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Binge Drinking in Young Adulthood: The Influence of Age at First Intercourse and Rate of Sex Partner Accumulation

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Abstract

There has been growing attention to the influence of youths' sexual experiences on alcohol use and other health-risk behaviors. Yet, because of the cross-sectional nature of many studies, as well as the likelihood of alcohol use and sexual behaviors to co-occur, the question of whether initiation of sexual activity tends to precede engagement in other behaviors, like binge drinking, remains largely unanswered. Using data from 4,726 respondents who participated in Waves I though IV of the National Longitudinal Study of Adolescent to Adult Health (Add Health), we examine the association between age at first intercourse and frequent binge drinking during one's mid-twenties and early thirties. We further explore whether this relationship is mediated or moderated by the rate at which individuals accumulate sex partners during the transition to adulthood. Findings show for women and men, later ages at first intercourse are associated with lower odds of frequent binge drinking in young adulthood. While rate of sex partner accumulation partially mediates this association, it does not moderate it. Furthermore, rate of partner accumulation is positively associated with binge drinking, particularly among women, with a quicker accumulation of sex partners associated with a higher likelihood of engaging in frequent binge drinking. Our findings underscore the importance of considering multiple dimensions of a single behavior and their relation to subsequent health-related behaviors.

Keywords

Add Health; Young Adults; Vaginal Intercourse; Sexual Partners; Binge Drinking

Introduction

There has been growing attention to the influence of youths' sexual experiences on health-risk behaviors. Many studies indicate that several dimensions of sexual activity, including age at sexual initiation and number of sexual partners, are linked with alcohol use (Cavazos-Rehg et al., 2011; Dogan, Stockdale, Widaman, & Conger, 2010; Guo et al., 2002; Howard & Wang, 2004; Makenzius & Larsson, 2012; Ogletree, Dinger, & Vesely, 2001; Ramrakha et

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al., 2013). Indeed research shows that early initiation of intercourse and more sexual partners is associated with binge drinking (Guo et al., 2002; Howard & Wang, 2004; Makenzius & Larsson, 2012; Ogletree et al., 2001). Despite this significant body of research, a majority of these studies frequently rely on the use of cross-sectional data, limiting their ability to discern temporal ordering (Howard & Wang, 2004; Makenzius & Larsson, 2012; Ogletree et al., 2001). Furthermore, studies often focus on the implications of sexual behavior measures that consistently appear in the literature without considering how alternative aspects of sexual risk affect health-related behaviors. Our study addressed these issues and extended prior research by examining the association between age at first vaginal intercourse and subsequent young adult binge drinking separately for women and men. By analyzing data from a nationally representative, longitudinal study, we were able account for prior drinking behavior, allowing us to establish temporal ordering between initiation of intercourse and binge drinking during young adulthood. Additionally, we explored individuals' rate of sex partner accumulation, a unique dimension of sexual behavior that has been largely absent from discourses of sexuality, as a potential mediator and moderator of this association.

Sexual Experience during the Transition to Adulthood

Although the share of unmarried youth who have engaged in vaginal intercourse has declined in recent decades, the percentage reporting coital experience remains high. Estimates from the National Survey of Family Growth (NSFG) describing vaginal intercourse experience among never-married 15 to 19 year olds, reveal a 13 percentage point drop among males between 1995 (55%) and the 2006–2010 survey (42%), and a 6 percentage point drop among females (from 49% to 43%) (Martinez, Copen, & Abma, 2011), suggesting an increase in age at first intercourse among both young women and men over the last decade. Over this time period, however, the number of vaginal sex partners reported by never-married youth with coital experience increased slightly: 33% of males and 32% of females reported 3 to 5 vaginal sex partners in the 2006–2010 survey, compared to 31% and 27%, respectively in 1995 (Martinez et al., 2011). In general, though, we continue to see a negative relationship between age at first intercourse and number of sexual partners. For example, among never-married 15 to 19 year olds, 35% of females and 41% of males who initiated vaginal intercourse before age 15 reported having 6 or more sexual partners, compared to only 4% and 3%, respectively, of their female and male peers who initiated vaginal sex between ages 17 and 19 (Martinez et al., 2011).

The Relationship between Sexual Experiences and Health-Risk Behaviors

A wealth of studies indicates that youths' engagement in sexual activity increases the risk of various detrimental outcomes, including teenage pregnancy (Kirby, 2002) and sexual transmitted infections (STIs) (Forhan et al., 2009; Kaestle, Halpern, Miller, & Ford, 2005). Research also suggests that teen sexual activity and experiences are correlated with youths' engagement in other risk behaviors, such as alcohol use. For example, a cross-sectional study of Swedish teens showed that those who initiated vaginal intercourse before age 15 were more likely than others to report current binge drinking (Makenzius & Larsson, 2012). Number of sexual partners also is associated with drinking behaviors, with a higher number

of sexual partners associated with binge drinking during adolescence and young adulthood (Guo et al., 2002; Howard & Wang, 2004; Ogletree et al., 2001).

The particular focus of this study is to determine whether sexual experiences have a significant association with subsequent drinking behaviors in young adulthood. Two longitudinal studies provide evidence that this is the case, showing that multiple sexual partners and more frequent sexual activity predicts young people's risk for substance dependence disorder and their trajectories of heavy drinking, respectively (Ramrakha et al., 2013; Windle et al., 2005). One recent longitudinal study, however, suggests that alcohol use may precede rather than follow sexual behavior, such that adolescents with higher levels of alcohol use go on to accumulate a larger number of sexual partners as they transition to adulthood (Dogan et al., 2010). This study also reports that number of partners was not associated with change in alcohol use over time. The contradictory findings of this prior longitudinal work may result from the use of substantively different measures of sexual experiences and drinking behavior.

In addition to the challenges associated with integrating these previous findings, one potentially important dimension of sexual experience remains largely ignored. The literature has not yet adequately addressed the possibility that the negative association between age at first intercourse and later drinking behaviors is either mediated or moderated by the rate at which individuals accumulate sexual partners. In general, individuals whose first vaginal intercourse occurs early report having more lifetime sexual partners than do those who delay sexual initiation (Coker et al., 1994; Sandfort, Orr, Hirsch, & Santelli, 2008). Although ample evidence exists that number of sexual partners is associated with drinking behaviors (Cavazos-Rehg et al., 2011; Guo et al., 2002; Howard & Wang, 2004; Ogletree et al., 2001), little attention has been given to how quickly (or slowly) individuals accumulate sex partners through adolescence and young adulthood.

To our knowledge, the effect of rate of sexual partner accumulation on health-risk behaviors has been investigated in just one other study: Using a sample young adults in New Zealand, Ramrakha and colleagues (2013) found that number of sex partners accrued per year increased the odds of being diagnosed with alcohol dependence disorder. The current study differs from this work in two key ways. First, we examined the relationship between rate of partner accumulation and binge drinking in a US-based sample. Ramrakha and colleagues' work is based on a population outside of the United States, and therefore, their study may not be generalizable to the experiences of young individuals in this country. Second, our measure of partner accumulation measures the average number of sex partners each respondent accrued per year from sexual initiation onward, whereas the work by Ramrakha and colleagues (2013) measured the number of annual partners accrued within specific age periods (18–20, 21–25, and 26–32 years). Because adolescents who initiate intercourse prior to age 18 tend to accumulate more annual sex partners than those who delay the initiation of intercourse to later ages (Martinez et al., 2011), it is important to consider how individuals' entire sexual history, from the onset of sexual initiation, influences subsequent binge drinking.

