Influence of Social Settings on Risky Sexual Behavior

James B. Hittner¹, Emmalee C. Owens¹, and Rhonda J. Swickert¹

Abstract
This study investigated the relevance of social settings as predictors of risky sexual behavior. In a young adult sample (n = 324, M age = 20.2 years), we examined the association between frequency of attendance at five different settings and frequency of engaging in four risky sexual behaviors (i.e., unprotected intercourse when not drunk or high, unprotected intercourse when drunk or high, casual sex when not drunk or high, casual sex when drunk or high). Predictive associations were examined using negative binomial regression, and all analyses controlled for frequency of recent alcohol use and age at first use of alcohol. Greater attendance at fraternity/sorority parties predicted more frequent intercourse for females in the not drunk or high and drunk or high contexts, and more frequent casual sex for males in the not drunk or high context. Greater attendance at large private parties predicted more frequent intercourse for females in the not drunk or high context. Greater attendance at bars without dance floors predicted more frequent intercourse for males in the drunk or high context. These findings highlight the importance of socializing habits in understanding risky sexual behavior.

Keywords
risky sex, social setting, socializing, alcohol use, age of alcohol use onset

Risky sexual behaviors are sexual activities that increase the risk of acquiring sexually transmitted diseases (STDs) and HIV. In addition, for women, risky sexual behavior increases the probability of experiencing an unwanted pregnancy. Risky sexual behavior is both prevalent and costly from a public health perspective. According to the Centers for Disease Control and Prevention (CDC; 2010), there are approximately 19 million new cases of STDs each year in the United States, costing the health care system about US$17 billion per year. The prevalence of many risky behaviors, including unprotected sexual intercourse, peaks during the late teen years and early 20s (Arnett, 2000). Consequently, STDs disproportionately affect adolescents and young adults. In fact, in the United States, roughly half of new STD cases annually are accounted for by teens and young adults (CDC, 2010). Among late teens and young adults, college students may be particularly at risk of STDs given that sizable numbers of college students participate in casual sex. For example, Paul, McManus, and Hayes (2000) found that 30% of undergraduates had sexual intercourse with a stranger or brief acquaintance in college. Grello, Welsh, and Harper (2006) found that 50% of male and 35% of female college students engaged in casual sexual activity. Other studies with college students have reported similar results (e.g., Fielder & Carey, 2010; Herold, Maticka-Tyndale, & Mewhinney, 1998).

College students are also at heightened risk of acquiring STDs due to inconsistent condom use. A 2005 study by the American College Health Association found that 52% of college students had vaginal intercourse at least once in the past month, but that of this subgroup, approximately 53% reported inconsistent condom use. Lewis, Miguez-Burbano, and Malow (2009) found that many college students reported both multiple sex partners and inconsistent condom use during intercourse. Inconsistent condom use and other risky sexual behaviors not only heighten one’s risk of acquiring STDs, but such behaviors also increase the chance of non-disease related negative consequences such as unintended pregnancies, regretting the sexual episode (Agius, Taft, Hemphill, Toumbourou, & McMorris, 2013), guilt and reduced self-esteem (Paul et al., 2000), and social stigmatization (Allison & Risman, 2013). Given the broad range of negative consequences associated with risky sexual activity, it is important to understand the factors that predict high-risk sexual behavior during the young adult years.

¹College of Charleston, SC, USA

Corresponding Author:
James B. Hittner, Professor, Department of Psychology, College of Charleston, 66 George Street, Charleston, SC 29424, USA.
Email: hittnerj@cofc.edu
The majority of research in this area has focused on individual-level, or person-level, predictors of risky sexual behavior. Some of the most important individual-level predictors include heavy alcohol use (e.g., Bellis et al., 2008; Cooper, 2002; Thompson, Kao, & Thomas, 2005), illicit drug use (e.g., Guo et al., 2002; Hittner & Kennington, 2008; Hittner & Schachne, 2012), condom use self-efficacy (e.g., Baele, Dusseldorp, & Maes, 2001; Sterk, Klein, & Elifson, 2003), perceived susceptibility to STDs and HIV (e.g., Gerrard, Gibbons, & Bushman, 1996; Kershaw, Nicololai, Ethier, Lewis, & Ickovics, 2003), and peer normative perceptions regarding risky sexual behavior (e.g., Bon, Hittner, & Lawandales, 2001; Winslow, Franzini, & Hwang, 1992). In contrast to individual-level predictors, contextual predictors, such as social settings, have received less research attention. Social setting factors may be especially relevant for college students as they often find themselves in new and novel situations such as being away from parents and siblings, adjusting to the dynamics of living with roommates, and dealing with a newfound level of autonomy and independence. Several studies with college students have found differences across social settings (e.g., public bars, private parties, drinking game events) in alcohol use patterns and amount of alcohol consumed (Clapp et al., 2003; Clapp, Reed, Holmes, Lange, & Voas, 2006; Demers et al., 2002). Other studies (e.g., Single & Wortley, 1993) have found that preferences for drinking in certain settings, such as bars, parties, and weddings (wherein the greatest proportion of yearly alcohol consumed occurs in these settings) are positively associated with total number of alcohol-related problems. In contrast to these studies, very little research has examined the association between social settings and risky sexual behavior.

In what appears to be the only published study on this topic, Bersamin, Paschall, Saltz, and Zamboanga (2012) examined how drinking activity in six different settings (fraternity or sorority parties, residence-hall parties, campus events, parties at off-campus houses or apartments, restaurants or bars, and outdoor settings) influenced the likelihood that college students would have sex with a relative stranger after drinking in those settings. Results indicated that fraternity or sorority parties, residence-hall parties, and off-campus parties were most strongly associated with having alcohol-related casual sex (Bersamin et al., 2012). Although comprehensive in many respects, the Bersamin study only examined one type of risky sexual behavior, that of having sex with a relative stranger (i.e., casual sex). Other types of risky sexual activity were not examined. In fact, to this point, Bersamin et al. (2012) wrote that future research “should also investigate how different drinking venues impact a range of high-risk sexual behaviors” (p. 280). Another consideration is that several of Bersamin’s settings could encompass different types of locations, and these locations could have very different associations with high-risk sexual behavior. Take, for example, the setting of “campus events.” Some campus events allow alcohol use, whereas others are alcohol-free activities. The presence or absence of alcohol use is an important predictor of risky sexual behavior (e.g., Bellis et al., 2008; Thompson et al., 2005). In fact, a recent meta-analysis by Claxton, DeLuca, and van Dulmen (2015) found a weighted mean correlation effect size of $r = .34 (Z = 12.6, p < .001)$ between alcohol use and casual sexual activity. As a second example, consider Bersamin’s setting of “restaurants or bars.” These two locations can be quite different, and thus, combining restaurants with bars could mask the specific risks associated with bars only (see Studer et al., 2015, for additional discussion of the importance of disentangling setting effects).

