Deliberate Self-Harm and Alcohol Involvement in College-Aged Females: A Controlled Comparison in a Non-Clinical Sample

Richard L. Ogle

Caroline M Clements

University of North Carolina Wilmington

Abstract

Individuals who engage in deliberate self-harm (DSH) report using other problematic coping mechanisms. One potential problematic coping mechanism is alcohol consumption. Research on alcohol involvement and deliberate self-harm is conflicting. This study compared individuals who have engaged in deliberate self-harm to controls on a range of alcohol measures. Five hundred females completed questionnaires assessing deliberate self-harm and alcohol involvement. Controlling for differences in psychopathology and impulsivity, the DSH group did not differ from the controls relative to quantity and frequency of alcohol use, but did differ relative to negative consequences, risky behaviors, and alcohol expectancies. We discuss mechanisms that account for increased negative consequences and expectancies of alcohol consumption in the absence of differences in quantity and frequency, as well as the clinical importance of assessing a broad spectrum of alcohol involvement in the DSH population.

KEY WORDS: Deliberate Self-Harm, Alcohol, Negative Consequences, College Student

Deliberate self-harm (DSH), the deliberate and direct self-inflicted harm to body tissues without suicidal intent, is a considerable clinical concern (Favazza, 1998; Gratz, 2003). DSH includes acts ranging from skin picking to cutting or burning oneself (Favazza, 1998). Studies suggest that the prevalence of DSH is approximately 4% in the general adult population and 21% in adult clinical populations (Briere & Gil, 1998). In adolescents, prevalence is approximately three times greater than the above estimates for the respective adult populations (Ross and Heath, 2003; Lloyd-Richardson, Perrine, Dierker, & Kelly, 2007). Negative outcomes associated with this behavior include disrupted interpersonal and therapeutic relationships, increased guilt and shame, and negative physical consequences (e.g. scarring; Gratz, 2003).

A growing body of research has begun to shed light on risk factors for and clinical correlates of this behavior. Risk factors include emotional reactivity and inexpressiveness, childhood abuse (sexual and physical) and neglect, insecure attachment relationships, and childhood separation/loss (Gratz, 2006; Gratz, 2003; Gratz, Dukes-Conrad, & Roemer, 2002). The range of clinical correlates associated with DSH includes increased depression, anxiety, hostility, somatic symptoms, hopelessness, and loneliness (Croyle & Waltz, 2007; Darche, 1990; Guertin, Lloyd-Richardson, Spirito, Donaldson, & Boegers 2001).

Regarding the function of DSH, Suyemoto (1998) presented a model of DSH that included six different functions: environmental, anti-suicide, sexual, dissociation, boundaries, and affect regulation. Although it appears that there are a number of functions of DSH, more recent conceptualizations suggest that the most common function of DSH is affect regulation (Chapman, Gratz, & Brown, 2007; Jacobson & Gould, 2007; Klonsky, 2007). Klonsky (2007) found support for many of the functions found by Suyemoto (1998) but argued that the function of affect regulation had the most empirical support. Chapman, Gratz, and Brown (2006) presented an experiential avoidance model of DSH, arguing that the primary function of DSH was relief of negative affect (i.e. negative reinforcement). That DSH appears to have primarily an affect

regulation function has led many investigators to consider this behavior a form of maladaptive coping (Gratz, 2006; Klonsky, 2007).

Conceptualizing DSH as a form of maladaptive coping has led some researchers to investigate other forms of maladaptive coping in those who engage in DSH. Herpertz, Sass, and Favazza (1997) found that those who engaged in DSH used fewer future-oriented coping strategies. Dear, Slattery, and Hillian (2001) showed that, among prisoners, those who engaged in DSH used fewer appropriate coping strategies than those who did not engage in DSH and were also less likely to use problem-focused strategies in response to stress. Recently, Andover, Pepper, and Brandon (2007) found that their college student DSH group reported utilizing avoidance strategies more often than distress-matched controls. They also found that females reporting DSH reported using fewer problem-solving and support seeking strategies than controls. This research suggests that DSH may be associated with a larger pattern of maladaptive coping.