Above and beyond the number of partners one accumulates, how *rapidly* one has moved in and out of sexual relationships or encounters with others may be associated with one's sense of stability, security and general emotional well-being, factors that are known to influence individuals' drinking motivations and behaviors (Fisher, Miles, Austin, Camargo, & Colditz, 2007; Kuntsche, Knibbe, Gmel, & Engels, 2005). Delayed initiation of intercourse may, in part, reflect less permissive attitudes regarding sex (Meier, 2003). As such, those who first engage in vaginal intercourse at later ages also may be more likely to do so within the context of committed, long-term relationships, leading to a slower rate of sex partner accumulation. That slower rate of sex partner accumulation may, in turn, be linked to a lower likelihood of binge drinking during young adulthood.

The negative association between of age at first intercourse and binge drinking also may be moderated by rate of partner accumulation. Individuals who initiate intercourse at older ages and then very quickly accumulate sexual partners may have much higher rates of binge drinking than their late initiating counterparts who accumulate sexual partners more slowly, and perhaps even higher rates of binge drinking than their peers who had sex at an earlier age but accrued their sexual partners more slowly, over a longer duration of time.

Gender Differences

Although studies indicate gender differences in sexual behaviors are small (for a review, see Petersen & Hyde, 2011), the influence that sexual experiences have on binge drinking behaviors may differ for young women and men. One study showed that number of sex partners was associated with an increased risk of substance dependence disorders for women and men, though the effect was stronger among the former (Ramrakha et al., 2013). Additionally, more frequent engagement in sexual activities is associated with a greater likelihood of heavy drinking among young women (Windle et al., 2005). Social norms that value virginity and sex within a committed relationship for girls and women, but tend to promote the initiation of sexual partnerships, regardless of age or context for boys and men (Milhausen & Herold, 2001; Sprecher, McKinney, & Orbuch, 1987), may place sexually active young women at a higher risk of heavy drinking as a way to cope with the stress and anxiety associated with deviating from norms and expectations. The stronger effects of sexual activity on drinking behavior among women also may result from a greater tendency of women to invest emotionally in their sexual partnerships (Meston & Buss, 2007). We speculate, therefore, that women who accumulate sexual partners at a quicker rate during their transition to adulthood may be more likely than men who have similar sexual experiences to frequently engage in binge drinking as a way to cope with stress and negative emotions tied to the repeated introduction and loss of intimate partners.

The Current Study

In addition to a lack of empirical evidence regarding the causality between age at first vaginal intercourse and drinking behavior, we do not yet know whether the potential effects of age at initiation extend into young adulthood. Studies suggest that in general, levels of substance use increase from early adolescence to one's mid-20s, peaking at around age 25, then decline thereafter (Chen & Jacobson, 2012). Binge drinking behaviors during young

adulthood may be particularly important to study today, since roughly 43% of young adults aged 21 to 25, and 40% of young adults aged 26 to 29, report binge drinking in the last month (Substance Abuse and Mental Health Services Administration [SAMHSA], 2014). Understanding the binge drinking behavior of this group is not only important from a public policy stand point in terms of health-related outcomes, but also because this health behavior may have a number of implications as they transition into new social roles, such as being a partner/spouse, parent, or worker.

In an effort to address the shortcomings of previous research, this paper used data from a rich, nationally representative, longitudinal data set of young adults in the United States. Three research questions structured our analyses: (1) Net of previous binge drinking experiences, what is the association between age at first vaginal intercourse and frequent binge drinking during young adulthood, when women and men are aged 24 to 32? (2) Is this relationship either mediated or moderated by the rate at which individuals accumulate sexual partners during the transition to adulthood? And (3) Are these associations present for both women and men?

Data and Methods

Data for this study come from the National Longitudinal Study of Adolescent to Adult Health (Add Health), a nationally representative sample of adolescents in grades 7 through 12 in the United States in 1995. Add Health used a multistage, stratified, school-based, cluster sampling design. This study includes multiple components and several waves of data collection, with the first wave conducted in 1994–1995, when respondents were aged 12 to 18 years. This wave of data collection included an in-school, self-administered questionnaire for students, a School Administrator Questionnaire, and a Parental Questionnaire. Additionally, an in-home interview was conducted from a random sample of students taken from the school rosters of the schools included in the in-school survey. In-home interviews were used to follow-up these respondents for Waves II (1996), III (2001–2002), and IV (2008). Wave IV included 15,701 of the original respondents, and was collected when respondents were aged 24 to 32 years (80.3% response rate).

The sample for this study includes respondents who completed Waves I through IV of the in-home interview and who had a valid sampling weight (n = 9,422). Starting at that original base, we applied a number of additional exclusion criteria. First, we excluded those who reported being younger than age 10 at initiation (n = 57) due to the possibility of non-consensual sexual activity. We then dropped respondents who had not initiated intercourse by Wave IV (n = 583) and those who reported having engaged in intercourse by Wave IV, but who did not report their age of initiation (n = 98). Due to methodological limitations and to establish temporal ordering between our primary covariates and dependent variable, we excluded respondents who reported that they had initiated intercourse prior to Wave I (n = 3,409). Because the question from which our binge drinking variable was constructed asks respondents about their behavior within the last 12 months, we excluded respondents who reported that their age at first vaginal intercourse was equal to or was within one year of their age at the Wave IV interview (n = 31). This exclusion ensures appropriate temporal ordering of our independent and dependent variables. In order to eliminate the effect of

influential outliers, we dropped respondents who reported more than 50 sexual partners (n = 57). Finally, respondents without valid data on the remaining variables were dropped (n = 461), yielding a final sample size of 4,726 respondents (n = 2,728 women and n = 1,998 men).

Measures

Frequent Binge Drinking

To measure *frequent binge drinking* at Wave IV, respondents were asked, "During the past 12 months, on how many days did you drink 4 (women) or 5 (men) drinks in a row?" Responses to this question were as follows: (0) none; (1) 1 or 2 days in the past 12 months; (2) once a month or less; (3) 2 or 3 days a month; (4) 1 or 2 days a week; (5) 3 to 5 days a week; and (6) every day or almost every day. From this, we created a binary measure of young adult binge drinking where 1 = engaging in the above behavior at least two days a month (giving a response of 3 or higher), and 0 = all other responses. Our multivariate models also include a dichotomous variable indicating the respondent's binge drinking behavior prior to the wave at which intercourse was initiated. At Waves I, II, and III, respondents were asked, "Over the past 12 months, on how many days did you drink 5 or more drinks in a row?" If they *ever* reported binge drinking, regardless of how often, they were coded as having ever engaged in binge drinking.

Age at First Vaginal Intercourse

Age at first vaginal intercourse, taken from the in-home interview at Wave IV, was determined by two questions. Respondents were first asked, "Have you ever had vaginal intercourse? (Vaginal intercourse is when a man inserts his penis into a woman's vagina.)" Respondents who answered "yes" to this question were then followed up with "How old were you the first time you had vaginal intercourse," with responses measured in years.

