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UNIVERSITY OF CALIFORNIA, SAN DIEGO

The Role of Impulsivity, Affect, and Expectations in Alcohol Use and Disordered
Eating

A dissertation submitted in partial satisfaction of the requirements for the degree
Doctor of Philosophy

in

Psychology

by

Teresa Kathleen Monreal

Committee in Charge:

Professor Sandra A. Brown, Chair
Professor Kerri Boutelle
Professor Gail Heyman
Professor James Kulik
Professor Mark Myers

2012

The Dissertation of Teresa Kathleen Monreal is approved, and it is acceptable
in quality and form for publication on microfilm and electronically:

Chair

University of California, San Diego

2012

DEDICATION

This dissertation is dedicated to my parents, Roger and Lupe Monreal, and to my sister, Marisa, for their steadfast support, encouragement, and love throughout all of my endeavors.

EPIGRAPH

"One ought to hold on to one's heart; for if one lets it go, one soon loses control of the head too."

Friedrich Nietzsche

"The advantage of the emotions is that they lead us astray."

Oscar Wilde

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ABSTRACT OF THE DISSERTATION

The Role of Impulsivity, Affect, and Expectations in Alcohol Use and Disordered Eating

By

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Doctor of Philosophy in Psychology

University of California, San Diego, 2012

Professor Sandra A. Brown, Chair

Alcohol use and eating disorders are a major public health concern for women in late adolescence and early adulthood. Emotion based impulsivity represents one process by which the experience of strong emotions may generally predispose some individuals to engage in rash behavior, including dysfunctional eating and drinking. In two sessions, the present study examined positive and negative urgency in relationship to dysfunctional eating and drinking, cognitive expectations about food and alcohol, affect regulation variables, and as a potential correlate of a behavioral task. 1,060 undergraduate college females were examined on measures of impulsivity, expectations, affect lability, depression, alcohol use, alcohol-related

problems, and disordered eating; 190 returned for a second session involving a behavioral task following mood manipulation. Among this sample of young adult college females, greater levels of negative urgency were affiliated with alcohol related consequences and disordered eating, above and beyond other sub-facets of impulsivity, depressive symptoms, and volatile affect. Negative urgency was especially heightened among females with co-occurring problem drinking and disordered eating symptoms, versus non-disordered controls and females with either set of symptoms alone. While positive urgency was related to alcohol-related problems above and beyond use rates, it did not add significant predictive power after controlling for other impulsivity sub-facets. Results demonstrate the urgency traits are unique predictors of disordered eating and problematic drinking, independent of depression and affect lability. Females who were elevated on the urgency traits and who held expectations regarding the reinforcing properties of food and alcohol tended to experience the greatest levels of dysfunction. Session two results indicated that while errors of commission on the Sustained Attention to Response Task (SART) were affiliated with increased levels of lack of premeditation when individuals were in neutral mood states, SART responding was unrelated to self reported impulsivity in positive or negative mood states. This study supplements research on the mechanisms and risk factors that underlie these disorders, and has clinical implications for mental health assessment, prevention and treatment.

INTRODUCTION

The Role of Impulsivity, Affect, and Cognitive Expectations in Alcohol Use and Disordered Eating

Alcohol Use and Eating Disorders Among College Students

Alcohol use is a widespread practice among college aged individuals in the U.S. and problem drinking is a significant public health problem (O'Malley & Johnston, 2002; Weschler et al., 2002). Of particular concern is the pervasiveness of excessive drinking. Heavy patterns of alcohol use peak during late adolescence and early adulthood, and increased drinking and alcohol abuse are more prevalent among young adults who attend college, versus their non-college attending peers of the same age (Johnston, O'Malley, & Bachman, 2008; Slutske, 2005). Excessive drinking among college students poses serious risks, and can lead to a host of unwanted negative consequences that range in nature and severity, including immediate health consequences like blackouts, personal injuries and illnesses, and long term problems in academic performance, legal repercussions, and interpersonal problems (Perkins, 2002). Heavy underage alcohol use can interfere with the development of transitional skills into adulthood, and cause brain damage and neurocognitive deficits that impair learning and intellectual growth (Ziegler et al., 2005). Negative consequences of use can potentially be devastating and traumatic, including unwanted sexual experiences, physical assault, alcohol related injuries, or death (White & Labouvie, 1989).

Eating disorders are also of particular concern for females during late adolescence. Between 1 and 3% of females in the U.S. develop full syndrome

bulimia in their lifetime (Kendler et al., 1991; Hudson, Hiripi, Pope, & Kessler, 2007), with onset typically occurring between 17 and 20 years of age, when students transition from high school to college (Striegel-Moore et al., 2003; Hudson, Hiripi, Pope, & Kessler, 2007). Lifetime prevalence for anorexia nervosa is slightly less common, at .9% (Hudson, Hiripi, Pope, & Kessler, 2007). Although it is rare for an individual to meet full diagnostic criteria for an eating disorder, sub-clinical eating disordered behaviors, classified as eating disorder not otherwise specified (EDNOS) in the DSM-IV, are relatively more pervasive (Fairburn & Cooper, 2007; Ricca, et al., 2001; Turner & Bryant-Waugh, 2004). Other definitions and prevalence rates of sub-clinical eating disorders vary widely among studies. One study of first year females in college found that 10% met criteria for bulimia except for binge frequency, with 31% reporting dieting and binge eating without compensatory behaviors (Drenowski, Yee, Kurth, & Krahn, 1994); other studies have found between 16 and 19% of first year freshman in college that meet criteria for some, but not all, bulimic criteria, including chronic dieting, use of diuretics/laxatives, bingeing, and purging (Mintz, O'Halloran, Mulholland, & Schneider, 1997; Krahn, 1992). Of particular concern is that a subset of individuals (estimates range from 7%-15%) who exhibit sub-clinical symptoms are at risk for developing full syndrome disorders in the future (Drewnowski, Yee, Kurth, & Krahn, 1994; Chamay-Weber, Narring, & Michaud, 2005; Lowe et al., 1996; Franko & Omori, 1999). Eating disorders can result in serious, often chronic, mental and physical health problems, including depression, anxiety, substance abuse, reduced psychosocial functioning, and medical complications (Lewinsohn, Striegel-Moore, & Seeley, 2000; Rome & Ammerman, 2003).

In sum, both heavy drinking and dysfunctional eating develop during late adolescence and early adulthood, and present significant threats to mental and physical health. Moreover, alcohol and eating disorders frequently co-occur. Approximately 22% of individuals with bulimia report alcohol abuse and or/dependence, and 17% of individuals with bulimia also report current or past substance abuse or dependence (Holderness, Brooks-Gunn, & Warren, 1994). The relationship between dysfunctional eating behaviors and alcohol abuse is also apparent among community samples of individuals with sub-clinical symptoms, and appears to be more common in the case of disinhibitory bingeing/purging behaviors, than with restrictive symptoms (Holderness, Brooks-Gunn, & Warren, 1994; Stock, Goldberg, Corbett, & Katzman, 2002, Wiederman & Pryor, 1996; Bulik et al, 1992). Thus, it is possible that common mechanisms underlie the relationship between these frequently co-occurring disorders and dysfunctional behaviors. Research examining the mechanisms and risk factors that underlie these dysfunctional behaviors has important implications for guiding prevention programs, interventions, and treatment.

Toward this end, the present study took place in two sessions. The aim of the first session was to address the significance of emotion-based impulsivity, cognitive expectations about food and alcohol, and affect related risk factors in the manifestation of problem drinking and eating disordered attitudes and behaviors among college aged females. The second session was conducted to examine responding under conditions of varying mood states, in order explore the intersection of mood and impulsivity directly.

Session I: Background

Emotion and Addictive Behaviors

Generally, emotional experiences play an integral role in influencing human behavior. The experience of intense emotions often induces individuals to find ways to address and manage their emotional states. While such strategies may be beneficial, and not interfere with long-term goals (e.g., writing in a journal to address one's anger), other strategies may be immediately rewarding, but prove maladaptive in the long run (e.g., drinking alcohol to address one's anger). Several lines of research indicate that college students who drink alcohol to cope with negative emotions such as depression and anxiety are more likely to drink heavily, and experience greater levels of alcohol related problems (Park & Levenson, 2002; Kuntsche, Knibbe, Gmel, & Engels, 2006). Furthermore, although social drinking motives tend to associate with moderate levels of alcohol consumption, coping motives have been positively associated with both greater consumption and alcohol abuse (Kuntsche, Knibbe, Gmel, & Engels, 2006; Cooper, Frone, Russell, & Mudar, 1995; Hussong, Hicks, Levy, & Curran, 2001). In their meta-analysis of problematic college drinking, Ham and Hope (2003) point out that the relationship between problematic drinking and coping motives seems to be particularly evident among females, perhaps as a function of elevated depression or anxiety. For example, high intensity drinking was affiliated with drinking in response to emotional pain in college females, but not for males (Beck, Thombs, Mahoney, Fingar, 1995).

Similarly, negative affect often plays a key role in the disordered eating cycle. In part, evidence suggests individuals binge eat because it provides comfort or distraction from negative mood, while compensatory behaviors relieve anxiety about weight gain or provide emotional catharsis (Stice, 2002). Several studies utilizing varying methods and samples have examined the way that mood fluctuates in

accordance with bingeing, and compensatory behaviors. The observation that binge eating is often precipitated by negative emotions that are worse before the binge episode (versus a regular meal or at random time intervals) has been supported by both retrospective (Abraham & Beumont, 1982; Mitchel, et al., 1999; Davis, Freeman, & Garner, 1988) and “real time” studies (Hilbert & Tuschen-Caffier, 2007; Powell & Thelen, 1996; Alpers & Tuschen-Caffier, 2001), and has been observed in both women with bulimia and binge eating disorder (Hilbert & Tuschen-Caffier, 2007; Agras & Telch, 1998), although one study did not find such an association among women with sub-clinical binge eating disorders (Wegner, et. al., 2002). Generally, these studies suggest that for certain individuals, negative affect may precede and be a trigger for both alcohol use and disordered eating.

While positive affect has been less studied, intense positive emotional states may also play a role in problematic drinking, particularly among college students. Some studies suggest that college students drink more heavily on days of celebration, often to enhance a positive mood (Del Boca, Darkes, Greenbaum, & Goldman, 2004; Cooper, Agocha, & Sheldon, 2000). Furthermore, enhancement motives, or drinking in order to enhance positive affect, are evident among a subset of the college population and have associations with problem levels of use (Ham & Hope, 2003).

Impulsivity and Addictive Behaviors

Impulsivity is a multi-dimensional trait that underlies vulnerability to several addictive behaviors, including problem gambling, alcohol abuse, and eating disorders (Fischer & Smith, 2008). Broadly defined, impulsivity is the tendency toward unplanned behavior without regard to the negative consequences of those behaviors

(Verdejo-Garcia, Bechara, Reckonor, & Garcia, 2007). Impulsive personality traits exist among individuals who misuse substances compared to non-clinical groups, exist prior to and are predictive of substance initiation and use, and are elevated in children at risk for substance use disorders, such as the children of alcoholic parents (Verdejo-Garcia, et al, 2008). While women with restrictive anorexia tend to have anxious and perfectionist traits; individuals who have bulimia or who engage in disinhibitory behaviors (ex. binge eating) are often elevated on measures of impulsivity (Vitousek & Manke, 1994; Claes, Vandereycken, & Vertommen, 2002; Steiger, et al., 2004, Loxton and Dawe, 2001). Furthermore, impulsivity may be especially heightened in co-morbid women (O'Brien & Vincent, 2002). Kane, Loxton, Staiger, and Dawe (2004) found that co-morbid women with bulimia and alcohol use disorders scored higher than women with bulimia only on a sub-scale of Eysenck's I7, a measure of impulsivity related to decision making without regard to risk. Furthermore, recently Fischer, Settles, Collins, Gunn, and Smith (2012) found negative urgency was elevated among adult women with clinical levels of disordered eating, substance dependence, and co-morbid women, versus non-disordered controls.

UPPS-P: the Urgency Traits

However, it is now clear that the term 'impulsivity' has been interpreted, defined, and measured in a number of ways in the scientific literature. In response to this lack of consistency, Whiteside and Lynam (2001) amalgamated the most commonly used impulsivity measures and conducted a factor analysis, to identify the core underlying traits present among them. This structural analysis resulted in a model of impulsivity composed of four distinct factors: Urgency, Premeditation (lack

of), Perseverance (lack of), and Sensation Seeking, each of which maps onto the framework of the five factor model of personality (extraversion, openness, agreeableness, conscientiousness, or neuroticism; NEO-PI-R; Costa & McCrae, 1995). Negative urgency is the tendency to act rashly and experience strong impulses in the face of negative affect and distress (Whiteside & Lynam, 2001). The negative urgency subscale is most strongly associated with the neuroticism factor of the NEO-PI-R, which reflects emotional instability and the tendency to experience negative, distressing emotional states. Sensation seeking refers to the tendency to seek novel experiences and adventure. Perseverance (lack of) measures one's ability to remain with a task until completion and avoid boredom. Premeditation (lack of) maps onto the deliberative facet of conscientiousness; it assesses the ability to refrain from action in favor of careful thought and planning. Recently Cyders and Smith (2007) developed a model of positive urgency, the tendency to act rashly in response to strong positive affective states (Cyders & Smith, 2007).

Urgency Trait Theory: Emotion and Action

Because both affective and impulsive elements are theorized to underlie alcohol use and eating disorders, positive and negative urgency represent particularly relevant traits in the study of these disorders. However, the underlying basis for the urgency traits is a connection between emotion and action that is not necessarily maladaptive. The ascribing of emotional value to environmental contexts allows humans to detect and attend to important stimuli. For example, in a life threatening situation, the capacity to recognize one's distressing emotions (fear, anxiety, or anger, for example) can prompt action to reduce negative affect, and thereby elude harm. Emotion is a precipitant of action, a motivational trigger that compels

individuals to address some underlying need (Lerner & Tiedens, 2006; Cyders & Smith, 2008).

In fact, emotion plays an integral role in basic decision making processes. Emotional experience directly influences the cognitive appraisal of environmental contexts, influencing memory, attention, and judgment. Specifically, the amygdala enhances attention to negative affect related stimuli, and enhances memory for emotion-laden events (Cyders, 2008; Guptaa, Kosciak, Bechara & Tranel, 2011). Part of the 'impulsive' system, it is responsible for triggering the emotional/affective content of immediate consequences (Bechara, 2005). The amygdala then feeds this affective information to regions in the orbitofrontal cortex (OFC), a type of 'bottom up' process. In turn, the ventromedial prefrontal cortex (VM PFC) and OFC modulate and regulate activity in the amygdala, a 'top-down' process (Cyders, 2008; Bechara, 2005). The modulation of emotional input from the amygdala by these regions allows for the 'flexible pursuit' of long term goals (Bechara, 2005). Importantly, the VM PFC and OFC can override emotion laden activity from the amygdala and steer judgment toward the achievement of longer term goals, as opposed to immediate consequences.

However, environmental stimuli and contexts can evoke numerous and sometimes intense emotional responses. In the case of alcohol use, the immediate reward of drinking can evoke positive emotions, but also negative emotions, if alcohol use has previously resulted in physical, emotional, or social unwanted consequences. Therefore when one is pondering a decision, numerous signals from 'bottom up' and 'top down' processes may conflict. In addition, strong emotions can overwhelm modulation by the higher order 'reflective' system, leading to ill advised, rash action

(Bechara, 2005). This hijacking of the top-down reflective system can potentially undermine impulse control, leading to deleterious alcohol or disordered eating behaviors. For individuals elevated on negative urgency, intense negative emotions may trigger engagement in unhealthy eating and drinking practices in order to alleviate, or distract from negative mood states, despite the long-term harmful consequences of these actions (Whiteside & Lynam, 2001). Individuals high in positive urgency may experience intense positive emotions which precipitates action toward enhancing those emotions.

Further, behavioral processes likely maintain emotion driven rash action. Action in response to one's immediate emotional states is immediately positively reinforcing, in the case of increased positive mood, and negatively reinforcing, by the removal, or escape from, negative affect. Individuals seeking to enhance preexisting positive mood will be rewarded by increases in positive mood states; individuals seeking to relieve, avoid, or distract from negative mood states will be rewarded by the removal of negative mood states. Reinforced behaviors are more likely to occur in the future; thus, such individuals may learn to perpetuate maladaptive methods of coping that address temporary needs at the expense of long term needs.

Urgency Traits and Problematic Behaviors: Associations

Recent literature suggests the urgency traits have differential associations with several problematic risky behaviors and forms of externalizing psychopathology. Both positive and negative urgency have been affiliated with pathological gambling (Fischer & Smith, 2008; MacLaren, Fugelsang, Harrigan, & Dixon, 2011) and risky sex (Zapolski, Cyders, & Smith, 2009; Deckman & DeWall, 2011). Positive urgency is positively associated with illicit drug use (Zapolski, Cyders, & Smith, 2009). Negative

urgency is correlated with borderline personality disorder symptoms (Miller, Flory, Lynam & Leukefeld, 2003), tobacco cravings (Doran, Cook, McChargue, & Spring, 2009), and predicts the severity of a variety of social, employment, and medical problems in substance dependent individuals (Verdejo-Garcia et al., 2007).

