Trajectories and Determinants of Alcohol Use Among LGB Young Adults and Their Heterosexual Peers: Results From a Prospective Study

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Abstract

Lesbians, gays, and bisexuals (LGBs) are at increased risk for alcohol use during young adulthood, but the mechanisms remain inadequately understood. The aim of the present study was to examine the trajectories and determinants of alcohol use among LGB young adults who were sampled prospectively. The sample included 111 LGB individuals (47 women and 64 men) and 2,109 heterosexuals (1,279 women and 830 men), who were assessed at three time points: during the summer after their senior year of high school and during the fall and spring of their freshman year of college. Hierarchical linear modeling analyses indicated that lesbians consumed more alcohol than their heterosexual peers during high school, whereas gay men increased their alcohol use at greater rates than heterosexual men during the initial transition to college. Positive alcohol expectancies and social norms mediated this relation for both men and women. The results extend the generalizability of these processes and highlight the importance of considering normative social–cognitive influences in the development of alcohol use among LGB young adults.

Keywords

alcohol use; LGB young adults; social norms; alcohol expectancies

Alcohol use and associated problems peak during young adulthood (Grant et al., 2004; Wechsler & Isaac, 1992), with levels of alcohol consumption tending to increase during the transition to college (Baer, Kivlahan, & Marlatt, 1995; Johnston, O'Malley, Bachman, & Schulenberg, 2005; McCabe, Schulenberg, Johnston, O'Malley, Bachman, & Kloska, 2005; Read, Wood, & Capone, 2005). One group that appears to be at heightened risk for alcohol use during this developmental period is lesbians, gays, and bisexuals (LGBs), a finding that is especially pronounced among women, who drink at higher rates than their heterosexual peers (Eisenberg & Wechsler, 2003b; McCabe, Boyd, Hughes, & d'Arcy, 2003; McCabe, Hughes, Bostwick, & Boyd, 2005). The processes leading to increased risk during this significant developmental period, however, remain inadequately understood because of a paucity of research on the determinants of alcohol use among LGB young adults.

Although not specifically designed to address the concerns of LGB individuals, several developmental models (Schulenberg & Maggs, 2002) may help explain why LGB young adults might be at risk for increased alcohol use. The overload model suggests that health-risk behaviors can result from experiencing several developmental transitions in short succession. In the transition to young adulthood, many LGB individuals negotiate the process of acknowledging, defining, and accepting their sexual identity (Savin-Williams & Diamond, 2001). This task is undertaken in addition to the normative developmental tasks of young adulthood, including peer and romantic relationships and academic achievement, that their heterosexual peers confront (Schulenberg & Maggs, 2002). These combined stresses could potentially challenge an individual's coping capabilities, and alcohol use may serve as an alternative coping strategy.

Whereas the overload model focuses on stress related to developmental transitions, most past research on LGB individuals focuses on stress associated with a stigmatized identity, including discrimination experiences and internalized homophobia (for a review, see Bux, 1996). Both approaches, however, suggest that alcohol use among LGB individuals may be driven by coping motives and largely ignore more normative influences on drinking behavior that LGB young adults might share with their heterosexual peers.

A developmental model that is more consistent with a role for normative social influences on alcohol use among LGB young adults is the transition catalyst model, which posits that some level of risk-taking is normative and that alcohol might facilitate certain aspects of the transition to young adulthood (Schulenberg & Maggs, 2002). To the extent that the additional developmental task of acknowledging and integrating a marginalized identity may be difficult or stressful for LGB young adults, these individuals might be rendered more vulnerable to normative risk factors for alcohol use during the transition to college. Consistent with this hypothesis, there is evidence within samples of LGB individuals that normative influences impact substance use and abuse, particularly under conditions of stress (McKirnan & Peterson, 1988). With rare exception (Eisenberg & Wechsler, 2003a), however, normative psychosocial processes have not been examined as prospective influences on alcohol use among LGB young adults, even though the importance of examining basic developmental processes with this population has been recognized for some time (Savin-Williams, 2001).

Among general samples of young adults, both normative social and cognitive influences predict increased rates of alcohol use. Social norms, both descriptive and injunctive, refer to the influence of the environment on an individual's level of alcohol consumption. Descriptive norms for drinking behaviors denote an individual's perception of how much alcohol others in their environment consume; injunctive norms, on the other hand, indicate an individual's beliefs about the acceptability of drinking (Larimer, Turner, Mallett, & Geisner, 2004). Both types of norms have been shown to predict drinking behavior and alcohol-related problems (Larimer et al., 2004; Sher, Bartholow, & Nanda, 2001). In addition to these social influences, a well-established cognitive influence on drinking behavior is alcohol outcome expectancies. Alcohol-related expectancies, both positive and negative, are beliefs about the effects of drinking alcohol. A substantial literature documents the association between alcohol expectancies and drinking behavior across time (e.g., Goldman, Brown, & Christiansen, 1987; Jones, Corbin, & Fromme, 2001).

During adolescence and young adulthood, peer relationships are consistently implicated in the etiology and maintenance of substance use, including alcohol (for reviews, see Borsari & Carey, 2006; also see Hops, Andrews, Duncan, Duncan, & Tildesley, 2000). For example, a longitudinal study of young adults demonstrated that peer use of alcohol predicted binge drinking and problem use by young adults, providing evidence for a causal role of peer

influence on drinking behaviors (Andrews, Tildesley, Hops, & Li, 2002). Peers can influence the alcohol use patterns of young adults in several ways. In addition to contributing to the development of norms regarding alcohol use, peers exert direct pressure to drink and influence behavior via modeling of drinking behavior (Borsari & Carey, 2001). Another way in which peers can influence alcohol use during this developmental period is through the stability, intimacy, and support they provide—that is, through the quality of peer relationships (Borsari & Carey, 2006). In particular, an absence or dissolution of peer relations has been consistently associated with alcohol use among college students (e.g., Hussong, Hicks, Levy, & Curran, 2001; Senchak, Leonard, & Greene, 1998), suggesting that the quality of peer relations can serve as both a risk for, and protection against, the initiation of alcohol use. It has been hypothesized that a dearth of stable, intimate, and supportive peer relationships leads to increased alcohol use primarily through the development of cognitions that reinforce drinking as a means of coping with social isolation (Borsari & Carey, 2006).

