The Relative Timing of Sexual Behaviors among Youth in the United States

Karin L. Brewster
Giuseppina Valle
Kathryn Harker Tillman

Florida State University

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ABSTRACT

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This paper uses retrospective data from the 2006-2010 National Survey of Family Growth to describe patterns of initial sexual engagement among women and men aged 15 to 24. We estimate gender-specific risks of experiencing first coitus while still an oral virgin, engaging in first oral sex while still a coital virgin, and experiencing first coitus and first oral sex on the same occasion, relative to remaining a coital and oral virgin. Results for young women show that these risks differ by abstinence pledge status, parental communication about sex, and formal sex education, net of race/ethnicity, nativity status, parents' educational attainment, religious service attendance, age, and age at menarche. Results for young men are similar in nature but less striking: coefficients for pledge status, sex education, and parental communication obtain significance less consistently. We find no evidence that the observed associations for women or men are conditioned by respondent's race/ethnicity.

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Although social scientists have long recognized that adolescents engage in an array of noncoital sexual behaviors (e.g., Newcomer & Udry, 1985; Smith & Udry, 1985; Vener, Stewart & Hagar, 1972), scholars know far more about the predictors of adolescents' coital experiences than about their other sexual activities. In part, this gap reflects the potentially negative consequences of early childbearing for mothers and their children. In recent years, however, researchers have realized that noncoital sexual engagement also may have negative, albeit less apparent, consequences for adolescents' well-being, including sexually transmitted infections and psychological distress (Brady & Halpern-Felsher, 2007; Ciesielski et al., 2004; Edwards & Carne, 1998). Estimates from the 2006-2010 National Survey for Family Growth (NSFG) indicate the prevalence of noncoital sexual activity, particularly oral-genital contact, among youth aged 15 to 24 (Copen et al., 2012: Table 1). Over 65% of males and 66% of females aged 15 to 24 report having any oral-genital contact with an opposite-sex partner, similar to the percentage with coital experience (63.9% and 67.2%, respectively).

Qualitative evidence suggests that teens and young adults do not view noncoital sexual activities like oral sex as "sex" but rather as a means of sexual gratification that preserves virginity and precludes pregnancy (e.g., Cornell & Halpern-Felsher, 2006; Sanders & Reinisch, 1999). Some researchers have speculated that the socio-cultural meaning of oral sex among the young is rooted in the heavy focus on penile-vaginal intercourse of most school-based sex education programs, including those with an abstinence-only curriculum (Halpern-Felsher et al., 2005; Hans et al., 2010). Similarly, some observers (e.g., Remez, 2000) have suggested that high rates of oral sexual experience can be traced to programs, like "True Love Waits," that encourage teens to pledge sexual abstinence until marriage. Evangelical Protestant religious

ideology, which strongly proscribes premarital intercourse, also has been implicated as a factor in in youths' oral sexual engagement. Indeed, one study has found that evangelical Protestant adolescents are more likely to engage in oral sex than are their black Protestant, Catholic, and Mormon peers (Regnerus, 2007). Until recently, however, population-based evidence has been indirect, relying on comparisons of the relative prevalence of oral sexual and coital experience (Brewster & Tillman, 2008; Lindberg, Jones & Santelli, 2008).

The 2006 – 2010 NSFG data include information on the relative timing of first oral sexual experience and coital initiation. Descriptive statistics from this data suggest that the percentage of youth who report that their first oral sexual experience predates their first coital experience is similar to the percentage who report the opposite, and most youth report having engaged in both sexual activities (Copen et al., 2012). Moreover, only 5.1% of young women and 6.5% of young men aged 15 to 24 report having experienced oral sex, but no vaginal intercourse (Copen et al., 2012: Table 1). Thus, it does not appear that most youth are using oral sex simply as a "safe" replacement for vaginal sex or as a means to preserving "technical virginity."

At the same time, both the prevalence and relative timing of first oral sex and first coitus vary across demographic sub-groups; for example, oral sexual experience is more common among non-Hispanic white youth than among their peers of other races and ethnicities, and a greater proportion of white youth report that their first oral sexual experience preceded their first vaginal intercourse (Copen et al., 2012). These findings raise the possibility that there is no single common trajectory of sexual initiation among youth. Instead, the nature of the transition to sexual activity may vary across socio-demographic groups, so that some groups engage in extensive noncoital activity prior to first coitus and others initiate coitus prior to exploration of

noncoital activity. Distinctive sexual trajectories would help to explain the long-standing differences by race and socioeconomic status in age at first intercourse and they have clear implications for the relative risks of unintended pregnancy and sexually transmitted infections across these groups.

This paper uses retrospective data from the 2006-2010 NSFG to explore variation in the relative timing of first coitus and first oral sexual experience among youth ages 15 to 24. Our intent is to expand the knowledge base informing health promotion efforts targeted to young people making the transition to sexual activity. To that end, we address three specific questions: (1) Are patterns of the relative timing of these sexual behaviors similar across racial/ethnic groups and between young men and women? (2) Net of socio-demographic controls, are abstinence pledging, formal sex education, parental communication about sex, and religious practice predictive of the relative timing of entry into oral sexual experience and coitus? (3) Are the effects of abstinence pledges, formal sex education, parental conversation, and religious practice conditioned by race/ethnicity and/or gender?

BACKGROUND

School- and clinic-based studies have provided considerable insight into the patterns of young people's oral sexual experience. The findings of these studies are consistent: a substantial share of youth engage in oral sex; oral sexual engagement typically emerges during early adolescence (Dake et al., 2011; De Rosa et al., 2010; Markham et al., 2009; Ronis & O'Sullivan, 2011) and becomes more prevalent through young adulthood (Chambers, 2007; Dake et al. 2011; Halpern-Felsher et al., 2005; Malacad & Hess 2010; Prinstein et al., 2003). Population-based evidence largely confirms with nationally representative data the findings of these non-

representative studies: oral sex is a normative behavior for youth (Kaestle & Halpern, 2007; Leichliter et al., 2007) and is as commonly occurring as vaginal intercourse, with about two-thirds of males and females aged 15 to 24 reporting engagement in both coitus and oral sex (Copen et al., 2012: Table 1).

Still, we know little about the relative timing of these particular sexual behaviors. Are youth choosing to engage in oral sex as a means of delaying vaginal intercourse or remaining "abstinent" as some have speculated? Several recent studies suggest not. For example, when asked about their motivations to engage in oral sex, only 14% of U.S. college students who had engaged in the practice cite the avoidance of sexual intercourse as a reason (Chambers, 2007). Moreover, using nationally representative Add Health data, Halpern and Haydon (2012) found that only about 15% of adolescents initiated oral sex more than 12 months prior to initiating vaginal intercourse. Similarly, as noted earlier, only a small minority of youth report oral sexual experience but not vaginal sex experience (Copen et al., 2012).

