Published in final edited form as:

Psychol Addict Behav. 2007 March ; 21(1): 76–83. doi:10.1037/0893-164X.21.1.76.

Condom Use With a Casual Partner: What Distinguishes College Students' Use When Intoxicated?

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Abstract

Determining alcohol's precise role in sexual risk taking has proven to be an elusive goal. Past research has produced mixed results, depending on characteristics of individuals, their partners, and the situation, as well as how the link between alcohol consumption and sexual behavior was assessed. In this study, cross-sectional predictors of the frequency of condom use were examined for 298 heterosexual college students at a large urban university. In hierarchical multiple regression analyses that controlled for frequency of condom use when sober, alcohol expectancies regarding sexual risk taking and self-efficacy regarding condom use when intoxicated were significant predictors of frequency of condom use when intoxicated. These findings highlight the importance of targeting beliefs about alcohol's disinhibiting effects in STD- and HIV-prevention programs.

Keywords

risky sexual behavior; condom use; alcohol; STD and HIV prevention; college students

Approximately 19 million STD infections are diagnosed annually in the United States, and almost half occur among individuals between the ages of 15 and 24 (Weinstock, Berman, & Cates, 2004). At least half of all new HIV infections in the United States are estimated to occur among people under the age of 25, with African Americans disproportionately affected (Centers for Disease Control and Prevention, 2004). Rates of heterosexual transmission have been increasing, particularly among young women (Centers for Disease Control and Prevention, 2004).

Nationally representative surveys of college students suggest that many engage in high-risk sexual behaviors. Approximately 80% of college students have engaged in sexual intercourse, yet only about one third report that they regularly use condoms (Douglas et al., 1997; Wechsler et al., 2000). About one quarter of college students report having had six or more lifetime sexual partners (Douglas et al., 1997), and 6% report having had more than one partner in the past 30 days (Wechsler et al., 2000). Self-reported lifetime rates of STD infections range from 12% to 25% among sexually experienced students (Cooper, 2002),

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with rates of human papilloma virus and chlamydia during the past school year of approximately 1.5% (American College Health Association, 2005). Hightow et al. (2005) found 84 cases of newly diagnosed HIV in male college students from 37 different colleges and universities in North Carolina. The authors observed that most college students do not feel personally at risk for contracting HIV and AIDS and engage in many high-risk behaviors that allow STDs to spread rapidly.

Sexual risk taking and heavy drinking frequently co-occur (Cooper, 2002; Perkins, 2002). For example, 16% of a national sample of college students reported that they had had sex without a condom when intoxicated during the past school year (American College Health Association, 2005). The co-occurrence of drinking and unprotected sex does not demonstrate a causal relationship or elucidate what types of individual and situational factors contribute to intoxicated sexual risk-taking behavior. The study presented in this paper examines the cross-sectional predictors of heterosexual college students' frequency of condom use when intoxicated, after controlling for their frequency of condom use when sober. A brief review of the relevant literature is provided below.

Mixed Evidence Regarding the Relationship Between Intoxication and Risky Sexual Behavior

Acute alcohol consumption impairs higher-order cognitive processing and activates relevant expectancies (Curtin & Fairchild, 2003; Fillmore & Blackburn, 2002; Fromme, D'Amico, & Katz, 1999; George & Stoner, 2000). Thus, sexual encounters that take place when individuals are intoxicated are expected to involve more high-risk sexual behavior because of drinkers' diminished decision-making capacities, coupled with their beliefs that intoxication reduces their sexual inhibitions. Despite the large body of theory and research that supports this hypothesis, delineating alcohol's role in risky sexual behavior has been more challenging than originally anticipated (for reviews see Cooper, 2002; Halpern-Felsher, Millstein, & Ellen, 1996; Weinhardt & Carey, 2000). Personality traits, such as impulsivity and sensation seeking, may lead to both heavy drinking and willingness to engage in unprotected sex (Justus, Finn, & Steinmetz, 2000; Kalichman, Heckman, & Kelly, 1996). This concern has led many researchers to focus on within-subject studies in which participants are asked to report on multiple sexual events. If the same individuals are more likely to engage in unprotected sex when intoxicated compared to when sober, then the relationship between alcohol and condom use cannot be attributed to personality or other stable individual differences.

Although some multiple-event studies have supported the hypothesis that alcohol consumption increases the likelihood of engaging in risky sexual behavior, here, too, the findings are mixed (Cooper, Peirce, & Huselid, 1994; Graves & Hines, 1997; Morrison et al., 2003; Testa & Collins, 1997). Some authors have found stronger results when the outcome measure was number of casual sexual partners than when it was frequency of condom use (see Cooper, 2002, for a review). For example, in a national study of young adults, Graves and Hines (1997) found that alcohol consumption was more common in sexual events that involved partners known for a short period of time; however, results regarding the relationship between alcohol consumption and condom use were inconsistent.

Corbin and Fromme (2002) asked college students to report on their first and most recent sexual experiences with their current partners. Among those participants who had strong sex-related alcohol expectancies, condom use was negatively related to alcohol consumption during first sexual experiences with the current partner. This pattern did not continue for most recent intercourse with current partner, suggesting that alcohol is most likely to contribute to risky sexual behavior early in a sexual relationship.

The interrelationships between partner type, intoxication, and condom use make it difficult to disentangle alcohol's role in unprotected sex. Cooper and Orcutt (2000) interviewed more than 1,000 sexually active young adults. In within-subject analyses, participants reported that they were more likely to use condoms and to drink alcohol with casual partners than with serious partners. In event-level analyses, alcohol consumption was unrelated to condom use when partner type was not controlled. In contrast, when analyses were conducted separately for casual and serious partners, alcohol and condom use were negatively related for both types of partners. The authors suggest that when partner type is not controlled for in data analyses, it may act as a suppressor variable and mask the relationship between alcohol consumption and condom use.