These social–cognitive influences also appear important in understanding the drinking behavior of specific high-risk groups, who tend to have more permissive social norms and higher alcohol expectancies (Larimer et al., 2004; Sher & Gotham, 1999). In particular, individuals with a family history of alcoholism have elevated alcohol expectancies compared with those without such a history (Conway, Swendsen, & Merikangas, 2003; Pastor & Evans, 2003; Sher & Gotham, 1999). Additionally, members of fraternities and sororities are more likely than non-Greeks to endorse attitudes that higher levels of alcohol use are normative and to indicate that their peers are more encouraging of heavy drinking (Baer, 1994; Sher et al., 2001). Social norms and expectancies have also been shown to mediate differences in drinking behavior among these two high-risk groups (Larimer et al., 2004; Sher & Gotham, 1999). Although LGB status is different in many ways from Greek membership or a positive family history of alcoholism, the prominence of social– cognitive influences on drinking behavior suggests the possibility that these influences may contribute to alcohol consumption among LGB adolescents and young adults. To our knowledge, no study has simultaneously examined these social– cognitive influences to determine whether they differ by sexual orientation or account for drinking differences between heterosexual and LGB young adults.

The present study addressed gaps in the literature with respect to social–cognitive influences in the development of alcohol use among LGB young adults. Using prospective data from a large cohort of students who were recruited during the summer between their senior year in high school and their matriculation into college, we had the following specific aims: (a) to determine whether levels of alcohol consumption among LGB individuals differ from those of their heterosexual peers both prior to college matriculation and during the initial transition to college, (b) to evaluate social–cognitive influences on alcohol use among LGB young adults, and (c) to examine social–cognitive influences as possible mediators of differences in drinking behavior between heterosexual and LGB young adults.

It was hypothesized that LGB individuals would exhibit higher levels of alcohol consumption than their heterosexual peers, especially among women who have been shown to be particularly at risk (Burgard, Cochran, & Mays, 2005; Cochran, Keenan, Schober, & Mays, 2000). In addition, given prior research with other high-risk drinking populations, LGB young adults were expected to report greater peer influence, more positive alcohol expectancies, and perceptions that their peers drink more heavily and are more accepting of alcohol use, relative to their heterosexual peers. Finally, social– cognitive influences were expected to be significantly related to drinking behavior, and group differences in these influences were expected to mediate the association between sexual orientation and drinking behavior. If these three mechanisms were shown to operate similarly in LGB and

heterosexual young adults, the results would suggest greater generalizability than previously known. If the opposite was true, the results would highlight where mainstream psychological models of addictive behaviors fail tests of generalizability to LGB young adults. Additionally, determining whether social– cognitive influences contribute to alcohol use among LGB young adults has important implications for future etiologic research as well as for the prevention of alcohol abuse in this population.

Method

Participants

Participants ($N = 2,245$; 60% female) were recruited from the incoming freshman class at the University of Texas at Austin (UT). Eligibility for this 5-year longitudinal project was limited to unmarried 1st-year students between the ages of 17 and 19 who had not previously attended college or university. The majority of participants were Caucasian (59%), with 20% Asian American, 19% Hispanic/Latino, 7% mixed ethnicity (racial/ethnic categories were not mutually exclusive), and 1% choosing not to answer.

Recruitment and Data Collection Procedures

The data come from a larger study on alcohol and other risk behaviors during the transition from high school to college. The survey administered each fall focused primarily on alcohol use and other risk behaviors, whereas the survey administered during the summer following high school and every spring semester included an assessment of both behavioral and social– cognitive variables. Data for the present study were collected during the 2004–2005 academic year.

Of the 6,391 eligible incoming students, 88.6% ($n = 5,662$) were provided information about the study while attending one of six summer orientation sessions. Over 83% of these students agreed to participate and completed a contact form by providing basic demographic information. The 729 eligible students who did not attend orientation were invited by mail, and 18.1% returned a completed contact form. A total of 4,832 (75.6%) students with complete contact information were randomly assigned to one of three study conditions. The other two conditions included assessments during high school and Year 4 of college and an assessment during only Year 4 of college in order for us to assess the impact of repeated assessments on the outcomes. The semiannual assessment condition, on which the current data are based, included 3,046 participants.

Students accessed a secure Web site (DatStat, Seattle, WA), where they provided informed consent and completed the initial High School Survey. The survey assessed behaviors that occurred during the last 3 months of their senior year in high school (Time 1). Three weeks prior to the end of both the fall and spring academic semesters, participants completed similar online surveys, which assessed behaviors that occurred during the last 3 months of each semester (Time 2 and Time 3, respectively).

A total of 2,245 (73.7% of the randomized sample) incoming students provided informed consent and completed the high school survey. Of those students who completed the high school survey, 92% ($n = 2,077$) also completed the fall survey. The spring survey had a response rate of over 90% ($n = 2,025$). Eighty-seven percent ($n = 1,953$) of the participants completed all three surveys. Participants received $30, $20, and $25 for completion of the high school, fall, and spring surveys, respectively.

Measures

Demographics—In addition to basic demographics including gender, ethnicity, and age, all participants provided information about their family socioeconomic status (parents' education, occupation, and estimated family income). Parental education was assessed on a 6-point scale ranging from no high school degree to postgraduate degree. Almost three fourths (74.0%) of the sample had parents who obtained either a college or postgraduate degree. Fourteen parental occupations were also assessed. From these, we created a four-level variable, including the following categories: (a) unskilled or semiskilled labor; (b) office, retail, service work, or skilled labor; (c) sales or management; and (d) professional. Over three fourths (77.2%) of the parents were in the highest two occupational categories. There were no group differences between the LGB and heterosexuals on levels of parental education or occupation.

Sexual orientation classification—Participants were classified as LGB on the basis of two dimensions, identity and behavior. Participants were asked "What is your sexual orientation?" and were given five possibilities: heterosexual/straight, bisexual, gay, lesbian, or questioning. In addition, participants were asked to indicate lifetime sexual history by answering the question "During your lifetime, with how many different partners have you had sex (i.e., vaginal intercourse, oral sex, or anal intercourse)?" Participants were also asked current sexual history at each time point by answering the question "During the last 3 months, with how many different partners have you had sex (i.e., vaginal intercourse, oral sex, or anal intercourse)?" For both lifetime and current sexual history, participants were asked about the biological sex of their partner(s) for each sexual activity.