Building on Bersamin et al. (2012), the aims of the present study were threefold. First, we examined the association between frequency of unprotected intercourse and frequency of attending five different social settings (i.e., bar with a dance floor, bar without a dance floor, fraternity/sorority party, large private party, and small private party. See the Instruments section for additional details). Second, we examined the association between frequency of casual sex (i.e., sex with someone just met) and frequency of attending the same five social settings. Third, we examined the strength of model fit (see Data Analyses section) between each risky sexual behavior and the five social settings under two different substance use contexts, that of being “drunk or high” and “not drunk or high.” Based on previous research (e.g., Bersamin et al., 2012; Bon et al., 2001; Hittner & Kennington, 2008), the following three hypotheses were advanced: (a) Frequency of attending one or more social settings will be significantly associated with risky sexual behavior (i.e., unprotected intercourse and/or casual sex); (b) frequency of attending certain types of social settings, in particular, private parties and fraternity/sorority parties, will be more strongly associated with risky sexual behavior than will other types of social settings (this hypothesis follows from Bersamin et al., who found that off-campus parties and fraternity/sorority parties were most predictive of casual sex); (c) the strength of model fit between frequency of attending the different social settings and risky sexual behavior will be greater in the “drunk or high” versus “not drunk or high” substance use context (this hypothesis follows from the literature linking heavy alcohol use and intoxication to high-risk sexual behavior, see Bellis et al., 2008; Claxton et al., 2015; and Thompson et al., 2005).

Method

Participants

The participants were 324 undergraduate students enrolled at a public university in Southeastern United States. There were 215 females and 109 males, and the students ranged in age from 18 to 26 years ($M = 20.2, Median = 20, SD = 1.8$). Ninety-five percent of the students were between 18 and 23
years of age. Sixty-one percent of the students were less than 21 years old (57% of males, 64% of females). The sample was predominantly White (86.7%), with the remaining racial breakdown being Black (6.9%), Hispanic (1.3%), Asian or Pacific Islander (1.3%), American Indian or Alaskan Native (1.3%), and other (2.5%). The vast majority of participants were not married (97.1%) and enrolled as full-time students (96.6%). Only six students (1.8%) reported that they lived in a fraternity or sorority house. All participants were lifetime alcohol users in that they had consumed at least one alcoholic beverage on at least one occasion. In other words, no lifetime alcohol abstainers were included in the study. Based on the sample characteristics, there were more White students, fewer minority students, and a higher percentage of full-time students than is typical of the modal 4-year public university in the United States (National Center for Education Statistics, 2015).

**Instruments**

Students completed the Core Alcohol and Drug Survey (Presley, Harrold, Scouten, Lyerla, & Meilman, 1993). The Core Survey contains questions requesting demographic information (e.g., age, gender) and personal substance use (e.g., “During the past 30 days, on how many days did you have alcohol?”). The questions regarding past month substance use were answered using a 7-point scale with the following response options: 0 days, 1 to 2 days, 3 to 5 days, 6 to 9 days, 10 to 19 days, 20 to 29 days, and all 30 days. The Core also contains questions regarding the ages at which participants first tried alcohol and other drugs (e.g., “At what age did you first use alcohol?”). Students indicated their responses using an 8-point scale with the following response options: never, under 10, 10 to 11, 12 to 13, 14 to 15, 16 to 17, 18 to 20, and 21 to 25. Presley et al. (1993) reported initial reliability and validity data for the Core, and numerous other studies have since provided convergent and discriminant validity evidence for the Core Survey (e.g., Bulmer, Irfan, Mugno, Barton, & Ackerman, 2010; Hittner & Kennington, 2008; Lanier, Nicholson, & Duncan, 2001; Martens, Brown, Donovan, & Dude, 2005). Results based on the Core have been used to inform alcohol- and drug-prevention programs in higher education (Liciardone, 2003).

In addition to the Core Survey, students completed the AIDS–Risky Behavior Inventory (ARBI; Bon et al., 2001). This instrument asks questions about personal sexual behavior. In particular, the ARBI focuses on behavior that has been identified as unsafe in terms of the probability of transmitting STDs or HIV. In the present study, we examined the following two risky sexual behaviors: “Engaged in genital or anal intercourse without a condom” and “Engaged in genital or anal intercourse or oral sex with someone just met.” Henceforth, these two behaviors will be referred to as unprotected intercourse and casual sex, respectively. Prior to completing each item, students read the following sentence: “During the last 30 days, on how many days did you engage in each of the following behaviors when not drunk or high.” Each item was responded to using a 7-point scale with the following response options: 0 days, 1 to 2 days, 3 to 5 days, 6 to 9 days, 10 to 19 days, 20 to 29 days, and all 30 days. These response options are the same as the response options for the Core Survey past month substance use items. After completing each item, the two items were completed a second time, but this time, the questions were preceded by the following sentence: “During the last 30 days, on how many days did you engage in each of the following behaviors when drunk or high.” Thus, the risky sex items were responded to in the context of two different recalled conditions: that of being “not drunk or high” and that of being “drunk or high.”

Additional items asked participants about the various social settings that they attended during the past month. In particular, students responded to the following item: “Indicate the number of days within the past 30 that you’ve made an effort to socialize in the following settings.” Five different settings, as five distinct items, were then presented: bar with a dance floor, bar without a dance floor, fraternity/sorority party, large private party, and small private party. These particular settings were selected for several reasons. First, they largely overlap with the settings examined by Bersamin and colleagues. Second, these settings exist in fairly large numbers in the local community and in the general vicinity of the university. Third, informal conversations with some undergraduates who were not participants in the study indicated that these settings are frequently attended (i.e., they are common venues for social activity). Fourth, all of the settings represent distinct locations (vs. combinations of qualitatively different locations such as “restaurants and bars”). Each social setting item was responded to using a 7-point scale with the following response options: 0 days, 1 to 2 days, 3 to 5 days, 6 to 9 days, 10 to 19 days, 20 to 29 days, and all 30 days. These response options are the same as those for the past month risky sexual behavior and past month substance use items.

