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Alcohol-Related Sexual Consequences during the Transition from High School to College

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Abstract

Alcohol use and risky sexual behavior are significant problems on college campuses. Using a prospective design, the present study sought to explore the relationship between alcohol use and experience of alcohol-related sexual consequences (ARSC) during the transition from high school to the first year of college. During the senior year of high school, and following the first year of college, participants completed assessments of alcohol use, problem drinking behavior, ARSC, and potential influences on drinking behaviors, including parental knowledge of alcohol use, peer influences, motivation for alcohol use, and mood state. Data indicated that 29% of men and 35% of women indicated some form of ARSC during the last year of high school, rates that increased by 6–7% for the first year of college (36% of men and 41% of women). The onset or recurrence of ARSC in college was not explained by differential increases in alcohol use between high school and college. Low levels of positive affect, low motivation to consume alcohol to cope, and high levels of peer alcohol use were associated with repeated ARSC in high school and college; whereas drinking to enhance positive affect and low parental knowledge of alcohol use were associated with the onset of such consequences in college. Implications for intervention are discussed.

Keywords

Alcohol use; sexual behavior; alcohol-related consequences; risk taking

1. Introduction

1.1 Alcohol use and alcohol-related sexual consequences

Compared to same-age non-college peers, college students ages 18–22 within the United States (US) report higher levels of episodic drinking (O'Malley & Johnston, 2002;

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Wechsler, Dowdall, Davenport, & Castillo, 1995) and sexual behavior (Cooper, 2002; Siegel, Klein, & Roughmann, 1999), and increases in alcohol use and sexual behavior are seen in the transition from high school to college (Baer, Kivlahan, Blume, McKnight, & Marlatt, 2001; Patrick & Lee, 2010). A study of 2,245 students matriculating to a large southern US university documented that individuals who report high levels of behavioral risks during high school are most at risk to report continued risk taking in college (Fromme, Corbin, & Kruse, 2008). However, about half of individuals who enter college have not engaged in sexual intercourse (Siegel et al., 1999), and will have their first sexual experience while in college (Cooper, 2002). Sexual experiences among college youth (Goldstein, Barnett, Pedlow, & Murphy, 2007) and in the general population (Patrick & Maggs, 2009) often involve the use of alcohol. This co-occurrence is concerning in light of the association between heavy drinking and a range of sexual risks, including failure to use a condom (Bagnall, Plante, & Warwick, 1990; Hingson, Heeren, Winter, & Wechsler, 2005; Wechsler, Dowdall, Maenner, Gledhill-Hoyt, & Lee, 1998) unplanned sexual activity (Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994) and sexual intercourse with new dating partners (Cooper & Orcutt, 1997) and multiple partners (Caldeira et al., 2009). The negative consequences associated with alcohol-related sexual risk taking, such as sexually transmitted infections (Centers for Disease Control and Prevention, 2008) and unwanted pregnancy (American College Health Association, 2008) underscore the need for identifying risk and protective factors associated with alcohol-related sexual consequences (i.e., Lewis, Rees, Logan, Kaysen & Kilmer, 2010). Alcohol intoxication promotes sexual risk taking by decreasing assertive responses to requests for unprotected sexual activity (Maisto, Carey, Carey, & Gordon, 2002; Maisto, Carey, Carey, Gordon, & Schum, 2004), increasing intentions to engage in risky sexual behavior (Abbey, Saenz, & Buck, 2005), and decreasing the likelihood that an individual perceives the consequences of sexual risk behavior as negative (Fromme, D'Amico, & Katz, 1999).

1.2 Peer and parental influences during the transition from high school to college

A life course developmental approach to understanding patterns of behavior recognizes that developmental transitions play a factor in facilitating or inhibiting change in risk and protective factors for problem behaviors (Elder, 1985). Whereas for some students, drinking is relatively constant from high school to college (Baer et al., 2001), the college environment, as well as changes in peer and parent relationships influences drinking patterns for young adults during the transition from high school to college (Baer, Kivlahan, & Marlatt, 1995). Upon matriculating to college, students often focus on establishing a peer network (Borsari & Carey, 2006; Paul & Kelleher, 1995); peers are an important source of influence on students' alcohol use attitudes and behaviors (see Borsari & Carey, 2001 for a review). Nonetheless, parents continue to exert influence on their college age children (Galotti & Mark, 1994; Mounts, Valentiner, Anderson, & Boswell, 2006). In a study of 556 students matriculating to a medium-sized northeastern university, Wood, Read Mitchell, and Brand (2004) documented that whereas higher levels of parental permissiveness were associated with increased risk for heavy drinking, increased parental monitoring and disapproval of drinking were associated with lower levels of heavy alcohol use among college youth; these parental influences moderated the effect of peer influences on alcohol consumption. These findings reflect the protective influence of parents on alcohol use in late adolescence (see Turrissi, Wiersma, & Hughes, 2000).