In several independent cross sectional studies, negative urgency is positively associated with problem drinking in adults (Smith, et al., 2007; King, Kayardi, Luk, & Patock-Peckham, 2011; Fischer, Anderson, & Smith, 2004; Claes, Vandereycken, & Vertommen, 2002; Verdejo-García, Bechara, Recknor, & Pérez-García, 2007) and drinking to cope (Anestis, Selby, & Joiner, 2007). Recently, this association has been demonstrated for early onset problem drinking among a sample of preadolescent boys and girls (Settles et al., 2012). Additionally, there is initial evidence to suggest that negative urgency may be a specific risk factor for negative alcohol consequences that is independent of levels of alcohol use (Magid & Colder, 2007; Simons, Carey, and Gaher, 2004; Smith, et al., 2007). That is, regardless of alcohol intake, individuals who tend to act rashly when distressed may be at risk for incurring alcohol-related negative consequences, for example, getting into fights after drinking, or getting involved in risky situations, such as drunk driving, or engaging in unwanted sexual situations. This particular sub-facet may be the most relevant aspect of impulsivity in the development of alcohol-related pathology; when compared in conjunction with the other factors, some studies have indicated that negative urgency is the strongest predictor of problematic alcohol use (King, Karyadi, Luk, & Patock-Peckham, 2011; Cyders, et al., 2007; Fischer, Anderson, & Smith, 2004).

The tendency toward rash action while distressed is also associated with several disordered eating behaviors, including bingeing, purging, and bulimic

symptoms among college and community samples of women (Fischer, Smith, Anderson, & Flory, 2003, Fischer, Smith & Anderson, 2003; Fischer, Anderson, & Smith, 2004; Smith, et al., 2007; Anestis, Selby, & Joiner, 2007; Miller, Flory, Lynam & Leukefeld, 2003). Clinical studies illustrate elevated levels of negative urgency in women with bulimia nervosa versus non-eating disordered controls (Fischer, Smith, Annus, Hendricks, 2007), a relationship that remains after controlling for other impulsivity related variables (Anestis, Smith, Fink & Joiner, 2009). Similarly, a recent meta-analysis of studies examining multiple aspects and measures of impulsivity (such as sensation seeking, persistence, and perseverance) identified negative urgency as the trait that had the largest effect size in the prediction of bulimic symptoms (Fischer, Smith, & Cyders, 2008).

Although positive urgency has been more recently proposed, research to date indicates that it shares unique associations with alcohol use and consequences. In a series of studies, positive urgency differentially explained positive mood-based risky behavior, and interacted with alcohol expectancies and drinking motives to predict problem drinking behavior (Cyders, et al., 2007). That is, among people that drink in order to improve a positive mood, or who believe that alcohol will produce positive, arousing effects, high levels of urgency were significantly related to problem drinking, but in the absence of this expectancy, positive urgency was unrelated to problem drinking. Longitudinally, positive urgency predicts increases in both quantity of alcohol consumed and number of alcohol related consequences over the first year of college (Cyders, Flory, Rainer, & Smith, 2009). However, unlike negative urgency, positive urgency appears to be unrelated to disordered eating. In a recent study, positive urgency differentiated individuals with alcohol dependence from those with

binge eating and purging behaviors, as well as controls (Cyders et al., 2007). Therefore while negative urgency predicts problematic alcohol use and bulimic symptoms, positive urgency seems to selectively predict alcohol use, and perhaps problematic alcohol use.

Other facets of impulsivity proposed by Whiteside and Lynam (2001) have also been examined in relation to alcohol use and disordered eating. When all five factors are considered simultaneously, sensation seeking has most often been associated with the frequency of engagement in dysfunctional behaviors, such as alcohol use or pathological gambling, but not necessarily with problematic engagement in these behaviors (Smith, et al., 2007; Magid, Colder, 2007; Cyders & Smith, 2008; Cyders, Flory, Rainer, & Smith, 2009). For example, in a longitudinal study examining risky behaviors over the course of the first year of college, sensation seeking predicted increases in quantity of alcohol use, while positive urgency differentially predicted the onset of alcohol problems (Cyders, Flory, Rainer, Smith, 2009). Lack of premeditation and lack of perseverance relate to deficits in deliberative and self-discipline aspects of conscientiousness, respectively. These 'cognitive' facets of impulsivity seem to share few or inconsistent associations with alcohol use and disordered eating patterns (Cyders & Smith, 2008). Thus, it is possible that it is the emotion driven aspect of impulsivity that is specifically and uniquely related to potentially harmful patterns of dysfunctional eating and drinking.

Expectancies

Pathways to dysfunctional eating and drinking behaviors are complex and multi-determined. In addition to trait impulsivity, which enhances vulnerability for multiple pathologies, manifestations of psychosocial learning such as cognitive

expectancies, likely play an important role in determining the nature of the relationship between personality and specific behavioral outcomes. First proposed by Tolman (1932), expectancies are learned outcomes about the positive or negative reinforcing effects of a stimulus or behavior that are stored in memory, and predict future behavioral choices. Individuals form specific expectations about the consequences of their actions that stem from their prior learning history. Those expectations then predict the likelihood of future engagement in those behaviors.

Prior research has demonstrated that psychological expectancies regarding the positive or negative effects of consuming alcohol are formed early in childhood, and predict the onset of problem drinking in adolescents, beyond traditional demographic variables (Brown, 1985; Miller, Smith, & Goldman, 1990; Smith, Goldman, Greenbaum, & Christiansen, 1995). General positive alcohol expectancies in which reinforcement is expected from drinking longitudinally predicted hazardous alcohol use among females in college over the course of a year (Zamboanga, Horton, Leitkowski, & Wanga, 2006). Furthermore, the expectation that alcohol reduces tension or anxiety has been associated with both drinking to cope and problem levels of engagement with alcohol (Brown, 1985; Cooper et al., 1995).

Expectancy theory has also been applied to the study of dysfunctional eating behaviors. Expectancies that eating alleviates negative affect are associated with bulimic symptoms of disinhibition (Hayuki, 2009), and distinguish bulimic from anorectic women and psychiatric controls (Hohlstein, Smith & Atlas, 1998). In an adolescent sample of girls, expectancies that eating alleviates negative affect and boredom was associated with dieting and disinhibition, and bulimic symptoms (Simons, Smith, & Hill, 2002). By contrast, the relationship of positive eating

expectancies may be unrelated to disordered eating. Endorsement of expectancies that food is pleasurable as a reward did not distinguish bulimic individuals from controls (Hohlstein, 1998). Recently it was demonstrated that while negative reinforcement eating expectancies predicted binge eating across the first year of middle school for girls, positive reinforcement expectancies did not, and instead were associated with less maladaptive social and celebratory overeating (Combs, Smith, & Simmons, 2010). Additionally, some evidence suggests that expectancies and trait urgency interact; in several studies, negative urgency moderated the relationship of negative affect eating expectancies on binge eating and bulimic symptoms among college women (Fischer, Anderson, & Smith, 2004; Fischer, Smith, Anderson, and Flory, 2003; Fischer & Smith, 2008). Urgency did not interact with expectancies about alcohol to predict drinking and alcohol problems, however (Fischer, Anderson, & Smith, 2004; Fischer & Smith, 2008).

In summary, individuals with alcohol use disorders and eating disorders may be similar in that they both engage in impulsive, rash action in the face of negative affect. A large body of research on negative affect and alcohol use has demonstrated that drinking in response to negative affect is related to problematic use. Thus, negative urgency may be a risk factor for the development of alcohol and eating related problems.

Research into the effects of positive mood states on alcohol use has been less extensively studied. There is preliminary evidence to suggest that individuals who are elevated on levels of positive urgency may be particularly prone to develop problems with alcohol use during the college years, when the influence of peers on drinking contexts and celebratory events are more likely to occur, but only if one has

the expectation that drinking will produce a positive mood (Cyders et al., 2007). Therefore, given that social drinking motives are associated with moderate alcohol use and not problematic use, it may be that positive urgency is a general risk factor for the development of alcohol problems, and that psychosocial learning about reward contingencies is important in this particular domain. Because there is little evidence to suggest that positive affect is a risk factor for bulimia, the tendency to engage in rash action in response to a positive mood state, however, is unlikely to be predictive of bulimic symptoms.

Distinction from and Relationship with Other Risk Factors

While previous research has concentrated on establishing direct pathways from impulsivity to alcohol use and disordered eating, less research has explored the manner in which urgency traits could interact with other known risk factors, specifically those related to mood. According to this model, personality dispositions to rash action enhance the associations of other mood-related risk factors with problematic alcohol use and disordered eating.

Depression

As discussed above, strong negative affect has been examined in direct relation to alcohol use and alcohol related problems, and disordered eating. Research indicates depression and alcohol abuse are frequently co-morbid (Swendsen & Merikangas, 2000; Lori, Akihito, Newell, & Frazier, 2008). Among college students, depression and depressive symptoms are often associated with alcohol related problems (Gonzalez, Reynolds, & Skewes, 2011), a relationship that is likely mediated by individual desires to drink to cope with, escape, avoid, and

regulate their negative affect (Cooper, Agocha, & Sheldon, 2000; Kassel, Jackson, Shannon, & Unrod, 2000). With regard to anorexia and bulimia, depression is the most commonly diagnosed co-morbid disorder (O'Brien & Vincent, 2003).

It is possible that the link between depressive symptoms and alcohol use could be amplified for individuals who are also impulsive when experiencing especially low negative mood states. That is, the link between depression and alcohol use could be exacerbated if the individual also acts rashly in the face of negative mood. Theoretically, an individual experiencing greater frequency and intensity of negative affect may have more difficulty regulating behavior in response to that depressed mood.

There is some evidence to suggest that the relationship between depression and alcohol problems may be particularly evident among impulsive individuals. In a study of adolescents, impulsivity was found to moderate the relationship between depression and alcohol use such that depressed, impulsive adolescents drank more heavily than depressed, non-impulsive or non-depressed adolescents (Hussong & Chassin, 1994). Mackie, Castellanos-Ryan, & Conrod (2011) demonstrated that adolescents who were elevated on impulsivity and who drank heavily were less likely to show a normative decline in depression over a period of 18 months. At least in early adolescence, it may be that the association between alcohol use and depression is conditional upon levels of impulsivity. Among college students participating in an experience sampling study of positive and negative affect, impulsivity moderated the relationships between negative affect and problems and also between alcohol consumption and problems (Simons, Gaher, Oliver, Bush, & Palmer, 2005).

While most of these studies have examined general measures of impulsivity; findings regarding the interaction of depression and negative urgency, specifically, on alcohol problems have been scarce, and findings remain inconclusive. Recently, Kayardi and King (2011) examined the possibility that positive and negative urgency would moderate the relationship between separate negative emotions (anger, anxiety, depression) and negative alcohol consequences among college students. They found that positive urgency--not negative urgency, strengthened the effect of depression on negative alcohol consequences. Another recent study found that while premeditation interacted with depression to enhance alcohol related problems, negative urgency did not (King, Karyadi, Luk, & Patock-Peckham, 2011).

In terms of disordered eating, Engel et al. (2007) examined mood using experience sampling over the course of 2 weeks, and found that antecedent anger level and the variability of antecedent anger predicted binge-eating episodes, and that these relationships were moderated by participants' level of impulsivity. However the relationship of depression to negative urgency, in particular, has not been well studied in relationship to disordered eating outcomes.

Affect Lability

Another affect-related risk factor relevant to these disorders is affect lability, defined as the degree to which individuals experience frequent shifts in the intensity and valence of affective states, including anger, elation, depression, and anxiety. It has been described as a type of affect dysregulation, a maladaptive pattern of mood variability that interferes with daily functioning (Oliver & Simons, 2004). Labile affect is present as a feature of several different types of pathology, including borderline

personality disorder, variants of bipolar disorder, and intermittent explosive disorder (Harvey, 1989).

Additionally, some studies have demonstrated that affect lability is significantly associated with both marijuana and alcohol problems (Simons & Carey, 2002; Simons & Carey, 2006). Previous studies have also indicated positive correlations between mood variability and dysregulated eating behaviors. Mood changeability, such as shifts in emotion between hypomania and depression, have been linked to severity of binge eating (Greenberg & Harvey, 1987); affect lability was associated with global disordered eating symptoms and binge eating among a samples of women with bulimia (Anestis et al., 2010). It has been posited that individuals who experience frequent mood shifts and emotional instability may engage in dysregulated behaviors as an attempt to manage frequent bouts of negative affect. Thus behavioral dysregulation, as evinced in problematic drinking or binge eating, may manifest from underlying emotional dysregulation.

Conceptually, negative urgency and affect lability are similar; both represent types of emotional dysregulation that have associations with maladaptive patterns of behavior. Previous work on the validity of the urgency traits has suggested that they are not mere proxies for affect, relating more to externalizing symptoms than to internalizing symptoms (Settles, Cyders, & Smith, 2010). In a recent study, Cyders and Coskunpinar (2010) examined how negative urgency is conceptually distinct from, and relates to, the related concept of affect lability. They demonstrated that the frequency and intensity of negative emotional states predicted greater increases in negative mood-based risky behavior for those individuals who were also high in negative urgency. Additionally, both urgency traits added unique predictive value to

the prediction of drinking and alcohol-related problems, above and beyond the frequency/intensity of emotional experiences. However, neither positive nor negative urgency interacted with affect lability in the prediction of alcohol use, or alcohol-related problems. Simons, Carey, and Gaher (2004) also examined affect lability in relationship alcohol problems, and found the relationship between affect lability and problems was greatest among participants with higher degrees of impulsivity. Thus there is some evidence to suggest that positive and negative urgency are distinct and separate constructs from affect lability, and that both aspects of emotional dysregulation may synergistically increase risk for alcohol related problems.

Session II: Background

Behavioral Measures of Impulsivity

Many of the research findings described above have been found in studies that measure impulsivity utilizing self-report measures. In the last few years, there has been a growing interest in the development of behavioral measures of impulsivity. Self-report indices rest on the assumption that individuals have the ability to assess their own personality accurately (Verdejo-García, Lawrence, & Clark, 2007). Performance based assessments promise several potential benefits over self-report measures, such as being easily quantifiable and amendable to manipulation. Performance on behavioral tasks can be deconstructed into specific behavioral elements (Keilpa, Sackeim, & Manna, 2005). Laboratory tasks also eliminate potential biases in accuracy or recall; theoretically, these tasks allow impulsivity to be directly observed, as opposed to indirectly reported. However, mapping behavioral measures onto underlying facets of impulsivity remains a difficult and complex task. Deficits in performance could reflect other cognitive weaknesses or deficits instead of

or in addition to impulsivity that are necessary to aid response inhibition, such as deficits in attention, and working memory, for example. Impulsivity is a multi-dimensional construct; performance on behavioral measures is likely at least partially multi-determined.

Generally, behavioral measures fall into one of two categories: delay of reinforcement/reward-choice paradigms and response disinhibition paradigms. Reward-choice paradigms involve choosing between immediate versus delayed rewards, and include delay discounting tasks, and decision making tasks such as the Iowa Gambling Task or the Delay Discounting Task. Response disinhibition tasks involve the ability to deliberately suppress dominant, automatic or pre-potent responses (Bechara, 2004). “Stop signal” and “go-no-go” tasks are the most commonly used tasks to measure failures of response inhibition (Keilpa, Sackeimc & Mann, 2005; LeMarquand et al., 1999; Cheung et al., 2004). In the stop-signal paradigm, the participant must respond to stimuli presented on a screen, however on a certain proportion of trials, an auditory tone will signal the participant to stop responding. In the typical paradigm of a go-no-go task, on ‘go’ trials, a the participant must respond as quickly as possible to a target that is presented on the majority of the trials; on ‘no-go’ trials that occur less often, the participant must not respond.

The inability to inhibit a prepotent response has been positively correlated with impulsivity (Enticott, Ogloff, & Bradshaw, 2006; Perales, Verdejo-García, Moya, Lozanod & Pérez-García, 2009; Keilpa, Sackeimc & Mann, 2005; Marsh, Dougherty, Mathias, Moeller, & Hicks, 2002); however, other studies have found no such associations (Claes, Nederkoorn, Vandereycken, Guerrieri, & Vertommen, 2006; Horn, Dolan, Elliott, Deakin, & Woodruff; 2003). Most research to date has examined

impulsivity as a function of the Behavioral Inhibition Scales (BIS; Carver & White, 1994) or other general impulsivity measures. In consideration of the multidimensionality of impulsivity as put forth by Whiteside and Lynam (2001), Bechara (2005) proposed that the mechanism involving response inhibition may be specifically related to the urgency sub-facet of impulsivity (also see Dick et al, 2010). Recently, this tentative hypothesis was examined in a study that explored the facets of the UPPS-P and a go-no-go task (Gay, Rochat, Billieux, d'Acremont, & Van der Linden, 2008). Consistent with this prediction, negative urgency was significantly and positively correlated with errors of commission of the Sustained Attention to Response Task-TUT (SART-TUT; Smallwood, et al., 2004), and tended to correlate positively with commission errors on the original version of this task. Similarly, McCarthy, Kroll, and Smith (2001) found that neurotic extraversion was significantly and positively related to commission errors on a go-no-go task. However, Perales, Verdejo-García, Moya,, Lozano, & Pérez-García (2009) found no such relationship with either positive or negative urgency and performance on a go-no go task, although in their version of the task a response was not previously made pre-potent; they utilized an equal proportion of go/no-go trials. Similarly, a recent study evaluated a stop-signal task designed to assess the capacity to inhibit prepotent responses in response to both neutral and emotional stimuli, in relationship to the urgency traits (Billieux, Gay, Rochat, & Van der Linden, 2010). However, no direct associations were found between performance to emotional stimuli on the stop-signal task and negative urgency, although indirect pathways between a risk-taking task were significant. Research examining the relationship of urgency to go-no-go tasks has been sparse, and results remain mixed.

Present Study

The present study examined the relationship between the UPPS-P impulsivity traits, cognitive expectations, and affect-related risk factors in the prediction of alcohol use and eating disorder symptoms among female college students. In session one, female participants completed a cross-sectional survey designed to assess primary study variables. In session two, a portion of participants who completed phase one completed a laboratory session, whereby performance on a behavioral task of impulsivity was examined under positive, negative, and neutral mood states.

