

Original article

Gender, Mature Appearance, Alcohol Use, and Dating as Correlates of Sexual Partner Accumulation from Ages 16–26 Years

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Abstract

Purpose: To determine growth in sexual partnering from age 16–26 years, and to test whether biological and social factors launched these growth patterns.

Methods: A prospective design was used. Participants were 176 young people (47% female) followed from birth to age 26 years. Sexual partnering was measured as the accumulated number of different sexual intercourse partners at ages 16, 19, 23, and 26 years. Physical appearance of maturity, alcohol use, and dating were measured at ages 13–16 via observations, interviews, and questionnaires.

Results: Mature appearance at age 13 years, use of alcohol more than monthly at age 16, and a history of a steady romantic partner before age 16 were each associated with a greater number of sexual intercourse partners by age 16. However a more mature appearance, more frequent alcohol use, and greater dating involvement did not foreshadow a steeper accumulation of sexual partners between ages 16 and 26. Only gender had such a “growth” influence, with males accruing sexual partners more rapidly from the ages of 16–26 years when compared with females.

Conclusions: Adolescents had accumulated a higher number of sexual partners by age 16 years when they looked older, drank alcohol more frequently, and were more involved with dating in early to middle adolescence. Also male gender was associated with accumulation of sexual partners more rapidly between ages 16 and 26 years, and there was little indication that the accumulation of different sexual partners had begun to slow by age 26 for the average participant. © 2008 Society for Adolescent Medicine. All rights reserved.

Keywords:

Sexual behavior; Dating; Longitudinal studies; Substance use; Pubertal maturation; Adolescent development; Emerging adulthood; Peer relationships

In the current longitudinal study, we had two aims. The first was to determine patterns of sexual partnering across an 11-year period (ages 16–26 years). Sexual partnering was measured as the accumulated number of partners and was assessed at ages 16, 19, 23, and 26 years. We focused on the ages of 16–26 years because late adolescence and emerging adulthood are times when sexual partner changes peak for most people. The second aim was to investigate gender, physical maturation, alcohol use, and dating as individual difference factors that launch age-related growth trajectories

of sexual partnering. A “launch” effect has been defined as a factor that is in place before or at the start of a developmental progression and is associated with growth over time [1]. The selection of biological and social factors was founded in theories [2–5] and empirical evidence [6–9] that draw attention to their importance for predicting sexual behavior patterns.

Early sexual debut, a higher number of different sexual partners, and inconsistent condom use increase the risk of sexually transmitted infections (STIs) and unintended pregnancy, and these risk behaviors have been found to co-vary during adolescence [10–12]. Age at first sexual intercourse has been positively associated with the number of sexual partners reported by adolescents. In two studies, having first sex by age 15 or 16 years was associated with the number

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of sexual partners accumulated by age 15 years [13] or age 14–17 years [14], respectively. Despite this association, in developmental studies of adolescent sexual behavior, investigating the correlates of sexual intercourse debut (particularly early debut defined as before age 15 or 16 and/or defined relative to the sample [15–17]) has had precedence over studying the accumulation of different sexual partners over time [8,9].

There have only been a small number of longitudinal studies on the antecedents and correlates of “sexual partnering” [18–21]. To our knowledge, repeated assessments of the number of adolescents’ different sexual intercourse partners over time were analyzed in only one of these studies. Tubman et al [20] followed more than 1000 participants from the age of 16 to 18 years. In their sample of U.S. adolescents living in suburban New York, 3% of males and 2% of females had at least four sexual partners by age 16, and 10% of males and 6% of females had at least four sexual partners by age 18 years. Groups with different patterns of sexual partnering were identified and compared. The groups with multiple sexual intercourse partners had elevated behavioral, social, and emotional problems compared with other groups. This provided information about patterns of sexual intercourse and partner switching during adolescence, as well as the risks associated with accumulating a higher number of sexual partners during adolescence. However the study was limited to 2 years of follow-up, did not examine growth patterns of sexual partnering over time, and grouped adolescents for comparison rather than modeling early correlates of sexual partnering trajectories. This means that there is little available information on patterns of sexual partnering over more than a 2-year period, and there has been no investigation of the predictors of sexual partnering growth trajectories. The accumulation of different sexual partners is an important behavior because of its links with other sexual risk-taking behavior [19–22] as well as its potential to increase exposure to physical health problems such as sexually transmitted infections [23,24], and to influence social, emotional, and economic problems [20,25,26].