Gender differences in the relationship between intoxication and condom use have also been hypothesized. Men consume alcohol more frequently and in larger quantities than do women (O'Malley & Johnston, 2002). Based on Steele and Josephs's (1990) theory of inhibition conflict, Cooper and Orcutt (1997) hypothesized that the situations in which sexual decisions create the most conflict differ for men and women; thus, the situations in which intoxication leads to greater sexual risk taking should also differ. They posited that having sex on a first date would be unappealing for most young women but would create conflict for most young men as they tried to balance their sexual desire and social prohibitions. In support of this theoretical reasoning, they found that young men's drinking on a first date was a significant predictor of engaging in intercourse; however, young women's drinking on a first date was unrelated to the likelihood of engaging in intercourse.

The Role of Self-Efficacy and Outcome Expectancies in Condom Use

Although alcohol researchers focus on alcohol's role in risky sexual behavior, many theories of health behavior have been applied to sexual risk taking and STD and HIV prevention (Albarracin et al., 2005). Bandura (1992, 1997) has successfully applied social-cognitive theory to explain college students' condom-use behaviors. This theory emphasizes the critical role of self-efficacy in determining whether people initiate safer sexual behaviors and persist despite challenges. A number of studies have supported the hypothesis that individuals who feel more self-efficacious about condom use are more likely to use condoms (Baele, Dusseldorp, & Maes, 2001; Dilorio, Dudley, Soet, Watkins, & Maibach, 2000; Wulfert & Wan, 1993). For example, in structural-equation analyses of data from 212 sexually active college students, Wulfert and Wan (1993) found that confidence about one's ability to use condoms was a strong predictor of the frequency of condom use for both women and men. Self-efficacy has been measured globally (Wulfert & Wan, 1993) and in terms of subdomains (Dilorio et al., 2000). Because condom use is inherently interpersonal, some researchers have emphasized the importance of feeling confident about partners'

acceptance of condoms and the ability to be assertive about expressing the desire to use a condom (Yesmont, 1992; Zamboni, Crawford, & Williams, 2000). Other common subdomains include feeling technically competent and feeling competent when intoxicated (Brien, Thombs, Mahoney, & Wallnau, 1994).

Outcome expectancies are another important component of the social-cognitive model that work in conjunction with self-efficacy but are a separate component of the model. Bandura (1997) argued that outcome expectancies are important to consider when the quality of performance does not fully determine the types of outcomes that will be experienced. Thus, people who expect to experience negative outcomes, such as reduced physical pleasure or partner disapproval, should be less likely to use condoms; whereas people who expect to experience positive outcomes should be more likely to use condoms (Dilorio et al., 2000; Wulfert & Wan, 1993). In support of this hypothesis, structural equation analyses of data from 1,380 students from six different colleges indicated that the stronger students' expectations that condom use would be associated with positive outcomes, the more frequently they used condoms (Dilorio et al., 2000).

Overview of Study and Hypotheses

To examine the effects of alcohol consumption on condom use, two parallel sets of hierarchical regression analyses were compared. In the first set of regressions, participants' frequency of condom use with a new or casual partner when sober was predicted with measures representing the domains of demographics (gender, age), personality (sensation seeking, assertiveness), alcohol (expectancies, consumption), and social-cognitive theory (self-efficacy, outcome expectancies). In the second set of regressions, we used the same independent variables to predict the same individuals' frequency of condom use when intoxicated, adding condom use when sober as a predictor on the first step. Because condom use when sober was controlled for, the predictors of condom use when intoxicated explain variance that is unique to condom use while intoxicated. Therefore, individual differences can be ruled out as a plausible alternative explanation for any divergence in the predictors of condom use while sober compared with condom use while intoxicated. Personality, alcohol, and social-cognitive variables were selected because they reflect different theories regarding condom use and alcohol's role in sexual risk taking. There are many reasons that college students engage in unprotected sex, and different individuals can be motivated to use condoms by different constellations of factors (Albarracin et al., 2005).

Although the primary focus was on condom use when intoxicated, it needs to be considered in the context of individuals' condom use when sober. We anticipated that condom use when sober and condom use when intoxicated would be strongly positively correlated and that they would share many of the same predictors. We focused on condom use with casual partners because most U.S. adults and college students report low levels of condom use with regular partners (Anderson, Wilson, Doll, Jones, & Barker, 1999; Fromme et al., 1999). Age and gender are included because past research suggests that men and younger individuals are more likely to report using condoms than are women and older individuals (Sheeran et al., 1999). Based on past research, we hypothesized that individuals high in sensation seeking would be less likely to use condoms with casual partners when sober and that individuals

high in social assertiveness would be more likely to do so (Justus et al., 2000; Kalichman et al., 1996; Zamboni et al., 2000). We also hypothesized that self-efficacy regarding negotiating condom use with one's partner and positive outcome expectancies regarding condom use would be associated with increased frequency of condom use when sober (Bandura, 1997; Dilorio et al., 2000; Wulfert & Wan, 1993).

We expected that when we controlled for condom use when sober, only alcohol-related variables would remain significant predictors of condom use when intoxicated. Based on past research and theory, alcohol expectancies about sexual risk taking and self-efficacy regarding condom use when intoxicated were expected to be significant predictors of frequency of condom use with casual partners when intoxicated (Abbey, Saenz, & Buck, 2005; Brien et al., 1994; Dermen & Cooper, 1994). A measure of usual alcohol consumption was included, although our expectation was that it would not be significant when drinking within the sexual situation was already taken into account. Interactions between the psychosocial predictors and gender were also examined, although these analyses were viewed as exploratory. Women express more concern than men do about the consequences of unprotected sex and have less positive attitudes about casual sexual relations (Amaro, 1995; Oliver & Hyde, 1993). Intoxication may cause women to be less focused on these concerns and feel more comfortable about unprotected sex with a casual partner. Thus, we explored the possibility that gender might interact with personality characteristics and attitudes, such that women who are high in sensation seeking or who strongly believe that alcohol makes them take sexual risks would be least likely to use condoms when intoxicated.

