Do Coping Motives Moderate Daily Mood-Drinking Covariation: Disentangling a Paradox

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A dissertation proposal submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of Psychology.

Chapel Hill
2006

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ABSTRACT

CHRISTOPHER A. GALLOWAY: Do Coping Motives Moderate Daily Mood-
Drinking Covariation: Disentangling a Paradox
(Under the direction of Andrea M. Hussong)

The current study examines a paradox in the college student alcohol use literature

where drinking to cope with negative affect (DTC) is concurrently and prospectively linked

to problems with alcohol; however, experience sampling and daily diary studies have either

failed to find a link between affect and drinking within a day, or found the relationship only

under specific circumstances. Participants were 124 college students from a large

Southeastern university. These individuals completed an online daily diary protocol for two

weeks to report daily emotions, drinking motives and alcohol consumption. A series of

HGLM analyses were conducted to test study hypotheses. The influence of self-awareness

on the moderating effects of dispositional DTC on mood-drinking covariation were

considered in two separate models, for global negative affect using the DTC subscale of

Cooper's drinking motives questionnaire (1994) and also for sadness using a sadness specific

measure of DTC. Neither the standard dispositional DTC model nor the dispositional

sadness specific models were significant. DTC was also assessed as a daily process. The

moderating effects of global negative affect and sadness specific daily drinking motives on

mood-drinking covariation on drinking days was tested and a significant interaction between

daily sadness motives, sad mood, and quantity of alcohol consumed was found. At relatively

higher levels of daily sadness DTC individuals drank more when experiencing more sad

mood and drank less when experiencing less sad mood, whereas those relatively low in DTC drank less on days with more sad mood and drank more on days with less sad mood. The global negative affect model was not supported. Post-hoc analyses were conducted to examine potential methodological explanations for the lack of findings in the three of the four models tested. Strengths, limitations, clinical implications and future directions are discussed.

ACKNOWLEDGEMENTS

only represents the person with whom I shared the most experiences and hours with throughout graduate school but also was and is an unmatched source of support, caring, and reality testing as well as an inspiration to live life mindfully.

My graduate school training experiences were rounded out on internship at the Seattle Veterans Hospital. Dr. Stephen McCutcheon and the staff at the Seattle VA create a nurturing and challenging environment that allows for personal and professional growth. My internship classmates helped to make the process of completing my dissertation while on internship a better experience than it might have been. I appreciate all of my internship classmates' contributions, but Kristen Lindgren's instrumental support was particularly critical to my ability to complete my dissertation analyses in Seattle.

Numerous friends from high school and college positively influenced my life trajectory, one friend whose impact was particularly salient is Anny Choi. Anny encouraged and supported me and my professional choices including my decision to pursue graduate school in clinical psychology. I am blessed to have her as a friend. Finally, I want to acknowledge the importance of the abundant love and support that my Mom, Dad, Grandmother, Brother, Sister-in-law, and extended family provided me throughout graduate school. My family as a whole provided the foundation for who I am today and that allowed me to accomplish what I have thus far and I am truly grateful for everything they have done for me. Thank you!

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CHAPTER I

INTRODUCTION

A paradox exists in the burgeoning research examining the implications of drinking alcohol to cope with negative affect. Individuals who report using alcohol to cope have consistently been found to consume more alcohol and experience more problems with alcohol than those who do not report drinking to cope (DTC; Kassel, Jackson, & Unrod, 2000). This relation has been attributed to greater actual behavior associated with self-medication of drinking in response to negative affect. However, several recent research studies utilizing experience sampling (ESM) and daily diary techniques has failed to find the expected positive relation between negative affect and drinking within a day for those who report DTC (e.g., Hussong, Galloway, & Feagans, 2005; Todd, Armeli, Tennen, Carney, & Affleck, 2003). Other recent research has found a relation between dispositional DTC and mood-drinking covariation, yet the findings have either been inconsistent across negative mood states (e.g., Todd et al., 2005) or inconsistent across drinking contexts (e.g., Mohr et al., 2005). This dissertation project is focused on disentangling the paradox by examining the relation of DTC to the daily covariation between affect and drinking in a college population.

College Drinking

       Most students begin college at the end of their teen years, a time of considerable emotional and intellectual development and identity exploration (Arnett, 2000). The transition to college is viewed as a key transition that not only involves the change from high school student to college student but typically also involves a change from living at home with parents to living alone or with roommates in a college dormitory (Maggs, 1997). Living away from parents means that an adolescent will have a greater degree of control over his/her schedule and use of free-time (Flanagan, Schulenberg, & Fuligni., 1993). In addition to being a time of learning, for many students the college years can be a time to explore new interests and ideas and to try on adult lifestyles and behaviors (Sherrod, Haggerty, & Featherman, 1993). During this time of transition, the underage consumption of alcohol has become a normative event (Prentice & Miller, 1993).

       Despite becoming a normative event, college student drinking is associated with many negative outcomes including elevated rates of death, physical injury, and health problems (Hingson, Heeren, Zakocs, Kopstein, & Wechsler, 2002). Heavy drinking is considered particularly risky and is common among college students, with studies showing that up to 84% of students report a binge drinking episode in the past 90 days (Vik, Carrello, Tate, & Field, 2000). Moreover, heavy drinking has been associated with difficulties in several domains, including interpersonal problems (O'Hare, 1990), academic difficulties (Presley & Meilman, 1994; Wechsler, Isaac, Grodstein, & Sellers, 1994), and involvement in the legal system (Schuckit, Klein, Twitchell, & Springer, 1994). The prevalence of heavy drinking and negative consequences from drinking necessitate efforts to further understand factors that contribute to alcohol use in the college population.

Several findings point to the importance of considering the impact of negative emotions (e.g., depression, anxiety, sadness, hostility, and worry) on alcohol use (Stice, Barrera, & Chassin, 1998; Wills, Sandy, Shinar, & Yaeger, 1999). Furthermore, students' self-reported motivations to use alcohol in order to cope with negative emotions (i.e., DTC) have been identified as the drinking motives most predictive of problematic patterns of alcohol use (Cooper, Frone, Russell, & Mudar 1995).

DTC has long been considered an indicator of problematic alcohol use (Polich & Orvis, 1979). In the adult alcohol literature DTC has been associated with potentially problematic patterns of use (e.g., increased frequency of drinking to intoxication, Tyssen, Vaglum, Aasland, Gronvold, & Eckberg, 1998; and episodic heavy drinking, Ichiyama & Kruse, 1998), as well as increases in level of consumption and alcohol problems (Labouvie & Bates, 2002). Similarly, in college populations there is robust evidence, from both cross-sectional and longitudinal studies, that DTC is associated with heavy drinking (Park & Levenson, 2002), binge drinking (Williams & Clark, 1998), increased alcohol consumption (Carey & Correia, 1997; Kassel, et al., 2000; Park & Levenson, 2002; Sadava & Pak, 1993; Williams and Clark, 1998) and alcohol problems (Bonin, McCreary, & Sadava 2000; Carey & Correia, 1997; Hussong, 2003; Kassel, et al., 2000; Lecci, MacLean, & Crouteau, 2002; Ratliff, & Burkhart, 1984; Sadava & Pak, 1993). There is evidence that DTC is increasing in acceptability among college students, with more students advocating drinking when under stress and with men increasing in their advocacy of drinking when experiencing interpersonal problems or pressures (McCormack, 1996). The importance of understanding drinking to cope is further highlighted by a recent review of cognitive-behavioral interventions for alcohol use disorders (Morgenstern & Longabaugh, 2000). The authors indicated that

addressing coping strategies is perhaps the primary target of treatment in these interventions. However, if individuals' reports of drinking to cope are not accurately reflecting their behavior then a major thrust of current interventions may be misguided by these self-reports, so it is essential that this issue be addressed.

In an effort to disentangle this apparent paradox, the current dissertation project will test three hypotheses. The first explores whether self-awareness is a moderator of this process such that DTC is only accurately reported by individuals with high levels of self-awareness. The second hypothesis examines whether DTC is more of a process than a disposition, whereby it is essential to measure daily drinking motives. The third hypothesis addresses the importance of specifying the particular affect preceding and motivating a drinking episode by testing the specific effects of sadness.

A Motivational Model of Alcohol Use

Cox and Klinger's motivational model of alcohol use (1988, 1990) presents a theory of how individuals decide to use alcohol. This theory posits that several factors combine to influence an individual's decision to drink and these factors can be divided into historical factors, current factors, and cognitive processes. Historical factors include an individual's biochemical reactivity to alcohol (including genetic disposition and brain changes due to prolonged alcohol use), personality characteristics (e.g., neuroticism), sociocultural influences (e.g., cultural norms about alcohol consumption), past reinforcement from alcohol, and conditioned reactions to alcohol. Current factors include the environmental context an individual is in when they are deciding whether to drink and the positive and negative incentives in all aspects of their life as a whole. In this model incentives are considered to be objects or events that can produce affective change. The direction, quality, and quantity of

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these incentives is purported to largely determine an individual's current emotional experience (e.g., the more positive incentives in one's life the more positive affect they experience).

Ultimately the historical factors and current factors impact an individual's motivation to drink by contributing to the formation of expectations about the affective changes that will result from drinking, relative to the affective changes that result from not drinking (and alternative behaviors). Thus motives are considered the "final common pathway to alcohol use" (Cox and Klinger, 1988; p. 168) and are in essence the link between an individual's expectancies and their behavior. Motives are the cognitions about desired or undesired goals and experiences that lead to behavior and motives have an emotional valence (Carver & Scheier, 2004; McClelland 1984). For example, if an individual is currently experiencing sad affect (current factor-negative incentive) and perceives that there is an absence of activities that will bring him positive affect (current factor - negative incentive), and has found alcohol to be successful in relieving negative affect in the past (historical factor that led to an expectancy of creating a positive incentive) then he will be motivated to drink to relieve his distress.

Key aspects of Cox and Klinger's motivational model of alcohol use have been empirically tested. Cooper, Russell, and George (1988) tested the relationship between alcohol expectancies, drinking motives, and alcohol consumption. Using path analysis they found that positive alcohol expectancies were strongly related to drinking to cope motives which were in turn related to both alcohol use and alcohol disorders. Subsequent research has replicated these findings with college students (Evans & Dunn, 1995). Further refining the assessment of alcohol use motives, Cooper used the Cox and Klinger model to extend

existing motives measures and added a fourth class of drinking motives.   These four motives

have been identified as driving drinking behavior and include coping (drinking to regulate

negative emotions), social (drinking to obtain positive social benefits), enhancement

(drinking to further increase positive mood), and conformity motives (drinking to avoid

social rejection; Cooper, 1994). Among these four motives, coping motives have been

identified as the most predictive of problematic patterns of alcohol use (Cooper, et al., 1995;

Kassel, et al., 2000).