Another form of coping with negative affect associated with the potential for problems is alcohol consumption. Using alcohol to cope with negative affect is a common motivation for consumption in that 10% to 25% of the adult population reports drinking to reduce negative emotion (Cahalan, Cisin, & Crossley, 1969; Mulford, 1983). Although common, this function of drinking is also associated with problem levels of consumption, including frequent drinking above recommended levels, binge drinking, and negative alcohol-related consequences (Ham & Hope, 2002). Wood, Nagoshi, and Dennis (1992) found that drinking to reduce negative affect predicted greater drinking frequency and problems, especially in women. Cooper, Russell, Skinner, Frone, and Mudar (1992) found that men who relied on avoidant forms of emotion-focused coping were more likely to use alcohol to reduce negative affect. These studies suggest that alcohol use, for some people, serves a similar function as does DSH and is associated with similar forms of problematic coping.

Little research has been conducted on alcohol involvement in those who engage in DSH. Early research found increased rates of alcohol use in those who engaged in DSH (Rosenthal,

Rinzler, Walsh, & Klausner, 1972; Walsh & Rosen, 1988). A problem with this early research is that, although frequency of use was reported to be higher, more telling aspects of alcohol involvement were not assessed. More recently, Guertin, Lloyd-Richardson, Spirito, Donaldson, and Boegers (2001) did not find differences in alcohol and drug involvement between hospitalized adolescents with and without a history of DSH. Nock and Prinstein (2005), in a sample of inpatient adolescents, found that most incidents of DSH occurred in the absence of alcohol or drug use. This finding did not address alcohol involvement, only the degree to which the two behaviors co-occurred, and according to this study, the behaviors do not typically occur in conjunction with each other. It is unknown whether this finding or the findings of Guertin et al. hold for college-aged individuals who both are more likely to drink and have easier access to alcohol (Ham & Hope, 2002). Overall, differences in populations studied as well as the assessment of alcohol involvement have resulted in mixed findings in this area.

Clarifying the nature of the relationship between alcohol misuse and DSH has been called for in the literature (Favazza, 1998). Whether alcohol misuse plays a contributing or a potentiating role in DSH is empirically unexplored. Moreover, whether alcohol misuse should be an important clinical focus in DSH treatment is unknown. Further understanding of the relationship between alcohol misuse and DSH is especially important given that both behaviors are related to completed suicide (Favazza & Conterio, 1989; Haw, Hawton, Casey, Bale, & Shepherd, 2005). These relationships are particularly strong in college-aged cohorts where suicide is currently the second leading cause of death (USDHHS, 2005) and alcohol use and misuse is normative (Ham & Hope, 2002).

The purpose of the present study was to examine the degree to which those who engage in moderately severe forms of DSH, such as cutting and burning (Favazza, 1998), differ from controls on measures of alcohol involvement. This was assessed in a non-clinical population where drinking is more normative than in populations of either early adolescents or adults beyond college age. Recently, researchers have begun to examine correlates of DSH in non-clinical

college-aged samples (Andover, Pepper, & Gibb, 2007; Croyle & Waltz, 2007; Gratz, 2006; Gratz, Dukes-Conrad, & Roemer, 2002; Polk & Liss, 2007); however, these studies have not addressed alcohol involvement. In addition, to our knowledge, there are no studies examining this relationship using standardized and valid measures of the broad range of involvement. Toward this end, we examined group differences between female college students who did and did not report DSH on a broad array of alcohol involvement measures. These measures included quantity and frequency of use, lifetime and recent negative consequences, risky behaviors while under the influence, and alcohol expectancies (that is, a drinker's experience-based beliefs about the effects alcohol has on himself or herself). Using an array of alcohol assessments allows for a more sensitive examination of the possible differences.