Rate of Sex Partner Accumulation

Rate of sex partner accumulation measures the average number of vaginal sex partners a respondent accrued per year from the point of sexual initiation onward, and is calculated as follows:

$$\text{Rate of Sex Partner Accumulation} = \frac{\text{Number of lifetime vaginal sex partners}}{(\text{Wave IV age} - \text{Age at first vaginal intercourse})}$$

Control Variables

Respondent demographic characteristics are taken from the Wave I in-home interview and include gender and race/ethnicity. *Gender* is self-reported as female or male. *Race/ethnicity* is self-identified and is measured with five dummy indicators – non-Hispanic White (reference category), non-Hispanic Black, Hispanic of any race, Asian, and Other. We also include a measure of self-perceived pubertal timing, measured at Wave I, that asks respondents, "How advanced is your physical development compared to other girls/boys your age?" Responses to this question were as follows: (1) I look younger than most; (2) I

look younger than some; (3) I look about average; (4) I look older than some; and (5) I look older than most. For both women and men, “early” timing captures respondents who reported looking younger than most or some, “typical” captures those who reported looking about average, and “late” captures those who reported looking older than some or most of their same-aged peers. A number of additional indicators measuring respondents’ current socio-economic standing are taken from the Wave IV in-home interview. *Respondents’ education* is measured with five dummy variables that capture educational attainment to date – less than high school (reference category), high school diploma/GED, vocational schooling, some college, and college degree or more. We also include a measure of whether the respondent is *currently enrolled in school* (i.e. attending a college, university, or vocational/technical school) (1 = yes, 0 = no). Respondents’ economic well-being is captured using two variables. *Currently employed* (1 = yes, 0 = no) reflects whether the respondent is currently working for pay at least 10 hours a week. Six dichotomous items asking respondents if they or anyone in their household had, in the past year, not been able to pay for phone service, utilities, or rent/mortgage, if they were evicted from their home, if their utilities were turned off, or if they were worried their food would run out before having money to buy more were summed to create a *financial difficulties* scale. Because most respondents (over 80%) had reported 0 on all of the items (indicating that these issues never occurred), we created a binary variable where 0 = no financial difficulties and 1 = financial difficulties.

We include several measures tapping young adults’ family characteristics at Wave IV. An indicator of *children living in the household* (1 = yes, 0 = no) was constructed from the household roster. *Current living arrangement* is measured with five dummy variables – living with cohabiting partner, living with marital partner (reference category), living with parents (no partner/spouse), living with others (no partner/spouse), and living alone. We also include a binary indictor of whether the respondent reported *ever having been divorced, separated, or widowed*, with one indicating a positive answer.

Finally, a dichotomous measure of whether the respondent *ever experienced forced sexual relations* was determined from three questions taken from the Wave IV in-home interview and was included to control for the possibility that some reports of intercourse, particularly at a young age, may be due to non-consensual activity. Respondents reported “yes” or “no” to the following two questions: (1) “Have you ever been physically forced to have any type of sexual activity against your will? Do not include any experiences with a parent/caregiver.” And (2) “Have you ever been forced, in a non-physical way, to have any type of sexual activity against your will? For example, through verbal pressure, threats of harm or by being given alcohol or drugs? Do not include any experiences with a parent or adult caregiver.” To account for forced sexual experiences with a parent/caregiver, we used an additional question that asked respondents “How often did a parent or other adult caregiver touch you in a sexual way, force you to touch him or her in a sexual way, or force you to have sexual relationships?,” with responses ranging from 0 (this has never happened) to 5 (happened more than ten times). If respondents answered yes to either the first or second question, or one time or more on the third question, they were coded as having experienced forced sexual relations.

Statistical Analyses

Weighted proportions, means, and standard deviations were used to descriptively examine the distribution of our study variables (Table 1). We also examined the bivariate association between our measures of sexual experience and frequent binge drinking behavior (Table 2). Using one-way ANOVA, we compared the means of age at first intercourse and rate of partner accumulation by gender (Table 1) and binge drinking status (Table 2). Design-based *F*-tests were used to examine gender differences in categorical variables (Table 1). Logistic regressions were conducted to estimate the effects of sexual experiences on whether the respondent had engaged in frequent binge drinking within the past year. To illustrate our findings, we relied on the margins command to estimate the predicted probability of binge drinking for age at first vaginal intercourse (Figure 1) and rate of sex partner accumulation (Figure 2). All models were gender-specific and were conducted using Stata-SE, version 13.0. To adjust for design and sampling, we estimated the models using a robust cluster estimator and the Add Health grand sample weights.

For each set of analyses, the first model examined the effects of age at first vaginal intercourse on binge drinking during young adulthood. In the second model, we explored whether the relationship between age at first intercourse and binge drinking was mediated by rate of sex partner accumulation. To do so, we conducted a formal test of mediation using the KHB-method developed by Karlson, Holm, and Breen (2012) and the user written Stata command *khb* (Kohler, Karlson, & Holm, 2011). The KHB-method decomposes the total effect into direct and indirect effects for both linear and nonlinear models (Breen, Karlson, & Holm, 2013). Finally, in the third model, we tested whether the association between age at first intercourse and binge drinking was moderated by rate of sex partner accumulation using an interaction term. All models controlled for race/ethnicity, educational attainment, school enrollment, financial difficulties, employment, co-residential children, living arrangement, ever divorced/separated/widowed, and experience with forced sexual relations. Importantly, we also controlled for binge drinking experience prior to the initiation of vaginal intercourse in each of the models.

Results

Descriptive Findings

Table 1 displays the weighted proportions, means, and standard deviations for all study variables by gender. Overall, 58% of the sample is female and 42% male. While the majority of both men and women in the sample are White, the male subsample has a slightly lower representation of Blacks and Hispanics than does the female subsample. This may reflect, in part, our exclusion of the earliest initiators (those who had engaged in vaginal intercourse prior to Wave I) from the sample. Indeed, previous research shows that Black men and Hispanic men tend to initiate intercourse earlier than Black women and Hispanic women, respectively (Copen, Chandra, & Martinez, 2012; Upchurch, Levy-Storms, Sucoff, & Aneshensel, 1998). Among both women and men, just over 40% of respondents reported that they appeared average in terms of physical development relative to their same-aged peers during adolescence. Approximately 20% of women and men reported late pubertal development and the remainder reported early pubertal development. Table 1 also shows that

by their mid-twenties and early thirties, a vast majority of respondents have attained at least some college education. Moreover, roughly 19% of women and 16% of men are currently enrolled in school and 61% of women and 72% of men report being currently employed. Overall, experiencing financial difficulties during young adulthood is not uncommon, but is also not reported by the majority of respondents. Women are slightly more likely than men report money problems (21% vs. 19%, respectively), though this difference is not statistically significant.

In terms of family characteristics at Wave IV, more women than men report having children in the household (47% vs. 29%, respectively). The living arrangement most commonly reported by both women and men is living with a marital partner (47% and 37%, respectively), though a substantial proportion of respondents report living with a cohabiting partner and living alone. Living with others, with no spouse/partner present is least commonly reported among both women and men. Having ever been divorced, separated, or widowed by young adulthood is more common among women (10%) than men (6%). Respondents reported retrospectively on experiences of forced sexual relations and, as expected, large gender differences emerged. Almost five times more women than men (23% vs. 5%) had experienced forced sexual relations. Slightly more men than women reported experience with binge drinking prior to the initiation of vaginal intercourse (28% vs. 22%, respectively).

Table 1 also presents descriptive statistics for the primary covariates and dependent variable for women and men. Among young adults who have engaged in vaginal intercourse, men and women initiate intercourse at roughly the same ages (mean of 18.01 years and 17.73 years, respectively). Due to the methodological necessity of excluding respondents who had already transitioned to first intercourse prior to Wave I, which drops the very earliest of initiators, the average ages at intercourse reported here are selective for respondents with somewhat later transitions, shifting the mean to older ages at first intercourse. In addition, because men often report initiating intercourse at slightly younger ages than women (Gibbs, 2013), men with later transitions may be overrepresented as a result of dropping those who reported sexual initiation prior to Wave I, leading to a higher average age at first intercourse for men than women. Although men and women report initiating intercourse at similar ages, on average, men experience a more rapid accumulation of sex partners than women, as evidenced by their rate of 0.90, versus 0.68 for women. Finally, engaging in frequent binge drinking is not reported by the majority of respondents in the sample, though men are more likely to engage in frequent binge drinking in the last year than women (29% vs. 16%, respectively).