Method

Participants

College students from a large urban university participated in this study (195 women and 103 men). Fifty-three percent of participants were Caucasian, 35% were African-American, 6% were Arabic or Middle Easterner, 3% were Asian or Pacific Islander, 1% were Hispanic, and the remaining 2% had another ethnic background. Participants' ages ranged from 21 to 35, with an average age of 24 years ($SD = 3.3$).

Procedures

Participants were recruited from lists provided by the registrar's office and flyers posted on campus. Interested individuals were screened by telephone to determine their eligibility for an alcohol-administration study that focused on perceptions of a man and woman in a potential sexual situation. Thus, participants were required to be of the legal drinking age, to be social drinkers, and to date people of the opposite sex so that they could relate to the stimulus materials. Individuals who met the study's criteria were mailed an information sheet describing the study, a self-administered questionnaire, and two prestamped envelopes. Participants mailed back the questionnaires and payment sheets separately so that identifying information and questionnaire responses remained separate. Participants were paid \$25 upon receipt of the payment sheet. Seventy percent ($n = 366$) of eligible individuals ($n = 520$) returned the questionnaire. Because of this paper's focus on condom use, 40

participants who had never had sexual intercourse and 28 students who did not answer all of the condom questions were not included in data analyses, leaving a sample of 298 individuals.

Measures

Social desirability—Ballard's (1992) 13-item short version of the Marlowe-Crowne Social Desirability Scale was used to measure and control for social-desirability response bias. Sample items include, "No matter who I'm talking to, I'm always a good listener," and "I'm willing to admit it when I make a mistake." Participants responded either *true* (1) or *false* (0). Cronbach's alpha was .70.

Sensation seeking—Eysenck and Eysenck's (1977) 11-item sensation-seeking measure was used. Sample questions include, "Do you enjoy taking risks?" and "Would you do almost anything for a dare?" Responses were made on 5-point scales, with options ranging from *not at all* (1) to *very much* (5). Cronbach's alpha was .81.

Social assertiveness—A 12-item subset of Rathus's (1973) Assertiveness Schedule was used to measure social assertiveness. Sample items include, "I am open and frank about my feelings," and "I enjoy starting conversations with new acquaintances and strangers." Responses were made on 6-point scales with options ranging from *not at all like me* (1) to *exactly like me* (6). Cronbach's alpha was .80.

Alcohol expectancies—Two of Dermen and Cooper's (1994) alcohol-expectancy subscales were used to assess alcohol expectancies relevant to sexual risk taking. The 6-item sexual-risk subscale and the 7-item disinhibition subscale were highly correlated, $r = .65$, $p < .001$; thus, they were combined into a single measure. A sample sexual risk item is, "After a few drinks of alcohol, I am less likely to take precautions before having sex," and a sample disinhibition item is, "After a few drinks of alcohol, I become uninhibited." Responses were made on 5-point scales, with options ranging from *not at all* (1) to *very much* (5). Cronbach's alpha was .92.

Alcohol consumption—Participants were asked to think back over the past 12 months and indicate how many days they consumed beer, wine, wine coolers, or liquor in a typical month. They were then asked how many drinks they usually consumed per day on the days they drank alcohol, with a drink defined as 12 oz of beer, 5 oz of wine, a 10-oz wine cooler, or 1.5 oz of liquor. These two questions were multiplied to create a quantity by frequency measure of total monthly alcohol consumption (Cahalan, Cisin, & Crossley, 1969). Scores were skewed; thus, they were winsorized (Wilcox, 1996). Quantity by frequency measures of alcohol consumption are strongly correlated with measures based on daily diaries (Hilton & Clark, 1987; Midanik & Greenfield, 2003; Poikolainen, Podkletnova, & Alho, 2002).

Outcome expectancies associated with condom use—The pleasure sub-scale from the UCLA Multidimensional Condom Attitudes Scale (Helweg-Larsen & Collins, 1994) was used to assess positive expectancies regarding condom use. This 5-item subscale assesses expectations that condom use will be associated with pleasurable outcomes. Sample items

include, “The use of condoms can make sex more stimulating,” and “Condoms are a lot of fun.” This subscale demonstrated good reliability and validity in past research (Gabler, Kropp, Silvera, & Lavack, 2004; Helweg-Larsen & Collins, 1994). Responses were made on 7-point scales, with options ranging from *strongly disagree* (1) to *strongly agree* (7). Cronbach's alpha was .80.

Condom use self-efficacy—Several subscales were included from the Condom Use Self-Efficacy Scale (Brien et al., 1994). The 5-item partner and 3-item assertiveness subscales were combined, $r = .54, p < .001$, to assess self-efficacy regarding negotiating condom use with partners. Sample items include, “I feel confident in my ability to discuss condom usage with any partner I might have,” and “If I were unsure of my partner's feelings about using condoms, I would not suggest using one.” The 3-item self-efficacy regarding condom use when intoxicated subscale was also used. A sample item is, “I feel confident in my ability to discuss condom usage with any partner even after I have been drinking.” Responses were made on 5-point scales, with options ranging from *strongly disagree* (1) to *strongly agree* (5). Cronbach's alphas were .74 for each subscale.

Sexual experiences—Participants were asked several questions regarding their past consensual sexual behavior. They were asked how many consensual sexual intercourse partners they had in their lifetime, the number of partners they had sexual intercourse with on only one occasion, their number of oral sexual partners, and their number of anal sexual partners.