In the current study, the average pattern of sexual partnering from age 16–26 was estimated using growth curve modeling. We also had four hypotheses regarding how sexual partnering trajectories would be associated with gender, physical maturation, alcohol use, and the formation of couple relationships (i.e., dating behavior). Although other correlates of adolescent sexual behavior have been identified [6–9], these four factors were expected to predict sexual partnering patterns over time, because they were identified in a recent review as consistently associated with adolescent sexual debut even after accounting for many other potential covariates [9].

In the first hypothesis, boys were expected to have accumulated more sexual partners by age 16 years than girls (a gender difference in age 16 intercepts) and to accumulate

partners more rapidly than girls from ages 16–26 (a gender difference in slopes of growth trajectories). Males have been found to accrue a higher number of sexual intercourse partners during adolescence when compared with females, but there have been few studies and the evidence is not consistent [13,27].

In the second hypothesis, a more mature physical appearance at age 13 years was expected to predict sexual partnering trajectories. Adolescents who appear more physically mature than others can prompt responses from the social environment that include opportunities for romantic and sexual behavior [10,28]. Yet we could find no previous study of associations between maturity of appearance (or pubertal maturation) and number of sexual partners in adolescence. This was surprising, given the theories that emphasize pubertal development and related aspects of physical maturation for understanding sexual behavior [29,30], as well as the multiple studies that have found significant associations between pubertal timing and onset of sexual intercourse [8,9,13,14,19]. Given this literature on age of sexual intercourse debut, we expected that individuals who looked more physically mature at age 13 years would have accumulated more sexual partners at age 16 than others. Yet because there had been no previous study, it was unclear whether sexual partnering would escalate more rapidly over time for those who looked relatively more mature at age 13 compared with others.

Although previous study was still insufficient, there was evidence supporting the third hypothesis that adolescent alcohol use would be associated with a greater accumulation of sexual intercourse partners. Significant associations between alcohol use and sexual partnering have been reported [18,20,21,31]. We expected that adolescents who used alcohol more frequently than others would report a greater number of different sexual partners at age 16 and would accumulate more sexual partners over time.

Finally, one of the strongest correlates of sexual behavior during adolescence is dating [6–9]. For example, an earlier onset of the first steady couple relationship has been associated with a greater number of sexual partners at age 19 years [21]. In addition, theory suggests a link between earlier couple formation and greater accumulation of sexual partners over time [32]. Hence, compared with other adolescents, it was hypothesized that adolescents who had their first steady couple relationship before age 16 years would report more sexual partners by age 16 and accumulate more partners over time.

Methods

Participants

The 176 participants (47% female and 53% male) entered the study via recruitment of their mothers who were receiving prenatal care in the Minneapolis Health Department [33]. Most participants had Caucasian/white mothers

(85%), and other participants had black mothers (10%) or mothers from other ethnic minority groups (5%). At the time of the birth of the participants, 35% of mothers had not graduated from high school, 42% had high school diplomas, and the remainder had attended university. Of the mothers, 59% were single, 29% were married, and the others were divorced, widowed or separated. Mothers ranged in age from 15–34 years (mean 20.6 years, SD = 3.5).

Participants were firstborn children, and data were collected from birth. By the time that the participating children were 2 years of age, 212 of the original 267 families (80%) remained in the longitudinal study, with residential mobility being the primary reason for attrition before age 2 years. The 176 participants (66% of the original sample) included in this study were those who reported on their sexual behavior at age 16. There were no differences between the 176 participants and those lost to follow-up on the following variables: age of mother, mother education, socioeconomic status, single motherhood, and percent female. One difference was found; a larger percentage of retained participants had white mothers when compared with those lost to follow-up (85% and 69%, respectively; $\chi^2 = 8.7, p < .01$).

