Distribution Agreement

In presenting this thesis as a partial fulfillment of the requirements for a degree from Emory University, I hereby grant to Emory University and its agents the non-exclusive license to archive, make accessible, and display my thesis in whole or in part in all forms of media, now or hereafter now, including display on the World Wide Web. I understand that I may select some access restrictions as part of the online submission of this thesis. I retain all ownership rights to the copyright of the thesis. I also retain the right to use in future works (such as articles or books) all or part of this thesis.

Talia Shirazi April 14, 2014

Continuity and Change in Male and Female Sexual Behavior of the Last 60 Years

by

Talia Shirazi

Dr. Kim Wallen

Adviser

Department of Psychology

Dr. Kim Wallen

Adviser

Dr. David Edwards

Committee Member

Dr. Gary Laderman

Committee Member

2014

Continuity and Change in Male and Female Sexual Behavior of the Last 60 Years

by

Talia Shirazi

Dr. Kim Wallen

Adviser

An abstract of

a thesis submitted to the Faculty of Emory College of Arts and Sciences

of Emory University in partial fulfillment

of the requirements of the degree of

Bachelor of Arts

Department of Psychology

2014

Abstract

Continuity and Change in Male and Female Sexual Behavior of the Last 60 Years

by Talia Shirazi

Studies have shown that while sexual behavior in both males and females is influenced by sociocultural factors as well as hormones, female sexual behavior may be more strongly influenced by context and culture than is male sexual behavior. Because society has become increasingly open minded about sexuality in the past 60 years, we would expect a change in female sexual behaviors and a narrowing of the sex differences previously seen in the incidences and frequencies of behaviors such as masturbation, orgasm, and intercourse. Using an online survey (n=3698), we collected data to compare age of first experience and incidence rates for males and females. Effect sizes suggested small to moderate sex differences in all behaviors other than orgasm, where there were moderate to large differences. Comparison of data in the current study to data collected by Alfred Kinsey the 1940's and 1950' suggested that while the sex differences in age of first experience and incidence of certain sexual behaviors have diminished, the pre and post-pubertal patterns of sexual desire and sexual experience seen in males and females remain largely the same. The largest sex difference found in the incidence and prevalence of orgasm suggests future sex researchers should study behaviors done for pleasure, rather than solely for procreation. Though there have been changes in female sexual behavior to accompany society's more open sexual views, the continued expression of patterns seen in the 1950's suggest a strong role of hormones in modulating behavior.

Continuity and Change in Male and Female Sexual Behavior of the Last 60 Years

by

Talia Shirazi

Dr. Kim Wallen

Adviser

A thesis submitted to the Faculty of Emory College of Arts and Sciences

of Emory University in partial fulfillment

of the requirements of the degree of

Bachelor of Arts

Department of Psychology

2014

Acknowledgements

Thank you to Dr. Wallen and Katy for all their guidance, without whom I would not have been able to complete my thesis. They have constantly shared their knowledge, passion, and curiosity with me, making them wonderful advisers as well as amazing role models. I would like to thank Dr. Edwards and Dr. Laderman for their input, and for serving on my committee. Finally, I would like to thank all the survey participants who made this study possible.

Table of Contents

Continuity and Change in Male and Female Sexual Behavior of the Last 60 Years

Large-Scale Surveys of Sex: Then and Now

In 1938, Alfred Kinsey, a professor of zoology at Indiana University, began one of the first large-scale studies of human sexual behavior. Through a grant from the Rockefeller Foundation, Kinsey trained a team of researchers to travel across the country gathering data from different populations via face-to-face interviews to document the variability in human sexual behavior. Although Kinsey collected data on what were then considered to be "normative" practices, such kissing and marital intercourse, he also asked about taboo topics such as oral sex, masturbation, homosexual experiences, and orgasm. To capture variability in sexual behavior, interviewers collected detailed accounts of participants' sexual histories, with interviews lasting as long as six hours. Participants were approached in clubs and bars, and recruited through snowball recruitment, where an interviewee suggests potential subjects from their network of friends. Kinsey's books Sexual Behavior in the Human Male and Sexual Behavior in the Human Female, published in 1948 and 1953 respectively, became quickly popular and controversial. People were intrigued and alarmed that information about individuals' sexual practices, which had previously been confined to the bedroom, was publically available. Opponents of Kinsey's work criticized him of degrading the field of scientific research, arguing that his funds could have been used to support research on physical illnesses, or research that would be directly relevant to lawmakers, clergymen, and physicians (Bancroft, 2004). Kinsey was also criticized for his sampling methods. While he believed large sample sizes were needed to capture the variability in sexual behavior, opponents argued that the use of probability sampling would have resulted in a smaller but more representative sample. The Rockefeller Foundation discontinued Kinsey's funding after 13 years due to the controversy surrounding the study and its findings.

Despite the premature termination of funding, Kinsey's studies transformed our views of human sexuality and paved the way for future studies on sexual behavior (Brown & Fee, 2003).

Many of the methodological criticisms of Kinsey's studies were addressed in the University of Chicago's National Health and Social Life Survey (NHSLS), begun in 1992, which was designed to collect one of the largest, representative samples since Kinsey. The goal was to study risky sexual behaviors, defined as behaviors that put an individual at risk for contracting a sexually transmitted disease (STD), and the social risk factors associated with these behaviors. Data suggest that most new cases of STDs are in adults under 30, and that an individual's number of sexual partners was the most important risk factor for contracting an STD. While the NHSLS improved upon Kinsey's methods by using probability sampling, other NHSLS methods have been criticized. Questions regarding number of sexual partners, sexual satisfaction, sexual dysfunction, and extramarital sex were asked with both members of a couple in the room. This may explain why the NHSLS reported a lower prevalence of extramarital affairs than in any other sex survey. Terms such as 'intercourse' and 'sexual dysfunction' were loosely defined, allowing people to interpret questions about them in different ways (Lewontin, 1995). Despite these criticisms, the NHSLS remains the first survey on human sexual behavior with a representative national sample. Because of its strong focus on behaviors that facilitate the transmission of STDs, results from the NHSLS do not inform us on a broad range of sexual behavior in the same way as did Kinsey's results.

Members of Indiana University's Center for Sexual Health Promotion argued in 2009 for the need for more current information on the population's sexual practices. The use of technology and resulting ease of accessibility of sexually explicit videos, new medications and treatments for sexual dysfunction, and changes in the public's view of homosexuality suggested

possible changes in sexual behavior since the NHSLS, a representative sex survey. Tasked with providing sexual health information to patients, healthcare professionals and physicians needed a complete and current understanding of human sexuality across the lifespan. However, previous surveys focused on risky sexual behaviors rather than on the full range of sexual behaviors, giving healthcare providers an incomplete picture of human sexual behavior. In response to this need for knowledge on current practices, the National Survey of Sexual Health and Behavior (NSSHB) was created. Multistage probability sampling was used to obtain a nationally representative sample, and data from over 5800 individuals from 14 to 94 were collected through online surveys. The large age range of the sample was used to conduct cross-sectional analyses of the frequencies of behaviors previously defined as the NHSLS as 'risky behaviors,' such as condom nonuse and multiple intercourse partners throughout the lifespan (Miller, 1995).

Kinsey's results were the first results of a national sex survey to be published and suggested a much higher rate of homosexual behavior than previously assumed, estimating that around 10% of the population had experience with a same-sex partner (Gebhard & Johnson, 1979). The NHSLS and NSSHB suggested similar rates of homosexuality as well, estimates between eight and 10 percent (Bancroft, 2004, Herbenick et al., 2010). A comparison of Kinsey data and NHSLS data indicate shifting attitudes towards homosexuality, with attitudes become increasingly accepting. Between 5% and 11% of Kinsey's sample approved of homosexuality compared to 20-21% approval by NHSLS respondents. Results from Kinsey's study as well as the NSSHB found that males reported more frequent condom use than did females, with males and females 14-17 years old reporting most frequent condom use (79.1% and 58.1%, respectively). NHSLS data indicated much lower condom use, with only 16.3% of individuals reporting condom use during their last vaginal intercourse (Fenton et al., 2001). Data from the

NSSHB suggested that frequency of masturbation, oral sex, vaginal intercourse, and anal intercourse decreased with age (Herbenick et al., 2010, Reece et al., 2010). Kinsey's results also suggested a decrease in these behaviors with age but his sample did not include adults over 60, whereas the NSSHB collected data from individuals up to 94 years of age, thus giving us a more complete view of sexuality across the lifespan. The NHSLS and NSSHB found that around 63% of males masturbated in the past year, but while the NHSLS found that 42% women masturbated in the past year, the NSSHB estimated this figure to be between 40% and 64%. However, both studies found similar rates of oral sex and vaginal intercourse in males and females. Data was not collected on the age at which these behaviors were first experienced.