Mounting evidence points to differences in the relative timing of these behaviors across socio-demographic groups. Males are more likely than females to initiate oral and vaginal sex within the same year; when they do not, young men are as likely to initiate oral sex first as the opposite. Females who stagger their initiation into these two sexual behaviors are more likely to have initiated coitus before initiating oral sex (Halpern & Haydon, 2012). Differences also appear by race/ethnicity. Non-Hispanic whites are more likely to report initiating oral sex activity prior to vaginal intercourse than are non-Hispanic blacks (Halpern & Haydon, 2012; Haydon et al., 2012; Copen et al., 2012) and Hispanics (Copen et al., 2012). Family structure also matters, as youth living with two biological parents are the least likely to have sexual experience (Halpern & Haydon, 2012) and are the most likely to have experienced oral sex but

not coitus (Brewster & Tillman, 2008). Youth with more educated parents also are less likely to report having vaginal intercourse prior to experiencing oral sex (Halpern & Haydon, 2012; Haydon et al., 2012) and are more likely to have oral sexual but not coital experience (Brewster & Tillman, 2008). These findings suggest the existence of important differences in the sexual initiation sequences of youth from differing socio-demographic backgrounds. Yet, to this point, the findings are largely descriptive in nature and most studies do not examine the predictors of the relative timing of sexual behaviors in a multivariate context.

Further, little research has examined the importance of individual characteristics other than socio-demographic background factors for the relative timing of oral sex initiation and first coitus. Young people's commitment to remaining a virgin or to being abstinent, their exposure to formal sex education, and their religious beliefs and practices may play independent roles in their sexual decisions. In 2002, roughly 11% of boys and 13% of girls aged 15 to 19 years in the United States reported that they had pledged to remain abstinent until marriage (Abma, Martinez, Mosher, and Dawson 2004). On average, teenagers who have taken a public virginity pledge initiate coitus at significantly older ages (Bearman & Brückner, 2001; Brückner & Bearman, 2005; Martino et al., 2008); however, they are no less likely than non-pledgers to engage in non-coital sexual behaviors, including oral and anal sex (Martino et al., 2008; Uecker et al., 2008). Moreover, five years after taking a pledge, the majority of pledgers have denied doing so (Rosenbaum 2006, 2009) and pledgers are no less likely than non-pledgers to have engaged in either vaginal intercourse or oral sex (Rosenbaum, 2009). We still do not know, however, how virginity or abstinence pledges are related to the likelihood of engaging in oral sex prior to vaginal intercourse.

Data from the first release of the continuous NSFG, for the years 2006 through 2008, indicated that 96% of women and 97% of men aged 15 to 19 reported that they had received some formal sex education in school (Martinez, Abma, and Copen 2010). The effects of sex education on sexual behaviors may depend upon the specific type of education received. Exposure to comprehensive sex education, for example, appears to marginally reduce the likelihood of teens engaging in vaginal intercourse (Kohler, Manhart, and Lafferty 2008; Mueller, Gavin, and Kulkarni 2008). The findings in regards to abstinence-only education are less clear. While several studies have shown that abstinence-only programs do not delay the initiation of sexual intercourse (Kirby 2002; Kohler, Manhart, and Lafferty 2008), a recent study found that receiving any form of sex education, regardless of type, is associated with a delay in first vaginal sex (Lindberg and Maddow-Zimet 2012).

Parent-child sexual communication also appears to influence adolescents' sexual attitudes and behaviors. Teens, particularly females, are more likely to report sexual communication with mothers than fathers (Hutchinson 2002; Hutchinson and Montgomery 2007). Mother-teen sexual communication has been linked to more negative attitudes towards premarital sex (Hutchinson and Montgomery 2007). In addition, discussing sex with parents has a direct effect on adolescents' sexual intentions (Miller, Nortson, Fan, and Christopherson 1998) and is associated with later initiation of sexual intercourse among females (Hutchinson 2002). Little is known about the possible role of parental communication in shaping aspects of youths' sexual initiation beyond coital intentions and first intercourse timing, however.

Past literature has shown direct links between youths' religious beliefs and practices and their engagement in sexual activity. Church attendance and religiosity are associated with less tolerant views of nonmarital sexual activity among youth and a later age at first intercourse

(Meier, 2003; Thornton & Camburn, 1989; Vazsonyi & Jenkins, 2010) and a Protestant Fundamentalist affiliation is associated with lower likelihoods of coital experience and contraceptive use among young women (Brewster et al., 1998). Although some have speculated that religious youth might substitute oral sexual behaviors for vaginal intercourse in an attempt to remain "technical virgins," research suggests that females' childhood religious affiliation and males' childhood religious service attendance lower the likelihood of oral sexual engagement (Brewster & Tillman, 2008). More religious adolescents also are less likely than their less-religious peers to engage in non-coital sexual activities . In fact, religion and morality are the least commonly cited motivators for sexual substitution among youth who have not experienced vaginal sex (Uecker et al., 2008).

It is possible, however, that the influence of religion on sexual behavior is conditioned by particular religious affiliation and by other individual factors such as race/ethnicity and gender. One study has found that evangelical Protestant adolescents actually are more likely to engage in oral sex than are their black Protestant, Catholic, and Mormon peers (Regnerus, 2007). Other recent studies have found that the sexual behavior of black youth is less impacted by their religiosity than is the sexual behavior of white and Hispanic youth (Tolma et al., 2008) and that religiosity differentially impacts males and females' sexual behavior (Vazsonyi & Jenkins, 2010).

METHODS

Data and sample

Our analyses use data from the first continuous version of the National Survey of Family Growth (NSFG), conducted under the auspices of the National Center for Health Statistics. The NSFG employs a multistage area probability sample representative of individuals ages 15 through 44 in

the household population of the United States. Because the NSFG was designed to produce national estimates of trends and differentials in fertility and reproductive health, it includes detailed information on individuals' sexual behaviors and their demographic, social, and economic characteristics. In-person interviews were conducted from June 2006 through June 2010; interviews with female respondents averaged 80 minutes in length and those with male respondents averaged 60 minutes. Respondents were interviewed in English or Spanish by trained female interviewers, using computer-assisted interviewing (CAPI). Sensitive questions were administered using audio computer-assisted self-interviewing (ACASI), so that respondents heard questions over headphones and entered their answers privately, directly into interviewers' laptops. Respondents signed consent forms after receiving oral and written information about the survey, and minors participated only with the signed consent of a parent or guardian. Response rates were about 78% for women, 75% for men, and 77% for those ages 15 through 19, with an overall rate of 77% (Lepkowski et al., 2010).

The full sample comprises 22,687 respondents: 12,279 women and 10,403 men. The analyses do not include the 3,073 female and 2,482 male respondents interviewed prior to July 2007, when items on the relative timing of first oral sex and first coitus were added to the questionnaire. We further restricted the sample to the 3,104 male and 3,242 female respondents aged 15 to 24, representing the age span during which most individuals experience the transition to sexual activity and minimizing recall bias. We also excluded female respondents who reported that their first sexual experience was coerced, forced, or preceded menarche (n=140), male respondents whose first sexual experience was coerced or forced (n=14), as well as all respondents missing data on any of the variables in the analysis. The final working sample comprises 2,908 women and 2,951 men.