Outcome Variables

We created an alcohol use composite from four variables assessing quantity and frequency of drinking: number of drinking days in an average week, average number of drinks per drinking day, frequency of drinking to the point of intoxication, and frequency of binge drinking. Values on these four measures were standardized, and the mean of the four variables was used as the outcome. Drinking days per week and drinks per drinking day were derived from the Daily Drinking Questionnaire (Collins, Parks, & Marlatt, 1985). We assessed frequency of intoxication with a single item: "During the past 3 months, how many times did you get drunk (not just a little high) on alcohol?" (Jackson, Sher, Gotham, & Wood, 2001). We also assessed binge drinking frequency with a single item: "During the past 3 months, how many times did you have four/five (for women/men) or more drinks at a sitting?" (Wechsler & Isaac, 1992).

Mediator Variables

Social norms—Participants were asked to indicate how much they thought the average man and woman in their social group drank, on average, each day of the week during the last 3 months. As an adaptation from the Daily Drinking Questionnaire (Collins et al., 1985), we summed the number of drinks for each day to create weekly consumption variables for both men and women, and we used the mean of the two variables as an index of descriptive social norms for alcohol consumption. On the basis of a measure by Perkins and Berkowitz (1986), we also asked participants four questions about injunctive norms for their social group (e.g., "It is okay for a student to get drunk even if it interferes with his/her grades or responsibilities"). Cronbach's alpha for the four-item scale was .66.

Peer relationships—Participants completed two measures related to quality of peer relationships. The first measure was adapted from the Quality of Relationship Inventory (Pierce, Sarason, & Sarason, 1991) and included nine items. Factor analysis of the scale

identified two subscales reflecting quality of relationships (e.g., "I can turn to my social group for advice about problems") and peer influence and control over behavior (e.g., "My social group tries to control or influence my life"). The subscales included six and three items with Cronbach's alphas of .89 and .74, respectively. The second 11-item measure of peer relationships was created specifically for the current study (Wetherill & Fromme, 2007) and assessed peers' awareness and caring about a variety of behaviors, including alcohol (e.g., "People in my social group know and care about how often I drank alcohol"). Cronbach's alpha for this scale was .96.

Alcohol expectancies—We measured alcohol expectancies with 15 items through the Brief Comprehensive Effects of Alcohol questionnaire (Ham, Stewart, Norton, & Hope, 2005), which has been shown to be a reliable and valid measure. The Brief Comprehensive Effects of Alcohol questionnaire includes items from each of the four positive (Tension Reduction, Sociability, Enhanced Sexuality, and Liquid Courage) and three negative (Cognitive and Behavioral Impairment, Risk and Aggression, and Negative Self-Perceptions) expectancy scales on the original Comprehensive Effects of Alcohol questionnaire (Fromme, Stroot, & Kaplan, 1993). We combined items from the subscales to create overall positive and negative expectancy scores. Cronbach's alpha for the positive and negative expectancy scales was .90 and .85, respectively.

Data Management

Prior to analyzing changes in drinking behavior across time, we identified potential outliers as any cases greater than three standard deviations from the mean. We examined these cases to see whether they were clearly separated from the remaining values in the distribution. A total of nine values from 8 participants were removed from the data set based on this procedure. As a result, 4 participants no longer had data for any of the drinking variables at any time point. After removal of outliers, distributions remained nonnormal for the drinking variables and perceptions of peer drinking variables. Log transformations were conducted and were successful in normalizing the distributions of these variables.

For classification of sexual orientation, all participants who self-identified as gay, lesbian, bisexual, or questioning at any of the three time points ($n = 95$; 52 men and 43 women) were included as LGB. In addition, 37 participants (18 men, 19 women) self-identified as heterosexual at each of the three time points but engaged in same-sex behavior either in their lifetime ($n = 6$ men; 14 women) or in the last 3 months ($n = 12$ men; 5 women). Of the 37 participants who reported same-sex sexual behavior, a total of 12 men and 4 women were classified as LGB for analyses. The other 21 participants were excluded from analyses because their responses precluded a clear determination of their engagement in consensual same-sex sexual behavior. Specifically, 5 men and 14 women who only reported a lifetime but not a current same-sex experience were excluded, because it was not possible to determine when the lifetime same-sex experience occurred and therefore whether those earlier same-sex sexual experiences accurately reflected current sexual behavior. Additionally, 1 male participant who entered the same data for men and women and therefore appeared confused by the directions was excluded. Finally, 1 woman was excluded because she reported that she had been sexually coerced during the past 3 months and only reported one sexual experience with a same-sex partner during the same period. The addition of the 16 cases based on behavioral data resulted in a total of 111 LGB individuals (47 women and 64 men; 5.0% of the sample), yielding a final sample of 2,220.

When analyses were conducted separately on behavioral measures of sexual orientation versus self-identification as LGB, the pattern of the results remained unchanged (i.e., all effects that were significant remained significant and no new significant effects emerged).

Because the importance of considering multiple dimensions of sexual orientation has been well-documented, we therefore chose to include both self-identification and behavioral measures in the analyses.

Statistical Analyses

We used procedures outlined by Baron and Kenny (1986) to evaluate the hypothesis that social norms, alcohol expectancies, and aspects of peer relationships mediate the association between sexual orientation and drinking behavior. The mediation analyses proceeded as follows: (a) We assessed sexual orientation, gender, and the Gender × Orientation interaction as predictors of alcohol use using hierarchical linear modeling (HLM 6.0; Raudenbush, Bryk, Cheong, Congdon, & du Toit, 2004); (b) we assessed social norms, peer relationships, and alcohol expectancies as predictors of alcohol consumption using HLM; (c) we assessed sexual orientation and gender as predictors of social norms, peer relationships, and alcohol expectancies using multivariate regression (general linear model); and (d) we tested the full mediation model (HLM).

We initially tested unconditional growth models, which include only the outcome measure (alcohol use) predicted by time, within HLM to determine whether there was significant within-subject variability in the outcomes over time. In a typical between-subjects design, within-subject variability is modeled as part of the error variance. The advantage of HLM is that within-subject variability can be modeled as a random effect, which reduces the error variance in the model. When significant within-subject variability was found, random effects were included (random effects were included in all models reported). Full maximum likelihood estimation with robust standard errors was used for all models. The unconditional model showed better model fit when homogenous variance across time was not assumed; therefore, heterogeneous sigma squared was used for all further analyses.

Two-level multilevel models such as HLM can represent individuals nested within groups or repeated measures nested within individuals, which was the case in the current study. There were no time-varying variables to be entered as Level 1 predictors; therefore, all variables were entered as Level 2 predictors, which represent variables that are fixed over time (e.g., gender, sexual orientation, psychosocial mediators). Although the mediating variables changed over time, only two data points were available, so these variables could not be modeled as time-varying within HLM. For this reason, we created change scores reflecting changes from high school to spring of freshman year on the mediator variables and treated them as fixed effects.