Condom use—In separate questions, participants were asked how often they used a condom when they had sexual intercourse when sober with a new or casual partner of the opposite sex and when drinking alcohol with a new or casual partner of the opposite sex. Responses were made on 7-point scales with options ranging from *never* (1) to *always* (7). No time frame was specified; thus, participants reported on their lifetime pattern of use. As is standard in survey research (Dillman, 1978), changes in the focus of the question were signaled to participants through the use of transitional statements (e.g., “The next two questions ask about times when you were *drinking alcohol*.”), and by making sure that important words stood out (e.g., “sexual intercourse with a **new or casual** partner AFTER DRINKING ALCOHOL”). Although these two items were highly correlated, $r = .75, p < .001$, this leaves 44% unshared variance, suggesting that participants distinguished between these two types of occasions. A measure of overall condom use that did not specify partner type or alcohol use was correlated .57 ($p < .001$) with condom use with a casual partner when sober and .53 ($p < .001$) with condom use with a casual partner when intoxicated.

Researchers have described the advantages and disadvantages of various measures of condom use depending on the risk status of the population and goals of the research (Schroder, Carey, & Vanable, 2003; Sheeran & Abraham, 1994). Schroder et al. (2003) argued that count data are preferable for evaluation studies, whereas measures of relative condom use, such as the measures used in this study, are preferable for etiological and correlational research. Experiments that have compared diary reports with retrospections of up to a year find that retrospective recall of condom use is very accurate (Graham, Catania, Brand, Duong, & Canchola, 2003; Jaccard, McDonald, Wan, Dittus, & Quinlan, 2002).

Results

Descriptive Information

As can be seen in Table 1, there was no significant difference in men's and women's number of sexual intercourse partners. Compared with women, men reported having significantly more partners with whom they had sex on only one occasion, more anal sex partners, and more oral sex partners.

Bivariate Analyses

Table 2 presents the correlations between the predictor and outcome measures, as well as the means and standard deviations for all variables. Social desirability was not significantly correlated with frequency of condom use when sober or intoxicated, although it was significantly correlated with gender, sensation seeking, social assertiveness, alcohol expectancies regarding sexual risk taking, self-efficacy regarding condom use when intoxicated, and positive outcome expectancies regarding condom use. Surprisingly, gender and sensation seeking were unrelated to condom use when sober or intoxicated. All of the other predictor variables were significantly correlated with both condom-use measures except alcohol consumption (which was only significantly correlated with frequency of condom use when intoxicated). This is not surprising, given the strong correlation between the two condom-use measures.

Hierarchical Multiple Regression Analyses

The first hierarchical multiple regression analysis examined how often participants had sex without a condom when sober with a new or casual partner (Cohen, Cohen, West, & Aiken, 2003). The first step included control and demographic variables: social desirability, age, and gender. The second step included personality measures: sensation seeking and social assertiveness. The third step included alcohol measures: alcohol expectancies about sexual risk taking and alcohol consumption. The final step included variables from social-cognitive theory: self-efficacy regarding communication with partner about condoms, self-efficacy regarding condom use when intoxicated, and positive outcome expectancies regarding condom use.

As can be seen in the first set of columns in Table 3, none of the demographic or control variables were significant multivariate predictors of condom use when sober. On the second step, social assertiveness was positively related to frequency of condom use when sober. This step explained 2% of the variance. On the third step, alcohol expectancies about sexual risk taking were significantly negatively related to frequency of condom use when sober. This step explained an additional 4% of the variance. On the fourth step, self-efficacy regarding condom use when intoxicated and positive outcome expectancies regarding condom use were both significant predictors of frequency of condom use when sober. This step explained an additional 19% of the variance, and in combination, these variables explained 26% of the variance in condom use when sober.

The same predictor variables were used to predict condom use when intoxicated, with one exception. Condom use when sober was added to the first step; thus, variables added on later

steps are explaining the variance in condom use when intoxicated that is not explained by condom use when sober. As anticipated, condom use when sober was a strong predictor of condom use when intoxicated, explaining 56% of its variance (see second set of columns in Table 3). On the second step, neither of the personality variables had significant effects after controlling for condom use when sober. On the third step, alcohol expectancies regarding sexual risk taking remained a significant predictor. This step explained approximately 4% of additional variance in condom use when intoxicated. On the fourth step, which also explained an additional 4% of the variance, self-efficacy regarding condom use when intoxicated remained a significant predictor. In combination, these variables explained 64% of the variance in condom use when intoxicated.¹

In a fifth step, interactions between gender and each of the personality, alcohol, and social-cognitive variables were examined. None of the interactions were significant; thus, they are not included in Table 3.

Discussion

The findings from this study replicate and extend past research. As hypothesized, frequency of condom use with casual partners was associated with social assertiveness, alcohol expectancies regarding sexual risk taking, self-efficacy, and positive outcome expectancies regarding condom use. Also as hypothesized, alcohol expectancies regarding sexual risk taking and self-efficacy regarding condom use when intoxicated were associated with frequency of condom use both when intoxicated and when sober. Beliefs about alcohol influenced condom use when intoxicated, even after controlling for condom use when sober, social desirability, age, gender, personality traits, and general alcohol consumption.