The first aim of the study was to replicate and extend previous research on the urgency traits: in relationship with alcohol use and disordered eating, as distinct from other aspects of impulsivity, and as distinct from negative and volatile affect. The following predictions were made. Consistent with prior research, it was predicted that negative urgency would be positively associated with alcohol frequency and quantity of use (Fischer & Smith, 2008, Fischer, Anderson, & Smith, 2004, Dunn, Larimer, & Neighbors, 2002; Fischer, Smith, Annus, & Hendricks, 2007; Verdejo-García, Bechara, Recknor, & Pérez-García, 2007), and with alcohol related problems, after controlling for alcohol use rates (Dunn, Larimer, & Neighbors, 2002; Simons, Carey, & Gaher, 2004; Smith, et al., 2003). When considering all five constructs of impulsivity conjointly, negative and positive urgency were expected to account for the majority of the variance in alcohol related problems. In addition, after depression and affect lability are taken into account, it was predicted that the urgency traits would add unique predictive validity in the prediction of alcohol problems.

In terms of disordered eating outcomes, it was hypothesized that negative urgency would be the strongest predictor of bulimic symptoms, specifically bingeing,

purging (Brookings & Wilson, 1994; Fischer & Smith, 2008, Fischer, Anderson, and Smith, 2004; Fischer, Smith, & Anderson, 2003; Heaven, Mulligan, Merrilees, Woods, & Fairouz, 2001), and core attitudinal features of dysfunctional eating, as measured by the EDE-Q global scale. After controlling for other aspects of impulsivity, negative urgency was expected to be the only subfacet to account for a significant portion of the variance in disordered eating symptoms, and that negative urgency, but not positive urgency, would add unique predictive validity in the prediction of disordered eating facets after accounting for depression and affect lability. In addition, it was hypothesized that females with clinical levels of disordered eating and problematic drinking would be multi-impulsive, and have the highest levels of negative urgency compared to disordered eating, alcohol, and non-disordered 'controls' without either symptoms.

A second aim of the present study was to examine the interactions between the urgency traits, mood-related risk factors, and cognitive expectations, with dysfunctional alcohol use and eating. First, it was hypothesized that the relationship between the urgency traits and alcohol related problems would be strengthened by both affect lability and depression. Secondly, it was predicted that tension reduction alcohol expectancies would predict more alcohol use problems among women who are high in negative urgency, versus those who are low in negative urgency (Cyders, et al., 2007), and that social and physical pleasure alcohol expectancies would predict more alcohol problems among women who demonstrate elevated levels of either positive or negative urgency, versus for women who are low on these traits (Cyders, et al., 2007). In terms of disordered eating, it was predicted that affect lability and depression would strengthen the association between negative urgency

and eating disordered symptoms. By contrast, it was expected that expectancies that eating is useful/pleasurable as a reward would not interact with positive urgency to predict disordered eating symptoms (Fischer & Smith, 2008).

The final aim of this project was to examine potential associations between performance on a go-no-go task and self-reported impulsivity under conditions of neutral, positive, and negative mood. Previous studies have relied on self-report measures of impulsivity, or examined the urgency traits and responding on neuropsychological tasks without manipulating mood. Theoretically, individuals elevated on the urgency traits could act rashly specifically in response to positive or negative affect. Therefore, such individuals may commit more errors on a go-no-go task when experiencing positive or negative moods. The urgency traits may not necessarily be related to behavioral responding when such individuals are in “neutral” mood states, in the absence of extreme affect. Toward this end, the principal hypotheses of the second study was that negative urgency would predict more errors on the SART when individuals are under a negative mood state, and that positive urgency would predict more errors on the SART when individuals are under a positive mood state. Furthermore, SART responding in relationship to the urgency traits when participants were in a neutral mood was explored.

Method

Participants

1,060 undergraduate college females were recruited for the first phase of this study. Participation was limited to females due to the low base rates of eating-disordered behavior among men (APA, 2000). The mean age of participating students was 20.4 years old (range 18-30; SD=1.6). The majority of the sample reported Asian or Asian-American ethnicity (58%); the remaining participants were White/Caucasian (non-Hispanic) ethnicity (23%), Hispanic/Latina ethnicity (12%), "Other" (5%), Black/African-American (1%), and American-Indian/Native Alaskan or Native Hawaiian/Pacific Islander ethnicity (less than 1%). 602 participants were invited to return for the second phase of the study; of these, 191 participants (32%) completed the second session.

Procedure

Session 1: Online Survey. The sample for the online study consisted of female undergraduate students recruited from the psychology subject pool. Electronic informed consent was obtained from all participants. Participants were informed that the study was anonymous and confidential. All those who participated received course credit.

Session 2: Laboratory Session. A subset of students who completed the online study (n=602; 57%) were invited to participate in the second part of the study that took place in the laboratory. In order to ensure that mood conditions had adequate representation from individuals who varied on the upper and lower ends of

the urgency spectrum, participants were categorized into groups based on urgency scores. All participants who completed the first part of the study were classified into one of nine groups, representing graded combinations of negative and positive urgency. For example, individuals who scored in the 25th percentile on both negative and positive urgency dimensions were placed in the low urgency group; individuals who fell in the 75th percentile were placed in the high urgency group. The largest group comprised individuals who had scores in the middle range of urgency scores; therefore a random half of this group was invited to return for the second half of the study. All other participants who consented to be contacted were invited to participate in the second phase (n=602), of these, 191 participants (32%) completed the laboratory session. Within grouped blocks, participants were randomly assigned to receive one of three conditions (happy film, neutral film, sad film).

All participants provided written informed consent and were given a “bill of rights” as a participant in a research study, according to university procedures. Participants were tested individually in a private room on a computer by a trained research assistant. Baseline mood was assessed using the mood adjective checklist, after which participants randomly assigned to view either a positive, negative, or neutral film clip. Participants were told that this phase of the study was part of a pilot study for a future experiment (Forgas and East, 2006), in order to attempt to distract participants from knowledge of mood induction. Immediately following viewing of the film clip, participants completed the second mood assessment and film questionnaire. Next, the participants performed the SART task. When the session was over, participants responded to a prompt asking what they thought the study as about, and

were debriefed by the research assistant. Additional course credit was provided as compensation for participation.

Measures

Demographics. Respondents reported their age and ethnicity (American Indian/Alaskan Native, Asian American, Black/African American (non-Hispanic), Hispanic or Latino/a, Native Hawaiian/Pacific Islander, White (Caucasian/non-Hispanic), or “Other”).

Depressive Symptoms. The Beck Depression Inventory II (BDI-II; Beck, Steer, and Brown, 1996) is a 21-item self-report measure that is used to assess affective, cognitive, and somatic depressive symptoms, as specified in the DSM-IV. Participants use a Likert-type scale (0–3) to report the degree to which the items describe their affective state over the course of the past 2 weeks. The reliability and stability of the BDI is well established (Beck et al., 1988; Beck, Steer, & Brown, 1996). The BDI–II has been shown to have high internal consistency among undergraduate ($\alpha = .93$) populations (Beck et al., 1996); Cronbach’s alpha in the current sample was .91.

Affect Lability. The Affect Lability Scale-Short Form (ALS-SF; Oliver & Simons, 2003) is an 18 item scale that measures the degree to which individuals experience frequent shifts in the intensity and valence of affective states, including anger, elation, depression, and anxiety. This instrument is composed of three subscales: anxiety/depression, depression/elation, and anger, and also produces a total score of affect lability, which will be used in this study. Items are rated on 4 point

anchored rating scale from very undescriptive (1) to very descriptive (4). Example items include, “I shift back and forth from feeling perfectly calm to feeling uptight and nervous.” and, “There are times when I have very little energy and then just afterwards I have about the same energy level as most people.” This instrument has demonstrated adequate internal consistency, convergent validity, and temporal stability (Oliver & Simons, 2003); Cronbach’s alpha in the current sample was .93.

Impulsivity. UPPS-P (Urgency, Perseverance, Premeditation, and Sensation-Seeking Positive Urgency, Self-Report Scale. The UPPS-P Impulsive Behavior Scale (Whiteside & Lynam, 2001; Cyders et al., 2007) is a 59 item self-response scale that measures five dimensions of impulsivity: Positive Urgency, Negative Urgency, Sensation Seeking, (lack of) Premeditation, and (lack of) Perseverance. Whiteside and Lynam (2001) developed and validated the original UPPS, and demonstrated that each of the original four subscales (Urgency, Premeditation, Perseverance, and Sensation Seeking) maps onto one of the five domains of personality as measured by the revised NEO Personality Inventory (NEO-PI-R; Costa & McCrae, 1995). The positive urgency subscale has been developed and validated by Cyders, et al. (2007) as a unique fifth element.

The urgency subscales measure emotional impulsivity--the tendency to commit rash action in the face of intense affect. The negative urgency subscale aligns with neuroticism, and consists of 12 items measuring the degree to which individuals act rashly in the face of intense negative affect (e.g., “When I am upset, I often act without thinking.”, and “When I feel bad, I will often do things I later regret in order to make myself feel better now.”). The 14 item positive urgency subscale assesses the propensity to engage in rash action in response to positive mood states.

("I tend to lose control when I am in a great mood"; "When I get really happy about something, I tend to do things that have bad consequences."). Perseverance relates to the self-discipline facet of Conscientiousness; it measures one's ability to remain with a task until completion and avoid boredom. ("I finish what I start.", and "Once I get going on something I hate to stop."). Premeditation maps onto the deliberative facet of Conscientiousness; it assesses the ability to refrain from action in favor of careful thought and planning ("I usually think carefully before doing anything.", and "I am a cautious person."). The Sensation Seeking subscale measures the tendency to seek novel experiences and adventure, and relates to the excitement seeking facet of Extraversion ("I quite enjoy taking risks.", and "I would enjoy fast driving."). Each subscale uses a Likert-type scale ranging from 1 "Agree strongly" to 4 "Disagree strongly."

The five subscales have good demonstrated content validity and discriminant validity (Cyders et al., 2007; Whiteside and Lynam, 2001). Internal consistency scales for each scale are greater than .80 (Zapolski, Cyders, & Smith, 2009). The alpha reliabilities in the present sample were .88, .94, .84, .84 and .86 for Negative Urgency, Positive Urgency, (lack of) Premeditation, (lack of) Perseverance, and Sensation Seeking, respectively.

Disordered Eating. Eating Disorder Examination-Questionnaire (EDE-Q; Fairburn & Beglin, 1994). The EDE-Q is the self-report version of the Eating Disorder Examination (EDE; Fairburn and Cooper, 1993). The original EDE is a well established interviewer based assessment, widely regarded as the instrument of choice for the assessment of eating disorders (Garner, 2002). The EDE-Q is a similarly comprehensive instrument designed to measure the occurrence and

frequency of eating disordered attitudes and behaviors. It can also be used to identify tentative cases of eating disorders (Fairburn & Beglin, 1994; Luce & Crowther, 1999). A score of 4 or above has been previously used as a cutoff score for clinical significance (Wolk, Loeb, and Walsh, 2005).

Generally, studies have demonstrated a high level of agreement between the EDE-Q and EDE in assessing the core attitudinal features of eating disorder symptomatology in the general population (Fairburn & Beglin, 1994), although concordance for behavioral features is less clear (Mond, Hay, Rodgers, Owen, & Beumont, 2004). The EDE-Q measures the attitudes and cognitions associated with eating disorders with four subscales: Eating Concern, Shape Concern, Weight Concern, and Restraint, as well as a global score. In addition, the EDE-Q measures the frequency of eating disorder (binge eating and compensatory) behaviors in terms of the number of episodes occurring during the past four weeks. Objective binge episodes are defined as eating an objectively large amount of food with a sense of loss of control. Binge frequency was measured as the number of binge days (days on which one or more objective binge episodes occurred).

Questions regarding height and weight allow for the assessment of body mass index (BMI). The EDE-Q has demonstrated acceptable internal consistency and test-retest reliability (Luce and Crowther, 1999; Peterson et al., 2007). Internal consistency estimates in the current sample were .81, .90, .85, .80 for Eating Concern, Shape Concern, Weight Concern, and Restraint, respectively.

Alcohol Use. The Daily Drinking Questionnaire (Collins, Parks, & Marlatt, 1985) is a self-report questionnaire designed to assess current drinking. It

incorporates a weekly calendar with days of the week to aid participant recall. A drink conversion chart was also available for reference, defining a standard drink as 12 oz. can, bottle, or glass of American beer, half of a 12 ounce can, bottle, or glass of a microbrew/European beer, a 4 oz. glass of wine, 12 ounce bottle of wine cooler, or 1-1.5 ounces of hard liquor (shot). Current use was defined as drinking within the past three months. Participants reported quantity (typical, current, and weekend use), frequency (current use), and current heavy episodic drinking (defined as 4 or more drinks in a row within a two hour period).

Alcohol Consequences. Brief Young Adult Alcohol Consequences

Questionnaire B-YAACQ (Kahler et al., 2005). The B-YAACQ is a 24 item self-report measure abbreviated from the YAACQ (Young Adult Alcohol Consequences Questionnaire; Read, et al., 2004). The B-YAACQ assesses 8 domains of problematic drinking over the past year: 1) social-interpersonal consequences, 2) impaired control, 3) self-perception, 4) self-care, 5) risk behaviors, 6) academic/occupational consequences, 7) excessive drinking, and 8) physiological dependence. Validated in a college sample, this instrument assesses the severity of drinking problems, and intentionally includes more items toward the lower end of the continuum and in the range of the continuum where most college students who regularly drink may experience problems. Consequences assessed include doing or saying embarrassing things while drinking, having a hangover, passing out, taking foolish risks, driving after drinking, etc. Participants respond in a dichotomous Yes/No format as to whether they have experienced any of the problems in the previous year. Responses are summed to form a total score. Cronbach's alpha in the current sample was .91.

Alcohol Expectancies. The Alcohol Expectancy Questionnaire-Revised (AEQ; Brown, Christiansen, & Goldman, 1987), is a 120-item instrument that assesses one's beliefs about the general and specific positive effects of alcohol consumption. The AEQ consists of six factor-analytically derived subscales, two of which were used in this study: social and physical pleasure (ex. "Drinking makes me feel good.", and "Drinking adds a certain warmth to social occasions.") and relaxation/tension reduction (ex. "If I am tense or anxious, having a drink makes me feel better.", and "Alcohol makes me sleep better."). The AEQ utilizes a 5 point likert style response format ranging from disagree strongly to agree strongly, reflecting the degree to which the individual agrees with each statement. Expectancy scores for each subscale are calculated by summing individual items comprising each factor, with higher scores indicating more positive expectancies about the effects of alcohol. The reliability and predictive validity of the AEQ are well established (e.g., Goldman, Greenbaum, & Darkes, 1997). Internal consistency for this sample was .90 for the social and physical pleasure subscale, and .90 for the relaxation/tension reduction subscale.

Eating Expectancies. The Eating Expectancy Inventory (EEI; Hohlstein et al., 1998) is a 34-item instrument that measures cognitive expectancies regarding positive and negative reinforcement from eating. It is comprised of five factor-analytically derived scales. The Eating Helps Manage Negative Affect subscale has 18 items and reflects negative reinforcement expectancies (ex., "Eating can help me bury my emotions when I don't want to feel them."). Hohlstein (1998) demonstrated that this subscale characterizes bulimic but not anorectic individuals in a clinical sample, and is correlated with indexes of restraint and disinhibition within a non-

clinical sample. The 6 item Eating is Useful and Pleasurable as a Reward scale measures positive reinforcement expectancies (ex., “Eating is a good way to celebrate.”, and “When I do something good, eating is a good way to reward myself.”). This subscale is not associated with dieting or eating disordered symptoms.

The EEI was validated in a college sample of undergraduate women, and in samples of adult women with and without eating disorders. The Cronbach’s coefficient alphas for the Eating Helps Manage Negative Affect and Eating is Pleasurable and Useful and as a Reward subscales in this sample were .94 and .82, respectively.

Behavioral Task. The Sustained Attention to Response Task (SART; Robertson, Manly, Andrade, Baddeley, & Yiend, 1997) is a computerized brief go-no-go task. In this procedure, 225 single digits (25 of each of 9 digits) are presented serially over the course of 4.3 minutes. Each digit is presented for 250msec, followed by a 900 msec mask (consisting of a diagonal cross within a circle). Participants responded to each digit with a space bar press, except when the digit 3 appeared (25 occasions), when they had to withhold the response. The target digit was distributed throughout the trials in a pre-fixed quasi-random fashion. The digits were presented in one of five randomly allocated font sizes in order to prevent reliance on sensory cues of the target, and enhance processing of the actual digits. No restrictions were placed on the participant’s movements. Participants were instructed to give equal importance to speed and accuracy when performing the task.

Film. Previous research has demonstrated that film is one of the most effective ways to induce mood (Gerrards-Hesse, Spies, & Hesse, 1994; Westerman, Spies, Stahl, & Hesse, 1996). The clips were chosen for their effectiveness in inducing target emotions (Gross and Levenson, 1995; Hewig et al., 2005). Scenes were between 2.5 and 5 minutes in length. A scene from “When Harry Met Sally” (Reiner, 1989) was intended to induce positive mood; in this clip, a man and a woman talk to each other in a restaurant. A scene from “The Champ” (Lovell, 1979) was intended to induce negative mood; this clip features a small boy crying as he watches his father die. To induce neutral mood, a 5 minute clip from Alaska’s Wild Denali (Hardesty, 1997) was shown which depicted wildlife scenes from the Alaskan wilderness.

Film Questionnaire. Following the film clip, participants were asked if they had seen the film before (Y/N). If not, participants reported how interested they were in viewing the film in full (0-6; not at all interested to extremely interested).