Measures

Dependent variable. Our dependent variable distinguishes four categories of coital and oral sexual experience: first oral sexual experience preceded first coital experience, first coital experience preceded first oral sexual experience, first oral and first vaginal sexual experience occurred on the same occasion, and no experience with either coitus or oral sex. Coding for this variable was determined by responses to multiple items in the ACASI and CAPI portions of the interview. Experience with vaginal intercourse was determined indirectly by items in the CAPI on pregnancy, cohabitation, and marriage, or by a direct question in the ACASI for individuals reporting no pregnancies, cohabitations, or marriages. All respondents were asked in the ACASI about engagement in oral-genital contact with an opposite-sex partner. Those respondents who reported coital and oral sexual experience (giving, receiving, or both) were then queried about the relative timing of their initial experience with each: "Thinking back to when you had oral sex with [an opposite-sex partner] for the first time, was it before, after, or on the same occasion as your first vaginal intercourse with [an opposite-sex partner]? Respondents who were not asked this timing question because they did not have both coital and oral sexual experience were coded as follows: Those who reported coitus but not oral sex with an opposite-sex partner were coded as having vaginal intercourse first. Similarly, respondents with opposite-sex oral sexual experience but not coital experience were coded as having had oral sex first. Respondents who had not engaged in either form of sexual activity were coded as no oral or coital experience.

Predictors. Our key predictors of interest are race/ethnicity, virginity pledging, exposure to formal sex education, parental communication about sex, and religious practice at age 14.

Race/ethnicity was coded as a set of binary indicators differentiating among white non-Hispanics, black non-Hispanics, non-Hispanics of other races, and Hispanics who are

phenotypically of any race; in the multivariate analyses, non-Hispanic whites were the reference category.

Data about virginity pledges was obtained from a question posed to all NSFG respondents less than age 25: "(Did/Have) you ever (take/taken) a public or written pledge to remain a virgin until marriage?" Responses were dummy-coded with one indicating a positive answer. Respondents less than age 25 also were questioned about their religious service attendance at age 14. For our analyses, the seven response categories were collapsed into a set of three dummy variables that distinguish individuals who attended services at least once weekly from those who attended no more than twice monthly and no less than once yearly,, and those who either never attended or did not recall ever attending. Preliminary analyses showed this coding to be a more efficient predictor of sexual behavior than either a more detailed measure or a simple binary measure of ever versus never attended.

We also include measures of whether the respondent received formal sex education and whether or not he/she discussed sexual education topics with parents. Any formal sex education is based on a series of questions in which respondents indicated whether or not they had received instruction in a formal setting (e.g., school or community center) before age 18 on any of the following: how to say no to sex; birth control methods; HIV/AIDS; or STDs. Respondents who answered "yes" to one or more of the sex education items were coded 1; those who answered "no" to all were coded zero. The measure of whether respondents spoke with a parent about sex is based on respondents' reports of discussing any of the following topics with their parents before age 18: how to say no to sex, methods of birth control, where to get birth control, STDs, how to prevent HIV/AIDS, or how to use a condom. Respondents who reported speaking to their parents about any of these topics were coded as 1 and all others were coded as 0.

Controls. Because the likelihood of sexual experience increases through adolescence and early adulthood, respondent's *age* at interview, measured in single years, was included in all models. Models for females also include an indicator of pubertal development, *age at menarche*, also measured in single years. Family background is indicated by two variables. *Lived with two biological parents* was coded as one if the respondent had always lived with both biological (adoptive) parents or, for respondents older than 18 years, until establishing an independent residence, and zero otherwise. *Parents' educational attainment* represents the highest degree attained by either parent for respondents who grew up in intact families or by the custodial parent for those who did not. It was coded as a set of three dummy variables: did not finish high school, has high school diploma or equivalent, or has a bachelor's degree or higher; high school diploma was the reference category in the multivariate models. Finally, a dichotomous indicator distinguishes respondents who were born outside of the United States (coded 1) from those born in the United States (coded 0).

Analyses

Descriptive analyses begin with estimates of the prevalence of each category of sexual experience—no oral or coital experience, oral sexual experience predates coital experience, coital experience predates oral sexual experience, and coital and oral sexual experience co-occurred—within groups defined by the covariates. Estimates are gender-specific, adjusted for the multi-stage probability sampling and continuous survey approach, and weighted to represent the national population of youths aged 15 to 24 over the three-year period from July 2007 through June 2010.

Multivariate associations were specified in Stata-SE, version 12.1, using mlogit (multinomial logistic regression) to estimate the covariates' net association with the relative risks

that (a) first heterosexual oral sexual experience predated first coitus, (b) first coitus predated first heterosexual oral sexual experience, (c) first coitus and first oral sexual experience co-occurred, or (d) an individual reported no coital or heterosexual oral sex experience. All models were adjusted for sampling design effects using the *svy* commands.

RESULTS

Descriptive results

Table 1 displays the prevalence of each sexual experience category, estimated within covariate categories, for young women aged 15 to 24, and P-values from designed-adjusted Pearson *F*-statistics. The sequencing of initial sexual behaviors has a statistically significant association with four of our five predictors: race/ethnicity, formal sex education, pledge status, and religious service attendance. Beginning with race/ethnicity, first oral sex predated first coitus most often among white females. Nearly two-fifths of non-Hispanic white females reported experiencing oral sex first or exclusively compared to less than one-fifth of black females, less than one-quarter of Hispanic females, and slightly over one-quarter of non-Hispanic females of other races. Almost half of non-Hispanic black females reported engagement in coitus first or exclusively, as did 38% of Hispanic females, 27% of non-Hispanic females of other races, and 26% of white non-Hispanics. Experiencing first coitus and first oral sex on the same occasion was uncommon among all race/ethnic groups; less than 9% of females of any race/ethnicity reported concurrent initiation of oral sex and coitus. Non-Hispanic females in the "other races" category reported no oral or coital experience more frequently than females in the other race/ethnic groups.

— Table 1 about here —

The next two rows compare women who pledged to abstain from coitus until marriage from those who did not. Substantially more of the former abstained from both coital and oral sexual engagement (48% vs. 27%). Further, pledgers (14%) less often reported coitus first or exclusively than non-pledgers (35%). Similar shares of pledgers and non-pledgers reported oral sexual experience first or exclusively (33% and 32%, respectively).

Roughly equal shares of those who did and did not talk with their parents about sex had not engaged in coitus or oral sex or reported that they engaged in both for the first time on the same occasion. Although parental conversation is not significantly associated with initial sexual experience, it is worth noting that somewhat more of those who reported no parental conversation also reported experiencing coitus first or exclusively (36% vs. 31%) while slightly more who reported a parental conversation experienced oral sex first or exclusively (33% vs. 30%).

Over half of young women with no formal sex education classes said that they experienced coitus first or exclusively compared to less than one-third of those who had formal sex education, and only 13% reported oral sex first or exclusively compared to about one-third of those who had sex education classes. The proportions reporting neither oral nor coital experience were similar among those who had and did not have sex education.

