# Sexual Health of Young Adults and Age at First Intercourse

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**ABSTRACT**

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(under the direction of Dr. Carolyn Halpern)

Interest in the timing of first sexual intercourse has increased in recent years because of public health, social, and political concerns. Using a life-course theoretical perspective, I examined the connection between timing of first sexual intercourse and later sexual behavior and health outcomes by analyzing data from Waves I through III of the National Longitudinal Study of Adolescent Health (Add Health). The majority of respondents with a current sexual relationship engaged in combinations of various types of sexual behaviors. Almost 80% of these respondents included cunnilingus and fellatio as well as vaginal intercourse in the sexual repertoire of their current relationship, with over 20% engaging in these three sexual activities plus anal sex. Earlier age at first intercourse was associated with engaging in oral sex with a current partner for females, and with anal sex with a current partner for males and females. Early first intercourse was associated with higher odds of testing positive for chlamydial infection, gonorrhea, and trichomoniasis among adolescents, but the association was not significant among young adults. By young adulthood, an older age at first intercourse was no longer protective against these sexually transmitted infections; young adults who had

started having sex recently had similar levels of sexually transmitted infection as those who had been having sex through most of adolescence. Furthermore, timing of first intercourse was not associated with sexual coercion victimization or perpetration with a current partner. Reports of sexual coercion in current relationships indicated substantial levels of male victimization and female perpetration. This work expands upon the current understanding of first sexual intercourse and later sexual behavior and health, and carries important implications for health promotion education and policy.

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## LIST OF ABBREVIATIONS

Sexually transmitted infections (STIs)

Youth Risk Behavior Survey (YRBS)

National Survey of Family Growth (NSFG)

National Longitudinal Study of Adolescent Health (Add Health)

National Health and Social Life Survey (NHSLS)

Odds Ratio (OR)

Prevalence Odds Ratio (POR)

Confidence Interval (CI)

Computer-Assisted Self-Interviewing (CASI)

Ligase Chain Reaction (LCR)

Deoxyribonucleic Acid (DNA)

## CHAPTER 1: Introduction

Interest in the timing of first sexual intercourse has increased in recent years because of public health, social, and political concerns. Early first sexual intercourse, defined in various ways, is often used as an indicator for later risky sexual behavior and therefore as a target for interventions (*e.g.*, abstinence education and virginity pledges). Although the long term implications are not fully understood, early first sexual intercourse itself has become a widely researched outcome measure in the literature (Goodson, Evans, & Edmundson, 1997). Factors that have been tied to having had first sexual intercourse among adolescents include pubertal or physical development, gender, race and ethnicity, intelligence, self-esteem, family environment, parental education, and peer influences (Alexander & Hickner, 1997; Brooks-Gunn & Furstenberg, 1989; Capaldi, Crosby, & Stoolmiller, 1996; Coker *et al.*, 1994; Goodson *et al.*, 1997; Halpern, Joyner, Udry, & Suchindran, 2000; Hogan, Sun, & Cornwell, 2000; Karofsky, Zeng, & Kosorok, 2001; Lammers, Ireland, Resnick, & Blum, 2000; McNeely *et al.*, 2002; Mott, Fondell, Hu, Kowaleski-Jones, & Menaghan, 1996; Paul, Fitzjohn, Herbison, & Dickson, 2000; Pedersen, Samuelsen, & Wichstrom, 2003; Pedersen & Skrondal, 1996; Resnick *et al.*, 1997; Santelli, Lowry, Brener, & Robin, 2000; Schloredt & Heiman, 2003; Sieving, McNeely, & Blum, 2000; Spencer, Zimet, Aalsma, & Orr, 2002; Upchurch, Aneshensel, Sucoff, & Levy-Storms, 1999; Upchurch, Levy-Storms, Sucoff, & Aneshensel, 1998; Upchurch, Lillard, Aneshensel, & Fang Li, 2002; Zierler *et al.*, 1991).

Early first sexual intercourse has been linked to a range of higher risk sexual behaviors during adolescence, such as failing to use a condom or using alcohol or drugs in combination with sexual activity (Coker *et al.*, 1994). Data from the 1992 Youth Risk Behavior Survey (YRBS) indicated that respondents with earlier first sexual intercourse were more likely to have had multiple recent partners; the association was particularly strong for females (Santelli, Brener, Lowry, Bhatt, & Zabin, 1998). Data from the 1995 National Survey of Family Growth (NSFG) indicated that concurrent partnerships were higher among those who reported an age of 12 or 13 at first sexual intercourse (Adimora *et al.*, 2002). Early first sexual intercourse has also been tied to experiencing sexually transmitted infections (STIs) during adolescence (Andersson-Ellstrom, Forssman, & Milsom, 1996; Coker *et al.*, 1994).

Life-course theory suggests that some poor outcomes linked to early first intercourse may persist into adulthood. Sociologist Glen Elder describes life-course analysis as the examination of trajectory and transition issues (Elder, 1985). Life transitions are embedded in trajectories; the timing of when a transition takes place within a trajectory helps give it meaning. A life-course perspective can provide a valuable framework to explore the implications of such early sexual experiences on later life events. Negative consequences can accumulate to affect sexual functioning and relationship skills and the subsequent sexual trajectory can produce adverse adult outcomes such as risk for STIs or experiencing sexual coercion (Browning, 2002; Browning & Laumann, 1997).

Some prior research has documented a link between early first sexual intercourse and increased risk for STIs and/or genital tract infections in adulthood (Greenberg, Magder, & Aral, 1992; Mardh, Creatsas, Guaschino, Hellberg, & Henry-Suchet, 2000; Miller, Cain, Rogers, Gribble, & Turner, 1999). However, the methodologies employed illustrate some of the challenges involved in conducting research on the effects of early first sexual intercourse, such as convenience samples, categorization of age groups with little explanation, possible recall bias over long time periods, and self reports of a history of STIs. Since many STIs are asymptomatic and diagnosis may also depend on access to health care, reliance on self reports probably results in substantial under-reporting of infection (Wellings & Cleland, 2001). It is likely that this under-reporting is not randomly distributed across factors (*e.g.*, age, race, education, and socioeconomic status) that may influence whether a person receives regular health care. Therefore, using self-reports could introduce problems with biased misclassification. Also, the measure of ever having an STI gives no indication of whether the infection was recent. This means that positive responses may indicate an infection that occurred early in adolescence rather than an infection in adulthood.

The existing literature on the effects of early first sexual intercourse focuses primarily on issues of infection. However, modern definitions of sexual health encompass a broader range of issues than the simple absence of disease (Edwards & Coleman, 2004). Abilities such as expressing affection and intimacy in ways consistent with one's own values are now being recognized as important elements of sexual health (Tolman, Striepe, & Harmon, 2003). In 2001, Surgeon General David

Satcher released “The Surgeon General’s Call to Action to Promote Sexual Health and Responsible Behavior,” which utilized a definition of sexual health that recognized the many ways in which sexuality influences the wellbeing of the individual:

> Sexual health is inextricably bound to both physical and mental health. Just as physical and mental health problems can contribute to sexual dysfunction and diseases, those dysfunctions and diseases can contribute to physical and mental health problems. Sexual health is not limited to the absence of disease or dysfunction. It includes the ability to understand and weigh the risks, responsibilities, outcomes and impacts of sexual actions and to practice abstinence when appropriate. It includes freedom from sexual abuse and discrimination and the ability of the individual to integrate their sexuality into their lives, derive pleasure from it, and to reproduce if they so choose (Satcher, 2001).

This definition values the intimacy and pleasure sexuality can foster and also recognizes the seriousness of problems such as sexual coercion (Satcher, 2001). To follow this broader conceptualization of sexual health, studies examining the long-term impact of early sexual intercourse should include a more comprehensive range of sexual health outcomes.

## Research Questions and Hypotheses

This investigation examined several elements of sexual health among young adults, including sexual activities with current partners, prevalence of certain STIs, and experiences of sexual coercion and disliked sexual activity with current partners. Furthermore, the role of early first sexual intercourse in predicting these adult experiences was determined. This dissertation is structured as three related papers,

followed by a summary and conclusion. The papers addressed the following research questions:

***Paper 1:*** What types of sexual activities are typical in romantic relationships among young adults? This paper describes the sexual activities of young adults and their current partners and examines how these sexual activities relate to characteristics of the individual (including age at first intercourse) and the relationship (including love between partners).

***Paper 2:*** Does timing of first sexual intercourse predict sexually transmitted infections among young adults? This paper determines the long-term associations between the timing of first sexual intercourse and STIs in young adulthood.

***Paper 3:*** Does timing of first sexual intercourse predict sexual coercion experiences with current partners among young adults? This paper describes the use or experience of coercion by males and females with their current partners, as well as the experience of disliked sexual activities. The paper also examines whether the timing of first sexual intercourse predicts coercion and disliked sexual activities.

By including not only issues of disease but also those of coercion and subjective experiences, this study utilizes a broader concept of sexual health than much of the existing literature. This research has substantial implications for the design of preventive interventions to reduce STIs and sexual coercion.

# CHAPTER 2: What's Love Got to Do with It? Sexual Behaviors of Opposite-Sex Couples through Emerging Adulthood

## Introduction

Emerging adulthood is a period beyond adolescence when adult roles and relationships are being established. It is a time of great transitions, as many individuals engage in long-term sexual and romantic relationships, cohabitation, or marriage for the first time. Despite the importance of these relationships, it can be difficult to obtain representative information regarding the sexual activities engaged in by young adults and their current romantic partners. Public health research and interventions have often focused exclusively on vaginal sex or on men who have sex with men. However, opposite-sex sexuality also encompasses a broad range of activities that have consequences for the quality of the relationship in which they occur as well as the sexual and reproductive health of the individuals.

### *Sexual Activities of Young Adults*

Detailed recent data on sexual activities from nationally representative samples of young adults are rare, particularly information on non-vaginal sex. One notable exception is the National Health and Social Life Survey (NHSLS), which obtained comprehensive information in 1992 on the sexual activities of 18 to 59 year olds (Laumann, Gagnon, Michael, & Micheals, 1994). Age and marital status were found to be associated with frequency of sexual intercourse in the entire sample (ages 18-

59), but racial, ethnic, religious, and educational groups only displayed minor variations. Although only about 15% of the sample was made up of young adults (ages 18-24), some conclusions can be drawn about this age group. Over 85% of the young adults in the study had engaged in vaginal sex in the past year. Among young adult women, 69% had ever experienced fellatio and 75% had ever experienced cunnilingus. Among young adult men, 74% had ever experienced fellatio and 72% had ever experienced cunnilingus. However, oral sex was not a common characteristic of each sexual event for male-female partnerships in the same way as vaginal intercourse (only 20% to 30% included oral sex in their most recent sex event). In contrast to oral sex, having experienced anal sex was less common (about 16% of young males and females reported ever having had anal sex) and was much less likely to have been part of the most recent sexual event (less than 2%). This finding is consistent with a 1991 study of Midwestern undergraduates that found that 17% of sexually experienced heterosexual males and 18% of females reported ever having had anal intercourse (Reinisch, Hill, Sanders, & Ziemba-Davis, 1995).

*Romantic Love and Sexuality*

The relationship of love to sexual activity is complex. Functional MRI studies of people experiencing feelings of romantic love versus those experiencing sexual arousal show very different brain activation patterns, indicating that romantic love is distinct from basic sexual arousal and drive (Arnow *et al.*, 2002; Aron *et al.*, 2005; Redoute *et al.*, 2000). However, sexuality is clearly an important component of romantic relationships, as indicated by well-documented associations of sexual

activity and satisfaction with relationship quality, stability, and love among married and dating men and women (Christopher & Sprecher, 2000; Felmlee, Sprecher, & Bassin, 1990; Regan, 2000; Sprecher, 2002). Sexual intimacy is often described as a way to express feelings of love, particularly among women (Martson, Hecht, Manke, McDaniel, & Reeder, 1998; Robinson, Balwell, & Ward, 1980; Roche & Ramsbey, 1993). In addition, people who are passionately in love report higher levels of sexual activity and excitement when thinking of their partners (Aron & Henkemeyer, 1995; Sprecher & Regan, 1998).

Romantic or passionate love is associated with a range of emotional responses, including euphoria, focused attention, and feelings of dependence (Aron *et al.*, 2005; Jankowiak & Fischer, 1992). While people sometimes feel the negative emotion of jealousy with passionate love, most men and women associate love with positive emotions and experiences (*e.g.*, happiness, closeness, tenderness) to a greater degree than negative ones (Regan, Kocan, & Whitlock, 1998; Sprecher & Regan, 1998). Functional MRI studies have demonstrated that viewing pictures of a partner one is "in love" with (versus a picture of a familiar individual) activates brain areas associated with mammalian reward and motivation (Aron *et al.*, 2005; Bartels & Zeki, 2000). This supports the view of romantic love not as an emotion itself but as a goal-oriented state that leads to various specific emotions related to the imperative to be with the beloved and preserve the relationship (Aron *et al.*, 2005). Sexual activity may play a role in efforts to establish and maintain such relationships.

*Health and Sexuality*

In addition to having implications for the quality of a relationship, sexual activity and dynamics have important reproductive and sexual health consequences for the individual. Sexually transmitted infections (STIs) are common during young adulthood and can have significant adverse consequences for reproductive health, including pelvic inflammatory disease, infertility, ectopic pregnancy, preterm birth, and fetal abnormalities (Land & Evers, 2002; Laumann *et al.*, 1994; Moodley & Sturm, 2000). Although most prevention interventions focus on more casual sexual activity or new sexual partners, sexual behavior in longer-term loving relationships still carries risk of infections, including viral infections with long durations or new infections from concurrent partners. This is particularly salient for young adults, considering the high incidence and prevalence rates for many STIs for this age group (Laumann *et al.*, 1994; Miller *et al.*, 2004). We need to better understand sexual behavior in young adult relationships to guide service provision and clinical advice as well as education policy.

## Research Aims and Hypotheses

Establishing romantic relationships and engaging in sexual activity is an important component of emerging adulthood for many individuals and is connected to issues of health, love, and wellbeing. Health professionals, educators, and counselors should have a thorough knowledge of what types of behaviors arise in young adult sexual relationships so they can provide relevant services and information. In this study, I explored participation in vaginal, oral, and anal sex by young women and men currently in heterosexual relationships. I also examined the

role of love between partners in predicting these experiences, controlling for relationship type and respondent's sex, race and ethnicity, current age, and age at first sexual intercourse. I tested the hypothesis that reports by respondents of higher levels of love for their partners, as well as reports that they think their partners feel higher levels of love toward them, will predict participation in a greater variety of types of sexual activities. In addition, I tested the hypothesis that the effect of love on the content of the current sexual relationship is modified by the respondent's sex (male or female).