1.3 The influence of motives and affect on drinking behavior

Motives, or self-reported reasons for consuming alcohol, are a key factor in the drinking patterns of college youth (Carey & Correia, 1997; Kassel, Jackson, & Unrod, 2000; Read, Wood, Kahler, Maddock, & Palfai, 2003). Specific drinking motives are categorized along affective (including drinking as a way to cope with negative affect or to regulate unpleasant

emotions), and social (to enhance social experiences or to increase social confidence) dimensions (Cox & Klinger, 1988). Social motives can be especially pertinent in influencing drinking patterns during the transition from high school to college (Read, Wood, Davidoff, McKracken, & Campbell, 2002). With regard to drinking to regulate affect, individuals who consume alcohol in order to enhance positive affect show different patterns of alcohol use compared to individuals who report consuming alcohol to cope with negative affect (Weller, 2000), and drinking motives are associated with alcohol-related problems generally (Carey & Correia, 1997).

Research suggests that high levels of depressive beliefs are associated with increased drinking (Camatta & Nagoshi, 1995; Hussong & Hicks, 2003) and increased likelihood of experiencing negative alcohol-related consequences (Park & Levinson, 2002). Research using experience sampling and diary methods suggests that college students report greater drinking on days characterized by higher sadness (Flynn, 2000). Furthermore, in research examining the daily self-reports of 85 college students at a large southeastern university, having prior experience of alcohol-related consequences combined with high motivation to drink in order to cope with distress facilitated drinking on days when negative mood was reported (Hussong, 2007), which may increase risk for subsequent negative consequences. Despite these indications of the links between drinking motives, negative affect, and alcohol-related consequences, the relationship between motives, affect and specific risk for ARSC has yet to be examined.

1.4 Study objectives

Based on the conceptual associations described above and previous research, the present study had two related objectives. We first sought to extend previous work examining alcohol use and sexual risk taking during the transition from high school to college (e.g., Fromme et al., 2008; Patrick & Lee, 2010) by examining whether changes in drinking patterns from high school to college were associated with the onset or continued experience of ARSC during the first year of college. Specifically, we made two comparisons to identify differences between groups of students who had new or repeated ARSC in college. To identify drinking patterns predictive of new onset of ARSC, we first compared the changes in drinking from high school to college between students with no ARSC in high school or college, to students who showed no ARSC in high school but new onset of ARSC in college. To identify drinking patterns predictive of continued ARSC, we next compared students with a history of ARSC in high school but not in college, with students who reported ARSC in both high school and college. Our second objective was to identify predictors (other than alcohol use) of new or continued college ARSC in: a) students who had consumed alcohol in high school without experiencing ARSC (i.e., to identify predictors of new ARSC in college drinkers), and b) students who reported ARSC in high school (i.e., we wanted to identify predictors of repeated ARSC in college). Aligning with the literature reviewed above, we considered how environmental factors such as peer and parental influences, and cognitive factors such as drinking motives, and negative affect predicted the onset or continued experience of ARSC during the first year of college. In order to identify characteristics of high school students at risk for ARSC upon matriculating to college, students' reports of putative risk factors during high school were utilized as predictors of college ARSC.

We hypothesized that increases in alcohol use from high school to college would differentiate students who reported the onset of ARSC in college from students who showed no ARSC in high school or college. We also hypothesized that increases in alcohol use from high school to college would differentiate students who showed repeated ARSC in high school and college from students who reported ARSC and high school and who showed no such outcome in college. We did not propose a specific *a priori* hypothesis regarding

whether predictors of new ARSC in college would differ from the predictors of repeated ARSC in high school and college.

2. Materials and method

2.1 Participants and procedure

Data for the present study was from a larger longitudinal study of alcohol use from pre-college to the sophomore year of college. Over a period of three years, participants in the larger study were recruited during the spring prior to the first year of college at three New England colleges/universities. To be eligible for inclusion in the larger study, college students were under 21 years old, enrolled full-time, lived on-campus during their freshman year, and were not International students. A random sample of 2,834 students were invited to participate, oversampling for ethnic minority status. Via mail, prospective participants over the age of 18 received a written description of the study, two copies of the informed consent form, and a \$5 token of appreciation for considering participation. If the student was under the age of 18, the parents of the sampled student received a similar packet of information and were required to provide consent. Instructions were provided to students, and parents when applicable, regarding how to provide informed consent online through a unique username and password or by returning the paper consent form. Of the total invited sample, 37.2% provided informed consent and were enrolled in the study ($N = 1053$).

