Patterns of Alcohol Use and Expectancies Predict Sexual Risk Taking Among Non–Problem Drinking Women

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ABSTRACT. Objective: Although alcohol consumption and sexual risk taking are associated, not everyone who drinks alcohol engages in risky sexual behavior. The purposes of the present study were to identify patterns of alcohol use behaviors and alcohol expectancies among women who are non–problem drinkers and to examine how these patterns are associated with indices of sexual risk. **Method:** Data from 758 non–problem drinking women who have sex with men and were not in committed relationships were analyzed using latent profile analysis to determine patterns of alcohol use and alcohol-related expectancies. **Results:** Of the four patterns observed, three classes had similar alcohol-related expectancies but differed with respect to drinking behavior (moderate drinking, regular heavy episodes, and frequent heavy episodes), and the fourth class consisted of moderate drinkers with low expectancies (low expectancies). Results revealed that those

in the frequent heavy episodes class had the greatest number of sexual partners in the past year and drank the most alcohol before having sex compared with the other women. Both the regular and frequent heavy episodes classes reported greater likelihood of having unprotected sex in the future, more positive beliefs about casual sex, and greater subjective intoxication before having sex than women in the moderate drinking or low expectancies classes. Women in the low expectancies class reported less positive beliefs about condoms than those in the moderate drinking and regular heavy episodes classes. **Conclusions:** Results suggest that different patterns of expectancies and drinking behaviors are associated with different indices of sexual risk taking and highlight the importance of individually tailored programs for prevention of sexually transmitted infections. (*J. Stud. Alcohol Drugs, 74,* 223–232, 2013)

RATES OF WOMEN'S ALCOHOL CONSUMPTION in the United States are high: Among community samples of women, as many as 75.5% reported at least one occasion of heavy drinking in the past year (Testa et al., 2003), and 8% reported consuming seven or more drinks in 1 day during the past 12 months (Cochrane et al., 1992). In addition, rates of sexually transmitted infections (STIs) are high among women in the United States. Women currently account for more than one quarter of all new HIV/AIDS diagnoses, 80% of which are transmitted via heterosexual contact (Hall et al., 2008b). Women also had the majority of 1.5 million chlamydia and gonorrhea cases reported to the Centers for Disease Control and Prevention (CDC) in 2008 (CDC, 2009), diseases associated with severe health consequences. To improve prevention and intervention efforts among women, more information is needed on the associa-

tions between alcohol use and sexual risk taking. Therefore, the goals of the current investigation were to determine the patterns of alcohol use and alcohol-related expectancies among a community sample of women who are non–problem drinkers and examine how these patterns relate to sexual risk-taking behavior.

Alcohol consumption has been associated with sexual risk taking, including unprotected consensual sex (Brown and Vanable, 2007; Cooper, 2002; Leigh and Morrison, 1991; Theall et al., 2007). Heavy episodic drinking has been related specifically to unplanned sex, unprotected sex, and having multiple sex partners (Halpern-Felsher et al., 1996; Hingson et al., 2003; Wechsler et al., 1995). In one study, female heavy drinkers were found to be 2.8 times as likely to engage in unprotected sex and 2.1 times as likely to have multiple sex partners in the past year as female nondrinkers (Huang et al., 2010). More frequent drinking may result in women spending more time in places often associated with an increased likelihood of casual sex and sexual risk taking, including bars and parties, which may contribute to these associations (Bersamin et al., 2012; Parks and Miller, 1997). In addition, alcohol use and sexual risk behavior may co-occur

as a result of common personality factors, such as sensation seeking and impulsivity (Caspi et al., 1995; Kalichman et al., 1996).

Alcohol intoxication is known to impair executive cognitive functioning and decision-making processes in ways that can directly increase the likelihood of sexual risk behavior (Giancola, 2000). The acute effects of alcohol can also increase risk-taking behavior by narrowing an individual's focus to only the most salient cues in the environment, a process referred to as *alcohol myopia* (Steele and Josephs, 1990; Taylor and Leonard, 1983). In a sexual encounter involving alcohol, the most salient cue may be sexual arousal rather than the potential risk associated with a sexual partner (e.g., Davis et al., 2007; George et al., 2009; MacDonald et al., 2000), thereby increasing the likelihood of risk-taking behavior (Adefuye et al., 2009).