Some of our hypotheses were not supported. Despite the gender difference in number of one night stands and number of anal and oral sexual partners, gender was not significantly related to frequency of condom use when sober or intoxicated, either as a main effect or in interaction with other variables. Age was also not a significant predictor of condom use. Although younger adults and men are more likely to report using condoms, the magnitude of these relationships is typically low (Sheeran et al., 1999), and this sample had a constricted age range. Surprisingly, sensation seeking was not significantly related to condom use when sober or when intoxicated. We used a well-validated but general measure of sensation seeking (Eysenck & Eysenck, 1977). There may be unique characteristics of individuals who are sensation seekers in the sexual domain; thus, domain-specific measures, such as Kalichman et al.'s (1996) sexual sensation-seeking scale, are likely to be more closely related to sexual risk taking. In contrast, the expectancy measure specifically focused on individuals' beliefs about alcohol; yet it was strongly related to condom use when sober and

¹It is difficult to compare the magnitude of the betas because the two sets of regressions do not include the exact same predictor variables. To partially address this issue, we reran the hierarchical regressions for condom use when intoxicated, omitting condom use when sober from Step 1, thereby making the set of predictor variables equivalent for the two condom-use outcome measures. We then used Cohen et al.'s (2003) test for different dependent variables from a single sample to determine if any of the betas differed in magnitude for the two outcome measures. The difference between the betas was significant for alcohol expectancies and self-efficacy when intoxicated, $t(296) = 6.25$ and -6.26 , respectively, $ps < .001$. When condom use when sober was no longer a predictor of condom use when intoxicated, the relationship between alcohol expectancies and self-efficacy when intoxicated were stronger for condom use when intoxicated than for condom use when sober.

when intoxicated. This is partially due to the strong relationship between people's condom use when intoxicated and when sober. It also is likely that alcohol expectancies about sexual disinhibition share variance with general risk-taking measures; thus, this measure may have tapped into general individual differences in sexual risk taking. Dermen and Cooper (2000) also found a main effect of alcohol expectancies and suggested that they may be negatively related to conscientiousness. Future research is needed to examine the relationship between alcohol expectancies and general personality traits. Additionally, although self-efficacy regarding condom-use negotiation with partners was significantly correlated with condom use, it was not a significant multivariate predictor of condom use. The strong correlation between self-efficacy regarding partner negotiation and self-efficacy when intoxicated suggests that there is a core aspect of self-efficacy that is invariant across situations.

As Cooper (2002) noted, “the relationship between alcohol use and risky sexual behavior appears to be both complex and highly circumscribed” (p. 115), varying with characteristics of the individual drinker and the sexual situation. Furthermore, there are many methodological challenges associated with assessing alcohol's effects on sexual behavior. Most researchers emphasize the importance of conducting within-subject analyses so that stable individual differences are controlled (Cooper, 2002; Weinhardt & Carey, 2000). Some researchers have contrasted two or more specific sexual occasions that did or did not involve alcohol consumption. These studies often focus on memorable occasions, such as individuals' first sexual experience or first sexual experience with their current partner (Cooper & Orcutt, 1997; Dermen & Cooper, 2000). A potential disadvantage to this approach is that condom use during these special sexual events may not generalize to more routine sexual encounters. This study focused on individuals' frequency of condom use, rather than condom use on specific occasions. This measurement approach has the advantage of representing a broad range of sexual experiences; however, it raises concerns about accuracy of recall. Diary studies can provide descriptions of multiple sexual events, and because they are written soon afterwards, recall is less of a concern (Leigh, 2000; Morrison, Leigh, & Gillmore, 1999). However, the time burden this methodology places on participants can reduce response rates and, consequently, the generalizability of the findings from these studies. Currently, there is not enough overlap in the measures used by different researchers to provide continuity across studies.

Limitations

This study has several limitations that need to be considered. Participants were heterosexual, sexually active college students, and it is important to replicate these findings with other populations. As noted above, the measures of condom use assessed general frequency of use and were not tied to specific partners or occasions. Participants appeared to be able to distinguish between condom use when sober and condom use when intoxicated; however, methodological research is needed to determine the best way to accurately assess the memory of events that occurred when intoxicated (Del Boca & Darkes, 2003). Timeline follow-back and event-sampling methodologies provide more precise measures of condom use. Additionally, the study was cross-sectional, and causal direction can only be plausibly inferred. Alcohol administration studies that randomly assign participants to drink conditions can make stronger causal inferences, although they must rely on proxy measures

of sexual risk taking. Several of these studies have found that compared to nondrinkers, individuals who consume alcohol express greater willingness to engage in unprotected sex in a hypothetical sexual situation (Abbey et al., 2005; Maisto, Carey, Carey, Gordon, & Schum, 2004; Maisto, Carey, Carey, Gordon, Schum, & Lynch, 2004).

Implications

Early studies that found a strong global correlation between alcohol consumption and risky sexual behavior suggested that interventions focused on reducing alcohol consumption among high-risk individuals would be effective in reducing rates of unprotected sex (Graves, 1995; Strunin & Hingson, 1992). Many researchers became pessimistic about the usefulness of alcohol interventions when later methodologically rigorous studies demonstrated that the relationship between alcohol consumption and risky sexual behavior was more complicated than first thought (Halpern-Felsher et al., 1996; Weinhardt & Carey, 2000). Intoxication does appear to affect risky sexual behavior, but only for some drinkers and only under some circumstances. Similar conclusions have been made by aggression researchers, who note that alcohol's role in aggression follows multiple pathways and may differ for individuals with different constellations of risk factors (Giancola, 2004; Pihl, Assaad, & Hoaken, 2003). There is a need for more sophisticated theories that include potential moderators to identify which individual drinkers are most likely to engage in risky sexual behavior when intoxicated. It is important to recognize that the strongest predictor of condom use when intoxicated is condom use when sober. This suggests that even when interventionists are concerned about condom use when intoxicated, prevention strategies that encourage general condom use may be most effective from a public health perspective.

Furthermore, this study's findings indicate that college students are less likely to use condoms if they strongly believe that alcohol makes them sexually disinhibited and if they feel less confident that they can successfully use a condom when drinking. These findings highlight the need for prevention programs that challenge these beliefs and provide students with skill-building exercises that increase their confidence about their ability to use condoms under all types of circumstances, including intoxication. Prevention programs should also encourage students to question whether they should be having sex if they feel temporarily unable to correctly use a condom due to intoxication, exhaustion, anxiety, or any other reason.