## Research Methods

*Study Sample*

I used data from Wave III of the National Longitudinal Study of Adolescent Health (Add Health). In Wave I of Add Health, professional interviewers conducted face-to-face, in-home, computer-assisted interviews with over 20,000 adolescent students enrolled in grades 7 to 12 in 1994-1995. These respondents included a core of about 12,000 adolescents who comprised a nationally representative sample and also several supplementary samples from groups that may normally be under represented in samples, such as disabled children, Black children of highly educated parents, and children with Chinese, Cuban and Puerto Rican ethnic backgrounds. In Wave III, 15,197 of the original Wave I respondents were re-interviewed from August 2001 through April 2002. The interviews included questions on the status of the respondent's romantic relationships and of their sexual experiences and behaviors. Add Health respondents ranged in age from 18 to 26 years old at Wave III.

In Wave III, respondents were asked to list any romantic relationships and sexual relationships they had at any time since the summer of 1995, including relationships that began more than six years ago if they continued at least until June 1995. For each listed relationship, respondents were asked if they had sexual relations with that partner, defined as "vaginal intercourse (a man inserts his penis into a woman's vagina), oral sex (a person puts his or her mouth on another person's sex organs), or anal sex (a man inserts his penis into his partner's anus or asshole)." Respondents were then asked to indicate which of these partners they had sex with most recently. Of the 14,322 respondents who were assigned weights by Add Health in Wave III, 11,087 (78% weighted) reported having a most recent sexual partner since 1995. Of these respondents, 7,468 were still in a relationship with their most recent sex partner (52% weighted of all Add Health respondents with weights).

Of the current sexual relationships reported, 126 were same-sex relationships (less than 1% weighted of the total sample). Unfortunately, the number of same-sex relationships was too small for meaningful analyses and they were dropped from this study. Although the definition given in Add Health for sexual relations as vaginal intercourse, oral sex, or anal sex is fairly broad, there are many activities such as mutual masturbation that were not included and so the wording of the question may have excluded some same-sex relationships from being counted as current sexual relationships.

To be sure that the relationship examined had the opportunity to establish a range of sexual activities, I excluded those under 3 months duration. This left 6,978

eligible respondents with a current, sexually active relationship of over 3 months duration (48% weighted of all Add Health respondents with weights). Of the 6,978 respondents with qualifying opposite sex relationships, 6,329 (91% weighted of eligible) had complete data on demographics, age at first sex, whether they engaged in vaginal, oral or anal sex with their current partner, and love between partners. Eligible respondents with missing data were somewhat less likely to be cohabitating and more likely to be of Black or Hispanic race and ethnicity (design-based F (1, 128), p-values<0.05). The study sample includes the 6,329 eligible respondents with complete data.

*Measures*

The following relationship characteristics were examined:

- Relationship Type. Relationships were categorized as dating, cohabitating, or married based on the respondent's report.
- Sexual Activities with Current Partner. For each of the sexual activities of interest, vaginal sex, fellatio (male receptive oral sex), cunnilingus (female receptive oral sex), and anal sex, the respondents were asked if they ever had that type of sex with their partner.
- Love for Partner and Perceived Love from Partner. Respondents were asked "how much do you love <partner>?" and "how much do you think <partner> loves you?" Answer choices were "a lot," "somewhat," "a little," or "not at all." From these questions, four categories were created to describe the exchange of love in the current relationship as perceived by the respondent: (1) neither partner loves each other a lot,

(2) both partners love each other a lot, (3) respondent loves partner a lot (not reciprocated), (4) partner loves respondent a lot (not reciprocated).

In addition, several respondent characteristics were controlled for in the analyses. Respondent's age at Wave III was recorded in years. Respondents were asked to report their age at first intercourse in years. Respondent's sex was coded male or female. The respondent's race and ethnicity were coded as Hispanic, non-Hispanic Black, Asian, other, or non-Hispanic White.

*Statistical Analyses*

I used the Stata statistical package to incorporate weights, adjust for Add Health's sampling design, and provide estimates that are standardized to the U.S. Census Bureau estimates of this age group's population demographics (Chantala & Tabor, 1999; STATACorp). I first used univariate and tabular analyses to determine the weighted percentages of young adult males and females with their current opposite-sex sexual partners who engaged in each of the sexual activities (vaginal sex, fellatio, cunnilingus, and anal sex). I then used multiple logistic regression models to determine demographic and relationship predictors of the types of sexual activities. As almost all of the respondents experienced vaginal sex, this outcome is not modeled. Preliminary analyses showed significant interaction terms between respondent's sex and love between partners, so males and females were modeled separately.

## Results

Of the entire young adult weighted sample of Wave III (N=14,322), 48% did not report a current sexual relationship, 6% reported a relationship that was not eligible or had incomplete data, 45% reported vaginal sex, 39% reported fellatio, 39% reported cunnilingus, and 10% reported anal sex with a current partner of over 3 months. All subsequent analyses are based on the study sample (N=6,329, those respondents with an eligible current sexual relationship).

The study sample was slightly over half female and the average current age was 22 years (range 18-26). About 70% of the participants were White, with more respondents in dating than in cohabitating or married relationships, as would be expected for this age group (Table 1). Most male and female respondents in relationships of three months or longer reported that they loved their partners “a lot” (88%) and they perceived that their partners loved them “a lot” (89%) (Table 1). Most respondents (84%) reported that both partners loved each other “a lot” and love was associated with cohabitating and married relationship status (design-based $F(5, 703) = 37.5$, $p < 0.05$) (Figure 1).

Almost all study sample respondents reported having vaginal intercourse in their current, sexually active relationship, and the large majority also reported fellatio and cunnilingus. In contrast, anal sex was less common. There were significant differences between females and males in the levels of each type of sexual behavior except for anal sex (Table 2). It is interesting to note that both sexes reported higher levels of receiving oral sex than providing oral sex.

When examined in terms of the most common types of combinations of behaviors, most study sample respondents reported a broad range of sexual behaviors, with the substantial majority including vaginal sex, cunnilingus and fellatio in their current relationship. A substantial proportion also added anal sex to that combination. Just under 10% reported only vaginal sex, and it was also relatively uncommon to engage in vaginal sex plus just one type of oral sex and not the other (Figure 2).

*Multivariable Logistic Regression Models of Sexual Behaviors*

Logistic regression models demonstrated that, for males, reports that both partners love each other a lot were associated with higher odds of engaging in fellatio (OR = 1.80), cunnilingus (OR = 3.91), and anal sex (OR = 3.09) compared to reports that neither partner loves each other a lot, controlling for demographic factors (Table 3). In addition, reports by males of loving a partner a lot even when the partner was not perceived as reciprocating that level of love were associated with higher levels of cunnilingus (OR = 5.19) and anal sex (OR = 5.61) compared to neither partner loving the other a lot (Table 3).

For females, reports that both partners love each other a lot were associated with higher odds of engaging in fellatio (OR = 2.59) and cunnilingus (OR = 3.27) compared to reports that neither partner loves each other a lot (Table 3). Odds of fellatio were also higher among females who loved their partner a lot even if they did not think their partner reciprocated that level of love (OR= 2.01) compared to females who reported neither partner loved each other a lot. Furthermore, females who thought their partner loved them a lot had higher odds of cunnilingus even when

they did not reciprocate that level of love (OR = 2.57) compared to those who reported neither partner loved each other a lot. Anal sex was not predicted significantly by reports of love for females (Table 3).

Cohabitating females had higher odds of anal sex and married females had higher odds of fellatio compared to dating females (Table 3). Married and cohabitating males also had higher odds of anal intercourse than dating males. Black females had lower odds of cunnilingus, fellatio and anal sex and Latina females had lower odds of cunnilingus and fellatio compared to White females. Latino and Black males had lower odds of performing cunnilingus and lower odds of receiving fellatio compared to White males. Older male and female respondents had higher odds of fellatio and cunnilingus compared to younger respondents. Males and females who reported an older age at first intercourse had lower odds of anal sex, and females with older ages at first intercourse also had lower odds of fellatio and cunnilingus (Table 3).

## Discussion

This study reveals substantial heterogeneity in the sexual lives of young adults that is often neglected in studies that focus solely on vaginal intercourse. Overall, reports of mutually high levels of loving between partners are associated with a wide range of sexual activities, including oral sex for males and females, and anal sex for males. Reports of loving one's partner very much are also associated with providing oral sex for that partner among males and females, whether that love is perceived to be reciprocated or not. This may reflect a greater willingness to give pleasure and dedicate time to one's partner based on how much love is felt for the partner. The

result that females who thought their partner loved them very much had higher odds of cunnilingus may reflect their perception of providing oral sex as a loving or caring act by their partner.

While causal directionality between loving and sexual activity is difficult to assess, the overall association between a variety of sexual activities and higher levels of love in a relationship may play an important role in the building of stable, rewarding relationships among young adults. My results show that mutually high levels of love are reported among 94% of married couples (compared to 89% of cohabitating couples and 76% of dating couples) and that, even when controlling for love, married and cohabitating couples often have higher odds for sexual activities beyond vaginal intercourse. Thus, both love and varied sexual activity appear to be major components of committed relationships. Considering the benefits of stable and loving relationships for individuals and for raising children (Amato, 2005; Nock, 2005), it is important to emphasize the positive role of sexuality in loving relationships in young adulthood, when family formation often occurs.

The findings that providing oral sex is associated with loving one's partner and that relationships that include oral sex generally include both male and female receptive oral sex are consistent with social exchange concepts. More equitable feelings and sexual behaviors may lead to greater relationship quality in terms of satisfaction, love, and commitment (Sprecher, 2002). Future research is needed to further explore the interconnections between love, commitment, and sexual activities from the perspective of balancing costs and rewards in a relationship (Lawrence & Byers, 1995; Sprecher, 1998). Considering the high proportion of marriages that

end in divorce, a better understanding of the factors that contribute to successful relationships is important for counselors and other practitioners.

In addition to love between partners, several other factors played important roles in predicting sexual activities. Older respondents generally had higher odds of participating in non-vaginal sexual activities, but this trend was not significant for anal sex. The length of time respondents have been sexually active was also important, particularly for females. Male and female respondents who were older when they had first sexual intercourse had lower odds of anal sex, and females with older ages at first sex had lower odds of cunnilingus and fellatio. It may be that individuals who have been sexually active for longer may be more comfortable with a range of sexual activities. Black and Latino males and females had lower odds of oral sex and Black females had lower odds of anal sex compared to White females. While race differences in the use of sexual techniques such as oral sex may be partially due to differences in education level, it has also been proposed that some of the sexual techniques that gained popularity in the primarily White, middle and upper middle class, urban, "singles" culture of the early 1960s did not spread much into other groups as sex partner choice tends to be homophilous (Laumann *et al.*, 1994).

My findings did not support previous research indicating that married couples had less oral sex (Laumann *et al.*, 1994). This may partly result from the current study sample being restricted only to young adults. Relationship type played a more substantial role in predicting anal sex than it did for oral sex, with cohabiting males and females and married males having higher odds of anal sex. Anal sex patterns were also unusual in that, while there were no sex differences in the reported

prevalence of the behavior, only males showed a strong association between love and anal sex. Additional variables beyond the scope of this study should be explored in future research to predict heterosexual anal sex behaviors, particularly for females.

These results provide helpful guidance for STI and HIV prevention efforts, particularly considering the high prevalence of many infections among this age group and the serious consequences for fertility and reproductive health. This nationally representative research indicates that about 40% of young adults are in a current relationship that includes fellatio and about 40% are in a relationship that includes cunnilingus. Furthermore, about one in 10 engage in anal sex within a current relationship. Given how common oral and anal sex practices are, the lack of adequate research on disease transmission and the efficacy of safer sex options for non-vaginal sexual activities is unacceptable. In particular, additional research is needed on the acceptability, proper use, and efficacy of dental dams. A dental dam is a sheet of latex (usually about 6x8 inches) used as a barrier between the mouth and the vulva (vaginal and clitoral area) or the anal area to prevent the transmission of infection. Like condoms, dental dams are now available in a variety of styles, colors, and even flavors.

In an age of abstinence-only education when many people enter young adulthood without the most rudimentary training in safer sex practices, any institutions that work with young adults (*e.g.*, community colleges, universities, health clinics) have an opportunity to provide needed education and services. It is important for young adults to understand that condoms or dental dams should be

used during fellatio, anal sex, and cunnilingus. Some universities have taken the lead in improving access not only to condoms but also to dental dams, and provide valuable information about using dental dams on their web pages (*e.g.*, Barnard at http://www.barnard.edu/health/dentaldams.htm and Johns Hopkins at http://www.jhu.edu/~shcenter/dentaldams.html). Schools can also incorporate dental dams into short sexual health orientation activities (Fennell, 1993).

This study's estimate that a substantial number (about 10%) of young adults have had anal sex with a current sexual partner of over three months supports earlier findings that anal sex is a component of heterosexual behavior for many young adults, and indicates that a broad range of young women and men require protection from STIs during anal sex (Erickson *et al.*, 1995; Reinisch *et al.*, 1995; Voeller, 1991). While the need to protect men who have sex with men from anal transmission of infection is often discussed in the public health community, the risk for women in opposite-sex couples is not as well recognized, even though more women may be having receptive anal intercourse than men (Voeller, 1991). This lack of attention is unfortunate because many opposite-sex couples may be under the impression that oral and anal sex are "safe" because they do not carry the risk of pregnancy (Halperin, 1999; Halpern-Felsher, Cornell, Kropp, & Tschann, 2005; Remez, 2000). Among those reporting anal sex in one clinic study, condom use by heterosexual women was rare (7%) compared to condom use by homosexual (71%) or bisexual (53%) men (Chetwynd, Chambers, & Hughes, 1992). However, anal sex risks for women include rectal STIs, anal cancer, and greater HIV transmission risk than vaginal sex (Frisch *et al.*, 1997; Halperin, 1999; Voeller, 1991). Despite this,

clinical sexual histories often do not cover condom use during anal sex or condom use problems or questions (Kurth, Holmes, Hawkins, & Golden, 2005). Taking a careful sexual history in a clinical setting may elicit questions from women about anal sex practices and safety and may assist in providing appropriate health advice. Furthermore, institutions should not exclude opposite-sex relationships from education efforts regarding condom use for anal sex.