The full sample included 447 men (42.5%) and 606 women (57.5%). Approximately 66% of the participants self-identified as Caucasian ($N = 691$), 7.2% African American ($N = 76$), 12.8% Asian American ($N = 135$), 0.1% American Indian or Alaskan Native ($N = 1$), 0.3% Hawaiian or Pacific Islander, 5.9% self-identified as multi-racial ($N = 62$), and 8.1% ($N = 85$) did not identify their race or listed “other”. Further, 11.9% ($N = 125$) of participants self-identified as Hispanic. Students who enrolled in the study completed assessments at the end of the senior year of high school and at the completion of the first year of college. At the first assessment the age of students averaged 18.4 years ($SD = 0.48$). Only students who completed the baseline assessment and the first yearly follow-up assessment were included in the present study ($N = 928$; 88.1%). The initial sample ($N = 1053$) and current study sample ($N = 928$) did not vary by race. Gender varied between the initial sample and the sample of students who completed the baseline and first yearly follow-up assessment, $\chi^2 (1, N = 1053) = 9.44, p < .01$, such that women ($N = 550$; 90.8% response rate) were more likely than men ($N = 378$; 84.6% response rate) to complete the follow-up. Data were collected using a commercially available web survey software system. Web surveys were disseminated via a unique survey link delivered to the participant’s email. These procedures were approved by the Institutional Review Boards at each of the three college institutions.

2.2 Measures

2.2.1 Demographic characteristics—Gender, race, ethnicity, and age were assessed with a brief questionnaire administered at baseline. For the purpose of analyses, race/ethnicity was coded as a binary variable (i.e., Non-Hispanic White, $n = 576$, 62.3%; Non-White, $n = 348$, 37.7%) to account for the relatively small sample sizes within some categories. Individuals self-identifying as mixed race and individuals who identified as Hispanic but provided no race were classified as Non-White.

2.2.2 Alcohol use—At baseline and follow-up, the Graduated Frequency Measure (Clark & Hilton, 1991; Hilton, 1989) assessed alcohol use during the senior year of high school and during the first year of college. Respondents are provided with the definition of a standard drink, and asked: “Think of all kinds of alcoholic beverages combined. During the last 12 months, what is the largest number of drinks you had on any single day?” Starting with this

maximum level, respondents indicate the frequency of consuming various amounts of alcohol (i.e., twelve or more drinks, eight to eleven drinks, etc.) per day. Response options were on a nine-point scale from 1 (never) to 9 (nearly every day or every day). From these responses, three measures of consumption were derived: number of heavy drinking days per week, number of drinks per week, and average number of drinks per drinking day. To adjust for distributional skew, alcohol use variables were normalized using a square-root transformation. A composite alcohol use score was created by summing the z-scores for the three consumption measures.

2.2.3 Problem drinking behavior and alcohol-related sexual consequences—

At baseline and at the end of the first year of college, the 27-item Young Adult Alcohol Problems Screening Test (Hurlburt & Sher, 1992) measured occurrence of alcohol problems. Items were dichotomized and summed for a total score. At baseline and follow-up, participants also completed six items from the sex-related alcohol negative consequences subscale of the modified YAAPST (i.e., Larimer, Lydum, Anderson, & Turner, 1999; Wood, Read, Palfai, & Stevenson, 2001) measuring different ARSC, including: regretted sexual experiences, neglecting to use birth control or protection from STDs, having sexual experiences when you didn't want to, having sexual intercourse with someone that you normally would not have sexual intercourse with, being pressured or forced to have sexual intercourse, and forcing or pressuring someone else to have sexual intercourse. At the baseline assessment participants were classified according to whether they reported a history of one or more of these ARSC. At follow up, participants were classified according to whether they reported one or more of these ARSC in the past year.

2.2.4 Parent and peer influences—Following Wood et al., (2004), the extent of peer alcohol use at baseline was assessed with one item from measures used by Jessor, Jessor and Donovan (1981) to assess social modeling of alcohol use. Participants were asked, "When your close friends drink, how much (on average) does each person drink?" Responses were on a five-point scale from 0 (they don't drink) to 4 (more than 6 drinks) per occasion. Parental knowledge of drinking at baseline was assessed with one item, adapted from the Strictness-Supervision scale (Steinberg, Lamborn, Dornbusch, & Darling, 1992). Following Wood et al., (2004), this item reflects the students' perception of how much their parents know about their alcohol use along a three-point scale, ranging from 1 (they don't know) to 3 (they know a lot).

2.2.5 Drinking motives—Drinking motives were assessed at baseline using the Drinking Motives Measure (DDM; Cooper, 1994), a 20-item scale with answers on a six-point scale ranging from 1 (never) to 6 (always). Responses are summed into four subscales: social motives, enhancement motives, coping motives and conformity motives.