Table 2 displays the bivariate association between our measures of sexual experience and frequent binge drinking behavior by gender. Frequent binge drinkers report significantly lower mean ages at first vaginal intercourse and higher rates of sex partner accumulation than their peers who do not engage in frequent binge drinking, though the differences are larger among the male sample (Panel 2) than the female sample (Panel 1). Although not shown in the table, a significant ($p \leq 0.001$) negative correlation is found between age at first vaginal intercourse and rate of sex partner accumulation for both women and men ($r = -0.15$

and $r = -0.23$, respectively), suggesting that later sexual initiation is associated with slower rates of sex partner accumulation.

Multivariate Findings

Tables 3 and 4 display the results from the logistic regression models predicting binge drinking for women and men. In Table 3, Model 1 shows that net of controls, age at first intercourse is negatively associated with the binge drinking during young adulthood, such that each additional year a woman delays sexual initiation is associated with 12% lower odds of engaging in frequent binge drinking. The effect of age at first intercourse remains statistically significant with the inclusion of rate of sex partner accumulation (Model 2). Table 5 shows the findings from the KHB method to test for mediation. For women (Panel 1), we find that the total effect of age at first intercourse is 1.11 times larger than the direct effect in the mediating model, with roughly 10% of the relationship between age at first intercourse and binge drinking being explained by rate of sex partner accumulation. We also find that rate of partner accumulation exerts a significant direct effect on binge drinking among women (Table 3, Model 2), such that a more rapid accumulation of sex partners is associated with higher odds of engaging in frequent binge drinking. Finally, to examine whether the association between age at first intercourse and binge drinking is moderated by rate of sex partner accumulation, we include an interaction in Model 3. However, no significant finding emerges.

In terms of the direct effects of the control variables in the full model (Model 2), we find that compared to White women, Black women are less likely to report frequent binge drinking and women of other race/ethnicities are more likely to do so. Furthermore, we find that residing with children and living with a marital partner (compared to other types of arrangements) reduces the odds of frequent binge drinking. Those who experienced forced sexual relations also have an odds of binge drinking that is 0.68 times lower than their peers who did not report such an experience. Conversely, women with a college degree or more have higher odds of frequent binge drinking than do their peers with less than a high school education. Finally, as expected, experience with binge drinking prior to initiation of intercourse is positively related to women's binge drinking behavior in the past year.

Turning to men (Table 4), we find that similar to women, age at first intercourse exerts a significant direct effect on young adult binge drinking behavior, net of controls (Model 1). More specifically, for each additional year delayed in age at first intercourse, the odds of engaging in frequent binge drinking in the last year decrease by 16%. Also similar to women, the effect of age at first intercourse remains robust with the inclusion of rate of sex partner accumulation (Model 2). The results from the formal test of mediation (Table 5, Panel 2) indicate that for men, the total effect of age at first intercourse is 1.17 times larger than the direct effect with rate of part accumulation in the model. Additionally, findings indicate that rate of sex partner accumulation accounts for roughly 15% of the total age at first intercourse effect on binge drinking in young adulthood. Table 3 also shows that a more rapid accumulation of sex partners is positively associated with men's odds of engaging in frequent binge drinking (Model 2), but does not moderate the association between age at first intercourse and binge drinking (Model 3).

Considering briefly the other covariates in Model 2, results show that Black men and Hispanic men (compared to White men), and men who have ever been divorced, separated, or widowed face lower odds of frequent binge drinking. Conversely, reporting experience with binge drinking prior to first intercourse, as well as having a high school degree/GED or vocational training (compared to having less than a high school degree) is associated with higher odds of binge drinking among men during young adulthood. Finally, we find that living with a marital partner, as compared to all other living arrangements, significantly reduces the odds of frequent binge drinking for men during their mid-twenties and early thirties.

Figures 1 and 2 graphically illustrate the results from our fully adjusted models (Model 2) for both women and men, displaying the predicted probability of frequent binge drinking by each of our sexual experience variables. Interpretations of the results are fairly straightforward. Figure 1 shows that, when holding constant rate of partner accumulation, age at first intercourse continues to exert a significant negative effect on the predicted probability of binge drinking. In other words, women and men who initiate intercourse at a later age have a lower probability of being a frequent binge drinker in their mid-twenties and early thirties. We also see a gender cross-over effect as age at first intercourse rises, with the cross-over appearing at the mean age at first intercourse (approximately 18 years). This shows that men are more likely than women to engage in frequent binge drinking when initiating intercourse at relatively early ages. Figure 2 shows that, when holding constant age at first intercourse, rate of partner accumulation exerts a significant positive effect on the predicted probability of binge drinking. Thus, regardless of when one initiates sexual intercourse, a faster pace of partner accumulation is associated with more frequent binge drinking during young adulthood. Together, these finding suggest that both age at first intercourse and how quickly one accumulates sexual partners once intercourse has been initiated matter for later binge drinking behavior.

Discussion

Using longitudinal data drawn from the National Longitudinal Study of Adolescent to Adult Health (Add Health), we address three research questions: (1) What is the association between age at first intercourse and binge drinking during young adulthood (i.e. the mid-to-late twenties and early thirties)? (2) Is this relationship mediated or moderated by the rate at which individuals accumulate sex partners during the transition to adulthood? And (3) Are these associations present for both women and men? Our results speak to a large body of literature documenting the impact of young people's sexual experiences on the likelihood of engaging in health-risk behaviors.

Among our sample, both young adult women and men reported that they had initiated intercourse at roughly the same ages (approximately 18 years), and that the typical respondent added fewer than one sexual partner per year after their initial commencement of sexual intercourse (mean of 0.68 for women and 0.90 for men). Overall, the majority of respondents did not engage in frequent binge drinking within the last year, though with men were more likely to do so than women.

The multivariate results presented in this study indicate a negative association between age at first intercourse and subsequent binge drinking in young adulthood, net of socio-demographic factors, family characteristics, and rate of sex partner accumulation. This finding is not surprising, given past research documenting the protective effect of delaying sexual initiation for both short- and long-term health-risk behaviors (Haydon, Herring, & Halpern, 2012; Sandfort et al., 2008). Although we are unable to examine motivations for delaying sexual initiation, these young women and men may be risk-averse to a number of behaviors, including sexual activity and binge drinking. Furthermore, these individuals may reside in a more cohesive family environment leading to higher levels of parental monitoring and supervision, therefore reducing the opportunity to engage in drinking. In addition, late sexual initiation may be related to greater ability to manage emotions, which has been shown to directly influence alcohol use (Fischer, Forthun, Pidcock, & Dowd, 2007).

In contrast to our expectations, rate of sex partner accumulation does not have a strong mediating effect on the association between age at first intercourse and binge drinking. In fact, the inclusion of partner accumulation accounts for 10% of the relationship for women and 15% for men. Furthermore, partner accumulation does not moderate this association. Future research should explore other potential factors unaccounted for in this study that may help to explain or modify this relationship. We do, however, find evidence of a significant positive association between rate of sex partner accumulation and binge drinking, a dimension of sexual behavior that, to our knowledge, only one other study has considered (Ramrakha et al., 2013). For both women and men, a faster rate of accumulation is associated with a greater likelihood of engaging in frequent binge drinking, net of age at sexual initiation.