Measures

Sexual partnering. Participants repeatedly reported their lifetime number of sexual partners. Response options at age 16 years were 0 (none), 1 (one partner), 2 (two to five), 3 (six to 10), and 4 (>10). Response options at ages 19, 23, and 26 were 0 (none), 1 (one), 2 (two to five), 3 (six to 10), and 4 (11–20), and 5 (>20). Only 6% of participants reported more than 10 sexual partners at age 16, and 4% reported more than 20 sexual partners at age 26 years. All values were recoded to the lower end of the range for analyses. This recoding was done to provide growth trajectories that better represented actual numbers of sexual partners at age 16 and accrued over time, rather than growth trajectories based upon the original response scales. However the results of all analyses were similar when means values of each category or responses on the original scale were used in analyses.

Some individuals were missing data at age 19 ($n = 2$), 23 ($n = 21$), and/or 26 years ($n = 12$). These missing data were imputed based on other data for the individual subjects and data from other participants for that variable.

Appearance of physical maturity at age 13 years. Seven undergraduate and graduate students rated adolescents' physical maturity. Ratings were made after observing videotaped interaction tasks conducted when participants were age 13. Adolescents were observed standing and sitting. Voice and physical characteristics, including adult features, breast development, and body proportions, were considered in rating adolescents on a scale from 1 (very immature appearance) to 6 (very mature appearance). Extensive descriptions of each response level and practice videos were

used to anchor the ratings. The independent coders (three male and four female undergraduate students) rated each participant. Mature appearance scores were calculated by averaging the ratings of all coders. The intraclass correlation of ratings among coders ($n = 7$) was .64.

Although the intraclass correlation was lower than ideal, other analyses provided evidence of validity. First, there was some difference between male and female raters, which is reflected in this modest intraclass correlation. Despite training to anchor ratings, males rated participants as less mature than did females $t(175) = -2.9, p < .01$; yet when ratings by males were averaged separately from ratings by females, the correlation between scores was $r = .87$. Second, we had more confidence in this measure because the rating was significantly negatively correlated with age of first menstruation ($r = -.40, p < .001, n = 70$) and girls were rated as more mature than boys (girls' mean = 3.5, SD = 0.9; boys' mean = 2.7, SD = 0.9, $t(175) = 5.6, p < .01$).

To identify adolescents who appeared older, younger, or average, we formed three groups. Adolescents in the first group were in the highest quartile (physical maturity scores >3.70, $n = 47$) and appeared older than others. Adolescents in the second group were in the lowest quartile (physical maturity scores <2.30, $n = 46$) and appeared younger than others. Adolescents in the two middle quartiles comprised the third group and were labeled as average ($n = 83$). Boys had scores ranging from 1.1–5.3, with 20% in the mature group and 30% in the immature group. Girls had scores ranging from 1.4–5.7, with 31% in the mature group and 21% in the immature group.

Frequency of alcohol use at age 16 years. Adolescents reported frequency of alcohol use by answering the following question: "How often do you use the following (without a doctor telling you to)?" using the response options of 0 (never), 1 (less than monthly), 2 (monthly) 3 (more than monthly), 4 (weekly), or 5 (daily) [34]. Frequency of alcohol use was the sum of two items that assessed consumption of beer/wine in one question and consumption of hard liquor in the second question, making the possible range 0–10.

Two groups were formed to identify adolescents who used more or less alcohol at age 16 years. The first group included those who were in the top quartile of alcohol use (a score of ≥ 4 indicating monthly or more frequent alcohol use, $n = 46$). The second group included adolescents with lower levels of alcohol use at age 16 ($n = 130$).

Romantic relationship history. Participants completed audiotaped interviews about dating and romantic relationships when they were 16 years of age. Part of the interview included the collection of a history of dating, boyfriends/girlfriends, steady romantic relationships, and length of past and current romantic relationships. From this interview, we constructed a dichotomous variable to indicate whether each participant had a history of a steady couple relationship before age 16 years. The ma-

majority of participants reported a first relationship before age 16 ($n = 125$, 71%).