2.2.6 Depression—Depression at baseline was assessed with the Centers for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). The CES-D was developed by the National Institute of Health, is easy to complete, and includes questions that address many of the diagnostic criteria for depression. Responses to the 20-item measure are provided along a four-point frequency scale, ranging from 0 (rarely or none of the time) to 3 (most or all of the time). Subscales include positive affect, depressed affect and somatic activity.

2.3 Data analytic approach

To determine whether changes in drinking from high school to college were different as a function of the onset or continuance of ARSC, we used repeated measures 2×2 Analyses of Covariance. Two sets of comparisons were conducted. In the first, we considered only

participants who had no ARSC in high school; the factors were time (high school drinking vs. college drinking) and ARSC college onset (no onset of college ARSC vs. onset of college ARSC). The second set of analyses included only those participants who had ARSC in high school; the factors were time (high school vs. college) and repeated ARSC in college (no college ARSC vs. ARSC in college). For both sets of comparisons, three dependent variables were considered: number of drinks per drinking day, number of drinks per week and number of heavy drinking days per year. Whereas analyses were conducted with the transformed variables, untransformed descriptive statistics are presented for the purpose of interpretation. High school alcohol problems and alcohol problems during the first year of college (YAAPST scores) were entered as covariates to ensure that the relation between alcohol use and ARSC was not a function of higher overall alcohol-related consequences. Simple effects analysis was utilized to examine significant interactions.

To address our second objective, which was to identify predictors of college ARSC in those with and without a high school history of ARSC, we conducted two hierarchical multivariate logistic regression analyses. The first analysis examined predictors of the onset of new ARSC in college, and included only those students who reported no prior history of ARSC in high school, despite reporting alcohol consumption. The second analysis examined predictors of repeated ARSC in college, and included only those students who reported a prior occurrence of ARSC in high school. For both analyses, the criterion variable was whether or not the student reported ARSC in the first year of college. Demographic characteristics, including participant sex and race/ethnicity were entered into the model in the first block as binary variables, with men serving as the reference group for participant sex, and self-identifying as Non-Hispanic White serving as the reference group for participant race/ethnicity. The second block of variables included the composite scores of alcohol use in high school and the first year of college, and problem drinking (YAAPST score) in high school and the first year of college. The third block included putative risk factors for ARSC reported during high school, including parental knowledge of drinking behavior, perception of peer alcohol consumption, drinking motives (DDM) subscales, and depression (CES-D) subscales.

3. Results

3.1 Alcohol use and related problems

The majority of participants (69.1%) reported using alcohol in both high school and during the first year of college ($N = 641$). Approximately 15.7% reported no alcohol use during college and during high school ($N = 146$); whereas 5.3% reported only using alcohol during high school ($N = 49$), and 9.9% reported their first use of alcohol in the first year of college ($N = 92$). Among students reporting continued alcohol use during high school and college (see Table 1), approximately 32.4% ($N = 208$) reported an ARSC during high school. Of the students who started consuming alcohol in college, 12.0% ($N = 11$) reported an ARSC during the first year of college. The small number of new drinkers and their low rate of ARSC made analyses with this subgroup difficult (e.g., comparing those who had ARSC to those who did not); we therefore focused our analyses on students who reported continued alcohol use during high school and college. Gender did not vary between the three groups of students (those reporting alcohol use in high school and college, those reporting no alcohol use, and those reporting alcohol use in only one time period). However, these groups varied by race, such that 65.9% of students who self-identified as Non-Hispanic White reported alcohol consumption at both time periods, compared to 52.3% of students who identified as a racial or ethnic minority, $\chi^2(1, N = 1047) = 16.72, p < .001$.

High school alcohol use in the sample that reported alcohol use in both high school and in college was an average of 10.43 ($SD = 24.37$) heavy drinking days per school year, 3.04 (SD

= 6.45) drinks per week, and 3.63 ($SD = 2.07$) drinks per drinking day. In the first year of college, these participants reported an average of 26.43 ($SD = 41.97$) heavy drinking days per year, 8.31 ($SD = 12.07$) drinks per week, and 4.20 ($SD = 2.27$) drinks per drinking day.

In the present study, 28.8% of men and 35.0% of women indicated some form of ARSC during high school (see Table 2). During the first year of college, 35.2% of men and 40.6% of women reported some form of ARSC. Chi-square tests using a Bonferroni adjustment suggested that the occurrence of each form of ARSC during high school did not vary between men and women. However, during college women were more likely than men to report being pressured to engage in sexual intercourse after drinking, $\chi^2(1, N = 641) = 8.52$, $p < .008$; and report engaging in sexual intercourse after drinking when then didn't want to, $\chi^2(1, N = 641) = 8.22$, $p < .008$.

