A PROSPECTIVE ANALYSIS OF SEXUAL ASSAULT AND ALCOHOL USE AMONG COLLEGE WOMEN

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This work is dedicated in loving memory to my grandmother, Lillian Leif.

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CHAPTER ONE

INTRODUCTION

Sexual assault is a leading form of violence against college women, with approximately 13% to 78% of women having experienced unwanted sexual contact (Canterbury, Grossman, & Lloyd, 1993; Miller & Marshall, 1987; Muehlenhard & Linton, 1987) and 15% to 30% experiencing nonconsensual sexual intercourse at some point during their college years (Finley & Corty, 1993; Koss, Gidycz, & Wisniewski, 1987; Miller & Marshall, 1987; Muehlenhard & Linton, 1987). In addition, national statistics indicate that women between the ages of 16 to 19 have the highest rate of victimization, followed by women between the ages of 20 to 24 (BJS, 1998). These findings point to the significant risk of sexual assault among college females. In fact, due to its prevalence and well-documented consequences, decreasing sexual violence on college campuses has been identified by the United States Public Health Services as the top National Health Objective for universities for the year 2000 (Guyton et al., 1989).

In the aftermath of sexual assault, women often experience a myriad of adverse emotional and cognitive disturbances (Weaver & Clum, 1995), including anxiety and fear (Calhoun, Atkeson, & Resick, 1982; Kilpatrick, Veronen, & Resick, 1979), depression (Winfield, George, Swartz, & Blazer, 1990), somatic symptomatology (Golding, Cooper, & George, 1997; Kimerling & Calhoun, 1994) and suicidal ideation (Kilpatrick et al., 1985; Resick, Jordan, Girelli, Hutter, & Marhoefer-Dvorak, 1989). In a meta-analytic review, Weaver and Clum (1995) concluded that experiencing sexual assault was significantly related to greater levels of psychological distress.

An association between experiencing a sexual assault and increased alcohol consumption has also been documented. Many investigators, using cross-sectional

designs, have reported elevated levels of problem drinking among sexually assaulted women. Such findings are reported in psychiatric outpatients (Swett, Cohen, Surrey, Compaine, & Chavez, 1991), community samples (Messman-Moore & Long, 2002), and college women (Canterbury et al., 1993; Corbin, Bernat, McNair, & Calhoun, 1996; Koss & Dinero, 1989; Messman-Moore, 1998). To explain these findings, some researchers have posited that increased alcohol consumption may serve as a risk factor for the occurrence of an assault (Greene & Navarro, 1998; Testa & Livingston, 2000).

Researchers have also hypothesized that increased alcohol use follows a sexual assault, with survivors using alcohol and other substances to avoid or attenuate psychological distress resulting from their victimization (e.g., Briere, 1992; Briere & Runtz, 1993; Polusny & Follette, 1995; Root, 1989). Such contentions coincide with the self-medication theory of substance use (Khantzian, 1985) and with behavioral and social-learning theories of alcohol use, which postulate that drinking behavior may function, in part, as a coping strategy aimed toward reducing unpleasant mood states (Bandura, 1969; Cappell & Greeley, 1987; Conger, 1956; Cox & Klinger, 1988). Evidence has, in fact, suggested that alcohol use may increase following a sexual assault. Results from a 2-year prospective study indicated that sexually and physically assaulted women were approximately 2.8 times more likely to develop alcohol abuse than their nonassaulted counterparts (Kilpatrick, Acierno, Resnick, Saunders, & Best, 1997). The results of this investigation also indicated that excessive alcohol use was not predictive of victimization over the two-year follow-up. These findings suggest that victimization increases the risk of developing maladaptive patterns of alcohol consumption. Similarly, in an epidemiologic catchment study, Burnam et al. (1988) found that women who experienced sexual assault were more likely to develop alcohol abuse or dependence

during the five years following their victimization relative to nonvictims.

Although the relationship between a sexual assault history and alcohol use has been well documented, the overwhelming reliance on cross-sectional and retrospective designs has limited our ability to draw inferences regarding the directionality of the relationship. To date, only one prospective investigation of the relationship between alcohol use among sexually assaulted college women has been published (Greene & Navarro, 1998). Importantly, this investigation examined the possibility that alcohol consumption serves as a risk factor for experiencing a sexual assault; the possibility that alcohol use increases following a sexual assault was not explored. Other prospective designs, using community women, have suggested that the experience of an assault is linked to elevated levels of alcohol use (Kilpatrick et al., 1997). However, the degree to which findings from community samples generalize to college women is not known. There is evidence to suggest that drinking behavior among college women may be markedly different than women in other life stages (Lex, 1994) and that women in college drink the heaviest (Gomberg, 1994). Taken with evidence that college women are at particularly high risk for experiencing a sexual assault, the generalizability of the findings from community women to college populations may be erroneous. Finally, although the self-medication hypothesis has been proposed as a mechanism accounting for alcohol consumption among sexually assaulted women, empirical investigations of this hypothesis have not been conducted. Empirical research grounded in theory could be uniquely applicable to the development of treatment approaches for women with a sexual assault history.

The purpose of the present study was to examine changes in alcohol consumption and psychological distress among college women following a sexual assault. In line with

motivational models of alcohol use, it was hypothesized that following a sexual assault, women will experience increased negative affect, consume more alcohol, and receive more negative reinforcement from alcohol due to its ability to quell or diminish negative affect. This study employed a prospective design to achieve these goals. A prospective design uniquely allowed for an examination of the impact of a sexual assault on changes in psychological distress, alcohol consumption, alcohol-related problems, and negative reinforcement from alcohol over the nine-week study period.

Following is a review of literature documenting elevated levels of psychological distress and alcohol use among sexually assaulted women. Specific theories of the relationship between elevated alcohol use among sexual assault survivors will be introduced. In support of these theories, a comprehensive review of the empirical literature will be provided. Literature demonstrating the negative reinforcing properties of alcohol, such that it serves to reduce subjective feelings of negative affect, will also be discussed in the context of this review.

CHAPTER TWO

LITERATURE REVIEW

Sexual Assault and Psychological Distress

A myriad of immediate and long-term consequences of sexual assault have been consistently identified in college, community, and psychiatric samples. In a review of the literature, Gilmartin (1994) described both the immediate and long-term effects of experiencing a rape. A constellation of psychological aftereffects, including anxiety, crying, sadness, somatic complaints, behavioral changes, cognitive difficulties, changed self-perceptions, and sexual difficulties are often present immediately following the experience and studies have shown that such sequelea can persist over time. Indeed, Gilmartin (1994) found that such effects may also lead to long-term consequences and persist anywhere from two to six months post-assault (Gilmartin, 1994). In an extensive meta-analytic review of the literature, Weaver and Clum (1995) concluded that experiencing sexual assault was significantly related to greater levels of psychological distress.

Kilpatrack and colleagues (1979) asked 46 recent rape victims (mean age = 25.28 years) presenting to a rape crisis center and 35 community women (mean age = 26.29 years) to complete a battery of self-report measures assessing anxiety, fear, and psychological distress. Participants completed an initial assessment followed by a one, three, and six-month follow-up. Results indicated that raped women reported significantly more general psychological distress immediately following the assault, as indicated by the Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1977), as well as at the one and three-month follow-ups. Significantly elevated levels of trait and state anxiety, mood disturbance, and fear also persisted through the one-month follow-up. At

both the three and six month assessments, anxiety and fear symptoms remained elevated as compared to non-assaulted women though the differences were not statistically significant.

Miranda, Meyerson, and Marx (1999) recruited 380 undergraduate women, with an average age of 19.5, to complete a variety of self-report instruments relating to adult sexual assault and psychological adjustment. Findings indicated that women who experienced unwanted sexual intercourse or penetration, as indicated by the Sexual Experiences Survey (SES; Koss & Gidycz, 1985) reported significantly higher levels of psychological distress across all SCL-90-R subscales including general psychological distress.

In a large community study by Burnam et al. (1988), 3,132 men and women provided information regarding current psychiatric problems as well as psychiatric history before a sexual assault. All participants (mean age = 36) were administered the NIMH Diagnostic Interview Schedule (DIS) and were identified as having been sexually assaulted based upon their answer to the question, "In your lifetime, has anyone ever tried to pressure or force you to have sexual contact?" In this study, sexual contact was defined as any activity involving genital contact. Individuals identified as having been sexually assaulted ($n = 432$) were matched with a non-assaulted individual for gender, age, ethnicity, and education. For the purposes of this study, psychological disorders that preceded a sexual assault were distinguished from those that followed the sexual assault. Results indicated that the risk of developing major depression, alcohol abuse/dependence, phobia, panic disorder, or obsessive-compulsive disorder was significantly higher among individuals following a sexual assault.

Sexual Assault and Alcohol Consumption

Alcohol problems have also been associated with the aftermath of sexual assault. Studies have consistently found that undergraduate women who experienced sexual assault consume greater quantities of alcohol and report more alcohol-related problems than their non-assaulted counterparts (for review see Testa & Parks, 1996). Larimer, Lydum, Anderson, and Turner (1999) administered a variety of self-report questionnaires to 131 sorority college women. Sexual assault was identified using the Sexual Experiences Survey (SES) and was defined as any unwanted sexual activity involving contact. Quantity and frequency of alcohol use as well as alcohol-related problems were also assessed. Analysis revealed that women who reported a history of unwanted sexual experiences consumed more alcohol, drank more frequently, had more alcohol-related problems, and reported more symptoms of alcohol dependence than their non-assaulted counterparts.

Canterbury et al. (1993) investigated this relationship in a sample of male and female college freshmen. In the first week of classes, 2,500 students (female = 1038) ranging in age from 17 to 22 years completed a self-report questionnaire that assessed drinking behavior and date rape experiences. Based their responses, 35 women (3.3%) were identified as having experienced a date rape. In addition, results indicated that women who reported that they consumed alcohol at least two to four times per week were three times more likely to have reported a date rape and significantly more raped women drank on a weekly basis (58.7%) compared to non-raped women (45.6%).

Karp, Silber, Holstrom, and Stock (1995) recruited 122 undergraduate and community women (mean age = 26.53) to complete a self-report measure assessing alcohol use and experiences of sexual abuse. Assessment of alcohol use included

questions regarding prior hospitalization for alcohol problems, prior history of alcohol problems, and current or prior therapy. Responses were used to create a composite alcohol/drug problem index. Sexual assault was defined as oral, anal or vaginal intercourse involving force or verbal threats. Results indicated that women who reported a sexual assault history had more alcohol/drug problems (27%) than non-assaulted women (2%).

Koss and Dinero (1989) utilized a national representative sample of 2,723 college women (mean age = 21.4) to examine the relationship between alcohol use and sexual assault experiences. Data was obtained via numerous self-report measures, including the SES which was used to identify unwanted sexual experiences ranging from sexual contact to completed rape (e.g., fondling, kissing). Five categories of sexual victimization occurring after the age of 14 were identified: rape, attempted rape (completed or attempted sexual intercourse by use of force or the inability to give consent due to alcohol or drugs), sexual coercion (sexual intercourse by verbal threats or pressure), sexual contact (kissing or fondling), and no assault. Results indicated that women who experienced a sexual assault scored higher on a composite measure of alcohol use which included typical quantity of alcohol consumed, frequency of alcohol use, and regularity of intoxication compared to non-victimized women.

Norris, Nurius, and Dimeff (1996) recruited 66 female sorority members (mean age = 19.2) to complete a packet of self-report instruments on topics related to sexual assault experiences and alcohol consumption. Sexual assault was defined as any unwanted sexual experience during the previous year and peak blood alcohol level over the previous month was estimated. Results indicated that women with a sexual assault history reported higher peak blood alcohol levels than non-assaulted women. The authors

suggested that alcohol consumption places women at risk for sexual victimization. Though these data lend support to the contention that women with an assault history drink more alcohol, the design does not permit inferences regarding directionality.

Corbin and colleagues (1996) examined alcohol consumption patterns among women with a sexual assault history. Participants were 238 undergraduate women between the ages of 17 to 43 years (mean age = 19.5) who completed measures related to average quantity of alcohol consumed per week and unwanted sexual experiences. The SES was used to determine sexual assault status; participants were classified into 3 groups: no assault history, sexual coercion, or attempted/completed rape, on the basis of their responses. Comparisons of means indicated that women who experienced an attempted or completed rape consumed significantly more alcohol per week than non-assaulted women.

Gross and Billingham (1998) utilized a sample of undergraduate women to investigate the relationship between alcohol use and sexual assault. Eight hundred and forty-two women, between the ages of 17 to 23 years, completed self-report measures designed to assess alcohol use and sexual experiences. Alcohol use was based on the average quantity of alcohol consumed per week and women were identified abstainers, light, moderate, or heavy drinkers. Sexual assault was determined using a 20-item measure in which women reported ways in which a partner tried to "get sex" from them; endorsed items were summed to provide a continuous measure of sexual assault. Results indicated that abstainers and light drinkers had significantly lower victimization scores than women identified as heavy drinkers.

Data supporting the link between experiencing a sexual assault and increased alcohol use and alcohol problems have also been reported among clinical samples.

Carmen, Rieker, and Mills (1984) examined the relationship between physical and sexual abuse and subsequent psychological disorders in adolescence and adulthood. Participants were 124 women, ranging in age from 12 to 88 years, receiving inpatient treatment. Assault was defined as any violent behavior documented in the patient's discharge summary or records. Results indicated that women with a history of sexual or physical violence had a higher prevalence of alcohol abuse upon admission to the hospital.

Wallen (1992) used an inpatient sample to identify specific treatment needs of women substance abusers. Participants were recruited upon entry to a private inpatient facility and completed an interview investigating the frequency, duration, and quantity of alcohol and drug use, as well as the occurrence of child or adult sexual abuse. Forty-eight women, with an average age of 33.5 years, participated in the study. Results indicated that 26.7% of the women in substance abuse treatment reported having experienced sexual abuse during adulthood. In 26.6% of those cases, the sexual abuse in adulthood was a completed rape experience.

Swett et al. (1991) assessed 188 women, with an average age of 35.3 years, at an adult outpatient clinic. Participants completed a packet of self-report questionnaires including the Michigan Alcohol Screening Test (MAST; an indicator of alcohol-related problems), as well as a question regarding abuse history which read, "Have you ever been pressured into doing more sexually than you wanted to do or were too young to understand?" The hospital chart for each participant was reviewed in order to obtain a diagnosis of alcohol abuse or dependence. Comparisons of mean scores on the MAST indicated that women with a lifetime sexual abuse history had significantly more alcohol-related problems than non-abused women. Further, those women who reported

experiencing a sexual assault within the year prior to the study had higher scores on the MAST compared to women who did not report an assault in the previous year.

Windle (1994) found further support for the link between sexual assault and alcohol consumption among a sample of adolescent males and females. Data for this study were drawn from the National Adolescent Student Health Survey (NASHS) which included 3,789 8^{th} and 10^{th} grade adolescents, ranging in age from 11 to 17, attending 224 public schools. Participants completed self-report questionnaires that assessed quantity of alcohol consumption over the previous 30 days and victimization history. Victimization was determined on the basis of four questions and operationalized as physical threat or assault (three questions) and forced, unwanted sex (one question). Results of correlational analyses indicated that adolescents who reported a victimization history also reported significantly higher levels of alcohol use.

Similarly, Erickson and Rapkin (1991) investigated health and risk-taking behavior and unwanted sexual experiences among a sample of 1,197 male and female middle and high school students. Participants completed a self-report questionnaire pertaining to the frequency of their use of alcohol, cigarettes, and illegal drugs. These items were summed to provide a continuous measure of substance use. Included in the questionnaire was one question regarding unwanted sexual experiences that read, "Did you ever have a sexual experience (or sexual intercourse) with someone when you did not want to?" Results indicated that unwanted sexual experiences were more common among females as compared to males. In addition, findings showed that individuals with a sexual assault history were significantly more likely to report frequent use of alcohol compared to students without such a history (10% and 3%, respectively). Students with

an assault history were also significantly more likely to report thinking that they had an alcohol or drug problem.

Fergusson, Horwood, and Lynskey (1996) found a link between sexual assault and alcohol use in a sample of 1,019 18 year-old male and female adolescents. All participants completed a semi-structured clinical interview which assessed childhood sexual abuse prior to the age of 16, and alcohol use/dependence using the Composite International Diagnostic Interview (CIDI; World Health Organization, 1993). For the purposes of these analyses, four groups were created on the basis of the extent of sexual abuse experienced: none, noncontact (e.g., exposure), contact (not involving attempted or completed oral, anal or vaginal intercourse) and intercourse (attempted or completed oral, anal or vaginal intercourse). Results indicated that the highest prevalence of alcohol abuse or dependence was significantly different between those individuals who reported intercourse (41.7%) and nonabused individuals (17.6%); noncontact and contact victims reported moderate rates of abuse and dependence (29.2% and 34.8%, respectively). In addition, odds ratios for developing the disorder were significantly higher for all abuse groups as compared to the nonabused group (noncontact abuse odds ratio = 1.9, contact abuse/no intercourse odds ratio = 2.5, intercourse odds ratio = 3.3).