How Drinking to Cope Works

DTC may be successful in altering an individual's affect because it is found to be

reinforcing through direct chemical effects, through the impact of chemical effects on

cognitive processing, and through the chemical effects on self-awareness. Alcohol's direct

chemical effects at low doses or at the beginning of a drinking episode (on the ascending

limb of the blood alcohol curve) initially lead to an increase in arousal whereas drinking at

larger doses or later in the blood alcohol curve produces effects that act as a depressant

(Pohorecky, 1977). Thus, an individual experiencing an affective state with low

physiological arousal such as (depression or boredom) might drink for the immediate

increase in physiological arousal that comes from drinking alcohol. Similarly, someone who

is experiencing an affective state with increased arousal (such as nervousness, tension, anger,

or agitation) might drink in order to achieve the physiological depressant effects of alcohol

that come later in the blood alcohol curve.

Alcohol can also have an indirect effect on a person's emotional state. Alcohol use

has been shown to impair cognitive functioning in several ways, including narrowing

perception (Rosen & Lee, 1976), impairing memory for feelings (Cowan, 1983), and

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impairing the ability for controlled cognitive processing (Schneider, Dumais, & Shiffrin, 1984). Steele and Josephs (1988) conducted a pair of experiments that found that alcohol effectively inhibited the development of anxiety about an upcoming speech through its effects on diminished cognitive processing and attention allocation. However, these effects were only present when participants were also engaging in a distracter activity while waiting for the speech task to begin, suggesting that alcohol's effects on cognitive processing are at least in part dependent upon the environmental context. Another way that alcohol impacts cognitive processing was identified by Hull (1981), who found that alcohol decreases an individual's self-awareness, which can be beneficial to mood when self-relevant thoughts are negative or critical. Additionally, drinking alcohol has been shown to have a short-term positive impact on the cognitions of participants with sad affect. Stephens and Curtin (1995) found that depressed participants who received alcohol, relative to those who did not receive alcohol, experienced a reduced recall of self-relevant information with depressed content that was in turn related to enhanced mood. Thus individuals may also use alcohol to escape from negative self-relevant cognitions that may be associated with depression, anxiety, or hostility, or from negative self-critical thoughts about themselves more generally.

The research on alcohol's chemical effects on physiological arousal and cognitive process suggests that there are several mechanisms by which alcohol can impact mood. Therefore, alcohol consumption can be considered an effective strategy for modulating affect. However, it is important to note that the consequences of using alcohol in this way are, in the long run, often contradictory to the original intent and, as noted earlier, retrospective reports of using alcohol to regulate mood are associated with negative outcomes (e.g., Kassel, et al., 2000; Ratliff & Burkhart, 1984).

Operationalizing Drinking to Cope

Drinking to cope has been defined as, "the tendency to use alcohol to escape, avoid, or otherwise regulate unpleasant emotion" (Cooper, et al., 1988 p.218). Consequently, in most cases we expect that negative affect and drinking should be linked in time, such that if one truly drinks to cope with their negative affect they will drink more on days when they experience negative affect.

Several scales have been used to operationalize the construct of DTC. Jessor, Carman, and Grossman (1968) developed a checklist of reasons for drinking that was comprised of items assessing motivations for using alcohol to alter aspects of their personality or psychological functioning. The content of this scale is very similar to current scales of coping motives and captured the idea of drinking as "an escape from or relief for such problems or shortcomings" (pp.110). Polich and Orvis (1979) conducted a study of drinking habits in the US Air Force and through factor analysis identified a factor of five DTC items that correlated with heavy alcohol consumption and problem behavior. The authors considered the items assessing drinking motivations and thought they were indicative of an emerging problem with alcohol use. In subsequent years Polich and Orvis' DTC items were considered to be indicative of psychological dependence to alcohol (Cahalan & Room, 1974). The DTC subscale of Cooper's (1988, 1994) widely used drinking motive questionnaire, the starting point of the measure of DTC used in this study, is based on the scale developed by Polich and Orvis (1979).

Other measures of DTC vary in how they operationalize the construct, using a range of items with slightly different content. Farber, Khavari, and Douglass (1980) have a nine-item negative reinforcement scale on their reasons for drinking questionnaire (RFDQ) and

Labouvie and Bates (2002) have a twelve-item suppression scale on their reasons for drinking questionnaire. Abbey, Smith, and Scott (1993) used only a three-item scale to measure drinking to cope. Yet another approach to characterizing DTC has been from the perspective of the coping literature. Carver, Scheier, and Weintraub's (1989) questionnaire to assess the coping strategies used when dealing with a problem (the COPE) assesses the use of substances as a coping strategy. Despite variability in item wording and survey length all of the DTC measures are consistently operationalized as measures of a dispositional trait. Additionally, researchers have used the various DTC scales to reflect participants' responses to several different types of negative affect with limited to no attention to affect-specific motivations for drinking. For example the survey item, 'I drink to relax' (Polich & Orvis, 1979) would seem to be more relevant when an individual is feeling anxious, tense, or nervous as opposed to when they are feeling bored, lonely, or sad. These shortcomings of the DTC literature will be addressed in the current study by using a measure of DTC that assesses each of the possible antecedent emotional conditions and by considering motives as states not traits.

The Moderating Effects of DTC in ESM and Diary Studies

Experience Sampling Methodology (ESM), Ecological Momentary Analysis, and daily diary studies are techniques used to capture psychological and behavioral phenomenon in the moment as they occur over time. These methods have several advantages over traditional measurement techniques, including the repeated assessment of constructs that change rapidly over time, a focus on within person processes, and reduced reliance on retrospective reports (Tennen & Affleck, 2002). Concerns have been raised about the possibility of reactance from the use of these techniques, however, previous research has

found that reactance does not appear to effect measurement validity (Bolger Davis, & Rafaeli., 2003; Hufford, Shields, Shiffman, Paty, & Balabanis, 2002).

Whereas several ESM and diary studies have examined the role of stress (e.g., Armeli, Carney, Tennen, Affleck, & O'Neil, 2000) or negative events (Carney, Armeli, Tennen, Affleck, & O'Neil, 2000; Mohr, et al., 2001) on alcohol use, few studies have addressed DTC with negative affect. In a study addressing this issue, Todd and colleagues (2003) reported a diary study and an ESM study. These studies were conducted with samples of adult regular drinkers (abstainers were excluded) with no history of alcohol dependence. Unlike most studies of drinking, specific precipitating emotions were analyzed separately (e.g., bored, nervous, sad, lonely, and angry). They assessed drinking to cope using both the alcohol subscale of the COPE and a 5-item composite of the RFDQ. In the diary study, in which participants were to complete recordings before retiring for bed each day, they found that individuals low on DTC drank less on days characterized by more loneliness or boredom, whereas there was no change in drinking related to loneliness or boredom for those high in DTC. As the authors note, the results of this study may have been confounded by mood reports coming at the end of the day, after drinking occurred. In their ESM study participants used hand held computers to report mood ratings three times a day and alcohol consumption after each drink. In this study a link between DTC and affect-drinking covariation was found only for boredom, with those low in drinking to cope drinking less on days characterized by bored mood.

Similarly, Hussong and colleagues (2005) reported an ESM study conducted in a college sample that evaluated how dispositional measures of drinking to cope moderated daily affect-drinking covariation. Using Cooper's measure of DTC, findings for sadness

were counter-intuitive and inconsistent with the self-medication hypothesis, with those high in DTC drinking less on days where more sadness was experienced and those low in DTC not experiencing a change in drinking on high sadness days. Thus neither Todd and colleagues (2003) nor Hussong and colleagues (2005) found that dispositional reports of DTC moderated mood-drinking covariation as would be expected given the meaning of DTC.

Todd and colleagues (2005) recently conducted a study further exploring the relationship between dispositional reports of DTC and electronic diary reports of mood and coping. Dispositional reports of DTC were collected via the COPE and daily reports of mood, drinking, negative interpersonal events, and coping responses (including a drinking to cope item) were collected via electronic diary using palm pilot devices over a period of 4 weeks. They found that dispositional DTC predicted higher proportion of reporting drinking as a coping response to experiencing negative moods. However, dispositional reports of DTC were inconsistently related to actual daily mood-drinking covariation. The expected relationship was not present at higher levels of angry, lonely, sad, disappointed, or global negative mood, yet for those who were relatively high on dispositional DTC, higher levels of bored and nervous mood were related with higher levels of alcohol use. Additionally, bored, disappointed, and global negative mood were found to be positively related to desire to drink among those higher in dispositional drinking to cope. Todd et al. (2005) is the first study to find the expected relationship between dispositional DTC and daily mood drinking covariation, however, this relationship was observed for only two of seven negative mood variables.

Using a methodology similar to the current study, Park, Armeli, and Tennen (2004) conducted an online daily diary study that examined stress and drinking using a college student sample. The daily diary portion of the study was conducted online via the internet between 3:30 and 7pm and assessed previous day's drinking as well as the current day's stressor, stressor appraisals, coping efforts, and affect. Using hierarchical linear modeling (HLM) analyses, they found a complex set of findings that overall pointed to effects of both positive and negative affect on daily drinking. There were several findings of particular relevance to the current study. First, a positive association was found between aggregate daily negative affect and aggregate drinking and at the within-person level it was found that on days characterized by relatively more negative affect, individuals drank more. Second, there was a positive association between aggregate measures of avoidance coping and drinking, however, there was not a within person association. The authors suggested that the way individuals respond to daily stressors could increase or decrease subsequent drinking, such that if coping strategies are instigated and successfully implemented drinking will be less likely and if the stressors induce or lead to negative affect then drinking will be more likely. Although reporting a link between daily negative affect and daily drinking, this study did not explicitly address drinking as a coping mechanism for the specific experience of negative affect.

Mohr and colleagues (2005) conducted another online daily diary study with similar features to those of Park et al. (2004) and the current study. In the Mohr et al. study dispositional DTC was assessed using Cooper's measure. In the daily portion of the study, quantity of alcohol consumed was assessed in terms of where it occurred, either at home or away from home. Participants' positive and negative mood, their time spent with friends and

whether their social contact that day was positive or negative were also assessed. Results of this study indicated that negative mood predicted increased alcohol consumption both at home and away from home while positive mood was associated with drinking away from home. Additionally, dispositional DTC moderated the relationship between negative mood and drinking at home, such that those higher on DTC drank more at home on days with more negative mood, but for those lower on DTC the relationship between negative mood and drinking in was not significant. Dispositional DTC did not moderate the relationship between negative mood and drinking away from home.

Thus, in all but one study in the existing literature DTC is assessed by retrospective self-report surveys, even in those studies that incorporate ESM and daily diary methodology. Additionally, in the study that incorporated daily DTC, the measure is a single item among a list of potential coping responses to each day's most salient negative emotion or stressor (a method that does not allow for the measurement of DTC for any other emotions or negative events that occurred that day).