3.2 Drinking patterns and the onset of alcohol-related sexual consequences

Among participants who reported no ARSC in high school, repeated measures ANCOVA examined how alcohol use varied between students who reported the onset of ARSC in college and students who had no such experience during the first year of college, controlling for alcohol problems at baseline and follow-up. Analyses examining number of heavy drinking days per year, accounting for alcohol problems, indicated a main effect for time, $F(1, 425) = 5.97$, $p < .05$, $\eta_p^2 = .01$; in both groups heavy drinking days per year increased from high school ($M = 5.11$, $SE = 0.78$) to college ($M = 17.00$, $SE = 1.53$). Analyses examining drinks per week, accounting for alcohol problems, also indicated a main effect for time, $F(1, 425) = 25.32$, $p < .001$, $\eta_p^2 = .06$; such that in both groups drinks per week increased from high school ($M = 1.65$, $SE = 0.21$) to college ($M = 5.82$, $SE = 0.44$). Analyses examining drinks per drinking day, accounting for alcohol problems, did not reveal any significant main effects or interactions.

3.3 Drinking patterns and continued occurrence of alcohol-related sexual consequences

Among participants with a prior history of ARSC in high school, repeated measures ANCOVA examined how alcohol use varied between students who continued experiencing such consequences in college and those who did not. Analyses examining number of heavy drinking days per year, controlling for alcohol problems, indicated a main effect for time, $F(1, 202) = 5.79$, $p < .05$, $\eta_p^2 = .03$. In both groups, heavy drinking days per year increased significantly from high school ($M = 22.51$, $SE = 2.15$) to college ($M = 44.20$, $SE = 3.23$). Data also indicated a main effect for group, $F(1, 202) = 4.37$, $p < .05$, $\eta_p^2 = .02$, such that number of heavy drinking days per year were higher among individuals with high school ARSC only ($M = 38.12$, $SE = 3.60$) compared to students with continued ARSC in high school and college ($M = 28.59$, $SE = 2.66$). Analyses examining drinks per week, accounting for alcohol problems, indicated a main effect for time, $F(1, 202) = 14.27$, $p < .05$, $\eta_p^2 = .07$; such that in both groups drinks per week increased from high school ($M = 6.24$, $SE = 0.55$) to college ($M = 13.13$, $SE = 0.91$). Data also indicated a main effect for group, $F(1, 202) = 4.00$, $p < .05$, $\eta_p^2 = .02$. Across time points, drinks per week were higher among individuals with high school ARSC only ($M = 10.90$, $SE = 0.98$) compared to students with continued ARSC in high school and college ($M = 8.48$, $SE = 0.73$). Analyses examining drinks per drinking day, accounting for alcohol problems, indicated no main effects or interactions.

3.4 Predictors of the onset of alcohol-related sexual consequences in college

Among participants who indicated no ARSC during high school, the hierarchical multivariate logistic regression analysis predicting the onset of experiences of ARSC during the first year of college (see Table 3) demonstrated that, accounting for demographic characteristics (Block 1), high school and college alcohol consumption and alcohol problems (Block 2) were associated with new experience of ARSC during the first year of

college, $G^2(4, N = 294) = 70.28, p < .001$, Nagelkerke $R^2 = 0.32$. The third block of predictors consisting of potential influences on ARSC improved the model, $G^2(9, N = 294) = 17.04, p < .05$, Nagelkerke $R^2 = 0.38$. In the full model, alcohol problems during the first year of college and greater motivation to use alcohol to enhance positive affect were associated with new experience of ARSC during the first year of college, Wald $\chi^2(1, N = 294) = 26.30, p < .001$; Wald $\chi^2(1, N = 294) = 3.96, p < .05$, respectively. Low parent knowledge about the student's alcohol use behavior at baseline was marginally associated with the onset of ARSC during college, Wald $\chi^2(1, N = 294) = 3.87, p = .056$.

3.5 Predictors of continued alcohol-related sexual consequences in college

The second hierarchical logistic regression predicting repeated experience of ARSC during the first year of college demonstrated that, accounting for demographic characteristics (Block 1), alcohol consumption and alcohol problems (Block 2) were associated with repeated experience of ARSC during the first year of college, $G^2(4, N = 161) = 34.19, p < .001$, Nagelkerke $R^2 = 0.27$ (See Table 4). The third block of predictors marginally improved the model, $G^2(9, N = 161) = 16.72, p = .05$, Nagelkerke $R^2 = 0.37$. In the full model, alcohol problems during the first year of college, higher levels of peer alcohol consumption in high school, low motivation to drink to regulate negative affect (i.e., coping motives), and low level of positive affect were associated with repeated experience of ARSC during the first year of college.