Esbensen and Huizinga (1991) used a similar definition of victimization to examine the relationship between alcohol use and assault. The data used for this study were taken from a multiple cohort sequential design in which 877 male and female adolescents, ranging in age from 11 to 15, were interviewed to obtain information on alcohol use and victimization. A total of six questions were used to assess lifetime physical or sexual assault and assault within the previous year. The question used to determine sexual assault read, "Have you ever been physically hurt or threatened to be

hurt by someone trying to have sex with you?" Findings indicated that the majority of adolescents who reported a victimization history also reported frequent use of beer, wine, and hard liquor (63%).

Collectively, findings from these studies clearly point to a relationship between a sexual assault history and elevated alcohol use and alcohol-related problems. To date, investigators have postulated several ways in which alcohol consumption is related to sexual assault. First, it has been suggested that women who consume alcohol may be vulnerable to experiencing a sexual assault (Greene & Navarro, 1998). Although some of the findings are interpreted as evidence that high levels of alcohol consumption serve as a risk factor for an unwanted sexual experience, the cross-sectional design of these studies precludes any substantive conclusions regarding the directionality of the relationship between sexual assault and alcohol use. It has also been posited that the experience of a sexual assault may be related to subsequent elevations in alcohol consumption (Burnam et al., 1998). Finally, a reciprocal relationship has been proposed whereby alcohol use is a risk factor for experiencing a sexual assault and that in turn, the experience of a sexual assault increases the likelihood of continued alcohol use (Kilpatrick et al., 1997).

Alcohol Use as a Risk Factor for Sexual Victimization

It has been proposed that increased levels of alcohol use predispose an individual to sexual assault. That is, high levels of alcohol consumption serve as a risk factor for an unwanted sexual experience. A number of mechanisms through which alcohol may place a woman at risk for a experiencing a sexual assault have been postulated. Young adults often have a limited understanding of sexual behavior, sexuality, and intimacy, as well as have under-developed communication skills, and superficial relationships which may make them vulnerable to experiencing a sexual assault (Guyton et al., 1989). Moreover,

unwanted sexual experiences in college often occur in the context of a "normal" social setting (Ward, Chapman, Cohn, White, & Williams, 1991) which is typified by the relative importance of alcohol consumption. Additional risk for experiencing a sexual assault may be related to the physiological effects of alcohol on a woman's ability to recognize, escape, or resist unwanted advances by impairing cognitive and motor abilities (Abbey, 1991; Testa & Parks, 1996). Along these lines, men who consume alcohol are also likely to experience similar physiological effects of alcohol; this may lead to difficulties monitoring or controlling behavior or appropriately identifying and responding to cues (Abbey, 1991). Additional theories posit that drinking may influence a man's perception of a woman's sexuality, availability, or responsibility for sexual activity (Abbey, 1991; Testa & Parks, 1996). Finally, Testa and Parks (1996) also suggested indirect effects of alcohol that may place a woman at risk for a sexual assault including being in unfamiliar environments or environments with limited social controls and excessive drinking (e.g., bars, parties).

Along these lines, Koss and Dinero (1989), in the study previously reviewed, proposed a "vulnerability-enhancing situational hypothesis." This hypothesis states that numerous factors, including alcohol use, put women at significant risk for experiencing a sexual assault. In order to investigate the explanatory power of the hypothesized risk variables a stepwise discriminant function analysis was conducted. Of the hypothesized risk variables, results revealed that sexual attitudes, alcohol use, and sexual abuse before age 14 were the most highly correlated with adult sexual victimization. Based on these findings, the authors postulate that alcohol use should be conceptualized as a risk factor for a sexual assault by impairing resistance behavior or as a cue for sexually aggressive men that a willing partner was available. Notably, the cross-sectional design of this

investigation significantly limits any clear interpretation regarding the directionality of the alcohol and sexual victimization relationship.

Support for the hypothesis that alcohol use increases risk for experiencing a sexual assault stems from investigations that have shown that alcohol use is a common contextual variable associated with sexual assault (for review see Cloitre, 1998). Finley and Corty (1993), using a sample of 247 undergraduate women between the ages of 17 to 22, examined the prevalence of alcohol intoxication during a sexual assault. All participants completed the SES; sexual assault was defined as unwanted sexual intercourse. Results indicated that 27.6% of all assaults occurred while the victim or perpetrator was under the influence of alcohol.

In a similar study, Muehlenhard and Linton (1987) recruited 380 women (mean age = 18.8) and 368 men (mean age = 19.5) from an undergraduate institution in order to identify risk factors for a sexual assault during a date. Participants completed a sexual aggression questionnaire designed for the purposes of this investigation. Based on responses to 17 sexual aggression items, individuals were identified as having been a victim of sexual assault if they reported any type of unwanted sexual experience during a date. Participants were also asked whether either individual drank alcohol or used drugs while on the date and how intoxicated they got. Results of a multivariate analysis of variance indicated that dates in which a sexual assault occurred were more likely to involve heavy alcohol use by both individuals.

Koss, Gidycz, and Wisniewski (1987) sampled 3,187 women from 32 universities. Women in this national sample were, on average, 21.4 years of age. Sexual assault was determined on the basis of responses to the SES that assessed for any unwanted sexual experiences occurring after the age of 14. Results indicated that out of

520 report women who experienced unwanted sexual intercourse, 91 women (accounting for 159 separate incidents) reported that the use of alcohol or drugs was involved.

Ward et al. (1991) examined the relationship between alcohol use and sexual assault in a sample of 524 undergraduate women. Participants completed self-report measures of unwanted sexual experiences ranging in severity from unwanted sexual contact to unwanted completed sexual intercourse. Results indicated that over half of the college women who experienced unwanted sexual contact, attempted intercourse, or completed intercourse during an academic year, reported that they were using alcohol at the time of the assault.

High prevalence rates of alcohol consumption during sexual assault have also been documented in additional samples of college students (Abbey, Ross, McDuffie, & McAuslan, 1996; Himelein, 1995), samples of convicted male rapists in which 50% report consuming alcohol at the time of their offense (Rada, 1975), as well as adolescent populations (Erickson & Rapkin, 1991). Together, these investigations suggest that alcohol consumption may be a risk factor for experiencing a sexual assault.

To date, only one prospective investigation has directly examined the hypothesis that alcohol serves as a risk factor for an unwanted sexual experience. Greene and Navarro (1998) investigated the relationship between sexual assault and alcohol use among a sample of undergraduate women. All participants completed an initial packet of self-report questionnaires in the beginning of the Fall semester and returned at the end of the Fall semester and again at the end of the Spring semester. The number of participants varied at each assessment with 274 participating at the initial assessment, 88 at the second and 105 at the third. For the purposes of this study, alcohol use and childhood or adolescent victimization were considered risk factors for experiencing an adult sexual

assault. Childhood sexual abuse, measured using nine items (Finkelhor, 1979), was defined as any unwanted sexual experience occurring prior to age 14. Sexual assault from age 14 until the beginning of the study was classified as an adolescent assault and was identified using the SES. At the follow-up session, the SES was completed in order to assess for any unwanted sexual experiences that occurred during the semester. A composite score for alcohol use was created based on questions pertaining to the frequency, quantity, degree of intoxication, and number of dating and social situations that included alcohol use. Descriptive analyses revealed that sexual assault was correlated with alcohol use at all three assessments. Multiple regression analyses indicated that alcohol consumption at the initial assessment significantly predicted victimization at the end of the fall semester. This analysis did not control for prior victimization experiences nor was it replicated for assaults occurring during the Spring semester. Notably, sexual assault as a predictor of alcohol consumption was not investigated, nor were comparisons of average alcohol consumption as a function of an assault history. Results further indicated that 47.4% of the incidents involved alcohol and/or drug use by the perpetrator and that 41% of survivors reported using alcohol at the time of the assault.

Sexual Assault as a Precursor to Increased Alcohol Use

Investigators have also postulated that experiencing a sexual assault leads to subsequent increased alcohol use. It has been hypothesized that survivors of sexual assault use alcohol and other substances to avoid or attenuate psychological distress resulting from their victimization (e.g., Briere, 1992; Briere & Runtz, 1993; Polusny & Follette, 1995). Khantzian (1985) reported that addictive drugs exert their effects by interacting with psychological distress and painful affective states in such a way that the

experience of negative emotions is reduced. This phenomenon is referred to as the self-medication hypothesis (Khantzian, 1985). Numerous investigators have suggested that individuals who experience a trauma use alcohol and other substances in an attempt to avoid abuse-specific memories, thoughts, and affective states (Briere, 1992; Polusny & Follette, 1995; Root, 1989). It is within this framework that the self-medication hypothesis has been applied to survivors of sexual assault. Polusny and Follette (1995) suggested that substance use among child sexual abuse survivors is a behavioral manifestation of emotional avoidance, whereby alcohol and other substance use is a mechanism to avoid or control aversive thoughts, emotions, or memories associated with an abuse history. This hypothesis coincides with studies that have shown higher levels of self-reported emotional avoidance among sexual assault survivors (for review see Polusny & Follette, 1995). Along these lines, Briere and Runtz (1993) conceptualize substance use among assault survivors as "chemically induced dissociation," a mechanism through which one can separate from intense affective states via substance use, or as a tool to enable expression of feelings of rage or sadness that would otherwise be too difficult to acknowledge.

Indeed, this explanation of alcohol use among assault survivors is consistent with behavioral and social-learning theories of alcohol use, which postulate that drinking behavior may function, in part, as a coping strategy aimed toward reducing unpleasant mood states (Bandura, 1969; Cappell & Greeley, 1987; Conger, 1956; Cox & Klinger, 1988). Support for tension-reduction models initially came from animal studies demonstrating that acute administration of alcohol curtailed behavioral indices of anxiety and fear (Conger, 1956; Masserman, Jacques, & Nicholson, 1945). More recent work in humans has further demonstrated the anxiolytic effects of alcohol (Conrod, Pihl, & Ditto,

1995; Josephs & Steele, 1990). Typically, these studies have used oral administrations of alcohol and measured reductions in the behavioral, physiological, and self-reported responses to various stress-induction tasks (for review see Greeley & Oei, 1999).

More recently, motivational models of alcohol use, which stem from earlier tension-reduction models, have suggested that alcohol consumption represents multiple psychologically distinct behaviors that are defined on the basis of the function that they serve (Cooper, Frone, Russell, & Mudar, 1995). Functional assessment focuses on identifying the relationship between environmental events and problematic thoughts, feelings, and behaviors to the extent that a change in one variable impacts change in another (Follette, Ruzek, & Abueg, 1998; Sturmey, 1996). Such an approach is valuable because it allows for the identification of the purpose underlying a specific behavior, in this case, alcohol use. Practically, identifying the function of a behavior allows for a more idiographic approach to understanding the development and maintenance of maladaptive behavior so that the behavior may be replaced by a functionally equivalent, yet more adaptive one.

Within this framework, it has been demonstrated that coping models of alcohol use are closely linked to negative affect, stress, poor coping skills, and unpleasant events. Such factors prompt efforts, such as alcohol use, to effectively deal with negative emotions. Investigations of this phenomenon have suggested a coping motive for drinking is a strong predictor of problematic drinking behavior and alcohol-related problems.

Kassel, Jackson, & Unrod (2000) investigated alcohol consumption in the context of tension-reduction models by examining the role of negative mood regulation expectancies in the development of maladaptive drinking behavior. One hundred and

thirty-six male and female undergraduate students, with an average age of 18.5 years, participated in this study. All participants completed a battery of self-report measures assessing negative mood regulation expectancies, psychological distress, frequency and quantity of alcohol consumption, and alcohol-related problems on two occasions eight weeks apart. Analyses indicated that negative mood regulation expectancies, alcohol consumption and drinking to cope were robust predictors of alcohol-related problems. Further, results indicated that individuals who reported higher negative mood regulation expectancies also reported lower levels of anxiety and depression. The authors suggest that their findings provide evidence for motivational models of alcohol use in that alcohol consumption serves as a mechanism for dealing with negative affect and that such an approach results in significant alcohol-related problems.

MacLean and Lecci (2000) examined motives for drinking in a sample of 298 undergraduate men and women between the ages of 17 to 38 years (mean age = 18.1); all participants completed a self-report measure of drinking motives. Results indicated that social and coping motives are the strongest motives for drinking behavior among college women. This finding provides evidence for the relevance of coping motives in the drinking behavior of college women.

Perkins (1997) examined patterns of stress-motivated drinking and problematic drinking behavior among college students and college graduates. Male and female undergraduates, between the ages of 17 to 24 years (n = 1,800), and 1,151 postgraduates (ages 17-24 years while in college) were recruited to complete self-report measures of frequency and quantity of alcohol use, alcohol-related problems, and reasons for drinking. Results indicated that undergraduate women as well as postgraduate women

who reported drinking primarily to cope with stress had more alcohol-related problems and reported a greater frequency and quantity of alcohol use.

Findings from investigations using community samples have revealed similar findings. Cooper, Russell, Skinner, and Windle (1992) examined motives for drinking in a probability sample of 1,616 community men and women (mean age = 41.8 years). Participants completed a structured interview on three occasions, at one-year intervals, which assessed alcohol use, alcohol-related problems, and motives for alcohol use. Analyses indicated that compared to enhancement motives and social motives, coping motives were the strongest predictors of frequency of alcohol use and alcohol-related problems including social and occupational dysfunction, and tolerance and withdrawal symptoms. In addition, drinking to cope was significantly predictive of drinking alone and with a partner. These findings remained robust even when controlling for the amount of alcohol consumed.

Cunningham, Sobell, Sobell, Gavin, and Annis (1995) proposed three models in an effort to explain drinking to cope among heavy alcohol users. The first model, the "risk factor model," proposes that "individuals who use alcohol to cope with negative affect are at greater risk for developing an alcohol use disorder." The "generalizing model" on the other hand, suggests that "individuals who are at risk for an alcohol use disorder are more likely to generalize their alcohol use to include emotion coping motives as alcohol use increases." Finally, the "epiphenomena model" suggests that drinking to cope among individuals with an alcohol use disorder "is a function of the greater severity of alcohol problems or negative affect at the time of the assessment."

Carpenter and Hasin (1999) tested the three models of alcohol use proposed by Cunningham et al. (1995) in an investigation of 777 community men and women between

the ages of 18 to 65 years. A structured interview was used to identify the presence of alcohol use disorders, alcohol-related problems, and frequency of alcohol consumption. Participants also completed a self-report measure of drinking motives. Multiple regression analyses supported the "risk-factor model" of negative affect and drinking such that individuals who reported drinking to cope with negative affect were at higher risk for developing alcohol dependence. Importantly, no differences were found between individuals with an alcohol use disorder (i.e., abuse or dependence) and those without a alcohol use disorder on coping measures indicating that the "generalizing model" is insufficient to explain the relationship between negative affect drinking and alcohol consumption. In addition, no support was found for the "epiphenomena model." Specifically, after controlling for current negative affect and alcohol-problem severity, no differences were found between groups on self-reported drinking to cope with negative affect. These findings indicate that negative affect has etiological significance for the development of alcohol use disorders.

Similar findings were revealed by the same authors using a prospective design (Carpenter & Hasin, 1998). In this investigation, 508 community men and women completed structured interviews and self-report instruments during an initial assessment and a one-year follow-up. Results of a multiple regression indicated that drinking to reduce negative affect predicted alcohol dependence at a one-year follow-up.

Studies have also demonstrated the relationship between coping motives and alcohol-related problems in clinical populations. Schutte, Hearst, and Moos (1997) examined the relationship between depressive symptomatology and drinking behavior among a sample of treatment-seeking men and women with an average age of 35 years. Of particular interest to these authors was the hypothesis that women are more likely to

drink to self-medicate than men. Participants completed a series of self-report instruments that assessed for their quantity of alcohol consumption, alcohol-related problems, and depressive symptoms three times at one-year intervals. Results indicated that depressive symptoms at the first assessment predicted alcohol consumption two years later.

Cooper et al. (1995) investigated antecedents and consequences of coping and enhancement drinking motives among a sample of 2,052 adolescents, ranging in age from 13 to 19 years and a sample of 1,616 community adults. The methodology is the same as the previously reviewed study by Cooper et al. (1992). Results of a path analysis revealed that depression was predictive of drinking to cope in both the adolescents and adult samples. In addition, drinking to cope was predictive of alcohol use during the previous six months and alcohol-related problems. Analyses further revealed coping and enhancement drinking to be exclusive constructs with distinct antecedents.

Although there is support for the contention that alcohol may be consumed because of its tension reduction properties in general, only a few investigations have examined this hypothesis among individuals who have experienced a traumatic event. Chilcoat and Breslau (1998) randomly selected 1,200 men and women, between the ages of 21 to 30 years, from a health maintenance organization and followed them over a six-year period, using three assessment times. Results indicated that exposure to a traumatic event increases the risk of developing a drug use/abuse disorder. In addition, no evidence for the hypothesis that alcohol or drug use increases the likelihood of experiencing a traumatic event or developing PTSD was found.

Swendsen et al. (2000) also investigated the virility of the self-medication hypothesis in a prospective investigation of negative mood and alcohol consumption.