Following the rationale that those who engage in DSH show greater levels of avoidant coping, we hypothesized that those individuals who engaged in DSH would show patterns similar to those found in individuals who drink to reduce negative affect; that is, individuals who engaged in DSH would report greater levels of alcohol involvement in terms of quantity, frequency, risk behaviors, and negative consequences of drinking. We also hypothesized that those who engaged in DSH would report greater alcohol expectancies in the domain of tension reduction. Endorsement of greater expectancies related to tension reduction is consistent with the affect regulation function of DSH (i.e. DSH is often committed in order to reduce tension). Lastly, we hypothesized that those who engaged in DSH would report greater expectancies related to cognitive/perceptual impairment, as this domain is reflective of an individual's perception that alcohol causes cognitive and perceptual impairment in him or her. Given that perceived cognitive impairment may be reflective of dissociation under the influence of alcohol, greater expectancies related to cognitive impairment would be consistent with the known relationship between DSH and dissociation (e.g. Gratz, Dukes-Conrad, & Roemer, 2002; Klonsky, 2007).

Methods

Participants

Participants consisted of 500 female university students ranging in age from 18 to 25, with a mean age of 18.83. Forty-four (8.8%) met criteria for inclusion in the DSH group. Eighty-eight percent of the sample was Caucasian. Five percent was African American, two percent were Hispanic, two percent were Asian, and two percent were Native American. The remaining participants endorsed "other." Ninety-four percent reported being single, four percent were either married or cohabitating, and approximately one percent reported being divorced. Groups did not significantly differ on any demographic variable. Students received course credit for participation.

Materials

Participants completed a large battery of questionnaires assessing a number of characteristics related to personality, health-related behavior, and alcohol involvement. This battery was part of a larger study on alcohol-related consequences that took approximately 60 minutes to complete and included the following measures.

Demographics Questionnaire. This questionnaire assessed general demographics including age, race, employment, and relationship status.

DSH Assessment. DSH was assessed by using specific language from the *Deliberate Self-Harm Inventory* (Gratz, 2001). The specific question of interest was: "Have you ever intentionally (i.e., on purpose) cut, carved on, or burned your wrists, arms, or other areas of your body without intending to kill yourself?" Participants who responded to this question with "yes" comprised the DSH group); those who responded with "no" comprised the control group. This question assessed whether DSH had ever occurred in the participant's lifetime and was imbedded in a questionnaire assessing a variety of different health and coping behaviors.

Quantity and Frequency Index (QFI; Cahalan & Cisin, 1968). This measure assessed quantity and frequency of alcohol use occurring during the 90 days prior to assessment. This measure allows for the calculation of common, valid, and reliable drinking variables, including number of

drinking days, average drinks per drinking day, and peak number of drinks consumed on a drinking day during the assessment window (Cahalan, Cisin, & Crossley, 1969). These variables are common measures of drinking in both studies of college student populations and alcohol treatment outcome studies.

Drinkers Inventory of Consequences Lifetime Version (DRINC-2L; Miller, Tonigan, & Longabaugh, 1995). This widely-used self-report measure consists of 50 items that assess negative consequences of drinking across an individual's lifetime. It has five subscales: physical, interpersonal, intrapersonal, social responsibility, and impulse control. A sum total score is used as well. Reliability of the measure is good, ranging from .72 to .87 for the five subscales and total score.

Drinkers Inventory of Consequences Recent Version (DRINC-2R; Miller, Tonigan, & Longabaugh, 1995). This measure is a widely used 50-item self-report measure that assesses negative consequences of drinking that occurred in the past 90 days. It scores into five subscales: physical, interpersonal, intrapersonal, social responsibility, and impulse control, and a sum total score. Reliability of the measure is good, ranging from .72 to.87 for the five subscales and total score.