This study relies on self reports of sexual behaviors. A respondent's understanding of a question, perception of privacy, and the perceived social acceptability of various behaviors may influence self-reports (Brener, Billy, & Grady, 2003) This study examined reports on sexual experiences that are relatively recent (with a current partner) and used questions with clear, anatomically specific language to reduce possible misunderstandings (Brener *et al.*, 2003). Add Health also made use of computer-assisted self-interviewing (CASI). CASI reduces the risk of accidental disclosure to the interviewer or others and improves privacy, making it easier for respondents to report on sensitive topics such as sexual behaviors (Kann, Brener, Warren, Collins, & Giovino, 2002; Turner *et al.*, 1998). However, the data presented here may represent an underreporting of more stigmatized sexual behavior such as anal sex. In addition, some sexual experiences may be more memorable compared to others (*e.g.*, receiving oral sex versus performing it) and therefore may be more likely to be reported.

Because emerging adulthood is an important time in family formation as well as reproductive health, sexual dynamics and activity in relationships are of particular interest during this time. In addition to providing recent, extensive data on a variety

of sexual activities, including anal sex, Wave III of Add Health is based on a nationally representative cohort of young adults, so the available sample size allowed detailed analyses that apply specifically to young adults. However, these estimates may under-represent the prevalence of the types of sexual activities in current relationships among all young adults. This study only includes sexual activities that took place in the context of a current relationship with the duration of at least three months, so activities in shorter relationships were not counted. In addition, some respondents may have had a current sexual relationship that was not reported and therefore not included in our study sample. Therefore, some individuals who were classified as either not having a relationship or having an ineligible relationship may be having vaginal oral or anal sex with a current partner, so the estimated proportions of all young adults engaging in various activities with a current sex partner should be considered conservative.

Overall, we can conclude that most young adult couples engage in a variety of sexual activities within the context of a loving relationship and therefore programs that address health and wellbeing during emerging adulthood should cover issues relevant to a broad range of sexual activities. Oral and anal sex should not be neglected in studies of sexual behavior, clinical sexual histories, and interventions to prevent STIs. It is also important to recognize that many of the sexual activities take place in the context of longer-term, loving relationships that may not be considered risky by the individuals involved. Public health professionals need to balance an appreciation for the potentially positive roles of sexuality in relationships with effective approaches to help individuals express their sexuality safely.

**Figure 1: Love between partners and relationship status in current opposite-sex sexual relationships of over 3 months, weighted percentages (N=6,329).**

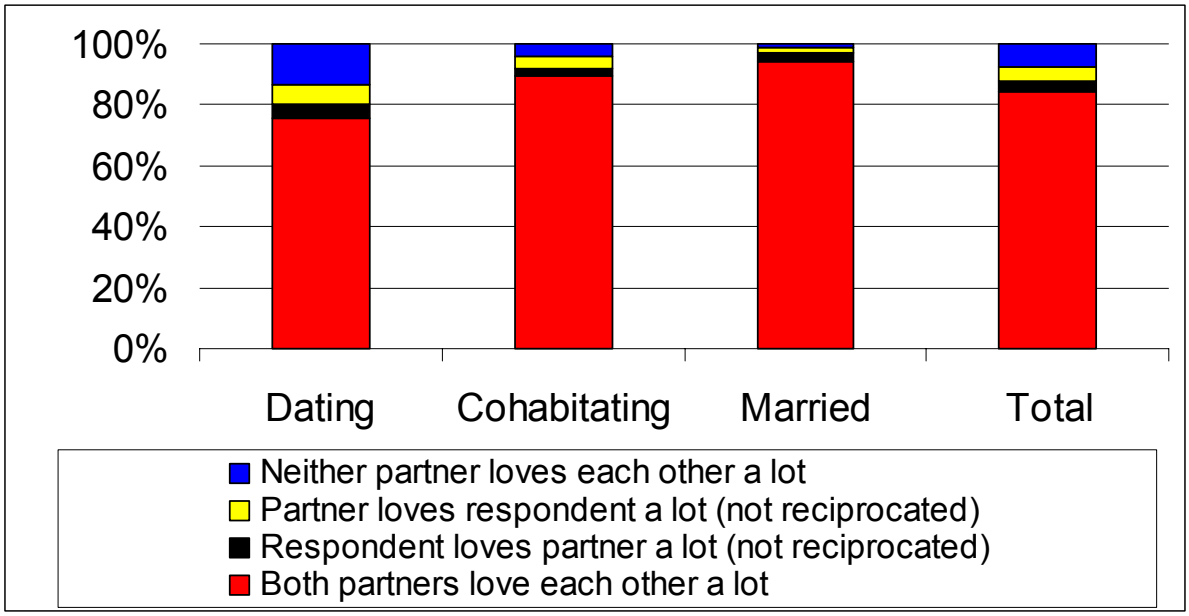



**Figure 2: Common combinations of sexual activities in current opposite-sex sexual relationship of over 3 months, weighted percentages (N=6,329).**

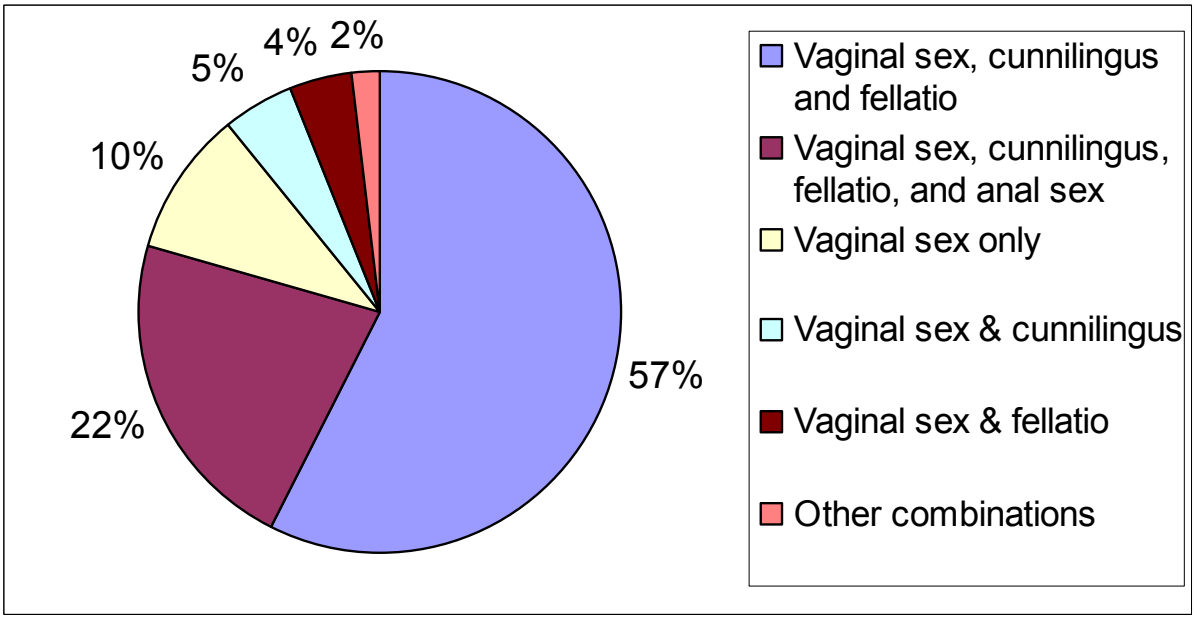


**Table 1: Characteristics of study sample respondents, weighted percentages.**

| | Percentages of Study Sample Respondents (N=6, 329) |
|---|---|
| **Sex** | |
| Male | 44.2 |
| Female | 55.8 |
| | |
| **Race** | |
| White | 68.5 |
| Latino | 11.3 |
| Black | 14.0 |
| Asian | 3.4 |
| Other | 2.1 |
| | |
| **Relationship type** | |
| Married | 26.5 |
| Cohabitating | 26.5 |
| Dating | 47.0 |
| | |
| **Loves partner** | |
| A lot | 87.7 |
| Somewhat | 7.5 |
| A little | 2.9 |
| Not at all | 1.9 |
| | |
| **Partner loves him/her** | |
| A lot | 88.8 |
| Somewhat | 7.2 |
| A little | 2.8 |
| Not at all | 1.3 |

**Table 2: Sexual activities in current opposite-sex sexual relationship of over 3 months by sex, weighted percentages.**

| | Females (N=3,735) | Males (N=2,686) | Study Sample (N=6,329) |
|---|---|---|---|
| **Vaginal intercourse ever with current partner*** | | | |
| Yes | 99.5 | 98.1 | 98.9 |
| No | 0.5 | 1.9 | 1.1 |
| **Fellatio ever with current partner*** | | | |
| Yes | 82.6 | 86.7 | 84.24 |
| No | 17.4 | 13.3 | 15.76 |
| **Cunnilingus ever with current partner*** | | | |
| Yes | 86.6 | 82.7 | 85.0 |
| No | 13.4 | 17.3 | 15.0 |
| **Anal sex ever with current partner** | | | |
| Yes | 22.6 | 22.9 | 22.7 |
| No | 77.4 | 77.1 | 77.3 |

* Females and males differ significantly, Design-based F test p-value < 0.05.

**Table 3: Odds ratios of participating in fellatio, cunnilingus and anal sex by sociodemographics and relationship characteristics.**

| | Fellatio | | | |
|---|---|---|---|---|
| | Females (N = 3,735) | | Males (N = 2,594) | |
| | OR | 95% CI | OR | 95% CI |
| Neither partner loves each other a lot | 1.00 | -- | 1.00 | -- |
| Both partners love each other a lot | 2.59* | 1.82, 3.68 | 1.80* | 1.23, 2.64 |
| Respondent loves partner a lot (not reciprocated) | 2.01* | 1.08, 3.75 | 2.17 | 0.85, 5.49 |
| Partner loves respondent a lot (not reciprocated) | 1.25 | 0.66, 2.38 | 1.28 | 0.64, 2.56 |
| Dating | 1.00 | -- | 1.00 | -- |
| Cohabitating | 1.35 | 0.99, 1.85 | 0.88 | 0.56, 1.37 |
| Married | 1.44* | 1.04, 1.99 | 1.12 | 0.67, 1.88 |
| White | 1.00 | -- | 1.00 | -- |
| Latino | 0.37* | 0.25, 0.55 | 0.56* | 0.36, 0.88 |
| Black | 0.16* | 0.11, 0.23 | 0.23* | 0.14, 0.38 |
| Asian | 1.18 | 0.56, 2.50 | 1.24 | 0.51, 3.04 |
| Other | 0.57 | 0.28, 1.17 | 1.35 | 0.55, 3.29 |
| Age (centered) | 1.15* | 1.06, 1.25 | 1.13* | 1.01, 1.26 |
| Age of first intercourse (centered) | 0.94* | 0.89, 1.00 | 0.94 | 0.87, 1.01 |

| | Cunnilingus | | | |
|---|---|---|---|---|
| | Females (N = 3,735) | | Males (N = 2,594) | |
| | **OR** | **95% CI** | **OR** | **95% CI** |
| Neither partner loves each other a lot | 1.00 | -- | 1.00 | -- |
| Both partners love each other a lot | 3.27* | 2.30, 4.65 | 3.91* | 2.57, 5.94 |
| Respondent loves partner a lot (not reciprocated) | 1.31 | 0.76, 2.26 | 5.19* | 2.21, 12.18 |
| Partner loves respondent a lot (not reciprocated) | 2.57* | 1.22, 5.42 | 1.51 | 0.82, 2.75 |
| Dating | 1.00 | -- | 1.00 | -- |
| Cohabitating | 1.29 | 0.93, 1.78 | 0.97 | 0.67, 1.40 |
| Married | 1.18 | 0.81, 1.72 | 1.22 | 0.76, 1.95 |
| White | 1.00 | -- | 1.00 | -- |
| Latino | 0.38* | 0.27, 0.53 | 0.52* | 0.36, 0.77 |
| Black | 0.23* | 0.16, 0.33 | 0.32* | 0.21, 0.47 |
| Asian | 1.14 | 0.61, 2.14 | 1.38 | 0.65, 2.94 |
| Other | 0.38* | 0.17, 0.81 | 1.31 | 0.57, 3.01 |
| Age (centered) | 1.13* | 1.04, 1.23 | 1.11* | 1.01, 1.23 |
| Age of first intercourse (centered) | 0.89* | 0.84, 0.94 | 0.99 | 0.93, 1.06 |

| | Anal Sex | | | |
|---|---|---|---|---|
| | Females (N = 3,735) | | Males (N = 2,594) | |
| | **OR** | **95% CI** | **OR** | **95% CI** |
| Neither partner loves each other a lot | 1.00 | -- | 1.00 | -- |
| Both partners love each other a lot | 1.32 | 0.85, 2.03 | 3.09* | 1.64, 5.82 |
| Respondent loves partner a lot (not reciprocated) | 1.08 | 0.59, 1.97 | 5.61* | 2.30, 13.68 |
| Partner loves respondent a lot (not reciprocated) | 1.18 | 0.60, 2.32 | 1.74 | 0.78, 3.87 |
| Dating | 1.00 | -- | 1.00 | -- |
| Cohabitating | 1.53* | 1.17, 2.02 | 1.85* | 1.28, 2.69 |
| Married | 1.24 | 0.93, 1.65 | 1.49* | 1.05, 2.13 |
| White | 1.00 | -- | 1.00 | -- |
| Latino | 1.02 | 0.74, 1.41 | 0.93 | 0.66, 1.30 |
| Black | 0.49* | 0.34, 0.72 | 0.64 | 0.40, 1.03 |
| Asian | 1.15 | 0.69, 1.92 | 0.85 | 0.41, 1.74 |
| Other | 0.89 | 0.46, 1.70 | 1.07 | 0.51, 2.25 |
| Age (centered) | 1.05 | 0.98, 1.12 | 1.04 | 0.96, 1.12 |
| Age of first intercourse (centered) | 0.86* | 0.82, 0.91 | 0.93* | 0.88, 0.98 |

* $p < 0.05$

## CHAPTER 3: Early First Sexual Intercourse and Sexually Transmitted Infections in Adolescents and Young Adults

This chapter is a pre-copy-editing, author-produced version of an article accepted for publication in the *American Journal of Epidemiology* following peer review. The definitive publisher-authenticated version (CE Kaestle, CT Halpern, W Miller, and C Ford. "Young Age at First Sexual Intercourse and Sexually Transmitted Infections in Adolescents and Young Adults," *American Journal of Epidemiology*. 2005; 161(8):774-80) is available online at: http://aje.oxfordjournals.org/cgi/reprint/161/8/774.