According to the theory behind Cox and Klinger's (1988) motivational model, decisions about drinking often become automatized (not made with conscious awareness), however, these decisions are voluntary and can be controlled. This raises a challenge for researchers, how do we access motivations that ultimately lead to these decisions? Currently, the standard is retrospective report over an unspecified time period. These dispositional measures require individuals to retrospect over a varied (typically unspecified) period of time and consider their emotions, thoughts, and drinking behavior – a challenging task that requires a great deal of self-awareness and a good memory. However, self-awareness and memory are two qualities typically impaired when consuming alcohol (Cowan, 1983: Hull,

1981). Alternatively, if we track a person's thoughts throughout an evening as each decision

to drink or not to drink is made (and each motivation is weighed) we would likely be creating

unnatural drinking conditions and be influencing the drinking process itself.

The current study creates a compromise by assessing motives through daily reports of

the drinking motives for the previous evening. These reports are less subject to the many

recall biases that have been noted with measures using a longer or open-ended period of

retrospection (Henry, Moffitt, Caspi, Langley, & Silva, 1994) and less likely to interfere with

the participant's natural drinking behavior than the event contingent reporting common in

ESM studies. Additionally, a daily DTC measure will permit identification of specific

motives for a particular drinking episode as opposed to reported dispositional motives which

are based on mental summaries or aggregates of motives for several episodes of drinking.

This is important because it may be the case that an individual's coping motives for drinking

vary depending upon the context or the intensity of the antecedent cognitions or emotions.

Furthermore, by allowing participants to report their motives for drinking on a particular day

without limiting the participants' to selecting one particular event or emotion that they are

drinking in response to (as in Todd et al., 2005), a more complete picture of the relationship

between a participant's mood, motives, and drinking can emerge. Hence, it can be concluded

that the existing ESM and daily diary studies examining DTC have several limitations. This

study will address a key limitation by incorporating a daily measure of drinking motives with

multiple affect-specific items.

Self-Awareness as a Moderator

One reason that participants' may not be accurately reporting their DTC motives is

that they lack the ability to do so due to deficits in self-awareness. Current research on the

constructs of self-awareness derives from models of psychological mindedness (Grant, 2001). Self-reflection is "the inspection and evaluation of one's thoughts, feelings, and behavior," whereas, insight is defined as, "the clarity of understanding of one's thoughts, feelings and behavior" (Grant, Franklin, & Langford, 2002, pp.821). Both of these processes are necessary to accurately report one's previous emotional and motivational states as well as to link them to behavior. As such, individuals who are low in self-awareness would be expected to be poor reporters of both their retrospected drinking motives as well as the link between their affect and drinking.

Self-reflection and insight are subscales of the Private Self-Consciousness Scale (Fenigstein, Scheier, & Buss, 1975), a frequently used measure of psychological mindedness. Grant and colleagues (2002) developed the Self-Reflection and Insight Scale (SRIS) to improve upon the Private Self-Consciousness Scale. Factor analysis revealed two factors for the SRIS, an insight factor (α=.87) and a self-reflection factor (α=.91). The factor structure was confirmed in a follow-up study and strong reliability and validity was demonstrated. The authors' concluded that the SRIS is superior to the Private Self-Consciousness Scale because it has better internal reliability, good test-retest reliability, and explicitly assesses feelings, thoughts, and behaviors. These characteristics are important in the current study, where we are concerned with how well individuals can report on their thoughts that relate to the linkage of their affect and behavior. It follows that an individual who is high in self-reflection and insight will be better able to accurately retrospectively report on the relationships between feelings, thoughts, and behaviors and those low in self-reflection and insight will be less accurate in their reports.

The first hypothesis predicts that self-awareness will moderate the relationship between dispositional DTC and daily affect-drinking covariation such that for those individuals who are high in drinking to cope and low in self-awareness there will not be covariation of daily drinking and mood. However, for those individuals who are high on both DTC and self-awareness there will be daily affect-drinking covariation. For those low in DTC no specific moderating effect is predicted.

DTC as a Process

Two reasons researchers may not have found a relationship between dispositional DTC and daily mood-drinking covariation are because dispositional DTC has been operationalized in a way that is inconsistent with how it occurs in the real world and because it is also subject to biased reporting. Measures of DTC are assessed as dispositions (e.g., Carver, et al., 1989; Cooper, et al., 1995; Farber, et al., 1980). However, it may be that DTC is a process that varies over context in ways that are not easily summarized into a global retrospective measure. For example dispositional and daily reports of DTC have been found to be only moderately correlated (Todd et al., 2005) and dispositional DTC has been found to moderate mood drinking covariation for drinking at home but not drinking away from home (Mohr et al., 2005). Additionally, in a study of college students that assessed drinking motives across several contexts it was found that drinking motivations varied across those contexts (Trim, 2000). Together these findings point to the importance of considering daily DTC to capture variation in daily drinking motives that occur across different mood states and drinking contexts.

It is also the case that retrospective reports of drinking motives may not be as accurate as daily assessment of motives would be. Shiffman and colleagues (1997) note that

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retrospective accounts of substance abuse and related constructs (e.g., negative mood and coping motives) are subject to biases and thus are potentially unreliable. Fromme and Rivet (1994) conducted a study comparing retrospective questionnaires and prospective monitoring measures of alcohol use and coping styles (using three factors of Carver and colleagues' COPE questionnaire). They found strong positive associations between measures of alcohol use, however, the retrospective and daily coping measures were only moderately correlated. The authors suggest that this discrepancy might be related to the more subjective nature of judgments about coping strategies and that the greater subjectivity would lead to the type of coping strategy used not being remembered as well as the typical number of drinks consumed. Based on the findings of studies of this nature, Sobell and Sobell (2000) call for studying the processes involved in substance abuse as they are manifested as opposed to relying on retrospective and dispositional measures of the constructs. Given the possibility that DTC is a process and not a trait-like construct as well as the difficulties inherent in self-report measures of constructs related to drinking behavior, I will test whether drinking motives measured daily as opposed to dispositionally relate to daily mood-drinking covariation as would be expected.

Affect-Specific Test for Sadness

Existing measures of DTC are inconsistent in the types of negative affect they assess, with some relying on single items and others relying on a composite of several items of a variety of types of negative affect. However, the importance of considering the impact of specific negative affective states was highlighted by an ESM study conducted by Hussong, Hicks, Levy, and Curran (2001) that found different patterns of relationships between mood and alcohol use for different emotions. The paradoxical finding of DTC and mood-drinking

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covariation has been found in studies when measures of dispositional DTC (that include several types of negative affect) have been considered in relation to daily specific affect (e.g., Hussong, et al., 2005; Todd et al. 2003). Although recent findings suggest that for some types of negative affect (e.g., bored and nervous; Todd et al., 2005) and in some drinking contexts (e.g., drinking at home; Mohr et al. 2005) dispositional DTC does moderated mood drinking covariation. Approaching the issue from a different perspective, Flynn (2000) examined the relationship of depressed mood and depression diagnosis to using alcohol to cope. Results indicated that a diagnosis of depression was not related to an increase in using alcohol to cope with daily stressors. However, daily depressed mood was significantly related to reports of using alcohol to cope. Unfortunately, only aggregate measures of alcohol coping and depressed mood were analyzed using correlational and one-way ANOVA analyses, so the within-person relationship between depressed mood and alcohol coping was not reported.

Depression or sadness is particularly important to study in relation to drinking to cope. Studies of both community and clinical samples have found high rates of comorbidity between depression and alcohol use disorders (e.g., Aneshensel & Huba, 1983; Grant & Harford, 1995). One possible underlying mechanism for this relationship is DTC. In fact, Holahan, Moos, Holahan, Cronkite and Randall (2004) found that depressed patients have higher rates of DTC than do community controls. Additionally, in a ten year longitudinal study, Holahan, Moos, Holahan, Cronkite and Randall (2001) found that individuals with higher baseline levels of DTC showed a stronger link between depressive symptoms and both alcohol consumption and problems in subsequent observations. In the current study, sadness DTC motives and daily sad mood will be measured, allowing for a test of whether drinking

motives need to be considered on an affect specific level in addition to or instead of global affect.

The Current Study

In summary, I will test three hypotheses aimed at understanding the mixed and paradoxical findings in the DTC literature. First, given that self-awareness impacts the ability to remember emotions and motivational states and their linkage to behavior, it is expected that self-awareness will moderate the relationship between dispositional reports of DTC and actual covariance of affect and drinking. Second, one explanation for the failure to find a relationship of dispositional DTC to the daily covariation of negative affect and drinking is that the dispositional measures do not adequately capture the process of affect-motivated drinking. In contrast, daily DTC assesses time-linked drinking motives and thus is expected to be associated with the daily covariance of affect and drinking. Third, the processes related to DTC have generally been tested with respect to the broad construct of negative affect, which may be obscuring affect-specific relationships. Given the high comorbidity between alcohol use disorders and depression, the sadness-drinking relationship is particularly important to explore. Thus, each hypothesis will be tested with broad negative affect and sadness-specific models. It is expected that those who report sadness and high DTC (dispositionally and daily) will show sadness-drinking covariation.

CHAPTER II

METHODS

Participants

Participants were full time college students at a large Southeastern University

recruited to complete a study of College Students' Feelings, Thoughts, and Behaviors in

partial or full completion of a course requirement for participation in studies conducted in the

Psychology Department. The sample of 124 participants included in the study analyses is

roughly representative of the overall population at the University, predominantly White

(85%) with a small percent of students who self-identified as mixed-race (5%), Asian-

American (4%), African-American (3%) and of other racial or ethnic groups (3%).

Additionally, the sample was 63% female, 85% were aged 18-20, and 83% of the students

had at least one parent who had graduated from college.

Procedures

The current study was conducted in four phases (1. Initial Visit, 2. Pre-diary Survey

and Orientation, 3. Online Daily Diary, and 4. Final Visit); the timing, incentives, and

measures for each of the phases are summarized in Table 2. In the first phase of the study

participants were recruited to complete self-report questionnaires in group sessions. Prior to

beginning the surveys, the participants were read a brief description of the study and

completed a consent form.

A trained member of the research team reviewed the surveys within 72 hours of the initial visit in order to determine eligibility for participation in the second phase of the study. The inclusion criterion was having drank alcohol on at least 4 occasions in the past month (measured using a question adapted from the scales used by Clark and Midanik, 1982, and Hussong, et al., 2001). This criterion allowed for a sample of regular drinkers with participants who abstain from alcohol use and individuals who drink infrequently excluded from the daily diary study. This maximized the chances of observing drinking episodes during the 15 day period of daily reports without creating a sample that may be qualitatively different from average college students (which could have been the case if criterion such as problem drinking, binge drinking or alcohol use disorder diagnosis had been used). Of the 318 initial visit participants, 131 met inclusion criteria, and 125 participants chose to enroll in the online diary phase. The inclusion rate (41%) was slightly less than expected from previous studies which suggested that about 50% of the participants initially surveyed will be eligible to participate in the daily portion of the study (Wechsler, Lee, Kuo, & Lee, 2000; Hersh, 2003), however the participation rate among those invited was 95%.