Validity evidence for the ARBI comes in the form of theoretically predicted associations between risky sex and other types of behavior (see Bon et al., 2001, and Hittner & Kennington, 2008). For example, frequency of casual sex when drunk or high is significantly positively correlated with the number of recent sexual partners ($r = .52, p < .001$), frequency of recent binge drinking ($r = .34, p < .001$), and frequency of past year alcohol use ($r = .24, p < .001$).

**Procedure**

Groups of participants were surveyed in classroom settings on weekdays between 8 a.m. and 5 p.m. Participation was voluntary, and no monetary compensation was provided. However, some instructors did provide extra credit points for participation. To recruit potential participants, instructors teaching undergraduate psychology courses were contacted.
individually and asked whether a member of the research team could arrive at the beginning of class to administer the survey. Students who elected to participate completed an informed consent form, the Core Survey, the ARBI, and the social setting items. Students completed the surveys anonymous, and all responses were kept confidential. Completion of the surveys required approximately 25 min, and all collected surveys were stored in a secure location. The study received approval from the university's institutional review board (IRB).

**Predictor, Criterion, and Control Variables**

There were five predictor variables, representing the frequencies of attending five different social settings (one predictor per social setting). The two criterion variables were frequency of unprotected intercourse and frequency of casual sex, and the control variables (covariates) were frequency of past month alcohol use and age at first use of alcohol. As previously noted, all participants were lifetime alcohol users, and the vast majority of students (89.3%) used alcohol in the past month. An even greater proportion (97.1%) drank alcohol during the past year. These two variables were selected as covariates because both frequency of alcohol use and age at first use of alcohol are associated with risky sexual behavior, with greater alcohol use and earlier age of alcohol use onset predicting more frequent risky sex (e.g., Bellis et al., 2008; Claxton et al., 2015; Guo et al., 2002; Hingson, Heeren, Winter, & Wechsler, 2003; Hittner & Kennington, 2008; Hittner & Schachne, 2012; Wu, Ringwalt, Patkar, Hubbard, & Blazer, 2009).

**Data Analyses**

Because both risky sex criterion variables were assessed as count variables (the number of occurrences of risky sexual behavior in a fixed period of time), we first used Poisson regression models to examine the association between each risky sex criterion and the five social setting predictors, controlling for covariates. However, a key assumption of Poisson regression is that the mean and variance for the distribution of count outcomes are equal—a property known as equidispersion. Inspection of our regression results indicated that for several models, the equidispersion assumption was violated in that the variance exceeded the mean. This circumstance, known as overdispersion, sometimes occurs with count data (Cameron & Trivedi, 2013; Coxe, West, & Aiken, 2009). In such situations, a more appropriate alternative to Poisson regression is negative binomial regression (NBR; Cameron & Trivedi, 2013; Coxe et al., 2009). Unlike Poisson regression, NBR does not assume equidispersion. In the NBR approach, the relationship between the mean and variance is directly computed, usually via maximum likelihood estimation, and then taken into account when determining model fit. All NBR analyses in the present study used a log link function with maximum likelihood estimation.

There were four negative binomial regressions, one for each criterion variable (i.e., unprotected intercourse—not drunk or high, unprotected intercourse—drunk or high, casual sex—not drunk or high, casual sex—drunk or high). However, because we conducted separate analyses for males and females, we performed a total of eight NBRs (four for males, four for females). Conducting separate gender analyses is important because males and females differ in their propensities toward risky sex, with males typically engaging in higher levels of risky sexual behavior (Bersamin et al., 2012; Cooper, 2002; Cubbins & Tanfer, 2000; Guo et al., 2002; Hendershot, Magnan, & Bryan, 2010; Hittner & Kennington, 2008; Netting & Burnett, 2004).

In assessing the overall fit of each NBR model, we examined the likelihood ratio chi-square statistic and accompanying two-tailed \( p \) value. Models with \( p \) values \( \leq 0.05 \) are considered statistically significant and thus indicate that the full model, with predictors and covariates, fits better than the intercept-only model (Cameron & Trivedi, 2013). Models with \( p \) values between .051 and .060 are labeled marginally significant. Models with \( p \) values > .060 are considered non-significant and are not interpreted further. The importance of each social setting predictor was evaluated by examining the two-tailed \( p \) value for the unstandardized regression coefficient \( B \), the exponentiated value of the regression coefficient (calculated as \( e \), which is \( \approx 2.718 \), raised to the power of \( B \)), and the 95% Wald confidence interval for the exponentiated value of \( B \) (Exp \( B \)). Unlike the unstandardized regression coefficient, which in NBR is on a logarithmic scale, the Exp \( B \) is on the same scale as the criterion variable and thus is readily interpretable. Individual predictors with \( p \) values \( \leq 0.05 \) are considered statistically significant. In contrast to the social setting predictors, the covariates are not of theoretical interest in the present study. Hence, the parameter estimates for the covariates are not interpreted. All negative binomial regression analyses were conducted using the generalized linear modeling procedure in IBM SPSS Version 20.

**Results**

**Descriptive Statistics**

Table 1 contains the means, standard deviations, ranges, and skewness for all variables by gender. As is typical of count data, the distributions deviate from normality (Cameron & Trivedi, 2013; Coxe et al., 2009). Hence, we used both parametric and non-parametric procedures to examine potential mean (and median) differences across gender. For all comparisons, the threshold for statistical significance was \( p \leq 0.05 \). The results from independent-samples \( t \) tests, median tests, and Mann–Whitney \( U \) tests were all consistent in indicating that males engaged in more frequent casual sex when not drunk or high and when drunk or high. In addition, the three procedures indicated that males attended large private parties
and small private parties more frequently than females. Finally, the three methods were consistent in indicating that relative to females, males drank alcohol more frequently in the past month and reported first using alcohol at an earlier age. These gender differences with regard to casual sex and alcohol use are consistent with recent data on U.S. college students (Johnston, O’Malley, Bachman, Schulenberg, & Miech, 2015).