### Introduction

Sexual intercourse is commonly initiated during adolescence (Resnick *et al.*, 1997). Early initiation of sexual intercourse has been linked to increased risk of sexually transmitted infections (STIs) and pregnancy during adolescence (Andersson-Ellstrom *et al.*, 1996; Coker *et al.*, 1994). The increased STI risk is due, in part, to a biological predisposition of the immature cervix to infection if exposed (Harrison *et al.*, 1985; Kahn, Rosenthal, Succop, Ho, & Burk, 2002; Moss *et al.*, 1991), and to the increased likelihood of those who initiate sexual intercourse at younger ages to engage in riskier sexual behaviors (Coker *et al.*, 1994; Durbin *et al.*, 1993; O'Donnell, O'Donnell, & Stueve, 2001; Santelli *et al.*, 1998). Over the past several years, substantial funding has been directed towards programs to delay first sexual intercourse among adolescents (*i.e.*,

prolong virginity) as a strategy to reduce risks of STIs (*e.g.*, http://opa.osophs.dhhs.gov/titlexx/afl-grantees-ae.html).

Little is known about the long term consequences of early first sexual intercourse. Life-course theory proposes that societal expectations exist regarding the appropriate times for important transitions, and there can be consequences if life events do not meet these normative expectations (Elder, 1985; Igra & Irwin, 1996; Merriam, 1999). In regards to sexual behavior, adolescents develop elaborate sets of ideas concerning sexuality and their sexual roles well before they actually engage in sexual activity (Crockett, Raffaelli, & Moilanen, 2003). These sexual "scripts" serve as guidelines for what types of sexual behaviors and partners are appropriate at different ages, and could vary based on an adolescent's gender, race, or ethnicity (Crockett *et al.*, 2003; East, 1998; Laumann *et al.*, 1994; Upchurch *et al.*, 1999; Upchurch *et al.*, 1998). Non-normative sexual scripts and early first sexual intercourse (an off-time event) may represent a life-course transition that increases the likelihood of a longitudinal pattern of risky sexual activity. Negative consequences may accumulate to impact sexual functioning and relationship skills (Browning, 2002; Browning & Laumann, 1997). The subsequent sexual trajectory may produce adverse adult outcomes, such as elevated risk for sexually transmitted infections.

Whether delaying first sexual intercourse among adolescents influences risk of STIs in young adulthood is unknown. This is an important question because STIs during young adulthood can have significant adverse consequences for reproductive health. STIs can result in complications such as

pelvic inflammatory disease, infertility, ectopic pregnancy, preterm birth, and fetal abnormalities (Land & Evers, 2002; Moodley & Sturm, 2000). STIs may also increase the risk of HIV transmission (Moodley & Sturm, 2000; Sorvillo, Smith, Kerndt, & Ash, 2001). Young adults ages 18 to 24 report much higher annual rates of infection with STIs compared to older adults and carry a heavy disease burden (Moodley & Sturm, 2000; Sorvillo *et al.*, 2001). If delaying first sexual intercourse in adolescence carries a lasting benefit of reduced STIs in young adulthood, this would represent a potentially huge impact for such a strategy in terms of long-term health benefits to the population. If, alternatively, the benefits of later first intercourse do not last into adulthood, then different strategies that address the health education and service needs of young adults should be emphasized.

Most studies investigating the link between age of first sexual intercourse and risk of STIs among young adults have focused only on females and used convenience samples, self reports of STIs, or both. Results have been mixed. In Europe, women age 16 to 44 attending family planning centers who reported first intercourse at age 16 or younger did not have greater prevalence of *C. trachomatis* (Mardh *et al.*, 2000). In contrast, women attending Planned Parenthood clinics in Pennsylvania who reported first sex before age 15 were more likely to self-report an STI in the past 5 years (Greenberg *et al.*, 1992). In the 1995 National Survey of Family Growth (NSFG), women who reported earlier first intercourse were also more likely to report a history of infection with a bacterial STI (Miller *et al.*, 1999).

Little is known about the relationship between age of first intercourse and longitudinal risk of STIs for males and females, or for different race and ethnic groups. These demographic factors have been associated with variation in mean age of first sexual intercourse and with extremely wide variation in prevalence of STIs (Miller *et al.*, 1999; Miller *et al.*, 2004; Shields *et al.*, 2004; Upchurch *et al.*, 2002). Early first intercourse may be more normative in some socioeconomic, racial, ethnic, or gender groups, and so may not be tied to non-normative risk behaviors or to longitudinal risk for STIs (East, 1998; Upchurch *et al.*, 1999; Upchurch *et al.*, 1998). Therefore, the long-term impact of programs aimed at prolonging virginity may vary among groups of young adults and may mitigate or exacerbate current disparities.

My goal is to clarify the long-term sexual health consequences of the timing of first sexual intercourse and to elucidate how such consequences may vary by characteristics of the individual. I examined the following research questions: (1) is early first sexual intercourse associated with increased likelihood of testing positive for an STI among older adolescents and young adults? and (2) does the effect of early first sexual intercourse on later STIs vary by the respondent's sex, race, ethnicity, or current age?

## Materials and Methods

*Study sample*

I used data from adolescents and young adults who (1) reported having ever had intercourse and (2) were tested for *Chlamydia trachomatis, Neisseria gonorrhoeae*, and *Trichomonas vaginalis* in Wave III of The National Longitudinal

Study of Adolescent Health (Add Health) (Udry, 2003). Add Health was approved by the Institutional Review Board for the Protection of Human Subjects at the School of Public Health at the University of North Carolina at Chapel Hill. Add Health was designed to examine the determinants of health and health-related behaviors of adolescents who were enrolled in grades 7-12 during the 1994-1995 school year. To construct the original Wave I sample that was representative of US schools with respect to region of country, urbanicity, school size, school type, and ethnicity, 80 high schools and 52 middle schools were selected using systematic sampling methods and implicit stratification. Wave I included an in-home questionnaire that was administered to over 20,000 adolescent students from the sample schools.

In Wave III, conducted from August 2001 through April 2002, 15,197 of the original Wave I respondents were re-interviewed. Add Health respondents ranged in age from 18 to 26 years old at Wave III. Of the 14,322 respondents with assigned sampling weights in Wave III, 12,334 reported ever having intercourse. Of those, 9,844 had complete data on my variables of interest, with almost all of the missing data attributable to respondents lacking results for the biological STI lab tests (about 8 percent of respondents chose not to provide a specimen, about 2 percent were unable to provide a specimen at the time of the interview, 3 percent of specimens could not be processed due to shipping and laboratory problems, and 6 percent of the *N. gonorrhoeae* results were excluded after the LCR assays were recalled by the manufacturer). The 9,844 individuals with complete data make up my study sample.

*Measures*

Respondents were asked at Wave III to provide a specimen of first stream urine for STI testing. These specimens were analyzed for the presence of *C. trachomatis, N. gonorrhoeae*, and *T. vaginalis*. A ligase chain reaction (LCR) assay was used to detect the presence of *C. trachomatis,* and *N. gonorrhoeae* DNA. *T. vaginalis* DNA was detected with a PCR-ELISA assay. I used a composite measure of STI indicating a positive test for any of these STIs. This composite measure was chosen because of the low prevalence of *N. gonorrhoeae* and *T. vaginalis* in the study population, which limits the potential for separate models. Furthermore, although the sexual network structures may differ somewhat between these infections, the sexual behavioral risks are likely to be similar. This composite measure provides a more comprehensive measure of the respondent's sexual health status. Analyses using chlamydial infection alone as the outcome (not shown) produce results that are similar to those for all three STIs combined.

During the in-home interviews, sensitive questionnaire content on sexual activity was administered using computer-assisted self-interviewing (CASI) technology. Age of first intercourse was defined as the respondent's answer to the question "how old were you the first time you had vaginal intercourse?" in the Wave III questionnaire (vaginal intercourse was defined as the insertion of the penis into the vagina). Age of first intercourse was used as a continuous variable. Current age was defined as the respondent's age at the time of the Wave III questionnaire administration and was also used as a continuous variable. Other

variables included sex of the respondent (male referent compared to female), ethnicity (non-Latino referent compared to Latino), race (White referent compared to Black and other), and parental education (highest level of education attained by either parent categorized as less than high school (referent), completed high school, some additional training, and college graduate).

*Data Analysis*

I used Stata (version 7.0) to incorporate weights and account for Add Health's sampling design in all analyses (STATACorp). All estimates are standardized to the U.S. Census Bureau estimates of the adolescent population demographics, as recommended by the Add Health research team (Chantala & Tabor, 1999). Preliminary analyses examined the frequency distributions of the variables of interest for the entire sample and for those positive for STIs. I used simple logistic regression to obtain adjusted estimates of the prevalence odds ratios (PORs) of having an STI at Wave III. Respondent's sex, race, ethnicity, and parental education, which are associated with having STIs, were controlled for in multiple logistic regression analyses. Including both current age and age of first intercourse in these models controls for the length of time an individual has been sexually active. Therefore, my age of first intercourse measure does not represent the effects of exposure time.

In addition to controlling for potential confounding in my models, I also examined whether the relationship between early first intercourse and STIs was the same for different groups of respondents. I included interaction terms in the full logistic regression model to determine if the association between age of first

intercourse and STI prevalence varied by the sex, race, ethnicity, parental education, or current age of the respondent. In the initial full model, all variables and interaction terms with age of first intercourse were entered simultaneously. Interaction terms that were significantly associated ($\alpha$ = 0.10) with the outcome in the full model were retained in the final logistic regression model.

## Results

*Sample*

The study sample of sexually experienced young adults was about half male and half female, and the majority of respondents were White and non-Latino (Table 4). The mean current age in my study sample at Wave III was 21.8 years. Age of first sexual intercourse ranged from 10 through 25 years of age, with a mean of 16.4 years. About a third of the sample had had first intercourse by age 15 and over 90 percent had had intercourse by age 19. Age of first intercourse was not associated with being dropped from the sample due to incomplete data. Almost 7 percent of the sample tested positive for at least 1 STI at Wave III. When examined in one-year age increments, the STI prevalence for all current ages was above 5 percent.

*Bivariate relationship of first intercourse age and STIs*

The weighted percentage of the sample with positive STI tests dropped gradually with increasing age of first intercourse. In a simple (unadjusted) logistic regression model, the prevalence odds ratio (POR) for age of first intercourse and adult STIs was 0.89 (95 percent confidence interval (CI): 0.85, 0.93). The

decreasing probability of having an STI for respondents with higher ages of first sexual intercourse is shown graphically in Figure 3.

*Interaction with current age*

In multiple logistic regression analyses, the relationship between first intercourse and STI did not differ by sex, race, ethnicity, or parental education (interaction $p > 0.1$). However, the association of first intercourse age with STIs varied between younger and older respondents ($p = 0.017$, Table 5). For this reason, the prevalence odds ratios for age of first intercourse were calculated for each current age group, using a reference first intercourse age of 17 (Figure 4). Although an early age of first intercourse is consistently associated with higher STI levels compared to later ages of first intercourse, the difference is substantially smaller among older respondents, suggesting that the association between first intercourse age and STIs dissipates with time (Figure 4). For older adolescents, the age of first intercourse makes a significant difference in the prevalence odds ratio. For example, the odds of having an STI for an 18 year old who had first intercourse at age 13 are over twice those of an 18 year old who had first intercourse at age 17 (POR: 2.25; CI: 1.42, 3.59). In contrast, the prevalence odds ratio comparing a 24 year old with a first intercourse age of 13 to a 24 year old with a first intercourse age of 17 is 1.11 (CI: 0.88, 1.39). Thus, earlier first sexual intercourse is strongly associated with STIs for older adolescent males and females but not for young adults over age 23, when the association becomes insignificant.

## Discussion

Public health professionals must understand the immediate and long-term impact of the interventions to allocate resources optimally and design interventions for reducing STIs. Early first sexual intercourse is often used as an indicator of risky sexual behavior and many interventions are designed to delay sexual activity, such as programs encouraging virginity pledges and delivering abstinence education (Bearman & Bruckner, 2001; Perrin & DeJoy, 2003). This study indicates that later ages at first sexual intercourse are associated with a lower probability of having an STI among adolescents. Thus, programs that effectively prolong virginity among adolescents make sense as part of a comprehensive strategy to reduce STIs among adolescents, who carry a substantial part of the STI burden.

However, this study also indicates that delaying first intercourse would not be a sufficient strategy when attempting to reduce STIs among young adults. Even assuming programs could substantially delay sexual activity, by young adulthood an older age of first intercourse is no longer protective against STIs (by age 23 the timing of first sexual intercourse has no significant influence on STI prevalence). Therefore, programs to delay first sexual intercourse will have limited returns in terms of reproductive health among young adults. Mechanisms to reduce rates of STIs may be different among late adolescents versus young adults. These mechanisms must be elucidated to develop appropriately targeted prevention and intervention programs. Given that STIs represent a serious problem among young adults because of their prevalence and reproductive

health consequences and that delaying first intercourse is not protective for young adults, prevention efforts that hope to have a long-term impact should emphasize other factors. Strategies such as providing health care and sex education to youth before they become sexually active should be considered whether that activity begins early or late.

These results, based on biological STI tests, complement and expand upon the results from the NSFG study on female self-reports of lifetime STI infection (Miller *et al.*, 1999). Furthermore, this study provides evidence that the long-term STI consequences associated with early first intercourse apply not just to females but also to males, who have been regularly excluded from previous studies. While the focus of past research on females may be driven in part by data availability, it can also lead to the misconception that the timing of first intercourse is less important for males in terms of their sexual risk trajectories. This research found that the association between first intercourse timing and STIs did not differ between males and females. The absence of a gender difference suggests that programs aimed at delaying sexual activity should strive to effectively target both genders equally during adolescence. Furthermore, future research on the consequences of first intercourse timing should not focus exclusively on females.

I also found that the relationship between first sexual intercourse and STIs does not vary by race, ethnicity, or parental education. As early first intercourse appears to impact different race, ethnic and socioeconomic groups similarly for this outcome, effective programs that delay sexual activity would be equally

beneficial for adolescents across groups. This strategy could provide substantial benefits as a component of programs targeting adolescents in high risk communities.

This study used biological tests for STIs whereas several previous studies have had to use self-reports (Coker *et al.*, 1994; Greenberg *et al.*, 1992; Miller *et al.*, 1999). Because many STIs are asymptomatic and self-reports of symptoms correlate poorly with biological tests for STIs, using self reports probably results in substantial under-reporting of infection (Wellings & Cleland, 2001). Self-reports may also introduce bias into previous studies, as diagnosis may depend on access to regular health services. Furthermore, unlike reports of lifetime infections, these data included the age of the respondents at the time their infections were detected. This allowed me to explore how early first intercourse is associated with the prevalence of infection among specific age groups.

