

Timing of Vaginal Sex Initiation, Number of Sexual Partners, and Binge Drinking During
Young Adulthood

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This research uses data from Add Health, a program project directed by Kathleen Mullan Harris and designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill, and funded by grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 23 other federal agencies and foundations. Special acknowledgment is due Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Information on how to obtain the Add Health data files is available on the Add Health website (<http://www.cpc.unc.edu/addhealth>). No direct support was received from grant P01-HD31921 for this analysis. Giuseppina Valle has received support from the grant, 5 T32 HD007081, Training Program in Population Studies, awarded to the Population Research Center at The University of Texas at Austin by the Eunice Kennedy Shriver National Institute of Child Health and Human Development.

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ABSTRACT

Using the Add Health, we explore the associations between timing of vaginal sex initiation, number of vaginal sex partners, and binge drinking among individuals in young adulthood. In our combined model, we find that timing of vaginal sex initiation does not have a significant independent effect on binge drinking, but number of sexual partners does. We also find a significant interaction between timing and number of partners for men, but not women. Men who initiate sex at a late age (>18 years) and report 11 to 15 lifetime sex partners have a greater likelihood of binge drinking compared to men who initiate sex at a normative age (between 15 and 18 years) and report fewer partners. These findings suggest that a “compressed” sexual trajectory consisting of late entry into sexual activity and the frequent introduction of new partners may place individuals, particularly men, at risk for more negative health-risk behaviors.

Introduction

Although the share of unmarried teens who have engaged in vaginal intercourse has declined in recent decades, the percentage reporting vaginal sex experience remains high. Estimates from the National Survey of Family Growth describing vaginal sex experience among never-married 15 to 19 year-olds, reveal a 13 percentage point drop among males between the 1995 (55%) and the 2006-2010 surveys (42%), and a 6 percentage point drop among females (from 49% to 43%) (Martinez, Copen, & Abma, 2011). Over this time period, however, the number of vaginal sex partners reported by never-married youth with coital experience increased: 32% of females and 33% of males reported 3 to 5 vaginal sex partners in the 2006-2010 survey, compared to 27% and 31%, respectively, in 1995 (Martinez, Copen, & Abma, 2011).

Early sexual initiation and multiple sexual partners increase teens' risk of various detrimental outcomes, including teenage pregnancy (Kirby, 2002; Reese, Haydon, Herring, & Halpern, 2013) and sexually transmitted infections (STIs) (Coker, Garrison, McKeown, Richter, Valois, & Vincent, 1994; Nordvik & Liljeros, 2006; Sandfort, Orr, Hirsch, & Santelli, 2008). Both factors also are correlated with teens' engagement in other risk behaviors. For example, alcohol use is associated with a number of sexual risk behaviors (Muchimba, Haberstick, Corley, & McQueen, 2013), including sexual initiation (Floyd & Latimer, 2010; Madkour, Farhat, Halpern, Godeau, & Gabhainn, 2010; Rothman, Wise, Bernstein, & Bernstein, 2009; Stueve & O'Donnell, 2005) and number of sexual partners (Bailey, Pollock, Martin, & Lynch, 1999; Calvert, Bucholz, & Steger-May, 2010; Cavazos-Rehg, Krauss, Spitznagel, Schootman, Cottler, & Bierut, 2011; Dogan, Stockdale, Widaman, & Conger, 2010; Howard & Wang, 2004; Nkansah-Amankra, Diedhiou, Agbanu, Harrod, & Dhawan, 2011; Ogletree, Dinger, & Vesely,

2001), as well as engagement in unprotected sex (Calvert, Bucholz, & Steger-May, 2010).

Adolescent binge drinking trajectories have also been shown to correlate with the number of sexual partners individuals have during young adulthood, with binge drinkers having significantly more sexual partners than their non-binge-drinking peers (Guo, Chung, Hill, Hawkins, Catalano, & Abbott, 2002). Binge drinking may be particularly important to study today, since roughly 45% of young adults aged 18 to 25, and 37.7% of young adults aged 26 to 29, report binge drinking in the last month (Substance Abuse and Mental Health Services Administration, 2013).

Yet, because of the cross-sectional nature of many studies (Cavazos-Rehg, et al, 2011; Howard & Wang, 2004), as well as the likelihood of alcohol use and sexual behaviors to co-occur (Duncan, Strycker, & Duncan, 1999; Zuckerman & Kuhlman, 2000), the relationship between problematic drinking behaviors and sexual experience is not completely understood. In particular, the question of whether initiation of sexual engagement tends to precede the onset of behaviors like binge drinking remains largely unanswered. Several recent longitudinal studies provide evidence supporting the former ordering: that sexual experiences precede problematic drinking behaviors (Ramrakha, Paul, Bell, Dickson, Moffitt, & Caspi, 2013; Windle, Mun, & Windle, 2005). Moreover, in a cross-sectional study of Swedish teens, researchers found that those who reported initiating coitus by age 15 were more likely than those who had not to report current binge drinking (Makenzius & Larsson, 2012). On the other hand, one recent longitudinal study suggests that alcohol use may affect sexual behavior, such that adolescents with higher levels of alcohol use have greater changes in their number of sexual partners as they transition to adulthood. Number of sexual partners, however, is not associated with changes in alcohol use over time (Dogan, Stockdale, Widaman, & Conger, 2010). The divergent findings discussed here may result from the different measures of sexual behavior examined by these studies. It might be

that timing of sexual initiation and changes in the number of partners after initiation has taken place are related to drinking behaviors in different ways.