One hundred community men and women (average age of 33.9 years), recruited from newspaper advertisements, participated in this investigation. Participants were trained to use a hand-held computer to record daily alcohol consumption over a 30-day period. The hand-held computer signaled the participant to complete an electronic mood inventory that assessed mood during the 30 minutes before the signal. Within-subjects analyses indicated that self-reported nervousness predicted subsequent alcohol consumption. In an effort to specifically test the self-medicating effects of alcohol, analyses indicated that consuming alcohol predicted decreases in nervousness. Interestingly, this effect was exaggerated among individuals with higher anxiety. The authors suggest that their findings provide evidence of the self-medication hypothesis.

Only one study has specifically examined the negative reinforcing properties of alcohol among sexually assaulted women. Miranda, Meyerson, Long, Marx, and Simpson (2002) recruited 342 women to complete a packet of self-report questionnaires assessing assault history, psychological distress, negative reinforcement from alcohol, and volume of alcohol use. Analyses indicated that sexually assaulted women reported higher levels of alcohol consumption, psychological distress, and negative reinforcement from alcohol than their non-assaulted counterparts. In addition, results of a path analysis supported the hypothesized model where rape leads to increased alcohol consumption through psychological distress and negative reinforcement from alcohol. Although the cross-sectional nature of this study preclude clear statements regarding the directionality of these relationships, it provides the first evidence of the strength of negative reinforcement in predicting alcohol consumption among sexually assaulted college women.

Although the studies reviewed above provide a reasonable basis for expecting that alcohol use may increase following a stressor like sexual assault, only a few studies have tested this directional hypothesis. Burnam et al. (1988), as previously reviewed, conducted a cross-sectional probability survey in a large sample of men and women in order to assess the relationship between sexual assault and subsequent psychological disorders, including substance abuse. All participants (n = 3,132; mean age = 36) were administered the NIMH Diagnostic Interview Schedule (DIS) and were identified as having been sexually assaulted based upon their answer to the question, "In your lifetime, has anyone ever tried to pressure or force you to have sexual contact?" In this study, sexual contact was defined as any activity involving genital contact. Individuals identified as having been sexually assaulted (n = 432) were matched with a non-assaulted individual for gender, age, ethnicity, and education. For the purposes of this study, psychological disorders that preceded a sexual assault were distinguished from those that followed the sexual assault. Initial results indicated that a higher percentage of sexually assaulted individuals had a diagnosis of alcohol abuse or dependence compared to non-assaulted individuals (18.4% and 13.8%, respectively). Further, results indicated that in the five years following the sexual assault, approximately 16% of assaulted individuals developed alcohol abuse compared to 7% of the non-assaulted controls. Interestingly, only 4.8% of assaulted individuals met diagnostic criteria for alcohol dependence before the assault. Based on these findings, the authors suggest that alcohol abuse is more highly related to sexual assault as consequence rather than a risk factor (Burnam et al., 1988).

Winfield et al. (1990) also examined the prevalence of psychiatric disorders before and after a sexual assault. These investigators utilized data from the North

Carolina Epidemiologic Catchment Area study and identified 1,157 women between the ages of 18-64 (mean age = 45.11) to participate in this study. All participants were interviewed using the DIS and sexual assault was determined on the basis of a single item similar to that used by Burnam et al. (1988). Findings from this study were consistent with those reported by Burnam et al. (1988) indicating that alcohol abuse and dependence were more prevalent among women with a sexual assault history compared to non-assaulted women (7.2% and 0.9%, respectively). Moreover, findings revealed that for all women who reported a sexual assault history, the onset of alcohol abuse or dependence occurred within one year following the sexual assault.

Findings have also revealed increased alcohol use among recent survivors of sexual assault (Frank, Turner, Stewart, Jacob, & West, 1990). Fifty sexual assault victims, with a mean age of 21.2 years, were given a psychiatric interview within 1 to 4 weeks of their assault. Results indicated that 8.2% of the women who were previously non-drinkers, began drinking after the assault. In addition, another 8.2% of the women were alcohol drinkers prior to the assault but, according to the authors, were currently abusing alcohol in response the stress of the assault.

Gidycz, Hanson, and Layman (1995) examined 796 undergraduate women, ranging in age from 18 to 22 years, in a prospective investigation of risk factors for experiencing an adult sexual assault. At the initial assessment, participants were asked to retrospectively report unwanted sexual experiences that occurred between age 14 to the beginning of the study using the SES. Participants also provided information regarding the quantity of alcohol typically consumed and frequency of drinking until intoxication; these items were combined to create a composite measure of alcohol use. Results

indicated that unwanted sexual experiences during adolescence significantly predicted alcohol use during the first semester of college.

Additional support for the contention that alcohol use increases following a sexual assault stems from investigations in which the cyclical nature of the relationship between alcohol use and sexual assault is explored. According to this idea, women who consume greater amounts of alcohol are at higher risk for experiencing a sexual assault. In turn, the experience of a sexual assault leads to elevated alcohol use as a means of reducing negative affect following the assault. As a result, these women are at increased risk for another sexual assault (Brady, Killeen, Brewerton, & Lucerini, 2000; Kilpatrick et al., 1997; McFarlane, 1998; Windle, 1994).

Kilpatrick and colleagues (1997) conducted a longitudinal investigation of the sexual assault and alcohol use relationship using a large sample of women (n = 3,006; mean age = 35.9 years) contacted as part of a larger national household probably sample of women between the ages of 18 and 34 years old. Participants completed an initial telephone interview and two follow-up telephone interviews at one year intervals to obtain information regarding sexual and physical assault history, and drug and alcohol use. In this investigation, sexual assault was assessed with four questions and defined as oral, anal or vaginal sex, or penetration by an object by use of force or verbal threats. Physical assault was assessed with two questions and included attempted or actual harm or attack with a weapon. Hierarchical regression analyses to predict assault at the final follow-up (2 years after initial interview), controlling for age, race, education, alcohol consumption at the initial interview, and lifetime history of assault, revealed that a new assault between the initial interview and the final follow-up increased the risk for alcohol abuse at the final follow-up by 2.77 times. Notably, regression analyses, also controlling

for age, race, education, and lifetime history of assault, indicated that alcohol use at the initial interview did not increase the odds of a new assault at the final follow-up.

In a smaller study, Testa and Livingston (2000) followed 93 community women for one year. Participants completed self-report measures and a brief interview regarding their sexual assault history and a follow-up telephone interview one year later. Eligibility criteria for this study included having more than one male sexual partner over the previous year, reporting sexual intercourse during the previous month, and consumption of three to four alcoholic beverages on at least one occasion per week. At Time 1, sexual assault was determined based upon responses to the SES and was defined as any unwanted sexual contact including sexual coercion, attempted rape and rape occurring before age 18. At the follow-up interview, this measure was re-administered for experiences occurring during the 12-month interval. Alcohol consumption was assessed using an index of the number of drinks consumed each day of the week and a measure of alcohol-related problems. Hierarchical regression analyses indicated that reporting a history of unwanted sexual experiences at Time 1 and having alcohol-related problems at Time 1 increased the odds of experiencing a sexual assault at the one year follow-up. In a second set of analyses, Time 1 sexual assault did not predict alcohol consumption or alcohol-related problems at follow-up. An analysis to predict alcohol consumption among only those women who experienced an assault over the 12-month interval was not conducted. While these findings were contrary to that of Kilpatrick et al. (1997), the authors suggest that the "failure to observe the effect is most likely idiosyncratic to this sample" (p. 424). In fact, the authors identify a number of factors that may contribute to the inability to reveal that experiencing a sexual assault leads subsequent alcohol consumption. Specifically, the limited range of scores on the alcohol-related problems

index, attrition, small sample size, selection of participants based on moderate to heavy alcohol consumption and sexual behavior, and not assessing for lifetime sexual assault experiences were identified as factors contributing to these null findings.

Summary

Together, findings of the existing literature indicate a strong relationship between sexual victimization and alcohol consumption. Within this framework, alcohol has been implicated as both a cause and consequence of experiencing a sexual assault. It should be noted that the accuracy of one hypothesis does not preclude the accuracy of the other. Instead, these hypotheses may be seen as complimentary perspectives for understanding the relationship between sexual assault and alcohol consumption. Both lines of inquiry may provide valuable information for prevention and treatment. However, the majority of studies from which conclusions regarding the sexual assault and alcohol use relationship utilize cross-sectional designs which hinders the ability to make causal inferences. While a few prospective investigations have been conducted, only one has been conducted using a sample of college women and the consequences of experiencing a sexual assault was not explored in that investigation.

Investigations that have considered the possibility that alcohol use increases following a sexual assault have proposed a self-medication hypothesis of substance use. This model, however, has not yet been empirically tested with sexual assault survivors. Evidence from both the trauma and alcohol literatures point to the notion that alcohol may function to quell negative affective experiences. This hypothesis that alcohol may be used as a means of diminishing negative affect following a sexual assault has been addressed in one path-analytic cross-sectional study (Miranda et al., 2002). While the findings of this study suggest a motivational model behind the relationship between

sexual assault and alcohol consumption, the cross-sectional design of the investigation was limiting. An understanding of the function of alcohol consumption among sexually assaulted women holds the promise of informing the development and maintenance of alcohol abuse and dependence as well as reducing rates of revictimization.

Methodological Limitations of the Existing Literature

While numerous investigators have reported a link between sexual assault and alcohol use (Canterbury et al., 1993; Karp et al., 1995; Larimer et al., 1999), an overwhelming reliance on cross-sectional and retrospective designs has limited our ability to draw inferences regarding the directionality of the relationship. To date, only two investigations (Kilpatrick et al., 1997; Testa & Livingston, 2000) have employed a prospective design to examine the hypothesis that an assault precedes elevated alcohol use; these investigations were conducted using samples of community women. The degree to which findings from community samples generalize to college women is not known. There is evidence to suggest that drinking behavior among college women may be markedly different than women in other life stages (Lex, 1994) and that women in college drink the heaviest (Gomberg, 1994; Wilsnack, Wilsnack, & Hiller-Sturmhofel, 1994). In addition, there is evidence indicating that women are at particularly high risk of experiencing a sexual assault while in college (Koss et al., 1987). Together, this suggests that the generalizability of the findings from community women to college populations may be erroneous. While one prospective investigation has examined the influence of alcohol use on subsequent assault experiences in a college sample, the possibility that alcohol use increases following a sexual assault was not explored (Greene & Navarro, 1998). In light of the preceding literature review, prospective investigations of alcohol use and sexual assault among college women appear particularly warranted.

Underlying the need to document a relationship between sexual assault and alcohol use among college women is the need to test theoretical models to conceptualize the relationship. Indeed, the self-medication hypothesis and motivational models have been proposed. However, empirical investigations of this phenomenon have yet to be conducted with sexually assaulted women. In light of the elevated levels of alcohol consumption, alcohol use disorders, and psychological distress among assaulted women, combined with the high relapse rate of sexually assaulted women in treatment for substance abuse (Root, 1989), empirical research grounded in theory could be uniquely applicable to the development of treatment approaches.

The Current Study

To address the limitations of previous research, the current project examined the relationship between sexual assault and alcohol consumption among a sample of undergraduate women using a prospective design. The focus of this investigation was to evaluate the aftermath of a sexual assault. Specifically, the aim of this study was to examine changes in a woman's level of self-reported psychological distress, alcohol consumption, alcohol-related problems, and negative reinforcement from alcohol following a sexual assault, over a nine-week period. A prospective design allowed for a baseline assessment of psychological distress and alcohol-related variables, so that changes following a sexual assault could be most accurately evaluated.

In order to achieve these goals, college women were asked to complete self-report measures assessing these constructs two times during an academic semester. In order to most efficiently evaluate the impact of experiencing a sexual assault on functioning, women who reported a prior history of unwanted adolescent or adult sexual experiences were excluded from the study. In this way, changes in the stated variables, as a function

of an unwanted sexual experience, were evaluated without being confounded by the impact of a prior assault.

Follow-up assessment occurred approximately nine weeks following the initial assessment. A follow-up of this duration has been used in a number of previous investigations of sexually assaulted women (Gidycz, Coble, Latham, & Layman, 1993; Greene & Navarro, 1998; Sandberg, Matorin, & Lynn, 1999). In addition, the use of a nine-week interval appeared most appropriate for capturing elevations in psychological distress as a function of a sexual assault. Investigations of the effects of sexual assault have indicated that patterns of symptomatology persist for two to three months following an assault and then return to levels similar to non-assaulted women (Kilpatrick et al., 1979; Resick, Calhoun, Atkeson, & Ellis, 1981). Resick et al. (1981) indicated that adjustment in numerous areas of functioning including work, economic, social, and family relations were significantly elevated at one and two months post-assault compared to non-assaulted women. Moreover, it was found that at four months post-assault, adjustment levels for most assaulted women were similar to non-assaulted women. Rothbaum, Foa, Riggs, Murdock, and Walsh (1992) also indicated that the psychosocial consequences of a sexual assault largely diminish in the three-months following an assault. In fact, Burgess and Holstrom (1974) described an acute response to a sexual assault as the "rape trauma syndrome." These findings suggest that psychological distress is likely to be most elevated immediately following the assault. Although no previous investigations have indicated a time frame in which sexual assault survivors consume more alcohol, develop alcohol-related problems, or obtain greater negative reinforcement from alcohol, the hypothesized link between psychological distress and negative

reinforcement indicates that changes in these constructs should be revealed in conjunction with elevations in psychological distress.

Within this framework, this study proposed a motivational model of alcohol use among assaulted women such that they would receive more negative reinforcement from alcohol following a sexual assault. This would suggest that sexually assaulted women drank to cope with the negative affect they experience following an assault. It was therefore expected that psychological distress, alcohol consumption, and alcohol-related problems would also increase during the nine-week interval among women who experienced a sexual assault.

Hypotheses

Hypothesis I- It was hypothesized that severity of psychological distress would increase following a sexual assault. Specifically, it was hypothesized that women who reported a sexual assault over the nine-week interval would report a significant increase in psychological distress at *Time 2* relative to *Time 1*, and this increase was hypothesized to be significantly greater than that found among nonassaulted women.

Hypothesis II- It was hypothesized that alcohol consumption would increase following a sexual assault. Specifically, it was hypothesized that women who reported a sexual assault over the nine-week interval would report a significant increase in alcohol consumption at *Time 2* relative to *Time 1*, and this increase was hypothesized to be significantly greater than that found among nonassaulted women.

Hypothesis III- It was hypothesized that alcohol-related problems would increase following a sexual assault. Specifically, it was hypothesized that women who reported a sexual assault over the nine-week interval would report a significant increase in alcohol-

related problems at *Time 2* relative to *Time 1*, and this increase was hypothesized to be significantly greater than that found among nonassaulted women.

Hypothesis IV- It was hypothesized that level of negative reinforcement from alcohol would increase following a sexual assault. Specifically, it was hypothesized that women who reported a sexual assault over the nine-week interval would report a significant increase in negative reinforcement from alcohol at *Time 2* relative to *Time 1*, and this increase was hypothesized to be significantly greater than that found among nonassaulted women.

CHAPTER THREE

METHODS

Participants

Participants were 451 women recruited from undergraduate psychology courses during the fall semester at a large mid-western state university. Of the 451 women who participated at *Time 1*, 410 (91%) returned for data collection at *Time 2*. The 410 women ranged in age from 18 to 52, with a mean age of 19.27 ($SD = 2.74$). Of these women, 91.7% reported that they had never been married, 2.8% were currently married, 1.8% were cohabitating, 2.1% were divorced, separated or widowed, and 1.6% did not specify their marital status. The majority of the women described themselves as Caucasian (89.6%), while 4.4% were Native American, 2.5% were African American, 1% were Asian or Asian American, 0.5% were Hispanic, and 2% included other ethnic groups. The women in the current study were most likely to be Freshmen (53.8%), with the remaining identified as Sophomores (26.4%), Juniors (12.6%), and Seniors (7.2%). Socioeconomic status was assessed with a modified version of Edwards' Two Factor Index of Social Position (Myers & Bean, 1968) calculated based on the income and education of the participant's father. Participants ranged from upper to lower class with the average participant being in the middle class.

Procedure

Potential participants were recruited via announcements and sign-up sheets in undergraduate Psychology Department courses. Announcements stated that participation in the current study was for women only and involved completing a battery of self-report questionnaires on two occasions nine weeks apart. All participants were compensated

with credit toward their psychology course and received financial compensation at the *Time 2* administration.

During the initial assessment (*Time 1*), participants were informed of the voluntary nature of their participation and provided written consent to participate in the study. All components of informed consent, including the nature of the study and the ability to withdraw from participation at any time without penalty, was included. During the initial phase, participants completed a packet of randomly ordered self-report questionnaires in a group-testing format. The questionnaires assessed the quantity and function of each participant's alcohol use, psychological distress, alcohol-related problems, and history of sexual assault (e.g., adolescent assault and assaults which occurred prior to the study). In addition, contact information (i.e., telephone, address, e-mail) for each participant was requested. Additional instruments, which were not included in the present study, were also completed. At the end of the first assessment, participants were provided a debriefing form that listed a number of low-cost or sliding fee scale referrals for counseling.

Approximately nine weeks following the initial assessment, all participants were sent a reminder postcard and contacted by telephone with an invitation to participate in the second portion (*Time 2*) of this study. At *Time 2*, each participant provided written consent a second time and then completed a similar packet of questionnaires in order to re-assess the quantity and function of each participant's alcohol use and psychological distress. Sexual assault was re-assessed specifically for any unwanted sexual experiences occurring during the nine-week interval following the initial assessment. At the end of the second session, participants were debriefed regarding the nature of the study, and a

debriefing form describing the problems associated with chronic alcohol use and a list of low cost or sliding fee scale referrals for counseling was distributed.