Mood Rating Scale. A mood adjective rating scale was used to assess current mood state immediately following viewing of the film clip. Respondents rated the extent to which they felt different moods at the present moment from 0 (not at all) to 8 (extremely/a great deal). The positive affect scale was comprised of the adjectives cheerful, glad, happy, joy, surprised, amused, and pleased. The negative affect scale was comprised of the adjectives depressed, anxious, gloomy, blue, sad, tense, and unhappy. The Cronbach’s alpha coefficients for both the positive mood scale and the negative mood scale was .93 (Range: 0-56).

Results

Sample Characteristics

Alcohol use. In this female undergraduate sample ($n=1,060$), 72% reported current drinking, that is, drinking at least once a month in the past three months. The prevalence of current alcohol use among this sample is slightly higher than the latest findings from Monitoring the Future, an ongoing large scale national survey of college students, whereby 65% of college students reported current drinking in the past 30 days (Johnston et al., 2010). In the current sample, 19% reported drinking 1-2 times a week, 5% reported drinking 3-4 times per week, and 1.3% reported drinking nearly every day or more often. Among all respondents, participants reported drinking an average of 3.7 ($SD=5.8$) drinks per week, for on average 3.4 hours ($SD=4.8$)(Table 1).

Approximately 72% of respondents reported experiencing at least 1 problem over the past year from drinking ($M= 4.8$; $SD=5.2$). The most common alcohol-related problems endorsed were: saying or doing something embarrassing while drinking (50%), having a hangover the morning after drinking (49%), and feeling sick or throwing up after drinking (48%). The least common alcohol related problems were: experiencing problems with one's partner, parents, or relatives (7%), being overweight as a result of drinking (5%), and needing a drink after waking up in the morning (1%) (Table 2).

Table 1

Mean Levels (Standard Deviations) of Alcohol Use, Disordered Eating, Expectancies, and Mood Related Variables

Variable	Mean (SD)
<i>Alcohol</i>	
Quantity (drinks/week)	3.68 (5.8)
Frequency (hours/week)	3.44 (4.8)
Problems	4.84 (5.2)
<i>Disordered Eating</i>	
Binge Eating (past 28 days)	2.44 (5.7)
Global EDE-Q Score	1.75 (1.2)
<i>Expectancies</i>	
AEQ Tension Reduction	27.37 (8.1)
AEQ Physical/Social	30.35 (8.2)
EEL Negative Affect	60.06 (19.7)
EEL Pleasure/Reward	25.63 (2.9)
<i>Mood</i>	
BDI Depression Score	10.31 (9.1)
Affect Lability	36.63 (11.4)

Note. EDE-Q=Eating Disorder Examination-Questionnaire. AEQ=Alcohol Expectancy Questionnaire. EEL=Eating Expectancy Questionnaire. BDI=Beck Depression Inventory.

Table 2

Summary of Alcohol Problems from the B-YYACQ and Their Frequency of Endorsement

Alcohol related problem	% Endorsed
Said or done embarrassing things	49.8
Hangover	49.3
Gotten sick or thrown up	47.9
Had less energy, tired	38.8
Unplanned drinking	33.4
Done impulsive things later regretted	30.3
Taken foolish risks	22.6
Felt badly about self	22.4
Forget stretches of time/blacked out	22.4
Passed out	19.8
Missed work or classes	18.0
Needed larger amounts to feel effects	17.4
Gotten into sexual situations later regretted	14.1
Difficulty limiting drinking	13.5
Quality of work or school suffered	12.7
Spent too much time drinking	11.7
Physical appearance harmed by drinking	10.6
Neglected family, work, or school obligations	10.0
Become rude, obnoxious, insulting	8.7
Driven after drinking too much	7.5
Woken up in unexpected place	7.1
Problems with partner, parents, relatives	6.7
Overweight	5.3
Needed a drink upon waking	1.3

Note. B-YAACQ=Brief Young Adult Alcohol Consequences Questionnaire.

Disordered eating. Body Mass Index (BMI) was calculated from participant self-reports of height and weight. According to the Center for Disease Control criteria for a healthy BMI (CDC, 2011), 8% of women qualified as underweight, 12% were overweight, and 4% were obese.

The EDE-Q yields four subscales and a global score to assess dysfunctional attitudes and cognitions associated with eating disorders. Using a cutoff score of 4 to

designate clinical significance (Carter, Stewart, and Fairburn, 2001; Mond, Rodgers, and Owen, 2006), 7% scored in the clinically significant range on the Restraint subscale of the EDE-Q, 24% on Shape Concern, 15% on Weight Concern, 4% on Eating Concern, and 7% on the Global Scale, derived from an average of all the scales.

Table 3 lists the prevalence and average engagement of bingeing and purging among the female students in this sample. With regard to bingeing and purging behavior, 42% of participants reported bingeing at least once during the past 28 days. The mean number of binge days (days on which bingeing occurred) was 2.4 (SD=5.3). A smaller percentage of women reported vomiting as a means to control weight or shape (7%) at least once in the past 28 days; 4% reported using laxatives to control weight or shape. The majority of women who purged at least once in the past 28 days (vomited or used laxatives) also reported bingeing at least once (82%).

Table 3

Disordered Eating Behaviors of Female College Students

Disordered Eating Behaviors	Any Occurrence (%)	Mean (SD)	Range
Objective Binge Episodes	41.5	2.4 (5.3)	28
Purging	8.1		
Laxative misuse	3.8	.24 (1.8)	28
Self-Induced Vomiting	6.5	.47 (2.8)	30

Note. Averages are for those who reported at least one occurrence of the specific eating disordered behavior during the past 28 days.

Session 1: Preliminary Analyses for Survey Study

Analysis of distributions revealed that drinks per week, hours spent drinking per week, and number of binge days per month had distributions indicating a large number of zero responses (zero-inflated), followed by scores which approximated a negative binomial distribution. Given this departure from normality, zero-inflated negative binomial distribution analyses were conducted for these outcomes. Zero-inflated negative binomial regressions generate output reflecting a mixture model. The first part of the model addresses the likelihood that the outcome is present or absent, zero or non-zero. The second part of the model focuses on the extent to which the outcome is non-zero, predicting zero and non-zero outcomes (Atkins & Gallop, 2007). All predictor variables were centered prior to ZINB analyses. The coefficients estimated for the count portion are exponentiated to give rate ratios. Similarly, the logit model coefficients are also exponentiated, resulting in odds ratios that show the probability that the outcome was zero.

Alcohol Use Outcomes

UPPS-P and alcohol use. Consistent with prior research, it was predicted that negative urgency would be positively correlated with alcohol frequency and quantity of use (Fischer & Smith, 2008, Fischer, Anderson, & Smith, 2004, Anderson, Martens, & Cimini, 2005; Dunn, Larimer, & Neighbors, 2002; Fischer, Smith, Annus, & Hendricks, 2007; Verdejo-García, Bechara, Recknor, & Pérez-García, 2007). Pearson correlations were conducted to examine the bivariate relationships between variables (Table 4; Figure 1). All five facets of trait impulsivity were positively associated with alcohol use, as well as problems associated with alcohol use. Lack

of premeditation had the strongest correlation with alcohol quantity ($r=.24$, $p<.001$) and frequency of consumption ($r=.23$, $p<.001$). Negative ($r=.30$, $p<.001$) and positive urgency ($r=.26$, $p<.001$) were the strongest predictors of alcohol problems.

Table 4

Correlations of UPPS-P Impulsivity Traits, Alcohol Use, Alcohol use Problems, and Disordered Eating Behaviors

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Negative Urgency	---										
2. Positive Urgency	.66**	---									
3. Lack of Premeditation	.38**	.44**	---								
4. Lack of Perseverance	.37**	.35**	.45**	---							
5. Sensation Seeking	.17**	.26**	.29**	-.11*	---						
6. Alcohol Use Quantity	.16**	.15**	.24**	.09**	.21**	---					
7. Alcohol Use Frequency	.13**	.13**	.23**	.07*	.21**	.83**	---				
8. Alcohol Use Problems	.30**	.26**	.25**	.17**	.23**	.61**	.58**	---			
9. Binging	.27**	.15**	.05	.12**	.06*	.15**	.13**	.16**	---		
10. Purging	.12**	.06	.06*	.04	.02	.15**	.13**	.13**	.35**	---	
11. Global EDE-Q	.30**	.15**	.01	.03	.03	.16**	.12**	.22**	.48**	.23**	---

Note. * $p<.01$ ** $p<.05$. $n=1,064$. EDE-Q = Eating Disorder Examination Questionnaire.

Because alcohol quantity and frequency outcomes were non-normally distributed, zero-inflated negative binomial regressions (ZINB) were conducted to examine the relationship of impulsivity variables with these outcomes. The first model predicted weekly drinking (alcohol quantity) from the 5 UPPS-P traits; the same predictors were entered for both the count and the zero-inflated models. The likelihood ratio for the full ZINB model was $X^2(5) = 31.39$, $p<.001$, which indicated that the overall model was significant. The logistic portion of the model indicated that increased (lack of) premeditation was associated with a decreased likelihood of

reporting zero drinks per week by a factor of .67 ($\beta = -.40$, $p < .01$); sensation seeking by a factor of .70 ($\beta = -.35$, $p < .01$). The odds of reporting no weekly drinking were reduced by 33% per 1 standard deviation (SD) increase in (lack of) premeditation and the odds of reporting no weekly drinking are decreased by 30% per 1 SD increase in sensation seeking. Results from the count portion of the model were similar, indicating that increased premeditation was positively associated with weekly drinking by a factor of 1.12 ($\beta = .11$, $p < .05$); whereas sensation seeking was positively associated with weekly drinking by a factor of 1.19 ($\beta = .17$, $p < .01$). Therefore, a 1 SD increase in premeditation was positively associated with a 12% increase in number of drinks consumed per week, and a 1 SD increase in sensation seeking was positively associated with a 19% increase in number of drinks consumed per week (Table 5).

Table 5.

Summary of Zero-Inflated Negative Binomial (ZINB) Regression for UPPS-P sub-facets Predicting Quantity of Drinks Consumed Per Week

Variable	z	p	Risk/odds ratio	95% CI
Count Model				
Negative Urgency	1.17	.24	1.07	-.04-.19
Positive Urgency	-.15	.877	.99	-.13-.12
Lack of Premeditation	2.11	.035	1.12*	.01-.22
Lack of Perseverance	1.00	.318	1.05	-.05-.16
Sensation Seeking	3.39	.001	1.19**	.07-.27
Inflated Model				
Negative Urgency	-.56	.573	.93	-.31-.17
Positive Urgency	.33	.743	1.04	-.21-.31
Lack of Premeditation	-3.20	.001	.67**	-.64--.15
Lack of Perseverance	.15	.879	1.01	-.19-.23
Sensation Seeking	-5.74	.000	.70**	-.92--.45

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

Results were similar when predicting to weekly drinking frequency. The likelihood ratio for the full ZINB model indicated that the overall model was significant ($X^2(5) = 14.82$, $p < .05$). Although no predictors were significant in the count portion of

the model, the logistic portion indicated that (lack of) premeditation and sensation seeking were related to alcohol use frequency. The odds ratio for (lack of) premeditation was .70 ($\beta = -.36$, $p < .01$); the odds ratio for sensation seeking was .67 ($\beta = -.40$, $p < .001$). That is, the odds of reporting zero hours of drinking per week are decreased by 30% per 1 standard deviation increase in (lack of) premeditation, and the odds of reporting zero hours of drinking per week are decreased by 33% per 1 standard deviation increase in sensation seeking.

Secondly, it was hypothesized that negative and positive urgency would be positively correlated with the number of problems with alcohol (Whiteside and Lynam, 2003, Fischer, Smith, 2008, Verdejo-Garcia, et al, 2007), and that these relationships would exist after controlling for use rates (Dunn, Larimer, and Neighbors, 2002; Simons, Carey, and Gaher, 2004; Smith, et al., 2003). A series of regression analyses were conducted to test the hypothesis that out of all the UPPS-P traits, only negative and positive urgency would be positively associated with alcohol-related problems, after accounting for alcohol use frequency and quantity. Score on the B-YAACQ was entered as the dependent variable. On the first step, total weekly drinks consumed (quantity) and total weekly hours spent drinking (frequency) were entered. On the second step, negative urgency was entered, in order to examine the predictive validity of this trait above and beyond alcohol use rates. In turn, each of the other four UPPS variables was entered on the second step in separate analyses. All UPPS-P traits significantly predicted alcohol related problems, above and beyond use rates, however, the urgency traits added the most variance; negative urgency added 4.1%; positive urgency added 2.8% (Table 6). Perseverance (lack of) added 1.3%, premeditation (lack of) added 1%, and sensation seeking added 1%.

Table 6.

Hierarchical Multiple Regressions Examining the Urgency Traits Beyond Alcohol Use in the Prediction of Alcohol Problems

Variable	B	S.E. B	β	Adjusted R ²	Change in R ²
<i>Negative Urgency Model</i>				.422	.041
Alcohol Quantity	.345	.040	.385***		
Alcohol Frequency	.247	.048	.229***		
Negative Urgency	.160	.020	.205***		
<i>Positive Urgency Model</i>				.401	.028
Alcohol Quantity	.343	.041	.383***		
Alcohol Frequency	.247	.049	.231***		
Positive Urgency	.109	.017	.169***		

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

In summary, lack of premeditation and sensation seeking were the strongest predictors of the quantity and frequency of alcohol consumption, while negative and positive urgency were the strongest predictors of alcohol problems. After controlling for alcohol use, the urgency traits accounted for the most variance in alcohol related consequences.

Urgency traits as distinct from other facets of impulsivity. Because all five aspects of impulsivity are correlated to some degree with alcohol problems, the unique capacity of negative urgency to predict alcohol problems after controlling for other aspects of trait impulsivity was considered. Specifically, it was hypothesized that when considering all five constructs of impulsivity, negative and positive urgency would account for the majority of the variance in alcohol related problems.

A series of stepwise multiple hierarchical regression analyses were conducted to examine the incremental validity of each of the UPPS-P variables over the others in the prediction of alcohol problems. To test the primary hypothesis, on Step 1

positive urgency, premeditation (lack of), perseverance (lack of), and sensation seeking were entered; negative urgency was entered on Step 2. The dependent variable was the total score on the B-YAACQ. In each of four subsequent analyses, each impulsivity construct was entered in step 1, and the remaining four UPPS-P variables were entered on step 2.

Both negative urgency and sensation seeking significantly predicted alcohol related problems, beyond what was accounted for by the other four constructs of impulsivity. The total model with all five constructs of impulsivity accounted for approximately 12% of the variance in alcohol problems. Negative urgency significantly predicted an additional 1.4% in alcohol related problems, as measured by the change in R^2 . Sensation seeking significantly predicted an additional 2.3% (Table 7). In sum, after controlling for the other impulsivity sub-facets, only negative urgency and sensation seeking accounted for a significant portion of the variance in alcohol related problems.

Table 7

Hierarchical Multiple Regressions Examining Negative Urgency and Sensation Seeking Beyond Other Impulsivity Traits in the Prediction of Alcohol Problems

Variable	B	S.E. B	B	Adjusted R^2	Change in R^2
<i>Negative Urgency Model</i>				.123	.014
Positive Urgency	.042	.029	.066		
Lack of Premeditation	.077	.043	.073		
Lack of Perseverance	.077	.041	.073		
Sensation Seeking	.123	.027	.166***		
Negative Urgency	.121	.033	.159***		
<i>Sensation Seeking Model</i>				.123	.023
Sensation Seeking	.123	.027	.166***		

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

Urgency traits as distinct from mood constructs. Correlations were conducted to examine relationships between mood constructs and the urgency traits. As shown in Figure 1, affect lability was positively associated with negative ($r=.50$, $p<.001$), and positive urgency ($r=.40$, $p<.001$), and alcohol problems ($r=.14$, $p<.001$). Depression was also positively associated with negative ($r=.44$, $p<.001$) and positive urgency ($r=.29$, $p<.001$) as well as alcohol related problems ($r=.21$; $p<.001$). To examine the possibility that the urgency traits add unique predictive validity in the prediction of alcohol problems, independent of negative and volatile affect, two multiple hierarchical regressions were conducted. On step 1, weekly alcohol quantity and frequency, total depression score, and affect lability score were entered; negative urgency was entered on Step 2. The dependent variable was alcohol related problems. The same analysis was repeated with positive urgency entered on Step 2.

The model without negative urgency accounted for 39% of the variation in alcohol use problems. In both models with all variables included, affect lability became an insignificant predictor of alcohol problems; however depression remained significant ($\beta=.13$, $p<.001$). Beyond alcohol use, depression, and affect lability, negative urgency added 2.8% of predictive power for alcohol related problems. Similarly, the model without positive urgency accounted for 38% of the variation in alcohol problems, and the addition of positive urgency was significant, adding 2.3% in predictive variance (Table 8). In sum, the urgency traits are significant predictors of alcohol problems, after related aspects of emotionality are taken into account.