4. Discussion

We examined differences between subgroups of students who did and did not have ARSC in high school and college, and specifically evaluated theoretically relevant predictors of the onset or recurrence of ARSC in college. Our most meaningful finding was that new and repeated ARSC showed very different patterns of predictors. Among students with no prior history of ARSC, greater motivation to use alcohol to enhance positive affect and low parental knowledge of alcohol use behavior during high school were associated with the onset of ARSC during the first year of college. It was notable that enhancement motives were a particular risk factor for individuals who have never had a prior ARSC. Heavy drinking often occurs in a social context on college campuses (Baer, 2002; Carey, 1993; 1995) and college students also report that alcohol will enhance social situations, or make potential social and dating situations more enjoyable (MacLachy-Gaudet & Stewart, 2001). Since alcohol use is often accompanied by sexual experiences among college students (Goldstein et al., 2007), an environment with decreased parental oversight increases risk for sexual consequences among this subgroup of students (Wood et al., 2004). Even in these situations, it appears that students who perceive their parents to know about their behavior were later protected; whereas high school students who indicated their parents have less knowledge are at greater risk of reporting the onset of ARSC upon college matriculation.

A very different pattern of results was evidenced among students with a history of ARSC. In this group, perceived levels of peer alcohol consumption in high school were associated with continuing to experience ARSC in college. According to social-cognitive theory, peers can shape alcohol consumption through active means, such as offering/providing alcohol to others (Graham, Marks & Hansen, 1991; Wood et al., 2001), by serving as models of drinking behavior (Lau, Quadrel, & Hartman, 1990), and by shaping descriptive and injunctive norms regarding what is normative and acceptable drinking behavior (Borsari & Carey, 2003; Costa, Jessor, & Turbin, 1999). Also among students who reported a history of ARSC in high school, we found that after accounting for drinking patterns and problems with alcohol in high school and college, low motivation to drink in order to cope with negative affect and lower levels of positive mood emerged as predictors of recurring ARSC.

It was unclear why low—instead of high—motivation to drink in order to cope with negative affect was associated with continued ARSC. While speculative, it may be that these students drink to make it easier to pursue sexual relationships in an effort to improve their mood. Such findings suggest that clinical interventions for students who report prior experience of ARSC in high school may benefit from targeted preventative intervention with a specific focus on the associations between affect and alcohol use.

Contrary to our expectations, our analyses indicated that differential increases in alcohol use from high school to college did not distinguish students who showed ARSC in college. For example, in our subgroups analyses all drinking groups increased the frequency of heavy drinking episodes from high school to college, and this increase was not greater among groups that showed new onset or repeat occurrence of ARSC. Indeed, in some cases, alcohol use was greater in the group that showed lower risk of ARSC. Furthermore, high school and college alcohol use did not significantly predict onset or reoccurrence of ARSC after other variables were included in the model. Rather, data suggested that other individual difference and interpersonal factors influenced risk for the onset and repeated occurrence of ARSC in college.

In the present study, 29% of men and 35% of women indicated some form of ARSC during high school, rates that increased by 6-7% for the first year of college (36% of men and 41% of women). Data also indicated that relative to men, the risk for coercive sexual experiences increased among women from high school to college. These data underscore the importance of concomitantly addressing the role of alcohol in young adult sexual behavior in the context of existing interventions addressing alcohol and sexual risk. Alcohol myopia theory (Steele & Josephs, 1990; Taylor & Leonard, 1983) provides one possible explanation for the concurrent association between heavy drinking and sexual risks. According to this model, individuals who consume alcohol attend to the more salient cues in an environment (i.e., sexual interest), as opposed to the more distant negative consequences associated with a risky behavior (i.e., risk for assault or sexually transmitted disease) (e.g., Cooper, 2002; George & Stoner, 2000). Thus, when faced with the opportunity to engage in sexual behavior when intoxicated, this cognitive impairment facilitates attention to the impelling cues and to discounting the more inhibiting cues; thereby increasing risk for ARSC (Abbey, Zawacki, Buck, Clinto, & McAuslan, 2004).

4.1 Implications for intervention

The present findings have several implications for alcohol and sexual risk intervention on college campuses. First, models for intervention with young adults entering college may benefit from a dual focus on alcohol use and related sexual consequences. Numerous interventions, such as personalized feedback (Larimer & Cronce, 2007; Lewis & Neighbors, 2006), now exist to reduce alcohol consumption in young adults, and it may be cost-effective to augment existing alcohol use interventions to target risk for ARSC (i.e., Lewis et al., 2010). For example, Ingersoll and colleagues' (2005) evaluation of a motivational intervention designed to reduce alcohol-exposed pregnancy risk in college women evidenced lower levels of risky drinking behavior, increased likelihood of using effective contraception, and lowered risk for alcohol-related pregnancy among program participants.