Surveys such as the Center for Disease Control and Prevention's National Survey of Family Growth and the University of North Carolina's National Longitudinal Study of Adolescent Health ('Add health') expanded our knowledge of the prevalence and frequency of sexual behavior by providing longitudinal data on changes in individual sexual practices over time. Data from such surveys inform our planning and implementation of public sexual health initiatives, aiming to reduce disease transmission. While these data help draw relationships between risky behaviors and factors such as age, they often do not look beyond demographic measures to explain the intrapersonal variability seen in the expression of sexuality. Networks and communities play a role in influencing individual behavior, in concert with an individual's beliefs. Information about an individual's beliefs and attitudes associated with certain risky behaviors could help shape STD prevention programs by identifying target groups more likely to perform behaviors that increase their risk of contracting or spreading STDs. The fact that almost half of the 19 million STDs occur in 15 to 24 year olds and one in four women 14 to 19 years old is infected with an STD (Fenton, 2010) suggests adolescence and young adulthood are times of

increased sexual risk. Because of the heightened sexual risk seen during this time period, research on attitudinal, social, and cultural factors influencing sexual behavior has focused on adolescents and young adults to create increasingly effective public health initiatives to decrease disease transmission.

Correlates of Risky Sexual Behavior in Adolescence and Young Adulthood

Surveys in adolescents and young adulthood have looked at a variety of factors to explain the variability in risky sexual behaviors, looking at variables from food insufficiency to amount of television watched. Most commonly, studies have investigated the link between religion, substance use, and self-esteem may play in moderating sexual behavior.

Consumption of alcohol lowers an individual's inhibitions (Paul et al., 2000) and focuses attention on more salient sexual aspects of their environment. Alcohol consumption may also lead to an individual experiencing higher sexual arousal, and perceiving others as more sexually disinhibited (George et al., 2000). Stall et al. (1986) may have been the first to suggest a link between risky sexual behavior and alcohol consumption by studying the frequency of risky behaviors and alcohol use in homosexual males. This result has since been replicated in heterosexual adolescents and young adults. In college undergraduates, alcohol consumption increased the probability that a sexual interaction with a casual partner included vaginal intercourse (Paul et al., 2000), as well as the probability of experiencing vaginal intercourse in the previous school year (Fielder et al., 2012). Alcohol use has been shown to be a strong predictor of condom nonuse, frequency of anal intercourse, and the number of sexual partners (Biglan et al., 1990). Heavy episodic drinkers, defined as individuals who consumed five or more drinks on a single occasion, were more than three times as likely as non-heavy episodic drinkers to have had multiple sex partners in the past month (Wechsler et al., 1995). Beliefs about the

effects of alcohol intoxication may moderate the role alcohol has on risky sexual behavior. Dermen and Cooper (2002) reported a positive correlation between condom nonuse and an individual's alcohol expectancies, such that individuals who more strongly believed in alcohol's disinhibitory effects were less likely to use condoms during their last sexual interaction. Additionally, the relationship between the individual and the sexual partner may moderate the influence alcohol has on sexual risk taking. Brown & Vanable (2009) found no relationship between alcohol use and unprotected vaginal intercourse in encounters with steady sexual partners, whereas there was a positive relationship between alcohol use and unprotected vaginal intercourse in encounters with non-steady sexual partners (but see DiClemente et al. 2008). Data on condom use and alcohol consumption has been less conclusive, with some studies suggesting a positive relationship (Stueve & O'Donnel, 2005, Turchik et al., 2010, Wechsler et al., 1995) and others suggesting no relationship (Desiderato & Crawford, 1995, Graves, 1995, McNair et al., 1998, Senf & Price, 1994). These conflicting findings may be due to the differences in populations studied. Plant et al. (1990) recruited male and female sex workers, making results from their study less generalizable to broader populations. Cultural differences across and within countries and communities are seen in the perception and use of alcohol, leading to potential differences in how the substance may affect behavior (Donovan & McEwan, 1995). Individuals often use substances for sensation-seeking purposes, and this propensity for general sensation-seeking may translate into increased risky sexual behaviors throughout the lifespan. It is unknown, however, if alcohol consumption would influence other sexual behaviors such as masturbation, oral sex, or orgasm. It also remains unknown whether there is a difference in the influence alcohol has on sexual behavior in males and females.

Research has focused on the role of religious networks, as more emphasis has been placed on the role communities and society have on sexual behavior. Religion can be seen as a tool for social control and conformity by providing members with similar experiences, morals, and values. Religious involvement facilitates the individual internalization of values and norms, and provides consequences for deviance from these norms (Barkan, 2006). Increased religious involvement, as measured by attendance, may delay sexual involvement in adolescent females, but not males (Hardy & Rafaelli, 2003, Jessor et al., 1983). Miller et al. (1997) found that while frequency of church attendance itself was not related to age of sexual debut, positive attitudes towards church attendance were related to later sexual involvement. In adolescence, a measure such as religious service attendance may not be a reliable measure of religiosity, as the behavior is very dependent on parental beliefs and practices rather than on individual views (Tittle & Welch, 1983). Studies on religious youth have suggested that attitudinal and internal measures are more accurate representations of religiosity (Mockabee et al., 2001). Barkan et al. (2006) used subjective measures of religiosity such as how strong an individual's religious preference was in addition to frequency measures of service attendance to create a multidimensional index of religiosity for adolescents. Religiosity was associated with a lower number of lifetime sexual partners for males and females. Meier (2003) found that female adolescents who had higher religiosity scores were more likely to delay first intercourse, but this effect was not found in males. This sex difference may be attributed to the fact that adolescent females report greater religious involvement, and place greater importance on religion than do males (Gallup & Bezilla, 1992). In addition to a sex difference seen in the influence of religion on sexual behavior, age may play a role as well. As individuals grow up and have less parental control, they may begin developing their own views and ways of experiencing religion (Barkan, 2006). Due to the current

lack of research on religiosity in adulthood (Rotosky et al., 2004), it is unknown whether the same correlations seen in adolescence between religiosity and risky sexual behavior continue beyond adolescence. It is also unknown whether the deterrent effect of religion on risky sexual behavior would be seen with other sexual behaviors as well. While religions such as Judaism and Christianity teach sexual abstinence before marriage, they also emphasize sex for procreation (Vasilenko et al., 2013). Thus, if very devout individuals are taught that intercourse or any sexual acts primarily for physical pleasure are wrong or immoral, they may delay or abstain from nonrisky sexual behaviors such as masturbation and oral sex.

Sexuality education efforts have placed emphasis on increasing self-esteem in adolescents to prevent risky sexual behavior (Goodson et al., 2006), based on the negative association between levels of self-esteem and unsafe behaviors. Shrier et al. (2001) found that self-esteem was related to condom nonuse in male and female middle school students. Among college students, higher self-esteem was associated with less sexual interactions with casual or unfamiliar partners in both sexes (Fielder et al., 2012). However, some studies indicate sex differences in the relationship between self-esteem and sexual behavior (Kowaleski-Jones & Mott, 1998, Orr et al., 1989), such that self-esteem may predict sexual debut in females but not in males. A longitudinal study found that adolescent females with high self-esteem were more likely to delay their first sexual interactions, while males with high self-esteem had earlier sexual debuts (Spencer et al., 2002). These contrasting results suggest that when looking at self-esteem and sexual risk taking, biological sex should be considered as it may influence males and females differently. Because of the focus on middle and high schoolers in such studies, we do not know whether self-esteem would influence sexual behaviors, either risky or normative, in adults. Relative to personality traits, self-esteem remains stable over the lifespan (Trzesniewski et al.,

2003). Thus, adult levels of self-esteem, in addition to adolescent levels, may correlate with sexual behavior.

While it is important to understand the influence of factors such as religion, self-esteem, and alcohol may have on sexual risk in adolescents and young adults, it is equally as informative to know whether these factors would influence other sexual behaviors in a similar manner. Kinsey's aim was to study the variability in peoples' complete sexual life, looking at solitary, partnered, risky, and normative behaviors alike, but the narrow range of behaviors focused on in recent research has added little to our current knowledge of the variability these different types of sexual behaviors. The presence of sex differences in the effect of social and attitudinal factors on behavior, such that females are more influenced by religiosity and self-esteem than are males, suggests that researchers should consider the influence of biological sex when studying human sexual behavior. Recent research has suggested, in fact, that female sexual behavior is much more 'plastic' and more influenced by sociocultural and contextual factors than is male sexual behavior (Baumeister, 2000).

Sex Differences in Sexual Behaviors and Attitudes

Kinsey was one of the first researchers to look at sex differences in the prevalence and frequency of specific sexual behaviors. He found that on average, males experienced vaginal intercourse earlier than did females, lifetime prevalence of masturbation was higher in males (92%) than females (58%), females were more likely to report no enjoyment from first sexual intercourse than were males (57.2% versus 27.8%), and males had more premarital sexual partners than did females (Gebhard & Johnson, 1979). A meta-analysis of 177 studies on sexual attitudes and behaviors confirmed these findings. Using data from studies published from 1960 to 1990, Oliver & Hyde (1993) found the largest effect size (d=0.96, Cohen, 1992) for a sex

difference in the incidence of masturbation, with men reporting a higher incidence than did women. Interestingly, there were no significant sex differences in attitudes about masturbation, only in its occurrence. As compared to females, males reported earlier age of first intercourse (d=0.38), higher incidence of intercourse (d=0.33), and higher number of lifetime sexual partners (d=0.25), consistent with Kinsey's findings. The trend of males reporting more lifetime sexual partners has been found in more recent research as well (Brown & Sinclair, 1999, Fenton et al., 2001), but this discrepancy may be related to the different methods males and females use when counting sexual partners. Brown & Sinclair (1999) observed the ways males and females counted their lifetime sexual partners, and found that individuals who used rough approximations reported roughly double the amount of sexual partners as compared to individuals who enumerated each partner or kept a running tally, and males were more likely than were females to use rough approximation methods. Thus, statistics suggesting a higher number of lifetime partners for males than females may be overestimates.