Participants who met the inclusion criteria were contacted via phone or email, informed about the nature of the additional phases of the study and the incentives they could receive and asked about their interest in participating further. If they were interested in participating further a visit to the lab was scheduled. Participants who came to the lab for the second phase of the study (Pre-diary survey and orientation) were provided with more information, signed additional consent forms, and completed a brief survey battery. Upon the participants' completion of the survey battery, they were reminded of the security considerations inherent in transmitting information over the internet and the precautions that

have been taken to insure their privacy and confidentiality. Staff then demonstrated how to access the online survey and fill it out for the third phase of the study

In the third phase of the study (Online Daily Diary) participants were requested to access and complete the online daily diary (see Appendix I) once a day between 4pm and 7pm. The exact time participants completed each survey was automatically recorded. Participants accessed the survey by clicking on a link that was emailed to them each day by the survey company, Zoomerang. Surveys were made available between 3:30 and 4:00 pm daily and survey responses received between 3:30 and 9pm were considered valid for mood data (provided that participants reported no drinking prior to completing the survey that day). Reported alcohol use data was considered valid if the survey was received between 3:30 and 11pm. The time frame for accessing the online diary is consistent with time frames used in previous studies, (e.g., Park, et al., 2004). Of the 125 participants that participated in the online diary phase, the data of one participant was not retained in the study analyses due to not completing a single valid daily survey.

During the fourth phase of the study (Final Visit), participants completed additional questionnaires and were given a debriefing form and were thanked for their participation in the study. The debriefing forms contained information about mood and alcohol use (Geisner & Larimer, 2004).

Measures

All measures were assessed through self-report and the measures used in this dissertation, which are a subset of the measures used in the larger study, are included in Appendix II. Demographic measures, including age, sex, level of parent education and ethnicity, were assessed at the initial visit.

Mood. Daily mood was measured in the online survey using the Daily Mood Questionnaire (DMQ; Emmons & Diener, 1985). This mood scale was developed to assess the dimensions of negative affect (depressed, unhappy, angry/hostile, frustrated, worried/anxious) and positive affect (happy, enjoyment/fun, joyful, pleased) with emphasis on discrete emotions that are frequently experienced (Diener & Emmons, 1984). The negative affect subscale is used in hypotheses one and two. An average of the two items depressed and unhappy is used to represent sadness in the third hypothesis. When completing this scale participants were asked to "recall what your day has been like today and rate the extent to which you felt" each of the emotional states on a six point scale (ranging from 1=not at all to 6=extremely). This scale has been shown to have good reliability in diary studies (α=.89 for negative affect; Gil et al., 2004), with college student populations (α =.84 for negative affect; Diener & Emmons, 1984), and in this study (for negative affect, Day 2 α=.84, Day 7 α=.85, Day 12 α=.84). In the current study the sadness variable also demonstrated good reliability (Day 2 α=.81, Day 7 α=.72, Day 12 α=.86).

Alcohol use. Daily alcohol consumption was assessed during the online study by asking participants to report the number of standard drinks of alcohol consumed the previous night, starting either after they completed their diary entry, or at 5:00pm if they did not complete a diary on the previous day. Standard drink sizes were defined as a 12-oz can or bottle of beer, a 4-oz glass of wine, a 12-oz bottle of wine Cooler, or a1-oz ("shot") of liquor straight or in a mixed drink (based on Park, et al., 2004).

Alcohol use motives. Alcohol motives were assessed using dispositional and daily measures. Dispositional drinking motives were assessed during the initial visit by the five item coping motives subscale of Cooper's motivations for alcohol use scale (Cooper, 1994).

Participants were asked to rate how often they drink for each reason using a five-point response scale ranging from (0) almost never or never to (4) almost always or always. In previous studies of college students, our lab has found adequate to strong reliability for this subscale (α=0.83 by Hussong, et al., 2005) as was the case with the current study (α=.86). Additionally, I developed a modified measure of alcohol motives to better assess affect-specific motives as well as the daily process of drinking motivation. This new measure, based on Cooper's motives questionnaire, is expanded to tap specific dimensions of negative affect including sadness. This measure has 12 items and in the daily format asks participants, "to what extent did each of the following influence your decision to drink alcohol last night?"; participants are instructed to rate the items on a 5 point response scale ranging from 'not at all' to 'very much'. The negative affect subscale of the daily format will be used in hypotheses two and demonstrated good reliability (Day 2 α=.77, Day 7 α=.90, Day 12 α=.88). A dispositional version of the modified motives measure was created in order to assess sadness specific dispositional motives. The measure was included in the phase 2, and participants are asked "to what extent do each of the following influence your decision to drink alcohol?" Participants are asked to rate this version using a five-point response scale ranging from (0) almost never or never to (4) almost always or always. As with dispositional sad mood, sadness drinking motives will be a composite of the items unhappy and depressed, and this variable demonstrated marginal reliability in the current study (α=.66).

Self-awareness. Self-awareness, comprised of self-reflection and insight, is hypothesized to moderate the accuracy of dispositional DTC predicting daily mood-drinking covariation, and these constructs are measured during the initial visit with the 20-item Self-Reflection and Insight Scale (SRIS; Grant, et al., 2002). Participants are asked to indicate the

extent each statement applies to them on a 6-point response scale (0=strongly disagree, 6=strongly agree). Hypotheses two and three utilized the SRIS which had good reliability in the current study (α=.86).

CHAPTER III

RESULTS

Participants were asked to fill out the daily online surveys for 15 consecutive days however, daily alcohol use and motives are reported for the previous day and mood is reported for the current day. In order to allow for the proper temporal sequencing of mood and alcohol use reports the mood variables were moved back one day. This leaves a potential maximum of 14 days of valid data for each participant (N= 124 participants). Across the total possible 1,736 person days of possible responses, participants had valid mood data for 1,629 survey days and valid alcohol data for 1,615. Twenty-eight survey days were not available due to the survey being inoperable for one day as a result of experimenter error. An additional 79 surveys were not completed or were completed outside of the established time frame. The one day lag of mood reports that lined up the mood and alcohol data means that missing a survey on one day in fact leads to missing data on two days, thus the final number of available and valid survey days is 1,527. The number of missing survey days varied across participants ranging from 0 (n=53) to 11 (n=1) days (mean = 1.69 days) and 90% of the sample had valid data for 10 or more survey days. Participants reported drinking alcohol and provided the number of drinks consumed on 515 of the 1,527 valid survey days and 98% of the sample reported drinking on at least one occasion. Participants' daily motives for using alcohol could only be reported only on days that participants drank

alcohol, thus the online motives hypotheses are based on 515 survey days while the dispositional DTC hypotheses are based on 1527 survey days. All 124 participants retained in the analyses had complete dispositional data, (see Table 2 for a summary of the descriptive statistics for both the dispositional and online data).

Analytic Approach

To test study hypotheses, I conducted a series of Hierarchical Generalized Linear Models (HGLM; Raudenbush & Bryk, 2002). Given that the outcome measure of alcohol use is the number of drinks consumed in a given day, a count variable, the data are more consistent with a Poisson than a normal distribution. The HLM statistical program (version 6) allows for estimation of nested and longitudinal data that takes into account missing data and provides estimation of count data through the HGLM using an assumed Poisson distribution and log-link function (Raudenbush, Bryk, Cheong, & Congdon, 2004). Given that the data will be nested within individuals over time and that missing data are anticipated, this analytic strategy is ideal to test the study hypotheses. All models were estimated with an overdispersion parameter and under the assumption of constant exposure because all participants were observed for the same period of time. Given that the interest is in intra-individual processes, effects will be interpreted for unit-specific analyses.

In the HGLM framework, the analyses may be conceptualized by level of nestedness in the data. The first level of analysis contains the repeated observations of alcohol use and mood over the 14 day period. The level 1 measures of mood are person-centered such that variation in level 1 mood represents a change from that individual's average level of mood (to account for variation in level of mood between participants an aggregate measure of mood, each participant's average level of mood over the course of the online study, was

included as a level 2 predictor of alcohol use, as recommended by Raudenbush & Bryk, 2002). Additionally, a weekend variable indicating whether the observed datum was collected on a weekday evening (e.g., Sunday- Wednesday) or a weekend evening (Thursday-Saturday) was included as a control variable to account for this cyclical pattern of college drinking. The second level of analysis contains the individual participants themselves and all models included study participants' gender and average online mood as predictors of each individual's average level of drinking. Several additional, daily (level 1) or dispositional (level 2) variables were added to test the four hypotheses of the study. Finally, based on theory it is believed that the relationship between daily mood and drinking will vary across individuals as such the Level 1 intercept and daily mood slope will be included as random variables in the statistical models. HGLM with these specifications was used for all of the hypotheses.

Hypothesis 1: The Influence of Self-Awareness on DTC's Moderation of Mood-Drinking Covariation.

In the first hypothesis, I tested whether the impact of dispositional DTC on the daily covariation of negative emotions and alcohol use was moderated by self-awareness (a cross-level three-way interaction). At level one, daily mood reports and weekend status were included as predictors of daily alcohol use. In the level two model, gender, dispositional DTC, self-awareness, and the interaction of DTC and self-awareness were included as predictors of both drinking level and mood-drinking covariation (i.e., the mood slope)..

Using the notation of Raudenbush and Bryk (2002), the Level 1, Level 2, and reduced-form equations are:

Level 1:

$$Y_{ti} = \beta_{0i} + \beta_{1i}(DailyMood)_{ti} + \beta_{2i}(Weekend)_{ti} + r_{ti}$$

Level 2:

$$\beta_{0i} = \gamma_{00} + \gamma_{01}(Gender)_i + \gamma_{02}(DTC)_i + \gamma_{03}(SelfAwareness)_i + \gamma_{04}(AggregateMood)_i + u_{0i}$$

$$\beta_{1i} = \gamma_{10} + \gamma_{11}(Gender)_i + \gamma_{12}(DTC)_i + \gamma_{13}(SelfAwareness)_i + \gamma_{14}(DTC)_i(SelfAwareness)_i + u_{1i}$$

$$\beta_{2i} = \gamma_{20}$$

Reduced Form:

$$\begin{aligned}
Y_{ti} &= \gamma_{00} + \gamma_{01}(Gender)_i + \gamma_{02}(DTC)_i + \gamma_{03}(SelfAwareness)_i + \gamma_{04}(AggregateMood)_i \\
&+ \gamma_{10}(DailyMood)_{ti} + \gamma_{11}(Gender)_i(DailyMood)_{ti} + \gamma_{12}(DTC)_i(DailyMood)_{ti} \\
&+ \gamma_{13}(SelfAwareness)_i(DailyMood)_{ti} + \gamma_{14}(DTC)_i(SelfAwareness)_i(DailyMood)_{ti} \\
&+ u_{0i} + (DailyMood)_{ti}u_{1i} + \gamma_{20}(Weekend)_{ti} + r_{ti}
\end{aligned}$$

The inclusion of dispositional DTC as a level-two predictor of mood-drinking covariation is equivalent to testing the interaction between mood and DTC in the prediction of drinking. Furthermore, the inclusion of the level-two interaction between self-awareness and drinking motives predicting mood-drinking covariation creates a three-way interaction. As such, the first hypothesis essentially concerns whether at different levels of self- awareness there is differential moderation of daily mood-drinking covariation by dispositional DTC.