The timing at which individuals first engage in vaginal sex, whether at a normative (and on-time) or a non-normative (and off-time) age relative to one's peers, is likely to play an important role in young people's health-related behaviors. Young individuals who make non-normative transitions to sex, both "early" and "late," may view themselves and may be perceived by others as not following age-graded norms and expectations. Deviating from social norms and expectations tends to increase stress and anxiety, which may lead to social isolation and disconnection from peers. As a result, non-normative sexual behavior may be linked to a higher likelihood of engaging in problem behaviors that stem from psychological distress, including binge drinking. The relationship between timing of sexual initiation and drinking behaviors may differ for women and men, however, given social norms that value virginity and sex within a committed context for girls and women but tend to encourage the initiation of sexual partnerships, regardless of age or relationship status, for boys and men (Milhausen & Herold, 2001). Indeed, studies show that greater number of sexual partners during adolescence is positively associated with boys' peer acceptance, but negatively associated with girls' peer acceptance (Kreager & Staff, 2009).

Gender differences in the association between number of sexual partners and binge drinking may also emerge. A recent study of young adults in New Zealand observed 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, Paul, Bell, Dickson, Moffitt, & Caspi, 2013). Additionally more frequent engagement in sexual activities is associated with a greater likelihood of heavy drinking among young women (Windle, Mun, &

Windle, 2005). The stronger effects among women may result from a greater tendency to engage emotionally in sexual partnerships as compared to men (Meston & Buss, 2007). Therefore, women who accrue multiple sexual partners during their transition to adulthood may be more likely than men who accrue a similar number of partners to engage in problem drinking as way to repress stress and negative emotions tied to the repeated introduction and loss of intimate partners.

Another issue that has yet to be considered empirically is the possibility that the association between timing of first vaginal sex and problematic drinking behaviors is contingent on the number of sexual partners that an individual goes on to have. In general, individuals whose first vaginal sex occurs early report more sexual partners than do those who have delayed sexual initiation (Kan, Cheng, Landale, & McHale, 2010; Santelli, Brener, Lowry, Bhatt, & Zabin, 1998). However, those who delay sexual initiation until late adolescence or early adulthood and then rapidly transition through several sexual partners may be more at risk of engaging in other potentially detrimental behaviors than those whose first vaginal sex experience was at a younger age and who accrued the same number of partners over a longer duration. Less time between sexual partnerships may not allow individuals to fully adjust to the loss of a previous partner, while simultaneously participating in a new partnership. Attempts to balance one's feelings and emotions may lead young women and men to turn to problem behaviors, such as binge drinking.

Furthermore, the interaction between timing of sexual initiation and number of sexual partners and its effect on binge drinking in young adulthood may operate differently for women and men. No research to date has examined this. For women, however, initiating sex at an early age and having a large number of sexual partners are both behaviors that breach social norms and expectations. Therefore, it may be this combination which proves particularly detrimental to

young women's health-related behaviors. Or, it may be that the effects of both behaviors operate independently of one another. For men, on the other hand, initiating sex at a late age is often considered more socially unacceptable than is transitioning early, and there may be intense pressure on young men who transition to sexual activity late to "catch up" with their peers. As a result, young men who have combined a late transition with a rapid accumulation of partners may be the most at risk for engaging in behaviors like binge drinking. While concerns about early sexual initiation are warranted, researchers should also consider whether delayed sexual initiation combined with a relatively rapid accumulation of sexual partners also leads to adverse outcomes and whether these effects vary by gender.

The Current Study

In an effort to address shortcomings of previous research, this paper uses data from a rich, nationally representative, longitudinal data set of young adults in the United States. Three research questions structure our analyses: (1) What is the association between timing of vaginal sex initiation and the likelihood of binge drinking during young adulthood, when women and men are aged 24 to 32? (2) Is this relationship moderated by number of lifetime vaginal sex partners? (3) Do these effects differ for women and men?

Data and Methods

Data for this study come from the National Longitudinal Study of Adolescent 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) and III (2001-2002). Wave IV was conducted in 2008 with 15,701 original respondents, when respondents were aged 24 to 32 (80.3% response rate).

This study utilizes data collected from each in-home interview from Waves I through IV, as well as selected data from the Wave I Parental Questionnaire. To ensure a nationally representative picture of the sexual initiation experiences of young Americans, the timing categories of vaginal sex initiation (i.e. “early”, “normative”, and “late”) were created using the full sample of respondents who completed Waves I and IV of the in-home interview. The analytic sample, however, was created using a number of exclusion criteria. First, it was limited to respondents who completed Waves I through IV of the in-home interview, whose parents completed the Parental Questionnaire, and who had a valid sampling weight ($N = 9,421$). We excluded those who reported being younger than age 10 at sexual initiation ($n = 57$), as previous research has treated sexual intercourse before 11 years of age as nonconsensual (Molnar, Buka, & Kessler, 2001). We dropped respondents who had not initiated vaginal sex by Wave IV ($n = 583$) and respondents who reported having engaged in vaginal sex by Wave IV, but who did not report their age of sexual initiation ($n = 98$). Due to methodological limitations and to establish temporal ordering between our primary covariate and dependent variable, we also excluded respondents who reported that they had initiated vaginal sex prior to or by Wave I ($n = 3,409$).

Furthermore, in order to eliminate the effect of influential outliers, we dropped respondents who reported more than 50 sexual partners ($n = 57$). Because the question from which our binge drinking variable was constructed asks respondents about their behavior within the last 12

months, we also exclude 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. Finally, respondents without valid data on the remaining variables were dropped ($n = 303$), yielding a final sample size of 4,883 respondents ($n = 2,802$ women and $n = 2,081$ men).