Procedure

At age 13 years, the primary assessment was a parent–adolescent interaction videotaped task that required attendance at the research laboratory. At ages 16, 19, 23, and 26 years, participants spent a day at the laboratory completing interviews and questionnaires; or, in minority of cases, research assistants visited their homes. Participants and their family members were provided with monetary compensation for their time.

Data analysis

The primary analyses were conducted with hierarchical linear modeling [35]. This modeling procedure accounts for the nonindependence of the repeated measures such as the measures of sexual partnering collected in the current study. In these models, time (age) was coded 0 for age 16 years, 3 for age 19, 7 for age 23, and 10 for age 26, and time and sexual partnering were modeled as level 1 variables nested within participant, a level 2 variable. We also tested for curvilinear patterns over time (e.g., a steeper incline earlier than later or *vice versa*) by entering time-squared as a covariate. When time-squared was regressed on the repeated measure of number of sexual partners, the association was not significant ($p = .45$). This indicated that there was not, in fact, a more rapid accumulation of partners, either earlier or later, between the ages of 16 and 26 years in this sample.

Hence time-squared was not included as a covariate in the main models.

The results of four mixed models are reported. One model was used to test each of the four study hypotheses. The first model compared patterns of sexual partnering between males and females. After accounting for differences between males and females, the final three models compared patterns of sexual partnering between participants who (1) looked younger, average, or older than others at age 13 years; (2) used more or less alcohol at age 16 years; and (3) had or had not formed a steady couple relationship at age 16 years, respectively.

Results

Patterns of sexual partnering over time for males and females

Figure 1 depicts observed patterns over time. Model estimates showed that males and females reported an average of ~ 1.79 and ~ 1.06 sexual partners at age 16 years, respectively, and this was not a significant gender difference ($p = .11$). On average, males had more rapid accumulation of sexual partners than females, with males accumulating an average of about 1.04 and females accumulating .70 new partners per year (i.e., about two partners every 3 years) from age 16–26 years ($p < .05$).

White and nonwhite participants also were compared, but when gender was accounted for there were no significant differences in intercepts or slopes between these two

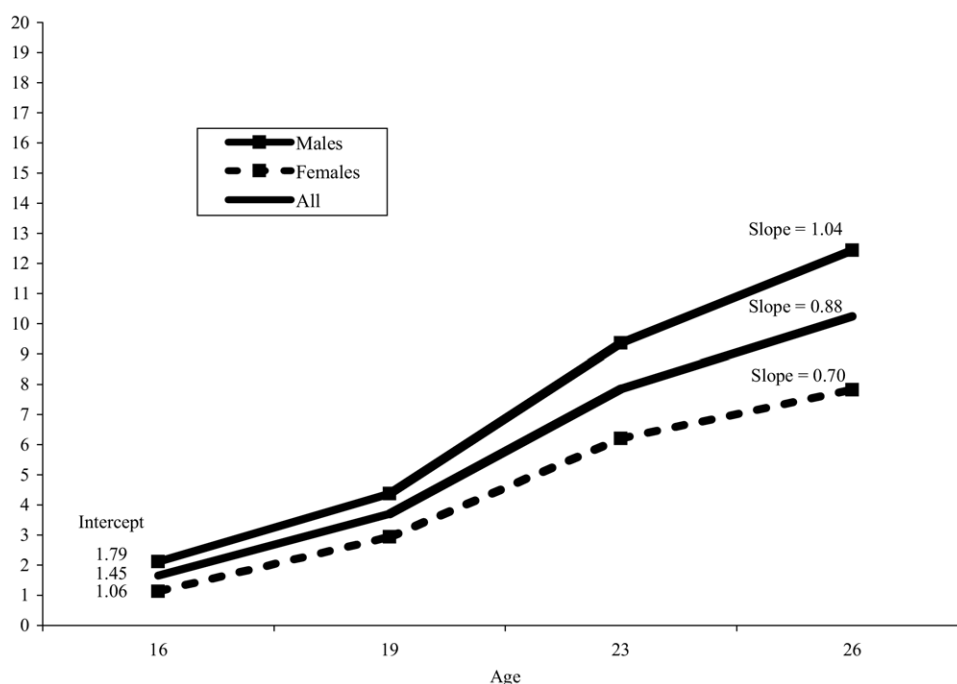


Figure 1. Average intercepts, slopes and patterns of sexual intercourse partnering from ages 16–26 years for all participants and for males and females.