All information provided by participants was kept confidential and all questionnaires were identifiable only by numerical code. A master list of participant's names and code numbers was created in order to match data across assessment sessions. Following completion of the investigation, all material containing contact information was destroyed.

Measures and Assessment Administrations

First Administration (Time 1)

Screening for sexual assault after the age of 14. The Sexual Experiences Survey (SES; Koss & Gidycz, 1985; Koss, et al., 1987) was used at *Time 1* to assess participants' histories of sexual assault from age 14 to 17, as well as from age 17 to the present. The SES is a 28-item self-report inventory assessing for a range of attempted or completed unwanted sexual experiences in which a man used force or coercion (e.g., verbal threats or pressure, intoxication, or physical force) to engage in sexual play, oral-genital contact, or intercourse. Participants respond by indicating ("yes" or "no") whether they have experienced each situation listed as well as the number of times each event had occurred. Determination of sexual assault status was achieved on the basis of responses on the SES. For the purposes of this investigation, sexual assault was defined as any unwanted attempted or completed oral-genital contact, or vaginal or anal intercourse, or penetration of the vagina or anus by an object through the use of physical force or administration of alcohol or drugs.

Sexual experiences occurring from age 14 to *Time 1* were exclusion criteria on the basis of investigations indicating that sexual assault during adolescence (defined as age

14 to 17) and adulthood was predictive of alcohol use in college (Gidycz et al., 1995; Koss & Dinero, 1989). This allowed for a more accurate identification of changes in the proposed variables as a function of an adult sexual assault. Age 14 is commonly used by researchers as the cutoff between childhood and adolescence (Finkelhor, 1984; Gidycz et al., 1993; 1995; Greene & Navarro, 1998; Koss et al., 1987). Koss and Gidycz (1985) have demonstrated that the SES has good internal consistency (.74) and construct validity (.73), as well as high test-retest reliability (.93). In addition, victims' self-report responses on this measure have been shown to correlate highly with information obtained via an interview (Koss & Gidycz, 1985).

Psychological Distress. The Symptom Checklist-90-Revised (SCL-90R; Derogatis, 1983) is a 90-item inventory that assesses psychological symptomatology on nine dimensions (Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism) and provides three overall indices of distress. Respondents rate their degree of distress associated with each of the 90 symptoms during the past 7 days on a 4-point scale ranging from "not at all" to "extremely." The present study used the Global Severity Index (GSI) as an index of participants' level of general distress. The GSI is calculated as the mean value of all nine symptom subscales. Higher scores on the GSI indicate greater levels of psychological distress. The SCL-90-R has demonstrated good psychometric properties, with test-retest reliabilities ranging from .78 to .90 and internal consistencies between .77 and .90. In addition, this instrument has been shown to correlate highly with clinician ratings and other standardized measures of psychological distress (e.g., MMPI; Derogatis, 1983). Coefficient alphas computed for this sample were excellent (*Time 1* alpha = .97; *Time 2* alpha = .98).

Alcohol Consumption. The Cahalan Drinking Habits Questionnaire (DHQ), formerly referred to as the Drinking Practices Questionnaire (Cahalan, Cisin, & Crossley, 1969), was completed at *Time 1*. The instrument is a 13-item quantity-frequency self-report measure of the average pattern of the respondent's alcohol consumption. Using the DHQ, each respondent estimates how often they consume beer, wine, and/or liquor (frequency), as well as how many drinks of each are consumed during a typical drinking episode (quantity). From this information, the average number of standard drinks consumed during a typical month may be calculated by multiplying the quantity by the frequency. In addition, based on individuals' severity of alcohol use, respondents can be classified as light (volume $\leq$ 17.5), moderate (volume = 17.6 to 44.9), or heavy drinkers (volume $\geq$ 45). Scores on this measure have demonstrated high variability in college samples (Miranda et al., 2002). Coefficient alphas computed for this sample were adequate (*Time 1* alpha = .64; *Time 2* alpha = .64).

Alcohol-Related Problems. The Alcohol Use Disorders Identification Test (AUDIT; Babor, de la Fuente, Saunders, & Grant, 1987) is a brief self-report measure that assesses problems caused by alcohol, including adverse psychological reactions and dependence. The AUDIT was used in the current study as an index of alcohol-related problems(e.g., blackouts, feelings of guilt or remorse after drinking, failure to follow through with responsibilities). Items (n = 10) were coded and summed as outlined by Babor et al. (1987) to provide a continuous measure of maladaptive alcohol use with scores ranging from 0 to 40; higher scores on the AUDIT reflect more alcohol-related problems. The AUDIT is a sensitive (.84) and specific (.71) instrument for identifying alcohol problems among college populations (cutoff score = 11), and has demonstrated

good internal consistency (.80; Fleming, Barry, & MacDonald, 1991). Coefficient alphas computed for this sample were good (*Time 1* alpha = .79; *Time 2* alpha = .81).

Function of Alcohol Use. The Drug Use Functional Assessment Screening Tool (DUFAST; Cole & Bonem, 1996) is a 75-item self-report measure that was used to assess the function of alcohol use. Items are responded to on a 7-point Likert-type scale ("never" to "always") indicating how often each listed experience or situation (i.e., thoughts, feelings, or behaviors that precede or follow substance use) is related to a respondent's substance use. Specifically, the DUFAST is composed of 40 items that assess stimulus situations and setting events that increase the likelihood of substance use, as well as 28 items which describe consequences that may reinforce and maintain substance use or result in aversive outcomes. Additional items identify alternative behaviors that may be functionally equivalent to using drugs (e.g., relaxation strategies). Given the focus of the current study, participants completed the DUFAST specific to alcohol use and only the negative reinforcement dimension (8 items) of the instrument was used in the analyses. Examples of items comprising this dimension include "I feel less anxious after I use," "I deal with stress better after I use," and "I feel more confident after I use."

The negative reinforcement dimension of the DUFAST has high one-week test-retest reliability (.85), internal consistency (Cronbach's α= .88), and correlates highly with tension reduction expectancies (.70) as measured by Brown, Goldman, Inn, and Anderson's (1980) Alcohol Expectancies Questionnaire (Miranda, Meyerson, & Long, 2000). The DUFAST has been found to correlate moderately with self-monitoring data (.47), indicating its usefulness as a self-report functional assessment (Cole & Bonem,

1998). Coefficient alphas computed for this sample were excellent (*Time 1* alpha = .97; *Time 2* alpha = .97).

Second Administration (Time 2).

Time 2 assessment occurred nine weeks following the initial assessment. At that time, the SES was re-administered in order to determine if any unwanted sexual experiences occurred during the nine-week interval. In order to do so, modifications were made to the original SES reading "*Please complete this questionnaire based on experiences you have had since the last time you completed the questionnaire.*" This modification was employed to ensure that only unwanted sexual experience occurring between *Time 1* and *Time 2* were reported. Based on responses to the SES at *Time 2*, individuals who reported experiencing attempted or completed oral-genital contact or anal or vaginal penetration or intercourse by a penis or object via force or coercion (i.e., verbal threats or pressure, intoxication, or physical force) were labeled as experiencing a sexual assault at *Time 2*. At *Time 2*, participants were also re-administered the DHQ, AUDIT, SCL-90-R and the DUFAST for the purposes of assessing changes in alcohol consumption, psychological distress, and negative reinforcement from alcohol over the nine-week interval.

CHAPTER IV

RESULTS

Development of the Sample and Prevalence of Sexual Assault

As noted previously, to more clearly examine the increases in alcohol use and problems, the role of negative reinforcement in such use, and general distress, women with a previous history of sexual assault were excluded from consideration in this study. Specifically, women who reported a history of unwanted sexual experiences (as previously defined) from age 14 until the beginning of the study were excluded from the study. Of the 410 women who completed both the *Time 1* and *Time 2* assessments, 83 (21.7%) reported experiencing a sexual assault during adolescence or just prior to study participation and were thus excluded from the analyses. These women reported a range of unwanted sexual experiences due to force or alcohol prior to the study including attempted unwanted oral-genital contact ($n = 38$), attempted unwanted vaginal or anal penetration ($n = 50$), completed unwanted oral-genital contact ($n = 44$), and completed unwanted vaginal or anal penetration ($n = 57$). Interestingly, eight of these women also reported an unwanted sexual experience during the nine-week study interval (a 9.64% rate of revictimization over the 9 weeks of the study).

An additional twenty-five women were excluded from the analyses due to missing SES data. Duplication of participant numbers prohibiting accurate matching of *Time 1* and *Time 2* assessments ($n = 2$) and failure of one participant to follow instructions in completing the measures resulted in the exclusion of three more women from consideration. The remaining 299 women comprised the final study sample and were included in all subsequent analyses. Of these women, 11 (3.68%) reported an unwanted sexual experience during the nine-week study interval. The unwanted sexual experiences

included attempted unwanted oral-genital contact (n = 1), attempted unwanted vaginal or anal penetration (n = 1), completed unwanted oral-genital contact (n = 6), and completed unwanted vaginal or anal penetration (n = 6). The 11 women reported an average of 1.55 (SD = 0.93) unwanted sexual assaults over the nine-week period.

Descriptive Information and Demographic Comparisons

Table 1 presents the intercorrelations for all study variables. The means and standard deviations of psychological distress, alcohol consumption, alcohol-related problems, and negative reinforcement from alcohol at both *Time 1* and *Time 2* for sexually assaulted (SA) and nonsexually assaulted (NSA) women are presented in Table 2. Overall, participants reported a range in the quantity of alcohol consumed, with 50% being nondrinkers, 17% classified as light drinkers, 13% as moderate drinkers, and 13% as heavy drinkers at the *Time 1* assessment. At the *Time 2* assessment, similar findings were revealed with 48% being nondrinkers, 23% classified as light drinkers, 12% as moderate drinkers, and 17% as heavy drinkers. Consistent with other samples of college women, the amount of alcohol consumption among this sample was highly variable (Miranda et al., 2002). Normative data further suggest that the women in this study were within normal range for psychological distress and alcohol-related problems. Overall, women in this study reported an average of 4 alcohol-related problems at both the *Time 1* and *Time 2* assessments. Previous research has indicated that alcohol-related problems are clinically significant among college students when 11 or more problems are reported (Fleming et al., 1991). Comparison of the current sample to a normative sample of nonpatient adolescents for psychological distress (M = .76, SD = .54; Derogatis, 1983) suggest that the women in the current study (*Time 1* M = .51, SD = .44; *Time 2* M = .51,

SD = .48) were experiencing levels of psychological distress that were within normal limits.

To ensure that no demographic differences were confounded with the variables of interest in this study, demographic comparisons between women who participated in data collection at both *Time 1* and *Time 2* and women who did not return for *Time 2* were conducted. Results indicated that women who did not return for the *Time 2* data collection did not differ from those who did on age $t(443) = 1.04, p = 0.30$, year in college $\chi^2(3, N = 444) = 4.5, p = .21$, ethnicity $\chi^2(3, N = 445) = 1.05, p = 0.79$, socioeconomic status $t(447) = 1.11, p = .27$, or social class $\chi^2(5, N = 451) = 7.87, p = .16$. In addition, women who completed both *Time 1* and *Time 2* did not differ from women who did not return for *Time 2* on unwanted sexual experiences reported at *Time 1*, $\chi^2(1, N = 433) = 0.24, p = .62$. Results revealed that fewer married women returned for *Time 2* than was expected, $\chi^2(1, N = 417) = 4.22, p = .04$.

Data Design and Primary Analysis

The primary analyses investigated changes in psychological distress, alcohol consumption, alcohol-related problems, and negative reinforcement from alcohol as a function of experiencing a sexual assault during the nine-week interval. Hypotheses were tested using four 2 Sexual Assault Group (SA, NSA) × 2 Time (*Time 1*, *Time 2*) mixed design analyses of variance (ANOVAs), with sexual assault status as the between subjects factor and time of assessment as the repeated measures factor. Each of the four ANOVAs examined one of the four dependent variables: psychological distress as measured from the SCL-90, alcohol consumption reported using the Cahalan Drinking Habits Questionnaire, alcohol-related problems from the Alcohol Use Disorders Identification Test, and negative reinforcement from alcohol as measured using the Drug

Use Functional Assessment Screening Tool. Follow-up *t* tests between groups were conducted as needed.

Results of the ANOVA examining psychological distress revealed significant effects for time, $F(1, 294) = 4.29, p = .04$ [$\eta^2 = .014$, with a small effect size ($f = .11$)], for sexual assault status, $F(1, 294) = 7.96, p = .005$ [$\eta^2 = .026$, with a small effect size ($f = .15$)] , and for the interaction between time and sexual assault status, $F(1, 294) = 5.43$, $p = .02$ [$\eta^2 = .018$, with a small effect size ($f = .13$)]. Psychological distress increased over the nine-week interval (*Time 1* $M = 0.62$, $SE = 0.07$; *Time 2* $M = 0.73$, $SE = 0.07$) and women who experienced a sexual assault reported greater distress ($M = 0.85$, $SE = 0.13$) than those women who did not experience a sexual assault ($M = 0.50$, $SE = 0.02$). As can be seen in Table 2 and Figure 1, an interesting interaction between these two variables also emerged. As the figure illustrates, psychological distress among women who did not report a sexual assault was relatively stable across the nine-week study interval. Women who reported a sexual assault during the study, however, demonstrated a notable increase in psychological distress from *Time 1* to *Time 2*. Most interestingly, it should be noted that while sexually assaulted women reported greater psychological distress at both the *Time 1* and *Time 2* assessments, the differences between assaulted and nonassualted women were nonsignificant at *Time 1*, $t(11.287) = 1.35, p = .20$, and significant *Time 2*, $t(11.286) = 2.22, p = .05$.

Results of the ANOVA examining alcohol-related problems also revealed a significant effect for time, $F(1, 295) = 10.41, p = .001$ [$\eta^2 = .034$, with a small effect size ($f = .176$)], and for the interaction between time and sexual assault status, $F(1, 295) = 11.87, p = .001$ [$\eta^2 = .039$, with a small effect size ($f = .204$)]. A nonsignificant effect for sexual assault status was revealed, $F(1, 295) = 2.79, p = .096$ [$\eta^2 = .009$, with a small

effect size (f < .101)]. Overall, alcohol-related problems increased over the nine-week interval (*Time 1* $M = 4.04$, $SE = 0.63$; *Time 2* $M = 5.53$, $SE = 0.69$). Women who experienced a sexual assault reported somewhat, although not significantly, more alcohol-related problems ($M = 5.82$, $SE = 1.22$) than those who did not experience a sexual assault ($M = 3.75$, $SE = 0.24$). As can be seen in Table 2 and Figure 2, a similar interaction to that seen in the previous analysis was also seen with alcohol-related problems. Figure 2 illustrates that women who did not experience a sexual assault reported relatively consistent rates of alcohol-related problems at the *Time 1* and *Time 2* assessments. Sexually assaulted women reported somewhat more alcohol-related problems at *Time 2* relative to the number of problems reported at *Time1*. Notably, as can be seen in the figure, while women who experienced a sexual assault appear to report more alcohol-related problems at both assessments, assaulted and nonassaulted women did not significantly differ in the number of alcohol-related problems at *Time 1*, $t(11.287) = .38$, $p = .70$. Importantly, at the *Time 2* assessment, alcohol-related problems significantly differed between the groups reflecting a greater rise in alcohol-related problems for the assaulted group, $t(296) = 2.65$, $p = .008$.

With regards to the average number of standard drinks consumed, results of the ANOVA examining alcohol consumption revealed a nonsignificant effect for time, $F(1, 276) = 2.72$, $p = .10$ [$\eta^2 = .010$, with a small effect size (f = .101)], sexual assault status, $F(1, 276) = 0.98$, $p = .32$ [$\eta^2 = .004$, with a small effect size (f < .101)], and for the interaction between time and sexual assault status, $F(1, 276) = 1.61$, $p = .21$ [$\eta^2 = .006$, with a small effect size (f < .101)]. Results failed to show a significant change in alcohol consumption over the nine-week interval (*Time 1* $M = 22.77$, $SE = 7.78$; *Time 2* $M = 32.70$, $SE = 7.73$) and women experiencing a sexual assault were not found to report

different levels of alcohol consumption ($M = 34.79$, $SE = 14.06$) than those women who did not experience a sexual assault ($M = 20.68$, $SE = 2.57$). While the interaction effect was not significant, as can be seen in Table 2 and Figure 3, a similar pattern was evident with this dependant variable as well. Nonassaulted women showed slight increases in the amount of alcohol consumed over the course of the study, whereas women who experienced a sexual assault reported more notable increases in alcohol consumption at *Time 2* relative to *Time 1*. As the graph indicates, women who reported a sexual assault also reported drinking more alcohol at both *Time 1* and *Time 2* although the discrepancy between groups is greater at *Time 2*. The nonsignificant findings revealed here may be attributed to the high variability in the amount of alcohol consumed leading to difficulties detecting differences between groups.