Alcohol Expectancy Questionnaire (AEQ; George, Frone, Cooper, Russell, Skinner, & Windle, 1995). The AEQ is a 40-item self-report measure assessing individuals' beliefs about the person-specific effects alcohol has on them. Individuals are asked to endorse as true or false items reflecting the effects alcohol has on them. Example items include, "Alcohol makes me worry less" and "Alcohol makes it hard for me to concentrate." It scores into eight scales: global positive, social and physical pleasure, social expressiveness, power and aggression, sexual enhancement, cognitive and physical impairment, careless unconcern, and tension reduction. Scale reliabilities are good, ranging from .83 to .92. A large body of literature shows that alcohol expectancies predict a variety of outcomes related to alcohol consumption, the function of alcohol use for an individual, and alcohol-related problems (Ham & Hope, 2002).

Symptom Checklist 90-Revised (SCL-90R: Derogatis, 1994). The SCL-90-R is a 90-item self-report inventory developed to screen for psychological symptoms on 10 subscales, including a global symptom index (GSI). The subscales of the SCL-90-R have demonstrated good reliability (α =.75-.90). For the purposes of this study, we decided a priori to use the GSI as a covariate if there were group differences, in order to control for overall psychopathological symptoms.

UPPS Impulsivity Inventory (UPPS; Whiteside & Lynam 2001). This 46-item self-report inventory assesses four distinct pathways to impulsive behavior: sensation-seeking, urgency, lack of premeditation, and lack of perseverance. Sensation-seeking refers to the tendency to enjoy and pursue exciting activities and openness to new experiences. Urgency refers to the tendency to engage in impulsive behavior under conditions of negative affect. Premeditation (lack of) refers to difficulty in thinking or reflecting upon the consequences of an action before engaging in that action. Perseverance (lack of) refers to inability to remain focused on a task that may be boring or difficult. Reliabilities for these scales are good, ranging from .83 to .89. For the purposes of this study, we decided a priori that subscales showing group differences were to be used as covariates to control for differences in impulsivity.

Marlowe-Crowne Social Desirability Questionnaire (MC: Crowne & Marlowe, 1960). The Marlowe-Crowne is a 33-item true-false measure designed to assess the tendency to skew one's responses to appear in a socially desirable light. Reliability for this scale is good (α =.88).

Procedure

Data collection occurred in groups ranging in size from 5 to 30, following procedures approved by the Institutional Review Board of the University of North Carolina Wilmington. After a research assistant obtained informed consent, participants completed the questionnaire packet. Questionnaire packets were randomized into three different orders. When finished, participants returned the packet to the research assistant and their participation was logged.

Results

Given that this study utilized self-report questionnaires to assess all variables, we compared the DSH and non-DSH groups on social desirability using a one-way ANOVA, where group was the fixed factor and the total score on the MC was the dependent variable. This analysis yielded a non-significant result, $F(1,496) = 2.32$, $p > .05$.

Psychopathology and Impulsivity

To compare the DSH and non-DSH groups on level of psychopathological symptoms for purposes of controlling for possible differences in psychopathology, as well as for use as a test to demonstrate that the DSH group was indeed a non-clinical sample, a multivariate analysis of variance (MANOVA) was conducted on the 10 SCL-90 subscales. A significant multivariate effect was found, (Wilks' Lambda $F(10, 485) = 4.75$ $p < .001$). All univariate tests were significant using a Bonferoni correction of .005, with the exception of phobic anxiety. Those who engaged in DSH reported a greater degree of psychopathological symptoms; however, the means for all subscales for both groups fell well within the normal range for female non-patients (Derogatis, 1994); therefore, the DSH group was considered to be a non-clinical sample in regard to psychopathology.

To compare groups on impulsivity, a MANOVA was calculated on the four subscales of the UPPS. There was a significant multivariate effect [Wilk's Lambda $F(4, 474) = 4.47$, $p = .001$]. Univariate tests showed that only urgency was significant [$F(1, 477) = 14.66$, $p < .001$]. Those engaging in DSH ($M = 29.18$) were higher in urgency than the controls ($M = 26.08$). Because of the differences found for psychopathology and urgency, the general symptom index (GSI) and the urgency score were used as covariates in subsequent analyses.