Measures

Binge Drinking

To measure 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 two days in the past 12 months; (2) once a month or less; (3) 2 or 3 days a month; (4) 1 or two 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 drinking behavior prior to the wave that vaginal sex was initiated. At Wave I, respondents were asked, “During the past 12 months, on how many days did you drinking alcohol?” At Waves 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 drinking (Wave I) or *ever* reported having 5 drinks of more in a row over the past 12 months (Waves II and III), they were coded as having ever engaged in drinking.

Timing of first vaginal sex

Timing of first vaginal sex, 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?” Using the entire sample of respondents from Waves I and IV, we examined separately the distribution of reported ages at first vaginal sex. Using an interquartile range and boxplot, we used the 25th and 75th percentiles to create the timing categories, with ages below the 25th percentile constituting “early” initiation and ages above the 75th percentile (excluding vaginal sex virgins) constituting “late” initiation. The 50th percentile or the median is what constitutes the “normative” age range in the distribution. The final categorization for *vaginal sex timing* specified “early” initiation as occurring between ages 10-14, “normative” initiation as occurring between ages 15-18 (references), and “late” initiation as occurring at the age of 18 or older. This categorization held for both men and women.

Number of lifetime vaginal sex partners

Number of lifetime vaginal sex partners was measured as a continuous variable using respondents’ answers to the following question at Wave IV: “With how many partners have you ever had vaginal intercourse, even if only once?” Because counts of lifetime sexual partners may be subject to “heaping” or “digit preference,” we used the Myers Blended Index to assess the preference for, or avoidance of, particular digits. This index ranges from 0 to 90, with 0 representing no heaping, and 90 indicating that all heaping ends in the same digit (Myers, 1940). Digit preference is considered low if the Myers’ index is less than 10, moderate if between 10 and 19, and high if equal to or greater than 20 (Institute for Resource Development, 1990). The Myers’ index for number of lifetime vaginal sex partners for our sample was 16.77, indicating a moderate presence of digit preference. In order to overcome this (Cherry & Poston, 2011), we recoded this measure into an ordinal variable: 1 partner, 2 to 5 partners (reference category), 6 to 10 partners, 11 to 15 partners, and 16 or more partners.

Control variables

Respondent socio-demographic variables are taken from the Wave I in-home interview and include *gender*, *race/ethnicity*, and *age*. *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. *Age* is measured at Wave IV and is continuous. Socio-economic background variables are taken from Wave I and include parental income and parental education. *Parental income* is continuous and is measured in thousands of dollars. Although cases missing parent data on income ($n = 971$) were assigned the median value (\$40,000), an indicator of missing income is included in the analyses. *Highest educational attainment achieved by a parent* (by either the mother or father) is measured with four dummy variables – less than high school (reference category), high school, more than high school, and missing education data. *Childhood family structure* was constructed from Add Health's household roster at Wave I and is measured with two dummy variables – two-parent family (i.e. two-biological parent, step-parent, and adoptive parent families) and other family type (reference category).

Respondents' own income and education are taken from the Wave IV in-home interview. *Respondent income* is measured with five dummy variables that capture total household income – less than \$20,000 (reference category), \$20-\$49,999, \$50-\$74,999, \$75,000 or more, and missing income data. *Respondent Education* is measured with six dummy indicators that capture educational attainment to date – less than high school (reference category), high school diploma/GED, vocational schooling, some college, college degree, and post- baccalaureate.

A binary measure was created to determine whether the respondent had *experienced forced sexual relations* using two questions from the Wave IV in-home interview. The first

question is a binary indicator (1 = yes, 0 = no) and asked respondents “Have you ever been physically forced to have any type of sexual activity against your will? Do not include any experiences with a parent or adult caregiver.” In order to also account for forced sexual experiences with a parent/caregiver, we utilize 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?” Responses to this question ranged from 0 (this has never happened) to 5 (more than ten times). If respondents answered yes to the first question or one time or more on the second question, they were coded as having experienced forced sexual relations. This measure is included to control for the possibility that some of the detrimental effects of vaginal sex engagement, particularly at an early age, might be due to non-consensual activity.

Given that youth who engage in romantic relationships tend to enter into sexual activity at an earlier age than their non-dating counterparts (DeRosa et al., 2010), and early experience with intimate relationships might also be related long-term well-being outcomes, we include a binary measure of whether respondents had been in a *romantic relationship* at Wave I. This measure was constructed from a question that directly asked respondents about their involvement in romantic relationships within the past 18 months and from responses to a set of additional questions regarding behaviors that are indicative of a romantic relationship, including hand holding, kissing, and telling another person that they like or love them. Following the convention set by others utilizing Add Health, if respondents responded yes to any of these questions, even if they did not consider their relationship to be “romantic,” they were coded as having been in a recent relationship (Carver, Joyner, & Udry, 2003). Finally, because union formation is associated with sexual initiation timing (Harden 2012) and is protective against drinking

behaviors (Duncan, Wilkerson, & England 2006), we include a control for whether the respondent reported ever being married by Wave IV (1 = yes, 0 = no).

Statistical Analyses

Weighted percentages and means are used to descriptively examine the sample characteristics, as well as differences in the prevalence of binge drinking behavior among respondents by timing of vaginal sex initiation and lifetime number of vaginal sex partners. Binary logistic regression is used to estimate the effects of sexual initiation timing on the likelihood of experiencing binge drinking during young adulthood and to examine the moderating role of number of vaginal sex partners. Because of interactions found between gender and number of sexual partners, all models were run separately for women and men. Analyses were conducted using Stata-SE, version 13.0, and applied survey commands to adjust for design and sampling weights.