Alcohol expectancies may also help explain the association between alcohol use and behavioral risks such as sexual risk taking. Alcohol expectancy theory posits that behaviors exhibited after drinking are likely to be consistent with previously held beliefs about the effects of alcohol (MacAndrew and Edgerton, 1969). Thus, intoxicated individuals will behave based on what they have learned to expect from alcohol. In general, positive alcohol outcome expectancies have been associated with more risk taking than negative beliefs about alcohol (Fromme et al., 1997). Alcohol-related sexual beliefs have been related to unsafe sexual outcomes including unprotected sex (Abbey et al., 2005; Cooper, 2002; George and Stoner, 2000). Research suggests that positive expectancies about the sexual-enhancement effects of alcohol predict more frequent substance use in sexual contexts (Kalichman et al., 1998). Indeed, alcohol-related sexual-enhancement expectancies have been associated with an increased number of sexual partners (Hendershot et al., 2007) and drinking before sex (White et al., 2009). Moreover, alcohol expectancies have been shown to interact with acute intoxication to predict sexual risk taking (Gordon et al., 1997) in addition to influencing risk behavior directly (Maisto et al., 2002).

Although it is often thought of as a classification unto itself, social (or moderate) drinking can take many forms depending on the quantity and frequency of consumption. This variation in drinking patterns may be associated with differences in alcohol expectancies and contribute to outcomes. Moreover, alcohol and sexual risk taking are associated; however, not everyone who drinks alcohol engages in such behavior (Leigh et al., 2008). This suggests that a more fine-grained assessment of specific patterns of drinking behavior and alcohol expectancies is needed. Existing literature in this area is limited to variable-centered approaches that do not allow for the examination of drinking profiles or subtypes, whereas the known heterogeneity among non–problem drinkers can be characterized using person-oriented approaches such as latent profile analysis. Based on previous research

suggesting that alcohol use and alcohol-related expectancies both independently and jointly influence sexual risk taking (Gordon et al., 1997; Maisto et al., 2002), the use of a person-oriented approach provides an examination of a constellation of behaviors and beliefs to identify individuals at greatest risk for engaging in these behaviors and to help inform tailored intervention and prevention efforts.

The purposes of the present study were to (a) identify patterns of alcohol use behaviors and expectancies among a community sample of heterosexual women who are non–problem drinkers using latent profile analysis and (b) determine how such patterns of alcohol behavior and expectancies are associated with indices of sexual risk taking. Examinations of profiles of individuals are by nature exploratory; however, we expected that distinct profiles based on alcohol use behavior and expectancies would emerge through latent profile analyses. Further, we hypothesized that profiles characterized by heavier and more frequent alcohol consumption, stronger positive alcohol expectancies, and weaker negative alcohol expectancies would be associated with greater sexual risk taking.

Method

Participants

By means of posted flyers and online advertisements, we recruited 758 women from the community (M_{age} = 23.5 years, SD = 4.2) for five experiments about alcohol and social interactions. The experiments involved an experimental protocol; however, only background questionnaire data were used in the analyses presented here. Participants' ethnic breakdown was 66.2% White, 7.1% African American, 7.9% Asian American/Pacific Islander, 2.6% American Indian/Native Alaskan, 9.0% multiracial, and 7.1% other; 8.6% identified as Hispanic. Sixty-four percent were employed either full- or part-time, and 46% were either full- or part-time students. Thirty-one percent were currently attending a 4-year college or university full time. Demographic differences among the experiments were examined. Participants in the two experiments focused on 18- to 20-year-olds were less likely to be employed and more likely to be a full-time student at a 4-year college or university than participants from the three samples of 21- to 35-year-olds. There were no ethnic differences across experiments.

Procedures

All procedures were approved by the university's Human Subjects Division. Participants for all experiments were recruited in a similar manner. Those interested in participating contacted the lab and were screened by phone to ensure eligibility. Participants were required to be single non–problem drinkers between the ages of 18 and 35 years.

Abstainers and those with a history of problem drinking (e.g., history of negative reactions to alcoholic beverages, concern about drinking) were excluded (National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2005). Three of the samples targeted women of legal drinking age (i.e., 21–35 years) who had the additional requirement of not currently taking medications or having any medical conditions that would contraindicate alcohol consumption. Because the target sample for each experiment was single women who have had sex with men, all participants had to report on the screening that they had had consensual sexual intercourse with a man at least once in their lifetime and were not currently in a committed and exclusive relationship.

On arrival to the laboratory, the participant was seated in a private room, provided informed consent, and was left alone to complete a set of background measures on the computer. At the end of the experimental session, participants were debriefed, paid $15 per hour, and given information about HIV and STI prevention.

Measures

Demographic information. Participants provided their age, ethnicity, and student/occupational status.