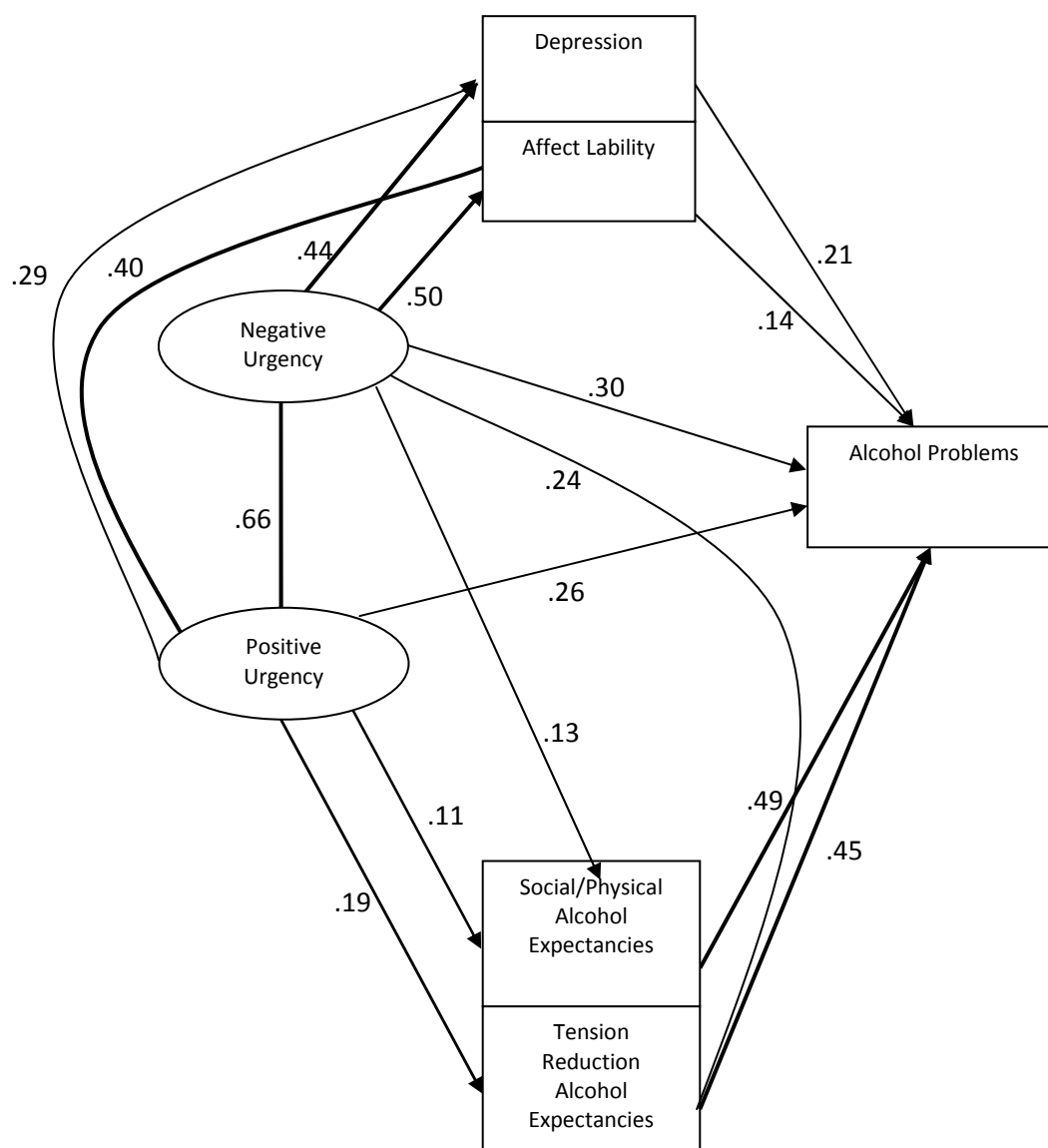


Figure 1.
Model of the personality pathway for the prediction of alcohol problems, including mood risk-factors, and alcohol expectancies. All correlation coefficients are significant at $p < .01$.

Table 8

Hierarchical Multiple Regressions Examining the Urgency Traits Beyond Alcohol Use, Affect Lability, Depression in the Prediction of Alcohol Problems.

Variable	B	S.E. B	B	Adjusted R ²	Change in R ²
<i>Negative Urgency Model</i>				.417	.028
Alcohol Quantity	.360	.043	.399***		
Alcohol Frequency	.218	.051	.207***		
Affect Lability	-.026	.014	-.059		
Depression	.047	.018	.082**		
Negative Urgency	.154	.025	.201***		
<i>Positive Urgency Model</i>				.404	.023
Alcohol Quantity	.348	.044	.387***		
Alcohol Frequency	.220	.051	.212***		
Affect Lability	-.017	.014	-.039		
Depression	.062	.018	.109***		
Positive Urgency	.107	.019	.167***		

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

Urgency traits and other mood-related risk factors. It was hypothesized that the relationship between the urgency traits and alcohol related problems would be greatest among participants who reported greater mood variability, as measured by affective lability. This was tested with two multiple hierarchical regressions. All predictor variables were centered before analysis. Regression analyses were conducted according to methods recommended by Aiken and West (1991). On step 1, the main effects of total ALS score and negative urgency were entered. On step 2, the product term for the interaction between predictors was entered. The same analysis was repeated with positive urgency.

For negative urgency, the first step of the model was significant ($R^2 = .09$, $p < .001$). The negative urgency main effect was significant ($\beta = .31$, $p < .01$), however affect lability was not significant ($\beta = -.02$, $p = .54$). The interaction term was also not

significant ($\beta = -.00$, $p = .95$). Similarly, for positive urgency, the first step of the model was significant ($R^2 = .07$, $p < .001$) and negative urgency was significant ($\beta = .25$, $p < .01$), however neither affect lability ($\beta = -.03$, $p = .42$) or the interaction term was significant ($\beta = -.03$, $p = .35$).

In the same way, it was predicted that negative urgency and alcohol related problems would be greatest among participants who reported experiencing depressive symptoms. A multiple hierarchical regression was conducted with depression score on the BDI and negative urgency on step 1, and the product term for the interaction between predictors on step 2.

For negative urgency, the first step of the model was significant ($R^2 = .09$, $p < .001$). The beta weights for negative urgency ($\beta = .27$, $p < .001$) and depression ($\beta = .08$, $p = .02$) were significant. However, the interaction term was not significant ($\beta = -.01$, $p = .77$). Thus, contrary to the hypothesis, depression and negative urgency did not interact to predict alcohol problems. In sum, the relationship of depression and affect lability to drinking problems did not change based on individual differences in urgency.

Urgency traits and alcohol expectancy interactions. It was predicted that negative urgency would moderate the relationship of alcohol expectancies with alcohol problems. Specifically, tension reduction expectancies (that alcohol will alleviate tension), were expected to predict the most alcohol use problems among women who are high in negative urgency, versus those who are low in negative urgency (Cyders, et al., 2007). A hierarchical multiple regression indicated the first step of the model was significant ($R^2 = .23$, $p < .001$). Both main effects were

significant; tension reduction expectancies ($\beta=.39$; $p<.001$) and negative urgency ($\beta=.21$; $p<.001$) were positively associated with alcohol problems. As predicted, the interaction term was also significant ($R^2=.24$, $\beta=.08$, $p<.01$), adding 1% to the prediction of alcohol problems. The tension reduction expectancies and negative urgency interaction indicates that the relationship between negative urgency and alcohol related problems was greatest for individuals with higher tension reduction alcohol expectancies. Simple slope analyses for problems on negative urgency at 1 SD above the mean on tension reduction alcohol expectancies was $b=.225$, $t=8.0$, $p<.001$ and at 1 SD below the mean $b=.097$, $t=3.09$, $p<.01$. The total amount of variance in alcohol related problems explained by the model was 24% (Figure 2).

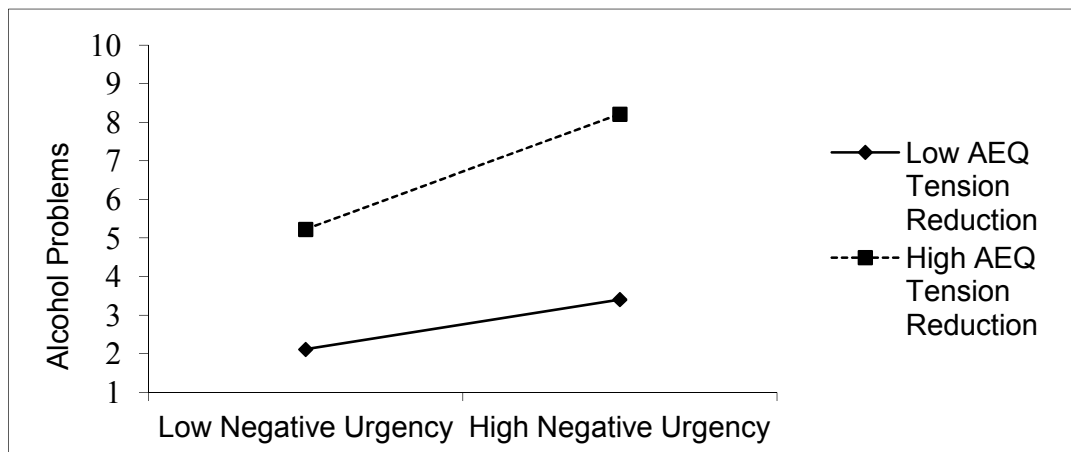


Figure 2. Tension reduction alcohol expectancies, negative urgency, and alcohol problems. High and low AEQ tension reduction expectancies and negative urgency are ± 1 SD from the mean. Variables are centered to have a mean of zero. Simple slopes are significant at $p<.01$.

It was also hypothesized that expectancies that alcohol will facilitate social and physical pleasure would predict the most alcohol problems among women who are high in positive and negative urgency, versus for women who are low on these traits (Cyders, et al., 2007). In the same manner, two hierarchical multiple

regressions were conducted, substituting the social and physical pleasure subscale of the AEQ.

For positive urgency, the first step of the model was significant ($R^2=.29$, $p=.000$), and both physical and social pleasure expectancies ($\beta=.47$; $p=.000$) and positive urgency ($\beta=.21$; $p=.000$) significantly predicted alcohol problems. As shown in Figure 3, the interaction term was also significant ($R^2=.29$, $p=.003$), adding 1% to the variance in problems. The interaction indicates that the relationship between positive urgency and alcohol related problems was greatest for individuals with higher physical and social pleasure alcohol expectancies. Simple slope analyses for problems on positive urgency at 1 SD above the mean on physical and social pleasure alcohol expectancies was $b=.185$, $t=10.47$, $p<.001$ and at 1 SD below the mean $b=.09$, $t=5.73$, $p<.001$.

A similar pattern emerged for negative urgency. The first step of the model was significant ($R^2=.30$, $p=.000$) and both physical and social pleasure expectancies ($\beta=.46$; $p=.000$) and negative urgency ($\beta=.24$; $p=.000$) predicted problems. The interaction term was also significant ($R^2=.31$, $\beta=.10$; $p=.000$), adding 1% to the prediction of alcohol problems. Females who were high on negative urgency and who endorsed high physical and social pleasure expectancies experienced more alcohol related problems. At 1 SD above the mean on tension reduction alcohol expectancies, simple slope analyses was $b=.26$, $t=12.95$, $p<.001$ and $b=.11$, $t=5.61$, $p<.001$ at 1 SD below the mean.

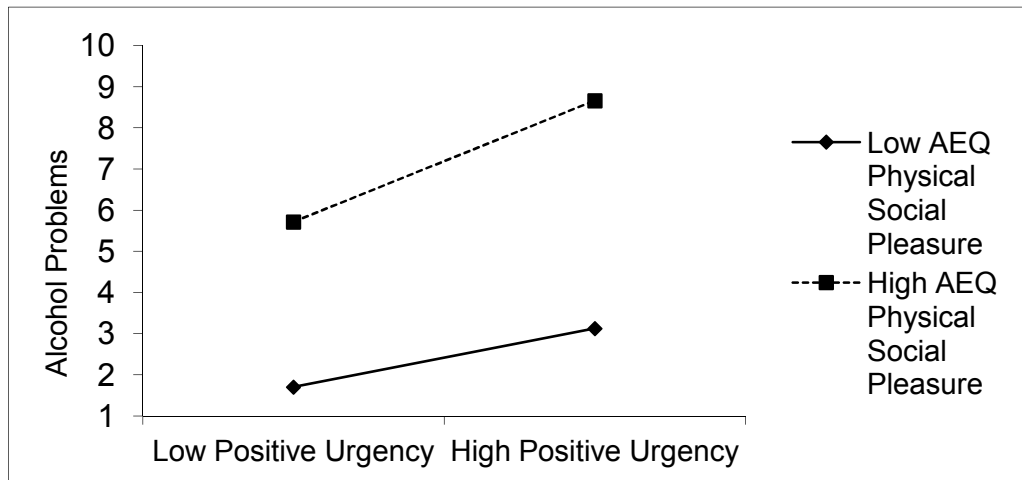


Figure 3.
Physical and social alcohol expectancies, positive urgency and alcohol problems. High and low AEQ physical/social expectancies and positive urgency are ± 1 SD from the mean. Variables are centered to have a mean of zero. Simple slopes are significant at $p < .01$.

In sum, females who were high in negative urgency and who had high expectations that alcohol reduces tension experienced the most consequences from drinking. In addition, the effect of both urgency traits on alcohol problems was moderated by expectancies that alcohol facilitates physical and social pleasure. That is, the relationship between both urgency traits and alcohol related problems was greatest among participants who held high expectations that alcohol facilitates physical and social pleasure.

Dysfunctional Eating

UPPS-P and dysfunctional eating. Consistent with prior research, it was hypothesized that negative urgency would be positively correlated with bingeing, purging (Brookings & Wilson, 1994; Fischer & Smith, 2008, Fischer, Anderson, and Smith, 2004; Fischer, Smith, & Anderson, 2003; Heaven, Mulligan, Merrilees, Woods, & Fairouz, 2001), and eating disordered cognitions and attitudes, as measured by the

EDE-Q Global Score. Correlations were conducted to examine the relationships between the UPPS-P impulsivity traits and eating disordered symptoms (Table 4; Figure 4). Among all 5 impulsivity facets, negative urgency was most strongly associated with disordered eating outcomes: binge eating ($r=.27$, $p<.001$), purging ($r=.12$, $p<.001$), and EDE-Q global score ($r=.31$, $p<.001$). Positive urgency was significantly associated with EDE-Q Global score ($r=.15$, $p<.001$) and binge eating ($r=.15$, $p<.001$).

Due to the non-normal distribution of the binge eating variable, a ZINB regression was conducted with binge days as the dependent variable, and all 5 UPPS-P traits as the predictors. The likelihood ratio for the full ZINB model was $X^2(5) = 36.79$, $p<.001$, which indicated that the overall model was significant. While no predictors significantly predicted bingeing in the logistic portion of the model, the count model indicated that increased negative urgency was associated with increased bingeing by a factor of 1.64 ($\beta=.49$, $p<.001$). Increased (lack of) premeditation was related to decreased bingeing by a factor of .84 ($\beta=-.17$, $p<.05$). Thus, 1 SD increase in negative urgency was positively associated with a 64% increase in reported number of binge days. A 1 SD increase in (lack of) premeditation was associated with a 16% reduction in number of binge days. Positive urgency was unrelated to bingeing in the ZINB analyses (see Table 9).

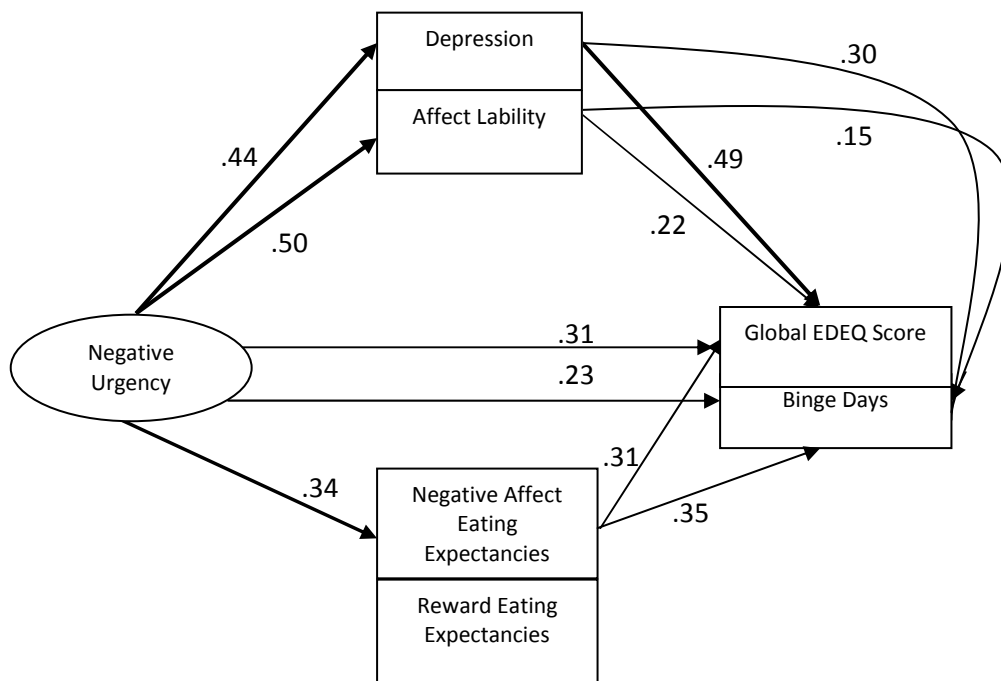


Figure 4.
Model of the personality pathway for the prediction of eating disordered outcomes, including mood risk-factors, and eating expectancies. All correlation coefficients are significant at $p < .01$.