Results

Descriptive Findings

--- Table 1 here ---

Table 1 displays the percentages/means of all variables for women (2,802) and men (2,081) separately. Among young adults who have engaged in vaginal sex, women are slightly more likely than men to report that they transitioned to vaginal sex at an early age (between ages 10 and 14) (6.4% vs. 5.7%) or a normative age (between ages 15 and 18) (63.3% vs. 61.4%, respectively), and less likely to report that they transitioned to vaginal sex after age 18 (30.4% and 32.9%).

Women tend to report fewer sexual partners than men. Approximately 18% of women and 14% of men have had only 1 vaginal sex partner by their mid-twenties and early thirties. Women also are slightly more likely than men to report 2 to 5 sexual partners (39% vs. 33.5%,

respectively). The proportion of women and men who report having 6 to 10 partners (25.2% and 24%, respectively) and 11 to 15 sexual partners (8.8% vs. 9.8%, respectively) are relatively similar. Yet, a significantly larger proportion of men than women have had 16 or more vaginal sex partners by young adulthood (18.5% vs. 9.2%, respectively).

In terms of background characteristics measured at Wave I, the sample is predominantly comprised of White women and men from a middle class background, as indicated by parental education and income. The majority of respondents also lived in a two-parent family during childhood (i.e. two-biological parent, step-parent, and adoptive parent families). Although the socio-demographic characteristics of female respondents and male respondents are very similar overall, we do see that the male subsample has a slightly lower racial/ethnic minority representation. This may reflect, in part, our exclusion of the earliest transitioners (those who had engaged in vaginal sex prior to Wave I) from the sample. Indeed, previous research shows that Black men and Hispanic men transition to vaginal sex earlier than Black women and Hispanic women, respectively (Upchurch, Levy-Storms, Sucoff, & Aneshensel, 1998). Approximately half of women and men reported at Wave I that they already had engaged in a romantic relationship (50.2% and 49.5%, respectively). Experience with drinking prior to the initiation of vaginal sex was also quite common among this sample, with roughly 29% of women and 34% of men reporting having engaged in this behavior.

At Wave IV, respondents were on average 28 years old, with a vast majority attaining at least some college education and earning mid-to-high levels of income (\$50,000+ per year). Respondents also reported retrospectively on experiences of forced sexual relations and, as expected, large gender differences emerged. Forced sexual relations were almost five times more likely to be reported by women (approximately 14%) than by men (approximately 3%). Women

also are more likely than men to report ever being married by Wave IV (53.6% vs. 41.5%, respectively). Finally, a larger proportion of men than women have engaged in recent binge drinking during their mid-twenties and early thirties (28.8% vs. 16%, respectively).

--- Table 2 here ---

Table 2 presents descriptive statistics of binge drinking behavior by timing of vaginal sex initiation and number of vaginal sex partners among women (Panel 1) and men (Panel 2).

Overall, the table indicates that binge drinking during young adulthood is not uncommon but is also not reported by the majority of respondents. Men are much more likely than women, though, to report having engaged in this behavior. A marginally significant bivariate association emerges between timing of vaginal sex and binge drinking, but only for men ($p \leq .10$). Binge drinking is significantly less common among men who initiated vaginal sex at a late age than at a normative or early age (24.1% vs. 31% and 32.2%).

Table 2 also shows that women and men with more vaginal sex partners are significantly more likely to experience binge drinking in their mid-twenties and early thirties. Among both women and men, binge drinking is most commonly reported among those with 16 or more vaginal sex partners, and is least commonly reported among those with only 1 partner.

--- Table 3 here ---

Table 3 shows a cross-tabulation of respondents' initiation timing of first vaginal sex and number of vaginal sex partners, with weighted total percentages and cell counts. Beginning with women (Panel 1), the two most common combinations of sexual experiences include those who transitioned to first vaginal sex at a normative age and report 2 to 5 partners (25.4%) and those who transitioned to first vaginal sex at a normative age and report 6 to 10 partners (18.1%). The next most common groups of women are those who report initiating vaginal sex at a late age and only 1 partner (11.8%) and those who report initiating at a late age and 2 to 5 partners (12%). It

is very uncommon for women to initiate vaginal sex at an early age and to report few sexual partners (e.g. 0.2% report early transition and only 1 partner, 1.6% report 2-5 partners) or to initiate vaginal sex at a late age and to report large numbers of sexual partners (e.g. 0.9% report late transition and 11-15 partners, 0.9% report 16+ partners).

Similar patterns of sexual experiences are found among men (Panel 2). The largest groups are comprised of men who transitioned to vaginal sex at a normative age and report 2 to 5 partners (19%) or 6 to 10 partners (16.8%). The next largest groups of men include those who report initiating sex at a normative age and having 16 or more partners (14.6%) and those who report initiating sex at a late age and having 2 to 5 partners (13.7%). Roughly 10% of men transitioned to vaginal sex at a late age and report only 1 partner. As with women, the combination of early initiation and few partners is very uncommon for men (e.g. 0 men report early transition and 1 partner, 0.7% report 2-5 partners). The combination of late initiation and numerous partners is also very rare, although less so than is the case for women (e.g. 1.8% report late transition and 11-15 partners, 1.9% report 16+ partners).