Although not presented in a table, it is perhaps worth noting that the five social setting attendance variables were significantly inter-correlated. For males, the correlations ranged from .33 to .74, with a mean correlation of .48. Similarly, the range of correlations for females spanned from .31 to .77, with a mean correlation of .45. For both genders, the largest correlation was between attendance at large private parties and attendance at small private parties.

### Table 1. Descriptive Statistics by Gender.

| Variable                                | Males (SD) | Females (SD) |
|-----------------------------------------|------------|--------------|
| Unprotected intercourse—not drunk or high | M (SD): 1.9 (1.6) | M (SD): 1.9 (1.5) |
| Frequency: 1-7 | Range: 1-7 | Range: 1-7 |
| Skew: 1.72 | Skew: 1.59 |
| Unprotected intercourse—drunk or high | M (SD): 1.6 (1.4) | M (SD): 1.4 (0.9) |
| Frequency: 1-7 | Range: 1-7 | Range: 1-7 |
| Skew: 2.31 | Skew: 3.22 |
| Casual sex—not drunk or high*a | M (SD): 1.3 (0.9) | M (SD): 1.0 (0.2) |
| Frequency: 1-7 | Range: 1-3 | Range: 1-3 |
| Skew: 4.04 | Skew: 10.17 |
| Casual sex—drunk or high*b | M (SD): 1.4 (1.0) | M (SD): 1.0 (0.4) |
| Frequency: 1-7 | Range: 1-6 | Range: 1-6 |
| Skew: 3.84 | Skew: 9.68 |
| Frequency of socializing—bar with dance floor | M (SD): 2.4 (1.3) | M (SD): 2.2 (1.1) |
| Frequency: 1-7 | Range: 1-6 | Range: 1-6 |
| Skew: 0.80 | Skew: 0.68 |
| Frequency of socializing—bar without dance floor | M (SD): 2.7 (1.4) | M (SD): 2.4 (1.5) |
| Frequency: 1-6 | Range: 1-7 | Range: 1-7 |
| Skew: 0.44 | Skew: 0.79 |
| Frequency of socializing—fraternity/sorority party | M (SD): 1.8 (1.4) | M (SD): 1.6 (1.0) |
| Frequency: 1-7 | Range: 1-6 | Range: 1-6 |
| Skew: 1.64 | Skew: 1.80 |
| Frequency of socializing—large private party*a | M (SD): 2.9 (1.3) | M (SD): 2.4 (1.4) |
| Frequency: 1-6 | Range: 1-7 | Range: 1-7 |
| Skew: 0.18 | Skew: 0.79 |
| Frequency of socializing—small private party*a | M (SD): 3.2 (1.4) | M (SD): 2.7 (1.3) |
| Frequency: 1-7 | Range: 1-6 | Range: 1-6 |
| Skew: 0.37 | Skew: 0.62 |
| Frequency of past month alcohol use*a | M (SD): 3.0 (1.5) | M (SD): 2.3 (1.4) |
| Frequency: 0-6 | Range: 0-5 | Range: 0-5 |
| Skew: -.046 | Skew: -.09 |
| Age at first use of alcohol*a | M (SD): 4.0 (1.2) | M (SD): 4.4 (1.0) |
| Frequency: 1-6 | Range: 1-7 | Range: 1-7 |
| Skew: -.26 | Skew: -.27 |

Note. Intercourse and casual sex (7-point scale): 1 = 0 days, 2 = 1-2 days, 3 = 3-5 days, 4 = 6-9 days, 5 = 10-19 days, 6 = 20-29 days, 7 = all 30 days. Socializing (7-point scale): 1 = 0 days, 2 = 1-2 days, 3 = 3-5 days, 4 = 6-9 days, 5 = 10-19 days, 6 = 20-29 days, 7 = all 30 days. Past month alcohol use (7-point scale): 0 = 0 days, 1 = 1-2 days, 2 = 3-5 days, 3 = 6-9 days, 4 = 10-19 days, 5 = 20-29 days, 6 = all 30 days. Age at first use of alcohol (7-point scale): 1 = under 10, 2 = 10-11, 3 = 12-13, 4 = 14-15, 5 = 16-17, 6 = 18-20, 7 = 21-23. All means and standard deviations are rounded to the tenths place.

*aThe difference between males and females was significant at p < .05 for the independent-samples t test, median test, and Mann–Whitney U test.

### Regression Findings

**Unprotected intercourse when not drunk or high.** For males, the likelihood ratio chi-square (henceforth, just LR $\chi^2$) was not significant, $\chi^2(7) = 7.60, p = .369$. Thus, these model results will not be discussed further. For females, the LR $\chi^2$ was significant, $\chi^2(7) = 38.02, p < .001$, indicating that the full model (with all predictors and covariates) was superior to the intercept-only model. With regard to the social setting predictors, greater attendance at fraternity/sorority parties (Exp B = .84, $p = .001$, 95% confidence interval [CI] for Exp
Unprotected intercourse when drunk or high. For males, the full model was significant, $\chi^2(7) = 14.63, p = .041$. The sole significant predictor was frequency of attendance at bars without dance floors (Exp $B = 1.16, p = .043$, 95% CI for Exp $B = [1.01, 1.35]$), indicating that more frequent attendance in this setting was associated with higher levels of unprotected sex. For females, the full model was also significant, $\chi^2(7) = 89.46, p < .001$. Similar to the “not drunk or high” context, greater attendance at fraternity/sorority parties was associated with more frequent unprotected sex (Exp $B = .91, p = .015$, 95% CI for Exp $B = [.84, .98]$).

Casual sex when not drunk or high. For males, the full model was marginally significant, $\chi^2(7) = 13.63, p = .058$. The only significant social setting predictor was frequency of attendance at fraternity/sorority parties (Exp $B = 1.11, p = .014$, 95% CI for Exp $B = [1.02, 1.21]$), indicating that greater attendance at these parties was associated with higher levels of casual sex. For females, the full model was not significant, $\chi^2(7) = 5.18, p = .638$. Thus, the specific predictor effects for females will not be considered.

Casual sex when drunk or high. For males, the full model was significant, $\chi^2(7) = 18.93, p = .008$, but none of the social setting predictors was statistically significant. For females, the full model was not significant, $\chi^2(7) = 3.51, p = .835$, and hence, the specific predictors will not be considered. Table 2 presents the negative binomial regression results for all eight models.