Acknowledgments

This research was supported by National Institute on Alcohol Abuse and Alcoholism Grant AA-11996. We would like to thank Shetoya Rice for her assistance with data collection and Angela Jacques for her advice regarding data analyses.

References

- Abbey A, Saenz C, Buck PO. The cumulative effects of acute alcohol consumption, individual differences, and situational perceptions on sexual decision making. *Journal of Studies on Alcohol*. 2005; 66:82–90. [PubMed: 15830907]
- Albarracin D, Gillette JC, Earl AN, Glasman LR, Durantini MR, Ho MH. A test of major assumptions about behavior change: A comprehensive look at the effects of passive and active HIV-prevention

interventions since the beginning of the epidemic. *Psychological Bulletin*. 2005; 131:856–897. [PubMed: 16351327]

- Amaro H. Love, sex, and power: Considering women's realities in HIV prevention. *American Psychologist*. 1995; 50:437–447. [PubMed: 7598292]
- American College Health Association. The American College Health Association National College Health Assessment (ACHA-NCHA) Spring 2003 reference group report. *Journal of American College Health*. 2005; 53:199–210. [PubMed: 15813230]
- Anderson JE, Wilson R, Doll L, Jones TS, Barker P. Condom use and HIV risk behaviors among U.S. adults: Data from a national survey. *Family Planning Perspectives*. 1999; 31:24–28. [PubMed: 10029929]
- Baele J, Dusseldorp E, Maes S. Condom use self-efficacy: Effect on intended and actual condom use in adolescents. *Journal of Adolescent Health*. 2001; 28:421–431. [PubMed: 11336873]
- Ballard R. Short forms of the Marlowe-Crowne Social Desirability Scale. *Psychological Reports*. 1992; 71:1155–1160. [PubMed: 1480695]
- Bandura, A. A social cognitive approach to the exercise of control over AIDS infection. In: DiClemente, RJ., editor. *Adolescents and AIDS: A generation in jeopardy*. Newbury Park, CA: Sage; 1992. p. 89-116.
- Bandura, A. *Self-efficacy: The exercise of control*. New York: Freeman; 1997.
- Brien TM, Thombs DL, Mahoney CA, Wallnau L. Dimensions of self-efficacy among three distinct groups of condom users. *Journal of American College Health*. 1994; 42:167–174. [PubMed: 8132940]
- Cahalan, D.; Cisin, I.; Crossley, H. *American drinking practices*. New Brunswick, NJ: Rutgers Center for Alcohol Studies; 1969.
- Centers for Disease Control and Prevention. HIV/AIDS surveillance report, 2003. Vol. 15. Atlanta, GA: US Department of Health and Human Services; 2004.
- Cohen, J.; Cohen, P.; West, SG.; Aiken, LS. *Applied multiple regression/correlation analysis for the behavioral sciences*. 3rd. Mahwah, NJ: Erlbaum; 2003.
- Cooper ML. Alcohol use and risky sexual behavior among college students and youth: Evaluating the evidence. *Journal of Studies on Alcohol*. 2002; (Suppl. 14):101–117.
- Cooper ML, Orcutt HK. Drinking and sexual experience on first dates among adolescents. *Journal of Abnormal Psychology*. 1997; 106:191–202. [PubMed: 9131839]
- Cooper ML, Orcutt HK. Alcohol use, condom use and partner type among heterosexual adolescents and young adults. *Journal of Studies on Alcohol*. 2000; 61:413–419. [PubMed: 10807212]
- Cooper ML, Peirce RS, Huselid RF. Substance use and sexual risk taking among black adolescents and white adolescents. *Health Psychology*. 1994; 13:251–262. [PubMed: 8055860]
- Corbin WR, Fromme K. Alcohol use and serial monogamy as risks for sexually transmitted diseases in young adults. *Health Psychology*. 2002; 21:229–236. [PubMed: 12027028]
- Curtin JJ, Fairchild BA. Alcohol and cognitive control: Implications for regulation of behavior during response conflict. *Journal of Abnormal Psychology*. 2003; 112:424–436. [PubMed: 12943021]
- Del Boca F, Darkes J. The validity of self-reports of alcohol consumption: State of the science and challenges for research. *Addiction*. 2003; 98:1–12. [PubMed: 14984237]
- Dermen KH, Cooper ML. Sex-related alcohol expectancies among adolescents: I. Scale development. *Psychology of Addictive Behaviors*. 1994; 8:152–160.
- Dermen KH, Cooper ML. Inhibition conflict and alcohol expectancy as moderators of alcohol's relationship to condom use. *Experimental and Clinical Psychopharmacology*. 2000; 8:198–206. [PubMed: 10843303]
- Dillman, DA. *Mail and telephone surveys: The total design method*. New York: Wiley; 1978.
- Dilorio C, Dudley WN, Soet J, Watkins J, Maibach E. A social cognitive-based model for condom use among college students. *Nursing Research*. 2000; 49:208–214. [PubMed: 10929692]
- Douglas KA, Collins JL, Warren C, Kahn L, Gold R, Clayton S, et al. Results from the 1995 National College Health Risk Behavior Study. *Journal of American College Health*. 1997; 46:55–66. [PubMed: 9276349]