Questions asking about the incidence or age of first occurrence of sexual behaviors may be less subject to differences in reporting (Fenton et al., 2001), and recent data from the NSSHB has found sex differences in these behaviors, confirming that the sex differences Kinsey found in these behaviors has persisted over time. Men reported more frequent and a higher incidence of masturbation, and a higher incidence of vaginal intercourse than did females (Herbenick et al., 2010).

After observing well-established sex differences in sexual attitudes and behaviors, Oliver and Hyde (1993) tested the changing magnitude of male and female differences over time. When comparing data from the 1980's to data from the 1960's, there were smaller sex differences in the incidence of masturbation (d=0.60 versus d=1.06), intercourse incidence (d=0.33 versus

d=0.41), and number of sexual partners (d=0.17 versus 0.33). These smaller effect sizes indicate that the differences in male and female sexual behavior are diminishing over time. Data collected from the NSSHB could be used to study whether this trend of shrinking sex differences has continued beyond the 1990's, but since main aim of the study was to conduct cross-sectional analyses of sexual behavior across age groups, effect sizes for sex differences in behaviors were not calculated. Thus, we do not know whether these differences in behaviors such as masturbation, orgasm, oral sex, and vaginal intercourse have continued to decrease over time. There is, however, strong evidence from studies of sexual plasticity to suggest that these sex differences have continued to narrow.

Baumeister (2000) argued that females show more plasticity in their sexual behavior than do males, as their behavior is more subject to the influence of social, cultural, and situational factors. Hormones have been shown to play a role in the sexual desire and behavior of females (Haselton & Gangestad, 2006, Roney & Simmons, 2013) and males (Travison et al., 2006). The argument of heightened female sexual plasticity in response to sociocultural context does not discount hormonal influences on behavior, but rather explains that the expression of sexuality is based on hormones and context alike, and that context may play a greater role in females. A study comparing 186 different cultures found greater cross-cultural variation in sexual behavior in adolescent females than in males (Schlegel, 1984 as referenced in Baumeister, 2000), suggesting greater cultural influence on female behavior. The greater intrapersonal variability seen in females as compared to males also suggests that female sexual desire and behavior is more heavily influenced by context than is male desire and behavior. Kinsey found that women often went through varying phases of sexual activity-periods of frequent sexual activity followed by periods of less, or complete lack of sexual activity. Such phases of activity were not

experienced as commonly by males. Males tended to keep their rates of sexual behavior constant by resorting to behaviors such as masturbation if they were not engaging in partnered sexual behavior (Kinsey, Pomeroy, Martin, & Gebhard, 1953). Studies conducted around the time of the sexual revolution of the 1960's and 1970's also provide evidence of greater plasticity in female sexual behavior, as the sexual revolution primarily resulted in changes in female sexual attitudes and behaviors (Bauman & Wilson, 1974). As the modern day double standard in sexual behavior diminishes and restrictions on female sexuality fade, we should expect to see differences in female sexual behavior, as well as increasingly smaller differences in the expression of sexuality in males and females (Leiblum, 2002).

Aims of the Current Study

Discussion of sexual behavior has been largely limited to behaviors that facilitate the transmission of STDs or result in unwanted pregnancy, ignoring behaviors that do not facilitate disease transmission and are performed for pleasure. While preventing negative consequences of sexual behavior is important, it is equally as important to understand the broad range of sexual practices to get a more hollistic understanding of variability in human sexuality. In a society where 30% of healthcare costs are related to sexuality (Elders, 2010), individuals and physicians can benefit from knowledge of how demographic factors, such as biological sex, attitudinal factors, such as self-esteem and religious views, and behavioral correlates, such as substance abuse, interact to modulate sexual behaviors. The current exploratory study has two main aims. The first aim is to explore the relationship between sexual behavior and self-esteem, alcohol use, and religiosity in adults, emphasizing the role sex may play in modulating the strength and direction of the relationship. Previous research has not targeted adults, and has not targeted nonrisky sexual behaviors. The second aim of the current study is to look at sex differences in

these nonrisky sexual behaviors, and to see if the differences in these behaviors have continued to decrease over time, as previous research suggests (Baumeister, 2000, Oliver & Hyde, 1993). For both aims, we chose to focus on the incidences and ages of first masturbation, orgasm, oral sex, and vaginal intercourse. These behaviors were studied by Kinsey, as well as by subsequent sex researchers (Gebhard & Johnson, 1979, Herbenick et al., 2010, Oliver & Hyde, 1993). We hope to contribute to Kinsey's goal of understanding the broad range of sexual acts that comprise an individual's sexual history, as well as to the conversation of sexuality focused on pleasure rather than solely on protection.

Specific Hypotheses

Previous research has suggested that religiosity is associated with certain risky sexual behaviors in females, but not in males. The current study tested whether religiosity is associated with nonrisky sexual behaviors, a relationship that has not previously been explored, and the degree to which the strength of this relationship is dependent on sex. As religiosity has been shown to influence behavior more in females than in males (Gallup & Bezilla, 1992) and cultural factors are more influential on female than male behavior (Schlegel, 1984), we hypothesized that religiosity will more strongly influence nonrisky sexual behavior in females than in males. A similar sex difference has been seen with self-esteem, such that the relationship between self-esteem and sexual risk taking differs between males and females (Kowaleski-Jones & Mott, 1998, Orr et al., 1989, Spencer et al., 2002). Thus, we hypothesized that the relationship between self-esteem and nonrisky sexual behaviors will be different for males and females as well. In regards to alcohol use and risk taking, sex differences have not been studied. Additionally, the relationship between alcohol use and other sexual behaviors has not been studied, making the

current study's investigation of the mediating role of sex on the influence between alcohol and nonrisky sexual behavior largely exploratory.

Consistent with data from 1960 to 1990 indicating narrowing sex differences in the incidence of nonrisky sexual behaviors (Oliver & Hyde, 1993) and data on the high plasticity in female sexual behavior (Baumeister, 2000), we predicted we would continue to see narrowing of the differences between men and women in the current study.

Method

Participants

Individuals who did not identify as either male or female, who did not indicate their sexual orientation, and who had no previous experience with oral or vaginal intercourse were excluded. 5,035 people began the survey. The Kinsey scale was used to classify sexual orientation. Predominantly or exclusively heterosexual participants (zero, one, and two on the Kinsey scale) took an arm of the survey with questions primarily about sexual experiences with members of the opposite sex, while predominantly or exclusively homosexual participants (four, five, and six on the scale) were directed to an arm with questions about same-sex sexual experiences. Participants who self-identified as heterosexual were included in all analyses. The data on self-identified nonheterosexual participants (204) were not analyzed for this paper. 4,566 heterosexual males and females began the survey and 3,698 completed it, giving the survey a completion rate of 80.1%. This completion rate is comparable to completion rates of other surveys of sexual behavior (Fenton et al., 2001). Participants identified as exclusively heterosexual (Kinsey zero, 56.5%), predominantly heterosexual with some homosexual experience or desire (Kinsey 1 or 2, 37.0%), or predominantly heterosexual with much homosexual experience or desire (Kinsey 3, 6.5%). The majority of participants were male

(53.2%). The median age was 22 (range: 18 to >60), and 90% of the sample was between 18 and 30. 71.3% selected the United States as their main country of residence, and the majority of international participants were from Canada. Participants identified as Caucasian (85.95%), Asian (4.3%), biracial (4.1%), Hispanic (3.2%), Black or African American (1.1%), or other. 51.8% of participants were unmarried but in a relationship, 28.4% single, 13.4% married, 3.7% engaged, and 0.7% separated at the time of the survey. See table 1 for additional sample demographics.

Recruitment

Participants were recruited via flyers and web-based sources. Flyers detailing the study and survey website were posted in libraries and coffee shops around the Atlanta, GA and Washington, DC areas. The survey was accessible via SONA, a database managed by Emory University's psychology department. Students who participated in the survey via the SONA system were awarded course credit in Introductory Psychology courses. Links and study descriptions were posted on social media sites such as Facebook, Twitter, and Reddit. The survey site was posted on Reddit boards related to survey participant recruitment, sexuality, religion, and womens' health. A recruitment e-mail was also sent out via SexNet, a listserv managed by Northwestern University dedicated to the dissemination of sex research and the discussion of topics related to sexuality. Because participants were not asked how they heard of the survey, we cannot estimate the relative contribution of each recruitment method to the overall participant pool.

Procedure

After entering the survey's URL into their web browser or following the provided link, participants were directed to a SurveyMonkey page entitled 'Sexual Attitudes and Behaviors.'