Early identification of ARSC and intervention in high school may be useful to reduce the onset or continuation of such consequences in college. Given data suggesting that risk factors for new and recurring ARSC do not overlap, college and universities may consider moving away from universal prevention strategies to more targeted approaches that match students with varying risk profiles to tailored intervention conditions. Interventions for high school students who report ARSC prior to entering college may include a focus on how positive affect, motivation to consume alcohol, and peer alcohol use influence their use of

alcohol and related sexual decision making; whereas interventions for high school students with no prior history of such consequences may highlight how motivation to use alcohol to enhance positive affect, and low parental knowledge of alcohol use behavior increase risk for of ARSC during the first year of college. Interventions that target parental awareness of alcohol consumption during high school and even as young adults transition to college (Testa, Hoffman, Livingston, & Turrisi, 2010) may also be particularly effective in buffering risk. Studies also suggest that parent communication can play a fundamental role in decreasing sexual risk behavior among high school students (Kirby et al., 2004).

4.2 Limitations and future directions

Whereas the present research provides a longitudinal examination of ARSC among college youth, there are limitations. Data were based on student reports of alcohol use behavior. Use of self-report measures is supported in the context of research that utilizes well established, reliable, and valid measures of alcohol use behavior and protects the confidentiality of the participant's response (Babor, Steinberg, Anton, & Del Boca, 2000); in this study assurance of confidentiality was provided throughout. In addition, web-based surveys were used, which may promote more accurate responding. The present research also focused on students during the transition from high school to the first year of college within a traditional 4-year college setting, so findings may not generalize to students transitioning from high school to other educational settings or into the work force. Furthermore, findings may not generalize to students outside of the United States. Other unmeasured constructs, including personality traits such as sensation seeking or risk-taking may have been relevant. We found that across time points, heavy drinking days per year and drinks per week were higher among individuals with high school ARSC only compared to students with continued ARSC in high school and college. The differences reflect a fraction of a heavy drinking day, but indicate that there may be other factors, including protective harm reducing strategies, used by the high school ARSC only group. Further research is warranted to understand the factors that may protect the at-risk group with high school ARSC from having repeat ARSC, particularly since it does not appear that a reduction in alcohol use occurs upon the transition to college.

The proportion of our sample that did not drink at one or more time points was 31%, and given our research focus, we reported only on students who drank in high school and in their first year of college. However, our data indicated that only 12% of students who consumed alcohol only in high school or only in college reported ARSC (compared to 41.5% of those who drank both in high school and college); indicating that the former group has lower risk, and confirming our decision to focus our analyses on students who report continued drinking in high school and in college. It would be interesting to examine the predictors of ARSC among students who begin drinking in college; given that these are likely a very different subgroup of college drinkers compared to students who report alcohol use in both high school and college. Students who are "new" to drinking may be particularly naive to the effects of alcohol, and face different challenges in their sexual decision making. A larger sample size of new college drinkers is needed for such analyses.

4.3 Conclusion

The current study highlights how the transition to the college context is associated with specific risk of new and repeated ARSC for drinkers, and identifies particular risk factors that may be useful for intervention development.

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Highlights

Alcohol related sexual consequences were common in high school and college.
Onset during college related to low parent knowledge and drinking to enhance affect.
Repeated experiences related to peer drinking, low drinking to cope and low mood.
Targeting these risk factors may decrease alcohol related sexual consequences.

Table 1

Alcohol-Related Sexual Consequences during High School and College among Students Reporting Continued Alcohol Use in High School and College (N = 641)

	<u>College</u>	
	No ARSC	ARSC
<u>High School</u>		
No ARSC	319 (49.8%) "No experience"	114 (17.8%) "New experience"
ARSC	76 (11.9%) "History only"	132 (20.6%) "Repeated experience"

Table 2

Alcohol-Related Sexual Consequences among Men and Women Reporting Continued Alcohol Use during High School and Freshman Year of College (N = 641)

Drinking resulted in:	High School		First Year of College	
	Men (N = 267) N (%)	Women (N = 374) N (%)	Men (N = 267) N (%)	Women (N = 374) N (%)
Regretted sexual experiences	61 (22.8)	115 (30.7)	71 (26.6)	116 (31.0)
Neglecting to use birth control or protection from STDs ^a	12 (4.5)	30 (8.0)	19 (7.1)	45 (12.0)
Having sexual experiences when you didn't want to ^c	6 (2.2)	25 (6.7)	18 (6.7)	52 (13.9)
Having sex with someone you normally would not have sex with ^b	23 (8.6)	47 (12.6)	38 (14.2)	58 (15.5)
Being pressured or forced to have sexual intercourse ^c	8 (3.0)	18 (4.8)	6 (2.2)	28 (7.5)
Forcing or pressuring someone to have sexual intercourse	4 (1.5)	9 (2.4)	9 (3.4)	8 (2.1)
Total: Experience of one or more consequence	77 (28.8)	131 (35.0)	94 (35.2)	152 (40.6)

Note: Categories are not mutually exclusive. Participants may report more than one alcohol-related sexual consequence;

^a N = 266 among men during the first year of college;

^b N = 373 among women during the first year of college;

^c Variation in ARSC between men and women during the first year of college; $p < .008$.