After testing the unconditional models, we entered gender, orientation, and their interaction as Level 2 variables predicting drinking intercepts (baseline values) and slopes (changes across time). Next, proposed mediating variables were assessed as Level 2 predictors of drinking intercepts and slopes. For the mediators, we used high school values to predict high school drinking, and we used changes in the mediators to predict changes in drinking. Next, we conducted multivariate regression using the general linear model (GLM) in SPSS 13.0 to examine whether gender and sexual orientation were significant predictors of high school values on the mediators (descriptive and injunctive norms, positive and negative alcohol expectancies, and peer relationships) and changes over time. GLM was used because it allows assessment of multiple outcomes in a single analysis, reducing problems associated with multiple comparisons. Finally, the full mediation model was tested using only the mediators that were predicted by orientation and were predictive of drinking.

Missing Data

For all analyses with drinking behavior as the outcome measure, we handled missing data by the estimation procedure utilized in HLM. Missing values on the proposed mediator variables from spring of freshman year were replaced with high school values. This is the most conservative approach to replacing missing values as it presumes no change across time. One hundred thirty-six participants had missing high school values for all seven mediators, resulting in a final sample of 2,084 participants (1,243 women, 841 men) for the analyses including the proposed mediators.

Results

Unconditional Growth Model

In addition to showing significant variance components for both intercepts ($p < .001$) and slopes ($p < .001$), the unconditional growth model showed a significant fixed effect for the slope reflecting increases in drinking across time, $t(2219) = 18.215$, $p < .001$. Mean levels of alcohol consumption increased by roughly .35 standard deviations during the transition from senior year of high school to freshman year of college.

Predictors of Alcohol Use

Gender, orientation, and Gender × Orientation interactions—Significant sexual orientation differences in drinking were identified during high school: $t(2217) = 2.653$, $p = .008$. Although there were no significant gender differences in high school drinking levels, $t(2217) = .368$, $p = .712$, the Gender × Orientation interaction for high school drinking levels reached statistical significance: $t(2216) = -2.214$, $p = .027$. Separate analyses by gender indicated that the significant effect of sexual orientation on high school drinking was driven by differences between heterosexual and lesbian/bisexual/questioning women, $t(1324) = 3.064$, $p = .003$, with the nonheterosexual women drinking more than their heterosexual peers (see Figure 1). The simple main effect for men found no significant differences between heterosexual and gay/bisexual/questioning men, $t(892) = 1.165$, $p = .245$.

For changes in drinking over time, there were no significant gender, $t(2217) = 1.96$, $p = .05$, or orientation, $t(2217) = .533$, $p = .594$, effects. However, a significant Gender × Orientation interaction for changes in drinking was observed, $t(2216) = 2.907$, $p = .005$. Separate analyses by gender indicated that this significant interaction was driven by the difference between heterosexual and gay/bisexual/questioning men, $t(892) = 2.446$, $p = .015$, with the nonheterosexual men increasing their alcohol use at greater rates than their heterosexual peers (see Figure 1). The simple main effect among women did not identify a significant difference between heterosexual and lesbian/bisexual/questioning women, $t(1324) = -1.044$, $p = .297$.

Because the four alcohol use variables were examined in the aggregate for the HLM analyses, Table 1 provides descriptive data for the individual outcomes during high school and spring of freshman year by gender and sexual orientation. These results indicate that the nonheterosexual women reported higher alcohol consumption (greater number of drinking days, higher average number of drinks), as well as greater high-risk drinking (drinking to intoxication and episodes of binge drinking), in high school. These differences persisted into college, although the differences were no longer statistically significant. In contrast, the LGB men did not significantly differ from heterosexual men on any of the drinking variables in high school. However, changes in high-risk drinking differed significantly by sexual orientation, with LGB men showing larger increases in binge drinking and drinking to intoxication relative to heterosexual men. In addition, as a result of the greater growth in alcohol consumption for the LGB men, there were significant differences between the two

groups on typical quantity of alcohol use and drinking to intoxication by the end of the freshman year.

Given that sexual orientation effects were qualified by gender interactions, tests of potential mediation of these effects were conducted separately by gender. Thus, mediators of high school drinking were examined for women, and mediators of change in drinking from high school to college were examined for men. Because high school drinking levels were assessed among women, high school values on the potential mediators were examined. In contrast, because changes in drinking from high school to college were evaluated as the outcome for men, changes in the proposed mediators were included in the analyses. Although mediators of high school drinking (for men) and changes in drinking (for women) were not examined, unconditional intercepts for men and slopes for women were included in the HLM models.

Proposed mediators as predictors of drinking behavior—Table 2 presents the results for mediators of high school drinking for women, as well as changes in drinking for men. With the exception of peer influence/control and peer awareness and caring, all mediators significantly predicted high school drinking for women (all $ps < .01$). Thus, alcohol expectancies (both positive and negative), social norms (both descriptive and injunctive), and quality of peer relationships were significantly related to women's alcohol consumption before they entered college. Stronger positive expectancies and weaker negative expectancies, higher perceived social norms, and lower quality peer relations were associated with greater alcohol consumption. For men, changes in two of the proposed mediators over time (operationalized by standardized residuals), positive expectancies and injunctive social norms, were predictive of changes in alcohol consumption from high school to college ($ps < .01$). Those men who had increased positive expectancies and higher perceived injunctive social norms reported larger increases in alcohol consumption over time.

Predictors of Mediators

We performed a multivariate regression with GLM to test whether sexual orientation was a significant predictor of high school mediators for women and changes in the mediators over time for men. Separate GLM analyses were conducted for women and men. For women, the multivariate test indicated that sexual orientation was a significant predictor of the mediators during high school, $F(1, 1147) = 2.877$, $p = .006$. Univariate tests revealed significant effects of sexual orientation on positive expectancies, $F(1, 1153) = 7.663$, $p = .006$, peer influence and control, $F(1, 1153) = 5.499$, $p = .020$, descriptive norms, $F(1, 1153) = 4.042$, $p = .045$, and injunctive norms, $F(1, 1153) = 9.030$, $p = .003$. Table 3 presents the descriptive statistics for each of the high school mediators, comparing the gay/bisexual/questioning women with the heterosexual women. The nonheterosexual women reported stronger positive alcohol expectancies, higher social norms for drinking, and greater peer influence over their behaviors than the heterosexual women.