The title page of the survey provided a brief description of the study aims, explaining that the aim was to collect information about individual's sexual experiences and accompanying attitudes. Previous sexual experience was required for participation in the study. Participants were told to answer in accordance with their overall or typical sexual experiences, rather than in accordance with their experiences with their most recent or current partner. Clicking 'next' at the bottom of the title page indicated informed consent in lieu of a signature. Because sex differences were a primary interest in the present study, participants had to indicate a binary sex, thus excluding participants who identified as 'intersex' or who did not respond. Other than for the question on biological sex, participants were able to select 'skip' as an answer for any question they did not feel comfortable answering. There was no penalty for exiting the survey, and participants could exit at any time. In order to ensure participants' anonymity, no identifying information was collected and IP tracking was disabled. At the conclusion of the survey, participants were instructed that if they would like to receive the results, they could follow a separate link, which would allow them to anonymously enter their email address. Participants were informed that although providing an e-mail address did indicate an individual's participation in the survey, e-mails could not be linked with particular responses. There was no monetary compensation for participating, though some participants received course credit.

Measures

The Kinsey scale, ranging from *exclusively heterosexual* (0) to *exclusively homosexual* (6), was used to classify participants' sexual orientation. We asked demographic questions pertaining to income, education, age, location, race, and relationship status. Participants were then asked about several mentions of religiosity. After indicating what religion they were raised and the religion they currently identified with, participants used Likert scales to answer three

questions related to religiosity- 'How important is religion to you?,' 'How devout do you consider yourself?,' and 'How frequently do you attend religious services?' Because these three measures of religion were highly correlated (Spearman's $r = 0.70$, 0.50, and 0.56), scores were summed to create a single, multi-dimensional score of religiosity, as suggested by previous studies on religiosity (Barkan, 2006). Participants who skipped any questions related to religion did not receive a religiosity composite score. Scores ranged from three to 17, with higher scores corresponding to higher levels of religiosity. The median score was 4, and 70.1% of participants had scores between 3 and 5.

Information about the frequency of alcohol, cigarette, marijuana, and other illicit drug (cocaine, methamphetamines, LSD, etc.) use was collected using Likert scales, with responses ranging from *never* (1) to *several times per day* (9).

To measure self-esteem, we used the Rosenberg Self-Esteem scale. This measure in particular was selected because of its short length (10 items) and its high internal reliability (Cronbach's $\alpha = 0.83$). This scale has previously been used in studies examining the relationship Between sexual behavior and self-esteem (Ethier et al., 2006, Fielder et al., 2012, McNair et al., 1998). The questionnaire requires participants to indicate their agreement with each item using a five point Likert scale, with responses ranging from *strongly agree* to *strongly disagree.* Scores range from 0 to 40, with higher scores corresponding with higher self-esteem. Five questions are scored regularly with higher agreement corresponding to higher self-esteem (for example, "*I feel that I have a number of good qualities"*), while five questions are reverse-scored with higher agreement corresponding to lower self-esteem (for example, "*At times I think I am no good at all*). Scores for all 10 items are required to calculate a total score. Participants who selected 'skip' for any items were excluded from analyses pertaining to self-esteem. 93.5% of participants

completed all 10 items, and the mean score was 20.46 (SD = 5.87). This mean is comparable with those of several large survey studies using the scale, which report means around 20.

Using Likert scales ranging from *never* (1) to *every time* (7), participants reported frequencies of solitary as well as partnered sexual behaviors. Frequencies of solitary sexual behaviors such as masturbation, orgasm during masturbation, and frequency of pornography viewing were included. While the NHSLS and NSSHB gathered data on masturbation, surveys correlating sexual behavior with self-esteem, religion, and religiosity have not. Because this study aimed to look at the variability in partnered behaviors as well as solitary behaviors, questions about risky and nonrisky partnered behaviors were included. Participants were asked about the frequency of manual genital stimulation, oral sex, and anal intercourse. Those who indicated having vaginal intercourse previously (90.87%) were asked about the relationship between them and their first partner, if they wished that they had waited longer before having intercourse, and questions relating to orgasm during intercourse. Data on orgasm were obtained using scales with answer choices starting at 0, and then grouped by intervals of 9 percentage points (i.e. *1-10%, 11-20%.... 91-100%)*. Finally, participants were asked about the age of first porn viewing, masturbation, menstruation (females only), orgasm, kiss, oral sex, and vaginal intercourse. Individuals who did not have experience with the behavior in question indicated the question was not applicable to them.

Data analytic strategy

SPSS version 21 (IBM, Armonk, NY) was used for all analyses. To test our hypotheses that nonrisky sexual behaviors would be related to self-esteem, religion, and alcohol use and the extent to which sex moderated the relationship, linear regressions were used. The predictor variable was added in the first block, sex in the second, and the interaction between sex and the

predictor variable in the third. Interaction variables were created by multiplying the value for sex by the value or score of the predictor variable. Each model tested for main effects of the predictor variable and sex, as well as the interaction between the two variables. Bivariate correlations were also calculated, separately for males and females, between predictor variables and age of first behaviors.

Participants choosing ages 26 or above for age of first experiencing any behavior of interest were excluded from analyses on the mean age of first behaviors. Age was listed incrementally until age 25, and was listed in 4 year categories thereafter (e.g 26—30, 31—35,…>60). A very low percentage of respondents reported first experiencing behaviors after 26, and were thus excluded from the analyses and enabled us to use parametric statistics. To test for differences in the mean age of first experiencing particular behaviors, we used independent-sample t-tests, excluding participants who had no experience with the particular behavior. We were interested in looking at the rates of nonexperience with behaviors, and whether there were sex differences in lifetime incidence rates. Individuals were characterized as either having experience or not having experience with each behavior, and chi-squared tests were used to test for sex differences in these incidence rates. All significance levels were set to $\alpha = 0.05$.

Results

Alcohol use

We hypothesized that alcohol use would be related to age of first masturbation, orgasm, kiss, oral sex, and vaginal intercourse. Our linear model looking at age of first masturbation, with alcohol use entered in the first block, sex in the second, and the interaction variable of alcohol use by sex in the third, revealed no significant main effects (p=0.17 for alcohol use, p=0.88 for sex), and no significant interaction (p=0.09). Age of first orgasm was predicted by sex such that

males experienced orgasm earlier than females, β = -0.27, t(3511)= -6.02, p<0.001, but not by alcohol use (p=0.93) nor by an interaction between alcohol use and sex (p=0.80). Age of first kiss and age of first oral sex were not predicted by alcohol use, sex, nor an interaction between the two variables (all $p > 0.20$). Age of first intercourse was related to sex such that females experienced intercourse earlier than males, β = 0.14, t(3304) = 2.74, p<0.001, but not by alcohol use (p=0.98) nor by the interaction between alcohol use and sex (p=0.48); see table 2 for summary. Our hypothesis that the relationship between alcohol use and sexual behavior would be stronger for females than males was not supported.

Religiosity

Religiosity scores were created by summing each participant's responses on 3 questions relating to religious practices and views, and we hypothesized this score would be related to sexual behavior. Age of first masturbation was predicted by an interaction between religiosity and sex, such that males experienced first masturbation earlier than females (β = -0.31, t(3198)= -4.45, p<0.001; figure 1). Age of first orgasm was also predicted by an interaction between religiosity and sex (β = 0.-22, t(3155)= -3.30, p=0.001; figure 2). Age of first kiss was not predicted by religiosity (p=0.51), sex (p=0.78), nor by an interaction between the sex and religiosity (p=0.99). Sex predicted age of first oral sex with females experiencing oral sex earlier than males (β= 0.08, t(3079)= 2.14, p=0.33), but neither religiosity (p=0.10) nor the interaction of religiosity and sex (p=0.74) were significant. Age of first intercourse was predicted by religiosity (β=0.18, t(2969)= 3.03, p=0.003), and sex (β=0.15, t(2969)= 3.87, p<0.001), but not by the interaction between the two (p=0.12); see table 3 for summary. Our hypothesis that religiosity and sexual behavior would be more strongly associated in females than males was

supported by our findings of masturbation and orgasm, but not by our findings on partnered sexual behaviors.

Self-esteem

Age of first masturbation and kiss were not predicted by self-esteem, sex, nor the interaction between self-esteem and sex. There was a significant main effect of sex on age of first orgasm with males experiencing orgasm earlier than females (β= -0.30, t(3291)= -4.73, p<0.001), but no significant main effect of self-esteem (p=0.91) or interaction (p=0.94). Age of first oral sex was predicted by the interaction between self-esteem and sex (β= -0.24, t(3215)=-2.75, p=0.006). Age of first intercourse was predicted by sex with females experiencing intercourse earlier than males (β=0.20, t(3100)=2.95, p=0.003), but not by self-esteem (p=0.08) nor the interaction of self-esteem and sex (p=0.14); see table 4 for summary. Our hypothesis that self-esteem would more strongly predict sexual behavior in females than males was not supported.