A final repeated measures ANOVA was conducted to examine changes in the negative reinforcing properties of alcohol consumption on the basis of having experienced a sexual assault over the nine-week interval. Results revealed nonsignificant effects for time, $F(1, 294) = 0.19$, $p = .66$ [$\eta^2 = .001$, with a very small effect size ($f = .00$)], and for the interaction between time and sexual assault status, $F(1, 294) = 0.48$, $p = .49$ [$\eta^2 = .002$, with a very small effect size ($f < .101$)]. Interestingly, a significant effect for sexual assault status, $F(1, 294) = 6.76$, $p = .01$, was revealed [$\eta^2 = .022$, with a small effect size ($f = .143$)]. Overall, sexually assaulted women reported receiving more negative reinforcement from alcohol ($M = 2.06$, $SE = 0.39$) than nonsexually assaulted women ($M = 1.03$, $SE = 0.08$). Results failed to indicate changes in negative reinforcement from alcohol over the nine-week interval (*Time 1* $M = 1.51$, $SE = 0.22$; *Time 2* $M = 1.58$, $SE = 0.21$). While the interaction effect was nonsignificant, as can be seen in Table 2 and Figure 4, a similar pattern to the other variables of interest in this

study was found. Nonsexually assaulted women reported similar levels of negative reinforcement from alcohol at both *Time 1* and *Time 2*. Sexually assaulted women reported slight increases in negative reinforcement from alcohol at *Time 2* relative to *Time 1*. Notably, sexually assaulted women reported more negative reinforcement from alcohol at both *Time 1*, $t(11.287) = 2.13, p = .034$, and *Time 2*, $t(11.286) = 2.72, p = .007$, as compared to nonassaulted women.

Power Analyses

Given the nonsignificant findings for a few of the analyses, and the small sample of sexually assaulted women, power analyses were computed to estimate the ability to detect true differences. Power was computed for the main effects (time and sexual assault status) as well as for the interaction effect between time and sexual assault status. For psychological distress, where all 3 effects were significant, adequate power to evaluate the effect of time (0.54), sexual assault status (0.80), and the interaction effect (0.64) was revealed. For alcohol-related problems, where significant effects were only found for time and the interaction, results of the power analysis were 0.90 and 0.93 for time and the interaction effect, respectively. However, the observed power for sexual assault status was 0.38 indicating insufficient power to detect true differences. Results of the power analysis for the third dependent variable, alcohol consumption, indicated insufficient power to detect all three effects (time = 0.38, sexual assault status = 0.17, interaction = 0.24). None of these 3 effects were significant in the analyses. With negative reinforcement as the dependent variable, a significant effect was found only for sexual assault status. Results of the power analysis indicated that there was insufficient power to evaluate the effect of time (0.07) and the interaction (0.11). The power analysis for sexual assault was marginal (0.74). Thus, failure to see significant effects within

planned analyses may potentially be attributable to low power rather than due to the absence of true effects.

Exploratory Analyses: Repeat Victimization

Given the large number of women who reported an unwanted sexual experience during adolescence or just prior to the study ($n = 83$) and were eliminated from analyses, the lower power to detect differences for some effects, and an interest in examining the interactions of the study variables for all participants, additional exploratory analyses were conducted. Specially, additional analyses were conducted in this study to examine the interaction of the variables of interest with prior sexual assault history. Four Time (*Time 1*, *Time 2*) × Sexual Assault Status at *Time 1* (SA, NSA) × Sexual Assault Status at *Time 2* (SA, NSA) mixed design analyses of variance (ANOVAs) were examined. Sexual assault status at *Time 1* and *Time 2* served as the between subjects factors and time of assessment served as the repeated measures factor. Psychological distress, alcohol-related problems, alcohol consumption, and negative reinforcement from alcohol served as the dependent variable in each analysis. Follow-up paired comparisons between groups were conducted as necessary. Tables 3 through 6 present the means and standard errors of each interaction effect for each dependent variable.

Results of the ANOVA for psychological distress revealed a significant effect for time, $F(1, 374) = 8.06$, $p = .005$, sexual assault status at *Time 2*, $F(1, 374) = 15.54$, $p = .0001$, sexual assault status at *Time 1*, $F(1, 374) = 6.37$, $p = .02$, and a significant interaction between time and sexual assault status at *Time 2*, $F(1, 374) = 3.86$, $p = .05$. However, the interaction between time and sexual assault status at *Time 1*, $F(1, 374) = 0.22$, $p = .64$, the interaction between sexual assault status at *Time 1* and sexual assault status at *Time 2*, $F(1, 374) = 0.36$, $p = .55$, and the three-way interaction between time,

sexual assault status at *Time 1*, and sexual assault status at *Time 2*, $F(1, 374) = 0.49$, $p = .48$, were nonsignificant.

Overall, psychological distress increased during the nine-week interval (*Time 1* $M = 0.74$, $SE = 0.06$; *Time 2* $M = 0.88$, $SE = 0.06$). Women who experienced a sexual assault during adolescence or just prior to the study reported greater distress ($M = 0.95$, $SE = 0.08$) than those who did not have a sexual assault history ($M = 0.68$, $SE = 0.07$). Similarly, women who experienced a sexual assault during the nine-week study period reported more psychological distress ($M = 1.02$, $SE = 0.10$) than those who did not experience a sexual assault ($M = 0.60$, $SE = 0.03$).

Figure 5 presents changes in psychological distress as a function of sexual assault status at *Time 1* and *Time 2*. Specifically, Figure 5 illustrates the interaction between time and sexual assault status at *Time 2*. This figure shows that women who were not assaulted during the study appear to report stable levels of psychological distress during the nine-week study period. Women who experienced a sexual assault during the current study demonstrated a trend toward reporting increases in psychological distress during the nine-week study interval. Notably, women who experienced a sexual assault reported more psychological distress than nonassaulted women at both the *Time 1*, $t(18.85) = 2.14$, $p = .05$, and *Time 2* assessments, $t(377) = 4.67$, $p = .0001$, with the discrepancy between the groups greater at *Time 2*.

Results of the ANOVA examining alcohol-related problems revealed a nonsignificant effect for time, $F(1, 375) = 1.42$, $p = .23$. A significant effect was revealed for sexual assault status at *Time 1*, $F(1, 375) = 20.35$, $p = 0.001$, sexual assault status at *Time 2*, $F(1, 375) = 5.24$, $p = 0.02$, the interaction between time and sexual assault status at *Time 1*, $F(1, 375) = 6.04$, $p = .02$, as well as the interaction between time

and sexual assault status at *Time 2,* $F(1, 375) = 4.51, p = .04$. The interaction between sexual assault status at *Time 1* and sexual assault status at *Time 2*, $F(1, 375) = 0.16, p = .69$ was not significant. Results of the three-way interaction between time, sexual assault status at *Time 1,* and sexual assault status at *Time 2* approached significance, $F(1, 375) = 3.14, p = .08$.

Overall, alcohol-related problems remained stable over the nine-week period (*Time 1* $M = 7.01$, $SE = 0.57$; *Time 2* $M = 7.50$, $SE = 0.60$). Women who experienced a sexual assault during adolescence or just prior to the study reported more alcohol-related problems ($M = 9.72$, $SE = 0.84$) than those who did not have a sexual assault history ($M = 4.78$, $SE = 0.70$). Similarly, women who experienced a sexual assault during the nine-week period reported more alcohol-related problems ($M = 8.50$, $SE = 1.05$) than those who did not experience a sexual assault ($M = 6.00$, $SE = 0.30$).

Changes in alcohol-related problems as a function of sexual assault status at the *Time 1* and *Time 2* assessments are presented in Figure 6 and Figure 7. Specifically, Figure 6 illustrates the interaction between time and sexual assault status at *Time 1*. This figure shows that women who were not assaulted during adolescence or just prior to the study reported no differences in alcohol-related problems between *Time 1* and *Time 2*. Women who experienced a sexual assault prior to the *Time 1* assessment also reported no changes in alcohol-related problems during the nine-week study interval. Overall, however, women with a sexual assault history prior to participation in the current study reported more alcohol-related problems relative to nonassaulted women at both the *Time 1,* $t(100.71) = 6.57, p = .0001$, and *Time 2* assessments, $t(104.66) = 5.83, p = .0001$.

Figure 7 illustrates the interaction between time and sexual assault status at *Time 2*. The graph illustrates that women who did not report a sexual assault during the current

study did not report changes in the number of alcohol-related problems at *Time 2* relative to *Time 1*. Interestingly, women who experienced a sexual assault during the nine-week period also reported no significant changes in the number of alcohol-related problems between *Time 1* and *Time 2*. Notably, women who reported a sexual assault during the study reported differences in alcohol related problems at *Time 1* compared to women without a sexual assault, $t(379) = 2.07, p = .04$, and significant elevations in alcohol-related problems at T*ime 2* relative to women did not experience a sexual assault during the course of the study, $t(18.90) = 2.51, p = .02$. Differences between women assaulted during the study appear somewhat larger at *Time 2* than at *Time 1*, however.

Figures 8A and 8B present the three-way interaction between time, sexual assault status at *Time 1*, and sexual assault status at *Time 2*. While the 3-way interaction only approached significance in analyses, inspection appears warranted to ensure that no important effects are overlooked. Specifically, Figure 8A illustrates changes in alcohol-related problems only among women who *did not* report a sexual assault during the nine-week study interval. This figure shows that women who were not assaulted prior to the study (or during the study) reported stable rates of alcohol-related problems between *Time 1* and *Time 2*. Women who experienced a sexual assault prior to the *Time 1* assessment reported nonsignificant decreases in alcohol-related problems during the nine-week study interval. Overall, however, women with a sexual assault history prior to participation in the current study reported more alcohol-related problems relative to nonassaulted women at both the *Time 1*, $t(91.14) = 6.12, p = .001$, and *Time 2* assessments, $t(93.53) = 5.58, p = .0001$. Interestingly, the discrepancy between the groups does appear to become narrowed over time.

Figure 8B shows the severity of alcohol-related problems *only* among women who reported a sexual assault during the nine-week study interval. The graph illustrates that women who did not report a sexual assault prior to *Time 1* (but did experience a sexual assault during the current study) appeared to report more alcohol-related problems at *Time 2* relative to *Time 1*. Interestingly, women who experienced a sexual assault prior to the study (as well as during the current study) did not report a significant increase in the number of alcohol-related problems between *Time 1* and *Time 2*. Overall, assaulted women (who also experienced a sexual assault prior to participation in the current study) reported somewhat more alcohol-related problems relative to nonassaulted women at *Time 1*, $t(9.19) = 2.22, p = .06$. No significant differences between those assaulted before or during the study were found at *Time 2*, $t(17) = 1.06, p = .31$.

A third repeated measures ANOVA with alcohol consumption as the dependent measure revealed a nonsignificant effect for time, $F(1, 351) = 1.23, p = .27$. A significant effect was revealed for sexual assault status at *Time 1*, $F(1, 351) = 12.28, p = .001$, and a trend toward significance was revealed for sexual assault status at *Time 2*, $F(1, 351) = 3.25, p = .07$. The interaction between time and sexual assault status at *Time 1*, $F(1, 351) = .07, p = .79$, the interaction between time and sexual assault status at *Time 2*, $F(1, 351) = 1.21, p = .27$, the interaction between sexual assault status at *Time 1* and sexual assault status at *Time 2*, $F(1, 351) = 0.46, p = .50$, and results of the three-way interaction between time, sexual assault status at *Time 1* and sexual assault status at *Time 2*, $F(1, 351) = 0.002, p = .97$, were nonsignificant. Alcohol consumption remained stable over the nine-week interval (*Time 1* $M = 45.79$, $SE = 7.54$; *Time 2* $M = 53.82$, $SE = 7.07$). Women who experienced a sexual assault during adolescence or just prior to the study reported more alcohol consumption ($M = 71.88$, $SE = 9.33$) than those who did not have a

sexual assault history ($M = 27.74$, $SE = 8.47$). Similarly, women who experienced a sexual assault during the nine-week period reported more alcohol consumption ($M = 61.16$, $SE = 12.14$) than those who did not experience a sexual assault ($M = 38.46$, $SE = 3.37$).

Finally, an ANOVA to evaluate changes in negative reinforcement from alcohol failed to show a significant effect for time, $F(1, 375) = 0.05$, $p = .83$, or sexual assault status at *Time 1*, $F(1, 375) = 2.46$, $p = .12$, but revealed a trend for sexual assault status at *Time 2*, $F(1, 375) = 3.37$, $p = .07$. Consistent with the previous analysis, nonsignificant interactions between time and sexual assault status at *Time 1*, $F(1, 375) = 0.11$, $p = .75$, between time and sexual assault status at *Time 2*, $F(1, 375) = 0.90$, $p = .34$, the interaction between sexual assault status at *Time 1* and sexual assault status at *Time 2*, $F(1, 375) = 2.11$, $p = .15$, and the three-way interaction between time, sexual assault status at *Time 1*, and sexual assault status at *Time 2*, $F(1, 375) = 0.01$, $p = .92$, were also revealed. Negative reinforcement from alcohol did not change over the nine-week interval (*Time 1* $M = 1.78$, $SE = 0.17$; *Time 2* $M = 1.80$, $SE = 0.17$). Women who experienced a sexual assault during adolescence or just prior to the study did not differ with regards to negative reinforcement from alcohol ($M = 2.03$, $SE = 0.24$) from women who did not have a sexual assault history ($M = 1.54$, $SE = 0.20$). Women who experienced a sexual assault during the nine-week period reported somewhat more negative reinforcement from alcohol ($M = 2.08$, $SE = 0.30$) than those who did not experience a sexual assault ($M = 1.50$, $SE = 0.08$).

A summary of the significant main effects and their corresponding power is presented in Table 7. Also presented in the table are estimates of effect size using eta squared and represented as Cohen's (1988) f. Similar to the primary analyses,

nonsignificant findings consistently corresponds with power that is insufficient to detect true differences between the groups. Importantly, however, all effect sizes were very small or small indicating that in order to detect group differences, a larger sample would likely have been necessary.

CHAPTER FIVE

DISCUSSION

This study employed a prospective design to examine the relationship between sexual assault and both alcohol use and psychological distress among a sample of college women. Specifically, this study proposed a model of alcohol use in which assaulted women would receive more negative reinforcement from alcohol following a sexual assault. This model suggests that sexually assaulted women consume alcohol in an effort to quell negative affect. Within this framework, this study sought to evaluate the hypotheses that psychological distress, alcohol-related problems, alcohol consumption, and negative reinforcement from alcohol would increase among women who experienced a sexual assault during the nine-week study period. To evaluate the hypotheses, this study employed a large sample of college women. Of the 451 women who participated in the initial assessment, 410 returned at *Time 2* and 19 of those women with complete and usable data reported a sexual assault during the nine-week study period.

Results supported the hypothesis that psychological distress would increase among women who experienced a sexual assault. While women, in general, reported increases in distress over time, and women with a sexual assault reported more distress across both time points of the study, an important interaction between sexual assault status and time was revealed. Specifically, women who were sexually assaulted during the nine weeks reported a significant increase in psychological distress from *Time 1* to *Time 2*. Women who did not experience a sexual assault during the study did not report increases in psychological distress over the nine-week period. Such findings support the contention that distress increases specifically in relation to sexual assault. These findings are consistent with previous work documenting postassault symptomatology (Weaver &

Clum, 1995) including anxiety and fear (Calhoun et al., 1982; Kilpatrick et al., 1979), depression (Winfield et al., 1990), and suicidal ideation (Kilpatrick et al., 1985; Resick et al., 1989). Important changes in alcohol problems were also documented in this study. While women, in general, all reported increases in such problems over time, a significant interaction between time and assault status indicated that such changes occur differentially for assaulted and nonassaulted women. Women who were sexually assaulted demonstrated an increase in alcohol-related problems over the course of the study. A particularly interesting finding was that 37% of the women who were sexually assaulted during the study met criteria for an alcohol misuse diagnosis at *Time 2* whereas only 12% met criteria for an alcohol misuse diagnosis at *Time 1* representing clinically significant increases in problems for sexually assaulted women. In contrast, women who did not report a sexual assault reported no changes in alcohol-related problems.

Taken together, these findings support the hypotheses that women who experienced a sexual assault during the study reported greater psychological distress and alcohol-related problems relative to women who did not experience a sexual assault. Importantly, such differential changes were not demonstrated in the two other areas for sexually assaulted women: alcohol consumption and negative reinforcement from alcohol. While no changes in alcohol consumption reached levels necessary to be considered important in this study, it should be noted that women who were sexually assaulted did report relatively higher levels of negative reinforcement from alcohol throughout this study. Thus, this group of women appear to be more likely to use alcohol for its negatively reinforcing properties even prior to the occurrence of their sexual assault.