No support was found for the hypothesized interaction ($b = 0.04$, $t = 0.25$, $p = .80$; see Table 3). Negative affect was a significant predictor of alcohol use, however, higher levels of negative affect were predictive of less alcohol consumption ($b = -0.19$, $t = -2.02$, $p < .05$). Similarly, higher dispositional self- awareness predicted lower mean levels of alcohol use ($b = -0.35$, $t = -3.11$, $p < .01$). As expected, participant gender ($b = 0.43$, $t = 2.96$, $p < .01$) and weekend ($b = 1.29$, $t = 15.38$, $p < .001$) both predicted average level of alcohol consumption

such that men were likely to consume higher quantities of alcohol within any given day than were women and alcohol was more likely to be consumed on weekend nights than weekday nights.

Hypothesis 2: Drinking Motives as a Daily Process.

To examine the importance of considering drinking motives as a daily process, the first level of analysis in the HGLM model testing this hypothesis contained the repeated observations of alcohol use, mood, drinking motives, and the interaction of mood by motives over the 14 day period. The second level of analysis contained the individual participants themselves, the control variables of their gender, aggregate mood, and aggregate motives. This is designed to test whether daily DTC moderates daily covariation of negative emotions and alcohol use (an interaction on level one).

Using the notation of Raudenbush and Bryk (2002), the Level 1, Level 2, and reduced form equations are:

Level 1:

$$Y_{ti} = \beta_{0i} + \beta_{1i}(DailyMood)_{ti} + \beta_{2i}(DailyDTC)_{ti} + \beta_{3i}(DailyMood)_{ti}(DailyDTC)_{ti} + \beta_{4i}(Weekend)_{ti} + r_{ti}$$

Level 2:

$$\beta_{0i} = \gamma_{00} + \gamma_{01}(Gender)_i + \gamma_{02}(AggregateMood)_i + \gamma_{03}(AggregateMotives)_i + u_{0i}$$

$$\beta_{1i} = \gamma_{10} + u_{1i}$$

$$\beta_{2i} = \gamma_{20}$$

$$\beta_{3i} = \gamma_{30}$$

$$\beta_{4i} = \gamma_{40}$$

Reduced Form:

$$Y_{ti} = (\gamma_{00} + \gamma_{01}(Gender)_i + \gamma_{02}(AggregateMood)_i + \gamma_{03}(AggregateMotives)_i)$$
$$+ (\gamma_{10}(DailyMood)_i + \gamma_{20}(DailyDTC)_i + \gamma_{30}(DailyMood)_i(DailyDTC)_i + \gamma_{40}(Weekend))$$
$$+ (u_{0i} + (DailyMood)_i u_{1i} + (DailyDTC)_i u_{2i} + r_{ti})$$

The above model was initially tested with Level 1 daily motives specified a random variable; however this model did not converge. To simplify the model and because intra-individual differences in daily drinking motives were not expected, I re-estimated these models and removed the random error term from the level 2 predictor of the slope of the relationship between daily motives and alcohol consumption. The resulting model converged, however, the predicted interaction of negative affect mood by drinking motives was not supported ($b =$ .02, $t = .47$, $p = .64$; see Table 4). Gender and weekend, were the only significant predictors in this model, both having the expected influence.

Hypothesis 3: Sadness-Specific Models.

The final hypothesis considers the sadness-specific test of the moderating effects of DTC. This hypothesis will be tested separately for both daily and dispositional DTC motives.

Sadness-specific daily motives. This model is identical to the model in Hypothesis 2 except the mood and motives variables are sadness-specific instead of generally capturing negative affect.

This model converged with random variables for both the mood and motives slopes included, however, given that the random variable was removed from the model in the corresponding test of negative affect, this model was also tested with only the mood slope set as random. The results of the models with and without random variability for motives were substantively identical, thus the model with only the random mood slope will be reported.

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The hypothesized interaction between daily sad mood and sadness drinking motives in predicting daily alcohol use was significant ($b = 0.07$, $t = 2.06$, $p = .04$; see Table 6). Consistent with hypothesis, on days that participants endorsed higher levels of daily sadness DTC and higher levels of sad mood, they consumed more alcohol. Whereas, on days when participants endorsed high sadness DTC and low levels of sad mood, they drank less. When participants endorsed low sadness DTC, they drank more when experiencing low levels of sad mood and drank less at high levels of sad mood (see Figure 1). The inter-individual level of sad mood ($b = .19$, $t = 1.91$, $p = .06$) was a marginally significant predictor of mean level of alcohol consumption such that participants with higher levels of aggregate sad mood were more likely to have higher levels of average levels of alcohol use. Aggregated sadness DTC's influence on mean levels of alcohol use was also marginally significant ($b = -0.27$, $t = -1.78$, $p = .08$) and indicated that an inverse relationship existed between mean level of sadness DTC and mean level of alcohol use after controlling for the effects of daily sadness DTC. Again the effects of gender and weekend were present in the expected directions.

Sadness specific dispositional motives. The HGLM model for the dispositional sadness DTC motives is similar to those used in hypothesis one, however, it included mood and DTC indicators that were sadness specific. The predicted cross-level 3-way interaction between daily sad mood, dispositional sadness drinking to cope motives and dispositional self- awareness was not significant ($b = -0.34$, $t = -1.37$, $p = .18$; see Table 6). Dispositional sadness DTC did not moderate the relationship between daily sad mood and drinking ($b = -0.11$, $t = -0.33$, $p = .33$). The relationship between daily sadness and alcohol use in this analysis was marginally significant ($b = -0.17$, $t = -1.69$, $p = .09$) and indicated that participants drank less on days they reported more sadness. Similar to the first hypothesis,

participants' level of self- awareness was significantly inversely related to each participants' average level of alcohol consumption ($b = -0.37$, $t = -3.33$, $p <.01$). Additionally, there was a significant interaction between daily mood and dispositional self- awareness in the prediction of daily alcohol use ($b = -0.32$, $t = -2.17$, $p <.05$). Individuals high in self- awareness, compared to those low in self- awareness, drank relatively more at low levels of sad mood, and relatively less at higher levels of sad mood, whereas those low in self- awareness increased their alcohol use as their sadness increased (see Figure 2). As with all previous models tested gender and weekend effects on average level of alcohol use were also present.

Post-hoc Analyses.

Given the limited and marginal findings for three of the proposed hypotheses, a series of post-hoc analyses were conducted to test likely reasons for why these hypothesized relationships were not found.

A possible confound in any longitudinal study is the effect of time. The linear and quadratic effects of time (measured by day in the survey) were considered as predictors of alcohol use (mean level of alcohol use across the study days is presented in Table 7 and total amount of alcohol consumption per day is depicted in Figure 3). The linear effects were not a significant predictor, however, the quadratic effects of time were, ($b = -0.01$, $t = -1.98$, $p = .05$). When the quadratic effects of time were included in each of the study models, the findings were unchanged.

Analyses of the two hypotheses involving online motives had many fewer valid observations at level 1 than the two hypotheses of dispositional motives because participants' motives for drinking were only recorded on days that they reported drinking alcohol. For this reason the online motives models were re-examined. One way to deal with this issue in the

present data is to set those missing motives to zero because the participants did not drink. Hypothesis two was re-analyzed with those motives set to zero and the model converged with the negative affect mood and motives variables modeled as random variables, however, the substantive findings were unchanged. The online sadness specific motives hypothesis was also re-analyzed using this approach and the significant interaction between daily mood and motives that was detected with the unaltered sample was no longer present.

To explore whether setting the motives to zero introduces a potential confound the following question was added to the final visit survey, "How many days did you **not** have access to alcohol when you wanted to drink?" (response options ranged from 0-15). The question was added after 23 participants had completed the study so a large sample of study participants (N=101) were able to respond to the question. Twenty six participants indicated that they wanted to drink on days that they did not have access to alcohol. Together these participants reported that there were 80 survey days when this occurred (8% of possible non-drinking days for this sample). Additionally, total quantity of alcohol consumed was positively correlated to the number of days participants wanted to drink but did not have access (r=.19, p=.05). These findings suggest that setting motives to zero for abstainers is not an ideal strategy.

Sample characteristics that might affect all of the models are highly influential cases and cases with limited variability on the outcome measure. The data were further examined using the OLStraj Macro (Carrig, Wirth, & Curran, 2004a; Carrig, Wirth, & Curran 2004b) to determine if there were influential cases. This macro provides graphical representation of inter-individual variability in ordinary least squares (OLS) estimated growth parameters and identifies potential outliers. Six likely outliers were identified using this method. Cases with

limited variability on the outcome measure, those participants who did not drink during the study period (n=2) or who drank only once (n=13) were removed to create another sample. Each of the study models were tested using these two samples (the sample with 6 outliers removed and the abstain/one drinking day sample with 15 cases removed), however, the findings again were not substantially altered.

Another possible explanation for three of the study hypotheses not being supported is that by including multiple additional variables the power to detect the relationships of interest was diminished. Accordingly, all models were tested with the weekend effect and the aggregated mood variable removed. Again, the findings remain unchanged.

CHAPTER IV

DISCUSSION

Three different ways of testing the relationship of DTC to mood-drinking covariation were considered in the current study; self-awareness was included as a moderator, DTC was operationalized as a daily process, and sadness specific indicators of mood and DTC were tested. However, the current study only found support for the moderating effects of daily sadness DTC, such that there was a positive relationship between sad mood and alcohol consumption for those with relatively higher sadness DTC. In essence, participants with higher levels of DTC drank more on drinking days when they experienced sadness. The significant findings for the moderating effects of online DTC motives did not hold for global negative affect indicators of daily DTC and mood. Together these findings highlight the importance of approaching drinking motives in college students with greater specificity in terms of linking mood and coping motives. Furthermore the importance of examining affect specific as opposed to global negative affect was demonstrated by the current study as well as in Todd et al. (2005). Had these studies relied solely on global negative affect, the moderating effects of DTC would not have been detected.