- Eysenck SB, Eysenck HJ. The place of impulsiveness in a dimensional system of personality description. *British Journal of Social and Clinical Psychology*. 1977; 16:57–68. [PubMed: 843784]
- Fillmore MT, Blackburn J. Compensating for alcohol-induced impairment: Alcohol expectancies and behavioral disinhibition. *Journal of Studies on Alcohol*. 2002; 63:237–246. [PubMed: 12033701]
- Fromme K, D'Amico EJ, Katz EC. Intoxicated sexual risk taking: An expectancy or cognitive impairment explanation? *Journal of Studies on Alcohol*. 1999; 60:54–63. [PubMed: 10096309]
- Gabler J, Kropp F, Silvera DH, Lavack AM. The role of attitudes and self-efficacy in predicting condom use and purchase intentions. *Health Marketing Quarterly*. 2004; 21:63–78. [PubMed: 15739827]
- George WH, Stoner SA. Understanding acute alcohol effects on sexual behavior. *Annual Review of Sex Research*. 2000; 11:92–124.
- Giancola PR. Executive functioning and alcohol-related aggression. *Journal of Abnormal Psychology*. 2004; 113:541–555. [PubMed: 15535787]
- Graham CA, Catania JA, Brand R, Duong T, Canchola JA. Recalling sexual behavior: A methodological analysis of memory recall bias via interview using the diary as the gold standard. *The Journal of Sex Research*. 2003; 40:325–332.
- Graves KL. Risky behavior and alcohol use among young adults: Results from a national survey. *American Journal of Health Promotion*. 1995; 10:27–36. [PubMed: 10155656]
- Graves KL, Hines AM. Ethnic differences in the association between alcohol and risky sexual behavior with a new partner: An event-based analysis. *AIDS Education and Prevention*. 1997; 9:219–237. [PubMed: 9241389]
- Halpern-Felsher BL, Millstein SG, Ellen JM. Relationship of alcohol use and risky sexual behavior: A review and analysis of findings. *Journal of Adolescent Health*. 1996; 19:331–336. [PubMed: 8934293]
- Helweg-Larsen M, Collins BE. The UCLA multidimensional condom attitudes scale: Documenting the complex determinants of condom use in college students. *Health Psychology*. 1994; 13:224–237. [PubMed: 8055858]
- Hightow LB, MacDonald PDM, Pilcher CD, Kaplan AH, Foust E, Nguyen TQ, Leone PA. The unexpected movement of the HIV epidemic in the Southeastern United States. *Journal of Acquired Immune Deficiency Syndrome*. 2005; 38:531–537.
- Hilton ME, Clark WB. Changes in American drinking patterns and problems, 1967–1984. *Journal of Studies on Alcohol*. 1987; 48:515–522. [PubMed: 3500367]
- Jaccard J, McDonald R, Wan CK, Dittus PJ, Quinlan S. The accuracy of self-reports of condom use and sexual behavior. *Journal of Applied Social Psychology*. 2002; 32:1863–1905.
- Justus AN, Finn PR, Steinmetz JE. The influence of traits of disinhibition on the association between alcohol use and risky sexual behavior. *Alcoholism: Clinical and Experimental Research*. 2000; 24:1028–1035.
- Kalichman SC, Heckman T, Kelly JA. Sensation seeking as an explanation for the association between substance use and HIV-related risky sexual behavior. *Archives of Sexual Behavior*. 1996; 25:141–154. [PubMed: 8740520]
- Leigh BC. Using daily reports to measure drinking and drinking patterns. *Journal of Substance Abuse*. 2000; 12:51–65. [PubMed: 11288474]
- Maisto SA, Carey MP, Carey KB, Gordon CM, Schum JL. Effects of alcohol and expectancies on HIV-related risk perception and behavioral skills in heterosexual women. *Experimental and Clinical Psychopharmacology*. 2004; 12:288–297. [PubMed: 15571446]
- Maisto SA, Carey MP, Carey KB, Gordon CM, Schum JL, Lynch KG. The relationship between alcohol and individual differences variables on attitudes and behavioral skills relevant to sexual health among heterosexual young adult men. *Archives of Sexual Behavior*. 2004; 33:571–584. [PubMed: 15483371]
- Midanik LT, Greenfield TK. Telephone versus in-person interviews for alcohol use: Results of the 2000 National Alcohol Survey. *Drug and Alcohol Dependence*. 2003; 72:209–214. [PubMed: 14643937]

