2 = Sometimes

3 = About half the time

4 = most of the time

5 = almost always

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.

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 at 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 I will stay 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.

20. When I'm upset, I can still get things done.

21. When I'm upset, I feel ashamed of 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 that 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 there is nothing I can do to make myself feel better.

29. When I'm upset, I become irritated at 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.

Alcohol Use Disorders Identification Test

(AUDIT; Saunders et al., 1993)

Question	0	1	2	3	4	
	Never	Monthly or less	2-4 times a month	2-3 times a week	4 or more times a week	
1. How often do you have a drink containing alcohol?	Never	Monthly	2-4 times	2-3 times	4 or more times	
2. How many drinks containing alcohol do you have on a typical day when you are drinking	1 or 2	3 or 4	5 or 6	7 to 9	10 or more	
3. How often do you have six or more drinking on one	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	

occasion?					
4. How often during the last year have you found 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 last year have you ailed to do what was normally expected of you because of drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
6. How often during the last year have you needed a first drink 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 last year have you had a feeling of guilt or remorse after drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
8. How often during the last year have you been	Never	Less than monthly	Monthly	Weekly	Daily or almost

unable to remember what happened the night before because of your drinking?					daily	
Have you or someone else been injured because of your drinking?	No		Yes, but not in the last year		Yes, during the last year	
Has a relative, friend, doctor, or other health care worker been concerned about yoru drinking or suggested you cut down?	No		Yes, but not in the last year		Yes, during the last year	

The Positive and Negative Affect Scales
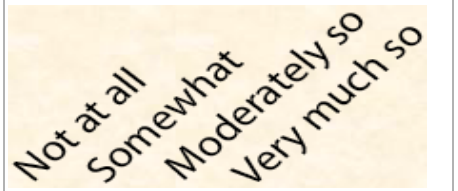
(PANAS; Watson et al., 1988)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer by marking the appropriate answer next to that word. Indicate to what extent you have felt this way *during the past year*.

1	2	3	4	5
Very slightly	a little	moderately	quite a bit	extremely
Or not at all				

1. Interested	1	2	3	4	5
2. Distressed	1	2	3	4	5
3. Excited	1	2	3	4	5
4. Upset	1	2	3	4	5
5. Strong	1	2	3	4	5
6. Guilty	1	2	3	4	5
7. Scared	1	2	3	4	5
8. Hostile	1	2	3	4	5
9. Enthusiastic	1	2	3	4	5
10. Proud	1	2	3	4	5
11. Irritable	1	2	3	4	5
12. Alert	1	2	3	4	5
13. Ashamed	1	2	3	4	5
14. Inspired	1	2	3	4	5
15. Nervous	1	2	3	4	5
16. Determined	1	2	3	4	5
17. Attentive	1	2	3	4	5
18. Jittery	1	2	3	4	5
19. Active	1	2	3	4	5
20. Afraid	1	2	3	4	5

STAI Form Y-l

(Spielberger et al., 1983)

	DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then click in the appropriate circle to the right of the statement to indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your feelings best.	Not at all	Somewhat	Moderately so	Very much so
1.	I feel calm	○	○	○	○
2.	I feel secure	○	○	○	○
3.	I am tense	○	○	○	○
4.	I feel strained	○	○	○	○
5.	I feel at ease	○	○	○	○
6.	I feel upset	○	○	○	○
7.	I am presently worrying over possible misfortunes	○	○	○	○
8.	I feel satisfied	○	○	○	○

9.	I feel frightened	○	○	○	○
10.	I feel comfortable	○	○	○	○
11.	I feel self-confident	○	○	○	○
12.	I feel nervous	○	○	○	○
13.	I am jittery	○	○	○	○
14.	I feel indecisive	○	○	○	○
15.	I am relaxed	○	○	○	○
16.	I feel content	○	○	○	○
17.	I am worried	○	○	○	○
18.	I feel confused	○	○	○	○
19.	I feel steady	○	○	○	○
20.	I feel pleasant	○	○	○	○

Demographics

1. Age: _____

2. Gender: M / F

3. Marital status:

    1 = single; never married

2 = married

3 = separated

4 = divorced

5 = widowed

4. Year in college:

1=Freshman

2=Sophomore

3=Junior

4=Senior

5=Graduate/Professional

5. Ethnicity:

1=White (non-hispanic)

2=African American (non-hispanic)

3=Hispanic

4=Asian American

5=Pacific Islander

6=Native American/Alaskan Native

7=Middle Eastern

8=Other_____

6. Where do you currently live?

1 = Residence hall

2 = Apartment or Rented Unit

3 = Fraternity/Sorority house

4 = Own home

5 = Live with parents

6= Live with family other than parents

7 = other:_____

7. Are you presently employed?

1 = unemployed

2 = employed 1-20 hours per week

3 = employed 20-30 hours per week

4 = employed full time

8. What is your major?

_____