Not surprisingly, more young women who attended religious services weekly at age 14 than who attended occasionally or not at all reported never experiencing coitus or oral sex (33%, 28%, and 22%, respectively). Occasional attenders reported oral sexual initiation prior to first coitus more frequently (35%) than both non-attenders (30%) and weekly attenders (31%). Non-attenders more often reported first coitus prior to first oral sex or exclusively (40%) compared to occasional attenders (32%) and weekly attenders (29%).

Table 2 provides the prevalence estimates for males. The *P*-values show that religious attendance at age 14, talking with parents about sex, and formal sex education do not predict the sequencing of initial sexual experience among young men; however, race/ethnicity and pledge status do. Non-Hispanic white males more often reported that their first oral sexual experience predated first coitus (34%) than their Hispanic (23%), non-Hispanic black (23%), and non-Hispanic other-race peers (23%). More non-Hispanic blacks (41%) than Hispanics (36%), non-Hispanic whites (24%), or young men of other race/ethnicities (12%) reported that first coitus predated first oral sex. More than half of non-Hispanic males of other races (55%) reported no oral or coital sexual experience, compared to less than 30% of Hispanic, white, and black men. As among young women, experiencing first coitus and first oral sex on the same occasion is uncommon for members of all race/ethnic groups, although this timing is more common among young men than young women.

— Table 2 about here —

About half (51%) of young men who pledged to forego non-marital sexual activity report abstaining from coital and oral sexual engagement, compared to 28% of their non-pledging peers. Fewer pledgers than non-pledgers (17% vs. 29%) reported that first coitus predated first oral-genital contact, and fewer pledgers (23% vs. 30%) reported experiencing oral sex prior to or instead of coitus. Finally, a smaller share of pledgers (9% vs. 12%) reported that their first oral and coital experience occurred on the same occasion. Although the general pattern of these results is similar to that observed for young women, the contrasts between pledgers and non-pledgers are sharper among young men, at least at the bivariate level.

Multivariate results

Tables 3 and 4 present relative risk ratios from a series of multinomial logistic regression models that together provide all contrasts for females and males, respectively. Our discussion proceeds as follows: we begin with the results for young women, focusing on our covariates of interest. We then discuss the results for men. Finally, we illustrate the results with graphs of predicted probabilities, estimated from the models, for each category of sexual experience. These figures allow us to address gender differences and similarities in influences on the nature of initial sexual engagement.

The relative risk ratios in Table 3 reveal that, among young women, the race/ethnic differences in initial sexual experience observed in the descriptive statistics largely reflect compositional differences with respect to the other predictors and the control variables. The relative log-odds for Hispanic women and non-Hispanic women of other races do not differ from those of non-Hispanic women for most outcomes; however, non-Hispanic black women and their white peers do differ significantly with respect to their initial sexual experiences. The relative risk ratios for young black women compared to their white peers indicate that blacks are 44% less likely to have engaged in oral sex prior to or instead of coitus, and 57% less likely to have experienced both first coitus and first oral sex on the same occasion; however, they are 91% more likely to have experienced coitus first or exclusively than their white peers.

— Table 3 about here —

Among young women, pledging to remain abstinent outside of marriage is associated with significantly higher odds of no engagement in either oral sex or coitus. More specifically, the odds of engagement in oral sex prior to or instead of first coitus are 59% of the odds of no experience with either behavior, and the odds of experiencing coitus prior to or instead of oral sex are 26% of the odds of no engagement in either behavior. At the same time, pledgers' odds

of engaging in oral sex prior to or instead of first coitus are more than double their odds of coital engagement first (*RRR* = 2.31). Interestingly, the pledge association obtains whether or not religious service attendance is included in the model; service attendance, however, has little effect on the sequencing of oral and coital activities during young women's transition to sexual activity, beyond reducing the log-odds of experiencing oral sex first relative to no oral sexual or coital experience.

Although speaking with parents about sex prior to age 18 was not predictive in the descriptive analyses, it has a significant association with sexual experience in the multivariate models. The odds of engaging in oral sex first or exclusively relative to having no oral sexual or coital experience are 57% higher for young women who spoke with their parents about sex than for their peers who did not. The pattern is similar for both the relative log-odds of engaging in coitus first or exclusively (50% higher) and experiencing oral sex and first coitus on the same occasion (87%). Formal sex education also is associated with higher odds of oral sexual experience. The results in the first two columns of Table 3 show that the log-odds of experiencing oral sex prior to or instead of first coitus are four times the odds of bothno sexual experience and experiencing first coitus prior to oral sex.

The results in Table 4 reveal that the pattern of race/ethnic differences in relative risks is different among young men than those observed among young women. The odds of engaging in oral sex, either exclusively or prior to first coitus, are lower for non-Hispanic black men and Hispanic men relative to non-Hispanic white men. Further, compared to whites, both blacks and Hispanics have higher odds of experiencing first coitus either exclusively or prior to first oral sexual engagement. Non-Hispanic men of other races are less likely to be sexually experienced

than non-Hispanic whites; Wald tests (not shown) confirm that this difference holds when these men are compared to their black and Hispanic peers as well.

— Table 4 about here —

Abstinence pledges, significant in the descriptive analyses, are largely unrelated to young men's initial sexual experiences once the other predictors and the control variables are held constant. Only one contrast attained statistical significance: pledgers are about half as likely to have engaged in coitus, either exclusively or before first oral sexual experience, relative to remaining "double virgins."

As in the models for young women, parental conversation attains statistical significance when other variables are held constant. The log-odds of engaging in first oral sex prior to first coitus relative to experiencing coitus first are 32% lower among young men who spoke with their parents about sex prior to age 18 compared to their peers who did not. Moreover, the odds of coital engagement first or exclusively relative to no coital or oral sexual experience are nearly 60% higher among those who had a parental conversation about sex. Formal sex education and religious service attendance at age 14 both fail to attain significance in the multivariate models.

As a final step in the multivariate analyses, we tested for the conditioning effects of race/ethnicity and religious service attendance. We anticipated that the impact of pledging on the nature of sexual initiation would differ by service attendance, with pledgers who attend services more frequently having higher odds of oral sexual experience relative to coital experience, as well as higher odds of no experience. Other recent studies have found that the sexual behavior of black youth is less impacted by their religiosity than is the sexual behavior of white and Hispanic youth (Tolma et al., 2008), and we anticipated a similar finding. Using

product terms to represent the statistical interactions of race/ethnicity with service attendance, pledging, and formal and informal sex education, we found no compelling evidence that the associations of sexual behavior with these predictors was conditioned by race/ethnicity. Similarly, using product terms to test the conditioning of pledge effects and formal and informal sex education effects by service attendance revealed no evidence of statistical interactions among youth of either gender.