- Morrison DM, Gilmore MR, Hoppe MJ, Gaylord J, Leigh BC, Rainey D. Adolescent drinking and sex: Findings from a daily diary study. *Perspectives on Sexual and Reproductive Health*. 2003; 35:162–168. [PubMed: 12941648]
- Morrison DM, Leigh BC, Gillmore MR. Daily data collection: A comparison of three methods. *Journal of Sex Research*. 1999; 36:76–81.
- Oliver MB, Hyde JS. Gender differences in sexuality: A meta-analysis. *Psychological Bulletin*. 1993; 114:29–51. [PubMed: 8346327]
- O'Malley PM, Johnston LD. Epidemiology of alcohol and other drug use among American college students. *Journal of Studies on Alcohol*. 2002; (Suppl. 14):23–39.
- Perkins HW. Surveying the damage: A review of research on consequences of alcohol misuse in college populations. *Journal of Studies on Alcohol*. 2002; (Suppl. 14):91–100. [PubMed: 11925064]
- Pihl RO, Assaad JM, Hoaken PNS. The alcohol-aggression relationship and differential sensitivity to alcohol. *Aggressive Behavior*. 2003; 29:302–315.
- Poikolainen K, Podkletnova I, Alho H. Accuracy of quantity-frequency and graduated frequency questionnaires in measuring alcohol intake: Comparison with daily diary and commonly used laboratory markers. *Alcohol and Alcoholism*. 2002; 37:573–576. [PubMed: 12414549]
- Rathus SA. A 30-item schedule for assessing assertive behavior. *Behavior Therapy*. 1973; 4:398–406.
- Schroder KEE, Carey MP, Vanable PA. Methodological challenges in research on sexual risk behavior: I. Item content, scaling, and data analytical options. *Annals of Behavioral Medicine*. 2003; 26:76–103. [PubMed: 14534027]
- Sheeran P, Abraham C. Measurement of condom use in 72 studies of HIV-preventive behaviour: A critical review. *Patient Education and Counseling*. 1994; 24:199–216. [PubMed: 7753715]
- Sheeran P, Abraham C, Orbell S. Psychosocial correlates of heterosexual condom use: A meta-analysis. *Psychological Bulletin*. 1999; 125:90–132. [PubMed: 9990846]
- Steele CM, Josephs RA. Alcohol myopia: Its prized and dangerous effects. *American Psychologist*. 1990; 45:921–933. [PubMed: 2221564]
- Strunin L, Hingson R. Alcohol, drugs, and adolescent sexual behavior. *International Journal of the Addictions*. 1992; 27:129–146. [PubMed: 1544720]
- Testa M, Collins RL. Alcohol and risky sexual behavior: Event-based analyses among a sample of high-risk women. *Psychology of Addictive Behaviors*. 1997; 11:190–201.
- Wechsler H, Lee JE, Kuo M, Seibring M, Nelson TF, Lee H. Trends in college binge drinking during a period of increased prevention efforts: Findings from 4 Harvard School of Public Health College Alcohol Study surveys: 1993–2001. *Journal of American College Health*. 2000; 50:203–217. [PubMed: 11990979]
- Weinhardt LS, Carey MP. Does alcohol lead to sexual risk behavior? Findings from event-level research. *Annual Review of Sex Research*. 2000; 11:125–157.
- Weinstock H, Berman B, Cates W Jr. Sexually transmitted diseases among American youth: Incidence and prevalence estimates, 2000. *Perspectives on Sexual and Reproductive Health*. 2004; 36:6–10. [PubMed: 14982671]
- Wilcox, RR. *Statistics for the social sciences*. San Diego, CA: Academic Press; 1996.
- Wulfert E, Wan CK. Condom use: A self-efficacy model. *Health Psychology*. 1993; 12:346–353. [PubMed: 8223358]
- Yesmont GA. The relationship of assertiveness to college students' safer sex behaviors. *Adolescence*. 1992; 27:253–272. [PubMed: 1621558]
- Zamboni BD, Crawford I, Williams PG. Examining communication and assertiveness as predictors of condom use: Implications for HIV prevention. *AIDS Education and Prevention*. 2000; 12:492–504. [PubMed: 11220502]

Table 1
Descriptive Information About Men's and Women's Sexual Behavior

Variable	Men (<i>n</i> = 103)		Women (<i>n</i> = 195)		<i>F</i> (1, 296)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
No. of consensual sexual intercourse partners	11.76	12.01	9.39	9.91	2.30
No. of 1-night stands	3.49	4.11	2.58	3.70	3.74*
No. of consensual anal sex partners	0.94	1.39	0.62	0.95	5.59*
No. of consensual oral sex partners	9.89	9.10	6.60	7.02	12.05**

* $p < .05$

** $p < .01$

Table 2
Intercorrelations of Condom Use and Predictor Variables (N = 298)

Predictor variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Condom use when sober	6.08	1.52	—											
2. Condom use when drinking	5.86	1.66	.75**	—										
3. Social desirability	1.42	0.22	.01	.00	—									
4. Age	24.36	3.33	.11	.07	.02	—								
5. Gender	0.65	0.48	.02	.05	-.13*	-.04	—							
6. Sensation seeking	2.86	0.67	-.07	-.08	-.12*	-.11	-.28**	—						
7. Assertiveness	3.80	0.79	.14*	.14*	.19**	.02	.02	-.08	—					
8. Alcohol expectancies	2.36	0.85	-.23**	-.34**	-.31**	-.14*	-.19*	.38**	-.19**	—				
9. Alcohol consumption	30.06	27.93	-.10	-.14*	-.03	-.24**	-.15*	.20**	.00	.28**	—			
10. Self-efficacy: partner	4.69	0.45	.38**	.41**	.07	.06	.08	-.08	.26**	-.30**	-.09	—		
11. Self-efficacy: intoxicated	4.29	0.84	.47**	.58**	.14*	.06	.04	-.07	.20**	-.45**	-.12*	.61**	—	
12. Positive outcome expectancies	4.07	1.22	.27**	.24**	.13*	.08	.13*	-.16**	.09	-.40**	-.10	.26**	.30**	—

Note. For gender, men = 0 and women = 1.

* $p < .05$.

** $p < .01$.

Table 3
Hierarchical Multiple Regression Analyses Predicting Frequency of Condom Use With a New or Casual Partner When Sober and When Intoxicated (N = 298)

Variable	Condom use: sober				Condom use: intoxicated			
	B	SE B	β	R ²	B	SE B	β	R ²
Step 1: control variables				.012				.560**
Condom use when sober	NA	NA	NA		0.82	.04	.75**	
Social desirability	0.10	.40	.02		-0.02	.29	-.00	
Age	0.05	.03	.11		-0.00	.02	-.01	
Gender	0.09	.19	.03		0.11	.14	.03	
Step 2: personality variables				.020*				.002
Sensation seeking	-0.12	.14	-.05		-0.04	.10	-.02	
Assertiveness	0.25	.11	.13*		0.08	.08	.04	
Step 3: alcohol variables				.040**				.038**
Alcohol expectancies	-0.40	.12	-.22**		-0.44	.09	-.22**	
Alcohol consumption	-0.00	.00	-.03		0.00	.00	-.03	
Step 4: condom-use variables				.189**				.042**
Self-efficacy: partner	0.39	.22	.12		-0.02	.17	-.01	
Self-efficacy: intoxicated	0.67	.13	.37**		0.51	.10	.26**	
Positive outcome expectancies	0.18	.07	.15**		-0.06	.05	-.05	

Note. For gender, men = 0 and women = 1. NA = not applicable.

* $p < .05$

** $p < .01$.