Table 9

Summary of Zero-Inflated Negative Binomial (ZINB) Regression for UPPS-P sub-facets Predicting Number of Binge Days in past 28 Days

Variable	z	p	Risk/odds ratio	95% CI
Count Model				
Negative Urgency	5.39	.000	1.64**	.31-.67
Positive Urgency	-1.02	.307	.91	-.28-.09
Lack of Premeditation	-2.15	.032	.84*	-.33--.02
Lack of Perseverance	.69	.492	1.05	-.09-.20
Sensation Seeking	.53	.594	1.04	-.09-.16
Inflated Model				
Negative Urgency	-1.81	.071	.73	-.65-.03
Positive Urgency	-.15	.878	.97	-.39-.33
Lack of Premeditation	.35	.729	1.06	-.25-.36
Lack of Perseverance	-1.76	.078	.76	-.58-.03
Sensation Seeking	-.64	.521	.92	-.32-.17

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

A MANOVA test was used to compare all 5 impulsivity traits of individuals with a 4 or greater on the global subscale of the EDE-Q ($n=56$) with individuals who scored less than a 4 on this subscale ($n=775$) on levels of trait urgency. As predicted, females who endorsed attitudes falling within the clinical range had significantly higher negative urgency scores ($M=30.8$, $SD=5.8$) than those who did not ($M=27.12$, $SD=6.5$; $F(1, 829)=17.06$, $p<.001$, partial $\eta^2=.02$). There were no other group differences on impulsivity scores (positive urgency: $F(1, 829)=2.35$, $p=.13$, partial $\eta^2=.00$, premeditation: $F(1, 829)=.37$, $p=.54$, partial $\eta^2=.00$; perseverance: $F(1, 829)=.21$, $p=.65$, partial $\eta^2=.00$; sensation seeking: $F(1, 829)=.90$, $p=.34$, partial $\eta^2=.00$).

In sum, higher scores on negative urgency were associated with increased binge eating and purging. Increased lack of premeditation was associated with decreased binge eating. Negative urgency was the only impulsivity sub-facet to differentiate individuals with potentially clinical levels of disordered eating attitudes from non-disordered individuals.

Negative urgency as distinct from other facets of impulsivity. Because EDE-Q global score was associated with positive urgency in bivariate analyses, the specific ability of negative urgency to predict EDE-Q global scores, after accounting for variance in positive urgency, was considered. It was hypothesized that after controlling for other aspects of impulsivity, negative urgency would add significant variance to the prediction of EDE-Q global score. A stepwise multiple hierarchical regression analyses was conducted with positive urgency, premeditation (lack of), perseverance (lack of), and sensation seeking entered on Step 1, and negative urgency entered on Step 2.

Negative urgency significantly predicted EDE-Q global scores, beyond what was accounted for by the other four constructs of impulsivity. The model with the four constructs of impulsivity except negative urgency accounted for 1.4% of the variance in disordered eating. Negative urgency significantly predicted an additional 8.3% of the variance in scores, as measured by the change in R^2 (Table 10).

Table 10

Hierarchical Multiple Regression Examining Negative Urgency Beyond Other Impulsivity Traits in the Prediction of Disordered Eating (EDE-Q Global)

Variable	B	S.E. B	β	Adjusted R^2	Change in R^2
<i>Model 1</i>				.014	.019
Positive Urgency	.024	.006	.154***		
Lack of Premeditation	-.018	.011	-.070		
Lack of Perseverance	.000	.011	.001		
Sensation Seeking	-.003	.007	-.014		
<i>Model 2</i>				.097	.083
Positive Urgency	-.014	.007	-.088		
Lack of Premeditation	-.023	.011	-.087		
Lack of Perseverance	-.014	.010	-.055		
Sensation Seeking	-.003	.007	-.016		
Negative Urgency	.076	.009	.399***		

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

Urgency Traits as distinct from mood constructs. Correlation analyses indicated affect lability was positively associated with disordered eating symptoms as measured by the global score on the EDE-Q ($r = .22$, $p < .001$), and with binge eating ($r = .15$, $p = .000$) (Figure 4). Depression was also positively associated with EDE-Q global score ($r = .49$, $p < .001$) and binge eating ($r = .30$, $p < .000$). To examine the possibility that negative urgency (but not positive urgency) adds unique predictive validity in the prediction of global EDE-Q score beyond depression and affect lability, two multiple hierarchical regressions were conducted. On step 1, BMI, total

depression score, and affect lability score were entered; negative urgency was entered on Step 2. The dependent variable was EDE-Q Global score. The same analysis was repeated with positive urgency on step 2.

The model without negative urgency was significant and accounted for 33% of the variation in EDE-Q global score. On step 1, affect lability became an insignificant predictor ($\beta=.03$, $p=.34$); however depression ($\beta=.42$, $p<.001$) and body mass index ($\beta=.33$, $p<.001$) remained significant. Beyond depression and affect lability, negative urgency significantly added 1.2% of predictive power to the model (Table 11). Positive urgency did not add significant variance to the prediction of global scores above and beyond these mood constructs ($\beta=.04$, $p=.18$).

Table 11

Hierarchical Multiple Regression Examining Negative Urgency Beyond Body Mass Index, Affect Lability, and Depression in the Prediction of Disordered Eating

Variable	B	S.E. B	β	Adjusted R ²	Change in R ²
<i>Model 1</i>				.333	.336
Body Mass Index	.107	.009	.330***		
Affect Lability	.003	.003	.032		
Depression	.059	.004	.429***		
<i>Model 2</i>				.345	.012
Body Mass Index	.106	.009	.329***		
Affect Lability	-.002	.004	-.020		
Depression	.054	.005	.395***		
Negative Urgency	.024	.006	.132***		

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

Similarly, a ZINB model was conducted to analyze the impact of mood variables, BMI, and the urgency traits in the prediction of binge days. The likelihood ratio for the full ZINB model was $X^2(5) = 45.64$, $p<.001$, which indicated that the overall model was significant. In the inflation portion of the model, increased body

mass index ($\beta = -.64$, $p < .05$) and depression ($\beta = -.40$, $p < .05$) were associated with decreased likelihood of reporting zero binge days. The odds ratio for BMI was .53; the odds ratio for depression was .67. In other words, 1 SD increase in BMI was associated with a 47% reduction in the odds of reporting zero binge days; a 1 SD increase in depression was associated with a 33% reduction in odds of reporting zero binge days. The count portion indicated that depression ($\beta = .18$, $p < .05$) and negative urgency ($\beta = .33$, $p < .01$) significantly predicted bingeing by factors of 1.19 and 1.39 respectively. Thus a 1 SD increase in depression was positively associated with a 19% increase in number of binge days; a 1 SD increase in negative urgency was positively associated with a 39% increase in number of binge days. Positive urgency did not predict binge eating in either the count ($\beta = -.15$, $p = .06$) or the inflated ($\beta = -.30$, $p = .07$) model.

In sum, negative urgency, but not positive urgency, added significant variance in the prediction of EDE-Q global scores above and beyond depression and affect lability. Higher scores on negative urgency, but not positive urgency, were associated with increased binge eating.

Negative urgency and other mood-related risk factors. It was predicted that the relationship between negative urgency and eating disordered symptoms would be greatest among participants who were elevated on affect lability. To test this hypothesis, a hierarchical regression was conducted with the centered predictors (affective lability score and negative urgency) entered at step 1 and the interaction term entered at step 2. Global score on the EDE-Q was the dependent variable. The first step of the model was significant ($R^2 = .09$, $p < .000$). While the beta weights for

affect lability ($\beta=.09$; $p=.01$) and negative urgency ($\beta=.25$; $p<.001$) were both significant, the interaction term was not ($\beta=.01$, $p=.83$).

To predict binge eating, a ZINB model was conducted with the same predictors and binge days as the dependent variable. The overall model was significant; the likelihood ratio for the full ZINB model was $X^2(3) = 35.65$, $p<.001$. Although negative urgency was associated with a decreased likelihood of reporting zero binge days in the inflated portion of the model ($\beta=-.46$, $p<.01$) and an increased likelihood of bingeing in the count model ($\beta=-.34$, $p<.01$), no significant interactions were found in either the count ($\beta=-.11$, $p=.05$) or the inflated model ($\beta=-.04$; $p=.70$) for binge eating.

Similarly, a hierarchical regression was conducted to examine the prediction that the relationship between negative urgency and eating disordered attitudes would be greatest among participants who reported elevated levels of depression. The first step of the model was significant ($R^2=.24$, $p<.001$). The beta weights for negative urgency ($\beta=.12$, $p<.001$) and depression ($\beta=.43$, $p=.02$) were significant. However, the interaction term on the second step was not significant ($\beta=-.01$, $p=.64$). Depression and negative urgency did not interact to predict disordered eating, as measured by the EDE-Q Global Score.

A ZINB model was conducted to examine the same interaction in the prediction of binge eating. The overall model was significant $X^2(3) = 49.36$, $p<.001$. Although depression ($\beta=.02$, $p<.01$) and negative urgency ($\beta=.05$, $p<.001$) were associated with increased binge days in the count model, these variables did not interact to predict bingeing in either the count ($\beta=-.00$, $p=.42$) or the inflated ($\beta=-.00$,

$p=.77$) model. In sum, neither depression nor affect lability interacted with negative urgency to predict disordered eating outcomes.

Urgency traits and eating expectancy interactions. It was predicted that eating expectancies, specifically that eating helps manage negative affect, would be positively correlated with global score on the EDE-Q, and with binge eating. Eating expectancies that eating is a reward, however, was not expected to be related to these outcomes. Negative affect eating expectancies were significantly related to binge days ($r=.35$, $p<.000$) and global EDE-Q score ($r=.31$, $p<.000$). As predicted, reward expectancies were not related to binge eating ($r=.01$, $p=.73$) or EDE-Q global score ($r=.05$, $p=.13$).

A ZINB model was conducted to analyze the interaction of negative affect eating expectancies and negative urgency to predict bingeing. The overall model was significant with a likelihood ratio of $X^2(3) = 96.14$, $p<.001$. Although increased negative urgency ($\beta=-.25$, $p<.05$) and negative affect eating expectancies ($\beta =-.46$, $p<.01$) were associated with a decreased likelihood of reporting no binge eating in the logistic model, and increased negative urgency ($\beta =.34$, $p<.01$) and expectancies ($\beta =.37$, $p<.01$) were affiliated with increased bingeing in the count model, their interaction was not significant in either the count ($\beta =-.08$, $p=.11$) or the inflated ($\beta =-.18$, $p=.13$) model.

A hierarchical regression was conducted to examine negative urgency and negative affect eating expectancies, and their interaction in the prediction of score on the EDE-Q global subscale. The first step of the model was significant ($R^2=.14$; $p<.001$), $F(2,900)=75.15$, $p<.01$). Both negative urgency ($\beta=.24$, $p<.001$) and negative

affect expectations ($\beta=.22$, $p<.001$) significantly predicted global EDE-Q scores. The second step with the interaction term was also significant ($R^2=.14$; $p<.001$), adding .4% to the prediction of eating disordered symptoms. As shown in Figure 5, the relationship between negative urgency and dysfunctional eating attitudes was greatest for individuals with higher negative affect eating expectancies. Simple slope analyses at 1 SD above the mean on tension reduction alcohol expectancies was $b=.07$, $t=8.0$, $p<.001$ and at 1 SD below the mean $b=.03$, $t=3.41$, $p<.01$. No other impulsivity trait interacted with negative affect expectancies.

By contrast, it was also predicted that eating expectancies that eating is useful/pleasurable as a reward would not interact with positive urgency to predict dysfunctional eating behaviors (Fischer & Smith, 2008). In a similar fashion, hierarchical regression and ZINB models were conducted to examine potential interactions between positive eating expectancies and positive urgency. The overall ZINB model was not significant for binge eating ($X^2(3) = 4.60$, $p=.21$). Eating expectancies that food is a reward did not interact with positive urgency to predict disordered eating symptoms, as measured as binge days (count: $\beta=.03$, $p=.70$; inflated $\beta = .20$, $p=.12$), or as global EDE-Q score ($\beta=.01$, $p=.66$).

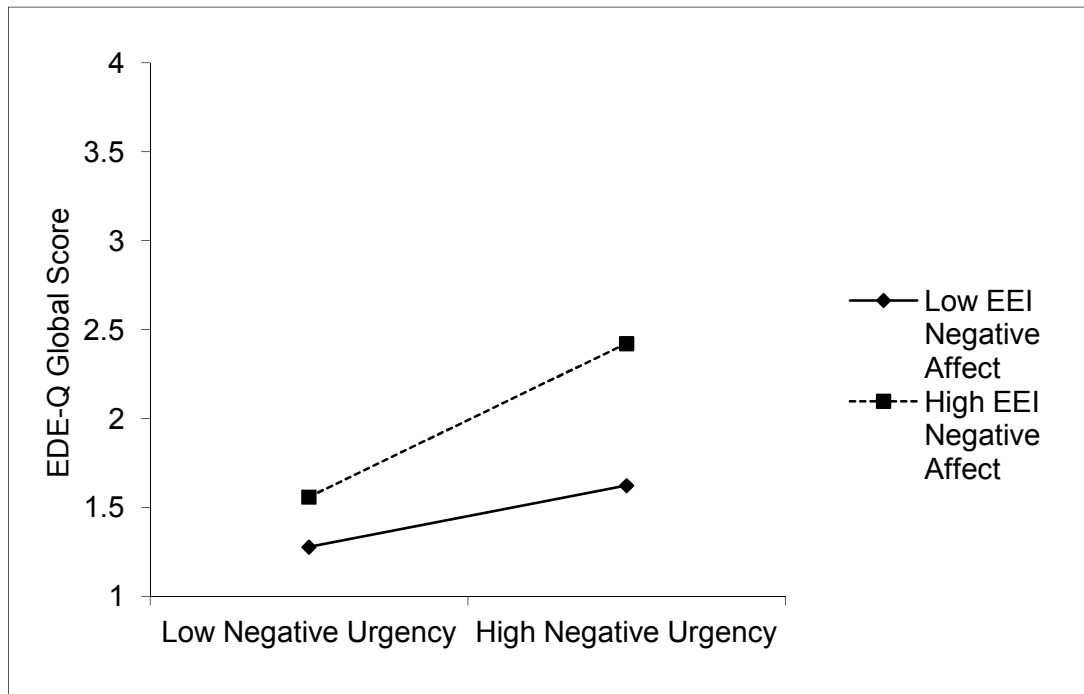


Figure 5.
Negative affect eating expectancies, negative urgency and EDE-Q Global Score. High and low EEI Negative Affect and Negative Urgency are ± 1 SD from the mean. Variables are centered to have a mean of zero.

In sum, negative affect eating expectations and negative urgency did not interact to predict binge eating. However, the relationship between negative urgency and global scores on the EDE-Q was strongest for individuals who held high expectations that eating alleviates negative affect. As predicted, expectancies that food is a reward did not interact with positive urgency to predict disordered eating.

UPPS-P and Co-Morbidity

To test the hypothesis that females with co-occurring symptoms would be multi-impulsive, and have the highest levels of negative urgency compared to eating disordered, alcohol, and non-disordered 'control' groups without either symptoms, a between groups multivariate analysis of variance (MANOVA) was performed. The

eating disorder group (n=48) consisted of women who fell within the clinical range for dysfunctional eating attitudes (scored 4 or greater on the Global subscale of the EDE-Q). The problematic drinking group (n=159) comprised females who indicated experiencing 10 or more problems as a result of drinking (1 SD above the mean). Females classified with 'co-occurring' symptoms (n=19) met criteria for both problem drinking and disordered eating. Non-disordered 'controls' (n=733) did not meet criteria for either disordered eating or problematic drinking. All UPPS-P impulsivity sub-facets were examined as dependent variables.

A significant difference was found across groups on all impulsivity scores. The means, standard deviations, F values and their significance for the four groups on the dependent variables is indicated in Table 12. Post-hoc Tukey comparison tests found that all disordered groups scored higher than controls on negative urgency. As predicted, the co-occurring group scored higher on negative urgency than females with either disorder alone. The co-occurring group also scored significantly higher than the eating disordered group only on lack of premeditation.

In addition, a total score was created from a composite of all UPPS-P sub-facets as a global measure of impulsivity. The hypothesis that women with co-occurring symptoms would have the highest levels of global impulsivity, compared to eating disordered and non-disordered 'control' groups without either symptoms, was tested with a between groups analysis of variance (ANOVA). Groups differed on total impulsivity scores ($F [3, 815]=27.76, P<0.01$); subsequent post-hoc Tukey comparison tests indicated that the co-occurring group had higher global impulsivity than the disordered eating group ($M=126.0; SD=20.4$). In addition, the co-occurring ($M=145.2; SD=20.8$) and problem drinking ($M=138.9; SD=19.0$) groups had

significantly higher total impulsivity scores than controls ($M=122.5$; $SD=20.4$).

Problem drinkers had greater impulsivity scores than the disordered eating group.

In sum, females with co-occurring disordered eating and problematic drinking scored higher than controls, and females with either disorder only on levels of negative urgency. Females exhibiting co-occurring symptoms also scored higher than the eating disorder only group on lack of premeditation and on a global measure of impulsivity.