Alcohol expectancies. The Alcohol Expectancies Questionnaire (AEQ; George et al., 1995) was used to assess alcohol expectancies. The AEQ includes 24 items rated on 6-point scales ranging from 0 (*disagree strongly*) to 5 (*agree strongly*). Items were averaged to create three subscales reflecting positive expectancies (social/physical pleasure, social expressiveness, sexual enhancement) and two subscales reflecting negative expectancies (cognitive/physical impairment, careless unconcern), which all had adequate internal reliability (Cronbach's α was .67, .85, .80, .81, and .75, respectively).

Alcohol behaviors. A modified version of the Daily Drinking Questionnaire (Collins et al., 1985) was used to assess alcohol consumption. Participants reported the number of standard drinks (defined as 12 oz. of beer, 5 oz. of wine, or 1.5 oz. of distilled spirits) they consumed on each day of a typical week in the past month, as well as the number of hours they typically spent drinking each day. From responses to the Daily Drinking Questionnaire, we calculated the average weekly frequency and average quantity consumed per drinking day. The number of heavy episodic drinking episodes per week was calculated to reflect the standard definition of having consumed four or more drinks in 2 hours (NIAAA, 2004).

Sexual behaviors. The Sexual Experiences Inventory was adapted from interview and questionnaire assessments to assess sexual experiences (Capaldi et al., 2002; Leigh et al., 1993). Participants reported on their past 3-month frequency of vaginal intercourse with a man and the proportion of occasions a condom was used (0 = *never,* 1 = *about*

a quarter of the time, 2 = *about half of the time,* 3 = *about three quarters of the time,* and 4 = *always*) as well as their number of past-year and lifetime intercourse male partners. Items created for the purposes of this study were used to assess how often participants drank alcohol before having sex (i.e., "How often do you consume alcohol before sexual activity?") on a 5-point scale (0 = *never,* 1 = *about a quarter of the time,* 2 = *about half of the time,* 3 = *about three quarters of the time,* and 4 = *always*), and their subjective intoxication (i.e., "During those times you consumed alcohol before sexual activity, how intoxicated were you?") on a 7-point scale (0 = *not at all,* 6 = *extremely*).

Unprotected sex likelihood. Participants completed an eight-item questionnaire developed for this research that assessed their unprotected sex intentions (Purdie et al., 2011). The five items that were averaged to form the Unprotected Sex Likelihood Behavior subscale were the likelihood participants would have sexual intercourse without a condom in the future (a) with a new male partner, (b) with a steady male partner, (c) with a male ex-partner, (d) with a male partner whose sex risk is unknown, and (e) with no birth control. The Unprotected Sex Likelihood Outcome subscale comprised three items in which participants reported the likelihood that they would contract an STI, contract HIV, and get pregnant when they did not want to. All responses were rated on 7-point scales ranging from 0 (*not at all likely*) to 6 (*very likely*). Internal reliability was good for both the Unprotected Sex Likelihood Behavior and Unprotected Sex Likelihood Outcome subscales (Cronbach's α was .79 and .78, respectively).

Casual sex attitudes. Participants' attitudes toward casual sex were assessed with a subscale of the Sociosexual Orientation Inventory (Simpson and Gangestad, 1991). This subscale included three attitudinal items (e.g., "I can imagine myself being comfortable and enjoying casual sex with different partners") answered on 9-point scales (0 = *strongly disagree,* 8 = *strongly agree*) and then averaged. These items demonstrated good internal reliability (Cronbach's α = .82). Higher values reflect more positive attitudes toward casual sex.

Condom use beliefs. Condom use beliefs were assessed with the Condom Use Outcome Beliefs scale (Morrison et al., 1995) drawn from a study based on the theory of planned behavior (Ajzen, 1991). Participants first reported the likelihood that each of 12 items (e.g., "not getting pregnant," "less physical pleasure from sex for me") would occur if a condom was used in the next 3 months using 7-point scales (0 = *very unlikely,* 6 = *very likely*). Next, using 7-point scales (-3 = *very bad,* 3 = *very good*), participants reported how bad or good it would be if the event described in each item occurred. The two responses for each item were multiplied together and then averaged across all items. Higher values reflect more positive beliefs about condoms, which have been associated with greater intentions to use condoms

and actual condom use (Campbell et al., 1992; Hall et al., 2008a).