Because the Wave III STI biological test data are cross-sectional, some of the observed associations may represent cohort differences rather than developmental change between the ages of 18 to 23. However, it seems unlikely that, for example, the older respondents experienced a historical event that altered not only the relationship of current age to STIs but also altered the nature of the association between age of first intercourse and STIs. The gradual decline of the importance of age of first intercourse in predicting STIs is more likely explained by the continued development of the individual as time passes. Additional longitudinal research on young adults using biomarkers for STIs is

needed to confirm that the influence of first intercourse timing fades over time and is eclipsed by other factors as individuals age.

A concern with longitudinal studies such as Add Health is that some of the highest risk adolescents may have been lost to follow-up. However, an Add Health study of Wave I respondents who were lost to follow up in Wave II did not find statistically significant differences between Wave II respondents and those lost to follow up in gender, race/ethnicity, or any of the Wave I self reports of STIs. Those lost to follow up were significantly older, a difference due primarily to the design decision not follow Wave I seniors at Wave II (Crosby, Leichliter, & Brackbill, 2000). Recent analyses of nonresponse in Wave III of Add Health suggest that potential bias due to loss to follow up is small (Chantala, Kalsbeek, & Andraca, 2004). Furthermore, sampling weights for Wave III were recalculated using poststratification techniques, which helps ensure the representativeness of the sample.

About 8% of Wave III Add Health respondents refused to provide a urine sample, which may have introduced bias if those who refused had different prevalence patterns than other respondents. In this study sample, age of first intercourse was not associated with being dropped from the sample due to incomplete data. Furthermore, a detailed sensitivity analysis of potential systematic differences between persons who did and did not provide a urine specimen in Wave III found that conclusions regarding chlamydial infection prevalence were robust to differences in characteristics of nonrespondents (Miller *et al.*, 2004). However, it is possible that respondents who suspected they might

be infected may have refused because of fear that the information would be disclosed, resulting in an underestimation of prevalence, or may have volunteered to take advantage of the opportunity to verify their status at no cost, resulting in an overestimation of prevalence.

First sexual intercourse data are dependent on self-report, which may introduce misclassification problems (Brener *et al.*, 2003; Upchurch *et al.*, 2002). However, Add Health used computer-assisted self-interviewing (CASI), which allows respondents to answer directly into the computer for sensitive sections of the survey. This technology reduces the risk of accidental disclosure to the interviewer, improves privacy, and may reduce non-response and increase reporting of sensitive or stigmatized behaviors (Kann *et al.*, 2002; Turner *et al.*, 1998). Nevertheless, CASI cannot mitigate the possible influence of recall bias. First sexual intercourse is likely to be a relatively vivid event for many respondents, though, and the time gap between the event of first intercourse and the reporting of this event in this sample is relatively short.

While the age of first sexual intercourse may be a helpful indicator of risk for STIs among adolescents, clinicians should be aware that young adults who started having sex recently are at similar risk for STIs as those who have been having sex through most of their adolescence. Future research could explore the mechanisms underlying the convergence of the prevalence of infections for young adults with early and late first intercourse. Instead of targeting the act of first intercourse itself, perhaps we should focus on what distinguishes persistently higher risk individuals from others during adolescence. This strategy would

require further investigation into the possibility that early first intercourse is a marker for more persistent problems among some youth and that other experiences may substantially influence the relationship between early first intercourse and long-term STI risk.

**Table 4: Weighted percent of sexually experienced respondents in study sample and of those with sexually transmitted infections (STIs) by selected characteristics.**

| | Full Sample (N = 9,844) | STI Positive (N = 742) |
|---|---|---|
| **Sex** | | |
| Male | 49.9% | 41.8% |
| Female | 50.1% | 58.2% |
| **Race** | | |
| White | 79.9% | 44.3% |
| Black | 14.9% | 50.7% |
| Other | 5.2% | 5.1% |
| **Ethnicity** | | |
| Non-Latino | 90.2% | 87.3% |
| Latino | 9.8% | 12.7% |
| **Parental Education** | | |
| Less than high school | 16.5% | 24.8% |
| Completed high school | 31.3% | 34.2% |
| Some additional training | 20.5% | 16.2% |
| College graduate | 31.7% | 24.8% |
| **Current Age** | | |
| Less than 22 | 44.7% | 46.9% |
| 22 or greater | 55.3% | 53.1% |
| **Age of First intercourse** | | |
| Less than 16 | 33.6% | 46.3% |
| 16 or greater | 66.3% | 53.6% |

**Table 5: Multiple logistic regression model of sexually transmitted infection (STI) prevalence associated with age of first intercourse among sexually experienced respondents in study sample.**

| Characteristic | Beta Coefficient | Prevalence Odds Ratio | 95 Percent Confidence Interval | P |
|---|---|---|---|---|
| First Intercourse Age (continuous) | -0.74 | † | | 0.009 |
| Current Age (continuous) | -0.48 | † | | 0.017 |
| First Intercourse*Current Age (interaction term) | 0.03 | † | | 0.017 |
| | | | | |
| Male (referent) | | 1.00 | | |
| Female | 0.31 | 1.37 | 1.12, 1.66 | 0.002 |
| | | | | |
| Non-Latino (referent) | | 1.00 | | |
| Latino | 0.57 | 1.76 | 1.24, 2.51 | 0.002 |
| | | | | |
| White (referent) | | 1.00 | | |
| Black | 1.80 | 6.02 | 4.80, 7.56 | <0.001 |
| Other Race | 0.52 | 1.69 | 1.08, 2.66 | 0.023 |
| | | | | |
| Less than high school (referent) | | 1.00 | | |
| Completed high school | -0.25 | 0.78 | 0.61, 1.00 | 0.050 |
| Some additional training | -0.47 | 0.63 | 0.46, 0.86 | 0.004 |
| College graduate | -0.31 | 0.73 | 0.53, 1.00 | 0.048 |
| | | | | |
| Constant | 8.76 | | | 0.057 |

† Prevalence odds ratios for the continuous variables first intercourse age and current age, with the interaction term, are shown graphically in Figure 4

**Figure 3: Weighted proportion with a sexually transmitted infection (STI) by age of first intercourse and corresponding probability of an STI calculated from simple logistic regression coefficients before adjusting for demographic factors (N=9,844).**

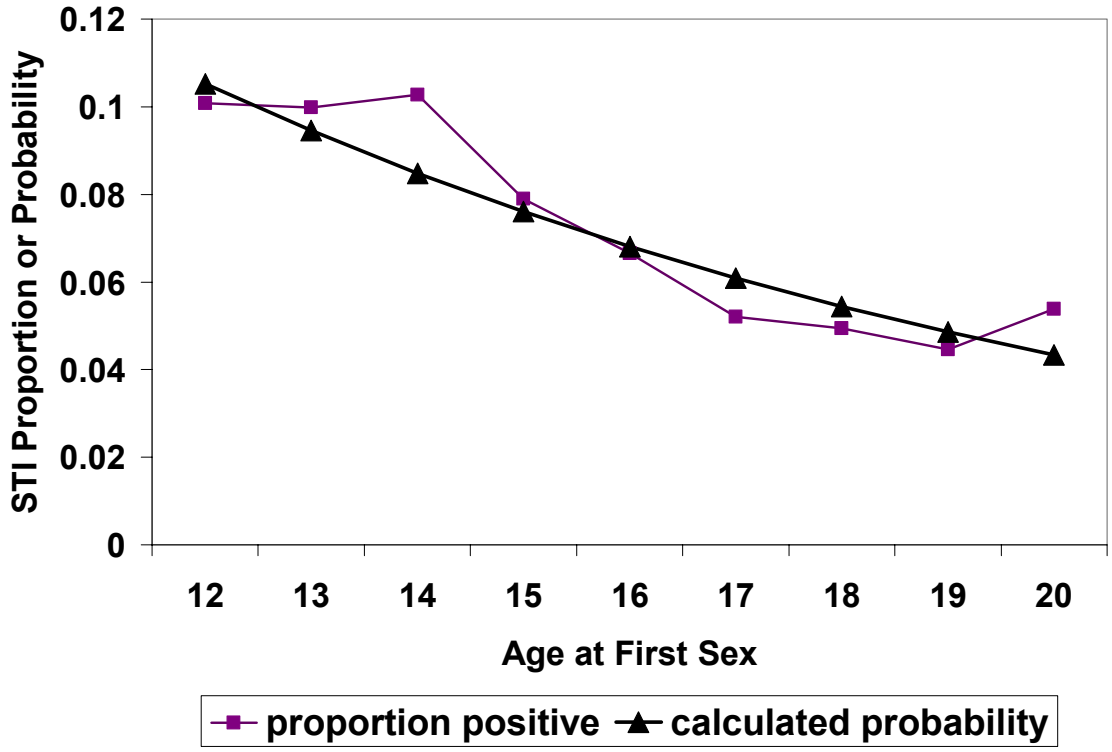
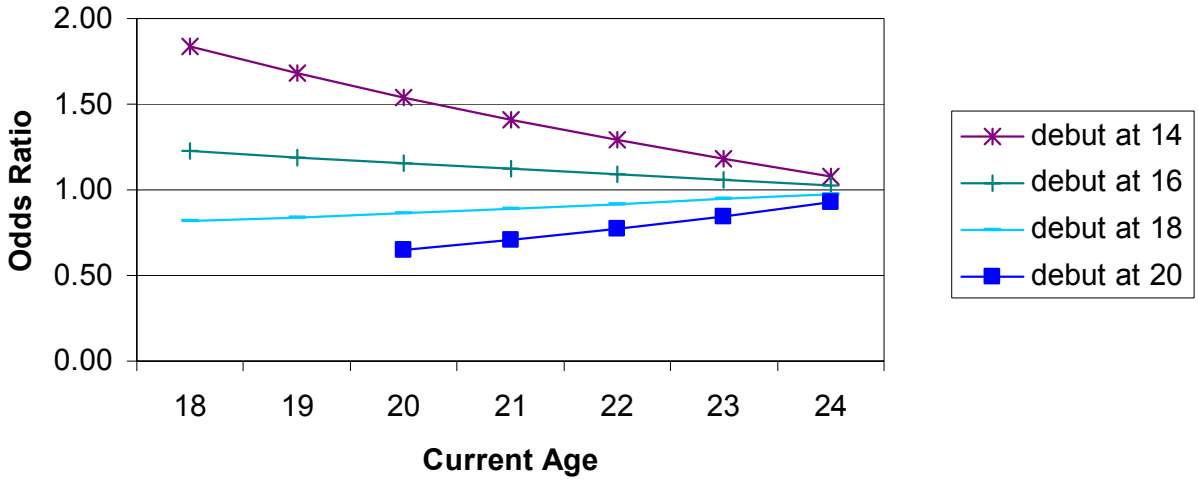


**Figure 4: Prevalence odds ratios from multivariate logistic regression analysis showing the relationship between age at first intercourse (reference first intercourse age 17) and sexually transmitted infections (STIs) by current age, adjusted for respondent's sex, race, ethnicity and parental education (N=9,844).**



## CHAPTER 4: Sexual Coercion and Disliked Sexual Activities among Current Opposite-Sex Partners in Emerging Adulthood

Early first intercourse is a concern for policy makers and public health educators because it has been linked to a range of higher risk sexual behaviors among adolescents (Andersson-Ellstrom *et al.*, 1996; Coker *et al.*, 1994; Santelli *et al.*, 1998). However, the longer-term implications of early first intercourse for sexual health are less clear, particularly for future experiences of sexual coercion.

*Timing of First Intercourse and Life-Course Theory*

Some behaviors, such as sexual activity, are considered undesirable and especially risky in early adolescence but are normative for young adults. For this reason, risk taking must be defined within the context of the life course (Igra & Irwin, 1996). Important life transitions are embedded in trajectories; the timing of when a transition takes place within a trajectory helps give it meaning. The social environment defines an anticipated timetable for life events that includes expectations about the appropriate times for important transitions, and there can be consequences if life events do not follow these normative expectations (Elder, 1985; Merriam, 1999). For example, there are expectations concerning the appropriate ages for first sexual intercourse, for marriage, and for childbearing. These norms can be dependent on a person's gender, race or ethnicity (*e.g.*, female adolescents often have older role-timing norms for sexual intercourse

than males, and Hispanic adolescents have reported older norms than Black adolescents) (East, 1998; East & Reyes, 2004). Life-course theory posits that events and transitions that are widely separated by time are connected; therefore, the later life course may reflect the influence of experiences that occurred perhaps decades earlier. In this way, events modify life trajectories. However, the resulting trajectory depends not only on the event itself, but on the different adaptations that follow it. Events can mean different things to different people in different contexts (Elder, 1985).

Sexual coercion can be a substantial problem for adolescents in their first sexual experiences. Even voluntary participation in a sexual activity may reflect a range of personal interest or subjective feeling about the activity, from extreme distaste to great desirability. In the National Health and Social Life Survey (NHSLS), only 71% of women and 92% of men reported that their first intercourse was something they wanted to happen at the time, but only 4.2% of women and 0.3% of men described it as forced (Laumann *et al.*, 1994). The 1995 National Survey of Family Growth (NSFG) data also support the idea that many first sexual experiences are not necessarily forced but neither are they wanted. In the NSFG, 27% of young women who described their first sexual intercourse as voluntary also rated it as four or lower on a ten-point scale of wantedness, where ten was most wanted (Abma, Driscoll, & Moore, 1998). Thus, many males and females are participating in unwanted sexual activities that are not forced, but may be the result of pressure or more subtle coercion. Individuals with earlier first sexual intercourse may be more vulnerable to coercion and

experiencing an unwanted sexual event. For example, in the NSFG, earlier age at first intercourse was strongly related to respondents regarding the event as unwanted (Abma *et al.*, 1998).

Young people have developed elaborate sets of ideas regarding sexuality and their sexual roles well before they actually engage in sexual activity. These sexual "scripts" serve as guidelines for what types of sexual behaviors are appropriate for which people at what ages and with which partners (Crockett *et al.*, 2003; Laumann *et al.*, 1994). Adolescents who have intercourse at a young age may feel they have less power and may learn to take a passive role in sexual encounters. Such sexual scripts and the often negative subjective response to early sexual intercourse (*e.g.*, low wantedness scores) may have long term consequences. This premise is supported by the literature. For example, in a survey of college women, Leitenberg *et al.* found that women who reported consensual sex at age 13 had more current symptoms of psychological distress compared to women who reported first intercourse at age 14 or 15 (Leitenberg & Saltzman, 2003).