Multivariate Findings

--- Table 4 here ---

Table 4 displays the logistic regression estimates (odds ratios) of several nested models predicting recent binge drinking for young adult women. Model 1 shows that, net of basic socio-demographic characteristics, timing of vaginal sex initiation does not significantly predict binge drinking during women's mid-twenties and early thirties. However, in Model 2 we find that, compared to those who report 2 to 5 sex partners, women with 6 to 10 partners and women with 11 to 15 partners are over two times more likely to engage in binge drinking. Moreover, women with 16 or more partners have over three times greater odds of binge drinking compared to those with 2 to 5 partners. There is no significant difference between women who report 2 to 5 partners

and those who report only one.

In terms of the direct effect of the control variables in this model, we find that Black women (compared to White women), older women, those who report an experience of forced sexual relations, and those who report ever marrying are less likely to report binge drinking during young adulthood. On the other hand, women who report experience with drinking prior to vaginal sex and those of “other” race/ethnicities, as well as those with the highest levels of income (\$75,000+ per year), report higher odds of engaging in binge drinking in their mid-twenties and early thirties. Model 3 adds a measure to capture the interaction between timing of vaginal sex initiation and number of lifetime vaginal sex partners, but no significant findings emerge.

--- Table 5 here ---

--- Figure 1 here ---

Table 5 presents the logistic regression estimates (odds ratios) of several nested models predicting binge drinking for men. Contrary to the findings for women, Model 1 shows that timing of vaginal sex initiation exerts a significant effect on binge drinking for men, net of basic background factors. Compared their peers who initiated vaginal sex at a normative age, men who transitioned to vaginal sex after age 18 face 35% lower odds of experiencing binge drinking in young adulthood. This effect is mediated to non-significance (and an odds ratio of 1.00), however, when controlling for number of sexual partners in Model 2. Similar to women, men with 6 to 10 partners, 11 to 15 partners, and 16 or more partners have 69%, 126%, 144% higher odds, respectively, of engaging in binge drinking than their male peers with 2 to 5 partners. Unlike women, though, having only 1 vaginal sex partner is actually protective of men’s drinking behaviors in young adulthood, such that those with only 1 partner, have 61% lower odds of binge

drinking than those with 2 to 5 partners.

Briefly considering the other covariates in this model, we find that Black and Hispanic men (compared to White men), older men, and those who have ever married are less likely to engage in binge drinking than their peers. In addition, reporting experience with drinking prior to sexual initiation, as well as completing a vocational school program after high school (compared to having less than a high school degree) is associated with higher odds of engaging in binge drinking.

Finally, contrary to the findings for women, a significant interaction emerges between men's timing of vaginal sex initiation and number of partners in Model 3. This effect is illustrated in Figure 1. Men who initiate vaginal sex at a late age and have 11 to 15 partners are over three times more likely to report binge drinking ($Pr=0.48$) than those who engage in vaginal sex at a normative age and have only 2 to 5 partners ($Pr=0.16$).

Discussion

Using a nationally representative sample of young adults, we examine the effects of timing of vaginal sex initiation and number of lifetime vaginal sex partners, both separately and in combination, on the likelihood of binge drinking in women and men's mid-twenties and early thirties. Our results speak to a large body of research documenting the impact of sexual experiences on negative health-risk behaviors.

The findings of this study reveal that engagement in vaginal sex with multiple partners is normative among young adults in America, and binge drinking is not uncommon. The average young adult in America reports initiating sex between the ages of 15 and 18. Given methodological constraints and theoretical considerations, the analytic sample used in this paper excludes young adults who had not yet had vaginal sex, those who had transitioned prior to the

first wave of data collection, and those who transitioned before the age of 10. Among those in the analytic sample, roughly 6% of both women and men transitioned to vaginal sex before the age of 15 and almost one-third transitioned to vaginal sex after the age of 18. Thus, the analytic sample does lose some of the earliest transitioners. Yet, even so, the vast majority of women (82%) and men (86%) in our sample report having had multiple partners by their mid twenties and early thirties, with the most commonly reported numbers falling within the 2 to 5 partner (39% women, 34% men) and 6 to 10 partner (25% women, 24% men) ranges. While the majority of respondents do not report having engaged in recent binge drinking behavior, a non-trivial percentage of women (16%) and men (29%) do.

Although some prior studies show that timing of sexual initiation is associated with drinking behaviors (Makenzius & Larsson, 2012; Olesen, et al., 2012), the multivariate findings of this study indicate that timing of first vaginal sex does not exert a significant direct effect on binge drinking in young adulthood once basic background characteristics and number of lifetime sex partners are taken into consideration. Several explanations may exist for these inconsistent findings. First, these differences may reflect the cross-sectional nature of previous studies, highlighting a significant association between these measures, rather than establishing a causal relationship. Thus, the use of longitudinal data, which allows us to account for drinking behaviors prior to sexual experiences, is essential to this area of study to better understand the effect of sexual initiation and number of sexual partners on subsequent drinking. Second, these inconsistent findings may result from previous studies examining sexual initiation and drinking with samples of youth outside of the United States (Makenzius & Larsson, 2012; Olesen, et al., 2012). Future research should replicate this study with American youth.

Evidence of a significant association between number of sexual partners and drinking,

however, is consistent with that of previous studies (Ramrakha, Paul, Bell, Dickson, Moffitt, & Caspi, 2013). Specifically, we find that among both women and men, those with more than 5 partners are more likely to engage in binge drinking than their peers with between 2 and 5 partners. No significant differences emerge between women who report 2 to 5 partners and those who report only 1. Among men, though, we find that those who report only 1 partner are significantly less likely to engage in binge drinking than those with between 2 and 5 partners. Thus, for women, it is only when the number of partners is above average that we see an increased risk of engaging in binge drinking during young adulthood. For men, there appears to be a more linear relationship between number of partners and the risk of binge drinking.