For men, multivariate tests indicated that sexual orientation was a significant predictor of changes in the mediators over time, $F(1, 794) = 2.529$, $p = .014$. Univariate tests revealed significant effects of sexual orientation on changes in positive alcohol expectancies, $F(1, 800) = 5.716$, $p = .017$, and injunctive norms, $F(1, 800) = 12.038$, $p = .001$. Table 4 presents the descriptive statistics for the mediators from high school and spring of freshman year, comparing the nonheterosexual men with their heterosexual peers. The gay/bisexual/questioning men had larger increases in positive alcohol expectancies and social norms for drinking than did the heterosexual men.

Final Mediation Models

Women—On the basis of the combined results from the preceding analyses, we entered sexual orientation, positive alcohol expectancies, descriptive norms, and injunctive norms into the final mediation model predicting high school drinking for women. Results indicate that the significant effect of sexual orientation on high school drinking levels for women was mediated by the three proposed mediators, and each remained a significant predictor of high school drinking: positive alcohol expectancies, $t(1238) = 5.048$, $p < .001$, descriptive norms, $t(1238) = 4.018$, $p < .001$, and injunctive norms, $t(1238) = 12.4$, $p < .001$. After we included these mediators in the final model, sexual orientation was no longer a significant predictor of high school drinking levels, $t(1238) = 1.154$, $p = .249$. The sexual orientation coefficient was reduced from .378 to .126. The Sobel test (Sobel, 1982) identified significant indirect effects of sexual orientation through both positive alcohol expectancies, $z = 2.758$, $p = .006$, and injunctive norms, $z = 3.082$, $p = .002$. However, the indirect effect of descriptive norms, $z = 1.541$, $p = .123$, was not statistically significant.

Men—The final mediation model predicting changes in men's drinking from high school to college included sexual orientation and the standardized residuals for both positive alcohol expectancies and injunctive norms. Results indicate that the significant effect of sexual orientation on changes in drinking over time was partially mediated by the two proposed mediators, and each remained a significant predictor of drinking changes: positive alcohol expectancies, $t(837) = 4.676$, $p < .001$, and injunctive norms, $t(837) = 7.073$, $p < .001$. Sexual orientation was no longer a significant predictor of changes in drinking levels after we entered the mediators into the final model, $t(837) = 1.459$, $p = .145$. The sexual orientation coefficient was reduced from .119 to .068. The Sobel test (Sobel, 1982) found significant indirect effects of sexual orientation via injunctive norms, $z = 2.991$, $p = .003$. However, the indirect effect of positive alcohol expectancies was not statistically significant, $z = 1.631$, $p = .103$. Thus, it appears that the primary mediator of the relationship between sexual orientation and changes in alcohol use for men was injunctive norms.

Discussion

As hypothesized, lesbian/bisexual/questioning women drank more than did heterosexual women, and this difference was already apparent during senior year of high school. This result is consistent with patterns observed in a nationally representative study of adolescents in Grades 7–12, which showed that girls with same-sex attractions were more likely to drink to intoxication than were those with opposite-sex attractions (Russell, Driscoll, & Truong, 2002). Despite the initial differences in high school, the nonheterosexual women did not evidence larger increases in drinking during the initial transition into college.

In contrast, men demonstrated the opposite pattern of results: No differences were found during high school, but significant differences in the trajectories of alcohol consumption emerged between gay/bisexual/questioning men and their heterosexual peers during the initial transition to college. This result contrasts with other studies of alcohol consumption among LGB individuals, which have tended to document differences only among women (e.g., Burgard et al., 2005; Cochran et al., 2000; Cochran & Mays, 2000). However, studies of LGB young adults have been cross-sectional and therefore might have obscured prospective differences in alcohol consumption between heterosexual and nonheterosexual men. Additional waves of data will help to confirm whether this pattern persists or whether it is unique to this particular transition period. If the rates of alcohol consumption among the nonheterosexual men continue to increase at higher rates than among heterosexual men, these results could help guide developmentally informed intervention strategies for this population.

A separate analysis of each individual alcohol variable that composed our composite alcohol measure revealed that the differences between the LGB and heterosexual young adults were not limited to consumption. Instead, group differences typically extended to high-risk drinking as well (defined as drinking to intoxication and episodes of binge drinking). Despite the higher rates of alcohol use for LGB women in high school and the greater changes in drinking over time for LGB men, differences by sexual orientation at the end of the freshman year were not significant for the women and were only significant for two of the drinking variables for the men (quantity of alcohol use and drinking to intoxication). Thus, depending on the time of measurement, studies may find a lack of differences by sexual orientation. In fact, some studies have not found increased rates of alcohol use or alcohol use disorders among LGB respondents (e.g., Bloomfield, 1993; Cochran, Sullivan, & Mays, 2003). In addition, it is important to recognize that the vast majority of LGB young adults in the present study were not high-risk drinkers at any time point. Thus, the results suggest that LGB young adults are at differential risk depending on stage of development and that increased risk is restricted to a subset of this sample. Nonetheless, these results have important implications for the development and timing of prevention and intervention programs for LGB young adults.

As hypothesized, social–cognitive influences that are known risk factors for alcohol use among heterosexual young adults were also important predictors of drinking behavior among LGB young adults. The combination of alcohol expectancies and social norms mediated the association between sexual orientation and alcohol consumption for the nonheterosexual women during high school, as well as changes in drinking over time for the nonheterosexual men. Although peer relationships were significantly predictive of drinking behavior for women, they did not differ by sexual orientation. Thus, differences in drinking behavior between heterosexual and LGB participants appear to be driven more by indirect or passive social influence (Borsari & Carey, 2001) than by direct peer influence. The importance of indirect social influence in the current study contrasts with the only other study on social norms among LGB young adults, which did not find that behavioral norms were predictive of binge drinking (Eisenberg & Wechsler, 2003a). One possibility for the divergent findings is that the prior study measured social norms based on prevalence rates rather than with measures of descriptive or injunctive norms. The results of the present study therefore extend the generalizability of social–cognitive influences and suggest that they are important mechanisms in the development of alcohol use among LGB young adults.

Although the findings of the current study indicate that social–cognitive influences to some extent account for differences in alcohol use between LGB and heterosexual young adults, substantial variability remains. Thus, alternative theoretical models including minority stress may still be important in understanding alcohol consumption in LGB individuals. The minority stress theory makes the implicit assumption that LGB individuals consume alcohol in order to cope with stress related to having a stigmatized identity. Although this may well be true, no study of LGB young adults to date has directly tested drinking to cope as a mediator of the relation between minority stress and drinking behavior. Thus, future studies are necessary to examine the unique influence of drinking motives relative to the social–cognitive influences assessed in the current study.