To provide a more intuitive understanding of the relative risks of each outcome, we used the multivariate results to estimate predicted probabilities for specific predictors, with all other variables held constant at their mean values. Results are presented graphically, with 95% confidence intervals around each point estimate. Figure 1 shows the predicted probabilities by race/ethnicity; results for females are in Panel A and results for males are in Panel B. The adjusted probability that the "average" young woman or man experienced oral sex prior to first coitus is higher among whites than blacks or Hispanics, but not those in the "other races" group. The probability of experiencing first coitus prior to first oral sex for the average young woman is highest for blacks but among young men, blacks and Hispanics are statistically tied for the highest probability. Overlap in the confidence intervals of whites, Hispanics and the other races group makes it difficult to state categorically which group of young women has the lowest probability of experiencing coitus first, but among young men, whites have a lower probability than blacks or Hispanics, and individuals of other races have the lowest probability. This group also has the lowest probability of having no coital or oral sexual experience; among young women, however, although the point estimates suggest that Hispanics and members of other races are most likely to be virgins, the confidence intervals overlap across all groups.

— Figure 1 about here —

Figure 2 illustrates the association of abstinence pledges with initial sexual experiences. The upper panel shows clearly that the average young woman who makes a pledge of abstinence has a lower probability of experiencing first coitus prior to first oral sex when compared to her non-pledging counterpart. Moreover, her probability of experiencing oral sex prior to first coitus is not significantly higher although her probability of no oral sexual or coital experience is. In contrast, the probability of experiencing oral sex first or coitus first is no different for the average young man who pledges abstinence than an otherwise identical non-pledger. Similar to young women, however, pledgers are less likely to have no oral sexual or coital experience.

Figure 3 shows the association of formal sexual education with the sequencing of initial sexual experiences. The average young woman who has taken a sex education class has a significantly higher probability of engaging in oral sex prior to or instead of first coitus than her counterpart with no formal sex education. She appears to have a lower probability of experiencing coitus first, as well, although the difference is of borderline significance. In contrast, lower panel shows clearly the relative unimportance of sex education classes to young men's behaviors.

— Figures 2, 3 about here —

DISCUSSION

This study uses retrospective data collected from the 2006 – 2010 National Survey of Family Growth to describe the relative sequencing of initial sexual behaviors among young women and men, ages 15 to 24. Building on a recent report from the National Center of Health Statistics (Copen et al., 2012), we consider the sequencing of first heterosexual oral sex and first coitus, and the association of this sequencing with predictors suggested by a substantial body of

prior research on teens and young adults. Using multinomial logistic regression models, we are able to evaluate of the relationship of different sequences and virginity with race/ethnicity, virginity pledge status, formal and parental-provided sex education, and religious participation, controlling for age, pubertal development, and family background.

Overall, we find that less than one-third of young women and young men reported no coital or oral sexual experience and, further, that oral sex and coitus are equally prevalent among members of both genders. In short, most youth have some sexual experience, buttressing recent arguments that sexual engagement during adolescence and young adulthood is normative (Tolman and McClelland 2011). At the same time, the sequencing of first oral sexual experience and first coitus differs by race/ethnicity, even with other variables controlled. Whites (both women and men) are more likely than their racial/ethnic minority peers to experience first oral sex before (or instead of) transitioning to coitus, while blacks are more likely than their white counterparts to experience first coitus prior to, or instead of) engaging in oral sex. Indeed, young black women are more likely to forego sexual engagement altogether than to engage in oral sex. We also find that youth of "other" race/ethnicities, particularly if they are male, are significantly more likely than their peers to forgo both vaginal and oral sex. These findings are consist with previous research (Kaestle and Halpern 2007; Brewster & Tillman, 2008) and point to potential racial and ethnic differences in norms about sexual behavior. It may be that white youth simply are more accepting of oral sex and blacks less, while "other" race/ethnicities may have less permissive attitudes regarding sexual activity more generally. It is also possible, however, that the context of and opportunities for youths' first sexual experience differs across racial and ethnic groups. Research suggests that most youth first initiate sexual activity in the context of a romantic relationship, yet not all groups share a similar likelihood of forming such relationships.

Asian boys, for example, are the least likely of all youth to date during their middle/high school years (Miller 2012).

Our results also speak to the mixed evidence concerning the impact of virginity pledges on youths' sexual decisions. Some prior studies find that taking a virginity pledge is associated with a delayed transition to first vaginal intercourse (e.g., Bearman and Brückner 2001) but some do not (Rosenbaum 2009), while others suggest that pledgers and non-pledgers do not differ with respect to non-coital sexual behaviors (Uecker et al. 2008). We find that pledgers are more likely than non-pledgers to report no vaginal or oral sexual experience. Further, among young women but not young men, pledgers are more likely to report initiating oral sex first. Although not conclusive, these findings do not lend strong support for the suggestion that individuals who pledge are substituting oral sexual engagement for coitus. The gender differences seen here may reflect different ideas about what constitutes "sex" for young men and women. In one study, females were more likely than males to believe that individuals were still virgins if they had engaged in oral sex (Bersamin, Fisher, Walker, Hill, & Grube, 2007). Therefore, young men who pledge may be more likely to forgo a number of sexual activities in order to preserve their "virginity." It may also be that young men who make an abstinence pledge are a more selective group than young women who make a pledge. While only 6.3% of male respondents report having pledged, 12.4% of female respondents report having done so (refer to Tables 1 and 2). Social norms and expectations that place pressure on boys to lose their virginity might keep all but the most conservative and/or religious of boys from publicly promising to abstain from sex.

While receiving formal sex education is not significantly associated with the relative timing of sexual behaviors for young men, among young women, sex education increases the likelihood of experiencing first oral sex before first vaginal sex. This may reflect, in part, sex

education programs' greater emphasis on vaginal intercourse (Halpern-Felsher, Cornell, Kropp, and Tschann 2005). Why sex education appears to influence boys and girls differently remains unclear. Yet, these findings suggest that receiving sex education in a formal setting may lead some young individuals, particularly women, to forgo certain types of sexual behaviors.

LIMITATIONS

This analysis builds upon past research on the sexual behaviors of adolescents and young adulthood by exploring the relative timing of first vaginal and oral sex. However, a number of limitations must be acknowledged. First, because we employed cross-sectional data, we are not able to control for selection processes that may impact associations between our covariates and sexual behaviors. Second, many of the variables in these analyses are measured using respondents' retrospective reports of past behavior. Limiting our sample to youths likely reduces recall bias, at least with respect to our dependent variable, but some covariates refer to events that occurred as much as ten years prior to the interview. Although the NSFG uses life event calendars to minimize recall bias, some research suggests that most people who report making abstinence pledges during adolescence will later deny (or forget) having made them (Rosenbaum 2006, 2009). Finally, the NSFG data do not provide dates for the initiation of oral sexual behavior, so we could not calculate the time interval between the initiation of oral sex and first coitus. It may be that young people who initiate one type of sexual behavior and quickly thereafter initiate the other type are similar in background characteristics and sexual motivations to those who initiate both activities at the same time. Those who wait longer between initiating oral sex and initiating coitus (or vice versa) may be more distinctive in terms of their characteristics and motivations.

CONCLUSION

The findings reported here point to the need for additional research on the factors underlying race/ethnic differences and gender differences in the sequencing of initial sexual behaviors. Why, for example, is formal sex education associated with a higher probability of initiating oral sex before vaginal sex among young women but not among young men? What accounts for the race/ethnic differences in initial sexual behaviors? Oral sex and coitus are associated with different risks and efforts to reduce disparities in the relative occurrence of these risks are less likely to succeed absent a clearer understanding of the motivations for youths' sexual decisions.