Alcohol Involvement

Quantity and frequency. To compare groups on quantity and frequency, a MANCOVA was calculated where the dependent variables were number of days of any alcohol use during the prior 90 days, the average number of standard drinks consumed per drinking day, and the average peak number of drinks consumed per drinking day. The GSI and urgency were covariates. This

test was not significant, indicating no differences in quantity and frequency of alcohol use. Table 1 shows means, standard errors, significance tests, and effects sizes for quantity and frequency variables.

Alcohol-related risky behavior. We assessed the degree to which groups engaged in two forms of risky behavior while intoxicated: unwanted sexual experiences and driving after consuming alcohol. Having an unwanted sexual experience while intoxicated was assessed by asking participants to answer "yes" or "no" to the question, "Have you ever experienced an unwanted sexual experience while intoxicated?" A chi-square analysis indicated a significantly greater proportion of the DSH group reported this type of experience compared to controls (56% vs. 28%; X^2 (1) = 14.96, $p < .001$). We also assessed the reported number of times in the preceding month that individuals drove a car after consuming any amount of alcohol as well as the number of times individuals drove a car after having 4 or more standard drinks. The MANCOVA for this test was significant [Wilk's Lambda $F(2, 475) = 4.09$, $p < .017$]. Univariate tests showed that the DSH group reported driving a greater number of times after having 4 or more drinks than controls [$F(1, 476) = 7.09$, $p = .008$]. Table 1 shows means, standard errors, significance tests, and effects sizes for risky behavior variables.

Alcohol-related consequences. To test for group differences in negative consequences due to drinking, two MANCOVAs were calculated. The first was with the six subscales of the lifetime version of the DRINC and the second was with the recent version. The GSI and urgency were covariates. Both tests were significant, [Wilk's Lambda $F(5, 489) = 2.66$, $p = .022$] for lifetime consequences and [Wilk's Lambda $F(5, 489) = 2.88$, $p = .015$] for recent consequences. For lifetime consequences, univariate tests indicated significant differences using a Bonferoni correction of $p < .008$ on all subscales with the exception of intrapersonal consequences. For recent consequences, significant differences were found for all subscales. For all significant tests, those who engaged in DSH reported greater alcohol-related consequences. Table 1 shows means, standard errors, significance tests, and effects sizes for all subscales.

Alcohol expectancies. To test for group differences on alcohol expectancies, a MANCOVA was calculated where the dependent variables were the subscales of the AEQ, with the GSI and urgency as covariates. There was a significant multivariate effect [Wilk's Lambda $F(8, 480) = 3.10$, $p = .002$]. Univariate tests using a Bonferoni correction of $p < .006$ indicated a significant difference for the cognitive and motor impairment subscale, where those who engaged in DSH reported greater expectancies in this domain. Contrary to our hypothesis, the tension reduction subscale was not significant based on the correction ($p = .02$). Table 1 shows means, standard errors, significance tests, and effects sizes for all AEQ subscales.

Discussion

In sum, although quantity and frequency of reported alcohol use did not differ between groups, those who engaged in DSH did differ on other aspects of alcohol involvement. These differences occurred even after controlling for psychopathology and impulsivity. Relative to controls, those who had engaged in DSH reported a greater number of risky behaviors while intoxicated as well as greater alcohol-related lifetime and recent negative consequences. Further, individuals in the DSH group reported that when they drink, they experience a greater degree of cognitive and motor impairment while drinking. Although the effects sizes for these findings are small, the results of this study provide an important and novel contribution to the DSH literature.

The findings of this study are important for a number of reasons. First, the prevalence of DSH in the current study is similar to studies of similar forms of DSH (i.e., cutting and burning) in college populations. Andover et al. (2007) found exactly the same rate in a college student sample. This suggests that rates of the more moderate to severe forms of DSH are stable in this population and are in-between rates for adult community samples and adult clinical samples. It is important to note, that most college studies include a broader range of DSH (e.g., scratching, scab picking) and show higher rates (Gratz, 2006; Gratz, Dukes-Conrad, & Roemer, 2002).