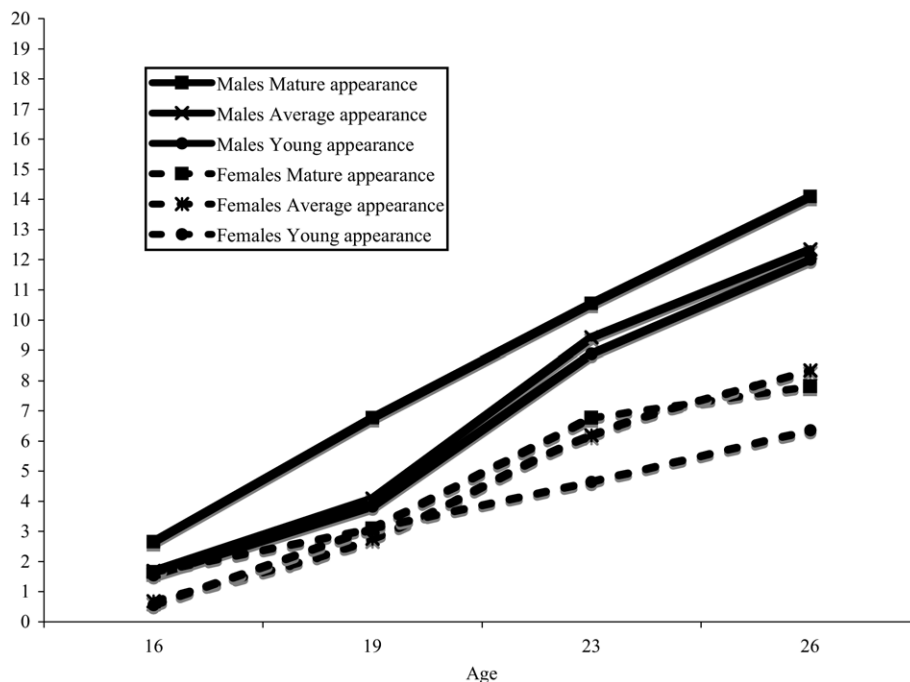


Figure 2. Average patterns of sexual intercourse partnering from ages 16–26 years for males and females who were most mature in appearance, average, and least mature in appearance at age 13 years.

groups, age 16 intercept $p = .12$, slope from age 16 to 26 $p = .37$. Because of this, white versus nonwhite groups were not examined further. Given the evidence that the difference in sexual behavior may be between black and nonblack males,⁹ a larger sample size is needed than was available here so that the combination of gender and race/ethnicity can be considered.

Mature appearance and gender as correlates of sexual partnering over time

Next a growth model with mature appearance at age 13 years and gender as fixed effects was tested. Figure 2 shows observed male and female patterns of sexual partnering for adolescents who were most mature in appearance at age 13 years, least mature, and about average compared with their peers in this study. Table 1 gives the results of hierarchical linear modeling that estimated sexual partnering patterns as associated with two fixed effects, namely, gender and maturity of appearance at age 13 years. After accounting for gender, participants who had the most mature physical appearance had accumulated more sexual partners at age 16 than those who were average ($p < .05$), and males who had the most mature appearance at age 13 had more sexual partners at age 16 than other groups (Figure 2). However there were no significant differences in growth rates of sexual partnering over time when mature appearance levels at age 13 years were compared.