Table 12

Comparison of the Mean Scores (Standard Deviations) on UPPS-P Impulsivity Traits for Control, Alcohol, Eating Disorder, and Co-Occurring Groups

	1.Control (n=733)	2. Problem Drinking (n=159)	3.Eating Disordered (n=48)	4.Co-Occurring (n=19)	F- test	Tukey Post- Hoc tests
Impulsivity Trait						
Negative Urgency	26.34(6.4)	31.01(5.7)	30.23 (6.3)	35.18(5.6)	35.55 ***	1<2, 1<3, 1<4 2<4 3<4
Positive Urgency	24.69(7.6)	30.15(7.9)	26.93(7.6)	30.19(9.3)	22.92 ***	1<2, 1<4
Perseverance (lack of)	19.28(4.6)	20.40(4.6)	19.17(4.2)	21.94(4.7)	4.07 **	1<2
Premeditation (lack of)	20.59(4.7)	23.05(4.5)	20.84(4.8)	24.89(4.8)	15.71 ***	1<2, 3<2, 1<4, 3<4
Sensation Seeking	31.52(6.7)	35.06(6.0)	30.82(8.4)	35.16(8.2)	13.45 ***	1<2, 3<2

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

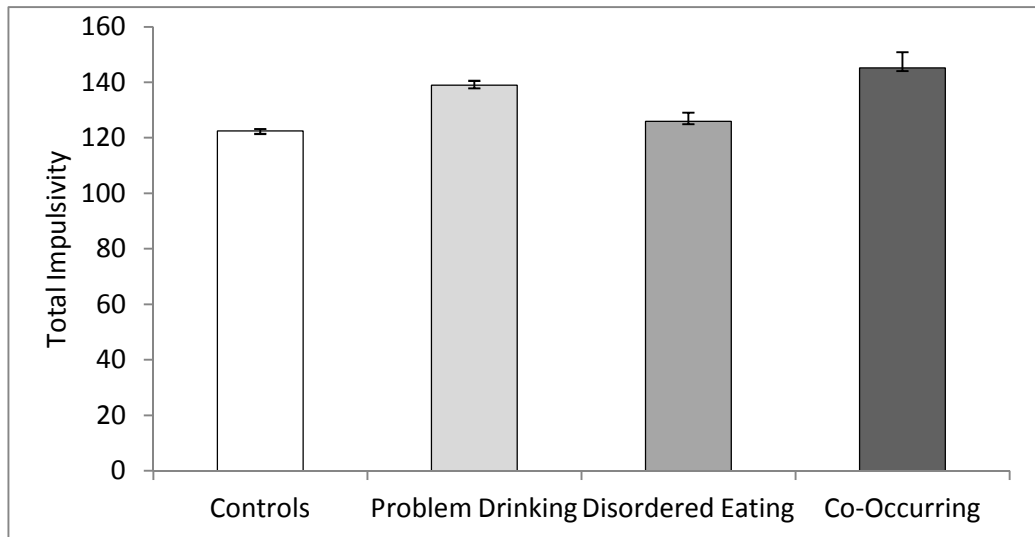


Figure 6.
Total Impulsivity scores among Non-Disordered controls, Problem Drinking, Disordered Eating, and Co-Occurring Groups.

Session 2: Laboratory Session

Sample characteristics. 190 participants completed the second half of the study; all were randomly assigned to either neutral ($n=94$), negative ($n=47$), or positive ($n=49$) mood conditions. Participants who participated in the lab portion of the study did not differ from the overall sample on age ($p=.70$), ethnicity ($p=.55$), UPPS-P impulsivity sub-facets ($p=.06-.54$), alcohol use (quantity, frequency, or alcohol problems; $p=.13-.69$), or disordered eating (binge eating or disordered eating; $p=.29-.69$).

Mood manipulation check. Negative and positive mood scales were calculated for each of two time points (baseline, and post neutral/positive/negative mood induction) for each participant by summing the item ratings from each scale (possible range: 0-56). A one-way ANOVA was conducted across groups to test

whether positive or negative mood states differed across mood conditions after viewing the film clip. Both negative ($F(2, 178) = 38.26$; $p < .001$) and positive ($F(2, 178) = 26.00$; $p < .001$) levels of affect were significantly different across mood conditions. Post-hoc Tukey analyses indicated negative mood was significantly higher in the negative mood condition ($M = 19.8$; $SD = 11.94$) compared to both neutral ($M = 7.19$; $SD = 8.77$) and positive mood conditions ($M = 4.69$; $SD = 5.96$). Positive mood was significantly higher in both the positive mood condition ($M = 26.89$; $SD = 10.39$) than the neutral mood condition ($M = 21.2$; $SD = 10.41$) and the negative mood condition ($M = 11.85$; $SD = 9.19$).

A two-way repeated measures analysis of variance (MANOVA) with time as a within subjects factor (baseline vs. post-mood induction) and mood condition (positive, negative, and neutral) as a between subjects factor were conducted with both positive and negative affect as dependent variables. For negative mood, there was a significant main effect of mood condition, $F(1, 176) = 8.68$, $p < .001$, and a significant interaction effect, $F(1, 176) = 74.49$, $p < .001$. To probe the significant interaction, tests of the simple effect of time at each level of condition were performed. In the negative mood condition there was a significant increase in negative mood from baseline ($M = 9.00$, $SD = 11.07$) to post-negative mood induction ($M = 19.8$, $SD = 11.94$; $t(45) = -6.74$, $p < .001$). In the positive mood induction condition there was a significant reduction in negative mood from baseline ($M = 9.38$, $SD = 9.15$) to post-positive mood induction ($M = 4.69$, $SD = 5.96$; $t(44) = 5.87$, $p < .001$). In the neutral condition, there was a significant reduction in negative mood from baseline ($M = 10.43$; $SD = 10.12$) to post-neutral induction ($M = 7.19$; $SD = 8.77$); $t(88) = 6.37$, $p < .001$).

Similarly, when examining positive mood, there were significant main effects of time, $F(1, 176) = 6.47, p = .012$, mood ($F(1, 176) = 6.38; p = .002$) and mood condition, $F(1, 176) = 6.38, p < .01$, and a significant interaction effect, $F(1, 176) = 47.55, p < .001$. To probe the significant interaction, tests of the simple effect of time at each level of condition were performed. In the positive mood condition there was a significant increase in positive mood from baseline ($M = 20.22; SD = 10.84$) to post-positive mood induction ($M = 26.89; SD = 10.39; t(44) = -4.53$). In the negative mood induction condition there was a significant reduction in positive mood from neutral ($M = 22.04, SD = 11.36$) to post-negative mood induction ($M = 11.85; SD = 9.19; t(45) = 8.18, p < .001$). In the neutral mood condition, there was no significant change from baseline to post-neutral mood induction in positive mood ($t(88) = 1.57, p = .12$).

In sum, in the negative mood condition, average negative mood increased by 120% from pre to post negative mood induction. In the positive mood condition, positive mood increased by 33% from baseline. The mood induction procedure was effective in increasing negative affect in the negative mood condition, and decreasing negative affect in the positive mood condition. The neutral mood induction resulted in a slight reduction of negative mood.

Baseline analyses of mood and urgency. Before examining the role of the impulsivity traits on SART performance, it was first tested whether the urgency traits were related to self-reported baseline mood, post-induction mood, and change in mood from pre-mood induction to post-mood induction. Baseline negative mood ($r = .23; p = .002$) and post-mood induction negative mood ($r = .18, p = .02$) were both positively associated with negative urgency. Positive urgency was also positively associated with baseline negative mood in bivariate analyses ($r = .15; p = .04$).

However, subsequent analyses indicated that after controlling for negative urgency, positive urgency was unrelated to baseline negative mood ($p=.84$). Mood may be associated with levels of negative urgency because prior literature has indicated this trait has underlying associations with neuroticism, the tendency to experience negative affective states. The lack of an association between positive urgency and mood states has been found elsewhere (Cyders, et al., 2010).

It was also examined whether there were pre-existing differences across mood conditions in impulsivity or along baseline mood states. ANOVA indicated no differences between mood conditions and baseline positive ($p=.44$) or negative mood ($p=.13$), or on any UPPS-P impulsivity sub-facet ($p=.22-.89$).

Mood and SART responding. A one way MANOVA was conducted to examine the effect of mood on performance on the SART. Commission errors, omission errors, and reaction time were entered as dependent variables; mood condition (neutral, positive, and negative) was the independent variable. Results indicated a main effect of mood condition $F(1,187)=4.23$, $p=.016$. A pairwise comparison post-hoc Tukey test indicated that individuals in the positive mood condition performed more errors of commission ($M=15.35$; $SD=4.83$) than individuals in the neutral condition ($M=13.10$; $SD=4.83$).

UPPS-P traits and neutral SART responding. Prior to examining the impact of positive or negative mood on SART performance, it was first examined whether impulsivity was related to SART performance when in a neutral mood state. A series of simultaneous regression analyses were conducted with the 5 UPPS-P impulsivity

traits as predictors; commission errors, omission errors, and reaction time were entered as dependent variables. As shown in Table 13, in the neutral condition, lack of premeditation was positively associated with commission errors ($\beta=.36$; $p=.008$). No other UPPS-P trait predicted performance on any dependant measure in the neutral condition.

Table 13

Multiple Regression Examining UPPS-P Impulsivity Traits in the Prediction of SART Commission Errors in the Neutral Condition (n=94)

Variable	B	S.E. B	β	Adjusted R ²
				.07
Negative Urgency	-.07	.10	-.11	
Positive Urgency	.13	.09	.24	
Lack of Premeditation	.38	.14	.36**	
Lack of Perseverance	-.18	.13	-.18	
Sensation Seeking	-.11	.08	-.15	

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

UPPS-P traits and mood SART responding. The above series of regressions were conducted among the negative and positive mood groups, separately, to examine the principal hypotheses of the second study: whether negative urgency would predict more errors on the SART when under a negative mood state, and whether positive urgency would predict more errors on the SART when under a positive mood state. A series of simultaneous regression analyses were conducted with the 5 UPPS-P impulsivity traits as predictors; commission errors, omission errors, and reaction time were entered as dependent variables. In the negative mood condition, there were no significant relationships between any UPPS-P sub-facet and commission errors ($p=.16-.86$), omission errors ($p=.25-.79$), or reaction time ($p=.32-.92$) (Table 14). In the positive mood condition, there were no significant relationships between any UPPS-P sub-facet and commission errors ($p=.22-.82$), omission errors ($p=.28-.99$), or reaction time ($p=.05-.64$) (Table 15).

In sum, in the neutral condition, lack of premeditation was positively associated with commission errors. Contrary to hypothesis, there were no relationships between any UPPS-P trait and performance when under a negative or a positive mood state.

Table 14

Multiple Regression Examining UPPS-P Impulsivity Traits in the Prediction of SART Commission Errors in the Negative Mood Condition (n=47)

Variable	B	S.E. B	β	Adjusted R ²
				-.05
Negative Urgency	-.03	.15	-.04	
Positive Urgency	-.04	.13	-.07	
Lack of Premeditation	.21	.19	.27	
Lack of Perseverance	-.26	.18	-.26	
Sensation Seeking	-.02	.12	-.04	

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

Table 15

Multiple Regression Examining UPPS-P Impulsivity Traits in the Prediction of SART Commission Errors in the Positive Mood Condition (n=49)

Variable	B	S.E. B	β	Adjusted R ²
				-.04
Negative Urgency	-.19	.17	-.27	
Positive Urgency	-.17	.14	.29	
Lack of Premeditation	-.19	.23	-.17	
Lack of Perseverance	.16	.20	.16	
Sensation Seeking	.03	.13	.05	

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

UPPS-P and SART Interactions. The interaction of mood condition and the urgency traits was examined in the prediction of commission errors, and omission errors on the SART. It was predicted that the relationship between negative urgency and errors would be greatest in the negative mood condition versus the neutral condition; and that the relationship between positive urgency and errors would be the greatest in the positive mood condition, versus the neutral mood condition. However,

contrary to prediction, there were no significant interactions between the urgency traits and mood condition for any response measure ($p=.30-.90$).

SART responding and addictive behaviors. To examine the possibility that SART responding was directly related to alcohol use and disordered eating outcomes, Pearson correlations were conducted to examine the bivariate relationships between SART responding (commission errors, omission errors, reaction times), alcohol use (quantity, frequency, problems) and disordered eating (binge eating, EDE-Q Global Score). There were no significant relationships between SART performance and addictive behaviors ($p=.16-.87$).

Discussion

The goal of the present study was to replicate and extend previous research on the role of impulsive tendencies precipitated by emotion in problem drinking and disordered eating in female college students. In two studies, trait urgency was examined in relationship to cognitive expectations about food and alcohol, affect regulation variables, and as a potential correlate of a lab-based neuropsychological task. Among young adult college females, greater levels of negative urgency were affiliated with alcohol related consequences and disordered eating, above and beyond other sub-facets of impulsivity, depressive symptoms, and volatile affect. Females who were elevated on the urgency traits and who held expectations regarding the reinforcing properties of food and alcohol tended to experience greater levels of dysfunction. While errors of commission on the SART were affiliated with increased levels of lack of premeditation when individuals were in neutral mood states, SART responding was unrelated to self reported impulsivity in positive or negative mood states.

In the first part of this study, impulsivity sub-facets differentially predicted alcohol use and disordered eating outcomes. Replicating findings from previous studies (Smith, et al., 2007; Magid, Colder, 2007; Cyders & Smith, 2008; Cyders, Flory, Rainer, Smith, 2009), when considered conjointly with other subfacets, sensation seeking was positively associated with the frequency and quantity of drinking. Sensation seeking measures the tendency to seek out and engage in novel experiences, from potentially dangerous physical pursuits such as skydiving and bungee jumping, to activities with potential harm to one's health, such as drug and alcohol use. Recently, Hittner and Swickert (2006) conducted a meta-analysis of the

literature, and found that the association between sensation seeking and alcohol use, as measured by alcohol frequency, quantity, and alcohol problems/dependence, carried a small to moderate effect size (mean weighted $r=.26$; Hittner & Swickert, 2006), similar to the effect sizes observed in this study ($r=.21-.23$). Exactly why individuals elevated on the trait of sensation seeking are more prone to drink alcohol excessively is unclear. One theory has posited that this relationship may be explained, in part, by lower levels of monoamine oxidase (MAO) among individuals elevated on this trait (Zuckerman, 2006). MAO is an enzyme that regulates the breakdown of monomines such as dopamine and norepinephrine. Low levels of MAO may be affiliated with higher levels of dopamine in individuals elevated on sensation seeking. Elevated levels of dopamine in individuals high on sensation seeking may cause someone to use alcohol, in part because dopamine motivates reward-seeking behavior (Hittner & Swickert, 2006).

Lack of premeditation also emerged from the other impulsivity subfacets as a significant predictor of the frequency and quantity of drinking. Lack of premeditation relates to the tendency to engage in unplanned behavior, that is, the tendency to have difficulty deliberating and considering the future consequences of behavior (Whiteside, Lynam, Miller, and Reynolds, 2005). The Whiteside and Lynam (2001) construct of lack of premeditation is considered to be consistent with many previous definitions of impulsivity, and may be the most common interpretation of the term in the literature. When tracing the UPPS-P definition of this trait onto previous studies with similar definitions of impulsivity, lack of premeditation relates to alcohol use and problems in adolescents and young adults (Whiteside & Lynam, 2009). However, lack of premeditation as specifically put forth by Whiteside and Lynam (2001) has

evinced relatively inconsistent relationships with alcohol use outcomes; while some studies have found positive associations between premeditation and alcohol frequency and quantity of use (Miller, Flory, Lynam, & Leukefeld, 2003; Lynam & Magdid & Colder, 2007; Shin, Hong, & Jeon, 2012), other studies have not (Lynam & Miller, 2004). Individuals who lack premeditation may drink alcohol more often and in larger amounts because they fail to consider the negative consequences of their behavior, or because they are drawn to smaller, immediate rewards versus more desirable, long-term rewards (Whiteside and Lynam, 2003). Behcara (2005) suggests chronic alcohol users may experience conflict when weighing the immediate reward of alcohol use, versus the long term impact of potential harm to one's health, relationships, and other problems, and that these individuals may be similar to those who lack premeditation. Alternatively, a general failure to foresee potential problematic outcomes of one's behavior may inadvertently lead individuals who lack premeditation to engage in high risk situations involving alcohol and other substances, which may in turn increase likelihood for engagement in those behaviors. More research is needed to establish the importance of this trait as it relates to alcohol use, problematic use and dependence.

Although heavy alcohol use often results in deleterious consequences, individuals who drink a lot or in large amounts do not necessarily experience unwanted, negative consequences from their use, per se. It is important to understand the mechanisms that differentiate between individuals who experience problems from their use, versus those who do not. In this study, only negative urgency and sensation seeking predicted alcohol-related problems after the other facets of the UPPS-P were taken into account. However, after controlling for the

frequency and intensity of use, negative urgency added the most incremental predictive power in the prediction of alcohol related problems. In simultaneous analyses, sensation seeking emerged from the other traits as an important predictor of the frequency and intensity of drinking alcohol. Taken together, these findings are similar to previous research that has found that sensation seeking often directly associates with the frequency of engagement in dysfunctional behaviors, such as alcohol use or pathological gambling (Smith, et al., 2007; Magid, Colder, 2007; Cyders & Smith, 2008; Cyders, Flory, Rainer, Smith, 2009). The relationship between sensation seeking and problematic alcohol use in particular, however, remains mixed, with some studies demonstrating positive associations (Shin, Hong, & Jeon, 2012; Hittner & Swickert, 2006) and other studies finding no associations (Fischer & Smith, 2008). It may be that sensation seekers experience certain types of problems with alcohol as a result of their tendency to seek risky situations (ex. Driving while drunk, legal problems), or as a direct result of their heavy drinking (ex. Hangovers, blackouts, etc.). Negative urgency, by contrast, has emerged as a relatively consistent predictor and potential risk factor for problematic alcohol use (Cyders & Smith, 2007; Smith et al., 2007; Cyders et al., 2007), often relating to increased alcohol problems after drinking intensity is taken into account. The tendency to act rashly in response to negative affect may particularly enhance the likelihood for problems such as social and interpersonal problems (ex. Physical fights, arguments with friends, family). Future research should attempt to assess in depth the types of problematic outcomes college students with different facets of impulsivity experience.

In alignment with previous research and theory, it was predicted that positive urgency would also predict alcohol-related problems. When considered alone in

bivariate analyses, and after controlling for use rates, positive urgency is related to alcohol-related problems. However, in this cross-sectional study of college females, positive urgency did not add significant predictive power above and beyond the other facets of impulsivity. Past research indicates mixed findings in this respect.