Previous investigators have highlighted the potential reciprocal relationship between sexual assault and alcohol such that alcohol may serve as both a risk factor for and a consequence of sexual assault. It should be noted that the accuracy of one hypothesis does not preclude the accuracy of the other. Instead, these hypotheses may be seen as complimentary perspectives for understanding the relationship between sexual assault and alcohol consumption. Though the aim of this study was not to test the reciprocal relationship, findings from the analyses conducted here provide information about changes following assault and differences that may have existed prior to an assault. First, findings lend support to the self-medication hypothesis by illustrating elevations in important variables *following* a sexual assault. Follow-up comparisons revealed that despite nonsignificant differences in psychological distress and alcohol-related problems prior to their sexual assault, women who reported a sexual assault during the study reported significantly more psychological distress and alcohol-related problems at the *Time 2* assessment relative to nonassaulted women. In addition, while the findings of this study did not support the specific hypotheses of changes in alcohol consumption as a function of sexual assault status, evaluation of the means for alcohol consumption revealed that sexually assaulted women consumed twice as much alcohol as nonassaulted women at *Time 2*. Although this finding is not statistically significant, this differential degree of alcohol consumption may hold important clinical significance and does demonstrate unequal increases in alcohol use between assaulted and nonassualted women. Failure to demonstrate statistically significant changes in alcohol consumption in the current study may have been due to limitations in the measure of alcohol use which produced a high degree of variability among participants and does not allow for evaluations of changes in drinking patterns (i.e., binge drinking).

Less support for the idea that alcohol is a risk factor for sexual victimization was revealed in this study. Comparisons between women who were eventually assaulted during the study and women without an assault did not reveal statistical differences. Interestingly, on all four distress and alcohol indices, however, women who were sexually assaulted did report somewhat higher levels of distress and alcohol issues. Further, analyses of negative reinforcement from alcohol revealed a significant main effect for sexual assault status. Specifically, women who experienced a sexual assault during the study reported greater levels of negative reinforcement at *Time 1* and at *Time 2.* This finding suggests that drinking for negative reinforcing purposes may represent a preexisting characteristic among women who are vulnerable to experiencing a sexual assault. It is possible that if women who were sexually assaulted during the study were *already* drinking for negatively reinforcing purposes, then increases in negative reinforcement may not have occurred following a sexual assault. It is possible that the primary change in alcohol use following a sexual assault was in the *pattern* of alcohol use which lead to more problems as opposed to the changes in the proportion of time negative reinforcement was related to alcohol use. This could explain the increases in alcohol-related problems and the failure to demonstrate increases in negative reinforcement from alcohol or actual alcohol consumption among sexually assaulted women. Importantly, the findings of increased psychological distress and alcohol-related problems in conjunction with elevated negative reinforcement from alcohol among assaulted women supports the self-medication hypothesis despite nonsignificant *changes* in negative reinforcement.

It is also possible that elevated negative reinforcement among asssaulted women at *Time 1* may be a function of the relationship between sexual victimization and other

traumatic events. Previous research indicates a high probability of victims' experiencing multiple types of traumas (Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993) as well as high rates of sexual revictimization (Gidycz et al., 1993; Kilpatrick et al., 1997; Messman-Moore & Long, 2002). In fact, findings of this study revealed that 9% of women who experienced a sexual assault prior to the study were revictimized during the nine-week study interval. As a function of its relation to experiencing a previous traumatic event, drinking for negatively reinforcing purposes may be related to risk for experiencing a sexual assault. Given this, additional analyses were conducted in this study to examine the interaction of the variables of interest with prior sexual assault history.

Findings of the exploratory analyses, which accounted for sexual assault prior to participation in the study, were similar to the findings of the primary analyses. Results suggested that as before, women experiencing a sexual assault reported more distress and alcohol problems than women not experiencing an assault by *Time 2*. Interestingly, results of analyses examining the effect of a history of prior sexual assault did reveal differential changes across time for women with and without a history of prior assault. Differential changes across time between women assaulted by *Time 2* and women not assaulted, similar to those seen in primary analyses, were also evident in alcohol-related problems. Inspection of the three-way interaction suggested that, as before, women who experienced a sexual assault during the study reported more alcohol-related problems over the course of the study whereas women who did not experience a sexual assault reported no changes over time. Regardless of their sexual assault history, women who did not experience a sexual assault during the study reported stability or even improvements in their symptoms of alcohol problems over time. Interestingly, however,

for those women who did experience an assault during the study, differences between women with and without a history of prior assault were evident. Specifically, women without a prior assault demonstrated increases in alcohol problems. Those women with both a history of previous assault and an additional assault during the study did not show increases in alcohol problems. However, the level of alcohol problems reported by these women was somewhat higher than the first group. Women without a history of assault did not report as many problems with alcohol as the women with a history of assault (the differences between these groups was not significant). Thus, it appears that when a sexual assault occurs, those women without a prior history of assault merely "catch up" to the level of alcohol problems reported by women with a prior history of assault. The stability seen in the women with more than one assault may be an artifact of the elevated number of problems these women experience even at the first assessment.

While results of exploratory analyses fail to indicate changes in alcohol consumption or negative reinforcement for assaulted women over time, it should be noted that differences were seen in alcohol consumption between women with a history of sexual assault and women without a history of sexual assault (in general across time). This may suggest that alcohol consumption has increased as a function of a first sexual assault. While only approaching significance, differences between women experiencing a sexual assault during the study and women not experiencing an assault are also evident. While not completely evidence, such findings may suggest that changes in, not only distress and alcohol-related problems, but also alcohol consumption and negative reinforcement may occur as a function of sexual assault. The need for caution when drawing strong conclusions about these factors is emphasized when power analyses are considered. As suggested by the power analyses, the null findings may be a function of

inadequate power to detect differences between assaulted and nonassaulted women. Specifically, in almost all cases in which findings of nonsignificance were noted, power was insufficient.

The failure to achieve adequate power may be attributed to the small number of women who reported a sexual assault during this study. Notably, decreasing the rates of sexual victimization on college campuses is a goal of clinicians and researchers alike and low rates of sexual victimization is a positive finding. Previous research evaluating unwanted sexual experiences among college women have indicated that approximately 11.7% (Gidycz et al., 1993) to 15.2% (Meyerson, Miranda, & Long, 2000) of women report a sexual assault over a nine-week period of time. In the current study, relatively few women reported an assault during this nine-week study interval. Specifically, only 4.97% (19 of 382 women) of women in this sample reported experiencing a sexual assault during the nine weeks and only 3.68% of women (11 of 299 women) who were eligible for inclusion in the planned analyses were sexually assaulted. This finding is surprising and inconsistent with previous work conducted on this, and other, college campuses (Gidycz et al., 1993; Meyerson et al., 2000).

Because this study utilized the Sexual Experiences Survey, the standard instrument for assessing unwanted sexual experiences in previous research, it is unlikely that the discrepancy is a function of the instrument by which these experiences were evaluated. Also consistent with previous research was the operational definition of sexual assault employed in the current study. Sexual assault was defined here as experiencing attempted or completed oral-genital contact or anal or vaginal penetration or intercourse by a penis or object via force or coercion (i.e., verbal threats or pressure, intoxication, or physical force). These similarities suggest that the low occurrence of

unwanted sexual experiences is likely not due to the methodology employed. In addition, although every attempt at maintaining participants' confidentiality was undertaken and explained in detail to participants at both the *Time 1* and *Time 2* assessments, it is possible that the women in the current study were reluctant to disclose such personal information. However, requests for personal disclosure is not unique to this investigation and failure to do so would be expected to universally influence research of this kind. It is also possible that the rates of sexual assault have decreased from previous years. Results from a national investigation showed slight decreases in the rates of completed rape between the year 1999 - 2000 among women age 12 and over (BJS, 2001). It is also possible that the low assault rate may reflect a sampling bias in that women who were assaulted during the study did not return for the *Time 2* assessment.

Conclusions and Significance

This study sought to examine changes in distress and alcohol-related variables as a function of experiencing a sexual assault. Hypotheses were based on the self-medication hypothesis of sexual assault and alcohol use which suggests that alcohol use among this population may serve to quell psychological distress resulting from victimization (Briere, 1992; Briere & Runtz, 1993; Root, 1989). Self-medication (Khantzian, 1985) is the term coined to describe this process by which individuals may engage in a variety of behaviors, including alcohol consumption, as a means of coping with negative affect. Overall, the findings of this study suggest that women who were assaulted during the study developed more psychological and alcohol-related problems whereas nonassaulted women did not. With regards to alcohol-related problems, evidence for increases in problems following a sexual assault, as well as some evidence that problems existed prior to a sexual assault emerged. The finding that women who

experienced an assault at any time report greater alcohol problems may indicate that such problems increase following an assault. In addition, comparing women with a sexual assault at *Time 1* who do and do not experience a second assault (by *Time 2*) reveals some evidence of alcohol-related problems as a risk factor for experiencing a sexual assault. Specifically, those women who do experience an assault by *Time 2* reported more alcohol-related problems at *Time 1* than women who don't experience another assault. With the experience of an additional assault, alcohol-related problems are maintained at the elevated level reported at *Time 1* (after first assault). The same pattern emerges when looking at women who did not experience a previous assault and comparing women based on whether they experienced a sexual assault during the nine-week study period. Those women who experienced a sexual assault during the study had more alcohol-related problems at *Time 1*. Interestingly, women who did not report a sexual assault at *Time 1* or *Time 2* reported the lowest levels of alcohol-related problems. Thus, the pattern supports the idea that alcohol-related problems increase after a sexual assault and that they may also serve as a risk factor for experiencing an assault. Similar results are found with regard to psychological distress. Women who were sexually assaulted during the nine weeks reported a significant increase in psychological distress from *Time 1* to *Time 2* whereas women who did not experience a sexual assault during the study did not report such an increase. These findings support the idea that psychological distress increases following a sexual assault. In addition, however, findings also revealed that although not statistically significant, women who reported a sexual assault at *Time 2* reported more distress prior to their assault indicating that greater psychological distress may also precede a sexual assault.

Further findings converge on the idea that women who experience sexual assault may consume alcohol, in part, to self-medicate and suggests the importance of distress reduction in a negative reinforcement model. Specifically, additional analyses revealed support for the hypothesis that sexual assault serves as a risk factor for subsequent psychological problems by demonstrating that sexually assaulted women reported more alcohol-related problems and psychological distress at the *Time 2* assessment despite nonsignificant differences in such problems at *Time 1*. Moreover, assaulted women reported more negative reinforcement from alcohol at both the *Time 1* and *Time 2* assessments which suggests alcohol-related risk factors for victimization among college women. With continuously high levels of distress, those women receiving more negative reinforcement from alcohol may change their usage to take advantage of this fact and this may in turn lead to alcohol related problems. As such, this study adds to previous work on sexual victimization among college women and highlights the necessity to continue research aimed toward clarifying the reciprocal nature of the alcohol use-sexual assault relationship.

The findings are consistent with previous research documenting the myriad of adverse emotional and cognitive disturbances associated with assault (Weaver & Clum, 1995). With regard to alcohol-related problems and alcohol consumption, differences between this investigation and previous work may be accounted for by the methodologies employed. The findings are inconsistent with a prospective evaluation using a sample of community women (Testa & Livingston, 2000) in which sexual assault failed to predict alcohol-related problems and alcohol consumption one year later. While the current study also revealed sexual assault to be a nonsignificant predictor of alcohol consumption, alcohol-related problems were shown to be highly related to having

experienced a sexual assault. The authors of this study suggest that their null findings were likely an artifact of the sample that was chosen based on their moderate to heavy alcohol consumption. The findings of the current study also seem inconsistent with the only other prospective investigation that evaluates assault and subsequent alcohol use. Kilpatrick and colleagues (1997) revealed that the experience of an assault (sexual or physical) increased the risk of alcohol abuse by 2.77 times. However, an important discrepancy in the evaluation of alcohol misuse may account for the apparent divergence in findings. Specifically, Kilpatrick et al. (1997) evaluated the presence of an alcohol use disorder while the current study assessed two separate continuous indices of alcohol misuse: alcohol-related problems and alcohol consumption. Notably, Kilpatrick et al. (1997) also evaluated community women and both sexual and physical victimization were included. Finally, with regards to cross-sectional data, the findings of the current study are consistent with findings that reveal greater alcohol-related problems among sexually assaulted women (Swett et al., 1991). However, the findings are inconsistent with investigations which indicate that sexually assaulted women consume greater quantities of alcohol (for review see Testa & Parks, 1996).

The current study is an extension of previous work that specifically examined the self-medication hypothesis among sexually assaulted college women. Miranda et al. (2002) used path analytic techniques to evaluate cross-sectional data and supported a model where rape leads to increased alcohol consumption through psychological distress and negative reinforcement from alcohol. Despite the cross-sectional nature of this study, it provided the first evidence of the importance of evaluating negative reinforcement in predicting alcohol consumption among sexually assaulted women. The current study extended this work by evaluating prospective data and by accounting for the confounding

effect of previous victimization. Only one study to date has used a prospective design to evaluate the relationship between sexual assault and alcohol use among college women. Greene and Navarro (1998) evaluated whether alcohol consumption serves as a risk factor for experiencing a sexual assault; the possibility that alcohol use increases following a sexual assault was not explored.

Limitations and Strengths

Although this study highlights the importance of sexual assault in the development of distress and alcohol problems, several limitations should be noted. First, as previously discussed, the small number of sexually assaulted women resulted in inadequate power to evaluate some of the hypotheses. In order to conduct a more stringent test of the hypotheses of the originally planned analyses, women who experienced an assault in the few years prior to the study were excluded from consideration, which further decreased the number of assaulted women in the analyses. Even in analyses including all participants, power was low due in part to the small number of assaulted women. With a larger number of participants, a larger number of assaulted women would likely have been identified.

Second, although the use of a prospective design is viewed as methodologically superior to cross-sectional designs for evaluating causal relationships, the current study is also limited in this regard. This study employed a prospective design with two assessments over a nine-week interval. As such, like a cross-sectional design, it is impossible to draw causal linkages between sexual assault and the alcohol-related variables. Although this study showed that psychological distress increased following a sexual assault, the reverse relationship, that psychological distress precedes a sexual assault, is also a possible explanation. It is not possible, using this methodology, to

clarify their temporal relationship. Additional assessments or methods to evaluate the variables of interest would have increased the ability to draw causal inferences.

Limitations surrounding the assessment of confounding events or variables should also be noted. Traumatic events other than sexual assault were not considered in this study and the relationship between exposure to trauma and substance use is well-documented (Stewart, 1996). Previous research has indicated that 23.7% women who experience a traumatic event have experienced more than one type of traumatic event (Resnick et al., 1993). It is possible that women in the current study experienced other events prior to or during the study that may have influenced the variables of interest. Second, information regarding sexual assault prior to the age of 14 was not considered in this study. In light of work that has documented a relationship between child sexual abuse and subsequent alcohol misuse (Langeland & Hartgers, 1998; Polusny & Follette, 1995), incorporating such experiences may have provided a more robust test of the hypotheses. In order to more fully evaluate the temporal relationship between victimization and alcohol use, investigations need to prospectively evaluate younger age cohorts (Kilpatrick et al., 1997). In addition, only alcohol use was examined. It seems possible that women engage in behaviors other than alcohol use, such as smoking, other substance use, and eating, to avoid negative affect. The inclusion of such behaviors may have provided a more comprehensive evaluation of the self-medication hypothesis among this population. Because of the specific focus of this study, all possible functions of alcohol use (i.e., use to increase pleasure) were not evaluated nor were other potentially relevant factors that may interact with sexual assault status to increase the risk for alcohol problems (i.e., alcohol expectancies, genetic predisposition, temperament).

The veracity of the sexual assault histories obtained in this study may have been limited by the retrospective nature of the reports. This is a universal and inherent limitation of research interested in obtaining historical information and may be particularly important to consider in investigations of sexual assault given the psychological sequelae associated with such experiences. However, given the short duration of the study, this limitation seems less likely to impact the accuracy of reports obtained at the *Time 2* assessment. This limitation may have impacted the findings if women who experienced a sexual assault after age 14 and prior to the beginning of the study were inappropriately included in the primary analyses in which these women were excluded from consideration.

While the focus of the current study was to evaluate alcohol use specifically within the context of the self-medication hypothesis, a more complete model of drinking among college females would have been achieved through incorporation of other factors related to alcohol consumption during college. In addition to personality, family history, and alcohol expectancy factors which are predictive of alcohol consumption among college and noncollege populations (Baer, 2002), a number of factors unique to the college environment are also important to consider. For example, factors that uniquely influence college drinking include sorority and fraternity affiliation, perceived drinking norms among peers, public policy factors such as law enforcement, availability and cost of alcohol, and participation in athletics (Dowdall & Wechsler, 2002). In order to better understand the phenomenon of college drinking, these factors should be evaluated.

Finally, caution should be employed when generalizing these findings to other groups (i.e., men, noncollege women). Evidence has suggested that distress is more highly associated with alcohol use in women (Gomberg, 1994) and that college

environments are particularly conducive to alcohol misuse (Wechsler, Lee, Kuo, & Lee, 2000). The impact of sexual assault on alcohol misuse may therefore not generalize to noncollege populations. In addition, this study employed a relative healthy group of college women. Although results indicated that psychological distress increased over time for all women in the study, as did alcohol-related problems, norms for these measures indicate that the women in this study were within normal range. Previous research has indicated clinically significant alcohol-related problems when college students report 11 or more problems (Fleming et al., 1991). Results indicated that sexually assaulted women reported an average of seven alcohol-related problems and nonassaulted women an average of four. Normative data for psychological distress (M = .76, SD = .54) also indicate that the women in the current study were experiencing levels of psychological distress that were within normal limits.