Data analytic strategy

Latent profile analysis is an analytic method used to determine underlying latent groups of individuals based on their responses to selected variables (Bartholomew, 1999; McLachlan, 1988). These analyses were conducted using Mplus Version 6 (Muthén and Muthén, 1998–2010) to identify profiles of women based on their positive and negative alcohol expectancies and alcohol use behavior (i.e., typical frequency, quantity, and number of heavy drinking episodes per week). Properties of each of the variables were examined before conducting the latent profile analysis, and no problems with skewness or kurtosis were identified. Eight measures were entered into the analyses, and classes were added iteratively. We evaluated whether the addition of a class improved model fit in order to determine the appropriate number of classes to maintain. Because there is no consensus on the single best indicator to determine model fit (Nylund et al., 2007), multiple fit statistics were examined. The Akaike information criterion (AIC) and the Bayesian information criterion (BIC) are expected to decrease as the model improves. The Lo–Mendell–Rubin test (LMR) compares a k class solution to a $k - 1$ class solution (where k = a given number of latent classes; Lo et al., 2001). The LMR provides a test for improvement in model fit for the addition of each class with significant p values indicative of improved model fit for the k class solution. Entropy provides a measure of the extent to which the latent classes are distinct from one another, with values close to 1 indicative of clearer classification (Ramaswamy et al., 1993).

Results

Table 1 shows model fit statistics for the latent profile analysis. The LMR was nonsignificant for the five-class solution and above, indicating that the addition of the fifth and subsequent classes did not improve model fit beyond the four-class solution. Although the AIC and BIC decreased for all models tested, the relative decrease in both the AIC and BIC was small from the three-class to the four-class solution. Taken together, these results suggest that the four-class solution should be retained. In addition, the four-class solution was associated with the highest entropy value, indicating that this model more clearly distinguished among the groups according to their alcohol expectancies and behaviors.

Standardized means for the variables included in the latent profile analysis are presented in Figure 1. As shown in Table 2, Class 1 ($n = 110$; 14.5%) was characterized by the lowest positive and negative expectancies for alcohol and infrequent moderate drinking (low expectancies). Women in Class 2 ($n = 388$; 51.2%) endorsed higher cognitive/physi-

cal impairment alcohol expectancies than those in the other classes and were infrequent moderate drinkers (moderate drinking). Class 3 ($n = 227$; 30.0%) was characterized by average alcohol expectancies, heavy drinking, and regular heavy episodic drinking (regular heavy episodes). Women in Class 4 ($n = 33$; 4.3%) reported higher social/physical pleasure alcohol expectancies than those in the other classes and were frequent heavy drinkers (frequent heavy episodes).

Predicting sexual risk perceptions and behaviors

To examine whether the classes predicted differences in sexual risk behaviors, generalized linear models were conducted (Table 3). Age and a dichotomous variable for full-time attendance at a 4-year college or university were included in all models to control for observed demographic differences and because the association between alcohol and sexual behavior may vary by age and be influenced by the traditional college environment. Significant univariate tests were followed up with pairwise comparisons using the Sidak procedure to control for alpha inflation and protect against Type 1 error.

Sex-related attitudes and beliefs. Women's unprotected sex intentions, condom use outcome beliefs, and attitudes about casual sex were examined. There was a significant difference among classes on the Unprotected Sex Likelihood Behavior subscale such that those in the regular and frequent heavy episodes classes reported greater behavioral intentions to have unprotected sex than their counterparts. There was also a significant difference among classes on their condom use outcome beliefs such that women in the low expectancies class endorsed less positive beliefs about condom use than those in the moderate drinking and regular heavy episodes classes but not less than those in the frequent heavy episodes class. Classes also significantly differed in their positive attitudes toward casual sex, with women in the low expectancies and moderate drinking classes reporting less positive attitudes toward casual sex than those in the regular and frequent episodes classes and those in the regular heavy episodes class reporting less positive casual sex attitudes than those in the frequent heavy episodes class. There were no differences among classes on the Unprotected Sex Likelihood Outcome subscale.

TABLE 1.   Model fit indices for the latent profile analysis of women's alcohol expectancies and alcohol behaviors

Model	AIC	BIC	LMR	Entropy
Two class	17,560.69	17,676.46	9,096.76**	.85
Three class	17,152.25	17,309.69	8,755.35**	.80
Four class	**16,912.15**	**17,111.27**	**8,542.12****	**.88**
Five class	16,710.14	16,950.94	8,413.08	.86
Six class	16,573.48	16,855.96	8,303.07	.84