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Table 1. Weighted Proportion in Each Sexual Experience Category, Overall and by Covariate Values: Females Aged 15 – 24 in the 2006 – 2010 National Survey of Family Growth (N = 2,908)

	Oral Sex First or Only	Coitus First or Only	Oral Sex, Coitus Same Time	No Oral Sex or Coitus	Totals: % [a]	N [b]	P [c]
Full sample	32.1	31.9	6.5	29.5	100.0	2908	na
Race/Ethnicity							.0000
Hispanic	23.8	38.0	6.2	32.0	100.0	645	
Non-Hispanic White	38.3	26.3	6.1	9.3	100.0	1480	
Non-Hispanic Black	19.3	47.7	8.3	24.7	100.0	631	
Non-Hispanic Other	27.2	27.4	7.3	38.2	100.0	152	
Virginity Pledge							.0000
No	31.9	34.6	6.8	26.7	100.0	2546	
Yes	33.4	13.8	4.6	48.2	100.0	362	
Talk to parents about sex by age 18							.2965
No	29.6	35.5	6.0	28.8	100.0	763	
Yes	33.0	30.5	6.7	29.8	100.0	2145	
Any formal sex education by age 18							.0003
No	12.9	54.6	5.0	27.5	100.0	101	
Yes	32.9	30.9	6.6	29.6	100.0	2807	
Religious service attendance							.0130
Weekly	31.1	29.3	6.5	33.1	100.0	1510	
Sometimes	34.7	32.3	5.5	27.5	100.0	904	
Never	29.6	39.5	8.7	22.1	100.0	494	
Age							.0000
≤ 18	39.2	39.5	7.7	13.6	100.0	1709	

≥ 19	20.9	19.8	4.7	54.6	100.0	1199	
Age at Menarche							.0026
Early (≤10)	29.5	44.6	6.1	19.8	100.0	267	
On-time (11-14)	33.2	29.8	6.6	30.5	100.0	2413	
Late (15+)	22.7	41.2	6.4	29.7	100.0	228	
Foreign-born							.4286
No	32.6	31.5	6.7	29.3	100.0	2617	
Yes	27.4	35.8	5.1	31.6	100.0	291	
Lived with Two Biological Parents							.0000
No	29.4	38.8	8.0	23.8	100.0	1462	
Yes	34.3	26.0	5.3	34.4	100.0	1446	
Parents' Education							.0000
Less than High School	24.1	46.0	10.1	19.8	100.0	333	
High School or Some College	30.2	35.3	7.6	26.9	100.0	1629	
College or more	36.7	23.3	4.1	35.9	100.0	946	

[a] Percentages may not sum to 100.0 due to rounding
[b] Unweighted sample size
[c] For design-based *F*-test

Table 2. Weighted Proportion in Each Sexual Experience Category, Overall and by Covariate Values: Males Aged 15 – 24 in the 2006 – 2010 National Survey of Family Growth (N = 2,951)

	Oral Sex First or Only	Coitus First or Only	Oral Sex, Coitus Same Time	No Oral Sex or Coitus	Totals: % [a]	N [b]	P [c]
Full sample	29.8	27.9	12.1	30.3	100.0	2951	na
Race/Ethnicity							.0000
Hispanic	22.5	36.2	14.0	27.3	100.0	681	
Non-Hispanic White	34.1	24.0	12.1	29.8	100.0	1496	
Non-Hispanic Black	22.5	40.8	10.3	26.4	100.0	587	
Non-Hispanic Other	22.7	12.0	10.2	55.1	100.0	187	
Virginity Pledge							.0002
No	30.4	28.9	12.4	28.4	100.0	2750	
Yes	22.6	17.1	9.3	51.0	100.0	201	
Talk to parents about sex by age 18							.1959
No	30.6	24.1	12.7	32.5	100.0	954	
Yes	29.3	29.7	11.8	29.2	100.0	1997	
Any formal sex education by age 18							.5810
No	19.9	29.8	13.4	36.9	100.0	94	
Yes	30.1	27.9	12.1	30.1	100.0	2857	
Age							.0000
≤ 18	34.3	36.7	14.4	14.6	100.0	1583	
≥ 19	23.5	15.7	8.9	51.9	100.0	1368	
Foreign-born							.0119
No	31.0	27.2	11.7	30.2	100.0	2625	
Yes	17.4	35.3	16.4	30.9	100.0	326	

Lived with Two Biological Parents							.0000
No	30.8	30.3	15.2	23.6	100.0	1425	
Yes	28.9	26.1	9.7	35.3	100.0	1526	
Parents' Education							.0096
Less than High School	26.6	35.8	16.3	21.3	100.0	322	
High School or Some College	27.7	30.2	12.9	29.2	100.0	1585	
College or more	32.8	23.5	10.3	33.4	100.0	1044	
Religious service attendance							.3887
Weekly	29.6	25.6	11.9	32.9	100.0	1422	
Sometimes	30.4	29.3	12.2	28.1	100.0	975	
Never	29.1	31.8	12.3	26.9	100.0	554	

[a] Percentages may not sum to 100.0 due to rounding
[b] Unweighted sample size
[c] For design-based *F*-test

Table 3. Relative Risk Ratios from Multinomial Logistic Regression Models of the Ordering of First Oral and First Coital Sexual Experience: 2006-2010 NSFG Females Aged 15 – 24 (n = 2908)

	Oral first versus:			Coitus first versus:		Same time versus:
	No oral or coital	Coitus first	Same time	No oral or coital	Same time	No oral or coital
Race/Ethnicity						
White non-Hispanic (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Black non-Hispanic	0.56**	0.29***	0.43**	1.91**	1.46	1.30
Other non-Hispanic	0.77	0.64	0.77	1.21	1.53	1.50
Hispanic	0.67	0.50***	0.51	1.34	0.80	0.87
Foreign-born	0.50	1.02	1.32	0.49*	1.29	0.38*
Took virginity pledge	0.59**	2.31***	1.40	0.26***	0.61	0.42**
Talk to parents about sex by age 18	1.57**	1.04	0.86	1.50**	0.82	1.84*
Any formal sex education by age 18	4.16**	4.22***	2.01	0.99	0.48	2.06
Lived with two biological parents	0.53***	1.34	1.38	0.40***	1.03	0.39***
Parents' education						
Less than high school	1.52	0.86	0.63	1.77	0.73	2.43*
High school or some college (ref)	1.00	1.00	1.00	1.00	1.00	1.00
College or more	0.87	1.44**	1.92*	0.61**	1.33	0.46**
Religious service attendance, age 14						
Weekly	0.75	0.96	0.70	0.79	0.73	1.08
Occasionally (ref)	1.00	1.00	1.00	1.00	1.00	1.00
No service attendance	0.65*	0.78	0.53	1.53	0.82	1.88
Age at interview	1.65***	0.98	1.01	1.69***	1.03	1.63***
Age at menarche	0.87**	1.02	0.97	0.86**	0.96	0.90