Differences in means and effect sizes

There was a significant difference in the mean of age of first masturbation for males and females (t (3579) =4.593, p<0.001, Cohen's d=0.17), with the mean age being slightly lower for males (11.99 ± 2.11) than for females (12.51 ± 4.14). There was a higher incidence of masturbation in males($\chi^2(1)=45.28$, p<0.001, d=0.23; see figure 3). There was also a significant difference in the mean age of first orgasm (t (3521) = 16.512, p<0.001, d= 0.61), with the mean age being lower for males (12.33 ± 1.96) than for females (14.22 ± 4.23). Females were less likely to have experience with orgasm than males ($\chi^2(1)=89.13$, p<0.001, d=0.32; see figure 5). There was no difference in the age of first kiss (t (3597) = 0.28, p=n.s). There were statistically significant differences in the mean age of first experience with oral sex (t (3440)= -4.38,

$p<0.001$, $d=0.15$) and vaginal intercourse ($t(3312)= -5.89$, $p<0.001$, $d=0.20$), with mean ages being lower for females than males. The incidence of oral sex ($\chi^2(1)=36.50$, $p<0.001$, d= 0.20) and vaginal intercourse ($\chi^2(1)=23.63$, $p<0.001$, d= 0.16) was higher in females than in males. We hypothesized that there would be sex differences in the age at which these behaviors were first experienced as well as sex differences in their incidences, and our hypotheses were confirmed (see tables 8 and 9). We also predicted to see smaller effect sizes for these tests as compared to effect sizes calculated from 1960's and 1980's data, and this was confirmed as well.

Discussion

Interpretation of findings

The current study aimed to look at female sexual plasticity, the idea that female sexual behavior is more heavily influenced by social and attitudinal factors than is male sexual behavior, by using two different approaches. We first examined the strength of the relationship between the predictor variables of alcohol use, religion, and self-esteem and age at which select behaviors were first experienced, hypothesizing that this relationship would be stronger in males than females. Next, we used effect sizes of sex differences in sexual behavior calculated in the 1960's and 1980's (Oliver & Hyde, 1993) to examine whether differences in male and female sexual behavior have continued to decrease over time. Plasticity can be expressed in several different ways- through changes in the behaviors desired, degree of desire, and expression of desire. The current study looked at patterns of masturbation and orgasm as indicative of degree of desire, and patterns of kissing, oral sex, and vaginal intercourse as expression of desire.

Previous research has suggested that certain risky sexual behaviors, such as frequency of condom nonuse, number of sexual partners, and age of first intercourse, are associated with levels of alcohol use, religiosity, and self-esteem. Many studies have found that these associations are stronger for females than they are for males (Kowaleski-Jones & Mott, 1998,

Meier, 2003, Spencer et al., 2002, Orr et al., 1989), suggesting that risky sexual behavior in females is more influenced by social and cultural views than is sexual behavior in males. Following this view, we tested whether the same trend would hold when looking at more normative behaviors, which were age of first masturbation, orgasm, kiss, oral sex, and vaginal intercourse. When using alcohol use as a predictor variable there were no significant interactions, meaning the strength of the relationship between age of behavior and alcohol use did not differ between males and females. Additionally, there were main effects of sex when only looking at age of first orgasm and age of first intercourse. Though statistically significant, the effect sizes for both of these main effects were very small. The link between sexual behaviors and alcohol use was formulated on the assumption that individuals who engaged in one type of risky behavior, in this case frequent alcohol use, would engage in other risky behaviors as well, such as sexual behaviors that facilitate disease transmission (Brown & Vanable, 2009). If this assumption of risk-seeking is correct, it may be that some individuals do not view the autosexual and partnered behaviors that the current study examines as 'risky,' and thus their desire to take risks in other social settings does not translate to a higher desire to engage in sexual behavior earlier or more frequently.

In examining the influence of religion on sexual behavior, our findings on autosexual behavior are consistent with previous literature. There was a significant interaction of sex and religiosity, meaning the strength of the relationship between religiosity and age of first masturbation and orgasm differed for males and females. Bivariate correlations revealed that religiosity accounted for more of the variance in age of first masturbation and orgasm in females (0.16 and 0.09, respectively) than it did in males (0.06 and 0.05, respectively). The effect sizes for these correlations, however, were very small, meaning that religiosity accounted for only a

small portion of the variance seen in females. Contrary to previous literature, we did not find any significant interactions between religiosity and age when looking at age of first kiss, oral sex, and vaginal intercourse. There was a significant main effect of religiosity for age of first intercourse such that individuals with higher religiosity scores were older when first having intercourse, but the strength of this relationship was the same for males and females. The weakening of the relationship between religiosity and sexual behaviors may be explained by the more general secularization of society. Data collected from the General Social Survey (GSS) from 1972 to 2000 indicated a 100% increase in the percent of respondents with no religious preference (Hout & Fischer, 2002). About 60% of our sample reported never going to religious services, and 71% reported religion having no importance in their lives. Because religion is thought to be a tool of social control and a way for individuals to internalize morals and standards of a group (Barkan, 2006), increased secularization would lead to diminished influence of religion on behavior. The current study's inability to replicate findings in previous studies of religion and sexual behavior may be because such a large portion of our sample did not identify with a particular religion, and did not consider religion important. As the secularization of society continues, it may become less informative to look at religious influence on behavior of the general population. Instead, it may be advantageous to focus the study of religion and behavior on distinct religious subgroups, and see how highly religious subgroups differ from the general population.

Tests of our third predictor variable, self-esteem, revealed results inconsistent with previous literature. Though studies have found sex differences in the influence of self-esteem on age of first intercourse (Spencer et al., 2002), we were unable to replicate this finding. Additionally, the strength of the relationships between self-esteem and age of first masturbation,

orgasm, and kiss were not significantly different for males and females. There was a significant interaction when looking at age of first oral sex, and bivariate correlations indicated a stronger positive relationship between self-esteem and age of first oral sex in males than in females. The effect sizes for the interaction and correlations were small, indicating that self-esteem accounts for a very small portion of the variation seen in age of first experience with oral sex.

In sum, we did not find strong evidence suggesting female sexual behavior is more influenced by alcohol use, religiosity, and self-esteem than is male sexual behavior, contrary to previous research. The fact that variables that previously strongly predicted female sexual behavior did not in our study suggests that the specific variables that influence female sexual behavior may be changing over time. Alternatively, the finding of a limited relationship to these variables may reflect aspects peculiar to our study or sample that we have not yet identified.

The mean age of first masturbation was younger in males (11.99 ± 2.11) than females (12.51 ± 4.14), and this was a small to medium effect size (d=0.17). A larger effect size (d=0.85) was found when looking at differences in frequency of masturbation (indicated by a scale ranging from *never* to *several times per day*)- with males reporting more frequent masturbation than did females. In the meta-analysis by Oliver and Hyde (1993), the reported effect size of the sex difference in incidence masturbation was down to 0.60 using data collected in the 1980's, smaller than the effect size of 0.96 calculated using data collected in the 1960's and 1970's. Using data from the current sample, we found a small effect size of 0.23 when looking at masturbation incidence. While the beginning of a heterosexual relationship was often thought of as the beginning of an adolescent female's sexual behaviors (Baumeister, 2000), we now see, as is common for males, an increasingly large percent of females engaging in autosexual behavior prior to partnered behavior. This gradual decrease in effect sizes suggests a narrowing of the gap

between masturbation incidence in males and females, and supports the idea of female sexual plasticity. As females are hypothesized to be more influenced by societal attitudes and attitudes towards sex have become increasingly permissive since the 1960's (Elders, 2010, Reece et al., 2010), it follows that an increased proportion of females have experience with masturbation. An alternate explanation to this diminishing sex difference may be that in the 1950's and 1960's, masturbation incidence was around 100% in males, and around 60% in females. Despite it now being a noncontroversial issue, masturbation incidence is still significantly higher in males than females.

While the mean age of first masturbation was about 6 months higher for females than males, larger differences were seen in age of first orgasm, with males (12.33 ± 1.96) experiencing orgasm about two years before females (14.22 ± 4.23). We then compared the proportion of males and females having ever experienced orgasm, and found females were significantly less likely to have experienced orgasm. The effect size for this difference (d=0.32) was interpreted as a moderate to large effect. Most males and females reported experiencing orgasm every time they masturbated (80% and 65%, respectively), but orgasm rates differed more when looking at frequency of orgasm during intercourse. Approximately 60% of males reported orgasm 91-100% of the time, while this figure for females was around 15%. The modal answer for frequency of orgasm during intercourse for females was 0% of the time, with about 22% of females choosing this answer. Thus, it is clear the differences in orgasm between males and females extend to frequency as well as age. While men must orgasm during intercourse for reproduction to occur, female orgasm is not required for reproduction. Thus, from an evolutionary standpoint, frequent orgasm during intercourse may be a trait that has been strongly selected for in males, but not in females (Lloyd, 2005, as seen in Wallen & Lloyd, 2011). We are

unable to compare behaviors relating to orgasm in the current sample to other samples, as large-scale surveys have largely focused on partnered rather than autosexual behaviors.

We found no significant difference in mean age of first kiss in males and females. Unlike masturbation, because kissing is a partnered behavior, it reflects more than internal sexual motivation. While masturbation starts to rapidly increase as males enter puberty and their sexual motivation increases, partnered behaviors require the expression of sexual desire to other individuals, and there are social conventions about the ages and circumstances in which it is acceptable to express this sexual interest. Thus, we would expect the values for males and females to be similar. Oliver and Hyde (1993) reported a small effect size for kissing experience (d=0.05), but since prior partnered sexual experience was required for participants of the current study, we do not have comparable data.