Model Fit Comparisons

When the fit of the NBR model for a given outcome was significant for both the “drunk or high” and “not drunk or high” contexts, then the two relative model fits could be compared. In the present study, two pairs of likelihood ratio chi-square statistics met these criteria: the casual sex models for males and the unprotected intercourse models for females. For males, the chi-square values in the “not drunk or high” and “drunk or high” conditions were 13.63 and 18.93, respectively, indicating a 38.9% increase in the “drunk or high” context. For females, the two chi-square values were 38.02 and 89.46, representing a 135.3% increase in the “drunk or high” context. The increase in chi-square values across conditions indicates stronger fitting models in the “drunk or high” context.

Discussion

The regression findings indicated that three types of social settings predicted risky sexual behavior. Perhaps most important was fraternity/sorority party attendance, with greater attendance at these parties associated with more frequent unprotected intercourse for females in the “not drunk or high” and “drunk or high” contexts, and more frequent casual sex for males in the “not drunk or high” context. Given that only six of the 324 research participants (1.8% of the sample) actually lived in a fraternity or sorority house, it appears that attendance at fraternity/sorority parties, rather than residence in a fraternity or sorority, is the key issue. These findings are partially consistent with Bersamin et al. (2012), who found a strong positive association between fraternity/sorority party attendance and alcohol-related casual sex. Although the present sample differs from Bersamin’s in several respects (our sample was recruited from a single university, contains fewer males, and has more White students), the two samples were also comparable in several important ways. In particular, they both examined students within the same age range (18-25 for Bersamin, 18-26 for the present study), and they contained almost identical proportions of students aged 21 and above (38% for Bersamin, 39% for the present study).

Greater attendance at large private parties also predicted more frequent unprotected intercourse for females in the “not drunk or high” context. This result is partially consistent with Bersamin et al.’s finding linking greater casual sex to more frequent attendance at residence-hall parties and off-campus parties, given that such parties are often, though not always, fairly large by design. Perhaps two features shared in common by both fraternity/sorority parties and large private parties are low levels of social control (lack of law enforcement, lack of authority figures to curb high-risk behavior) and the availability of rooms (bedrooms) where sexual activity can take place. Both features might facilitate risky sexual behavior, especially when under the influence of alcohol and/or drugs (Clapp et al., 2006; Cooper, 2002). Future research on this topic might benefit from identifying and examining qualitatively different types of large private parties. Some large parties, such as a kid friendly event in a private gated community, might have minimal alcohol available and an implicit norm discouraging drunkenness and disinhibited behavior. Other types of large private parties (e.g., a post-football game house party hosted by college students) would likely encourage very different drinking-related and behavioral norms. Such qualitative distinctions among large private parties (and small private parties) were not made in the present study. It is recommended that future research pay greater attention to these types of qualitative distinctions.
### Table 2. Negative Binomial Regression Results.

| Predictors and covariates                                                                 | B     | SE  | Wald $\chi^2$ | $p$ value | Exp($B$) | 95% CI            |
|------------------------------------------------------------------------------------------|-------|-----|----------------|-----------|----------|--------------------|
| **Males**                                                                                |       |     |                |           |          |                    |
| Unprotected intercourse—not drunk or high                                                |       |     |                |           |          |                    |
| Bar with dance floor                                                                     | .01   | .09 | 0.01           | .93       | 1.01     | [0.85, 1.19]       |
| Bar without dance floor                                                                  | .08   | .07 | 1.32           | .25       | 1.08     | [0.95, 1.23]       |
| Fraternity/sorority party                                                                | .001  | .05 | 0.001          | .98       | 1.00     | [0.90, 1.11]       |
| Large private party                                                                      | -.20  | .10 | 4.44           | .04       | 0.82     | [0.68, 0.99]       |
| Small private party                                                                      | .11   | .07 | 2.49           | .12       | 1.12     | [0.97, 1.28]       |
| Age at first use of alcohol                                                              | -.01  | .06 | 0.01           | .94       | 0.99     | [0.88, 1.13]       |
| Past month alcohol use                                                                   | .01   | .06 | 0.03           | .86       | 1.01     | [0.89, 1.15]       |
| Unprotected intercourse—drunk or high                                                    |       |     |                |           |          |                    |
| Bar with dance floor                                                                     | -.09  | .09 | 0.96           | .33       | 0.91     | [0.76, 1.09]       |
| Bar without dance floor                                                                  | .15   | .08 | 4.08           | .04       | 1.16     | [1.01, 1.35]       |
| Fraternity/sorority party                                                                | -.02  | .04 | 0.12           | .73       | 0.98     | [0.90, 1.08]       |
| Large private party                                                                      | -.07  | .09 | 0.57           | .45       | 0.93     | [0.78, 1.11]       |
| Small private party                                                                      | .07   | .07 | 1.17           | .28       | 1.07     | [0.94, 1.22]       |
| Age at first use of alcohol                                                              | -.08  | .06 | 1.48           | .22       | 0.93     | [0.82, 1.05]       |
| Past month alcohol use                                                                   | .03   | .06 | 0.26           | .61       | 1.03     | [0.92, 1.16]       |
| Casual sex—not drunk or high                                                             |       |     |                |           |          |                    |
| Bar with dance floor                                                                     | -.01  | .04 | 0.03           | .86       | 0.99     | [0.92, 1.08]       |
| Bar without dance floor                                                                  | .02   | .03 | 0.53           | .47       | 1.02     | [0.96, 1.10]       |
| Fraternity/sorority party                                                                | .11   | .04 | 6.10           | .01       | 1.11     | [1.02, 1.21]       |
| Large private party                                                                      | -.03  | .07 | 0.16           | .69       | 0.97     | [0.86, 1.11]       |
| Small private party                                                                      | .07   | .07 | 0.91           | .34       | 1.07     | [0.93, 1.23]       |
| Age at first use of alcohol                                                              | -.05  | .05 | 1.16           | .28       | 0.95     | [0.87, 1.04]       |
| Past month alcohol use                                                                   | -.04  | .04 | 1.05           | .30       | 0.96     | [0.89, 1.04]       |
| Casual sex—drunk or high                                                                 |       |     |                |           |          |                    |
| Bar with dance floor                                                                     | .06   | .05 | 1.27           | .26       | 1.06     | [0.96, 1.17]       |
| Bar without dance floor                                                                  | .06   | .06 | 0.95           | .33       | 1.06     | [0.94, 1.18]       |
| Fraternity/sorority party                                                                | .05   | .05 | 1.03           | .31       | 1.05     | [0.96, 1.15]       |
| Large private party                                                                      | .01   | .08 | 0.01           | .94       | 1.01     | [0.86, 1.18]       |
| Small private party                                                                      | .04   | .09 | 0.22           | .64       | 1.04     | [0.87, 1.25]       |
| Age at first use of alcohol                                                              | -.09  | .06 | 2.42           | .12       | 0.91     | [0.81, 1.02]       |
| Past month alcohol use                                                                   | -.04  | .04 | 0.68           | .41       | 0.96     | [0.88, 1.05]       |
| **Females**                                                                              |       |     |                |           |          |                    |
| Unprotected intercourse—not drunk or high                                                |       |     |                |           |          |                    |
| Bar with dance floor                                                                     | -.01  | .06 | 0.04           | .84       | 0.99     | [0.87, 1.12]       |
| Bar without dance floor                                                                  | .03   | .05 | 0.35           | .55       | 1.03     | [0.94, 1.13]       |
| Fraternity/sorority party                                                                | -.18  | .05 | 11.99          | .001      | 0.84     | [0.76, 0.93]       |
| Large private party                                                                      | -.14  | .07 | 4.67           | .03       | 0.87     | [0.76, 0.99]       |
| Small private party                                                                      | .05   | .07 | 0.46           | .50       | 1.05     | [0.92, 1.20]       |
| Age at first use of alcohol                                                              | -.08  | .05 | 2.79           | .09       | 0.92     | [0.83, 1.02]       |
| Past month alcohol use                                                                   | .13   | .06 | 5.33           | .02       | 1.14     | [1.02, 1.27]       |
| Unprotected intercourse—drunk or high                                                    |       |     |                |           |          |                    |
| Bar with dance floor                                                                     | -.05  | .05 | 1.36           | .24       | 0.95     | [0.87, 1.04]       |
| Bar without dance floor                                                                  | .01   | .04 | 0.07           | .79       | 1.01     | [0.93, 1.10]       |
| Fraternity/sorority party                                                                | -.09  | .04 | 5.86           | .02       | 0.91     | [0.84, 0.98]       |
| Large private party                                                                      | -.08  | .06 | 1.93           | .16       | 0.92     | [0.82, 1.04]       |
| Small private party                                                                      | .05   | .05 | 1.03           | .31       | 1.05     | [0.95, 1.16]       |
| Age at first use of alcohol                                                              | -.04  | .03 | 1.31           | .25       | 0.96     | [0.90, 1.03]       |
| Past month alcohol use                                                                   | .22   | .05 | 21.18          | <.001     | 1.25     | [1.14, 1.38]       |