Second, we found in this non-clinical sample, after controlling for impulsivity and psychopathology, those who reported a history of DSH reported a greater degree of risk behavior

and consequences related to alcohol use. These differences existed for both lifetime and recent negative consequences (in multiple domains) and also for risky behaviors that carry a significant potential for negative consequences (i.e., driving after 4 drinks and unwanted sexual experiences). Importantly, groups did not differ on any of the indices of quantity and frequency. Given this, the differences in consequences do not appear to be due to the actual amounts of alcohol consumed, the amount of time spent under the influence of alcohol, or differences in psychopathology or impulsivity. Therefore, another variable or other variables likely mediate this effect.

One known correlate of DSH, dissociation (Favazza, 1998; Gratz, Dukes-Conrad, & Roemer, 2002; Zlotnick, Shea, Pearlstein, Simpson, Costello, & Begin, 1996), has been found to be related to harmful alcohol use in the general population (Maaranen, Tanskanen, Honkalampi, Haatainen, Hintikka, & Viinamaki, 2005; Seedat, Stein, & Forde, 2003). The disinhibiting effects of alcohol in an individual who is prone to dissociate may render that individual at greater risk for negative consequences while under the influence of similar amounts of alcohol because of the combined effects of alcohol and dissociation. The group differences found in expectancies of cognitive and motor impairment is consistent with this possibility, in that this measure is reflective of the perceived cognitive effects that alcohol has on individuals who endorse these expectancies.

It should be noted that alcohol expectancies, as measured in this study, assessed an individual's beliefs about the effects that alcohol has on that individual while drinking. Expectancies, as measured, are not a measure of the actual acute effects of alcohol intoxication; however, it is assumed that these beliefs are accurate reports of the effects that alcohol does have on the reporting drinker when under the influence of alcohol (George, et al. 1995); therefore, endorsement of greater expectancies related to cognitive impairment may be reflective of dissociation under the influence of alcohol.

Another possible mediating variable of this relationship is borderline personality features. Given that substance use and DSH are contained in the criteria for Borderline Personality

Disorder (BPD), it may be that the findings of this study reflect the fact that the DSH group is higher in BPD features; therefore, there is nothing unique about the relationship between DSH and increased alcohol consequences. Although this is a possibility, it is unlikely that the findings of this study are reflective of increased BPD features. First, studies indicate that college students who score high on BPD features show greater quantity and frequency of alcohol use (Crawford, Moore, & Ahl, 2004; Stepp, Trull, & Sher, 2005). We did not find greater quantity or frequency in the present study. To our knowledge, no studies assess the relationship between BPD features and alcohol expectancies; therefore, it is unknown if increased perceived effects of cognitive and physical impairment are related to BPD features. Second, from this perspective, DSH and alcohol consequences are both part of the impulsive behavior found in those high in BPD features. If this is true, then the DSH group should show a pattern of impulsivity relative to controls that is similar to patterns of impulsivity relative to those high in BPD features compared to controls. Whiteside et al. (2005), in validating the UPPS scale, found that individuals high in BPD features differed from controls on all four scales. In the present study, the DSH group differed only on urgency, and the mean score for the DSH group is considered within the normal range on this measure. These two points, along with the fact that the DSH group was within the normal range on all subscales of the SCL-90, suggest that the DSH group in this study is not a proxy for those who are high in BPD features.

Implications for Research

The results of this study suggest a number of implications for future research. First, future studies should examine the role of possible mediators of these relationships. Specifically, the role of dissociation in the relationship between DSH and elevated alcohol consequences, as well as the role of BPD features, should be examined.

Second, the literature suggests that alcohol use and DSH are risk factors for completed suicide (Favazza & Conterio, 1989; Haw, Hawton, Casey, Bale, & Shepherd, 2005). Our findings suggest that those who engage in DSH are at increased risk of impulsive behavior while drinking.