Support for the sadness specific daily motives also suggests that DTC is indeed more of a process that changes over time and context rather than a dispositional trait. Although Mohr et al. (2005) used a dispositional measure of DTC, their findings that the expected

effects of DTC are only present in a particular context, drinking at home, and not in another context drinking away from home, also provides support for this assertion. A one time point measure of DTC that does not assess affect-specific and context-specific motives does not adequately predict individuals' daily mood linked drinking behavior. The results of the current study indicate that capturing the context of drinking via daily motives must be combined with affect specific indicators of mood and DTC. This finding may reflect the importance of matching emotion and affect specific indicators of DTC generally or it may be that this relationship between mood and DTC is particular to sadness. Hussong et al., (2005) discussed one potential mechanism that could be specific to sadness (and similar emotions). They proposed that individuals experiencing low arousal emotions such as sadness will be motivated to drink because of the physiologically arousing effects of alcohol that occur during the ascending limb of the blood alcohol curve or more generally at lower doses of alcohol (Pohorecky, 1977). If this is the mechanism underlying daily sadness DTC as Hussong and colleagues suggested, then other low arousal negative emotions such as boredom or loneliness may operate in a similar fashion, whereas high arousal emotions like anger and anxiety would not.

Another finding of interest in the current study is the negative relationship between daily negative mood and alcohol consumption. This is consistent with several prior studies (e.g., Hussong et al., 2005) and in the college context is likely due to the high prevalence of drinking associated with positive affective states (i.e., for celebratory and social reasons). However, a positive relationship was found between individuals' aggregate negative mood and average levels of use; essentially, participants who experienced more negative moods also drank more. This finding is consistent with prior research focused on retrospective

dispositional reports (e.g., Wills et al, 1999). There are two possible interpretations of this finding, the first is that individuals who tend to experience more negative mood also tend to drink more, but not necessarily in response to that negative mood. Given that daily negative mood is negatively related to daily alcohol use, the relationship may indicate that higher levels of average use are leading to more negative mood, either from the negative physiological effects secondary to alcohol use (e.g., hangovers) or due to remorse over actions that occurred while drinking. In fact, Hussong et al. (2001) found that drinking predicted subsequent increases in sadness, guilt, and hostility, but not fear. These authors noted how this effect can create a cycle whereby efforts at self-medication actually lead to greater negative affect which then leads to additional efforts at self-medication.

Self-awareness did not have the expected moderating effects on the dispositional DTC link to mood-drinking covariation, however, self- awareness did have an impact on alcohol use. Participants who were higher on self- awareness consumed less alcohol over the course of the online study than those with lower levels of self-awareness. Additionally, self-awareness moderated the relationship between mood and drinking, such that those higher in self- awareness drank less on days when experiencing more negative mood and more on days with less negative mood, whereas those with lower self-awareness reported more drinking on days when experiencing more negative mood and less drinking on days with less negative mood. These findings suggest that individuals with higher self-awareness may have a less problematic pattern of drinking. Hull (1981) presented a theory that proposes that individuals use alcohol to regulate their self-awareness such that those high in self-awareness will drink more following negative events in order to reduce the impact of the negative events. The current findings are contrary to Hull's theory, but not inconsistent with other

tests of Hull's theory. In a study of adolescent alcohol use, the findings of Chassin, Mann, and Sher (1988) did not support Hull's theory. Additionally, these authors noted that the support for this theory comes largely from laboratory based studies where individuals' response options for coping with negative events are limited . They speculated that in more ecologically valid settings, individuals with high self-awareness are likely to employ other more adaptive coping mechanisms in response to negative events or stressors (Chassin, et al., 1988). In the current study, no predictions were made about the impact of self-awareness on mood-drinking covariation, and, in fact, self-awareness was not conceptualized in terms of Hull's theory; however, it is interesting to note that Hull's theory essentially proposes a form of self-medication for negative cognitions. As such a better test of Hull's theory could be achieved by operationalizing self-awareness as a daily process.

The lack of support for reports of DTC predicting actual mood-drinking covariation in three of the four hypotheses in the current study and in previous studies, coupled with the frequent finding of a negative relationship between negative mood and drinking in the current study and several previous studies (Hussong et al., 2005; Todd et al., 2003), could be interpreted as evidence against a self-medication model of drinking. However, it is more likely with the mixed findings of this study and previous studies (Mohr, et al., 2005; Todd et al, 2005) that DTC is a complex phenomenon in need of further study. Baker, Piper, McCarthy, Majeski, and Fiore (2003) proposed a mechanism by which substance use may be initiated to avoid negative affect prior to an individual experiencing the negative affect. By this theory, through repeated substance use individuals become conditioned to interoceptive cues for negative affect and begin to detect these cues pre-consciously. The cues in turn are purported to influence cognitive processing by causing the individual to engage in more "hot

processing" and less "cool processing" which makes substance use more likely. According to this model, this process can occur without the individual consciously realizing the motivation for their use, and the individual uses the substance prior to experiencing the negative emotions in order to avoid those emotions   Although this model was developed to explain use in individuals addicted to substances, it is likely that a similar process can occur in regular substance users. If so then observing mood-drinking covariation in these individuals who are drinking to cope might not be necessary, or in fact, possible.

Cognitive constructs such as DTC and self-awareness have received relatively limited attention in daily process research compared to studies on affect (Nezlek, 2005). Accordingly, the scientific understanding of the process of such cognitions and how to measure them is still developing. Nezlek (2002) conducted a daily process study that examined the relationship between self-reflection, social events, positive affect and negative affect. He found that self-reflection is a construct that can be measured as a process and that it covaries positively with social events. Given that self-reflection is a key aspect of self-awareness, these findings suggest that self-awareness may also need to be measured as a process instead of a disposition. More importantly, Nezlek's research demonstrates the feasibility and utility of daily process studies of constructs traditionally operationalized in dispositional formats.

Limitations and Strengths.

A limitation of the current study that impacts the hypotheses testing the role of online DTC is that drinking motives were not assessed on days that participants did not drink. Due to the logic behind the online survey design, participants only reported their motives for drinking on days that they drank. It is true that participants could not report on motivations

for why they engaged in drinking if they did not engage in drinking; however, the result is that those study days on which participants did not drink are either considered missing data or can be set to zero. Setting participants' motives to zero on non-drinking days introduces a potential confound as it presupposes that participants were not motivated to drink to relieve negative affect on days that they did not drink. It may in fact be the case that they were experiencing that motivation but did not have access to alcohol. About one quarter of the sample indicated that on at least one day they wanted to drink but did not have access to alcohol, accounting for 8% of non-drinking days. Additionally, the number of days that a person did not have access but wanted access to alcohol was positively correlated to the quantity of drinks consumed over the course of the study. It cannot be safely assumed that participants drinking motives are zero on non-drinking days given that participants have indicated that they were unable to drink on days they desired to and the frequency that participants endorsed this is significantly correlated to the outcome variable. An ideal way to resolve this issue in future studies would be to include a question about desire to drink or cravings to drink in the online survey. Although most studies of college student drinking do not include measures of craving, in their study of a community sample of individuals who desired to reduce their alcohol consumption, Todd et al. (2005) included desire to drink as an outcome variable. In fact, they found that bored, disappointed, and global negative mood were positively related to desire to drink among those higher in dispositional DTC.

Another concern in the current study, and with all daily process studies of mood and alcohol use, is that data may not be missing at random, as participants may be less likely to complete surveys when they are sad and less likely to complete surveys on days following heavy alcohol use. Unfortunately, these are two of the states most relevant to the questions

of interest (Armeli, Todd, & Mohr, 2005). Additionally, as Shiffman and Stone (1998) noted, the sample of participants willing to tolerate the burden of daily process research may be biased. In the current study 98% of those eligible to participate elected to do so; however, it may be that those participants who repeatedly failed to complete surveys or completed surveys outside of the valid time range (i.e., completing surveys the next morning or completing several days at once) were doing so because they perceived the incentive as inadequate relative to the burden of full participation. Thus, the current sample may not be biased in terms of participants included but it may be biased in terms of the data acquired.

Another notable limitation of the current study is that participants were mostly white, college undergraduates, and likely of high socio-economic status (as approximated by parental college education). Unfortunately, these are characteristics of most studies of DTC. Participants' gender was included as a predictor of overall amount of alcohol consumed in the study and as a predictor of the relationship between mood and drinking in the dispositional motives hypotheses; however, it was not included as a predictor of the hypothesized interactions in any of the study models. This was based on a lack of empirical evidence about how gender might influence these relationships, and for practical reasons, to limit the complexity of the models. If there are indeed gender differences in how DTC is manifested, given that the current study did not account for them, the observed relationships between DTC and mood-drinking covariation may be attenuated.

Despite these limitations, the current study had several important strengths. On a methodological level, one strength is that using HGLM allowed for tests of between and within person differences in the constructs of interest. The use of the innovative online daily diary technology is an improvement over traditional diary methods that cannot track when

participants actually record their data. On a theoretical level, the inclusion of temporally

linked DTC and the affect specific indicators of mood and motives provide for assessment of

the constructs of interest in a more realistically complex manner. Additionally, the inclusion

of self-awareness as a moderator of the effects of DTC represents the first exploration of how

non-alcohol related cognitions impact the process of DTC.

Clinical Implications

Dispositional reports of DTC do not reliably capture the actual relationship between

mood and drinking on a daily basis. Accordingly, more frequent or context specific

measurement of drinking motivations should be undertaken in situations where there is

clinical interest in knowing an individual's pattern of drinking motives. Additionally,

assessing variables of interest using daily process research technology (e.g., an online diary

or palm pilot) would provide clinicians with information about when the client is making

recordings, preventing the client from filling out the information all at once, and thus

minimizing the impact of memory biases and errors. As presented earlier, previous research

on frequent monitoring techniques has found that reactance does not appear to effect

measurement validity (Bolger et al.., 2003; Hufford et al., 2002). However, a study

conducted over a longer sampling period than most ESM, EMA, and diary studies did

suggest that participants' drinking may be affected by frequent monitoring. In an 8-week

EMA study that involved event-contingent drinking assessments, Collins et al. (1998) found

decreased drinking over the sampling period, suggesting that prolonged monitoring of

drinking behavior might in itself serve as a means of intervention These results point to the

potential power of combining frequent monitoring techniques with therapeutic interventions.

Coping strategies are considered to be key components of CBT interventions of substance use; however, there is limited empirical evidence that CBT interventions actually alter patients' use of adaptive coping skills or that the use of coping skills is what leads to a decrease in substance use (Morgenstern & Longabaugh, 2000). Accordingly, knowledge about the process of CBT interventions for substance abuse can be enhanced by incorporating daily monitoring of DTC and other coping strategies into treatment outcome studies.

Previous studies of college student drinking have found that DTC is not the most prevalent drinking motive in the college context (e.g., Hussong, 2003; MacLean & Lecci, 2000); however, DTC has been found to be the drinking motive most associated with problematic alcohol use (e.g., Cooper et al., 1995). Most college student drinkers do not go on to develop alcohol problems, so indicators that identify the individuals who are at risk for later problems may be useful in developing targeted interventions. Most previous studies of DTC have not found that DTC moderates mood-drinking covariation; however, by assessing DTC as an affect specific daily process, the moderating effects of DTC were observed. This suggests that efforts at intervention with the college population should continue to address DTC as a maladaptive and insufficient coping mechanism.