It is also important to acknowledge that minority stress theory and normative social–cognitive models need not be incompatible. It is possible that minority stress renders one more vulnerable to normative influences that are known to predict alcohol use. For example, one study found that social stress predicted alcohol problems but only among individuals who lived in environments in which there was strong normative support for drinking (Linsky, Colby, & Straus, 1987). Additional evidence for Stress × Norms interactions comes from a study of adult gay men, in which discrimination experiences predicted alcohol

problems only among gay men whose cognitions (i.e., tension reduction expectancies) and cultural values (i.e., a reliance on bars for social interaction) made them vulnerable to alcohol abuse (McKirnan & Peterson, 1988). Future studies that simultaneously assess sexual minority stressors and social– cognitive influences among LGB young adults are necessary to directly assess interactive effects.

Although the results of the current study further researchers' understanding of the factors that contribute to alcohol use among LGB young adults, a number of limitations must be considered in interpreting the findings. First, the study relied on self-report data for alcohol use, without collateral reporters. Nevertheless, several studies have demonstrated that self-reports of alcohol use are reliable and valid and do not underestimate alcohol use relative to collateral reports (Babor, Steinberg, Anton, & Del Boca, 2000; LaForge, Borsari, & Baer, 2005). Additional limitations include the relatively small sample size of LGB young adults, although our prevalence rate of 5% is comparable with, and in many cases larger than, other studies that have used representative samples of LGB individuals (e.g., Burgard et al., 2005; Cochran et al., 2003; Sandfort, de Graaf, Bijl, & Schnabel, 2001). In addition, as with other studies of LGB individuals (e.g., Cochran et al., 2003), in the current study we combined individuals with same-sex and both-sex orientations in order to increase power. It is possible that analyzing the data in this way obscured important within-group differences among LGB students. Future studies with representative samples of LGB young adults should oversample bisexuals, especially in light of recent findings that bisexual adolescents and young adults might be especially at risk for substance use and misuse (McCabe, Hughes, Bostwick, & Boyd, 2005; McCabe, Hughes, & Boyd, 2004; Russell et al., 2002). Finally, sexual orientation was a fixed Level 2 predictor, even though we included some individuals whose self-identification as LGB varied over time. This strategy sometimes led to defining LGB status on the basis of behavior that occurred later in the study, which was then used to predict drinking at an earlier time point. Although this is a potential limitation, it was considered important to capture the consistent, underlying dimension of sexual orientation that was likely occurring throughout this developmental period.

Despite these limitations, the results extend the literature on alcohol use in LGB young adults in several important ways. First, data were drawn from a sample of LGB young adults that is representative of the population from which it was drawn, rather than a convenience sample, which characterizes most LGB studies. Second, we recruited the homosexual and heterosexual samples using identical sampling methods, another rarity in research on LGB individuals (Diamond, 2003). Third, the study occurs during the transition to young adulthood, an especially salient developmental period for LGB young adults, when many first disclose their sexual orientation (Savin-Williams & Diamond, 2001). In addition, whereas the majority of studies with LGB individuals utilize urban samples, the present study included LGB young adults from rural areas in a part of the country that does not have a large percentage of LGB individuals. This geographic diversity likely increases the generalizability of the present sample. An additional strength of the study was our use of both behavioral and self-identification information in order to categorize sexual orientation status. Studies have increasingly highlighted the importance of considering multiple dimensions of sexual orientation, which can affect the observed relationship with health-related behaviors, including alcohol use (McCabe et al., 2005). Finally, and most importantly, to our knowledge this study was the first to provide longitudinal data on alcohol use patterns and determinants among LGB young adults, and as a result represents an important contribution to the literature on the development of alcohol use in this population.

References

Andrews JA, Tildesley E, Hops H, Li F. The influence of peers on young adult substance use. Health Psychology 2002;21:349–357. [PubMed: 12090677]

Babor TF, Steinberg K, Anton R, Del Boca F. Talk is cheap: Measuring drinking outcomes in clinical trials. Journal of Studies on Alcohol 2000;61:55–63. [PubMed: 10627097]

Baer J. Effects of college residence on perceived norms for alcohol consumption: An examination of the first year of college. Psychology of Addictive Behaviors 1994;8:43–50.

Baer JS, Kivlahan DR, Marlatt GA. High-risk drinking across the transition from high school to college. Alcoholism: Clinical and Experimental Research 1995;19:54–61.

Baron RM, Kenny DA. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. Journal of Personality and Social Psychology 1986;51:1173–1182. [PubMed: 3806354]

Bloomfield K. A comparison of alcohol consumption between lesbians and heterosexual women in an urban sample. Drug and Alcohol Dependence 1993;33:257–269. [PubMed: 8261890]

Borsari B, Carey KB. Peer influences on college drinking: A review of the research. Journal of Substance Abuse 2001;13:391–424. [PubMed: 11775073]

Borsari B, Carey KB. How the quality of peer relationships influences college alcohol use. Drug and Alcohol Review 2006;25:361–370. [PubMed: 16854663]

Burgard SA, Cochran SD, Mays VM. Alcohol and tobacco use patterns among heterosexually and homosexually experienced women in California. Drug and Alcohol Dependence 2005;77:61–70. [PubMed: 15607842]

Bux DA Jr. The epidemiology of problem drinking in gay men and lesbians: A critical review. Clinical Psychology Review 1996;16:277–298.