There are several reasons why rate of partner accumulation may have implications for subsequent health-risk behaviors. Although the average respondent in our sample accumulated less than one partner a year, over 6% of the sample reported accruing 2 or more sexual partners per year (not shown, available on request). Research shows that individuals sometimes turn to drinking as a way to cope with negative emotions (Cooper, Shapiro, & Powers, 1998), including those associated with romantic relationship instability and dissolution (Larson & Sweeten, 2012). Young individuals who rapidly transition through romantic relationships or non-relationship sexual encounters may be likely to experience a greater sense of instability and more frequent feelings of loss than their peers who transition in and out of relationships and encounters more gradually over time, even if they end up having the same number of partners. In addition, individuals who quickly accumulate partners may be engaging in casual sexual relationships or “hookups,” which are characterized by a series of sexual partnerships, generally lacking commitment and emotional investment (Armstrong, Hamilton, & England, 2010). Research reveals a number of emotional effects associated with engaging in these types of partnerships, including regret, shame, and disappointment (Fisher, Worth, Garcia, & Meredith, 2012; Paul & Hayes, 2002). As a result, those with a faster rate of partner accumulation may be more likely to frequently binge drink in an attempt to alleviate negative feelings and deal with stress.

Social context may also help to explain the relationship between rate of partner accumulation and binge drinking. Settings that provide the opportunity to meet sexual

partners may also be a place where alcohol is available (Ramrakha et al., 2013). Finally, young individuals, particularly men, may feel pressured to conform to the sexual norms of seeking multiple sexual partners (Masters, Casey, Wells, & Morrison, 2013), and doing so at a faster pace once they have initiated sexual activity. This pressure, in turn, may cause greater levels of distress, leading young adults to more frequently binge drink.

The findings presented here highlight the importance of studying multiple aspects of a single sexual behavior and examining their effects on women and men separately. Many studies have found that girls/women are more adversely affected by engaging in sexual behaviors than boys/men (Makenzius & Larsson, 2012; Ramrakha et al., 2013; Windle et al., 2005). Our analyses suggest, however, that the effect of age at first intercourse on binge drinking is largely the same for women and men. Although rate of partner accumulation, an aspect of sexual history that has been largely unstudied, adversely affected both women and men, consistent with our expectations, the effect was more pronounced for the former. Despite recent studies that suggest the narrowing of gender differences in sexual behavior (Petersen & Hyde, 2011), the sexual double standard, which governs gender-specific norms about sexual behavior and the context in which these experiences should occur, continues to persist (Milhausen & Herold, 2001). As such, women who frequently introduce new sexual partners outside the context of a committed relationship may regularly engage in binge drinking as a way to cope with the stress they may feel as result of deviating from sexual norms and expectations. Furthermore, women may be more likely than men to feel disapproval from one's peers for having multiple sexual partners and engaging in casual sex, possibly turning to alcohol as a way to manage their interpersonal anxiety. Finally, women have a greater tendency to invest emotionally in their sexual relationships (Meston & Buss, 2007). As a result, women may engage in frequent binge drinking as a way to alleviate the negative emotions tied to the repeated introduction and loss of intimate partners. Future work should replicate this study with attention to gender differences and additional health-related outcomes and behaviors.

One additional contribution of this study is its focus on binge drinking during young adulthood. Although levels of substance use generally peak around age 25 (Chen & Jacobson, 2012), many individuals in their mid-twenties and early thirties are still at risk of engaging in binge drinking. In fact, our findings show that 16% of women and 29% of men between the ages of 24 and 32 report having engaged in frequent binge drinking within the last year. While binge drinking has been shown to be problematic at various stages of the life course (Choi & DiNitto, 2011; Miller, Naimi, Brewer, & Jones, 2007; Popovici & French, 2013), its effect may be particularly consequential during young adulthood given the significant life changes many individuals experience during this time, such as making transitions into major family roles (e.g., relationship formation/parenthood) and work roles (e.g., establishing a career).

Although we believe that this study pushes forward our understanding of the relationship between sexual activity and risky health-related behaviors, there are several limitations to this study that should be acknowledged. First, given methodological constraints and theoretical considerations, the analytic sample used in this study excludes young adults who had not yet initiated intercourse, those who had initiated intercourse prior to the first wave of

data collection, and those who transitioned prior to the age of 10. Excluding these individuals from the analyses may bias the findings in that we lose some of the earliest and latest transitioners in the final sample. Therefore, the descriptive results should be taken with some caution. Second, retrospective reports of age at first vaginal intercourse are used. Although this may be subject to inconsistencies in the reporting or recall of behavior, honesty of self-reports about sexual behaviors tends to increase with age (Siegel, Aten, & Roghmann, 1998). Indeed, most young adults are consistent in reports of their age at first intercourse (Goldberg, Haydon, Herring, & Halpern, 2014), suggesting that our use of age at first vaginal intercourse from the Wave IV interview may be a more valid self-report measure than are reports gathered from respondents during previous waves when they were adolescents. It is also important to note that our exclusive focus on vaginal intercourse limits the generalizability of our study to sexual activity between different-gender partners. With notable proportions of adolescents and young adults reporting same-gender sexual activity (Chandra, Mosher, Copen, & Sionean, 2011; McCabe, Brewster, & Tillman, 2011), future work should examine whether our findings extend to these individuals as well. Third, at Wave IV, respondents were not asked specifically about the number of partners with whom they had engaged in sexual behaviors other than intercourse. Recent studies find that among adolescents and young adults, oral sex is just as or more common than vaginal sex (Brewster & Tillman, 2008; Copen et al., 2012), and may occur prior to vaginal sex (Malacad & Hess, 2010). As a result, young individuals may accrue more oral sex partners than vaginal sex partners during their transition to adulthood. Future research should examine whether the rate at which one accumulates oral sex partners similarly influences drinking behaviors.

Finally, although these data do not allow us to determine the context in which first intercourse took place, the majority of adolescents report engaging in first intercourse outside of marriage. In fact, according to recent estimates from 2006–2010 NSFG, among 15 to 19 year olds, only 3% of women and 2% of men engaged in first intercourse with a partner with whom they were cohabiting, engaged, or married (Martinez et al., 2011). Because previous research indicates that the consequences of adolescent sexual activity are moderated by the context in which this activity occurs (Harden & Mendle, 2011; Meier, 2007), first intercourse that occurs within a co-residential relationship may not have the same association with subsequent drinking behavior as intercourse that occurs in other relationship contexts. Given that those who transition to first intercourse in the context of a co-residential relationship represent a selective, and very small, group of persons, future research should focus on identifying the characteristics and outcomes of these individuals.

Despite these limitations, the current study has several strengths and thus, makes a number of important contributions to the growing literature on adolescent and young adult sexual behavior. First, we utilize a nationally representative, longitudinal sample in the United States. The reliance on cross-sectional data used by other U.S. studies in this area prevents researchers from determining the temporal ordering of sexual experiences and drinking (Cavazos-Rehg et al., 2011; Howard & Wang, 2004; Ogletree et al., 2001), limiting our understanding of this relationship. Moreover, these studies are unable to account for previous drinking behaviors. Our data allows us to control for respondents' binge drinking behavior prior to the wave in which they initiated intercourse. By doing so, we resolve limitations of past research by eliminating the possibility of reverse causality, allowing us to

draw temporal inferences about this association. This also allows us to capture both the short- and long-term effects of sexual initiation. Second, in contrast to much recently published work on sexual initiation and health-related outcomes using the Add Health, our analysis is based on data that extend to 2008. Here, we are able to gather information about sexual activity and binge drinking behavior into individuals' mid-twenties and early thirties. Finally, we consider a dimension of sexual behavior that has been largely absent from the literature, highlighting the need for scholars to both recognize and include multiple aspects of youths' sexual behavior in future studies.