The experience of early first intercourse may heighten interest in sexual activity and increase vulnerability to the advances of others. Subsequent sexual encounters may in turn reinforce the inappropriate elements of the sexual script provided by the earlier sexual experience. Patterns of sexual risk behaviors may be established as experiences perpetuate or exacerbate the initial behavior. Adolescents may select or create environments that support their behaviors, and these behaviors can reduce opportunities to learn pro-social alternatives (Moffitt,

1993). As a result, they could be relegated to more restricted social networks, which could limit the types of potential partners available to them. All of these differences would exacerbate the effects of being off time, adding to the cumulative forces that could restrict their behavioral repertoire. Negative consequences can accumulate to impact sexual functioning and relationship skills, and the subsequent sexual trajectory can produce adverse adult sexual health outcomes (Browning, 2002; Browning & Laumann, 1997).

*Sexual Coercion in Relationships*

A substantial body of evidence reveals that both males and females experience sexual coercion within established romantic relationships (Adams-Curtis & Forbes, 2004; Harned, 2005; Hines & Saudino, 2003; Irwin & Rickert, 2005; Katz, Carino, & Hilton, 2002; Struckman-Johnson, Struckman-Johnson, & Anderson, 2003; Waldner-Haugrud & Magruder, 1995). Although the definitions of "coercion" vary by study, a large proportion of young adults report unwanted sexual acts, ranging from unwanted touching or kissing to acts of intercourse (see Struckman-Johnson, *et al.* for a detailed discussion of the literature on the prevalence of coercion tactics) (Struckman-Johnson *et al.*, 2003). In a study that defined coercion as using tactics to gain sexual activities after a partner had refused those activities, almost 70% of college respondents had experienced at least one post-refusal tactic since the age of 16. One-third reported using a tactic (Struckman-Johnson *et al.*, 2003). Non-physical coercion tactics have also been tied to a greater willingness to use force to obtain sex and to acceptance of interpersonal violence and rape myths (Craig, Kalichman, & Follingstad, 1989;

Degue & DiLillo, 2004). In addition, use of sexual coercion is associated with physical and psychological abuse of partners (Hogben & Waterman, 2000).

Often, the perpetrator of forced sexual activity is a romantic partner. For example, about half of women report that the person who forced them to have sex was either a spouse or someone they were in love with (Laumann *et al.*, 1994). It is important to recognize that even relationships that are described as loving can include harmful sexual events. Experiencing forced sex has been associated with a variety of sexual health problems, including difficulty achieving orgasm, pain during sex, not finding sex pleasurable, anxiousness over sexual performance, and trouble lubricating. In addition, women who have ever been forced also report higher levels of sexual risk behaviors, including higher numbers of partners and group sex (Laumann *et al.*, 1994).

There is debate about gender differences in the use of various coercive tactics. For example, among college students in ongoing romantic relationships, both males and females indicated that males were more likely to be the perpetrator of sexual coercion within that relationship. However, a substantial number of both males and females reported being perpetrators of coercion (29% of males and 13.5% of females) (Hines & Saudino, 2003). College males also score higher than females on scales that examine coercive tactics such as unwanted touching, removal of clothing, and verbal attempts to obtain intercourse (Hogben & Waterman, 2000). In addition to using sexual coercion at different rates, males and females may also use different types of sexual coercion tactics. For example, in the study of post-refusal sexual tactics, not only

did significantly more females than males report experiencing at least one tactic (78% versus 58%), but females specifically reported experiencing higher levels of certain types of tactics, such as persistent kissing and touching, repeated asking, lies, exploitation while intoxicated, purposeful attempts to get them drunk, physical restraint, and threats of physical harm (Struckman-Johnson *et al.*, 2003). Males also experienced substantial amounts of post-refusal tactics, but females overall tended to use less severe or exploitative tactics than males (Struckman-Johnson *et al.*, 2003). Another study of coercive techniques found that tactics such as detainment, being held down, persistent touching, and lying were used more often against women, while blackmail was used more often against men (Waldner-Haugrud & Magruder, 1995). The authors speculated that male and female coercers are following different gender-based sexual scripts (Waldner-Haugrud & Magruder, 1995). Because sexual coercion may encompass different behaviors and experiences for males and females, analyses should be stratified by gender.

## Research Questions

There is little evidence available on the long-term potential influence of early first sexual intercourse during adolescence on later sexual health through young adulthood. In particular, it is not known if the timing of first sexual intercourse is associated with later experiences of sexual coercion in relationships. The literature on sexual coercion itself focuses primarily on college students rather than representative samples (Adams-Curtis & Forbes, 2004; Craig *et al.*, 1989; Degue & DiLillo, 2004; Harned, 2005; Hines & Saudino, 2003;

Hogben & Waterman, 2000; Struckman-Johnson *et al.*, 2003; Waldner-Haugrud & Magruder, 1995). Also, despite evidence that a substantial amount of sexual coercion takes place in well-established romantic relationships, many of the studies examine lifetime experiences of sexual coercion rather than coercion within the context of a specific relationship (Craig *et al.*, 1989; Struckman-Johnson *et al.*, 2003; Waldner-Haugrud & Magruder, 1995). This study uses a nationally representative sample of young adults and includes not only individual characteristics but also the characteristics of the relationship in which coercion occurs.

Using a life-course perspective, this study explores the role of coercion in current sexual relationships among young adults. This study will clarify whether men and women often use or experience sexual coercion or engage in behaviors they do not particularly like within the context of current sexual relationships, and how this might differ depending on respondent and relationship characteristics, such as the relationship type (dating, cohabitating, or married) and reciprocation of love between partners. The specific aims are:

1. To describe whether young adult males and females used or experienced sexual coercion with their current sexual partners.
2. To describe whether young adult males and females engaged repeatedly in disliked sexual activities with their current sexual partners.
3. To determine the role of the timing of first sexual intercourse and relationship characteristics in predicting these experiences among young adults.

## Research Methods

*Study Sample*

I used data from Waves I and III of the National Longitudinal Study of Adolescent Health (Add Health). Add Health's Wave I included a computer assisted in-home questionnaire that was administered to over 20,000 adolescent students (enrolled in grades 7 to 12) in 1994-1995. These respondents included a core of about 12,000 adolescents who comprised a nationally representative sample. Several supplementary samples from groups that typically may not be represented in large enough numbers for meaningful analysis, such as children with disabilities, Black children from highly educated households, and children with Chinese, Cuban and Puerto Rican ethnic backgrounds were also obtained. Weights based on the respondent's computed probability of inclusion are used to produce unbiased estimates. In Wave III, conducted from August 2001 through April 2002, 15,197 of the original Wave I respondents were re-interviewed. Add Health respondents ranged in age from 18 to 26 years old at Wave III. The interviews included questions on the respondent's romantic relationships, sexual experiences, and behaviors.

The analysis sample was restricted to young adults with current sexual relationships. Of the 14,322 respondents who were assigned weights by Add Health in Wave III, 11,087 reported information about their most recent sexual partner (78.12% weighted). Of these respondents, 7,468 were still in a relationship with their most recent sex partner (52.27% of all respondents, weighted). Of the current sexual relationships reported, 126 were same-sex

relationships (less than 1% weighted of the total sample). Same-sex relationships were not included in the study sample. Unfortunately, because of the small number of same-sex relationships, they could not be examined separately. Although the definition given in Add Health for sexual relations as "vaginal intercourse (a man inserts his penis into a woman's vagina), oral sex (a person puts his or her mouth on another person's sex organs), or anal sex (a man inserts his penis in to his partner's anus or asshole)" is fairly broad, it may have excluded some same-sex relationships from being counted as current sexual relationships.

The sample was also restricted to allow the examination of characteristics of relationships that have had a chance to establish sexual patterns and expectations rather than the characteristics of one-night partnerships or other brief encounters. To be sure that the relationship examined had the opportunity to establish a range of sexual activities, I excluded those under 3 months duration. This left 6,978 respondents with a current, sexually active relationship of over 3 months in duration (48.86% of the total sample, weighted). Of these respondents with qualifying opposite sex relationships, 6,329 had complete data on demographics, on whether they engaged in vaginal, oral or anal sex with that partner and on experiencing or using coercion, and on perceived levels of love between partners. These 6,329 make up my primary study sample.

Of the primary study sample, a subset of 4,469 respondents were asked about whether they liked the sexual activities they engaged in with their partner and whether they intended to engage in those activities again. These

respondents make up my secondary study sample to examine repeated engagement in disliked activities.

In addition to indicating if the relationship had lasted for over three months or not, respondents were asked to provide more specific information about when they started the relationship so the exact duration could be calculated. However, there was substantial missing data on this measure so exact duration was not included as a variable in the analyses presented here. Analyses (not shown) that controlled for duration with the smaller subpopulation that provided exact duration information produced similar results to those described here.

*Measures*

Sexual Coercion. Respondents were asked "how often have you insisted on or made <partner> have sexual relations with you when {he/she} didn't want to?" Any positive response was coded as a yes for forcing sexual relations. They were also asked "how often has <partner> insisted on or made you have sexual relations with {him/her} when you didn't want to?" Any positive response was coded as a yes for having been forced.

Repeated Disliked Sexual Activities. Young people often rank experiences that they report as voluntary to be unwanted. Such unwanted activity indicates a negative sexual experience subjectively as well as possible exposure or vulnerability to pressure and coercion that may be more subtle than force. Therefore, in addition to the direct question on forced sex, I broadened the scope of my definition of coercion to include disliked experiences. Respondents were asked if they ever had vaginal sex, fellatio, cunnilingus, or anal sex with their

partner. If they indicated yes for a specific type of sexual activity, they were then asked if they did that on one occasion or more than one occasion. They were also asked, “how much do you like having <sexual act> with <partner>?” with the following answer options: “like very much,” “like somewhat,” “neither like nor dislike,” “dislike somewhat,” or “dislike very much.” After being asked if they liked specific sexual activities, respondents were asked if they expect to engage in that activity with that partner again. If a respondent indicated that they (1) dislike the activity very much and (2) either engaged in it more than once or expect to engage in that behavior again, then the respondent was coded positive for engaging repeatedly in disliked sexual activities. By not including people who disliked an activity but only engaged in it once and do not expect to again, I excluded those who experimented with an activity once and then dropped the activity when they found it unappealing.

Age at First Intercourse. During the in-home interviews, sensitive questionnaire content on sexual activity was administered using computer-assisted self-interviewing (CASI) technology. Age of debut was defined as the respondent’s answer to the question “how old were you the first time you had vaginal intercourse?” in the Wave III questionnaire (vaginal intercourse was defined as the insertion of the penis into the vagina). Age of debut was used as a continuous variable.

Love for Partner and Perceived Love from Partner. Respondents were asked “how much do you love <partner>?” and “how much do you think <partner> loves you?” Answer choices were “a lot,” “somewhat,” “a little,” or “not

at all." From these questions, four categories were created regarding the current relationship described by the respondent: (1) both partners love each other a lot, (2) neither partner loves each other a lot, (3) respondent loves partner a lot (not reciprocated), (4) partner loves respondent a lot (not reciprocated).

Current age was defined as the respondent's age at the time of the Wave III questionnaire administration and was used as a continuous variable. Other variables included: *biological sex* of the respondent (male referent compared to female), *race/ethnicity* (non-Latino White referent compared to Latino, Black, Asian, or other), and *relationship status* (dating referent compared to cohabitating, or married).

*Statistical Analyses*

I used the Stata statistical package to incorporate weights and adjust for Add Health's sampling design in all analyses and to provide estimates that are standardized to the U.S. Census Bureau estimates of the adolescent population demographics (Chantala & Tabor, 1999; STATACorp). I tabulated whether males and females used or experienced sexual coercion with their current partners or had repeated experiences of disliked sexual activities. I used multiple logistic regression models to determine the role of age at first intercourse, demographics and relationship characteristics (relationship type and perceived love reciprocation between partners) as predictors of experiencing coercion or repeated disliked activities for males and females. Tests of heterogeneity to determine if the effect of age at first sex was modified (varied by) respondent's current age or race and ethnicity did not support stratifying the models.

*Results*

The mean age of first sexual intercourse was 16.4 (range 10 to 25). The majority of respondents in the primary study sample used for the coercion analyses were female and White (Table 6). About half of the respondents were in dating relationships, with about a quarter in cohabitating relationships and a quarter in married relationships. Almost 85% of respondents reported that both partners in the relationship love each other "a lot." The sub-sample of respondents who were asked about how much they liked the sexual activities with their partners included slightly higher proportions of cohabitating or married respondents and respondents reporting mutual love (Table 6).

*Occurrence of Coercion and Repeated Engagement in Disliked Activities*

Males and females reported similar levels of using coercion with their partners and similar levels of partners using coercion (Table 7). Sexual coercion was often mutual; of those who reported sexual coercion in their relationship, 30% reported both victimization and perpetration, 52% reported victimization only, and 18% reported perpetration only (victimization and perpetration were associated with each other among both males and females, Pearson design-based F tests $p<0.05$). Significantly more females than males (11% vs. 3%) engaged repeatedly in disliked sexual activities, primarily fellatio and anal sex (Table 7). There were large differences in the level of liking by type of activity (Figure 5). The large majority of both sexes liked having vaginal sex very much (92% of males and 86% of females). While males who received oral sex overwhelmingly liked it very much (83%), only 40% of women who performed it

liked it very much. However, only about 7% reported actually disliking fellatio somewhat or very much. The majority of males and females who experienced cunnilingus report liking it very much (62% and 75%, respectively). In contrast, only about half of males and 14% of females who had anal sex with their partner reported liking it very much. In fact, about 40% of females reported disliking it somewhat or very much.

*Multivariable Logistic Regression Models*

Perpetration. Several respondent and relationship characteristics were associated with sexual coercion perpetration (Table 8). Asian males had higher odds of perpetrating coercion than White males, and cohabitating and married males had higher odds of perpetrating compared to dating males. Latina and other race/ethnicity females had higher odds of perpetrating coercion than White females, and females who love their partner "a lot" but felt that their level of love was not reciprocated had higher odds of perpetration than those in relationships where high levels of love were mutual. Age at first sexual intercourse was not a significant predictor of perpetration for males or females (Table 8).