*p≤0.05; **p≤0.01; ***p≤0.001

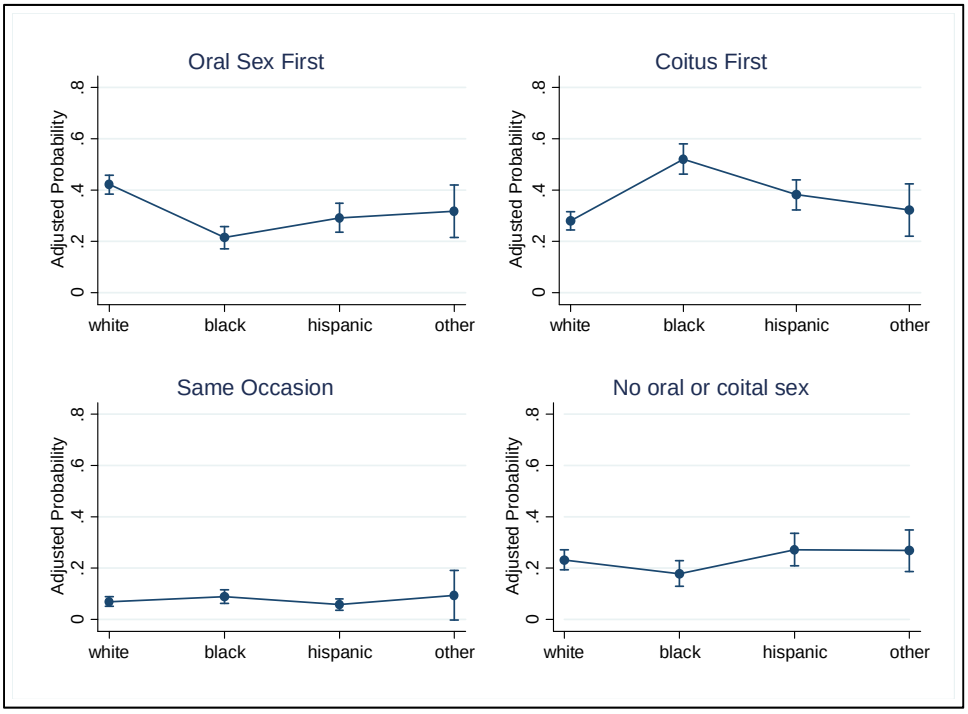
Table 4. Relative Risk Ratios from Multinomial Logistic Regression Models of the Ordering of First Oral and First Coital Sexual Experience: 2006-2010 NSFG Males Ages 15 – 24 (n = 2,951)

	Oral first versus:			Coitus first versus:		Same time versus:
	No oral or coital	Coitus first	Same time	No oral or coital	Same time	No oral or coital
Race/Ethnicity						
White non-Hispanic (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Black non-Hispanic	0.71	0.38***	0.95	1.85**	2.48***	0.75
Other non-Hispanic	0.31*	1.60	0.78	0.19***	1.61	0.33*
Hispanic	0.86	0.48***	0.94	1.79**	0.59	1.11
Foreign-born	0.44*	0.57*	0.46*	0.78	0.81	0.96
Took Virginity Pledge	0.54	1.05	0.90	0.51*	0.85	0.60
Talk to parents about sex by age 18	1.07	0.68*	0.93	1.57**	1.37	1.15
Any formal sex education by age 18	2.49	0.43	1.39	1.75	0.98	1.79
Lived with two biological parents	0.47***	0.90	1.41	0.52***	1.56*	0.33***
Parent Education						
Less than High School	1.44	1.21	1.05	1.19	0.87	1.36
High School or Some College (ref)	1.00	1.00	1.00	1.00	1.00	1.00
College or more	1.05	1.33*	1.36	0.79	1.02	0.77
Religious service attendance, age 14						
Weekly	0.79	1.12	0.93	0.71	0.83	0.85
Occasionally (ref)	1.00	1.00	1.00	1.00	1.00	1.00
No service attendance	0.89	0.78	1.00	1.15	1.29	0.89
Age	1.50***	0.92**	0.98	1.64***	1.07*	1.52***

*p≤0.05; **p≤0.01; ***p≤0.001

Figure 1. Predicted Probabilities of Type of First Sexual Engagement with 95% CI, by Race-Ethnicity and Gender: Respondents to the 2006- 2010 National Survey of Family Growth, Ages 15 to 24.

A. Females



B. Males

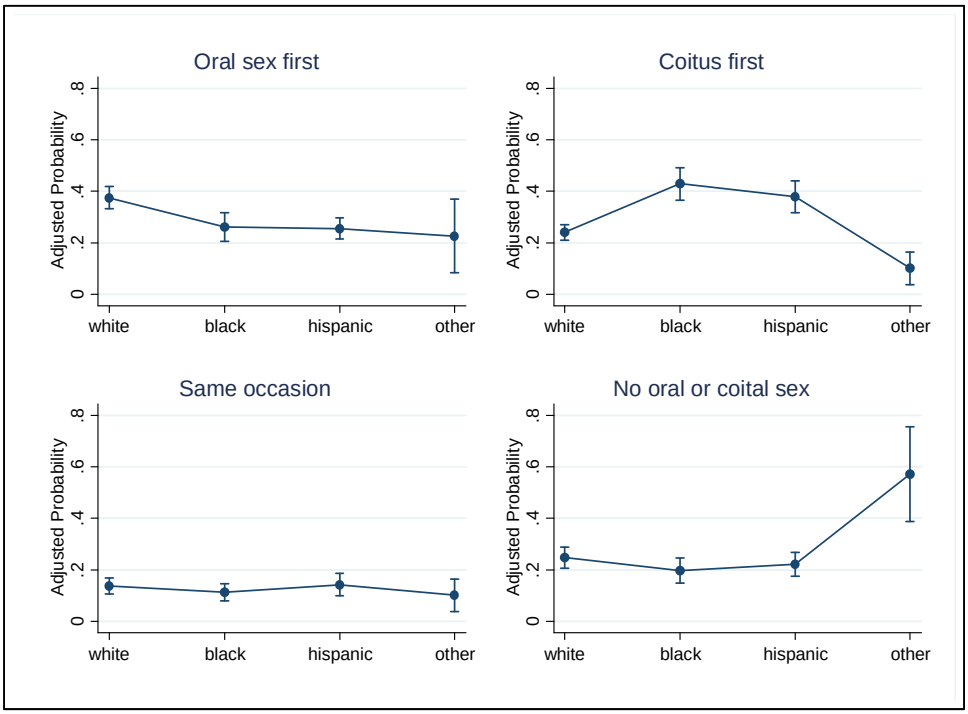
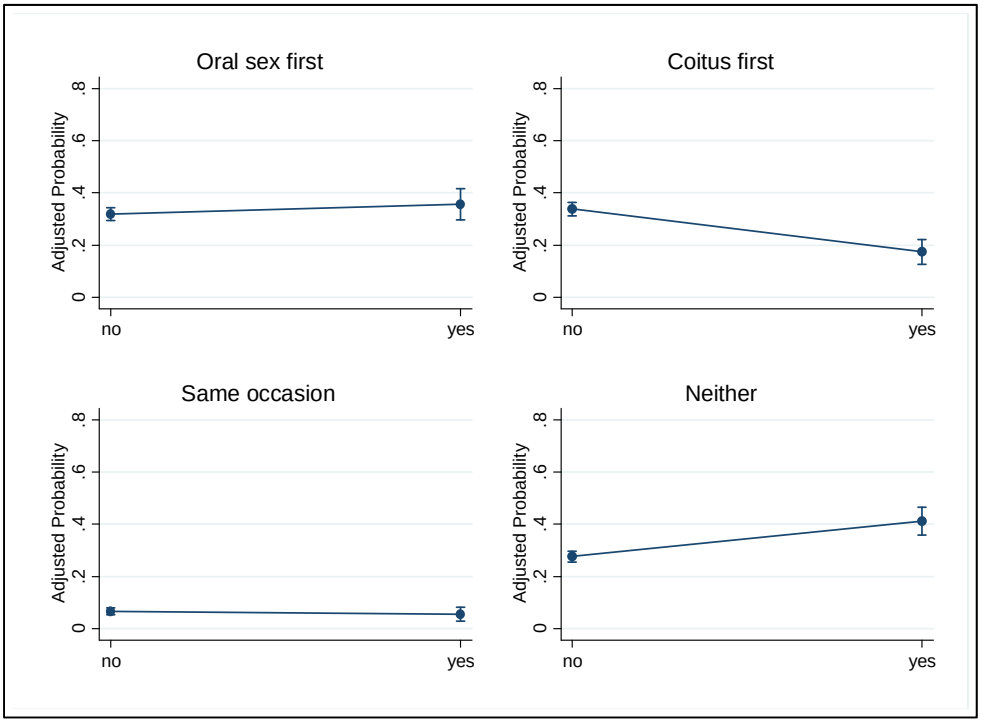