Notes: The best fitting model is indicated in **bold.** AIC = Akaike information criterion; BIC = Bayesian information criterion; LMR = Lo–Mendell–Rubin test.
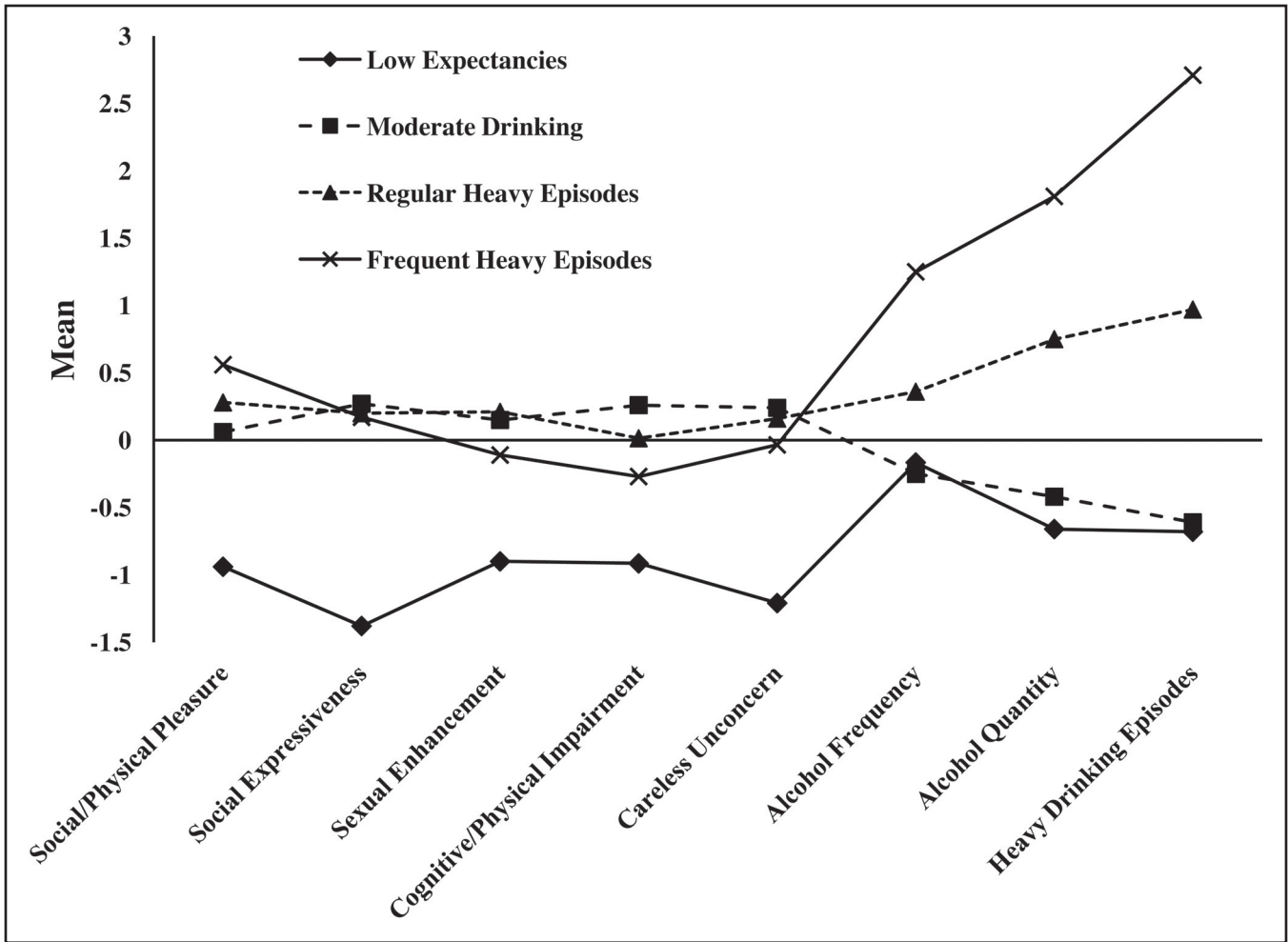**$p < .01$.

FIGURE 1. Standardized means of alcohol expectancies and alcohol behaviors included in the latent profile analysis

Sexual risk behavior. Women's sexual behavior in the last 3 months (i.e., the frequency of vaginal sex and frequency of condom use) was examined, in addition to the number of partners in the past 12 months and lifetime as well as co-occurring alcohol and sexual behavior. Significant differences among the classes emerged on the number of vaginal sex partners women had had in the past 12 months,

with those in the frequent heavy episodes class reporting the greatest number of partners compared with those in the other classes, and those in the regular heavy episodes class reporting more than those in the low expectancies class. The classes also differed in the frequency with which they drank before sex, with those in the frequent heavy episodes class reporting more frequent alcohol use before having sex,

TABLE 2. Means (and standard deviations) of alcohol expectancies and alcohol behaviors by class