Research shows that individuals sometimes turn to drinking as a way to cope with negative emotions (Cooper, Shapiro, & Powers, 1998). As such, young individuals involved in larger numbers of sexual partnerships during the transition to adulthood may turn to drinking in order to alleviate negative emotions associated with changing sexual partners. Individuals may use alcohol to cope with negative or stressful emotions related to the frequent introduction and loss of partners, as well as any negative feelings associated with sexual encounters that take place outside the context of a committed relationship. Because girls report fewer sex partners than boys, on average (Kreager & Staff, 2009; Martinez, Copen, & Abma, 2011; Petersen & Hyde, 2010), it may be that young men who accrue only one sex partner by the time they reach their mid-twenties and early thirties are a more selective group than young women who report the same. Men with only one partner may have higher levels of religiosity, and consequently more conservative attitudes about sexual activity, which in turn may extend to other types of health-related behaviors, such as binge drinking.

To our knowledge, prior research has not examined whether the link between timing of

sexual initiation and binge drinking is conditioned by number of sexual partners. Considering how different types of sexual-risk behaviors simultaneously affect health related behaviors, rather than focusing on the implications of a single sexual-risk factor, is important, as it is unlikely that any one behavior in and of itself influences subsequent outcomes. In this study we find a significant interaction between timing and number of partners for men, but not women. Men who initiated sex at a late age (>18 years) and report 11 to 15 lifetime sex partners have a significantly greater likelihood of binge drinking compared to men who initiated sex at a normative age (between 15 and 18 years) and report fewer partners. It may be that “compressed” sexual trajectories consisting of late entry into sexual activity and the rapid introduction of many new partners actually place individuals at a greater risk for binge drinking during young adulthood than would earlier entry into sexual activity with a more gradual pace of partner accumulation. We urge future researchers to consider multiple components of sexual risk influence health-related behaviors.

Furthermore, the significance of our interaction term for men, but not women, highlights the importance of studying these associations by gender. Many studies find that girls are more adversely affected by engaging in sexual behaviors than men (Hallfors, Waller, Bauer, Ford, & Halpern, 2005; Makenzius & Larsson, 2012; Ramrakha, Paul, Bell, Dickson, Moffitt, & Caspi, 2013; Spriggs & Halpern, 2008; Windle, Mun, & Windle, 2005). Although our findings show that for women and men, young adult binge drinking behaviors are sensitive to their accumulation of sexual partners, the combination of sexual initiation at a late age and having a high number of sexual partners, specifically 11 to 15 partners, is particularly detrimental to the drinking behaviors of men. Fewer significant effects of sexual behavior and the binge drinking behavior of women may be a result of gender differences in coping mechanisms associated with

the stress and negative emotions of sexual initiation timing and number of sexual partners.

Because women are more likely to exhibit internalized behaviors and men are more likely to exhibit externalized behaviors (Simon, 2002), we may not be capturing responses to stressful or emotional situations among female respondents. Future studies should replicate this study with other health-related outcomes and behaviors, such as depression and disordered eating. This finding may also reflect the gendered sexual norms among American youth, proscribing sexual engagement more so for girls than boys (Milhausen & Herold, 1999). It may be that men who engage in vaginal sex at a later age feel pressured to “catch up” to their peers in terms of the number of sexual partners they have had. This pressure, in turn, may cause men greater levels of distress, leading them to drink more heavily.

Strengths and Limitations

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, to establish temporal ordering and to adequately control for respondents’ drinking behaviors prior to their initiation of vaginal sex, respondents who reported having ever engaged in vaginal sex by Wave I and respondents who reported have never engaged in vaginal sex were excluded from the analytic sample. Although categories of timing were created using the full sample, and previous research has used this approach (Armour & Haynie, 2007; Bearman & Brückner, 2001; Meier, 2004), 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. Second, retrospective reports of age at first vaginal sex 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 vaginal intercourse (Goldberg, Haydon, Herring, & Halpern, 2014), suggesting that our use of age at first vaginal sex 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. Finally, at Wave IV, respondents were not asked specifically about the number of partners they had ever engaged in oral sex with. 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 even 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 number of oral sex partners similarly influences drinking behaviors.

Despite these limitations, the current study has several strengths and thus, makes a number of important contributions. 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 direction and causality (Cavazos-Rehg, Krauss, Spitznagel, Schootman, Cottler, & Bierut, 2011), limiting our understanding of this relationship. Moreover, these studies are unable to account for prior drinking behaviors. Our data allows us to control for whether or not the respondent had engaged in drinking behaviors prior to the wave in which they initiated vaginal sex, allowing us to draw temporal inferences about this association. In addition, many recent studies that examine the association between sexual behaviors and drinking are based on samples outside of the United States (Makenzius & Larsson, 2012; Ramrakha, Paul, Bell, Dickson, Moffitt, & Caspi, 2013), and therefore are not generalizable to the experiences of young individuals in this country.