Conclusions

In sum, although researchers should continue to explore the influence of age at first intercourse on health-related outcomes, the findings presented here suggest that we should move beyond the simple focus on age at sexual initiation, and consider other aspects of sexual behavior, such as the rate of sexual partner accumulation throughout the course of adolescence and early adulthood. To help minimize health-risk behaviors among young adults, prevention efforts should focus on reducing the rapidity of transitions into and out of relationships and sexual encounters. Targeting young individuals who quickly accumulate multiple sexual partners may be particularly important to help reduce binge drinking behaviors in young adults. Identifying and reinforcing healthy coping strategies for emotional responses to rapid transitions in and out of sexual partnerships are necessary to help facilitate healthy sexual development through the course of adolescence and young adulthood.

From a public policy perspective, understanding the factors that put individuals at risk for engaging in frequent binge drinking is crucial, as studies show that frequent binge drinkers experience worse health-related quality of life (Okoro et al., 2004), sleep problems (Popovici & French, 2013), and suppressed immune functioning (Afshar et al., 2015). Furthermore, understanding the prevalence of binge drinking among young adults in their mid-twenties and early thirties may be particularly important, as it may have implications as they transition into new social environments and social roles. To that end, future research should focus on more carefully identifying the factors and characteristics that put young adults at risk of frequent binge drinking, in addition to how these experiences influence their well-being across the life course.

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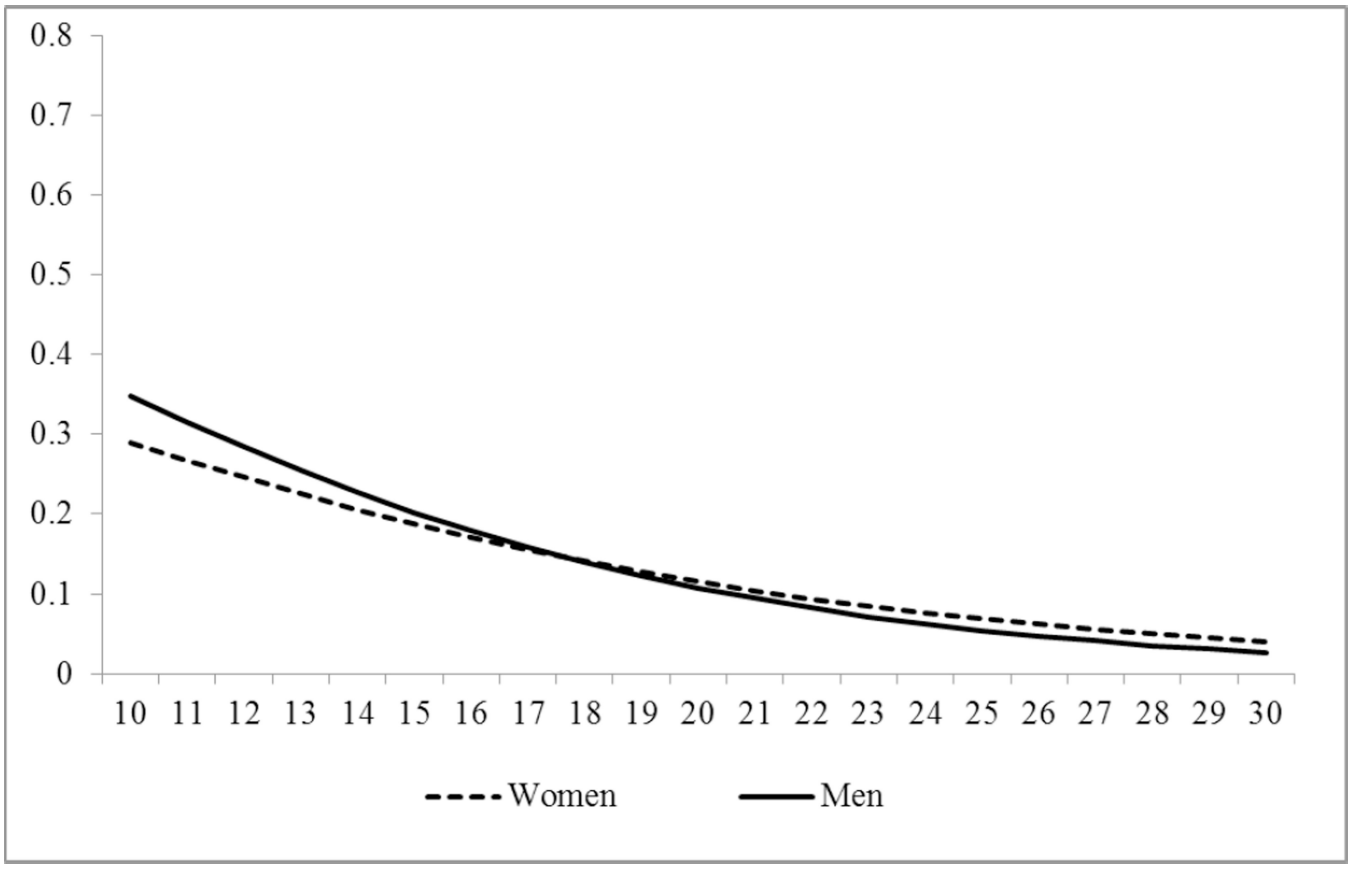

Figure 1.
Predicted probability of frequent binge drinking within the last year, by age at first vaginal intercourse and gender