Variable	Low expectancies ($n = 110$)	Moderate drinking ($n = 388$)	Regular heavy episodes ($n = 227$)	Frequent heavy episodes ($n = 33$)
Alcohol expectancies				
Social/physical pleasure	3.15 (0.84)$_a$	3.86 (0.60)$_b$	4.01 (0.64)$_c$	4.21 (0.42)$_d$
Social expressiveness	2.28 (0.87)$_a$	3.87 (0.69)$_b$	3.80 (0.89)$_b$	3.78 (0.82)$_b$
Sexual enhancement	1.82 (0.98)$_a$	2.85 (0.86)$_b$	2.92 (0.96)$_b$	2.60 (0.92)$_b$
Cognitive/physical impairment	2.48 (0.98)$_a$	3.58 (0.78)$_b$	3.35 (0.90)$_c$	3.08 (1.00)$_c$
Careless unconcern	2.12 (0.88)$_a$	3.49 (0.72)$_b$	3.41 (0.94)$_b$	3.23 (0.86)$_b$
Alcohol use frequency per week	3.07 (1.66)$_a$	2.94 (1.38)$_a$	3.93 (1.56)$_b$	5.36 (1.25)$_c$
Alcohol use quantity per drinking day	2.23 (0.91)$_a$	2.63 (1.00)$_b$	4.48 (1.41)$_c$	6.15 (1.57)$_d$
Heavy drinking episodes per week	0.17 (0.42)$_a$	0.27 (0.44)$_b$	2.30 (0.52)$_c$	4.55 (0.94)$_d$

Note: Means with differing subscripts are significantly different at $p < .05$.

Table 3.　Means (and standard deviations) of sexual risk perceptions and behaviors and differences among classes

Variable	Low expectancies (*n* = 110) M (SD)	Moderate drinking (*n* = 388) M (SD)	Regular heavy episodes (*n* = 227) M (SD)	Frequent heavy episodes (*n* = 33) M (SD)	GzLM Wald χ² (df = 3)
Unprotected sex likelihood					
Behavior	1.91 (1.34)$_a$	1.99 (1.35)$_a$	2.39 (1.43)$_b$	2.55 (1.34)$_b$	21.18***
Outcome	0.81 (1.27)	0.85 (1.09)	0.95 (1.02)	0.89 (1.08)	2.73
Condom use outcome beliefs	4.07 (2.95)$_a$	5.29 (2.59)$_b$	5.67 (2.79)$_b$	4.83 (2.47)$_{a,b}$	23.43***
Positive attitudes—casual sex	3.53 (2.15)$_a$	4.08 (2.21)$_a$	4.50 (2.11)$_b$	5.03 (2.32)$_c$	27.15***
Vaginal sex frequency	10.66 (13.58)	11.51 (15.66)	14.19 (25.27)	12.28 (12.49)	3.53
Condom use frequency	1.82 (1.83)	1.81 (1.70)	1.87 (1.72)	2.00 (1.63)	0.42
Number of partners past year	2.40 (1.94)$_a$	2.72 (2.23)$_{a,b}$	3.28 (4.49)$_b$	5.84 (8.81)$_c$	57.91***
Number of partners lifetime	11.12 (11.48)	13.31 (29.17)	13.18 (15.22)	13.53 (13.46)	7.28
Drink before sex	1.19 (0.82)$_a$	1.61 (0.96)$_b$	1.92 (1.00)$_c$	2.47 (0.95)$_d$	87.95***
Intoxicated before sex	2.33 (1.39)$_a$	2.96 (1.33)$_b$	3.45 (1.13)$_c$	3.56 (0.76)$_c$	67.53***

Notes: Means with differing subscripts represent significant differences between classes at *p* < .05. GzLM = generalized linear model.
***p < .001.

followed by, in order, those in the regular heavy episodes, moderate drinking, and low expectancies classes. A similar pattern emerged for the extent to which these women reported feeling intoxicated before having sex, except that in this case the regular and frequent heavy episodes classes did not differ significantly. There were no differences among the classes on the frequency of sex and condom use in the past 3 months or number of lifetime sexual partners.

Discussion

Consistent with hypotheses, the present results suggest that there are several different patterns of alcohol use behaviors and alcohol-related expectancies among female non–problem drinkers. Three classes emerged reflecting different patterns of alcohol use ordered from moderate to heavy on three dimensions of use: average weekly frequency, typical quantity per drinking day, and average number of heavy drinking episodes per week. There was considerable variability among the classes with respect to their alcohol use frequency, quantity, and number of heavy drinking episodes. Those in the frequent heavy episodes class typically consumed alcohol 2 more days per week, had approximately four more drinks per drinking day, and engaged in heavy episodic drinking about four more times per week than those in the low expectancies and moderate drinking classes. One of the lighter drinking classes (the low expectancies class) was further differentiated from the other classes by having significantly lower positive and negative alcohol-related expectancies.