Conclusion

In sum, despite prior research that suggests a protective effect of delayed sexual initiation on some behavioral and health outcomes during adolescence (Sandfort, Orr, Hirsch, & Santelli, 2008), the findings presented here suggest that timing of sexual initiation in and of itself may not exert an enduring effect on drinking outcomes during young adulthood. Specifically, timing of vaginal sex initiation does not significantly affect the likelihood of binge drinking in women and men's late twenties and early thirties. Rather, the accumulation of many sexual partners appears to be much more strongly related to drinking behavior than the age at which individuals begin their sexual trajectories. In fact, those at highest risk for binge drinking appear to be men who transitioned to vaginal sex at a late age (after age 18), but accumulated a high number of sexual partners (11-15 partners) in a relatively short time.

As a result, recent public policy efforts that have been aimed at delaying sexual initiation and promoting sexual abstinence among adolescents (Santelli, Ott, Lyon, Rogers, Summers, & Schleifer, 2006) in an attempt to reduce negative health-related outcomes may not be appropriately targeted. Prevention efforts should focus on other potentially risky sexual behaviors, such as the accumulation of many sexual partners throughout the course of adolescence and early adulthood. Targeting young individuals who accumulate multiple sexual partners, in particular those who accumulate multiple partners in a short period of time, may be particularly important to help reduce binge drinking behaviors in young adults.

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Table 1: Percentages/Mean of Study Variables, by Gender

Variable	Women (<i>n</i> = 2,802) % or mean	Men (<i>n</i> = 2,081) % or mean
Timing of first vaginal sex		
Early, 10-14	6.4	5.7
Normative, 15-18	63.3	61.4
Late, >18	30.4	32.9
Number of vaginal sex partners		
1 partner	17.9	14.2
2-5 partners	39.0	33.5
6-10 partners	25.2	24.0
11-15 partners	8.8	9.8
16+ partners	9.2	18.5
Experience with drinking prior to vaginal sex	29.1	33.5
Race		
White	69.4	73.7
Black	11.4	7.7
Hispanic	13.0	10.3
Asian	4.2	4.3
Other	2.0	4.0
Two-parent family	78.8	81.1
Parent education		
Less than high school	10.1	7.6
High school	28.5	26.4
More than high school	58.3	62.3
Missing education data	3.1	3.7
Parent income (0-999)	\$48,358	\$49,038
Parent income data missing	18.3	15.9
Romantic relationship by Wave I	50.2	49.5
Age at Wave IV	28.0	28.0
Respondent education by Wave IV		
Less than high school	4.5	5.9
High school diploma	11.3	15.4
Vocational school	8.1	8.1
Some college	34.5	33.6
College	25.0	24.8
Post-baccalaureate	16.6	12.2
Respondent income by Wave IV		
Less than \$20,000	10.8	7.6
\$20,000-\$49,999	30.6	30.7
\$50,000-\$74,999	23.6	23.3
\$75,000+	28.5	33.5
Missing income data	6.4	4.9
Ever experienced forced sexual relations	14.3	3.0
Ever married	53.6	41.5
Binge drinking at Wave IV	16.0	28.8

Note: Total percents may not equal 100 due to rounding.

Table 2: Binge Drinking Behavior by Timing of First Vaginal Sex and Number of Vaginal Sex Partners

	Did not engage in binge drinking	Engaged in binge drinking
Panel 1: Women (<i>n</i> = 2,802)		
Timing of first vaginal sex		
Early, 10-14	83.3	16.7
Normative, 15-18	83.2	16.8
Late, >18	85.9	14.1
Number of vaginal sex partners ^{***}		
1 partner	92.5	7.5
2-5 partners	89.6	10.4
6-10 partners	78.3	21.7
11-15 partners	73.1	26.9
16+ partners	70.5	29.5
	Did not engage in binge drinking	Engaged in binge
Panel 2: Men (<i>n</i> = 2,081)		
Timing of First Vaginal Sex [†]		
Early, 10-14	67.8	32.2
Normative, 15-18	69.0	31.0
Late, >18	75.9	24.1
Number of vaginal sex partners ^{***}		
1 partner	91.5	8.6
2-5 partners	77.5	22.5
6-10 partners	67.8	32.3
11-15 partners	58.4	41.6
16+ partners	55.4	44.6

Note: Significance tests indicate that binge drinking varies by sexual behavior variables

(^{***} $p \leq .001$; [†] $p \leq .10$)

Table 3: Weighted Total Percentages and Cell Counts, Sexual Behavior Variables

Panel 1: Women ($n = 2,802$)

	Number of vaginal sex partners				
	1	2-5	6-10	11-15	16+
Timing of first vaginal sex					
Early (10-14)	0.2 (4)	1.6 (36)	2.2 (48)	1.2 (20)	1.1 (32)
Normative (15-18)	5.9 (180)	25.4 (722)	18.1 (478)	6.7 (169)	7.2 (187)
Late (>18)	11.8 (361)	12.0 (373)	4.8 (130)	0.9 (35)	0.9 (27)

Panel 2: Men ($n = 2,081$)

	Number of vaginal sex partners				
	1	2-5	6-10	11-15	16+
Timing of first vaginal sex					
Early (10-14)	0.0 (0)	0.7 (11)	1.9 (26)	1.1 (15)	2.0 (29)
Normative (15-18)	4.1 (98)	19.0 (419)	16.8 (338)	6.9 (135)	14.6 (271)
Late (>18)	10.1 (245)	13.7 (289)	5.4 (122)	1.8 (40)	1.9 (43)

Note: Total percents may not equal 100 due to rounding.
Weighted cell counts shown in parentheses.