Females in our sample experienced oral sex about 4 months earlier than did males (16.92 ± 2.44 and 17.29 ± 2.58, respectively), with the standard deviations for mean age of first oral sex being about the same for males and females. There was a small to medium effect size for this difference in mean age (d=0.15). Oliver and Hyde (1993) found a small effect size (d=0.15) when looking at incidence of oral sex, with males more likely to have experience than do females. Conversely, our sample suggested a higher incidence rate of oral sex in females than males, with a small to moderate effect size (d=0.20). Whereas females were less likely to have experience with oral sex in the 1960's and 1980's, our results show that the pattern has now reversed, suggesting a high degree of plasticity in the behaviors females engage in. Alternatively, since we do not know if reports of oral sex reflect giving or receiving the act, it may be that an increase in reports of oral sex reflect changes in what males expect from females in a sexual interaction, rather than changes in female sexual preferences.

Females on average had their first experiences with vaginal intercourse half a year before males (17.53 ± and 18.01 ±, respectively). The effect size for this difference was small to moderate. Females were more likely to have experience with vaginal intercourse than are males, and this effect was small to moderate as well (d=0.16). Interestingly, previous research has estimated a larger proportion of males with experience with vaginal intercourse, along with small to moderate effect sizes (d=0.33). This reversal in the pattern seen in the 1960's and 1980's may be in part due to shifting views of intercourse. Whereas females in Kinsey's sample were less likely to have intercourse before marriage and less likely to hold permissive views of casual sexual encounters (Gebhard & Johnson, 1979), Oliver and Hyde found that females increasingly accept intercourse outside the context of a relationship or marriage. In fact, males and females may have the same number of casual sex partners, though males are comparatively more accepting than females of casual sexual encounters (Peplau, 2003).

Our results show there have been changes over time in the patterns of sexual behavior in males and females. The effect sizes for the difference between sexes have continued to decrease, indicating shrinking sex differences. Additionally, our results suggest that more females than males have experience with oral sex and vaginal intercourse, whereas previously the incidence rates were higher in males.

Not all results, however, suggest changes in the overall patterns of sexual behavior over time. When looking at cumulative percent graphs for age of first masturbation and age of first orgasm by sex (figure 3 and figure 5, respectively), we see that before age 10, a higher percentage of females have experience with masturbation and orgasm than do males. By 11 years of age, the percentages become equal and then the percentage of males with such experience dramatically increases between the ages of 12 and 15. By age 15, 96.3% of boys have

masturbated, and have had an orgasm. In contrast, 75.3% of women have masturbated, but only a bit more than half (55.7%) have experienced orgasm. These results are strikingly similar to data collected by Kinsey more than 60 years ago (Gebhard & Johnson, 1979). While the percentage of boys in Kinsey's data having experienced masturbation before age 12 is 11.4%, 94% have by age 25 (figure 4). The slightly lower percentages seen in the Kinsey data compared to ours may reflect on overall reduction in prohibitions against masturbation in the intervening years. The same sudden increase in boys experiencing masturbation around puberty seen in both our data and in Kinsey's sample may suggest a strong role for hormones in male sexual desire and motivation. The beginning of puberty in males is accompanied by an increase in endogenous testosterone levels (Chada et al., 2003), and studies have suggested testosterone is the hormone of male sexual motivation and desire (see Isidori et al., 2005 for review). Masturbation can be seen as a behavioral expression of sexual desire, thus a rise in masturbation rates around the onset of puberty would reflect an increase in desire and be expected as a result of the rise in testosterone. Because it is an autosexual behavior, masturbation may be less influenced by social and cultural norms, and more influenced by the sexual motivation and hormones of an individual. Though attitudes towards sexuality have changed in the past 60 years (Bancroft, 2004, Herbenick et al., 2010), results from the current study suggest there have not been changes in male autosexual behavior, emphasizing the role of hormones in modulating male sexual behavior. For females, puberty accompanies the onset of menstrual cycles, rather than a surge of hormones, as is seen in males. Sexual desire and motivation in females is correlated with estradiol levels (Bullivant et al., 2004, Haselton & Gangstead, 2006), such that peaks in sexual desire and motivation are seen during ovulation. Thus, while males may experience increases in baseline levels of sexual motivation during puberty, females experience cyclic fluctuations,

which may explain the lack of sudden increases in masturbation around puberty. Comparable Kinsey data on age of first masturbation in females was not available.

While essentially 100% of males in our sample have experienced orgasm by age 16, the percentage of females experiencing orgasm plateaus at about 94% at age 23 (figure 5). These data on orgasm closely mirror Kinsey's findings in both males and females- until about 10 years of age, the percentage of females with experience with orgasm exceeds that of males, whereas at about 11 to 12 years of age, the percentage of males with experience starts jumping until it plateaus at age 16, with almost 100% of males having experience with orgasm by then (figure 6). The rise in percentage of women having experienced orgasm is much more gradual and plateaus at age 30, with only about 90% of women ever experiencing orgasm (figure 6). As is the case in increases in male masturbation during puberty, the increases in orgasm experience in males during puberty may be a result of increased sexual interest and autosexual behavior. Recent research has suggested that some females are unable to experience orgasm, with the prevalence of anorgasmia ranging from 5% to as high as 24% (Meston et al., 2004, Rosen, 2005). Data from our sample as well as Kinsey's sample fall within this range, and support the idea of anorgasmia as a clinical entity. In part due to the lack of research on sexual behaviors other than those that facilitate STD transmission, the biological mechanisms of anograsmia remain unknown.

Results of the current study suggest the importance of both social and hormonal factors in moderating sexual behavior. The increasingly open and permissive views of sexuality, especially in females, may contribute to shrinking sex differences in sexual experiences. When comparing data from the current study to data collected by Kinsey, however, we see that several patterns have still remained the same. Patterns of masturbation and orgasm, both autosexual behaviors that can be seen as indicative of sexual desire, have remained largely similar. Before males enter

puberty, a larger percentage of females have experience with masturbation and orgasm, but this pattern quickly reverses once puberty hits. While sex differences in such behaviors are shrinking, it may be that they will never fully cease to exist because of the different hormonal patterns of males in females, especially during adolescence when most individuals experience their sexual debut.

Limitations

The present study had several limitations, perhaps the most notable of which is possible participation bias. Clement (1990) argued that participation bias increases as survey content increases in intimacy, making participation bias a concern for all sex research. Because the survey was advertised as a survey on human sexual behavior, more conservative individuals may have chosen not to start the survey, or may have begun taking the survey but stopped before completing it. It is possible that individuals who completed the survey, and were thus included in our data analyses, have more liberal views and patterns of behavior that are not fully representative of the views and patterns of the general population. Bias in our sample may have also resulted from the way the survey was distributed. Because social media was the primary method of directing individuals to the survey, individuals who do not frequently use social media were less likely to be recruited. It is unknown whether the sexual behavior of young adults who spend more time on social media sites differs from young adults who spend less time. Additionally, because the survey was posted online, individuals who do not have access to the internet or individuals who do not feel as comfortable using the internet were unlikely to be recruited.

The reliance on internet distribution methods may have contributed to young age of the sample. 51% of participants were between the ages of 18 and 22, and 90% of participants were

between 18 and 30. It may be that individuals under 30 use the internet more frequently than do individuals above 30, due to the increased accessibility of the internet in the past 20 years, and were thus more likely to encounter our survey, as participants were largely recruited via the internet.

Because only 387 subjects 30 yrs old or older completed our survey we are unable to generalize our findings to those over 30 and were also unable to make meaningful comparisons between age cohorts. Though unable to make cross-sectional comparisons, the current study contributes information on the behaviors and attitudes of a young, modern cohort, and these data could be compared to data collected from the NSSHB to elucidate how practices within same-aged individuals have changed from the 1990's to the 2010's.

Similarly, we did not have a racially diverse a sample. The majority of our sample was from the United States, where an estimated 13.1% of the population is African American, or Canada, where about 15.5% of the population is African American. Yet only 1.1% of participants in the current study identified as African American, making our sample demographics unrepresentative of the racial demographics of the US or Canada. This limitation is important as previous work suggests that there are racial differences in the extent to which religiosity and substance abuse modulate sexual behavior and attitudes (Barkan, 2006) for example. The relatively small number of participants identifying with races other than 'white' make our results more representative of white patterns of behavior, but less representative of patterns of behavior in the general population.

A large body of literature supports that self-report may provide systematic, inaccurate population estimates of behavior (Lauritsen & Swicegood, 1997, Michaels & Giami, 1999, Turner et al., 1997). Self-reports may not always accurately measure behavior, and may be

increasingly unreliable when asking for sensitive information such as information on drug use or sexual behavior (Tourangeau & Yan, 2007). For example, data analyzed in 1998 from the National Survey of Family Growth suggested that only 52% of the abortions performed in the United States were reported on the survey (Michaels & Giami, 1999). Similarly, the reported mean number of sexual partners is frequently higher for men than for women, though this number should be equal in a closed population (Tourangeau & Yan, 1997). Thus, men may over report their number of sexual partners or females may underreport, but it is unknown which one of these cases is accurate (Fenton et al., 2001). Because there are social norms governing public perceptions of 'normal' sexual behavior, participants may have reported socially desirable responses rather than responses that accurately represent their sexual experience. To minimize the influence of social desirability on responses, we did not collect any identifying information on participants and assured them that we could not match a response to any individual. Though this is common practice in self-report surveys, participants still may not trust that their responses are truly anonymous and thus bias their responses (Tourangeau & Yan, 2007). Social desirability bias is seen more in reports of frequency than in reports of experience. Reports of experience ask, for example, whether a behavior has ever been experienced or at what age the behavior was first experienced. These questions typically produce more reliable and valid responses than responses to queries about how often a subject has engaged in a specific behavior (Fenton et al., 2001). We therefore aimed to minimize participant recall bias in the present study by focusing most analyses on reports of experience. There is, however, no way to confirm the validity of participants' responses, though to some extent the large sample size ameliorates the effect of bias in any individual in the survey.