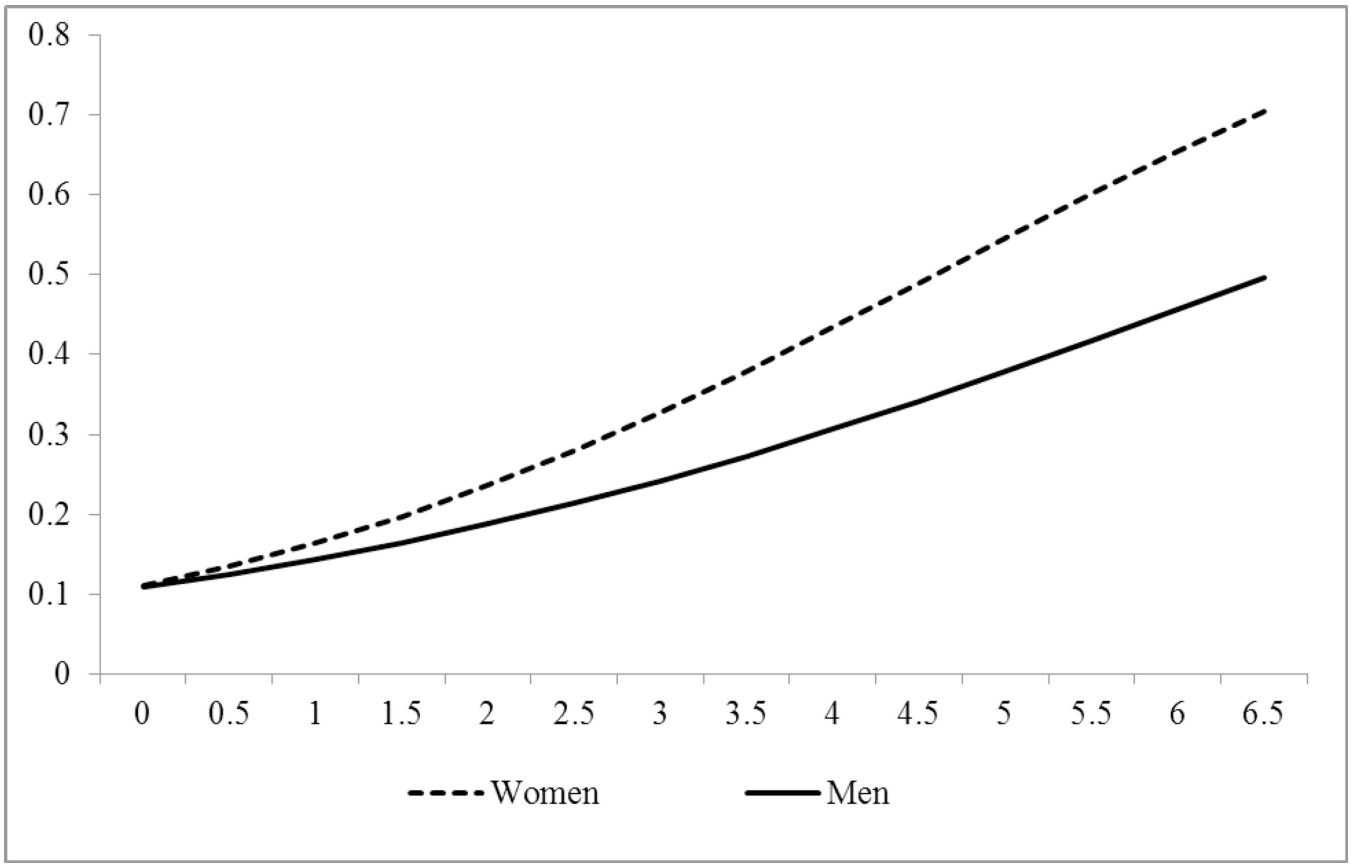

Figure 2.
Predicted probability of frequent binge drinking within the last year, by rate of sex partner accumulation and gender

Table 1

Weighted proportions, means, and standard deviations of variables, by gender

	Women (n = 2,728)		Men (n = 1,998)	
Variable	**Proportion/ Mean**	**SD**	**Proportion/ Mean**	**SD**
Race[a]				
White	0.71	----	0.75	----
Black	0.10	----	0.07	----
Hispanic	0.13	----	0.10	----
Asian	0.04	----	0.04	----
Other	0.02	----	0.04	----
Pubertal timing				
Early	0.38	----	0.35	----
Typical	0.42	----	0.43	----
Late	0.20	----	0.22	----
Educational attainment[a]				
Less than high school/GED	0.04	----	0.06	----
High school degree	0.11	----	0.15	----
Vocational schooling	0.08	----	0.08	----
Some college	0.35	----	0.33	----
College or more	0.42	----	0.38	----
Currently enrolled in school[a]	0.19	----	0.16	----
Experienced financial difficulties	0.21	----	0.19	----
Currently employed[a]	0.61	----	0.72	----
Children living in household[a]	0.47	----	0.29	----
Current living arrangement[a]				
Living with cohabiting partner	0.20	----	0.20	----
Living with marital partner	0.47	----	0.37	----
Living with parents (no partner/spouse)	0.12	----	0.13	----
Living with others (no parent/spouse)	0.02	----	0.03	----
Living alone	0.19	----	0.27	----
Ever divorced/separated/widowed[a]	0.10	----	0.06	----
Ever experienced forced sexual relations[a]	0.23	----	0.05	----
Experienced binge drinking prior to vaginal intercourse[a]	0.22	----	0.28	----
Mean age at first vaginal intercourse[a] (Range = 11–30 years)	17.73	0.11	18.01	0.11
Mean rate of sex partner accumulation[a] (Range = 0–6.5)	0.68	0.02	0.90	0.03
Frequent binge drinking within the last year[a]	0.16	----	0.29	----

[a]Statistically significant ($p \leq .05$) differences by gender based on one-way ANOVA for continuous variables and design-based *F*-tests for categorical variables.

Table 2

Mean age at first vaginal intercourse and mean rate of partner accumulation by binge drinking behavior and gender

	Did not engage in frequent binge drinking within the last year	Engaged in frequent binge drinking within the last year
Panel 1: Women (n = 2,728)		
Age at first vaginal intercourse [a]	17.81	17.33
Rate of sex partner accumulation [a]	0.62	0.97
Panel 2: Men (n = 1,998)		
Age at first vaginal intercourse [a]	18.24	17.46
Rate of sex partner accumulation [a]	0.77	1.23

[a]Significance tests (*$p \leq .001$) for differences in the means of sexual behavior variables by binge drinking status based on one-way ANOVA.

Table 3

Logistic regression models for frequent binge drinking within the last year, women (n = 2,728)

	Model 1			Model 2			Model 3		
	b	**Exp(*b*)**	**95% CI**	***b***	**Exp(*b*)**	**95% CI**	***b***	**Exp(*b*)**	**95% CI**
Age at first vaginal intercourse	−0.13	0.88	(0.83, 0.94)***	−0.11	0.89	(0.84, 0.95)***	−0.12	0.89	(0.81, 0.97)**
Rate of sex partner accumulation				0.45	1.58	(1.31, 1.89)***	0.39	1.48	(0.37, 5.97)
Age at first vaginal intercourse × Rate of sex partner accumulation							0.01	1.01	(0.04, 2.58)
Experienced binge drinking prior to vaginal intercourse	0.79	2.21	(1.56, 3.12)***	0.79	2.19	(1.54, 3.11)***	0.79	2.19	(1.54, 3.11)***
Race/Ethnicity (Ref = White)									
Black	−1.95	0.14	(0.07, 0.27)***	−1.94	0.14	(0.08, 0.27)***	−1.94	0.14	(0.08, 0.27)***
Hispanic	−0.12	0.89	(0.60, 1.32)	−0.04	0.96	(0.64, 1.45)	−0.04	0.96	(0.64, 1.44)
Asian	−0.54	0.58	(0.27, 1.27)	−0.43	0.65	(0.30, 1.42)	−0.43	0.65	(0.30, 1.42)
Other	1.02	2.76	(1.26, 6.07)**	1.01	2.74	(1.26, 5.96)**	1.01	2.74	(1.25, 6.01)**
Pubertal timing (Ref = Typical)									
Early	0.27	1.31	(0.92, 1.85)	0.22	1.25	(0.88, 1.76)	0.22	1.24	(0.88, 1.76)
Late	0.08	1.08	(0.68, 1.73)	0.06	1.06	(0.67, 1.70)	0.06	1.07	(0.67, 1.70)
Educational attainment (Ref = Less than high school)									
High school degree/GED	1.05	2.86	(1.08, 7.59)*	0.91	2.49	(0.97, 6.42)	0.91	2.49	(0.97, 6.41)
Vocational schooling	1.20	3.31	(1.05, 10.46)*	1.03	2.81	(0.90, 8.76)	1.03	2.81	(0.90, 8.75)
Some college	0.79	2.20	(0.78, 6.19)	0.60	1.82	(0.65, 5.09)	0.60	1.82	(0.65, 5.06)
College or more	1.13	3.11	(1.18, 8.19)*	0.97	2.65	(1.01, 6.97)*	0.98	2.66	(1.02, 6.90)*
Currently enrolled in school	0.28	1.32	(0.92, 1.90)	0.32	1.38	(0.95, 2.00)	0.32	1.37	(0.94, 2.01)
Experienced financial difficulties	0.27	1.31	(0.89, 1.94)	0.29	1.33	(0.90, 1.98)	0.29	1.33	(0.90, 1.98)
Currently employed	0.18	1.20	(0.87, 1.67)	0.20	1.22	(0.88, 1.70)	0.20	1.22	(0.88, 1.69)
Children living in household	−0.96	0.38	(0.27, 0.55)***	−0.95	0.39	(0.27, 0.55)***	−0.95	0.39	(0.27, 0.55)***
Current living arrangement (Ref = Living with marital partner)									
Living with cohabiting partner	0.77	2.17	(1.52, 3.09)***	0.64	1.89	(1.32, 2.72)***	0.64	1.89	(1.31, 2.74)***