If these behaviors co-occur, there may be an increased likelihood that an individual may inflict a level of DSH that has greater than intended consequences including completed suicide. Although Nock and Prinstein (2005) reported that these two behaviors typically do not co-occur, some subjects in that sample did report co-occurrence. In addition, their sample was an adolescent population. It is unknown if their finding in relation to co-occurrence would hold for college students, given that, as mentioned, college students have greater access to alcohol , are more likely to drink, and drink in larger quantities (Ham & Hope, 2002). Future studies should address the degree of co-occurrence of DSH and alcohol use in college-aged individuals, and to the degree that co-occurrence exists, future studies should assess the degree to which individuals who engage in DSH while drinking have inflicted greater levels of intended injury.

Third, although males and females of college age show comparable rates of DSH, differences in risk factors have been found (Gratz & Chapman, 2007; Gratz, Dukes-Conrad, & Roemer, 2002). Gratz, Dukes-Conrad and Roemer (2002) found that paternal separation was a risk factor for DSH in men but not for women. Gratz and Chapman (2007) found that for male undergraduates, affective intensity served to some degree as a protective factor against DSH and that emotional inexpressivity was not related to DSH. In females, both of these variables have been shown to be risk factors for DSH (Gratz, 2006). Given these differences in correlates of DSH, and the findings that college-aged males consume alcohol with more frequency, greater quantity, and experience more negative consequences (Ham & Hope, 2002), it is likely that males who engage in DSH may show a different pattern of relationships; therefore, future studies should address this issue.

Implications for Prevention and Intervention

These findings have important implications for prevention and intervention. Given that these data suggest that alcohol may lead to increased risk for impulsive behavior in those who have engaged in DSH, and to the extent that there are times when alcohol use and DSH co-occur, an individual may be at risk for engaging in a level of DSH that would lead to serious injury or

death even though there was no suicidal intent. Psychoeducational efforts in the context of both DSH and alcohol prevention should include the message that alcohol may have greater disinhibitory effects in those with a history of DSH, and therefore DSH and alcohol use are a potentially dangerous, and perhaps deadly, combination.

In regard to intervention, when assessing alcohol use in those who have a history of DSH, one must go beyond a simple assessment of quantity and frequency of use and assess the degree and impact of negative consequences, risky behavior while intoxicated, and the nature of alcohol expectancies. Assessment of these variables will provide not only a more accurate assessment of alcohol involvement but may also indicate important targets for therapeutic intervention. Specifically, individuals in treatment for DSH may benefit from interventions designed to increase awareness of risk for alcohol use consequences (even though use may not be excessive), as well as interventions designed to address the contexts in which use occurs so as to reduce risk of alcohol consequences. Interventions designed to work through the psychological impact of negative alcohol consequences (e.g. violence, interpersonal problems, physical injury, etc.) and risk behaviors (e.g. unwanted sexual interactions) may also be beneficial. The knowledge as to whether an individual with a history of DSH would benefit from such interventions depends on the degree to which clinicians assess these more detailed forms of alcohol involvement.

Limitations

This study is not without limitations. A substantial limitation is that our measure of DSH was an adapted measure of a standardized instrument that assessed only lifetime presence of DSH. It did not allow us to capture the full range of DSH (only cutting and burning), nor did it allow for the assessment of recency or frequency; however, our method of assessment is consistent with a number of past studies assessing DSH (Gratz, 2001). That our DSH group may have varied in recency and frequency may account to some degree for the small effect sizes in that the effects may be driven by more recent and or more frequent DSH. Studying groups of recent versus remote engagers and taking frequency into account may lead to different effect