Future directions

Despite these limitations, results of the current study add to our knowledge of the aspects of sexual behavior that have changed and remained the same over time. Additionally, few large scale sex surveys ask about masturbation, and fewer ask about orgasm. The focus on behaviors relevant from an epidemiological point of view has left us knowing little about the factors that may influence these autosexual and nonrisky behaviors. The fact that our effect sizes for sex differences in orgasm were the largest effect sizes found in this study suggest the need for future research on the topic. While some research has aimed to explain the large variability seen in female orgasm (see Wallen & Lloyd, 2011), studies focusing on pleasurable aspects of sexual behavior remain sparse (Edlers, 2010). If we aim to broaden the scope of the national conversation of sexual behavior, it is important to have accurate, current information on the full sexual repertoires of individuals. Scientifically-based sex education should include the discussion of sexual behaviors performed for pleasure in addition to those associated with high risk and consequences, as humans are innately sexual beings. By reporting large and persistent sex differences in pleasurable sexual behaviors, the current study reflects an attempt to contribute to the conversation of sexual behavior for pleasure, rather than solely for procreation.

References

Bancroft, J. (2004). Alfred C. Kinsey and the politics of sex research. *Annual Review of Sex Research*, *15*(1), 1-39.

Barkan, S. (2006). Religiosity and premarital sex in adulthood. *Journal for the Scientific Study of Religion, 45*(3), 407-417.

Bauman, K., & Wilson, R. (1974). Sexual behavior of unmarried university students in 1968 and 1972. *Journal of Sex Research, 10,* 327-333.

Baumeister, R. (2000). Gender differences in erotic plasticity: The female sex drive as socially flexible and responsive. *Psychological Bulletin, 126*(3), 347-374.

Biglan, A., Metzler, C., Wirt, R., Ary, D., Noell, J., Ochs, L,…& Hood, D. (1990). Social and behavioral factors associated with high-risk sexual behavior among adolescents. *Journal of Behavioral Medicine, 13*(3), 245-261.

Brown, J., & Vanable, P. (2009). Alcohol use, partner type, and risky sexual behavior among college students: Findings from an event-level study. *Addictive Behavior, 32*(12), 2940-2952.

Brown, N., & Sinclair, R. (1999). Estimating number of lifetime sexual partners: Men and women do it differently. *The Journal of Sex Research, 36*(3), 292-297.

Brown, T., & Fee, E. (2003). Alfred C. Kinsey: A pioneer of sex research. *American Journal of Public Health, 93*(6), 896-897.

Bullivant, S. B., Sellergren, S. A., Stern, K., Spencer, N. A., Jacob, S., Mennella, J. A., & McClintock, M. K. (2004). Women's sexual experience during the menstrual cycle: identification of the sexual phase by noninvasive measurement of luteinizing hormone. *Journal of Sex Research*, *41*(1), 82-93.

Chada, M., Prusa, R., Bronsky, J., Kotaska, K., Sidlova, K., Pechova, M., & Lisa, L. (2003). Inhibin B, follicle stimulating hormone, luteinizing hormone and testosterone during childhood and puberty in males: Changes in serum concentrations in relation to age and stage of puberty. *Physiological Research*, *52*(1), 45-52.

Clement, U. Surveys of heterosexual behavior. *Annual Review of Sex Research, 1990*(1), 45-74.

Cohen, J. (1992). A power primer. *Psychological bulletin*, *112*(1), 155-160.

Dermen, K., & Cooper, M. (2000). Inhibition conflict and alcohol expectancy as moderators of alcohol's relationship to condom use. *Experimental and Clinical Psychopharmacology, 8,* 198-206.

Desiderato, L., & Crawford, H. (1995). Risky sexual behavior in college students: Relationships between number of sexual partners, disclosure of previous risky behavior, and alcohol use. *Journal of Youth and Adolescence, 24*(1), 55-68.

DiClemente, R. J., Crittenden, C. P., Rose, E., Sales, J. M., Wingood, G. M., Crosby, R. A., & Salazar, L. F. (2008). Psychosocial predictors of HIV-associated sexual behaviors and the efficacy of prevention interventions in adolescents at-risk for HIV infection: what works and what doesn't work?. *Psychosomatic Medicine*, *70*(5), 598-605.

Donovan, C., & McEwan, R. (1995). A review of the literature examining the relationship between alcohol use and HIV-related sexual risk-taking in young people. *Addiction, 90,* 319-328.

Elders, J. (2010). Sex for health and pleasure throughout a lifetime. *The Journal of Sexual Medicine, 7(*s5), 248-249.

Ethier, K., Kershaw, T., Lewis, J., Milan, S., Niccolai, L., & Ickovics, J. (2006). Self-esteem, emotional distress and sexual behavior among adolescent females: inter-relationships and temporal effects. *Journal of Adolescent Health, 38*(1), 268-274.

Fenton, K. (2010). Time for change: Rethinking and reframing sexual health in the United States. *The Journal of Sexual Medicine, 7(*s5), 250-252.

Fenton, K. A., Johnson, A. M., McManus, S., & Erens, B. (2001). Measuring sexual behavior: methodological challenges in survey research. *Sexually Transmitted Infections*, *77*(2), 84-92.

Fielder, R., Walsh, J., Carey, K., & Carey, M. (2012). Predictors of sexual hookups: A theory-based, prospective study of first-year college women. *Archives of Sexual Behavior*, *42*(8), 1425-1441.

Gallup, G. H., & Bezilla, R. (1992). The religious life of young Americans. *Princeton, NJ: George H. Gallup International Institute*.

Gebhard, P. H., Johnson, A. B., & Kinsey, A. C. (1979). *The Kinsey data: Marginal tabulations of the 1938-1963 interviews conducted by the Institute for Sex Research*. Indiana University Press.

George, W., Stoner, S., Norris, J., Lopez, P., & Lehman, G. (2000). Alcohol expectancies and sexuality: A self-fulfilling prophecy analysis of dyadic perceptions and behavior. *Journal of Studies on Alcohol and Drugs, 61,* 168-176.

Goodson, P., Buhi, E., & Dunsmore, M.(2006). Self-esteem and adolescent sexual behaviors, attitudes, and intentions: A systematic review. *Journal of Adolescent Health, 2006,* 310-319.

Graves, K. (1995). Risky behavior and alcohol use among young adults: Results from a national survey. *American Journal of Health Promotion, 10,* 27-36.

Hardy, S., & Raffaelli, M. (2003). Adolescent religiosity and sexuality: An investigation of reciprocal influences. *Journal of Adolescence, 26,* 731-739.

Haselton, M., & Gangestad, S. (2006). Conditional expression of women's desires and men's mate guarding across the ovulatory cycle. *Hormones and Behavior, 49*(1), 509-518.

Herbenick, D., Reece, M., Schick, V., Sanders, S. A., Dodge, B., & Fortenberry, J. D. (2010). Sexual behavior in the United States: Results from a national probability sample of men and women ages 14–94. *The Journal of Sexual Medicine*, *7*(s5), 255-265.

Hout, M., & Fischer, C. (2002). Why more Americans have no religious preference: Politics and generations. *American Sociological Review, 67,* 165-190.

Isidori, A. M., Giannetta, E., Gianfrilli, D., Greco, E. A., Bonifacio, V., Aversa, A., ... & Lenzi, A. (2005). Effects of testosterone on sexual function in men: results of a meta‐analysis. *Clinical Endocrinology*, *63*(4), 381-394.

Jessor, R., Costa, F., Jessor, S., & Donovan, J. (1983). Time of first intercourse: A prospective study. *Journal of Personality and Social Psychology, 44,* 608-626.

Kinsey, A. C. (Ed.). (1953). *Sexual behavior in the human female*. Indiana University Press.

Kowaleski-Jones, L., & Mott, F. (1998). Sex, contraception and childbearing among high-risk youth: Do difference factors influence males and females? *Family Planning Perspectives, 30(*4), 163-169.

Lauritsen, J. L., & Swicegood, C. G. (1997). The consistency of self-reported initiation of sexual activity. *Family Planning Perspectives*, *29*(5).

Leiblum, S. (2002). Reconsidering gender differences in sexual desire: An update. *Sexual and Relationship Therapy, 19*(1), 57-68.

Lewontin, R. C. (1995). Sex, lies, and social science.

McNair, L., Carter, J., & Williams, M. (1998). Self-esteem, gender, and alcohol use: Relationships with HIV risk perception and behavior in college students. *Journal of Sex and Marital Therapy, 24,* 29-36.

Meier, A. (2003). Adolescents' transition to first intercourse, religiosity, and attitudes about sex. *Social Forces, 81,* 1031-1052.

Meston, C. M., Hull, E., Levin, R. J., & Sipski, M. (2004). Disorders of orgasm in women. *The Journal of Sexual Medicine*, *1*(1), 66-68.