Congruent with the present study, Cyders (et al., 2007) found that positive urgency did not have incremental validity over the set of other forms of impulsivity in explaining problem drinking. However, a later prospective study found that above and beyond the other UPPS traits, positive urgency alone predicted increases in drinking-related problems among males and females over the course of the first year of college (Cyders, Flory, Rainer, and Smith, 2009). Theoretically, emotion depleted cognitive resources of young women could be driven by both positive and negative affect, which in turn influence the behavioral inhibition of alcohol use. Initial studies (Cyders, Flory, Rainer, and Smith 2009; Cyders, et al., 2007) suggest this facet plays a role in problematic use, however positive urgency is a more recently proposed trait than the other facets. More research is needed to examine whether this trait predicts patterns of use differently among males and females, and, more generally, to clarify the role of this facet in the spectrum of alcohol use outcomes.

Specifically, future research should examine the urgency traits developmentally via longitudinal studies. Adolescence is a period of increased emotional volatility that is often associated with increased risk-taking (Steinberg, 2008). In adolescence and early adulthood, the capacity for inhibitory responding may be reduced, the result of functional and structural changes in the pre-frontal cortex and dopaminergic systems (Steinberg, 2007; Steinberg, 2008). In addition, the highly social nature of the collegiate environment may particularly promote risk-taking

in response to positive affect. This idea is corroborated by the fact that some college students drink alcohol with to enhance a positive mood (enhancement motives) or for social reasons (social motives), intentions that are affiliated with problematic outcomes (Cooper, Agocha & Sheldon, 2000; Simons, Gaher, Oliver, Bush, & Palmer, 2005). Furthermore, there is evidence to suggest college students drink alcohol more heavily after experiencing positive mood during the day and during holidays versus academic periods, (DelBoca, Darkes, Greenbaum, & Goldman, 2004; Simons, Gaher, Oliver, Bush & Palmer, 2005). Therefore, adolescence and young adulthood could exacerbate individual differences in tendencies to engage in rash action in response to both positive and negative affect.

The differential role of the five UPPS-P traits in explaining problematic eating behaviors of young women was also examined in this study. Negative urgency was the strongest predictor of binge eating and global score on the EDE-Q and was the only impulsivity facet to predict purging behaviors for these women. Although positive urgency was weakly related to global score on the EDE-Q and bingeing in bivariate analyses, in subsequent analyses with the other UPPS traits, it failed to predict eating disordered outcomes. Unexpectedly, increased (lack of) premeditation was related to decreased bingeing in this sample. This finding is surprising, as prior work has indicated that disinhibitory behaviors such as binge eating are typically associated with increased impulsivity (Vitousek & Manke, 1994; Klaes, Vandereycken, & Vertommen, 2002). In sum, these findings are similar to previous findings that have identified negative urgency as a unique predictor for disordered eating among females (Fischer, Smith, Anderson, Flory, 2003, Fischer, Smith & Anderson, 2003; Fischer, Anderson, and Smith, 2004; Smith, et al., 2007; Anestis, Selby, & Joiner,

2007; Miller, Flory, Lynam & Leukefeld, 2003). The differential prediction of the urgency traits here is likely related to the fact that unlike positive affect, intense negative moods often trigger bingeing and purging episodes (Abraham & Beumont, 1982; Mitchel, et al., 1999; Davis, Freeman, & Garner, 1988; Alpers & Tuschen-Caffier, 2001). Individuals may engage in unregulated binge eating because it distracts from negative mood, and exhibit compensatory behaviors because they in part relieve anxiety about weight gain, or provide emotional catharsis (Stice, 2002). Beyond the mere experience of negative affect, however, converging evidence from clinical and sub-clinical populations indicates that it is the disposition toward rash action prompted by negative affect that may be a risk factor for disordered eating.

Another goal of this study was to examine the validity of the urgency traits apart from aspects of emotionality, and to examine the ways in which dispositions to rash action enhance the associations of other mood-related risk factors with problematic alcohol use and disordered eating. Results indicated that above and beyond alcohol use, depressive affect, and the frequency and intensity of affect, negative and positive urgency predicted additional, although modest, variance in alcohol related problems. Consistent with earlier findings, only negative urgency (not positive urgency) predicted variance in binge eating, and global scores on the EDE-Q, above and beyond depressive affect and affect lability. These results corroborate previous work that the urgency traits, although conceptually similar, are distinct from the frequency and intensity of emotional experiences (Cyders & Coskunpinar, 2010). In addition, these findings suggest that negative urgency, in particular, is not a mere proxy for depressive affect. However, contrary to prediction, neither depression nor affect lability interacted with either urgency trait to predict alcohol use problems or

disordered eating. Recently, negative urgency did not interact with measures of psychological distress to predict four types of alcohol use outcomes: binge drinking, alcohol-related problems, and alcohol use disorders alcohol use (Shin, Hyokyoung, & Jeon, 2012). Both types of emotionality represent different aspects of affective experience: depressive symptoms measure enduring, low levels of mood, while affect lability measures fluctuations in mood states, from negative to positive valence. It appears that although both aspects of emotionality alone predict eating and drinking problems, they do not necessarily interact with urgency toward these outcomes. It may be that individuals who are elevated on the urgency traits engage in problematic behaviors not necessarily because of particularly depressed mood or rapid changes in mood, but because of difficulty in regulating behavior while experiencing different mood states.

Expectancies about the reinforcing aspects of food and alcohol were examined as potential mechanisms by which personality is linked with problematic eating and drinking. In contrast to previous studies (Fischer, Anderson, & Smith, 2004; Fischer & Smith, 2008), in this study female college students who were elevated on negative urgency and who held high expectations that alcohol alleviates tension experienced a greater number of alcohol related consequences. Similarly, the relationship between both urgency traits and alcohol related consequences was strongest for those who endorsed high expectancies that alcohol facilitates social and physical pleasure. Thus, both negative and positively reinforcing expectations about alcohol impacted the association of the urgency traits on problematic drinking.

In terms of eating expectancies, the relationship between negative urgency and global scores on the EDE-Q was strongest for individuals who held high

expectations that eating alleviates negative affect. This is consistent with previous findings (Fischer, Anderson, & Smith, 2004; Fischer, Smith, Anderson, and Flory, 2003; Fischer & Smith, 2008). However, expectancies that food is a reward did not interact with positive urgency to predict disordered eating. Positive urgency appears to be largely unrelated to disordered eating (Cyders et al., 2007). Previous research suggests that expectancies about positive reinforcement from eating are unrelated to both bulimic symptoms in clinical samples (Hohlstein, 1998) and to dysfunctional eating in middle school girls (Combs, Smith, & Simmons, 2010). Converging evidence indicates that individuals who have trouble regulating negative, not positive affect, and who expect eating to relieve that negative affect, are at increased risk for developing dysfunctional eating behaviors. Learned expectancies about the positive and negatively reinforcement properties of food and alcohol may be one mechanism by which personality influences behavior. While impulsive personality traits may predispose individuals toward multiple risk behaviors, including dysfunctional eating and drinking, what determines whether or not an individual engages in potentially harmful alcohol use or disordered eating in particular may be the result of psychosocial learning.

This study also explored the possibility that females who exhibit both problematic drinking and disordered eating attitudes are especially impulsive, both on generally, and specifically in terms of negative urgency. As predicted, negative urgency was heightened among the co-occurring group versus non-disordered controls, and females with either set of symptoms alone. Furthermore, negative urgency was the only trait to differentiate co-morbid versus both disordered groups. In partial support of the multi-impulsivity hypothesis, females exhibiting co-occurring

symptoms reported elevated general impulsivity, and lack of premeditation, than the eating disorder only group. Prior work has similarly found impulsivity to be especially elevated among co-morbid women with both problem drinking and bulimia, versus women with bulimia alone (Kane, Loxton, Staiger & Dawe, 2004); this study replicates these findings in a non-clinical sample. Evidence from the present study and in prior work (Fischer, Smith, Annus, & Hendricks, 2006) indicates lack of premeditation or planning may be related to alcohol use and disordered eating independently; this trait may underlie their co-occurrence, and warrants future investigation. In sum, these findings provide evidence that females with both disordered eating symptoms and problem drinking may have difficulty inhibiting behavior in response to negative affect. Emotion based impulsive tendencies may generally place females at risk for multiple problematic, 'addictive' behaviors. Although the present study was limited by low base rates of individuals exhibiting both sets of symptoms ($n=19$), future research should examine the multi-impulsivity hypothesis among larger samples of college females across the spectrum of clinical severity.

The purpose of the second part of this study was to explore whether a behavioral task measuring prepotent response inhibition would associate with self-report measures of impulsivity as measured by the UPPS-P. Specifically, this study was designed to examine how young women with varying levels of positive and negative urgency would inhibit responding when under neutral, positive, and negative mood states. Results indicated that in the neutral condition, lack of premeditation, the tendency to fail to think about the consequences of one's behavior, was associated with more commission errors. The relationship of this facet of impulsivity with a go/no-go measure of pre-potent response inhibition was somewhat unexpected, and

differs from Gay, Rochat, Billieux, d'Acremont, and Van der Linden (2008) who found no relationship between lack of premeditation and performance on two versions of the SART. Recently, Cyders and Coskunpinar (2011) conducted a meta-analysis of self-report and behavioral measures of impulsivity, coding previous measures of impulsivity into the 5 dimensions of the UPPS-P. Although prepotent response inhibition and lack of premeditation/lack of deliberation shared a small but significant effect size, prepotent response inhibition shared associations with several other facets of impulsivity (only sensation seeking did not associate). Tasks measuring the ability to inhibit an ongoing or dominant response may not measure one specific construct, but instead constitute broad measures of behavioral impulsivity.

Furthermore, some researchers have posited that premeditation, which maps onto the deliberative facet of the NEO-PRI-R, may be related to the decision making process, which is influenced by somatic markers or emotion-related signals (Bechara, 2005; Gay, Rochat, Billieux, d'Acremont, Van der Linden, 2008). Decision making tasks are designed to mimic real life situations in which long term benefits must be weighed against short term gains. In the Iowa Gambling Task, for example, participants must choose between decks of cards in order to maximize profit; some decks offer large gains immediately but at high long term cost, other decks offer small gains immediately but at low long term cost (Bechara, Damasio, Damasio, Anderson, 1994). Zermatten, Van der Linden, d'Acremont, Jermann & Bechara (2005) found that higher scores on lack of premeditation were related to disadvantageous decision making. However, by contrast, a recent study of the UPPS and the IGT found no association between premeditation and decision making (Bayard, Raffard, & Gely-Nargeotc, 2011). Although currently the potential relationship between premeditation

and behavioral tasks has not been well studied and results are conflicting, Bechara and colleagues (Bechara, Damasio, & Damasio, 2000) propose a distinction between ‘cognitive’ and ‘motor’ inhibition that may be relevant in this respect. Tasks of propotent response inhibition appear to measure aspects of automatic or motor inhibition. Lack of premeditation, a facet of inhibition relating to lack of deliberation, may ultimately align best with behavioral measures like decision making tasks, that involve cognitive deliberation between alternate choices.

The main hypothesis regarding a positive relationship between the urgency facets and performance on a go/no-go task was not supported; neither positive nor negative urgency was significantly related to performance in a neutral, positive, or negative mood state. In addition, levels of urgency did not interact with mood state to predict errors on this task. These findings do not support previous predictions that the urgency facets, involving the inability to suppress sudden, rash action triggered by strong states of emotion, would relate to the inability to inhibit an ongoing response (Bechara, 2005; Dick, et al., 2010). Furthermore, no other UPPS-P trait besides premeditation was associated with performance. These results are not consistent with the results of the meta-analysis (Cyders & Coskpuniar, 2011) that these types of tasks tend to correlate with negative urgency, as well as several other types of self-reported impulsivity.

To the author’s knowledge, this is the first study to examine the relationship of the newer construct of positive urgency with a behavioral measure of impulsivity. In addition, the examination of the relationships between state mood, impulsivity, and executive functions represent strengths of the current study. Research indicates these concepts are intertwined, therefore it may be important for future lines of

research to include mood as a factor when examining performance on behavioral tasks. In this study, mood state did not appear to interact with the urgency traits to influence responding on this task. It is possible that the mood induction procedure was not powerful or personal enough to elicit the strong emotional states that are affiliated with the urgency facets. Future studies can attempt to induce mood using procedures that are more self-relevant, such as the imaginary mood induction procedure in which participants recall situations from their lives that evoke the desired mood (Westerman, Spies, Stahl, & Hesse, 1996). Alternatively, the ecological validity of this task may be limited; behavioral performance on this task may not reflect the impulsive rash action that occurs in real life situations.

Generally, the lack of significant associations found in the second part of this study accentuates the fact that the task of mapping self-report measures onto behavioral measures is challenging at best. Although Cyders and Coskpuniar (2011) found a significant overall relationship between self-reported measures of impulsivity and behavioral measures, it was of small proportion. There are several potential reasons for the current lack of consistency. First, there are numerous impulsivity measures utilized in the literature. Impulsivity has been described as risk-taking, sensation seeking, novelty seeking, boredom susceptibility, adventure seeking, and reward sensitivity, among many other terms. In the past few years, empirical efforts such as the research of Whiteside and Lynam (2011) have been guided toward consolidating these various measures, in attempts to parse out which facets best represent this heterogeneous construct. However, currently there is still considerable variability in operational definitions of this construct in the literature, with no single, agreed upon definition or unifying theory. Second, and mirroring this difficulty, are the

multitude of behavioral tasks that have been designed to measure the cognitive processes contributing to impulsivity. Dick et al. (2010) summarizes five types of tasks: 1) ability to inhibit a dominant/automatic response (prepotent response inhibition) 2) ability to avoid task-irrelevant information (resistance to distractor interference) 3) ability to resist memory intrusions of irrelevant information (resistance to proactive interference) 4) inability to delay responding in order to obtain a larger reward (delay response) and 5) ability to judge time accurately (distortions in elapsed time). Each of these cognitive processes is affiliated with tasks that have been designed by different researchers; for example, other measures designed to measure prepotent response inhibition include stop-signal tasks, the continuous performance task, and the antisaccade task (Dick et al., 2010). Third, although neuropsychological tasks are promising in their potential to directly measure impulsivity under laboratory controls, they are complicated by the fact that each task could measure several different cognitive processes. For example, a go/no go task such as the one used in this study, although seemingly simple in its design, produces several behavioral measures that could reflect a multitude of cognitive processes. Commission errors on a go-no-go task could represent failures at multiple levels of cognition, from a failure to learn or encode the response to the target (and failure to code a non-response to a non-target), to problems with over activation of the representation of the response, to a reduction in the ability to decide between the two representations necessary for a response (Perales, Verdejo-García, Moya, Lozano, & Pérez-García, 2009). Fourth, the enduring, long-lasting 'impulsivity' of a personality trait could inherently differ from the state-like 'impulsivity' captured by neuropsychological tasks (Dick, et al., 2010; Cyders and Coskunpinara, 2011).

In part, these systemic empirical problems highlight the importance of directing future research toward a common dialogue. Unification can be achieved by mapping operational definitions of self-reported impulsivity onto previous definitions, or by utilizing empirically derived measures such as the UPPS-P, which was developed by consolidating previous measures. Empirical consolidation of lab tasks is also useful toward unification. Finally, mapping neuropsychological tasks onto self-report measures has so far yielded inconsistent, weak associations. It is possible that these measures reflect similar cognitive processes and that the lack of associations are due to the inherent noise associated with the multidimensionality of the impulsivity construct. However it is also possible that these two measures capture disparate aspects of impulsivity and thus may not correlate. Self-report measures might reflect long-term behavioral tendencies arising from complex interactions between psychosocial, biological, and cognitive processes, while neuropsychological tasks might reflect state-like variations in impulsivity involving a different set of cognitive processes and executive functions.

There are some limitations to this study. These findings are based on an all female sample of college students; therefore gender generalizations are cautioned. In addition, the mood manipulation procedure, although effective in changing the valence of temporary mood states in the laboratory, may not mimic the more personalized and real life intensity of emotions that occur for individuals elevated on the urgency traits. Future studies should examine how a potentially stronger manipulation of emotion with relevant personalized stimuli may impact performance on neuropsychological tasks. As mentioned earlier, future studies should also attempt to examine the association of the urgency traits longitudinally, to examine

how they relate to disordered behaviors beyond young adulthood. For example, it is possible that the urgency traits may be most relevant toward problematic alcohol use during adolescence and early adulthood, when emotional volatility and impulse behaviors tend to peak, but less relevant beyond those years. Additionally, future studies should attempt to examine if certain mood states are more likely to trigger rash action among individuals elevated on positive and negative urgency. For example, items on the negative urgency subscale refer to being 'upset', 'rejected,' feeling 'bad', or to being 'in the heat of an argument'. Certain negative emotional states like anger may serve as precipitants of rash action more often than sadness, for example.

In general, the findings of this study have important implications for research, treatment, and interventions. Surmounting and converging evidence from the literature suggests that negative urgency, and perhaps to a lesser extent, positive urgency, are particularly important in problematic alcohol use, while negative urgency is particularly important in the development of disordered eating. Interventions aimed at providing personality-specific cognitive behavioral exercises, including motivational and coping skills training, have shown initial success in reducing drinking among young adult females (Conrod, et al., 2000) and adolescents (Conrod, Stewart, Comeau, & Maclean, 2006). Interventions for both problematic behaviors should consider focusing efforts toward teaching individuals elevated on these traits to both identify patterns of emotion-based rash behavior, and learn skills on how to avoid acting rashly on the basis of emotion. Prevention and intervention work could also directly address efforts toward altering negative affect expectations for both food and alcohol, as these beliefs in particular may enhance risk for disordered eating and

risky alcohol use. Although impulsivity research is challenged by complexities in construct validity and measurement, efforts aimed at theoretically and empirically consolidating measures in both self-report and laboratory task domains into common, underlying facets, will be imperative in identifying the role of impulsivity in dysfunctional behaviors, and in guiding the future of this research.

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