This difference in alcohol-related expectancies may be because women in the low expectancies class have not developed strong expectations for the effects of alcohol because they have less experience drinking alcohol themselves and have likely had less exposure to other individuals who consume alcohol (Aas et al., 1995). Women in the moderate drinking, regular heavy episodes, and frequent heavy episodes classes reported similar expectations for the effects of alcohol with two exceptions. First, those in the moderate drinking class anticipated greater cognitive and physical impairment from alcohol compared with women in the regular and frequent heavy episodes classes, and second, the expectation for social and physical pleasure increased in accordance with each class's increased alcohol use quantity. These differences in alcohol expectancies may offer insight into the alcohol use behavior observed in each class. It may be that those in the moderate drinking class limited their consumption to avoid the expected impairment associated with alcohol intoxication, or, when they drank, they actually did experience more impairment than heavier drinkers because of less tolerance. In contrast, increased expectation for (and perhaps increased experience of) alcohol's pleasurable effects may provide a motivation for increased drinking to achieve these desired effects among those in the regular and frequent heavy episodes classes (Bekman et al., 2011; Fromme et al., 1993).

We hypothesized that sexual risk taking would differ among the classes of women such that those characterized by heavier and more frequent alcohol consumption, more positive alcohol expectancies, and less negative alcohol expectancies would report greater sexual risk taking. Several indices of sexual risk were examined with partial support for this hypothesis. We found that those with frequent heavy episodes—who also held the most positive beliefs about the social and physical pleasure of alcohol—had more positive attitudes about casual sex, had the greatest number of sexual partners in the past year, and drank more alcohol before having sex. Both regular and heavy episodes classes reported higher likelihood of having unprotected sex in the future and greater subjective intoxication before having sex than the lighter drinking classes. These women may represent a subgroup whose alcohol and sexual behaviors were motivated by sensation seeking and impulsivity (Hendershot et al., 2007). Alternatively, those in the frequent heavy episodes

class may consume alcohol in order to achieve the expected pleasurable effects of alcohol, which in turn may serve to focus their attention on experiences consistent with their expectations, including sexual arousal. This process may lead to an increase in their sexual risk taking, especially when they have been drinking.

It is noteworthy that there were no differences among classes on the frequency of vaginal sex, frequency of condom use, or the number of lifetime sexual partners. Although these behaviors were reported at comparable rates among all women, differences in other beliefs and behaviors suggest that their sexual risk is not equivalent. Indeed, those in the frequent heavy episodes class felt most positively about casual sex and reported more sexual partners in the past year, indicating that they could have been having sex with a greater number of casual partners recently whose sexual history and STI/HIV diagnoses were unknown, thereby putting themselves at greater risk for STIs. The regular and frequent heavy episodes classes reported greater intentions to have unprotected sex in the future compared with those in the moderate drinking and low expectancies classes. In accordance with the theory of planned behavior (Ajzen, 1991), intentions to engage in risky behaviors have been associated with an increased involvement in those risky behaviors in the future (Combs-Lane and Smith, 2002). Moreover, despite a similar frequency of condom use, the motivation for using condoms could have differed among classes. For example, the frequent heavy episodes class may have been motivated to use condoms because they had a greater number of partners in the past year.

That those in the frequent heavy episodes class were more likely to drink before sex and that both the regular and frequent heavy episodes classes felt more intoxicated before sex than lighter drinking women was not surprising given that these women reported greater quantity and frequency of alcohol use. However, it is concerning because greater alcohol use and intoxication are associated with impaired decision-making processes and a narrowing of one's attention that may decrease the perception of risk associated with a sexual situation (Fromme et al., 1999; Maisto et al., 2004; Steele and Josephs, 1990; Taylor and Leonard, 1983). Indeed, recent experimental research has demonstrated a link between acute alcohol intoxication and sexual appraisals among women asked to project themselves into a story depicting a sexual interaction. Results showed that alcohol consumption was positively associated with primary appraisals of sexual potential, which subsequently positively predicted appraisals of sexual pleasure (Norris et al., 2012). Using similar experimental methodology, additional investigations found that alcohol consumption directly or indirectly increased women's likelihood to engage in unprotected sex (George et al., 2009; Norris et al., 2009). Zawacki (2011) also found that during live social interactions in the laboratory, intoxication decreased women's sexual risk appraisal

of men, which in turn increased women's unprotected sex intentions.