Figure 2. Predicted Probabilities of Type of First Sexual Engagement with 95% CI, Pledge Status and Gender: Respondents to the 2006- 2010 National Survey of Family Growth, Ages 15 to 24.

A. Females



B. Males

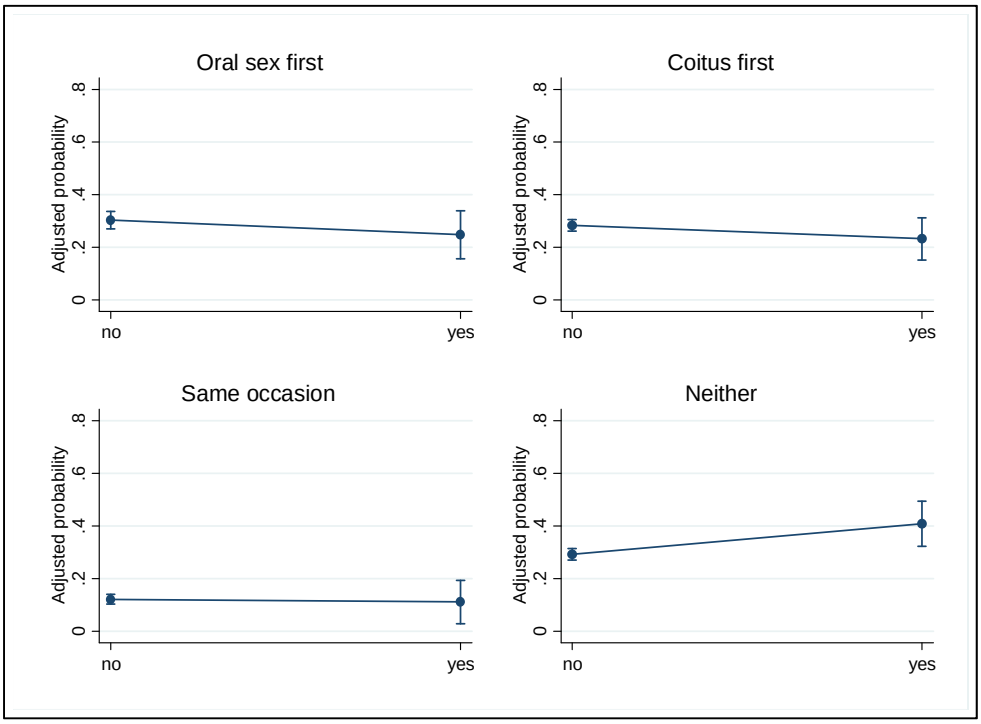
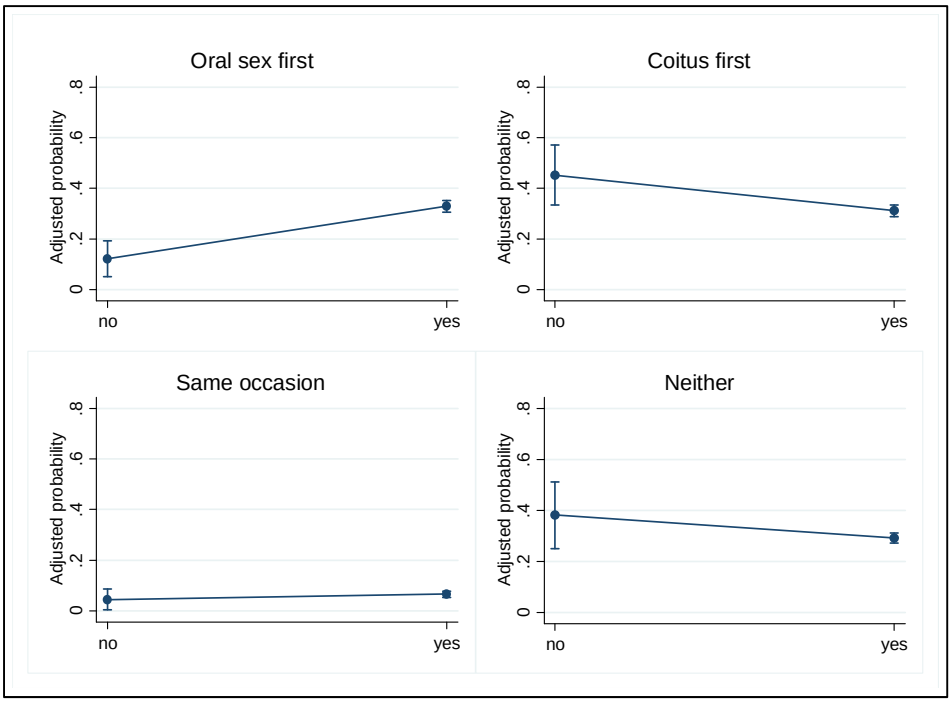


Figure 3. Predicted Probabilities of Type of First Sexual Engagement with 95% CI, by Formal Sex Education and Gender: Respondents to the 2006- 2010 National Survey of Family Growth, Ages 15 to 24.

A. Females



B. Males