Victimization. Sexual coercion victimization was also predicted by several respondent and relationship characteristics (Table 8). Latino and Asian males had higher odds than White males for being coerced. Males who felt their partner loved them "a lot" but did not feel the same level of love for their partner had higher odds of experiencing coercion than those in relationships where high levels of love were mutual. Latina, Black and Asian females had higher odds of being coerced than White females. Cohabitating and married females had higher

odds of being coerced compared to dating females. Females who reported that neither partner loved the other "a lot," females who loved their partner "a lot" but did not feel their partner reciprocated, and females who felt their partner loved them "a lot" but did not feel the same level of love for their partner all had higher odds of experiencing coercion compared to females who reported that they love their partners a lot and that their love was reciprocated. Age at first sexual intercourse was not a significant predictor for victimization for males or females (Table 8).

Disliked Activities. While females reported substantially higher levels of engaging repeatedly in disliked sexual activities compared to males (Table 7), it is interesting to note that few other respondent or relationship characteristics predicted participation in disliked activities. Males of other race/ethnicity had lower odds of engaging in disliked sexual activities than White males, and married females had higher odds of participating in disliked sexual activities than dating females (Table 8).

## Discussion

This study makes a substantial contribution to the literature on sexual coercion by examining coercion within the context of relationship characteristics, using a nationally representative sample, and including female perpetration and male victimization. Over 6% of males and females in current sexual relationships report sexual coercion victimization resulting in sexual relations, and about 4% report perpetration within that relationship, consistent with previous research indicating that coercion is a common experience in young adulthood. Over 11%

of females also report repeatedly engaging in disliked sexual activities within that relationship. Thus, a large number of males and females experience coercion during sexual activity, even in the context of a longer-term romantic relationship. Furthermore, many females dislike some aspects of their sexual activities, particularly fellatio and anal intercourse. It may be that some individuals feel obliged to engage in disliked activities not because of direct pressure from partners but because of perceived expectations of how sexual partners should behave or because of trade-offs in other areas of their relationship. While most people like the sexual activities they engage in, the proportion of people who repeatedly engage in disliked activities should be of special concern.

Neither sexual coercion victimization nor perpetration is associated with the timing of first sexual intercourse. Furthermore, engaging in disliked activities in a current relationship is not associated with age at first intercourse. There are no significant interactions with the respondent's race and ethnicity or age, indicating that delayed sexual initiation is not associated with lower levels of sexual coercion in young adult current relationships for males or females regardless of race and ethnicity or age. Thus, this research does not support the hypothesis based on life-course theory that the timing of the transitional event of first intercourse influences a person's trajectory in a way that increases the risk of coercive sex in romantic relationships through emerging adulthood.

This study only examines the effect of a single event (first intercourse) on later sexual coercion in relationships. Other characteristics or experiences during childhood and adolescence may play more important roles in predicting

sexual coercion through the life-course. Future research may benefit from examining potential early predictors of perpetration, such as gender attitudes or antisocial behaviors, to help identify early risk factors for perpetration and to help design timely interventions. Although sexual coercion is sometimes defined in the literature as a male behavior (Degue & DiLillo, 2004; Shackelford & Goetz, 2004), the substantial level of male victimization reported here indicates that females should not be excluded from research into perpetration of sexual coercion.

This study found higher rates of victimization than perpetration, which concurs with some previous research (Katz *et al.*, 2002; Struckman-Johnson *et al.*, 2003). While this likely reflects differences in the social desirability of reporting such acts, it may also reflect a failure of perpetrators to fully recognize that their partners are unwilling or that their own behaviors are coercive (Struckman-Johnson *et al.*, 2003). Some researchers have speculated that males and females may be interpreting the words “insisted on” differently (Hines & Saudino, 2003). Future qualitative research may be required to better understand how males and females interpret language used to describe coercion and how they conceptualize their own actions. If differences in reports of perpetration and victimization stem from misunderstandings or differing perceptions, then this would highlight the need for better educational efforts to explicitly define coercion among adolescents and young adults before it becomes a component of their long-term romantic relationships.

Reports of sexual coercion in this study should be considered conservative estimates. Because the study sample is restricted to current relationships, these analyses apply only to relationships that did not dissolve as a result of sexual coercion or disliked sexual experiences. In addition, sexual coercion is a particularly sensitive area for self reports, making under reporting likely. However, to minimize under reporting, Add Health makes use of computer-assisted self-interviewing (CASI), which can help provide privacy and improve reporting of potentially stigmatizing behaviors (Kann *et al.*, 2002; Turner *et al.*, 1998).

The most substantial limitation of this research is the inability to distinguish between physical and nonphysical coercion tactics or to determine the level of distress felt by the respondent. Interpretations of the single question on sexual coercion ("how often have you insisted on or made <partner> have sexual relations with you when {he/she} didn't want to?") may differ. Individuals may include or not include various tactics in their interpretation depending on their personal characteristics (*e.g.*, male/female) or even depending on whether they are considering perpetration or victimization. Unfortunately, large-scale studies often cannot devote enough resources to each topic of interest to use elaborate scales to measure experiences such as coercion. However, future research with representative populations would benefit from the use of more detailed measures of sexual coercion that can distinguish between intercourse versus other contact such as touching, and between coercive strategies such as verbal coercion versus violence and threats (Hogben & Waterman, 2000; Rapaport & Burkhart,

1984; Shackelford & Goetz, 2004). Representative population samples are likely to capture a range of severity in terms of sexual coercion tactics. The examination of more severe forms of coercion, such as the use of physical violence or threat of weapons, may be difficult in general samples of romantic couples because of low prevalence and therefore may require targeted samples (Hogben & Waterman, 2000).

Previous research has shown that sexual coercion can play an important role in the ending of a friendship or romantic relationship (Struckman-Johnson *et al.*, 2003). It is important for counselors and others who work with adolescents and young adults to understand why some individuals choose to continue a relationship after a coercive sexual experience with that partner. Future research should focus on characteristics of the individuals, the relationship, and the coercive experience that may differentiate between events that lead to relationship termination versus those that do not. For example, gender socialization may play a role in the likelihood that someone would break off a relationship after experiencing sexual coercion or disliked sex.

Clinical practitioners need to be aware of the substantial proportion of enduring relationships that include sexual coercion. Some individuals may need assistance to leave coercive relationships if they are in distress. Males and females may need training to accept initial refusals and to be sensitive to a partner's unwillingness to engage in an activity. The reports of perpetration by 4% of the study sample indicate that individuals often do understand their partners' unwillingness to have intercourse, but choose to employ coercive

tactics anyway. Sexual coercion was reciprocated in many relationships and reports of perpetration and victimization were associated, which may imply that for some relationships, sexual coercion has become integrated as a mutual component of sexual interactions, or that individuals who use coercive tactics tend to find partners who also incorporate coercion in their behavioral strategies.

Further research is needed to better understand the relationship context of sexual coercion and disliked sexual activities. People who feel they are in non-equitable relationships may become distressed and try to restore equity (Sprecher, 1998). They may feel that they or their partners are entitled to additional rewards. Perceived non-reciprocity of love may therefore have sexual consequences. Sexual favors, such as engaging in a disliked activity or having intercourse when a partner insists, may be reciprocated in another relationship area. However, in the current study, love and the reciprocity of love do not play a significant role in predicting disliked sexual activities. In fact, the main factor that significantly predicts disliked activities is being female, which may reflect the importance of gendered sexual and relationship scripts in determining sexual activities and relationship trade-offs. Females may feel they are expected to be less assertive about their sexual preferences or they may engage in disliked activities in exchange for feelings of intimacy. In contrast, relationship characteristics are associated with sexual coercion. For example, the odds of reports of female victimization are substantially higher in couples that do not report mutually high levels of love. In particular, females who report that their partners love them more than they love their partners are more likely to also

report victimization. It is important to note that causality is not clear in these circumstances. It may be that some individuals interpret the insistence of a partner to be a symbol of greater interest or love. Alternatively, individuals who do not think their partners reciprocate their feelings may insist on sexual activities as a way of relieving distress, increasing a sensation of control, or restoring perceived equity to a relationship (Sprecher, 1998).

The roles of coercion and disliked activities in current sexual relationships among young adults have implications for reproductive health. It is important that individuals be empowered to have control over all aspects of their sexual activities. Sexual activities often include some level of risk for infection and/or unwanted pregnancy. The evidence that young adults, particularly females, are exposing themselves to such risk despite the fact that they do not like the activities should concern educators and policy makers, as this may imply a potential loss of control or influence over sexual decision making and dynamics within the relationship. Prevention efforts should be based on a broad understanding of how such dynamics play out within couples.

**Table 6: Study sub-samples from Add Health Wave III, weighted percentages by selected characteristics.**

| | Primary Sample for Coercion Analyses (N=6,329) | Secondary Sample for Disliked Activities Analyses (N=4,469) |
|---|---|---|
| **Sex** | | |
| Male | 43.7 | 43.3 |
| Female | 56.3 | 56.7 |
| **Relationship Status*** | | |
| Dating | 46.2 | 40.3 |
| Cohabitating | 27.0 | 29.7 |
| Married | 26.8 | 30.0 |
| **Race*** | | |
| White | 68.4 | 70.3 |
| Latino | 11.3 | 11.0 |
| Black | 14.1 | 12.7 |
| Asian | 3.3 | 3.1 |
| Other | 2.9 | 2.9 |
| **Love*** | | |
| Neither partner loves each other a lot | 7.6 | 6.4 |
| Both partners love each other a lot | 84.3 | 85.4 |
| Respondent loves partner a lot (not reciprocated) | 3.5 | 3.5 |
| Partner loves respondent a lot (not reciprocated) | 4.6 | 4.7 |

* Significant differences between those who did and did not answer questions on liking sexual activities (Pearson Design-based F test $p<0.05$)

**Table 7: Coercion victimization and perpetration and repeated disliked selected sexual activities with current opposite-sex sexual partner, weighted percentages.**

| | Males | Females |
|---|---|---|
| **Coercion (N=6,329)** | | |
| Perpetration (used force/insisted) | 3.9 | 3.8 |
| Victimization (partner used force/insisted) | 6.0 | 6.9 |
| **Disliked Activities (N=4,469)** | | |
| Repeated Disliked Vaginal Sex | <1 | <1 |
| Repeated Disliked Fellatio* | <1 | 5.7 |
| Repeated Disliked Cunnilingus* | 2.7 | 1.3 |
| Repeated Disliked Anal sex* | <1 | 4.7 |
| Any Repeated Disliked Activities* | 3.3 | 11.6 |

* Significant differences between males and females (Pearson Design-based F test $p<0.05$)

**Table 8: Odds ratios for forced, insisted, and disliked sexual experiences.**

| | Coercion (Forced/Insisted) Perpetration, Males (N=2,594) | | Coercion (Forced/Insisted) Perpetration, Females (N=3,735) | |
|---|---|---|---|---|
| | **OR** | **95% CI** | **OR** | **95% CI** |
| Current Age (centered) | 1.01 | 0.86, 1.18 | 0.98 | 0.87, 1.09 |
| Age at first sex (centered) | 0.99 | 0.90, 1.09 | 0.97 | 0.88, 1.07 |
| **Relationship Status** | | | | |
| Dating (reference) | 1.00 | -- | 1.00 | -- |
| Cohabitating | 2.59* | 1.21, 5.53 | 1.73 | 0.99, 3.01 |
| Married | 2.54* | 1.24, 5.18 | 1.37 | 0.76, 2.47 |
| **Race** | | | | |
| White (reference) | 1.00 | -- | 1.00 | -- |
| Latino | 1.02 | 0.46, 2.27 | 2.25* | 1.30, 3.87 |
| Black | 1.13 | 0.53, 2.39 | 1.61 | 0.94, 2.76 |
| Asian | 3.28* | 1.45, 7.44 | 1.37 | 0.61, 3.09 |
| Other | 0.44 | 0.12, 1.60 | 3.79* | 1.55, 9.25 |
| **Love** | | | | |
| Both partners love each other a lot (reference) | 1.00 | -- | 1.00 | -- |
| Neither partner loves each other a lot | 1.09 | 0.40, 2.96 | 1.53 | 0.69, 3.40 |
| Respondent loves partner a lot (not reciprocated) | 3.04 | 0.95, 9.80 | 4.32* | 2.04, 9.15 |
| Partner loves respondent a lot (not reciprocated) | 0.73 | 0.25, 2.09 | 1.91 | 0.77, 4.76 |

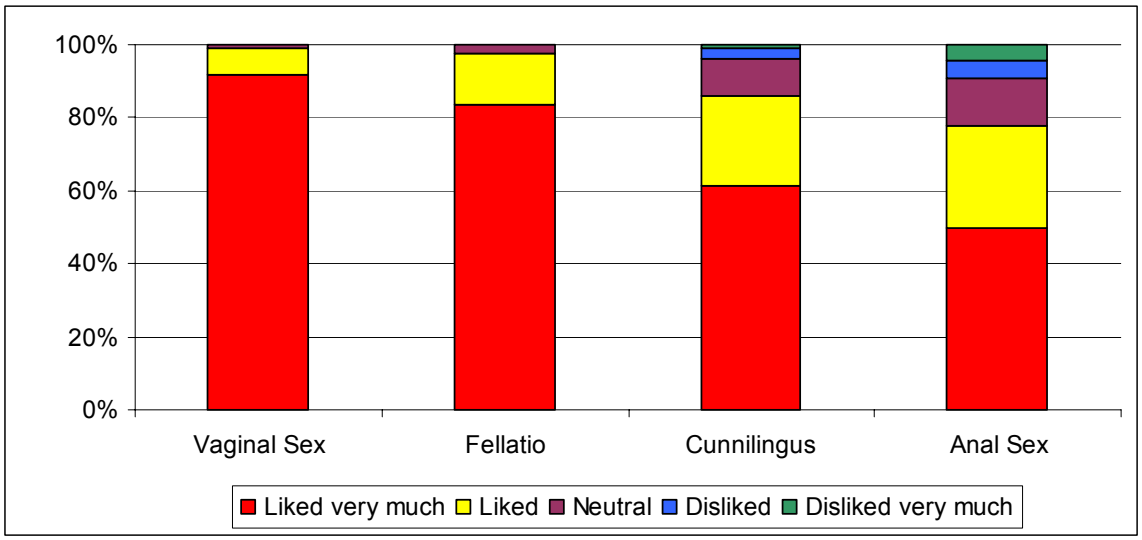
| | Coercion (Forced/Insisted) Victimization, Males (N=2,594) | | Coercion (Forced/Insisted) Victimization, Females (N=3,735) | |
|---|---|---|---|---|
| | **OR** | **95% CI** | **OR** | **95% CI** |
| Current Age (centered) | 0.99 | 0.88, 1.11 | 1.02 | 0.92, 1.12 |
| Age at first sex (centered) | 0.92 | 0.83, 1.02 | 0.97 | 0.89, 1.06 |
| **Relationship Status** | | | | |
| Dating (reference) | 1.00 | -- | 1.00 | -- |
| Cohabitating | 1.51 | 0.92, 2.47 | 2.29* | 1.53, 3.39 |
| Married | 1.37 | 0.71, 2.65 | 1.91* | 1.24, 2.95 |
| **Race** | | | | |
| White (reference) | 1.00 | -- | 1.00 | -- |
| Latino | 1.09* | 0.58, 2.01 | 2.04* | 1.24, 3.36 |
| Black | 1.16 | 0.71, 1.90 | 1.52* | 1.01, 2.28 |
| Asian | 3.24* | 1.48, 7.08 | 2.30* | 1.27, 4.15 |
| Other | 0.70 | 0.12, 3.96 | 2.14 | 0.99, 4.62 |
| **Love** | | | | |
| Both partners love each other a lot (reference) | 1.00 | -- | 1.00 | -- |
| Neither partner loves each other a lot | 0.67 | 0.28, 1.62 | 2.96* | 1.64, 5.34 |
| Respondent loves partner a lot (not reciprocated) | 2.61 | 0.86, 7.96 | 3.13* | 1.67, 5.83 |
| Partner loves respondent a lot (not reciprocated) | 3.37* | 1.76, 6.46 | 6.13* | 3.37, 11.16 |