	Model 1			Model 2			Model 3		
	b	**Exp(*b*)**	**95% CI**	***b***	**Exp(*b*)**	**95% CI**	***b***	**Exp(*b*)**	**95% CI**
Living with parents (no partner/spouse)	0.49	1.62	(0.95, 2.78)	0.28	1.32	(0.75, 2.32)	0.28	1.32	(0.75, 2.32)
Living with others (no parent/spouse)	−0.08	0.92	(0.28, 3.04)	−0.33	0.72	(0.20, 2.52)	−0.34	0.71	(0.19, 2.64)
Living alone	1.11	3.03	(2.14, 4.29) ***	0.90	2.46	(1.71, 3.55) ***	0.90	2.46	(1.69, 3.57) ***
Ever divorced/separated/widowed	0.13	1.14	(0.70, 1.86)	0.12	1.12	(0.69, 1.82)	0.12	1.12	(0.69, 1.82)
Ever experienced forced sexual relations	−0.25	0.78	(0.56, 1.08)	−0.39	0.68	(0.48, 0.95) *	−0.39	0.68	(0.48, 0.95) *

Note: 95% CI for Exp(*b*).

* $p \leq .05$;

** $p \leq .01$;

*** $p \leq .001$.

Table 4

Logistic regression models for frequent binge drinking within the last year, men (n = 1,998)

	Model 1			Model 2			Model 3		
	b	**Exp(*b*)**	**95% CI**	***b***	**Exp(*b*)**	**95% CI**	***b***	**Exp(*b*)**	**95% CI**
Age at first vaginal intercourse	−0.18	0.84	(0.79, 0.89)***	−0.15	0.86	(0.81, 0.92)***	−0.16	0.85	(0.79, 0.91)***
Rate of sex partner accumulation				0.32	1.38	(1.17, 1.64)***	0.03	1.03	(0.33, 3.15)
Age at first vaginal intercourse × Rate of sex partner accumulation							0.02	1.02	(0.95, 1.09)
Experienced binge drinking prior to vaginal intercourse	0.81	2.24	(1.62, 3.11)***	0.77	2.15	(1.56, 2.97)***	0.76	2.14	(1.55, 2.96)***
Race/Ethnicity (Ref = White)									
Black	−1.02	0.36	(0.20, 0.63)***	−1.02	0.36	(0.21, 0.63)***	−1.03	0.36	(0.21, 0.63)***
Hispanic	−0.60	0.55	(0.36, 0.84)**	−0.56	0.57	(0.37, 0.88)**	−0.57	0.57	(0.37, 0.88)**
Asian	−0.40	0.67	(0.27, 1.69)	−0.30	0.74	(0.29, 1.91)	−0.30	0.74	(0.29, 1.90)
Other	−0.52	0.60	(0.27, 1.32)	−0.55	0.58	(0.26, 1.29)	−0.54	0.58	(0.26, 1.29)
Pubertal timing (Ref = Typical)									
Early	−0.13	0.87	(0.62, 1.24)	−0.15	0.86	(0.61, 1.21)	−0.15	0.86	(0.61, 1.21)
Late	−0.07	0.93	(0.64, 1.37)	−0.08	0.93	(0.62, 1.38)	−0.08	0.92	(0.62, 1.37)
Educational attainment (Ref = Less than high school)									
High school degree/GED	0.86	2.37	(1.13, 4.97)*	0.89	2.43	(1.09, 5.39)*	0.88	2.41	(1.10, 5.32)*
Vocational schooling	1.05	2.87	(1.18, 6.98)*	1.04	2.83	(1.11, 7.23)*	1.04	2.82	(1.11, 7.15)*
Some college	0.73	2.08	(0.98, 4.39)	0.67	1.96	(0.88, 4.37)	0.67	1.95	(0.89, 4.29)
College or more	0.51	1.67	(0.82, 3.41)	0.47	1.61	(0.74, 3.49)	0.47	1.60	(0.74, 3.45)
Currently enrolled in school	0.09	1.09	(0.73, 1.62)	0.06	1.06	(0.71, 1.59)	0.06	1.06	(0.71, 1.59)
Experienced financial difficulties	−0.01	0.99	(0.68, 1.46)	−0.04	0.96	(0.65, 1.42)	−0.04	0.96	(0.65, 1.43)
Currently employed	−0.04	0.96	(0.73, 1.27)	−0.06	0.94	(0.71, 1.24)	−0.06	0.94	(0.71, 1.24)
Children living in household	−0.23	0.79	(0.54, 1.17)	−0.22	0.81	(0.54, 1.20)	−0.22	0.81	(0.54, 1.20)
Current living arrangement (Ref = Living with marital partner)									
Living with cohabiting partner	1.02	2.78	(1.88, 4.11)***	0.89	2.44	(1.67, 3.56)***	0.89	2.44	(1.67, 3.56)***

	Model 1			Model 2			Model 3		
	b	**Exp(*b*)**	**95% CI**	***b***	**Exp(*b*)**	**95% CI**	***b***	**Exp(*b*)**	**95% CI**
Living with parents (no partner/spouse)	1.00	2.72	(1.55, 4.79) ***	0.93	2.53	(1.42, 4.48) **	0.93	2.53	(1.43, 4.47) ***
Living with others (no parent/spouse)	1.53	4.61	(2.15, 9.87) ***	1.46	4.31	(2.04, 9.09) ***	1.46	4.31	(2.04, 9.08) ***
Living alone	1.51	4.52	(2.95, 6.91) ***	1.34	3.81	(2.47, 5.89) ***	1.34	3.80	(2.46, 5.88) ***
Ever divorced/separated/widowed	−0.57	0.56	(0.33, 0.97) *	−0.57	0.56	(0.32, 0.99) *	−0.56	0.57	(0.33, 0.98) *
Ever experienced forced sexual relations	−0.50	0.61	(0.32, 1.17)	−0.59	0.55	(0.29, 1.07)	−0.58	0.56	(0.29, 1.08)

Note: 95% CI for Exp(*b*).

* $p \leq .05$;

** $p \leq .01$;

*** $p \leq .001$.

Table 5

Decomposition of mediation effect of rate of sex partner accumulation in the logistic regression of age at first vaginal intercourse on frequent binge drinking within the last year, by gender

Panel 1: Women (*n* = 2,728)			
	b	**Exp(*b*)**	**95% CI**
Total effect	−0.127	0.88	(0.83, 0.94)***
Direct effect	−0.114	0.89	(0.84, 0.95)***
Indirect effect	−0.013	0.99	(0.98, 0.99)***
Confounding ratio	1.11		
Confounding percentage	10.24%		
Panel 2: Men (n = 1,998)			
	b	Exp(*b*)	95% CI
Total effect	−0.175	0.84	(0.79, 0.89)
Direct effect	−0.149	0.86	(0.81, 0.92)
Indirect effect	−0.026	0.97	(0.96, 0.99)
Confounding ratio	1.17		
Confounding percentage	14.86%		

Note: 95% CI for Exp(*b*). All covariates controlled for.

***
p ≤ .001