Future Directions and Conclusion

Future studies of the constructs assessed in the current study would benefit from the inclusion of additional information about drinking context, including the location of drinking and whether the drinking is occurring alone or with peers. Additionally, alcohol craving or urges to drink should be assessed. Measurement of alcohol craving is particularly important in that it provides a logical construct in which drinking motives can be measured in relation

to non-drinking days. Thus, it would overcome one of the limitations of the current study.

Additionally, the consideration of the influence of several affect specific indicators of mood

and DTC in addition to sadness will likely provide more information about the types of

negative emotions that individuals' use alcohol to regulate. Considering the impact of daily

DTC in the presence of other daily drinking motives (i.e., social, enhancement, and

conformity motives) would allow for a view of the influence of DTC on mood-drinking

covariation when other common reasons for alcohol use are controlled.

      As noted earlier, the inclusion of additional daily measures of cognitive processes

(including self-awareness) may provide important insights about DTC and affect motivated

drinking. A potential drawback to the inclusion of additional measures is the burden upon

participants. However, Armeli et al. (2005) noted that daily process studies can be designed

to include more complex and time intensive constructs, and participant burden minimized by

randomly sampling participants on a number of days instead of collecting data daily.

Furthermore, studies of these constructs should be conducted with more ethnically diverse

samples as the findings of Cooper, Russell, Skinner, and Windle (1992) suggest that drinking

motives may vary across ethnicity.

      The time frame of the relationship between mood and drinking in college student

drinking is often operationalized as occurring within the same-day, with current mood

influencing drinking later that evening, as it was in the current study and several prior studies

(e.g., Hussong et al, 2005; Mohr et al., 2005, Park & Levenson, 2005). However most

college students are underage and may have limited access to alcohol so the possibility of

additional time frames should be considered. Hussong et al. (2001) tested the Weekday-

Weekend drinking and found that for some emotional states this time frame did in fact lead to

observations of mood-drinking relationships. Additionally, another model for the

relationship of mood and drinking is one where a build-up of negative affect has to occur and

a threshold reached before dinking will be initiated to cope with that negative affect.

Hussong (2006) explored this question using survival analysis and found that for some

individuals it is important to take into account this time lag.

The study of precipitants of alcohol consumption in college students requires a high

degree of specificity of indicators, closely temporally linked assessments of cognitive

processes and emotions, and the consideration of contextual influences. The current study

includes these components and contributes to the important and growing literature on college

student drinking and more generally the construct of DTC.

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Appendix I:

Online Daily Diary

QUESTIONS FROM ONLINE DIARY USED IN DISSERTATION ANALYSES

College Students' Feelings Thoughts and Behaviors Study

---------------------------------- **Questions about Yesterday** -------------------------------
---

Did you consume alcohol yesterday? YES NO

Did you drink alcohol after you completed the survey yesterday (or after 5pm if you did not complete survey? YES NO

How much alcohol did you drink last night? (1 standard drink=12-oz can or bottle of Beer; 4-oz glass of Wine; 12-oz bottle of Wine Cooler; 1-oz (a shot) of liquor straight or in a mixed drink)

1 drink or less
2 to 3 drinks
4 drinks
5 drinks
6 to 7 drinks
8 to 9 drinks
10 to 15 drinks
16 or more drinks

To what extent did each of the following influence your decision to drink last night? (Rate on a 5 point scale, 1= not at all 5= very much)

     (not at all)   **(very much)**

To help you feel less depressed or blue?
     1—2—3—4—5

To help you feel less unhappy?
     1—2—3—4—5

To help you feel less angry or hostile?
     1—2—3—4—5

To help you feel less frustrated?
     1—2—3—4—5

To help you feel less worried or anxious?
     1—2—3—4—5

---------------------------------- **Questions about Today** ------------------------------------

RECALL WHAT YOUR DAY HAS BEEN LIKE AND USING A 6 POINT SCALE
(1=not at all, 6=extremely) RATE THE DEGREE TO WHICH YOU FELT:

(not at all)   **(extremely)**

Depressed
            1—2—3—4—5—6

Unhappy
            1—2—3—4—5—6

Angry/hostile
            1—2—3—4—5—6

Frustrated
            1—2—3—4—5—6

Worried/anxious
            1—2—3—4—5—6

Appendix II:

Paper and Pencil Measures

College Students' Feelings, Thoughts, & Behaviors Study

CONFIDENTIAL CONTACT INFORMATION

Name: _____

Local Phone: _____

Email: _____

Please remove this page from the survey packet before beginning to answer the questionnaires.

The following questions are about you. Please take your time and circle the letter next to the response below that best describes your answer to each of the questions.

1. What is your gender?

   a) Male   b) Female

2. How old are you?

   a) 17   b) 18   c) 19   d) 20   e) 21   f) 22 – 25   g) 26 and up

7. What is the highest level of education your father has completed?

   a) Less than High School

   b) High School Graduate

   c) Some College or Technical School

   d) College Graduate

   e) Graduate or Professional School

8. What is the highest level of education your mother has completed?

   a) Less than High School

   b) High School Graduate

   c) Some College or Technical School

   d) College Graduate

   e) Graduate or Professional School

9. Which of the following best describe you? Circle all that apply.

   a) White

   b) Black or African American

   c) Hispanic/Latino (a)

   d) American Indian or Alaska Native

   e) Asian

   f) Native Hawaiian or Pacific Islander

      g) Other _____

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Please circle the number beside the statement that best describes the degree to which it applies to you

	Strongly Disagree					Strongly Agree
1. I don't often think about my thoughts	0	1	2	3	4	5
2. I rarely spend time in self-reflection	0	1	2	3	4	5
3. I frequently examine my feelings	0	1	2	3	4	5
4. I don't really think about why I behave in the way that I do	0	1	2	3	4	5
5. I frequently take time to reflect on my thoughts	0	1	2	3	4	5
6. I often think about the way I feel about things	0	1	2	3	4	5
7. I am not really interested in analyzing my behavior	0	1	2	3	4	5
8. It is important for me to evaluate the things that I do	0	1	2	3	4	5
9. I am very interested in examining what I think about	0	1	2	3	4	5
10. It is important to me to try to understand what my feelings mean	0	1	2	3	4	5
11. I have a definite need to understand the way that my mind works	0	1	2	3	4	5
12. It is important to me to be able to understand how my thoughts arise	0	1	2	3	4	5
13. I am usually aware of my thoughts	0	1	2	3	4	5
14. I'm often confused about the way that I really feel about things	0	1	2	3	4	5
15. I usually have a very clear idea about why I've behaved in a certain way	0	1	2	3	4	5
16. I'm often aware that I'm having a feeling, but I often don't quite know what it is	0	1	2	3	4	5
17. My behavior often puzzles me	0	1	2	3	4	5
18. Thinking about my thoughts makes me more confused	0	1	2	3	4	5
19. Often I find it difficult to make sense of the way I feel about things	0	1	2	3	4	5
20. I usually know why I feel the way I do	0	1	2	3	4	5

Clearly mark the appropriate box according to your substance use.

1. In the past month, how often did you drink alcohol (wine, beer, wine coolers, hard liquor or mixed drinks)?

Not at all	1-2 times	2-3 times	Once a week	2-3 times a week	4-5 times a week	Every day
☐	☐	☐	☐	☐	☐	☐

2. In the past month, how much would you drink on a typical drinking occasion?
   (One drink = 12-oz can or bottle of Beer; 4-oz glass of Wine; 12-oz bottle of Wine Cooler; 1-oz (a shot) of liquor straight or in a mixed drink)

Less than 1 drink	1	2-3	4	5	6-7	8-9	10-15	16 or more
☐	☐	☐	☐	☐	☐	☐	☐	☐

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

	Never/ Almost Never	Some of the Time	Half of the Time	Most of the Time	Always/ Almost Always
1. To forget your worries	0	1	2	3	4
2. Because your friends pressure you to drink	0	1	2	3	4
3. Because it helps you to enjoy a party	0	1	2	3	4
4. Because it helps you when you feel depressed or nervous	0	1	2	3	4
5. To be sociable	0	1	2	3	4
6. To cheer up when you are in a bad mood	0	1	2	3	4
7. Because you like the feeling	0	1	2	3	4
8. So that others won't kid you about not drinking	0	1	2	3	4
9. Because it's exciting	0	1	2	3	4
10. To get high	0	1	2	3	4
11. Because it makes social gatherings more fun	0	1	2	3	4
12. To fit in with a group you like	0	1	2	3	4
13. Because it gives you a pleasant feeling	0	1	2	3	4
14. Because it improves parties and celebrations	0	1	2	3	4
15. Because you feel more self-confident and sure of yourself	0	1	2	3	4
16. To celebrate a special occasion with friends	0	1	2	3	4
17. To forget about your problems	0	1	2	3	4
18. Because it's fun	0	1	2	3	4
19. To be liked	0	1	2	3	4
20. So you won't feel left out	0	1	2	3	4

When you **drink alcohol**, how often do you drink for the following reasons? Please rate each reason by circling a number across from each statement.

	Never/ Almost Never	Some of the Time	Half of the Time	Most of the Time	Always/ Almost Always
1. To help you feel less depressed or blue	0	1	2	3	4
2. Because you like the feeling	0	1	2	3	4
3. It helps you feel less unhappy	0	1	2	3	4
4. Because it makes social gatherings more fun	0	1	2	3	4
5. To help you feel less angry or hostile	0	1	2	3	4
6. To fit in with a group you like	0	1	2	3	4
7. To help you feel less frustrated	0	1	2	3	4
8. Because it gives you a pleasant feeling	0	1	2	3	4
9. To help you feel less worried or anxious	0	1	2	3	4
10. Because it improves parties and celebrations	0	1	2	3	4
11. To help you feel less stressed or tense	0	1	2	3	4
12. So you won't feel left out	0	1	2	3	4
13. To help you feel less bored	0	1	2	3	4

Table 1

Summary of Measures, Timing, and Compensation

Phase	Phase 1: Initial Survey	Online Daily Diary Study		
		Phase 2: Orientation & Survey	Phase 3: 15 Daily Online Surveys	Phase 4: Final Survey
Measures	Alcohol & Drug Use past 30 days	Modified Drinking Motives Measure (Trait)	Alcohol & Drug Use – Past Day	Question about access to alcohol.
	Drinking Motives Questionnaire (Trait)		Modified Drinking Motives Measure - Daily	
	Insight/Self-awareness (SRIS)		Daily Mood Questionnaire	
	Demographics			
Additional Activities in Phase	Consent procedure, collecting contact information,	Consent procedure reviewing security provisions; orienting to online survey.	None	Debriefing; providing participant pool credit.
Participant Incentive	1 credit hour	1 credit hour	3 credit hours (0.2 per day)	1 credit hour

Table 2.