Cochran SD, Keenan C, Schober C, Mays VM. Estimates of alcohol use and clinical treatment needs among homosexually active men and women in the U.S. population. Journal of Consulting and Clinical Psychology 2000;68:1062–1071. [PubMed: 11142540]

Cochran SD, Mays VM. Relation between psychiatric syndromes and behaviorally defined sexual orientation in a sample of the U.S. population. American Journal of Epidemiology 2000;151:516–523. [PubMed: 10707921]

Cochran SD, Sullivan JG, Mays VM. Prevalence of mental disorders, psychological distress, and mental health services use among lesbian, gay, and bisexual adults in the United States. Journal of Consulting and Clinical Psychology 2003;71:53–61. [PubMed: 12602425]

Collins RL, Parks GA, Marlatt GA. Social determinants of alcohol consumption: The effects of social interaction and model status on the self-administration of alcohol. Journal of Consulting and Clinical Psychology 1985;53:189–200. [PubMed: 3998247]

Conway KP, Swendsen JD, Merikangas KR. Alcohol expectancies, alcohol consumption, and problem drinking: The moderating role of family history. Addictive Behaviors 2003;28:823–836. [PubMed: 12788259]

Diamond LM. New paradigms for research on heterosexual and sexual-minority development. Journal of Clinical Child and Adolescent Psychology 2003;32:490–498. [PubMed: 14710457]

Eisenberg M, Wechsler H. Social influences on substance-use behaviors of gay, lesbian, and bisexual college students: Findings from a national study. Social Science & Medicine 2003a;57:1913–1923. [PubMed: 14499515]

Eisenberg M, Wechsler H. Substance use behaviors among college students with same-sex and opposite-sex experience: Results from a national study. Addictive Behaviors 2003b;28:899–913. [PubMed: 12788264]

Fromme K, Stroot E, Kaplan D. Comprehensive effects of alcohol: Development and psychometric assessment of a new expectancy questionnaire. Psychological Assessment 1993;5:19–26.

Goldman, MS.; Brown, SA.; Christiansen, BA. Expectancy theory: Thinking about drinking. In: Blane, HT.; Leonard, KE., editors. Psychological theories of drinking and alcoholism. New York: Guilford Press; 1987. p. 181-226.

Grant BF, Dawson DA, Stinson FS, Chou SP, Dufour MC, Pickering RP. The 12-month prevalence and trends in DSM-IV alcohol abuse and dependence: United States, 1991–1992 and 2001–2002. Drug and Alcohol Dependence 2004;74:223–234. [PubMed: 15194200]

Ham LS, Stewart SH, Norton PJ, Hope DA. Psychometric assessment of the Comprehensive Effects of Alcohol Questionnaire: Comparing a brief version to the original full scale. Journal of Psychopathology and Behavioral Assessment 2005;27:141–158.

Hops, H.; Andrews, JA.; Duncan, SC.; Duncan, TE.; Tildesley, E. Adolescent drug use development: A social interactional and contextual perspective. In: Sameroff, AJ.; Lewis, M.; Miller, SM., editors. Handbook of developmental psychopathology. 2. New York: Kluwer Academic/Plenum; 2000. p. 589-605.

Hussong AM, Hicks RE, Levy SA, Curran PS. Specifying the relations between affect and heavy alcohol use among young adults. Journal of Abnormal Psychology 2001;110:449–461. [PubMed: 11502088]

Jackson KM, Sher KJ, Gotham HJ, Wood PK. Transitioning into and out of large-effect drinking in young adulthood. Journal of Abnormal Psychology 2001;110:378–391. [PubMed: 11502081]

Johnston, LD.; O'Malley, PM.; Bachman, JG.; Schulenberg, JE. College students and adults ages 19–45 (NIH Pub. No. 05–5728). Vol. II. Bethesda, MD: National Institute on Drug Abuse; 2005. Monitoring the future national survey results on drug use, 1975–2004.

Jones BT, Corbin W, Fromme K. A review of expectancy theory and alcohol consumption. Addiction 2001;96:57–72. [PubMed: 11177520]

LaForge RG, Borsari B, Baer JS. The utility of collateral informant assessment in college alcohol research: Results from a longitudinal prevention trial. Journal of Studies on Alcohol 2005;66:479–487. [PubMed: 16240555]

Larimer ME, Turner AP, Mallett KA, Geisner IM. Predicting drinking behavior and alcohol-related problems among fraternity and sorority members: Examining the role of descriptive and injunctive norms. Psychology of Addictive Behaviors 2004;18:203–212. [PubMed: 15482075]

Linsky AS, Colby JP, Straus MA. Social stress, normative constraints, and alcohol problems in American states. Social Science and Medicine 1987;24:875–883. [PubMed: 3616681]

McCabe SE, Boyd CJ, Hughes TL, d'Arcy H. Sexual identity and substance abuse among undergraduate students. Substance Abuse 2003;24:77–91. [PubMed: 12766375]

McCabe SE, Hughes TL, Bostwick W, Boyd CJ. Assessment of differences in dimensions of sexual orientation: Implications for substance use research in a college-age population. Journal of Studies on Alcohol 2005;66:620–629. [PubMed: 16331847]

McCabe SE, Hughes TL, Boyd CJ. Substance use and misuse: Are bisexual women at greater risk? Journal of Psychoactive Drugs 2004;36:217–225. [PubMed: 15369203]

McCabe SE, Schulenberg JE, Johnston LD, O'Malley PM, Bachman JG, Kloska DD. Selection and socialization effects of fraternities and sororities on US college student substance use: A multi-cohort national longitudinal study. Addiction 2005;100:512–524. [PubMed: 15784066]

McKirnan DJ, Peterson PL. Stress, expectancies, and vulnerability to substance abuse: A test of a model among homosexual men. Journal of Abnormal Psychology 1988;97:461–466. [PubMed: 3264559]

Pastor AD, Evans SM. Alcohol outcome expectancies and risk for alcohol use problems in women with and without a family history of alcoholism. Drug and Alcohol Dependence 2003;70:201–214. [PubMed: 12732414]

Perkins HW, Berkowitz AD. Perceiving the community norms of alcohol use among students: Some research implications for campus alcohol education programming. The International Journal of the Addictions 1986;21:961–976. [PubMed: 3793315]

Pierce GR, Sarason IG, Sarason BR. General and relationship-based perceptions of social support: Are two constructs better than one? Journal of Personality and Social Psychology 1991;61:1028–1039. [PubMed: 1774625]

Raudenbush, S.; Bryk, A.; Cheong, YF.; Congdon, R.; du Toit, M. HLM 6: Hierarchical linear and nonlinear modeling [Computer software and manual]. Lincolnwood, IL: Scientific Software International; 2004.