| | Engaged Repeatedly in Disliked Activities, Males (N=1,788) | | Engaged Repeatedly in Disliked Activities, Females (N=2,681) | |
|---|---|---|---|---|
| | **OR** | **95% CI** | **OR** | **95% CI** |
| Current Age (centered) | 0.93 | 0.77, 1.12 | 0.93 | 0.85, 1.02 |
| Age at first sex (centered) | 1.07 | 0.93, 1.23 | 0.95 | 0.88, 1.03 |
| **Relationship Status** | | | | |
| Dating (reference) | 1.00 | -- | 1.00 | -- |
| Cohabitating | 0.86 | 0.36, 2.05 | 1.14 | 0.69, 1.90 |
| Married | 0.41 | 0.14, 1.24 | 1.75* | 1.06, 2.91 |
| **Race** | | | | |
| White (reference) | 1.00 | -- | 1.00 | -- |
| Latino | 0.39 | 0.06, 2.48 | 0.97 | 0.57, 1.65 |
| Black | 1.54 | 0.63, 3.76 | 0.74 | 0.47, 1.19 |
| Asian | 0.32 | 0.06, 1.81 | 1.75 | 0.84, 3.62 |
| Other | 0.02* | 0.01, 0.20 | 1.31 | 0.33, 1.35 |
| **Love** | | | | |
| Both partners love each other a lot (reference) | 1.00 | -- | 1.00 | -- |
| Neither partner loves each other a lot | 0.49 | 0.16, 1.49 | 1.50 | 0.74, 3.06 |
| Respondent loves partner a lot (not reciprocated) | 0.97 | 0.12, 7.90 | 1.45 | 0.74, 2.86 |
| Partner loves respondent a lot (not reciprocated) | 0.84 | 0.25, 2.80 | 1.80 | 0.81, 4.01 |

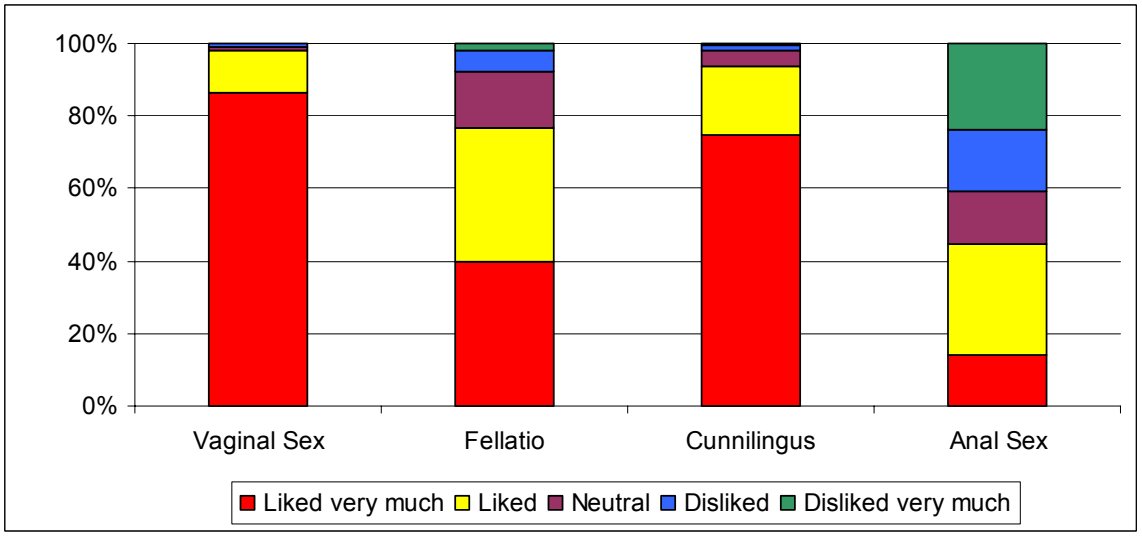
*p-value < 0.05

**Figure 5: Liking selected sexual activities with current opposite-sex sexual partner, weighted percentages of those respondents in the secondary sample who also reported engaging in the activity.**

**MALES**




**FEMALES**



## CHAPTER 5: Conclusions

In this investigation, I examined the connection between timing of first sexual intercourse and later sexual behavior and health outcomes from a life-course perspective. The research presented in chapter 2 illustrated that the majority of the respondents with current relationships engaged in combinations of various types of sexual behaviors with that partner. Almost 80% of these respondents included cunnilingus and fellatio as well as vaginal intercourse in the sexual repertoire of their current relationship, with over 20% engaging in these three sexual activities plus anal sex. Mutually high levels of loving between partners were associated with engaging in a wide range of sexual activities, including oral sex for males and females, and anal sex for males. Earlier age at first intercourse was also associated with engaging in oral sex with a current partner for females, and with anal sex for males and females.

In chapter 3, my results indicated that early first intercourse was associated with higher odds of STIs compared to later first intercourse, but the association diminished with increasing age. By young adulthood, older age at first intercourse was no longer protective against STIs, so young adults who had started having sex recently had similar levels of STIs as those who had been having sex throughout most of adolescence.

The findings from chapter 4 illustrated that young adults who started having sex recently reported similar levels of sexual coercion with their current partner as those who had been having sex throughout most of adolescence. In addition, this study documented substantial levels of male victimization and female perpetration in current romantic relationships.

The results of my dissertation expanded upon the current understanding of first sexual intercourse, adult sexual behavior, sexual coercion, and STIs, and also provided several methodological improvements to the literature on first sexual intercourse. The Add Health sample was large and nationally representative. Add Health interviewers collected extensive data on topics related to sexual health, including the timing of first sexual intercourse, detailed listings of sexual activities, subjective responses, and the use of force in current sexual relationships. This allowed me to describe the heterogeneity in the sexual lives of young adults that is often neglected in studies that focus on heterosexual vaginal intercourse. Furthermore, most of the literature on age at first sex examined only females, but this research included males as well as females and allowed comparisons by biological sex.

In addition, this study used biological tests for STIs rather than self reports, which can cause underreporting and bias. Furthermore, unlike reports of lifetime infections, the Add Health data included the age of the respondents at the time their infections were detected. This allowed me to explore how early first intercourse is associated with the prevalence of current infection among specific age groups. I was also able to examine whether the relationship between age at first intercourse

and STIs was similar for males and females, or for different racial and ethnic groups. Finally, this study substantially broadened the definition of sexual health by investigating whether adult relationships included force or coercion and whether participants liked the activities they engaged in with their partners.

My interpretations of the resulting analyses were informed by a firm understanding of the strengths and weaknesses inherent in using survey data and the characteristics of Add Health specifically. Many of these issues were discussed individually in each chapter. All three studies included a measure for age at first intercourse that was based on self-reports from Wave III. Although Waves I and II also included questions about first sex, the questions were worded differently (Wave III specifies vaginal intercourse rather than "sexual intercourse," and the insertion of the penis into the vagina is described in the previous question). Also, in Waves I and II, respondents were asked to give the date of first sex, while Wave III asked for their age at first sex in years. In preliminary analyses, Wave I and II responses produced more missing data and nonsensical responses (*e.g.*, a first intercourse age of zero), possibly because of the more difficult task of recalling the date of first sex rather than age at first sex. Therefore, I used Wave III data in this study. It is interesting to note that studies of inconsistencies in reports of age at first intercourse have concluded that such inconsistencies can affect point estimates but do not substantially affect predictive models (Kahn, Kalsbeek, & Hofferth, 1988; Lauritsen & Swicegood, 1997; Upchurch *et al.*, 2002). This indicates that self reports of age at first intercourse were appropriate to use in this research, which sought to understand associations with later sexual health.

*Practice and policy implications*

There are clear indications in the literature that, during adolescence, later first intercourse has health benefits. For these reasons, encouraging abstinence is a promising strategy as part of a comprehensive health promotion program. However, sexual health is a life-long outcome and many risks are especially intense as individuals enter young adulthood. Currently, the United States is heavily invested in promoting an intervention agenda that not only focuses on delaying sexual activity but also actively excludes material on safer sex practices. From a public health perspective that considers the needs of young adults, focusing so exclusively on the event of first sexual intercourse only makes sense if people who have sex early become trapped in substantially higher risk sexual behavior patterns compared to people who start having sex later. If timing of first sexual intercourse influences sexual health trajectories in the long term, then the potential benefits of delay would be substantial for multiple phases of the life course. However, the possible health benefits of delaying sexual activity examined in this research (lower levels of sexual coercion with current partners and lower levels of STIs) were either not significant or did not last through emerging adulthood. Although this research did not measure sex education directly, it is important to note that young adults who had abstinence-only education in high school may not have the information or skills needed to stay healthy as they enter this formative and high risk time period. Furthermore, a window of opportunity to educate these individuals has been lost because many are no longer in easy to reach places, like public schools.

Public health professionals must be wary when policy is set according to agendas that are not based on scientific evidence. Policies and specific interventions, whether they are comprehensive or abstinence-focused, should be based firmly in evidence supporting their goals, methods, and implementation. The importance of physical health and the high prevalence of STIs in adolescence and young adulthood make it easy to focus exclusively on infections and forget that human sexuality is much more than just a risk behavior. In public health we sometimes become focused on the idea of "risk" behaviors and we see activities as healthy or unhealthy instead of complex. This can make prevention efforts vulnerable to becoming co-opted by other social agendas that attempt to govern behavior with threats of ill health. It is important to keep in mind that sexual expression is an integral part of the human experience. In fact, sexual activity and partner contact have been tied to positive health indicators (Davey-Smith, Frankel, & Yarnell, 1997; Drory, 2002; Ebrahim *et al.*, 2002; Grewen, Anderson, Girdler, & Light, 2003; Palmore, 1982).

My research emphasizes that a wide range of sexual behaviors is common among young adults. They require adequate information about how to protect themselves and their partners during all types of sexual activities, including oral and anal sex. Furthermore, sexual health can be defined more broadly than simple absence of disease. Sexual coercion and disliked activities among young adults have implications for reproductive health and for general wellbeing. Sexual health policies and programs must strive to empower individuals to have control over all aspects of their sexual activities. The evidence that young adults, particularly

females, are exposing themselves to such risk despite the fact that they do not like the activities should concern educators and policy makers. These individuals may experience a loss of control or influence over the types of activities they engage in because of pressure from partners, perceived expectations of how sexual partners should behave, or in exchange for benefits in other areas of their relationship. Prevention efforts should be based on a broad understanding of how such dynamics play out within couples. Both males and females may need training to accept initial refusals and to be sensitive to a partner's unwillingness to engage in an activity, as well as to voice their own preferences and dislikes.

*Future research implications*

Future research could explore the mechanisms underlying the convergence of the prevalence of infections for young adults with early and late first intercourse experiences. Instead of targeting the act of first intercourse itself, perhaps we should focus on what distinguishes persistently higher risk individuals from others during adolescence. This strategy would require further investigation into the possibility that early first intercourse is a marker for pre-existing problems among some youth and that other experiences may substantially influence the relationship between early first intercourse and long-term STI risk.

Life-course approaches to adolescent antisocial behavior may be helpful in understanding how behaviors may change or persist through adolescence and into young adulthood. For example, Moffitt proposed that there are two qualitatively distinct types of antisocial adolescents: adolescence-limited and life-course-persistent antisocial adolescents. Life-course-persistent antisocial behavior has its

roots early in life and these adolescents show behavioral coherence through the stages of life (Moffitt, 1993). Cumulative developmental forces in the form of interactions between the child or youth and the environment can perpetuate or exacerbate problems. These interactions drive the continuity of various antisocial behavioral manifestations from childhood to adolescence and into adulthood. In contrast, adolescence-limited antisocial behavior is motivated by the experience of the gap between when individuals experience biological maturity versus social maturity in the form of adult roles and independence. Adolescents strongly desire the privileges and independence of adulthood but are told they cannot have them (Moffitt, 1993).

Early first intercourse may be motivated by how an adolescent experiences the maturity gap and desires to experience more adult roles. By young adulthood, adolescents in this group may no longer have elevated levels of sexual risk behavior. For other adolescents, early first intercourse may be part of a continuous pattern of risky behaviors that begins in childhood and will persist into young adulthood. While many negative psychosocial outcomes have been associated with early first intercourse, Bingham and Crockett found that this was not the case after controlling for prior psychosocial adjustment. They suggested that poor outcomes attributed to early first intercourse in the prior literature are in fact the “continuation of enduring developmental trajectories” that precede sexual first intercourse and may be the result of childhood temperament and family context (Bingham & Crockett, 1996). This illustrates the complexities involved in issues of causality and how difficult it can be to determine the effects of timing of first intercourse versus identifying preceding

or co-occurring factors, especially when data are cross-sectional. My future research plans include using longitudinal data to examine the potential role of childhood antisocial behavior as an effect measure modifier of age at first intercourse. Understanding if a history of antisocial behavior predicts continued higher risk sexual behavior for young adults who initiated sexual intercourse early will help clarify whether early first intercourse effects represent the impact of an early life transition on a life-course trajectory, or whether, for some youth, they are a marker for a pre-existing high risk trajectory.

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