Despite these limitations, this study focused on a large sample of women at particularly high risk for experiencing a sexual assault and employed a prospective design which has the advantage of establishing a baseline and documenting change over time. This is also the first study to evaluate increases in alcohol consumption as a consequence of sexual victimization among college women. Two previous investigations have investigated this relationship among community women with disparate findings and the only prospective evaluation among college women has examine alcohol use as a risk factor for victimization. In addition, this study employed a theoretically-based analysis of the relationship between sexual assault and alcohol use. Recent motivational models of alcohol use have suggested that alcohol consumption is a behavior that may be best understood on the basis of the function that it serves (Cooper et al., 1995). Identifying the purpose or function of a behavior allows for a more idiographic approach to

understanding the development and maintenance of maladaptive behavior so that the behavior may be replaced by a functionally equivalent, yet more adaptive one. The importance of such an analysis is highlighted by research indicating that women with a history of sexual abuse report emotional suppression and denial as primary methods of coping (Leitenberg, Greenwald, & Cado, 1992) and that coping motives for drinking have been shown to be related to alcohol-related problems (Schutte et al., 1997).

An additional strength over previous investigations using this design is the relatively high retention rate in the current study. Previous prospective investigations of college women have reported attrition rates of 7.6% (Gidycz et al., 1993) to 15% (Gidycz et al., 1995). The attrition rate in this study was in the low range as compared to existing research. Only 9% of women who participated in the initial assessment failed to attend the *Time 2* assessment. In addition, information regarding participants' unwanted sexual experiences was assessed using the Sexual Experiences Survey, a widely used instrument with robust psychometric properties. All of the other variables of interest were also evaluated using reliable and valid measures.

Finally, a strength of this study is its attention to the problem of college drinking and exploration of factors that influence alcohol consumption among college females. Drinking on college campuses is a national problem that has been related to crime, mortality, and victimization (Dowdall & Wechsler, 2002; Hingson, Heeren, Zakocs, Kopstein, & Wechsler, 2002). Research suggests that heavy drinking during college predicts alcohol-use disorders up to ten years after college (O'Neill, Parra, & Sher, 2001) and that despite the emergence of national prevention efforts, the prevalence of binge drinking has been stable during the years 1993-2001 (Keeling, 2002). There is also evidence to suggest that drinking behavior among college women may be markedly

different than women in other life stages (Lex, 1994) and that women in college drink the heaviest (Gomberg, 1994; Wilsnack et al., 1994). In conjunction, these factors highlight the importance of evaluating drinking and other substance use among college women.

Implications and Future Directions

The complex relationship between sexual assault and alcohol use would be clarified through methodology that increases the ability to draw causal inferences. This includes diary methods where participants independently document their alcohol consumption and provide such documentation to researchers may also improve the veracity of the report if measures are taken to ensure that the diary is completed daily and not retrospectively. Similarly designed instruments could also be employed for assessing sexual assault. Another alternative for assessing alcohol consumption as well as negative reinforcement from alcohol could be the use of a modified version of the Ecological Momentary Assessment (EMA) employed by Stone and Shiffman (1994). As indicated by Stone and Shiffman (1994), EMA is used "to assess phenomena at the moment they occur in natural settings" and it has been used in numerous investigations of smoking cessation. Participants are provided a hand-held Electronic Diary that has been programmed in previous research to assess mood, the situation, and activities related to substance use (O'Connell et al., 1998). This method could be modified and specifically programmed to evaluate alcohol consumption and the functions of substance use. A primary strengths of EMA is that using the Electronic Diary participants could indicate immediately following alcohol consumption the quantity of alcohol consumed, motives for drinking, as well as their mood state and subjective evaluation of mood changes. The Electronic Diary could also be used to obtain daily records of psychological distress and quantity of alcohol consumption.

Advanced statistical models can also be employed to evaluate the relationship between sexual assault and alcohol use. Survival analysis is a unique method in that it estimates the probability that a particular event, in this case sexual assault, will occur and takes into account the possibility that some individuals will never experience the hazard event. Particularly relevant here, survival analysis can be used with Cox regression analysis to evaluate risk factors, such as alcohol abuse, for experiencing a sexual assault. Recent research has described the use of this method in the context of its application to domestic violence (Yoshihama & Gillespie, 2002). Alternately, the development of alcohol abuse or dependence can be evaluated as the hazard event in conjunction with associated risk factors such as victimization.

Additional advanced statistical models such as structural equation modeling could also be employed (Kline, 1998). Such analytic procedures could be used to evaluate complex models of sexual assault and alcohol use and incorporate a number of variables shown to be related to the development of alcohol use disorders. Given the uniqueness of college student drinking, previously mentioned factors related to drinking among college students could also be incorporated to create a more complete model.

The findings from this study also inform violence and substance use prevention and treatment efforts. Across the country, numerous colleges have employed both types of prevention programs on their campuses. This study highlights the importance of addressing the relationship between experiencing a sexual assault and subsequent increased use of alcohol and other drugs among women in violence prevention programs and, just as important, substance use as a risk factor for aggression and violence should be addressed in drug awareness initiatives.

Practitioners should also be cognizant of the reciprocal relationship between sexual assault and alcohol use and the findings from this study should influence therapeutic approaches with both populations. Decreasing affect among distressed individuals may improve treatment outcome for alcohol use disorders and reduce the probability of relapse (Cooney, Litt, Morse, Bauer, & Gaupp, 1997). To that end, exposure techniques have been shown to effectively reduce negative affect associated with both substance use disorders and posttrauma symptomatology (Foa & Rothbaum, 1998; Monti & O'Leary, 1999). In line with these treatment approaches, and in accordance with theories of substance use (Stasiewicz & Maistio, 1993), reducing distress among sexually assaulted women may help offset the development of problematic alcohol use. Moreover, motivational assessments of alcohol use among women with sexual assault histories may better inform prevention and treatment efforts, and targeting coping motives for drinking may be particularly salient for reducing alcohol-related problems and rates of revictimization among this population.

Within this framework, Najavits and colleagues (Najavits, Weiss, & Liese, 1996) have developed a cognitive-behavioral intervention specifically targeted for individuals with substance abuse disorders and comorbid posttraumatic stress disorder. This group-based program centers on developing coping skills that aid in both abstinence from substances and management of posttrauma distress. To date, empirical evaluations of this intervention with women has demonstrated reductions in both alcohol consumption and posttrauma symptomatology and suggests the efficacy of addressing psychological distress in concert with maladaptive alcohol use (Najavits, Weiss, Shaw, & Muenz, 1998). The efficacy of substances in reducing psychological distress as well as the potential benefits of interventions which address both conditions is underscored by

research indicating that posttrauma symptomatology is exacerbated with initial abstinence from substances (Brady, Killeen, Saladin, Dansky, & Becker, 1994; Root, 1989). Women should be educated about the relationship between the experience of an assault and subsequent alcohol use and made aware of the consequences of drinking to relieve distress. The risk of revictimization and how alcohol plays a role in increasing risk should also be addressed with women in treatment. As such, continual efforts to empirically examine the relationship between sexual assault and alcohol use has significant clinical implications with the potential of decreasing both rates of sexual victimization and the development of problematic alcohol use.

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Table 1

Zero-Order Intercorrelations of Study Variables

Variable	1	2	3	4	5	6	7	8	9
1. SA Time 2	-	.10 (298)	.19** (297)	.02 (298)	.15** (298)	.12* (298)	.16** (297)	.03 (278)	.07 (298)
2. Distress Time 1		-	.68** (296)	.14* (297)	.05 (297)	.09 (297)	.11 (296)	.04 (277)	.01 (297)
3. Distress Time 2			-	.09 (296)	.06 (296)	.04 (296)	.14* (295)	.03 (276)	.01 (296)
4. Alcohol Problems Time 1				-	.75** (297)	.58** (297)	.56** (296)	.67** (277)	.54** (297)
5. Alcohol Problems Time 2					-	.54** (297)	.68** (296)	.56** (277)	.65** (297)
6. Negative Reinforce. Time 1						-	.72** (296)	.39** (277)	.36** (297)
7. Negative Reinforce. Time 2							-	.39** (276)	.52** (296)
8. Alcohol Consumption Time 1								-	.70** (278)
9. Alcohol Consumption Time 2									-

Note. SA Time 2= Sexual assault status at Time 2; Negative Reinforce. = Negative reinforcement from alcohol. Numbers in parentheses reflect group sizes within each analyses.

*$p < .05$. **$p < .01$.

Table 2

Means and Standard Deviations of Distress and Alcohol-Related Measures by Sexual Assault Status

	NSA		SA	
Variable	*M*	*SD*	*M*	*SD*
Time 1				
Psychological Distress	0.50 (285)	0.43	0.73 (11)	0.54
Alcohol consumption	19.54 (269)	46.34	26.01 (9)	28.07
Alcohol problems	3.80 (286)	4.13	4.27 (11)	3.90
Negative Reinforce.	1.05 (285)	1.39	1.97 (11)	1.86
Time 2				
Psychological Distress	0.49 (285)	0.46	0.98 (11)	0.73
Alcohol consumption	21.82 (269)	45.88	43.57 (9)	36.31
Alcohol problems	3.70 (286)	4.41	7.36 (11)	6.52
Negative Reinforce.	1.01 (285)	1.35	2.15 (11)	1.62

Note. NSA = Nonsexually assaulted during nine-week study interval; SA = Sexually assaulted during nine-week study interval; Negative Reinforce. = Negative reinforcement from alcohol. Numbers in parentheses reflect group sizes within each analyses.

Table 3

Means and Standard Errors for the Interaction between Sexual Assault Status at Time 1 and Sexual Assault Status at Time 2 for all Study Variables

	Time 1 NSA		Time 1 SA	
Variable	*M*	*SE*	*M*	*SE*
Psychological distress				
Time 2 NSA	0.50 (285)	0.03	0.70 (74)	0.05
Time 2 SA	0.85 (11)	0.13	1.19 (8)	0.16
Alcohol problems				
Time 2 NSA	3.75 (286)	0.27	8.25 (74)	0.53
Time 2 SA	5.82 (11)	1.37	11.19 (8)	1.60
Alcohol consumption				
Time 2 NSA	20.68 (269)	3.05	56.24 (69)	6.02
Time 2 SA	34.79 (9)	16.66	87.52 (8)	17.67
Negative reinforce.				
Time 2 NSA	1.03 (285)	0.08	1.97 (75)	0.15
Time 2 SA	2.06 (11)	0.39	2.09 (8)	0.46

Note. NSA = Nonsexually assaulted; SA = Sexually assaulted; Negative reinforce. = Negative reinforcement from alcohol. Numbers in parentheses reflect group sizes within each analyses.

Table 4

Means and Standard Errors for the Interaction between Time and Sexual Assault Status at Time 2 for all Study Variables

	Time 2 NSA		Time 2 SA	
Variable	*M*	*SE*	*M*	*SE*
Psychological distress				
Time 1	0.58 (285)	0.03	0.90 (74)	0.11
Time 2	0.62 (11)	0.03	01.14 (8)	0.12
Alcohol problems				
Time 1	6.19 (286)	0.31	7.82 (74)	1.10
Time 2	5.81 (11)	0.32	9.18 (8)	1.15
Alcohol consumption				
Time 1	38.42 (269)	3.99	53.17 (69)	14.36
Time 2	38.50 (9)	3.79	69.14 (8)	13.63
Negative reinforce.				
Time 1	1.55 (285)	0.09	2.00 (75)	0.32
Time 2	1.46 (11)	0.09	2.15 (8)	0.33

Note. NSA = Nonsexually assaulted; SA = Sexually assaulted; Negative reinforce. = Negative reinforcement from alcohol. Numbers in parentheses reflect group sizes within each analyses.

Table 5

Means and Standard Errors for the Interaction between Time and Sexual Assault Status at Time 1 for all Study Variables

	Time 1 NSA		Time 1 SA	
Variable	*M*	*SE*	*M*	*SE*
Psychological distress				
Time 1	0.62 (285)	0.07	0.86 (74)	0.09
Time 2	0.73 (11)	0.08	1.03 (8)	0.10
Alcohol problems				
Time 1	4.04 (286)	0.73	9.98 (74)	0.88
Time 2	5.53 (11)	0.76	9.46 (8)	0.92
Alcohol consumption				
Time 1	22.77 (269)	10.01	68.82 (69)	11.04
Time 2	32.70 (9)	9.51	74.94 (8)	10.48
Negative reinforce.				
Time 1	1.51 (285)	0.21	2.04 (75)	0.26
Time 2	1.58 (11)	0.22	2.03 (8)	0.26

Note. NSA = Nonsexually assaulted; SA = Sexually assaulted; Negative reinforce. = Negative reinforcement from alcohol. Numbers in parentheses reflect group sizes within each analyses.

Table 6

Means and Standard Errors for the Interaction between Time, Sexual Assault Status at Time 1, and Sexual Assault Status at Time 2 for all Study Variables

	Time 1 NSA		Time 1 SA	
Variable	*M*	*SE*	*M*	*SE*
		Psychological distress		
Time 1 Assessment				
Time 2 NSA	0.50 (285)	0.03	0.65 (74)	0.05
Time 2 SA	0.73 (11)	0.14	1.08 (8)	0.16
Time 2 Assessment				
Time 2 NSA	0.49	0.03	0.75	0.06
Time 2 SA	0.98	0.15	1.30	0.18
		Alcohol-related problems		
Time 1 Assessment				
Time 2 NSA	3.80 (286)	0.28	8.58 (74)	0.55
Time 2 SA	4.27 (11)	1.43	11.38 (8)	1.67
Time 2 Assessment				
Time 2 NSA	3.70	0.29	7.92	0.58
Time 2 SA	7.36	1.49	11.00	1.75

Table 6 (cont.)

Variable	Time 1 NSA		Time 1 SA	
	M	*SE*	*M*	*SE*
		Alcohol consumption		
Time 1 Assessment				
Time 2 NSA	19.54 (269)	3.60	57.30 (69)	7.11
Time 2 SA	26.01 (9)	19.70	80.33 (8)	20.89
Time 2 Assessment				
Time 2 NSA	21.82	3.42	55.17	6.75
Time 2 SA	43.57	18.70	94.71	19.84
		Negative Reinforcement		
Time 1 Assessment				
Time 2 NSA	1.05 (285)	0.08	2.05 (75)	0.16
Time 2 SA	1.97 (11)	0.42	2.03 (8)	0.49
Time 2 Assessment				
Time 2 NSA	1.01	0.08	1.90	0.16
Time 2 SA	2.15	0.42	2.15	0.50

Note. NSA = Nonsexually assaulted; SA = Sexually assaulted; Negative reinforce. = Negative reinforcement from alcohol. Numbers in parentheses reflect group sizes within each analyses.

Table 7

Significance Level, Corresponding Power and Effect Size for Main Effects and Interactions in Exploratory Analyses

	Psyc Distress				Alcohol Problems				Alcohol Cons				Neg Reim			
Main Effect	*p*	*Power*	η^2	f	*p*	*Power*	η^2	f	*p*	*Power*	η^2	f	*p*	*Power*	η^2	f
Time	.005	.81	.02	.14	*ns*	.22	.004	<.10	*ns*	.20	.003	<.10	*ns*	.06	.00	.00
SA T1	.02	.71	.04	.20	.001	.99	.01	.10	.001	.94	.009	<.10	*ns*	.35	.009	<.10
SA T2	.0001	.98	.02	.14	.02	.63	.05	.23	.07	.44	.03	.18	.07	.45	.007	<.10
Time × SA T1	*ns*	.08	.01	.10	.02	.69	.01	.10	*ns*	.06	.003	<.10	*ns*	.06	.002	.00
Time × SA T2	.05	.50	.001	<.10	.04	.56	.02	.14	*ns*	.20	.000	.00	*ns*	.16	.00	.00
SA T1 × SA T2	*ns*	.09	.001	<.10	*ns*	.07	.00	.00	*ns*	.10	.001	<.10	*ns*	.31	.006	<.10
3 way	*ns*	.11	.001	<.10	.08	.43	.008	<.10	*ns*	.05	.000	.00	ns	.05	.00	.00

Note. *ns* = $p > .05$. SA T1 = Sexual assault status at *Time 1*; SA T2 = Sexual assault status at *Time 2*; Psyc Distress = Psychological distress; Alcohol Problems = Alcohol-related problems; Alcohol Cons = Alcohol Consumption; Neg Rein = Negative Reinforcement from alcohol; f = Estimate of effect size.