Read JP, Wood MD, Capone C. A prospective investigation of relations between social influences and alcohol involvement during the transition to college. Journal of Studies on Alcohol 2005;66:23–34. [PubMed: 15830900]

Russell ST, Driscoll AK, Truong N. Adolescent same-sex romantic attractions and relationships: Implications for substance use and abuse. American Journal of Public Health 2002;92:198–202. [PubMed: 11818291]

Sandfort TG, de Graaf R, Bijl RV, Schnabel P. Same-sex sexual behavior and psychiatric disorders: Findings from the Netherlands Mental Health Survey and Incidence Study (NEMESIS). Archives of General Psychiatry 2001;58:85–91. [PubMed: 11146762]

Savin-Williams RC. A critique of research on sexual-minority youths. Journal of Adolescence 2001;24:5–13. [PubMed: 11259066]

Savin-Williams RC, Diamond LM. Sexual identity trajectories among sexual-minority youths: Gender comparisons. Archives of Sexual Behavior 2001;29:607–627. [PubMed: 11100265]

Schulenberg JE, Maggs JL. A developmental perspective on alcohol use and heavy drinking during adolescence and the transition to young adulthood. Journal of Studies on Alcohol 2002;14:54–70.

Senchak M, Leonard KE, Greene BW. Alcohol use among college students as a function of their typical social drinking context. Psychology of Addictive Behaviors 1998;12:62–70.

Sher KJ, Bartholow BD, Nanda S. Short- and long-term effects of fraternity and sorority membership on heavy drinking: A social norms perspective. Psychology of Addictive Behaviors 2001;15:42–51. [PubMed: 11255938]

Sher KJ, Gotham HJ. Pathological alcohol involvement: A developmental disorder of young adulthood. Development and Psychopathology 1999;11:933–956. [PubMed: 10624733]

Sobel, ME. Asymptotic confidence intervals for indirect effects in structural equation models. In: Leinhart, S., editor. Sociological methodology. San Francisco: Jossey-Bass; 1982. p. 290-312.

Wechsler H, Isaac N. "Binge" drinkers at Massachusetts colleges: Prevalence, drinking style, time trends, and associated problems. Journal of the American Medical Association 1992;267:2929–2931. [PubMed: 1583763]

Wetherill RR, Fromme K. Perceived awareness and caring influences alcohol use by high school and college students. Psychology of Addictive Behaviors 2007;21:147–154. [PubMed: 17563134]
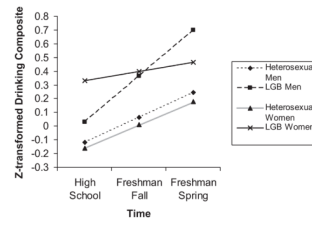
Figure 1.
Trajectories of alcohol use comparing lesbian, gay, and bisexual (LGB) young adults and their heterosexual peers.

Table 1

Alcohol Use Outcomes by Gender and Sexual Orientation Status

Outcome	High school				Spring of freshman year				Change scores	
	Heterosexual		LGB		Heterosexual		LGB		Heterosexual	LGB
	M	SD	M	SD	M	SD	M	SD		
Women										
Number of drinking days	0.44	0.72	0.92	1.14***	0.75	0.97	1.08	1.40	0.31	0.16*
Average number of drinks	1.71	2.19	3.11	3.23***	2.36	2.51	3.02	2.71	0.65	−0.09
Drinking to intoxication	1.46	3.73	2.28	2.95***	2.65	5.15	3.98	6.41	1.19	1.70
Frequency of binge drinking	1.88	4.68	2.78	4.35*	3.07	6.26	4.38	7.24	1.19	1.60
Men										
Number of drinking days	0.50	0.88	0.57	0.81	0.83	1.14	0.92	0.93	0.33	0.35
Average number of drinks	2.00	2.89	2.11	2.84	2.92	3.27	3.74	3.19*	0.92	1.63
Drinking to intoxication	1.82	4.46	1.47	3.78	3.37	6.61	4.15	6.40*	1.55	2.68**
Frequency of binge drinking	2.30	5.28	1.78	4.24	3.89	7.67	4.12	6.78	1.59	2.34*

Note. The analyses are based on the log-transformed data, but the raw data are presented for ease of interpretation. LGB = lesbian, gay, bisexual.

*
 $p < .05$.

**
 $p < .01$.

***
 $p < .001$.

Table 2

Mediators Predicting High School Alcohol Use for Women and Changes in Alcohol Use From High School to College for Men

Mediator	Baseline women		Residuals men	
	β	SE	β	SE
Positive expectancies	.126	.02**	.068	.02**
Negative expectancies	−.093	.02**	.004	.01
Quality of peer relations	−.091	.02**	−.025	.01
Peer influence	.011	.03	.004	.01
Peers who know and care	.004	.01	−.025	.02
Descriptive norms	.036	.00**	.102	.06
Injunctive norms	.354	.02**	.106	.02**

**
 p < .01.

Table 3

High School Mediators for Heterosexual and Nonheterosexual Women

Mediator	Heterosexual women		LGB women	
	M	*SD*	*M*	*SD*
Positive expectancies[**]	3.05	0.96	3.42	0.84
Negative expectancies	3.22	0.91	3.23	0.77
Quality of peer relations	4.13	0.86	4.16	0.75
Peer influence[**]	1.62	0.75	1.88	0.91
Peers awareness and caring	3.36	1.24	3.25	1.35
Descriptive norms[**]	7.81	9.07	10.34	10.27
Injunctive norms[**]	2.36	0.90	2.74	0.99

Note. Descriptive norms were measured continuously, whereas all other measures were on a scale from 1 to 5. LGB = lesbian, gay, bisexual.

[**] $p < .01$.

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Table 4

Mediators for Heterosexual and Nonheterosexual Men

| | Heterosexual men | | | | | | LGB men | | | | | |
| | HS | | SF | | | | HS | | SF | | | |
Mediator	M	SD	M	SD	Change score		M	SD	M	SD	Change score	
Positive expectancies **	3.02	0.99	3.13	1.04	0.11		3.03	1.08	3.32	0.95	0.29	
Negative expectancies	3.10	0.99	3.00	0.97	−0.10		2.93	0.86	2.83	0.94	−0.10	
Quality of peer relations	3.82	0.93	3.81	0.96	−0.01		4.09	0.65	4.06	1.02	−0.03	
Peer influence	1.69	0.80	1.87	0.89	0.18		1.77	0.73	1.93	0.98	0.16	
Peer awareness and caring	2.96	1.31	2.94	1.24	−0.02		3.31	1.25	3.01	1.29	−0.30	
Descriptive norms	6.01	7.96	9.28	14.22	3.27		5.25	7.07	10.55	9.73	5.30	
Injunctive norms **	2.48	0.92	2.75	0.95	0.27		2.47	0.88	3.05	0.89	0.58	

Note. Descriptive norms were measured continuously, whereas all other measures were on a scale from 1 to 5. HS = high school; SF = spring of freshman year; LGB = lesbian, gay, bisexual.

**
p < .01.