Alcohol use and gender as correlates of sexual partnering over time

The next model included alcohol use at age 16 years and gender as fixed effects. Results are shown in Table 1 and Figure 3 illustrates observed sexual partnering over time for four groups based on gender and high or low alcohol use at age 16. Figure 3 also shows the estimated intercepts and slopes of sexual partner growth trajectories for these four groups. After considering gender, participants who used alcohol most frequently reported a significantly higher number of sexual partners at age 16 than others ($p < .01$), and males who used alcohol monthly or more often clearly stood out as having had a greater number of different sexual partners at age 16. This group difference was maintained up to age 26. Nonetheless, this was only a difference in the number of sexual intercourse partners at each age; alcohol use was not significantly associated with a steeper or flattened accumulation of partners from ages 16–26 years (i.e., there was no alcohol use group difference in growth curve slopes; $p = .54$).

Romantic history and gender as correlates of sexual partnering over time

The final growth curve model included romantic partner history at age 16 years and gender as fixed effects. Table 1 provides the hierarchical linear modeling results. Figure 4 shows observed male and female patterns of sexual partnering over time within four groups based on gender and on

Table 1
Results of multilevel modeling of sexual partnering from ages 16–26 years (N = 176)

Fixed effects	B	SE B	t
Model of gender and appearance^a			
Intercept	1.69	.41	4.14**
Gender (0 = male, 1 = female)	-1.01	.50	-2.04*
Mature appearance (1 = yes, 0 = no)	.97	.48	2.03*
Young appearance (1 = yes, 0 = no)	-.14	.58	-.24
Slope	1.06	.13	8.10**
Gender (0 = male, 1 = female)	-.34	.16	-2.13*
Mature appearance (1 = yes, 0 = no)	-.04	.18	-.23
Young appearance (1 = yes, 0 = no)	-.04	.18	-.22
Model of gender and alcohol use^b			
Intercept	1.33	.33	4.08**
Gender (0 = male, 1 = female)	-.96	.45	-2.11*
Alcohol use more than monthly (1 = yes, 0 = no)	2.18	.51	4.23**
Slope	1.02	.11	9.48**
Gender (0 = male, 1 = female)	-.35	.15	-2.38*
Alcohol use more than monthly (1 = yes, 0 = no)	.10	.17	.59
Model of gender and romantic partner history^c			
Intercept	.76	.34	2.22*
Gender (0 = male, 1 = female)	-.66	.45	-1.97*
Steady partner before age 16 (1 = yes, 0 = no)	1.55	.42	3.79**
Slope	.94	.15	6.45**
Gender (0 = male, 1 = female)	-.35	.14	-2.45*
Steady partner before age 16 (1 = yes, 0 = no)	.16	.15	1.04

Note: As an example, physical appearance at age 13 years was coded to compare those who had the most mature appearance with those who were considered to be average, and to compare those who had the least mature (i.e., young) appearance with those who were average. This shows that the average intercept of the growth trajectory was 1.69 and the average slope was 1.06 for males with an average mature appearance. To obtain values for females with an average appearance, one would add the B for Intercept to the B for Intercept–Gender (1.69 + -1.01) and the B for Slope to the B for Slope–Gender (1.06 + -.34). Similar strategies are used to obtain other values.

* $p < .05$; ** $p < .01$.

^a Refer to Figure 2.

^b Refer to Figure 3.

^c Refer to Figure 4.

whether or not an adolescent had had a first steady couple relationship before age 16 years. After considering gender, participants who reported romantic partners before age 16 had a significantly higher number of sexual partners at age 16 than others ($p < .01$); however, as was found in analyses of all other individual difference fac-

tors, there was no association of romantic partner history with the growth rates of sexual partnering from ages 16–26 years ($p = .30$).

Discussion

The findings in the current study show that maturity of appearance at age 13 years, use of alcohol more than monthly at age 16 years, and having a first steady couple relationship before age 16 years are all factors associated with a greater number of different sexual intercourse partners reported at age 16. In addition, it was the group of males who looked older at age 13 years and who consumed alcohol the most frequently at age 16 that clearly stood out from other groups of participants by having accumulated a higher number of sexual partners by age 16 and in every 3-year increment up to age 26.