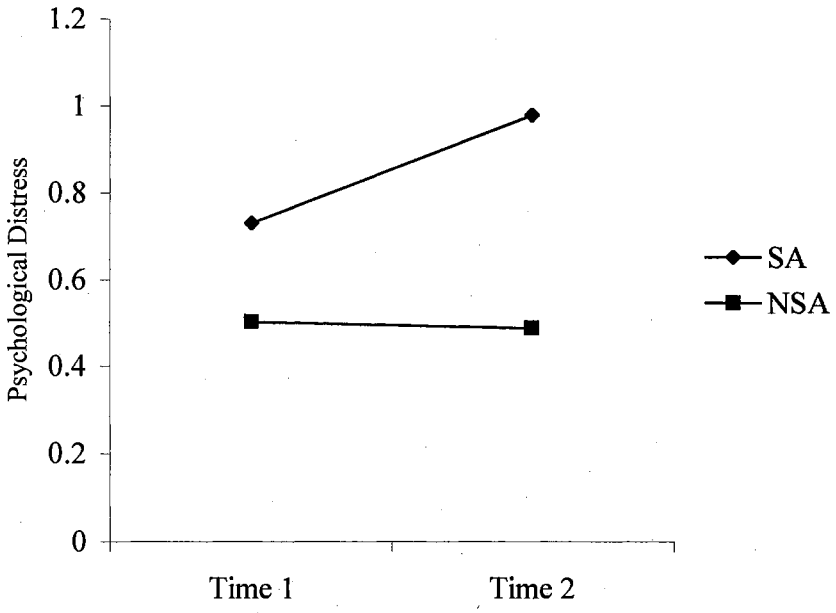

Figure 1. Changes in severity of psychological distress during the nine-week study interval by sexual assault status. SA = Sexually assaulted during nine-week study interval; NSA = Nonsexually assaulted during nine-week study interval.

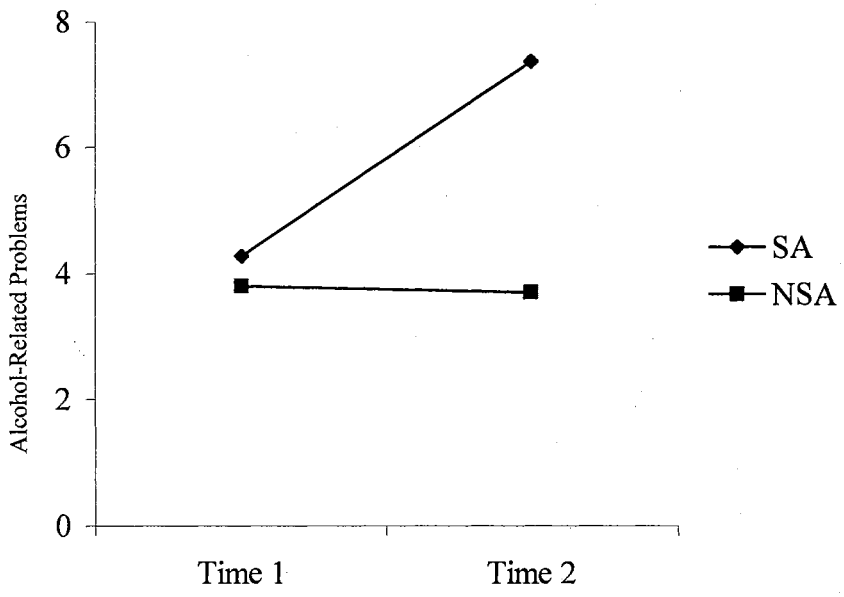

Figure 2. Changes in alcohol-related problems during the nine-week study interval by sexual assault status. SA = Sexually assaulted during nine-week study interval; NSA = Nonsexually assaulted during nine-week study interval.

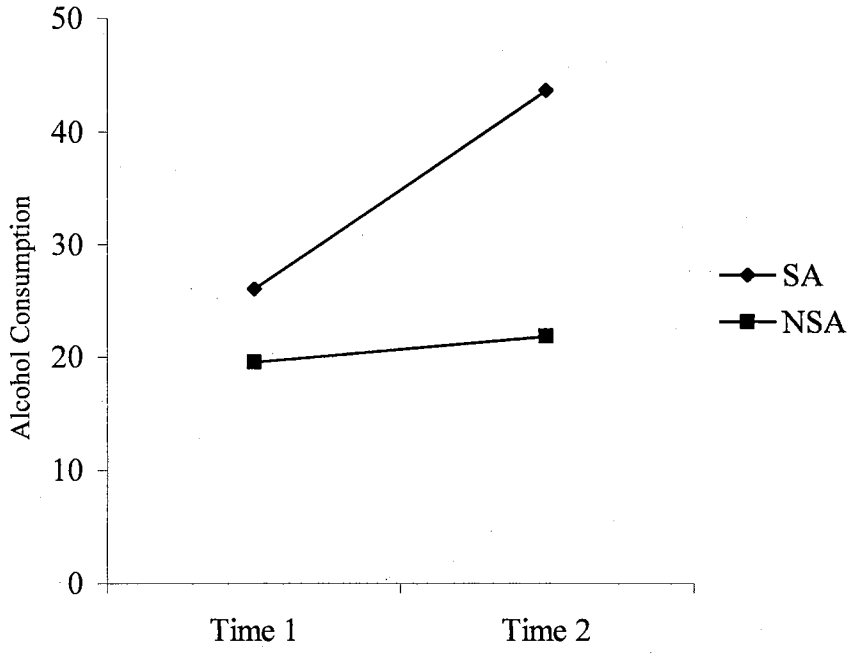

Figure 3. Changes in average number of standard drinks consumed during the nine-week study interval by sexual assault status. SA = Sexually assaulted during nine-week study interval; NSA = Nonsexually assaulted during nine-week study interval.

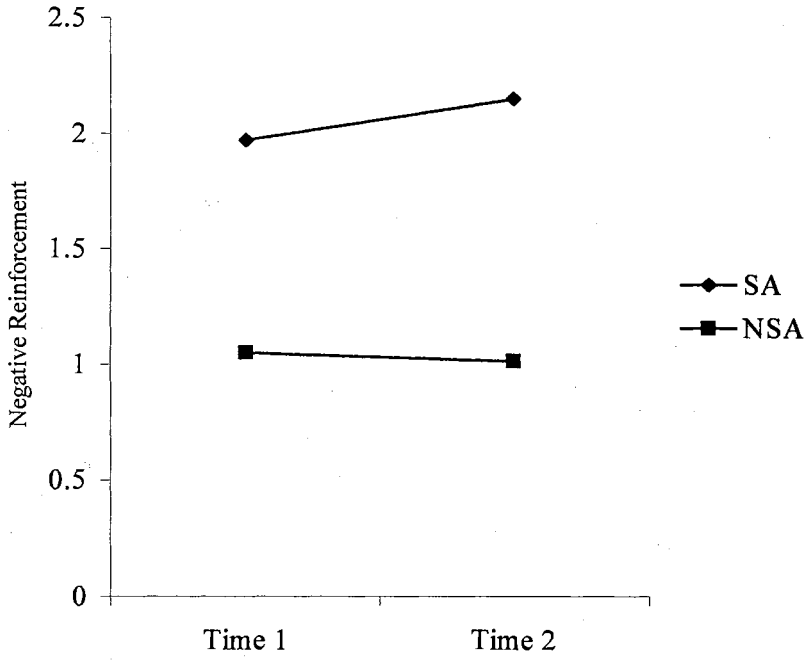

Figure 4. Changes in negative reinforcement from alcohol during the nine-week study interval by sexual assault status. SA = Sexually assaulted during nine-week study interval; NSA = Nonsexually assaulted during nine-week study interval.

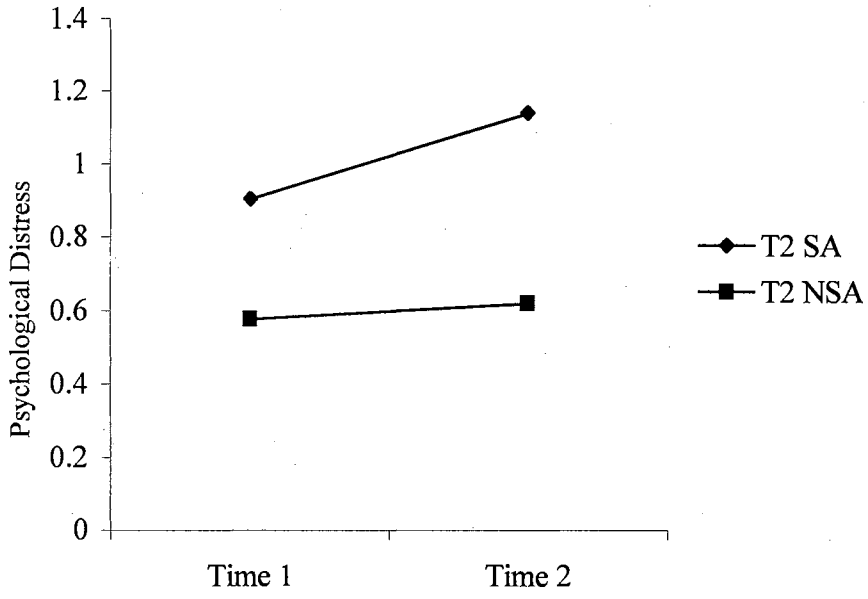

Figure 5. Interaction between time and sexual assault status at *Time 2* for psychological distress. T2 SA = Sexually assaulted at Time 2; T2 NSA = Nonsexually assaulted at *Time 2*.

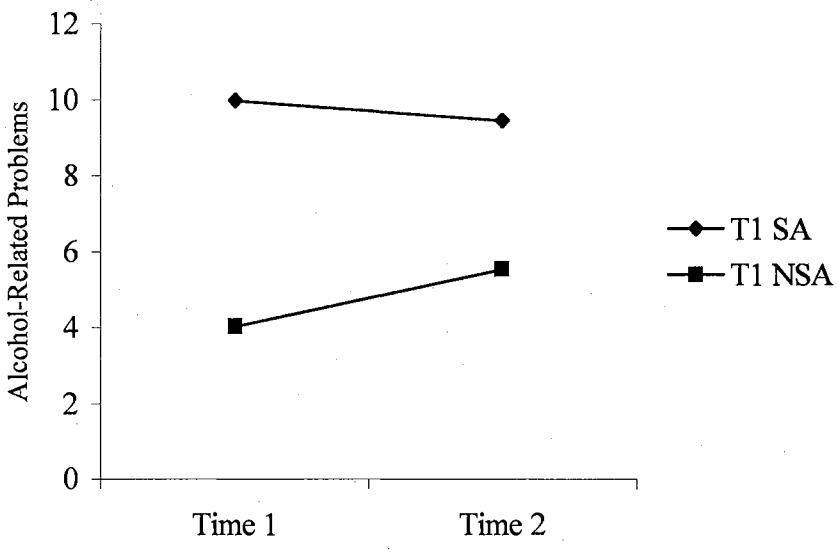

Figure 6. Interaction between time and sexual assault status at *Time 1* for alcohol-related problems. T1 SA = Sexually assaulted at *Time 1*; T1 NSA = Nonsexually assaulted at *Time 1*.

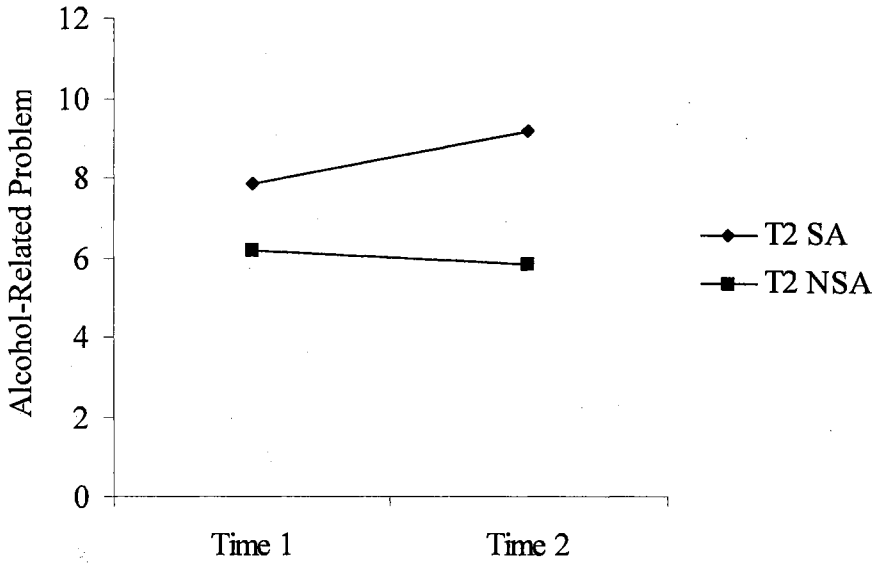

Figure 7. Interaction between time and sexual assault status at *Time 2* for alcohol-related problems. T2 SA = Sexually assaulted at *Time 2*; T2 NSA = Nonsexually assaulted at *Time 2*.

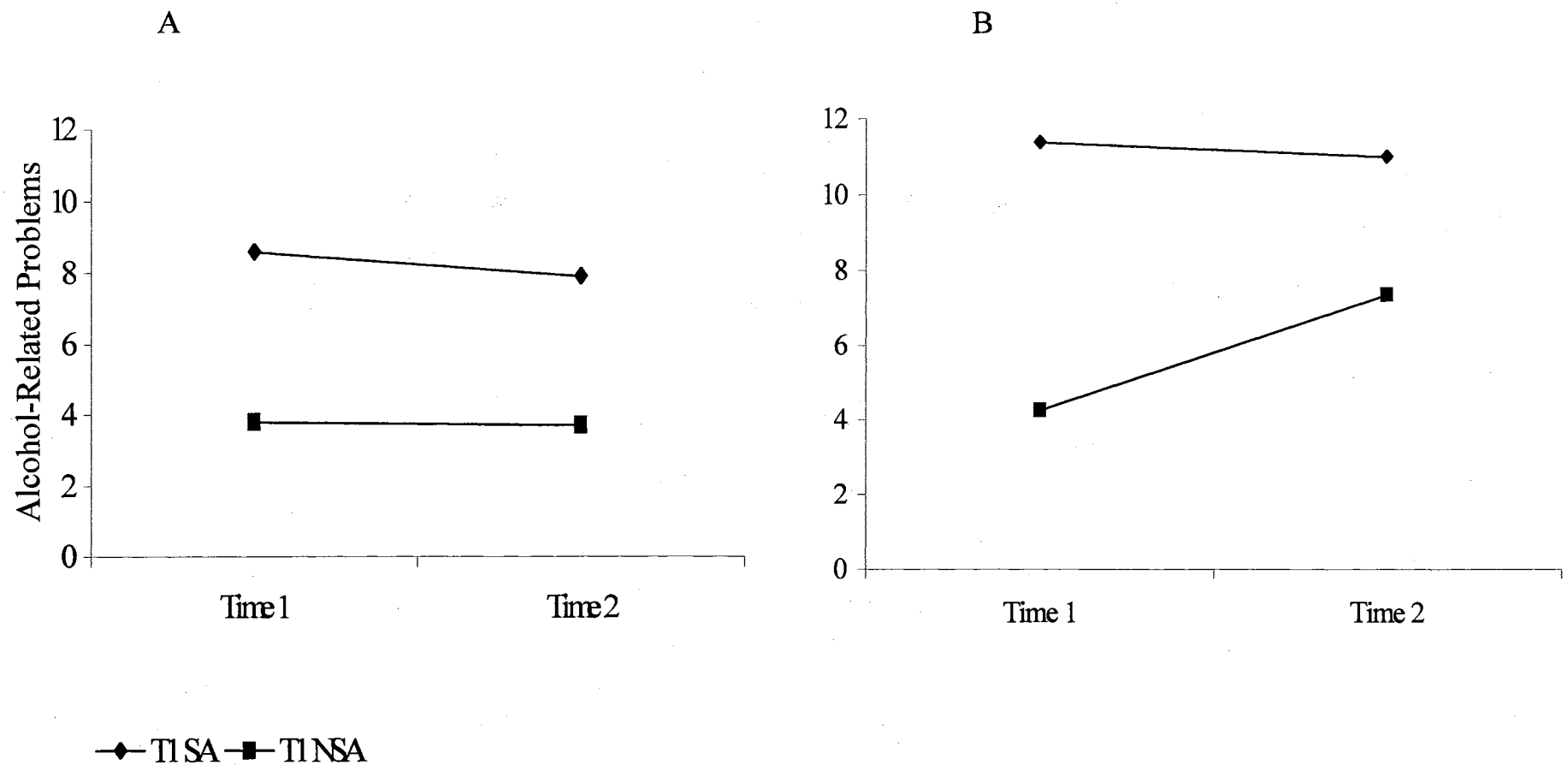

Figure 8. T1 SA = Women who experienced a sexual assault prior to the study; T1 NSA = Women who did not experience a sexual assault prior to the study. A) Changes in severity of alcohol-related problems among women who did not report a sexual assault during the nine week study period. B) Changes in severity of alcohol-related problems among women who experienced a sexual assault during the study.

APPENDIX

Oklahoma State University
Institutional Review Board

Protocol Expires: 7/19/01

Date : Thursday, July 20, 2000 IRB Application No AS013

Proposal Title: EXPERIENCES OF COLLEGE WOMEN

Principal Investigator(s) :

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Reviewed and Processed as: Expedited

Approval Status Recommended by Reviewer(s) : Approved

Signature: Carol Olson

Carol Olson, Director of University Research Compliance

Thursday, July 20, 2000
Date

Approvals are valid for one calendar year, after which time a request for continuation must be submitted. Any modifications to the research project approved by the IRB must be submitted for approval with the advisor's signature. The IRB office MUST be notified in writing when a project is complete. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board.

VITA

Lori A. Meyerson Z

Candidate for the Degree of

Doctor of Philosophy

Thesis: A PROSPECTIVE ANALYSIS OF SEXUAL ASSAULT AND ALCOHOL USE AMONG COLLEGE WOMEN

Major Field: Psychology

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