sizes. Regardless of this possibility, the findings of this study surely suggest that a history of DSH is related to alcohol consequences and risky behavior, but at this point the data cannot be interpreted in relation to other forms or the frequency of DSH. Gratz and Chapman (2007) found a relationship between frequency of DSH and emotion dysregulation in a sample of male undergraduates, and Gratz (2006) reported relationships between DSH frequency and emotional inexpressivity as well as a combination of other risk factors; therefore, it stands to reason that alcohol involvement may covary with frequency as well. However, these two studies assessed developmental experiences and characterological risk factors that predict DSH, whereas the present study examined reports of alcohol related behaviors and outcomes; therefore, it is to some degree difficult to predict how frequency of DSH may be related to these factors. Because of this, these data should be considered preliminary and represent an important first step to increase the knowledge base in this area. Future studies should assess the relationship between DSH type and frequency and alcohol involvement by using recent empirically validated assessments of DSH that assess different forms as well as frequency estimates of DSH. Regarding the recency of DSH, studies should address the question of whether this pattern of alcohol involvement manifests only in those who are currently engaging in DSH or if this pattern of involvement remains even after DSH has resolved.

Another limitation is because of the differences in risks for DSH and alcohol involvement in males discussed above, these results cannot be generalized to males. It is also likely that these findings may not apply to younger adolescents or to clinical samples (Polk & Liss, 2007).

Lastly, the assessments in this study were self-report instruments, which by definition depend on each participant's ability and willingness to accurately report problematic and socially undesirable behaviors. Because groups did not differ on social desirability measures, there is no reason to assume differential reporting. In addition, the vast majority of studies in this area use self-report measures.

With these limitations in mind, the findings of this study indicate that females who have a history of DSH manifest a pattern of alcohol involvement that is significantly more risky and consequential to their well-being (while controlling for psychopathology and impulsivity) without drinking more in quantity or frequency, and this pattern may further complicate the consequences of an already dangerous behavior.

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Table 1

Means, Standard Errors and Significance Tests for Alcohol Involvement Variables

Variable	Control Mean (S.E.)	DSH Mean (S.E.)	F-test
Partial η^2			
Drinking Days	14.60 (.75)	18.73 (2.44)	2.59
.005			
Drinks per Drinking Day	3.65 (.12)	4.02 (.40)	.77
.002			
Most Number of Drinks	7.35 (.23)	7.87 (.76)	.42
.001			
Risky Behavior			
Driving After Alcohol	3.63 (.66)	7.60 (2.18)	.52
.006			
Driving After 4 Drinks	1.51 (.37)	4.95 (1.23)	7.09**
.015			
Lifetime Consequences			
Physical	2.17 (.07)	2.81 (.24)	6.61**
.013			
Interpersonal	1.45 (.07)	2.15 (.23)	8.97**
.018			
Intrapersonal	1.71 (.08)	2.15 (.26)	2.56
.005			
Social Responsibility	1.25 (.07)	1.92 (.24)	7.08*
.020			

Impulse Control	2.14 (.09)	3.13 (.30)	9.91**
.014			
Total	8.71 (.30)	12.15 (.99)	10.91**
.022			
Recent Consequences			
Physical	2.57 (.11)	3.51 (.37)	5.97*
.020			
Interpersonal	1.56 (.17)	2.35 (.37)	3.82*
.014			
Intrapersonal	1.73 (.11)	2.82 (.36)	8.27**
.022			
Social Responsibility	1.48 (.10)	2.33 (.31)	6.84**
.020			
Impulse Control	2.63 (.14)	3.80 (.46)	5.83*
.022			
Total	9.99 (.48)	14.81 (1.55)	8.72**
.027			

Variable	Control Mean (S.E.)	DSH Mean (S.E.)	F-test
Partial η^2			
Alcohol Expectancies			
Global Positive	1.19 (.06)	1.36 (.20)	3.36
.001			
Social/Physical Pleasure	3.49 (.07)	3.99 (.24)	3.80*
.008			
Social Expressiveness	3.45 (.08)	3.59 (.26)	.26
.001			
Sexual Enhancement	1.97 (.08)	2.47 (.27)	2.56
.005			
Power and Aggression	2.40 (.08)	2.83 (.26)	2.48
.005			
Tension Reduction	2.91 (.07)	3.45 (.24)	4.44*
.009			
Cognitive/Physical Imp.	3.16 (.08)	4.05 (.28)	9.11**
.018			
Careless Unconcern	2.34 (.06)	2.25 (.21)	.15
.000			

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