Table 4: Logistic Regression Estimates Predicting Binge Drinking, Women (n = 2,802)

	Model 1	Model 2	Model 3
	OR	OR	OR
Timing of first vaginal sex (ref = Normative, 15-18)			
Early, 10-14	0.75	0.61 ⁺	1.27
Late, >18	0.77	1.12	0.94
Number of vaginal sex partners (ref = 2-5 partners)			
1 partner		0.75	0.87
6-10 partners		2.24 ^{***}	2.07 ^{***}
11-15 partners		2.65 ^{***}	2.42 ^{**}
16+ partners		3.20 ^{***}	3.28 ^{***}
Experience with drinking prior to vaginal sex	1.90 ^{***}	1.77 ^{***}	0.18 ^{***}
Race (ref = White)			
Black	0.16 ^{***}	0.17 ^{***}	0.18 ^{***}
Hispanic	1.00	1.12	1.15
Asian	0.76	0.83	0.81
Other	2.81 ^{**}	2.85 ^{**}	2.98 ^{**}
Age at Wave IV	0.86 ^{**}	0.85 ^{**}	0.85 ^{**}
Two-parent family	0.83	0.84	0.85
Parent education (ref = < High school)			
High school diploma	1.30	1.18	1.19
More than high school	1.67 ⁺	1.38	1.41
Missing education data	0.47	0.45	0.47
Parent income (0-999)	1.00 ⁺	1.00	1.00
Parent income data missing	0.94	1.00	1.01
Romantic relationship by Wave I	1.35 ⁺	1.35 ⁺	1.36 ⁺
Respondent education by Wave IV (ref = < High school)			
High school diploma	2.03	1.84	1.92
Vocational school	2.56 ⁺	2.07	2.08
Some college	1.74	1.46	1.51
College	2.11	1.90	1.96
Post-baccalaureate	2.45 ⁺	2.23	2.32
Respondent income by Wave IV (ref = < \$20,000)			
\$20,000-\$49,999	1.56 ⁺	1.57 ⁺	1.54 ⁺
\$50,000-\$74,999	1.15	1.17	1.14
\$75,000+	1.87 ^{**}	1.98 ^{**}	1.95 ^{**}
Missing income data	1.05	0.99	0.98
Ever experienced forced sexual relations	0.70 ⁺	0.60 [*]	0.62 [*]
Ever married	0.38 ^{***}	0.49 ^{***}	0.49 ^{***}
Interactions (ref = Normative vaginal sex*2-5 partners)			
Early vaginal sex*1 partner			n/a
Early vaginal sex*6-10 partners			0.34
Early vaginal sex*11-15 partners			0.83
Early vaginal sex*16+ partners			0.27
Late vaginal sex*1 partner			0.93
Late vaginal sex*6-10 partners			1.62
Late vaginal sex*11-15 partners			1.01
Late vaginal sex*16+ partners			1.22

⁺ $p \leq .10$; ^{*} $p \leq .05$; ^{**} $p \leq .01$; ^{***} $p \leq .001$

Table 5: Logistic Regression Estimates Predicting Binge Drinking, Men (n = 2,081)

	Model 1	Model 2	Model 3
	OR	OR	OR
Timing of first vaginal sex (ref = Normative, 15-18)			
Early, 10-14	0.95	0.78	1.71
Late, >18	0.65**	1.00	1.05
Number of vaginal sex partners (ref = 2-5 partners)			
1 partner		0.39**	0.57
6-10 partners		1.69**	1.87**
11-15 partners		2.26***	1.76*
16+ partners		2.44***	2.72***
Experience with drinking prior to vaginal sex	2.12***	1.98***	2.02***
Race (ref = White)			
Black	0.46**	0.42***	0.43***
Hispanic	0.53**	0.58*	0.57*
Asian	0.58	0.68	0.66
Other	0.47 ⁺	0.48 ⁺	0.46 ⁺
Age at Wave IV	0.82***	0.82***	0.82***
Two-parent family	0.98	0.97	0.99
Parent education (ref = < High school)			
High school diploma	1.82	1.67	1.64
More than high school	1.37	1.28	1.28
Missing education data	1.39	1.24	1.30
Parent income (0-999)	1.00**	1.00**	1.00**
Parent income data missing	1.21	1.24	1.21
Romantic relationship by Wave I	1.03	0.88	0.90
Respondent education by Wave IV (ref = < High school)			
High school diploma	1.98 ⁺	2.05 ⁺	2.15*
Vocational school	2.33*	2.27*	2.46*
Some college	1.79 ⁺	1.70	1.78
College	1.47	1.48	1.54
Post-baccalaureate	1.43	1.46	1.51
Respondent income by Wave IV (ref = < \$20,000)			
\$20,000-\$49,999	0.92	0.96	0.93
\$50,000-\$74,999	1.00	1.11	1.09
\$75,000+	1.25	1.37	0.34
Missing income data	0.82	0.94	0.94
Ever experienced forced sexual relations	0.32 ⁺	0.31 ⁺	0.31 ⁺
Ever married	0.29***	0.37***	0.37***
Interactions (ref = Normative vaginal sex*2-5 partners)			
Early vaginal sex*1 partner			n/a
Early vaginal sex*6-10 partners			0.36
Early vaginal sex*11-15 partners			0.79
Early vaginal sex*16+ partners			0.34
Late vaginal sex*1 partner			0.59
Late vaginal sex*6-10 partners			0.78
Late vaginal sex*11-15 partners			3.19*
Late vaginal sex*16+ partners			0.63

⁺ $p \leq .10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Figure 1:
Adjusted Probability of Binge Drinking by Timing of Sexual Initiation and Number of
Vaginal Sex Partners Among Men (n = 2,801)