(continued)
The third significant social setting predictor was attendance at bars without dance floors, such that greater attendance was associated with more frequent unprotected intercourse for males in the “drunk or high” context. Although an interesting finding, we are uncertain as to how to explain this result. Future research is needed to examine the replicability of this finding. In addition, future research is needed to examine whether the social settings that we have identified as important will replicate with non-college student samples.

The associations we obtained between the various social settings and risky sex support our first hypothesis, which stated that one or more social settings would significantly predict risky sexual behavior. In addition, the significant effects of fraternity/sorority parties and large private parties support our second hypothesis, which posited that socializing in these particular settings would predict risky sex. An important question, though, is why attending some social settings, but not others, is positively associated with risky sexual behavior. One model that may shed light on this issue is the situational-specificity hypothesis (Wall, McKee, Hinson, & Goldstein, 2001). This model argues that environmental cues, which vary across different settings, influence alcohol and/or drug use, alcohol/drug expectancies, and memory associations (Lau-Barraco & Dunn, 2009; Wall et al., 2001). The cues present in a particular setting might, for example, motivate greater alcohol use, heighten alcohol-related sexual expectancies, and trigger positive memories of previous alcohol-related sexual encounters. These factors, in turn, could lead to risky sexual behavior. In addition, to the extent that environmental cues in different settings trigger different types of expectancies and memories for males and females, these factors could also explain some of the differences we obtained across gender. Future research is needed to further examine these issues.

Our third hypothesis stated that the overall fit of the models (ability of social setting predictors and covariates to predict risky sex) would be stronger in the “drunk or high” versus “not drunk or high” contexts. Analysis of two pairs of likelihood ratio chi-square statistics (i.e., the casual sex models for males and the unprotected intercourse models for females) supported this hypothesis, indicating significantly stronger fitting models in the “drunk or high” context. The stronger fitting models in the “drunk or high” condition could be due to substance-related behavioral and cognitive alterations. In particular, when in a drunk or high state, behavioral inhibitions typically are lowered and sexual decision-making skills become compromised (Hittner & Kennington, 2008; Lewis et al., 2009; Wechsler, Dowdall, Maenner, Gledhill-Hoyt, & Lee, 1998). These substance-related consequences, in turn, heighten the probability of engaging in unsafe sexual behavior when drunk or high (Bon et al., 2001; Meilman, 1993). In the present study, we did not actually assess behavioral inhibitions and sexual decision-making skills. Future research would benefit from measuring these variables in different social settings and examining whether they mediate the influence of socializing habits on risky sexual behavior.

An unexpected set of null findings concerned the non-significant likelihood ratio chi-square values for the two...
female casual sex models (the “not drunk or high” and “drunk or high” contexts). One explanation could be that social setting factors are less important in predicting casual sex for females than for males. Perhaps other variables not measured in the present study, such as intimacy motives and desire for romance (Cooper, Shapiro, & Powers, 1998), are more relevant predictors. An alternative explanation is statistical in that the standard deviations of the casual sex variables are smaller for females than males (see Table 1). Perhaps such a relatively restricted range in variability lessened the magnitudes of the likelihood ratio chi-square statistics for the female casual sex models. Another contributing factor could be the higher levels of skewness for the female casual sex variables.