However in this study these biological and social forces did not foreshadow a steeper accumulation of different sexual intercourse partners between the ages of 16 and 26 years. This means that young people who appear more mature in early adolescence and engage in drinking and steady dating have tended to accrue a greater number of different sexual intercourse partners by age 16 than other adolescents, but they apparently do not engage in any more rapid or repeated partner switching throughout the remaining teen years and during emerging adulthood than others. It is important to note a methodological strength here that is different from many past studies in this area. Multiple assessment methods were used to determine maturity of appearance, alcohol use, and romantic involvement. Maturity of appearance was based on an observational assessment, whereas alcohol use was based on adolescent self-report and romantic involvement was based on individual interviews with participants about their dating experiences. This use of different methods would reduce the concern that all associations found here were overly and similarly influenced by shared method variance.

These findings of associations between sexual partnering, appearance, alcohol use, and dating must be considered along with whether an individual is male or female. In this study, no association was found between gender and the number of different sexual intercourse partners reported at age 16, although there was a slight trend toward males having a more diverse history of sexual partners than females. Instead gender had a “launch” influence, with males more rapidly accruing new sexual partners from the ages of 16–26 years when compared with females.

Having sexual intercourse relatively early in adolescence is often considered a risk behavior because it is associated with increased rates of sexually transmitted infections and unintended pregnancy [21,36]. In recent years, researchers have realized that studying behaviors that may be more closely aligned with risk, such as partner switching and inconsistent contraceptive use, is as important as studying

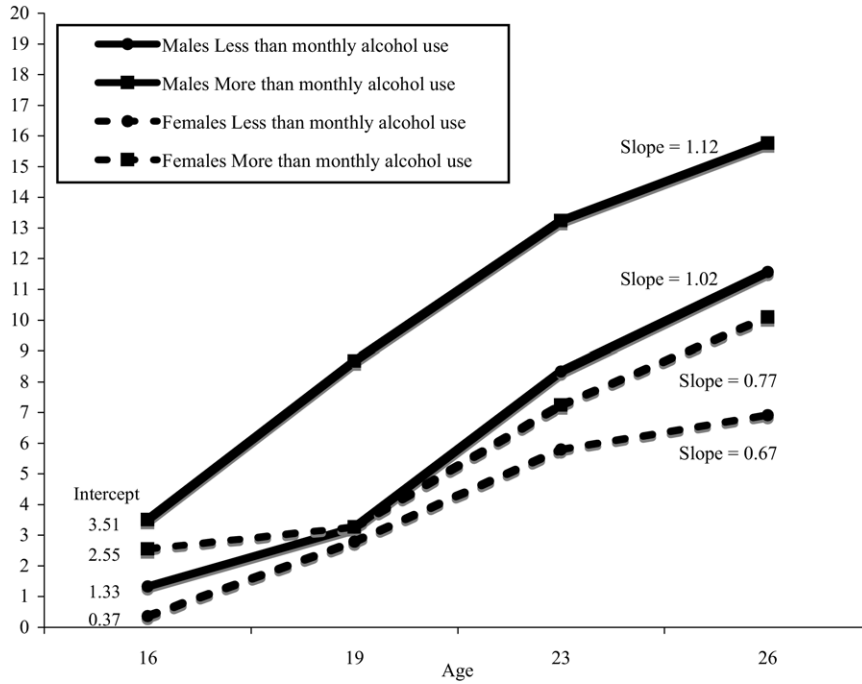


Figure 3. Average intercepts, slopes and patterns of sexual intercourse partnering from ages 16–26 years for all males and females who used alcohol more than monthly versus less than monthly.

correlates of the age of first sexual intercourse. The current study findings add to this direction in research and suggest three important considerations about sexual partnering and risk across adolescence and emerging adulthood.