Correlations Among Variables of Interest

	1	2	3	4	5	6	7	8
1 Negative Affect[+]								
2 Sadness[+]	.78†							
3 Online Negative Affect Motives[+]	.12	.15						
4 Online Sadness Motives[+]	.08	.16	.86†					
5 Alcohol Use[+]	.10	.17	-.05	-.01				
6 Dispositional DTC Cooper	.20*	.11	.38*	.30	.03			
7 Dispositional DTC Sadness specific	.18*	.12	.21	.26	-.04	.71†		
8 Dispositional Self-Awareness	-.10	-.05	-.29	-.35*	-.16	-.09	-.07	
Mean	1.97	1.66	1.39	1.26	1.35	1.12	0.57	3.40
SD	0.89	0.91	0.65	0.65	2.82	0.76	0.62	0.55
N	118	118	33	33	119	124	124	124

Note. [+] Day 7 assessments of these repeated daily measures are used in this correlation matrix to indicate relations among variables. Correlations are based on different sample sizes according to the number of participants available. * $p \leq .05$. § $p \leq .01$. † $p \leq .001$.

Table 3

Hypothesis One

Predictors	$\hat{\beta}$	t	df	p
Weekend	1.29	15.38	1516	<.001
Daily Negative Affect Person Centered	-0.19	-2.02	119	<.05
Gender	0.43	2.96	119	<.01
Aggregate Negative Affect Grand Mean Centered	-0.08	-0.51	119	.61
DTC (Cooper) Grand Mean Centered	0.12	1.16	119	.25
Self-Awareness Grand Mean Centered	-0.35	-3.11	119	<.01
Gender X Daily Negative Affect	0.04	0.23	119	.82
DTC (Cooper) X Daily Negative Affect	-0.06	-0.65	119	.52
Self- Awareness X Daily Negative Affect	-0.11	-0.83	119	.41
DTC (Cooper) X Self- Awareness X Daily Negative Affect	0.04	0.25	119	.80

Note. *N* =124.

Table 4

Hypothesis Two

Predictors	$\hat{\beta}$	t	df	p
Weekend	.22	3.36	507	.001
Daily Negative Affect Mood Person Centered	-.07	-1.58	123	.12
Daily Negative Affect Motives Person Centered	.00	-.89	507	.99
Gender	.33	3.81	120	<.001
Aggregate Negative Affect Mood GMC	.15	1.37	120	.17
Aggregate Negative Affect Motives GMC	-.12	-.89	120	.37
Daily Negative Affect Mood X Daily Negative Affect Motives	.02	.47	507	.64

Note. *N* =124.

Table 5

Hypothesis Three: Daily Sadness Motives

Predictors	$\hat{\beta}$	t	df	p
Weekend	.23	3.42	507	.001
Daily Sad Mood Person Centered	-.06	-1.63	123	.11
Daily Sad Motives Person Centered	-.00	-.02	507	.99
Gender	.30	3.74	120	<.001
Aggregate Sad Mood Grand Mean Centered	.19	1.91	120	.06
Aggregate Sad Motives Grand Mean Centered	-.27	-1.78	120	.08
Daily Sad Mood X Sad Motives	.07	2.06	507	.04

Note. N = 124.

Table 6

Hypothesis Three: Dispositional Sadness Motives

Predictors	$\hat{\beta}$	t	df	p
Weekend	1.29	15.33	1516	<.001
Daily Sad Mood Person Centered	-.17	-1.69	119	.09
Gender	.43	3.08	119	<.01
Aggregate Sad Mood Grand Mean Centered	.00	.02	119	.99
Dispositional Sadness DTC Grand Mean Centered	.00	.02	119	.99
Self- Awareness Grand Mean Centered	-.37	-3.33	119	<.01
Dispositional Sadness DTC X Daily Sad Mood	-.11	-.33	119	.33
Self- Awareness X Daily Sad Mood	-.32	-2.17	119	<.05
Sadness DTC X Self- Awareness X Daily Sad Mood	-.34	-1.37	119	.18

Note. $N = 124$.

Table 7

Alcohol Consumption Across Study Days

Day	N	Mean	SD	Range	% Drinking
1	118	2.04	3.47	0 - 16	39
2	118	1.83	3.01	0 - 12.5	37
3	102	2.60	3.70	0 - 16	49
4	115	2.92	4.08	0 - 16	44
5	119	1.52	3.21	0 - 12.5	25
6	118	1.77	3.71	0 - 16	29
7	119	1.35	2.82	0 - 12.5	28
8	114	1.91	3.46	0 - 16	34
9	115	2.99	4.41	0 - 16	44
10	109	2.25	4.08	0 - 16	34
11	114	2.93	4.17	0 - 16	44
12	117	1.90	3.58	0 - 16	31
13	117	1.46	3.24	0 - 16	25
14	120	1.13	2.82	0 - 12.5	19

Note: The maximum possible number of participants each day is N=124. % Drinking= the percent of participants with valid data who reported drinking on each survey day.
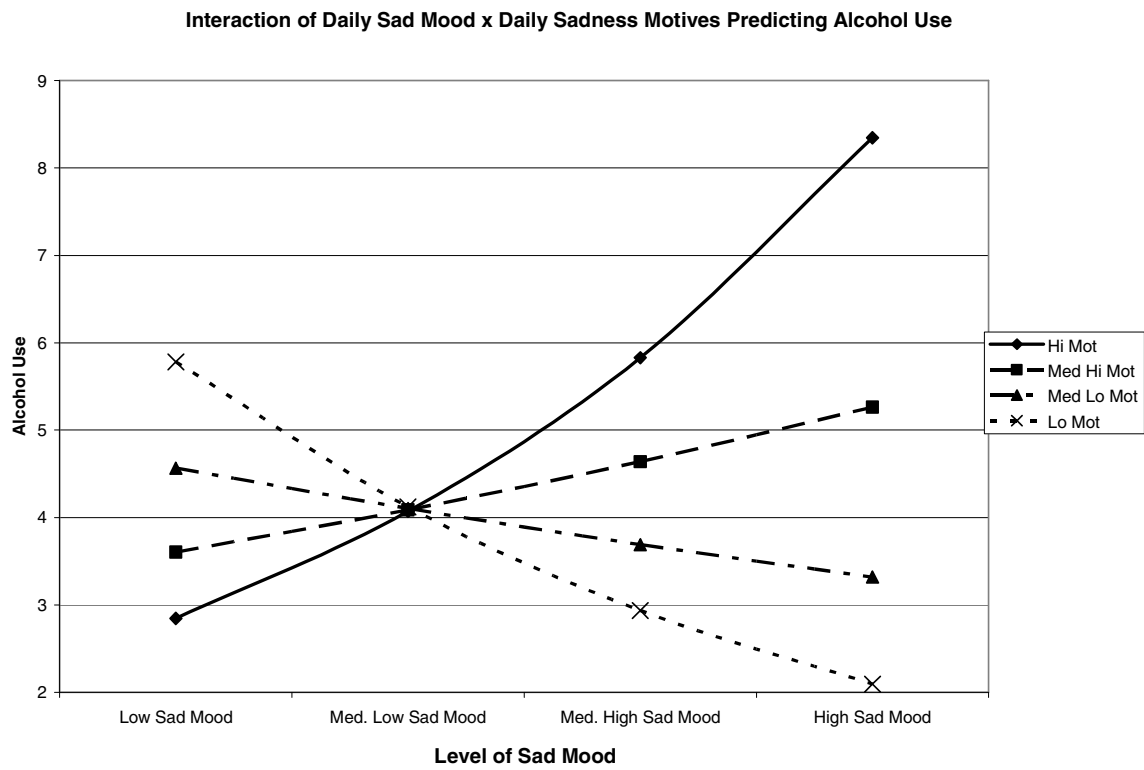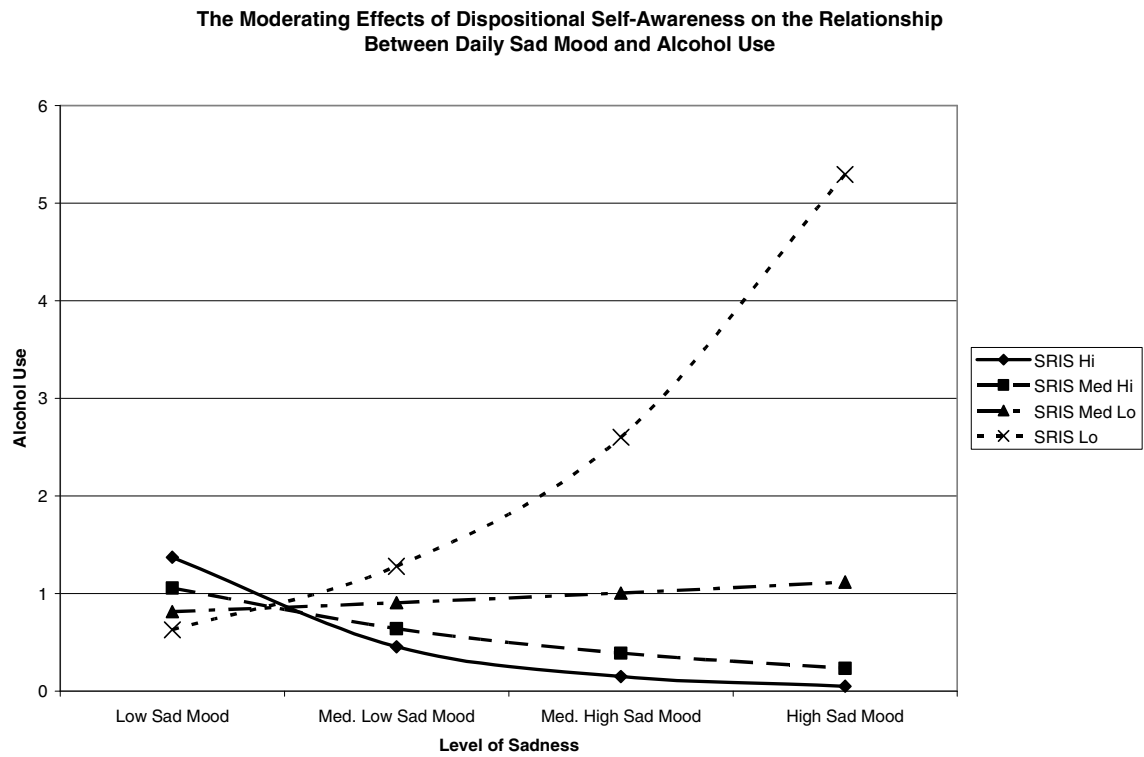
Figure 1

Interaction of Daily Sad Mood x Daily Sadness Motives Predicting Alcohol Use

Figure 2

The Moderating Effects of Dispositional Self-Awareness on the Relationship
Between Daily Sad Mood and Alcohol Use

Figure 3

Number of Drinks Each Study Day Across All Participants