Table 3

Predictors of New Experiences of Alcohol-Related Sexual Consequences among First-Year Students with No History of Alcohol Related Sexual Consequences (N = 294)

Variables	B	Wald	OR	95% CI	ΔG^2	p
<u>Block 1: Demographic Characteristics</u>						
					2.84	.241
Sex ^a	0.40	1.31	1.49	0.75 – 2.97		.253
Race ^b	0.28	0.66	1.32	0.67 – 2.63		.481
<u>Block 2: Alcohol Use</u>						
					70.28	.001
High School Alcohol Use	0.04	0.07	1.04	0.80 – 1.35		.792
High School Alcohol Problems	-0.18	2.45	0.84	0.67 – 1.05		.118
First Year Alcohol Use	0.02	0.03	1.02	0.84 – 1.24		.855
First Year Alcohol Problems	0.42	26.30	1.53	1.30 – 1.80		.001
<u>Block 3: High School Characteristics</u>						
					17.04	.048
Parent Knowledge of Alcohol Use	-0.42	3.68	0.66	0.43 – 1.01		.056
Extent of Peer Alcohol Use	-0.22	1.24	0.81	0.55 – 1.18		.265
Drinking Motives: Coping	0.31	1.22	1.37	0.79 – 2.37		.269
Drinking Motives: Social	0.08	0.12	1.08	0.69 – 1.71		.729
Drinking Motives: Enhancement	0.41	3.96	1.51	1.01 – 2.28		.047
Drinking Motives: Conformity	-0.04	0.02	0.96	0.55 – 1.67		.877
CESD: Depressed Affect	-0.03	0.01	0.97	0.46 – 2.08		.945
CESD: Positive Mood	-0.11	0.20	0.90	0.56 – 1.44		.655
CESD: Somatic Symptoms	0.21	0.24	1.23	0.54 – 2.82		.621

Note.

^aMen served as the reference group for participant sex;

^bSelf-identifying as Non-Hispanic White served as the reference group for participant race;

OR = odds ratio; CI = confidence interval.

Table 4

Predictors of Repeated Experiences of Alcohol-Related Sexual Consequences among First-Year Students with a History of Alcohol-Related Sexual Consequences (N = 161)

Variables	B	Wald	OR	95% CI	ΔG^2	p
<u>Block 1: Demographic Characteristics</u>						
					0.68	.714
Sex ^a	-0.24	0.01	0.98	0.41 – 2.32		.957
Race ^b	-0.20	0.19	0.82	0.33 – 2.01		.661
<u>Block 2: Alcohol Use</u>						
					34.19	.001
High School Alcohol Use	-0.14	2.92	0.87	0.74 – 1.02		.088
High School Alcohol Problems	0.15	2.54	1.17	0.97 – 1.41		.111
First Year Alcohol Use	0.40	3.61	0.85	0.72 – 1.00		.057
First Year Alcohol Problems	0.43	17.93	1.48	1.23 – 1.78		.001
<u>Block 3: High School Characteristics</u>						
					16.72	.053
Parent Knowledge of Alcohol Use	0.18	0.39	1.20	0.68 – 2.10		.533
Extent of Peer Alcohol Use	0.68	6.75	0.90	0.77 – 3.29		.009
Drinking Motives: Coping	-0.79	4.05	0.45	0.21 – 0.97		.044
Drinking Motives: Social	-0.21	0.47	0.81	0.45 – 1.47		.494
Drinking Motives: Enhancement	0.08	0.10	1.09	0.65 – 1.81		.753
Drinking Motives: Conformity	0.50	1.65	1.65	0.77 – 3.53		.199
CESD: Depressed Affect	-0.11	0.05	0.90	0.34 – 2.34		.826
CESD: Positive Mood	-0.84	4.62	0.43	0.20 – 0.93		.032
CESD: Somatic Symptoms	0.78	1.91	2.18	0.72 – 6.55		.167

Note.

^aMen served as the reference group for participant sex;

^bSelf-identifying as Non-Hispanic White served as the reference group for participant race;

OR = odds ratio; CI = confidence interval.