There were both strengths and limitations of the present study. Strengths included examining the predictive associations under two different contextual conditions, that of being “drunk or high” versus “not drunk or high,” the inclusion of two different risky sexual behaviors (unprotected intercourse and casual sex), and the use of negative binomial regression to appropriately model count outcomes. Limitations included the self-report assessment format (vs. directly observing behavior), the possibility of underreporting given the sensitive nature of the questions, the possibility of differential recall in the two contextual conditions, the exclusive use of college students within the age range of 18 to 26 as participants, and the fact that all students were sampled from a single university. Sampling across multiple universities with ethnically diverse student populations would enhance the generalizability of our findings.

Of course, one must always be cautious when generalizing results based on college students to non-college attending, community-residing adults. For example, it is an empirical question as to whether the social setting effects found in the present study would generalize to non-student adult samples. Because the majority of full-time undergraduate students are below the age of 21 (61% in the present sample), they may be restricted from entering certain bars or nightclub settings—establishments that community-residing adults aged 21 and above could attend if they so desire. The differences in the types of settings that are frequented by college students and non-college students, and how attendance rates in such different settings predict risky sexual behavior, are important questions for future research. Another question for future work is to ascertain the degree to which attendance rates across different settings are inter-correlated for non-student community-residing adults. For the college students in the present study, the cross-setting correlations were significant, with a particularly strong positive correlation between large private party and small private party attendance. It would be interesting to see whether such cross-setting collinearity is likewise observed for community-residing adults. As a final point, the present study focused exclusively on the link between social setting attendance and risky sexual behavior. Other correlates and/or consequences of social setting attendance, such as sexual assaults and victimization, were not considered here but represent important areas of foci for future research.

In conclusion, this study contributes to the literature on social-contextual factors and risky sex by providing new data concerning the associations between socializing habits in different social settings and risky sexual behavior. We hope that our findings will stimulate further inquiry into the predictors, correlates, and consequences of high-risk sexual behavior.

**Declaration of Conflicting Interests**

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

**Funding**

The author(s) received no financial support for the research and/or authorship of this article.

**References**

Agius, P., Taft, A., Hemphill, S., Toumbourou, J., & McMorris, B. (2013). Excessive alcohol use and its association with risky sexual behaviour: A cross-sectional analysis of data from Victorian secondary school students. Australian and New Zealand Journal of Public Health, 37, 76-82.

Allison, R., & Risman, B. J. (2013). A double standard for “hooking up”: How far have we come toward gender equality? Social Science Research, 42, 1191-1206.

American College Health Association. (2005). American College Health Association—National College Health Assessment (ACHA-NCHA) web summary [Fall 2005 data]. Retrieved from http://www.acha-ncha.org/docs/ACHA-NCHA_Reference_Group_ExecutiveSummary_Fall2005.pdf

Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. American Psychologist, 55, 469-480.

Baele, J., Dusseldorp, E., & Maes, S. (2001). Condom use self-efficacy: Effect on intended and actual condom use in adolescents. Journal of Adolescent Health, 28, 421-431.

Bellis, M. A., Hughes, K., Calafat, A., Juan, M., Ramon, A., Rodriguez, J. A., . . . Phillips-Howard, P. (2008). Sexual uses of alcohol and drugs and the associated health risks: A cross-sectional study of young people in nine European cities. BMC Public Health, 8, 155.

Bersamin, M. M., Paschall, M. J., Saltz, R. F., & Zamboanga, B. L. (2012). Young adults and casual sex: The relevance of college drinking settings. Journal of Sex Research, 49, 274-281.

Bon, S. R., Hittner, J. B., & Lawandales, J. (2001). Normative perceptions in relation to substance use and HIV-risq sexual behaviors of college students. The Journal of Psychology, 135, 165-178.

Bulmer, S. M., Irfan, S., Mugno, R., Barton, B., & Ackerman, L. (2010). Trends in alcohol consumption among undergraduate students at a northeastern public university, 2002-2008. Journal of American College Health, 58, 383-390.

Cameron, A. C., & Trivedi, P. K. (2013). Regression analysis of count data (2nd ed.). Cambridge, UK: Cambridge University Press.
Centers for Disease Control and Prevention. (2010). *STD trends in the United States: 2010 national data for gonorrhea, chlamydia, and syphilis*. Retrieved from http://www.cdc.gov/std/stats10/trends.htm

Clapp, J. D., Lange, J. E., Min, J. W., Shillington, A., Johnson, M., & Voas, R. B. (2003). Two studies examining environmental predictors of heavy drinking by college students. *Prevention Science*, 4, 99-108.

Clapp, J. D., Reed, M. B., Holmes, M. R., Lange, J. E., & Voas. R. B. (2006). Drunk in public, drunk in private: The relationship between college students, drinking contexts and alcohol consumption. *The American Journal of Drug and Alcohol Abuse*, 32, 275-285.

Claxton, S. E., DeLuca, H. K., & van Dulmen, M. H. M. (2015). The association between alcohol use and engagement in casual sexual relationships and experiences: A meta-analytic review of non-experimental studies. *Archives of Sexual Behavior*, 44, 837-856.

Cooper, M. L. (2002). Alcohol use and risky sexual behavior among college students and youth: Evaluating the evidence. *Journal of Studies on Alcohol and Drugs*, 14, 101-117.

Cooper, M. L., Shapiro, C. M., & Powers, A. M. (1998). Motivations for sex and risky sexual behavior among adolescents and young adults: A functional perspective. *Journal of Personality and Social Psychology*, 75, 1528-1558.

Coxe, S., West, S. G., & Aiken, L. S. (2009). The analysis of count data: A gentle introduction to Poisson regression and its alternatives. *Journal of Personality Assessment*, 91, 121-136.

Cubbins, L. A., & Tanfer, K. (2000). The influence of gender on sex: A study of men’s and women’s self-reported high-risk sex behavior. *Archives of Sexual Behavior*, 29, 229-257.

Demers, A., Kairouz, S., Adlaf, E. M., Gliksman, L., Newton-Taylor, B., & Marchand, A. (2002). Multi-level analyses of situational drinking among Canadian undergraduates. *Social Science & Medicine*, 55, 415-424.

Fielder, R. L., & Carey, M. P. (2010). Prevalence and characteristics of sexual hookups among first-semester female college students. *Journal of Sex & Marital Therapy*, 36, 346-359.

Gerrard, M., Gibbons, F. X., & Bushman, B. J. (1996). Relation between perceived vulnerability to HIV and precautionary sexual behavior. *Psychological Bulletin*, 119, 390-409.