First, earlier first sexual intercourse and a greater history of partner switching at age 16 does not seem to be indicative of escalating partner switching into the later teen years and the 20s. When we categorized adolescents by particular

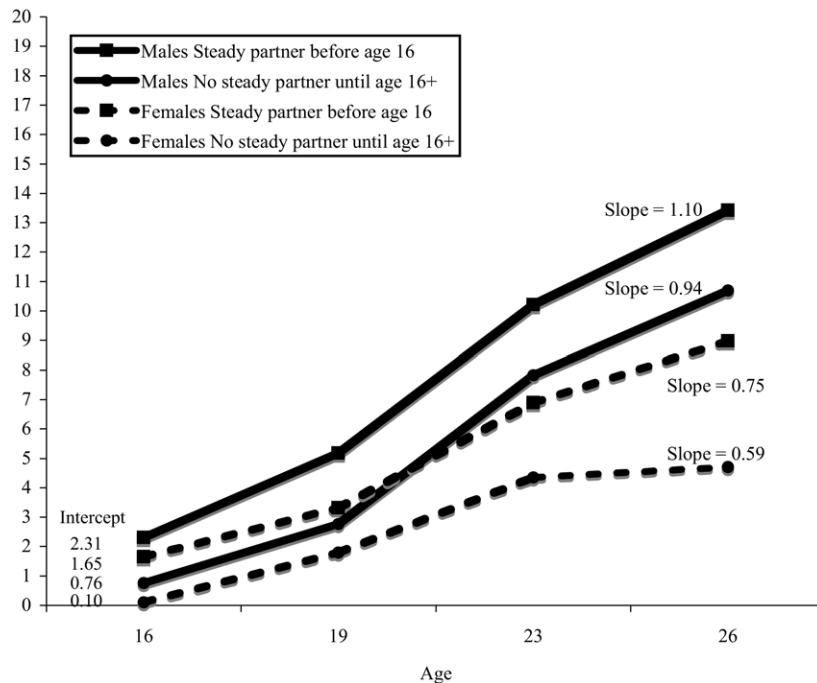


Figure 4. Average intercepts, slopes and patterns of sexual intercourse partnering from ages 16–26 years for males and females who had their first steady romantic partners before age 16 years versus at age 16 or later.

biological or social factors known to be associated with earlier onset of sexual intercourse behavior during adolescence, no subgroup had a significantly different rate of accrual of different sexual intercourse partners than any other subgroup, with the exception of males when compared with females. Yet subgroups of young people did have higher or lower numbers of sexual partners at each age, and this difference stayed fairly consistent across the ages of 16–26. This means that young people who engage in risk behavior during the middle teen years do not necessarily engage in even riskier behavior in the later teens and 20s. Future research could focus on the correlates of a reduction in the accrual of sexual partners below the levels found here, and could address the following questions: What accounts for a reduction in the accrual of about one partner per year for males and a rate of about two partners every 3 years for females? Is a reduced growth rate associated with romantic involvement and commitment, and are there other factors that are important to consider? In the current study, we found no evidence of a slowing of this growth rate by the age of 26 years (i.e., we found no evidence of an inverted-U-shaped growth trajectory), so it is unclear from these data when, during the life course, this rate of growth in the accumulation of different sexual intercourse partners may slow in the average male and female individual.

Although adolescent sexual risk behavior does not seem to get riskier with increasing age, in this relatively high-risk group of participants, on average, partner switching did dissipate by age 26 years either. This is a second consideration for understanding patterns of sexual risk behavior over the adolescent and emerging adult years. These findings indicate that interventions targeted at teens to reduce sexual risk behavior also may be just as appropriate and necessary in the later teen years and into emerging adulthood. Future studies might expand on this by examining patterns of contraceptive use over a similar age period to help guide the content of interventions and the groups that could benefit the most from continued access to advice and clinical services. Most important to consider is the evidence that young people may stop the consistent use of condoms when they are in steady relationships or may discontinue other types of contraception (e.g., use of oral contraceptives) when they end steady relationships [22]. Relationship dissolution and formation seem to be frequent social experiences of young people at least until the age of 26, and this means that inconsistent contraceptive use and switching methods may continue to be common throughout the early 20s.

A third consideration is inspired by a limitation of this study. Sexual partnering was the focus in this study, rather than considering other sexual behaviors that may come with risks for physical, social, or psychological health. Such behaviors that have been identified in other bodies of research include earlier age of sexual intercourse debut and inconsistent condom use [8,9,19]. This research has shown that these behaviors do co-vary; therefore understanding the

patterns of multiple sexual risk behaviors over time, along with their antecedents and correlates, are important directions for future research.

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