Perhaps most surprising was the finding that women in the low expectancies class—who were moderate drinkers with low positive and negative alcohol expectancies—reported less positive condom use beliefs than the moderate drinking and regular heavy episodes classes and did not differ from the frequent heavy episodes class. For these women in the low expectancies class, condom use may be associated with having casual sex, about which they also expressed less positive attitudes. We speculate that this might be related to differences in patterns of contraceptive use. A recent examination of contraceptive use in young adults' dating relationships found that hormonal contraception alone, compared with condoms alone or dual methods, was more common when sex was initiated after the dating relationship began rather than before and as relationship duration and level of intimacy increased (Manlove et al., 2011). Women in the low expectancies class may be more likely to use only hormonal contraception methods earlier in the course of what they perceive to be a committed relationship. Although this would certainly increase their risk for STIs, which are not prevented by hormonal contraceptive methods, they may still be at lower overall risk because they generally have fewer partners or because they have longer term partners who present less disease risk.

The moderate drinking class represented a particularly interesting subgroup. These women had similar drinking behaviors to those in the low expectancies class; however, their expectancies were quite different. Moreover, the moderate drinking class had similar expectancies to those in the regular and frequent heavy episodes classes but differed in their alcohol use. The moderate drinking class may be at slightly greater risk than those in the low expectancies class and at less risk than the regular and frequent heavy episodes classes. These differences in risk cannot easily be explained, as it appears that their increased risk relative to the low expectancies class was likely attributable to high alcohol expectancies, whereas their decreased risk relative to the regular and frequent heavy episodes class was likely attributable to less alcohol use. These findings highlight the importance of additional person-oriented analyses that examine the constellation of expectancies and alcohol use to shed further light on the experiences of these women.

Present findings should be considered in light of several limitations. Some aspects of the current study limit the generalizability of the findings; the sample was self-selected, for example, and abstainers and women with a history of problem drinking were excluded from participating. Problem drinkers represent a small percentage of women who consume alcohol (Hasin et al., 2007), and the goal of this study was to understand patterns associated with non–problem drinking. Women indicating that they were in a committed exclusive relationship were also excluded from

the study, which further limits generalizability. Although women in committed and exclusive relationships generally have lower STI/HIV risk (Adimora et al., 2002; Morris and Kretzschmar, 1995), in this study the partner's perception of the level of commitment in the relationship and whether the partner was exclusive in the relationship was not assessed. This exclusion criterion was necessary for the experimental portion of the study not described here; however, we may have excluded a subset of women at risk for STIs and HIV if they believed their relationship was exclusive but their partner did not. Moreover, the number of women categorized into the frequent heavy episodes class was small, likely because of the inclusion/exclusion criteria established for the experimental portion of the present research.

An additional limitation is that the present study was cross-sectional. We were therefore unable to examine whether alcohol use behaviors or alcohol-related expectancies increased subsequent sexual risk taking, whether the opposite was true, or whether there was a reciprocal relationship. Future studies should include longitudinal assessments to determine the patterns of alcohol use and associations with sexual risk taking over time to begin to examine these important issues. Such studies could also include measurement of personality attributes that potentially underlie elevated levels of both drinking and sexual risk taking, such as impulsivity and sensation seeking. Last, the fact that no differences on condom use frequency emerged among classes may have been related to a lack of sensitivity of the assessment. Condom use frequency was assessed with a single item in which participants reported the proportion of time they used a condom, with limited response options and without reference to partner type. Given the differences in condom use beliefs and attitudes toward sex with casual partners among classes, it would stand to reason that a more fine-grained assessment of their actual condom use behavior might have revealed differences.

Together these results highlight the variability among heterosexual female non–problem drinkers that were able to be captured through the use of a person-oriented analytic approach and suggest the importance of continuing to examine patterns of both alcohol use behaviors and alcohol expectancies in predicting sexual risk taking. Although moderate drinking was associated with some indices of sexual risk taking, women who reported heavier drinking exhibited the highest STI risk indicators, especially those who also reported greater expectations for the social/physical pleasure effects of alcohol. It is noteworthy that the current investigation excluded problem drinkers; therefore, these heavy drinking women are not likely to present for treatment related to their alcohol use specifically. Nevertheless, it is important to develop alcohol-focused STI risk-reduction interventions for heavy drinking women that can be implemented whether or not they seek traditional alcohol treatment. It may also be important to include information about the possible influence of social/physical pleasure expectancies in the association between alcohol use and sexual risk taking. Lighter drinking women will likely not need alcohol-focused STI risk-reduction interventions; however, they would still benefit from general STI education and risk-reduction strategies. Although many STI intervention efforts are targeted toward young women on college campuses, results of the current investigation suggest that efforts should be broadened to address the needs of women more generally, including the possibility of providing educational material to women seeking medical services at primary care or women's health clinics or developing smart phone applications that can be widely disseminated.

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