Grello, C. M., Welsh, D. P., & Harper, M. S. (2006). No strings attached: The nature of casual sex in college students. *Journal of Sex Research*, 43, 255-267.

Guo, J., Chung, I., Hill, K. G., Hawkins, J. D., Catalano, R., & Abbott, R. (2002). Developmental relationships between adolescent substance use and risky sexual behavior in young adulthood. *Journal of Adolescent Health*, 31, 354-362.

Hendershot, C. S., Magnan, R. E., & Bryan, A. D. (2010). Associations of marijuana use and sex-related marijuana expectancies with HIV/STD risk behavior in high-risk adolescents. *Psychology of Addictive Behaviors*, 24, 404-414.

Herold, E. S., Matica-Tyndale, E., & Mewhinney, D. (1998). Predicting intentions to engage in casual sex. *Journal of Social and Personal Relationships*, 15, 502-516.

Hingson, R., Heeren, T., Winter, M., & Wechsler, H. (2003). Early age of first drunkenness as a factor in college students’ unplanned and unprotected sex attributable to drinking. *Pediatrics*, 111, 34-41.

Hittner, J. B., & Kennington, L. E. (2008). Normative perceptions, substance use, age of substance use initiation, and gender as predictors of HIV-risky sexual behavior in a college student sample. *Journal of Applied Biobehavioral Research*, 13, 86-101.

Hittner, J. B., & Schachne, E. R. (2012). Meta-analysis of the association between ecstasy use and risky sexual behavior. *Addictive Behaviors*, 37, 790-796.

Johnston, L. D., O’Malley, P. M., Bachman, J. G., Schulenberg, J. E., & Miech, R. A. (2015). Monitoring the Future national survey results on drug use, 1973-2014: Volume II, college students and adults ages 19-55. Ann Arbor: Institute for Social Research, The University of Michigan.

Kershaw, T. S., Niccolai, L. M., Ether, K. A., Lewis, J. B., & Ickovics, J. R. (2003). Perceived susceptibility to pregnancy and sexually transmitted diseases among pregnant and non-pregnant adolescents. *Journal of Community Psychology*, 31, 419-434.

Lanier, C. A., Nicholson, T., & Duncan, D. (2001). Drug use and mental well-being among a sample of undergraduate and graduate college students. *Journal of Drug Education*, 31, 239-241.

Lau-Barraco, C., & Dunn, M. (2009). Environmental context effects on alcohol cognitions and immediate alcohol consumption. *Addiction Research & Theory*, 17, 306-314.

Lewis, J. E., Miguez-Burbano, M., & Malow, R. M. (2009). HIV risk behavior among college students in the United States. *College Student Journal*, 43, 475-491.

Licciodone, J. C. (2003). Outcomes of a federally funded program for alcohol and other drug prevention in higher education. *The American Journal of Drug and Alcohol Abuse*, 29, 803-827.

Martens, M. P., Brown, N. T., Donovan, B. M., & Dude, K. (2005). Measuring negative consequences of college student substance use: A psychometric evaluation of the Core Alcohol and Drug Survey. *Measurement and Evaluation in Counseling and Development*, 38, 164-175.

Meilman, P. W. (1993). Alcohol-induced sexual behavior on campus. *Journal of American College Health*, 42, 27-31.

National Center for Education Statistics. (2015). *Characteristics of postsecondary students*. Retrieved from http://nces.ed.gov/programs/coe/indicator_csb.asp

Netting, N. S., & Burnett, M. L. (2004). Twenty years of student sexual behavior: Subcultural adaptations to a changing health environment. *Adolescence*, 39, 19-38.

Paul, E. L., McManus, B., & Hayes, A. (2000). “Hookups”: Characteristics and correlates of college students’ spontaneous and anonymous sexual experiences. *Journal of Sex Research*, 37, 76-88.

Presley, C. A., Harrold, P. W., Scouten, E., Lyerla, R., & Meilman, P. W. (1993). *Core alcohol and drug survey user’s manual* (4th ed.). Carbondale: Core Institute, Southern Illinois University.

Single, E., & Wortley, S. (1993). Drinking in various settings as a predictor of HIV-risky sexual behavior in a college student sample. *Addictive Behaviors*, 175-182.

Studer, J., Baggio, S., Deline, S., N’Goran, A. A., Henchoz, Y., Mohler-Kuo, M., . . . Gmel, G. (2015). Drinking locations and alcohol-related harm: Cross sectional and longitudinal
associations in a sample of young Swiss men. *International Journal of Drug Policy*, 26, 653-661.

Thompson, J. C., Kao, T., & Thomas, R. J. (2005). The relationship between alcohol use and risk-taking sexual behaviors in a large behavioral study. *Preventive Medicine*, 41, 247-252.

Wall, A., McKee, S. A., Hinson, R. E., & Goldstein, A. (2001). Examining alcohol outcome expectancies in laboratory and naturalistic bar settings: A within-subject experimental analysis. *Psychology of Addictive Behavior*, 15, 219-226.

Wechsler, H., Dowdall, G. W., Maenner, G., Gledhill-Hoyt, J., & Lee, H. (1998). Changes in binge drinking and related problems among American college students between 1993 and 1997. *Journal of American College Health*, 47, 57-68.

Winslow, R. W., Franzini, L. R., & Hwang, J. (1992). Perceived peer norms, casual sex, and AIDS risk prevention. *Journal of Applied Social Psychology*, 22, 1809-1827.

Wu, L. T., Ringwalt, C. L., Patkar, A. A., Hubbard, R. L., & Blazer, D. G. (2009). Association of MDMA/ecstasy and other substance use with self-reported sexually transmitted diseases among college-aged adults: A national study. *Public Health*, 123, 557-564.

**Author Biographies**

**James B. Hittner** is a professor of psychology at the College of Charleston. His research interests include risky sexual behavior, cognitive and personality correlates of substance abuse, personality, stress and coping, and statistical methodology.

**Emmalee C. Owens** graduated from the College of Charleston with a BS degree in psychology. Her research interests include substance use and risky behavior.

**Rhonda J. Swickert** is a professor of psychology at the College of Charleston. Her research interests include mindfulness, forgiveness, posttraumatic growth, and personality and social support coping.