Michaels, S., & Giami, A. (1999). Review: Sexual acts and sexual relationships: Asking about sex in surveys. *Public Opinion Quarterly*, 401-420.

Miller, B., Norton, M., Curtis, T., Hill, E., Schaveneveldt, P, & Young, M. (1997). The timing of sexual intercourse among adolescents: Family, peer, and other antecedents. *Youth and Society, 29,* 54-83.

Miller, P. (1995). They said it couldn't be done: The national health and social life survey. *Public Opinion Quarterly, 59,* 404-419.

Mockabee, S., Monson, J., & Grant, J. (2001). Measuring religious commitment among Catholics and Protestants. *Journal for the Scientific Study of Religion, 40,* 675-690

Oliver, M., & Hyde, J. (1993). Gender differences in sexuality: A meta-analysis. *Psychological Bulletin, 114*(1), 29-51.

Orr, D., Wilbrandt, M., Brack, C., Rauch, S., & Ingersoll, G. (1989). Reported sexual behaviors and self-esteem among young adolescents. *American Journal of Diseases of Children*, *143*(1), 86-90.

Paul, E., McManus, B., & Hayes, A. (2000). "Hookups": Characteristics and correlates of college students' spontaneous and anonymous sexual experiences. *The Journal of Sex Research, 37*(1), 76-88.

Peplau, L. A. (2003). Human sexuality: How do men and women differ?. *Current Directions in Psychological Science*, *12*(2), 37-40.

Reece, M., Herbenick, D., Schick, V., Sanders, S., Dodge, B., & Fortenberry, J. (2010). Background and Considerations on the National Survey of Sexual Health and Behavior (NSSHB) from the Investigators. *The Journal of Sexual Medicine, 7(*s5), 243-245.

Roney, J., & Simmons, Z. (2013). Hormonal predictors of sexual motivation in natural menstrual cycles. *Hormones and Behavior, 63*(4), 636-645.

Rosen, R. (2000). Prevalence and risk factors of sexual dysfunction in men and women. *Current Psychiatry Reports, 2*(3), 189-195.

Rotosky, S., Wilcox, B., Comer Wright, M., & Randall, B. (2004). The impact of religiosity on adolescent sexual behavior: A review of the evidence. *Journal of Adolescent Research, 19*(6), 677-697.

Senf, J., & Price, C. (1994). Young adults, alcohol and condom use: What is the connection? *Journal of Adolescent Health, 15,* 238-244.

Shrier, L., Harris, S., Sternberg, M., & Beardslee, W. (2001). Associations of depression, self-esteem, and substance use with sexual risk among adolescents. *Preventative Medicine, 33,* 179-189.

Spencer, J., Zimet, G., Aalsma, M., & Orr, D. (2002). Self-esteem as a predictor of initiation of coitus in early adolescents. *Pediatrics, 109*(4), 581-584.

Stall, R., Coates, T., & Hoff, C. Behavioral risk reduction for HIV infection among gay and bisexual men: A review of results from the United States. *American Psychologist, 43*(11), 878-885.

Stueve, A., & O'Donnell, L. (2005). Early alcohol initiation and subsequent sexual and alcohol risk behaviors among urban youths. *American Journal of Public Health, 95*(5), 887-893.

Tittle, C., & Welch, M. (1983). Religiosity and deviance: Toward a contingency theory of constraining effects. *Social Forces, 61,* 53-80.

Tourangeau, R., & Yan, T. (2007). Sensitive questions in surveys. *Psychological Bulletin, 133*(5), 859-883.

Travison, T., Morley, J., Araujo, A., O'Donnell, A., & McKinlay, J. (2006). The relationship between libido and testosterone levels in aging men. *Journal of Clinical Endocrinology and Metabolism, 91*(7), 2509-2513.

Trzesniewski, K., Donnellan, B., & Robins, R. (2003). Stability of self-esteem across the life span. *Journal of Personality and Social Psychology, 84*(1), 205-220.

Turchik, J., Garske, J., Probst, D., & Irvin, C. (2010). Personality, sexuality, and substance use as predictors of sexual risk taking in college students. *Journal of Sex Research, 47*(5), 411-419.

Turner, C. F., Miller, H. G., & Rogers, S. M. (1997). Survey measurement of sexual behavior. *Researching Sexual Behavior: Methodological Issues*, 37-60.

Vasilenko, S., Duntzee, C., Zheng, Y., & Lefkowitz, E. (2013). Testing two process models of religiosity and sexual behavior. *Journal of Adolescence, 26,* 667-673.

Wallen, K., & Lloyd, E. (2011). Female sexual arousal: Genital anatomy and orgasm in intercourse. *Hormones and Behavior, 59*(2011), 780-792.

Table 1

Sample demographics

Variable	Female	Male
Mean age (SD)	22.90 (4.96)	25.41 (7.22)
Race (%)		
White	83.6	87.9
Asian	5.7	3.0
Hispanic	3.8	2.6
African American	1.4	0.9
Other	5.5	5.6
Relationship status (%)		
Single	25.3	31.1
In a relationship	59.5	45.0
Engaged	4.1	3.4
Married	8.5	17.6
In a civil union	0.3	0.4
Divorced	0.8	0.6
Other	1.4	1.7
Region (%)		
Northeast	22.1	19.6
Southeast	13.9	11.8
Midwest	17.2	18.0
Southwest	6.2	6.8
West	7.7	7.9
Northwest	5.8	5.7
Non-U.S.A	25.8	28.2
Years of education (%)		
Less than 12	7.1	8.2
12-15	56.8	49.7
More than 15	35.5	41.7

Table 2

Raw (B) and standardized (β) regression coefficients for males and females with alcohol use and sex as predictor variables

Behavior	B	SE B	β
Masturbation			
Alcohol use	0.13	0.09	0.08
Sex	-0.47	0.30	-0.01
Interaction	-0.10	0.06	-0.12
Orgasm			
Alcohol use	0.01	0.01	0.005
Sex	-1.82	0.30	-0.27**
Interaction	-0.02	0.06	-0.02
Kiss			
Alcohol use	-0.07	0.1	-0.04
Sex	0.12	0.31	0.02
Interaction	-0.02	0.06	-0.03
Oral sex			
Alcohol use	-0.07	0.08	-0.05
Sex	0.31	0.25	0.06
Interaction	0.02	0.05	0.03
Intercourse			
Alcohol use	-0.001	0.24	-0.001
Sex	0.66	0.24	0.14**
Interaction	-0.03	0.05	-0.05

**= $p<0.01$

Table 3

Raw (B) and standardized (β) regression coefficients for males and females with religiosity and sex as predictor variables

Behavior	B	SE B	β
Masturbation			
Religiosity	0.43	0.07	0.53**
Sex	0.38	0.24	0.06
Interaction	-0.20	0.04	-0.31**
Orgasm			
Religiosity	0.32	0.07	0.26**
Sex	-1.29	0.24	-0.19**
Interaction	-0.14	0.04	-0.22**
Kiss			
Religiosity	0.05	0.07	0.04
Sex	0.07	0.25	0.01
Interaction	-0.001	0.05	-0.001
Oral sex			
Religiosity	0.01	0.06	0.1
Sex	0.42	0.19	0.08*
Interaction	-0.01	0.04	-0.02
Intercourse			
Religiosity	0.17	0.06	0.18**
Sex	0.73	0.19	0.15**
Interaction	-0.05	0.4	-0.11

*= $p<0.05$

**= $p<0.01$

Table 4

Raw (B) and standardized (β) regression coefficients for males and females with self-esteem and sex as predictor variables

Behavior	B	SE B	β
Masturbation			
Self-esteem	0.06	0.03	0.10
Sex	-0.10	0.41	-0.02
Interaction	-0.02	0.02	-0.10
Orgasm			
Self-esteem	0.004	0.03	0.01
Sex	-1.95	0.41	-0.29**
Interaction	0.002	0.02	0.01
Kiss			
Self-esteem	0.06	0.03	0.10
Sex	0.80	0.42	0.12
Interaction	-0.04	0.02	-0.17
Oral sex			
Self-esteem	0.07	0.03	0.15**
Sex	1.25	0.33	0.25**
Interaction	-0.04	0.02	-0.24**
Intercourse			
Self-esteem	0.04	0.02	0.1
Sex	0.94	0.32	0.20**
Interaction	-0.02	0.02	-0.13

**=$p<0.01$

Table 5

Nonparamtric correlations (Spearman's rho) between alcohol use and age of first behavior

Variable	Female	Male
Masturbation	0.02	-0.05**
Orgasm	0.004	-0.03
Kiss	-0.07**	-0.08**
Oral sex	-0.08**	-0.12**
Vaginal intercourse	-0.09**	-0.16**

*= $p<0.001$

Table 6

Nonparametric correlations (Spearman's rho) between religiosity and age of first behavior

Variable	Female	Male
Masturbation	0.16**	0.06**
Orgasm	0.09**	0.05*
Kiss	0.02	0.04
Oral sex	0.09**	0.08**
Vaginal intercourse	0.18**	0.09**

*= $p<0.01$

**= $p<0.001$

Table 7

Nonparamtric correlations (Spearman's rho) between self-esteem and age of first behavior

Variable	Female	Male
Masturbation	0.07**	0.03
Orgasm	0.01	0.01
Kiss	0.03	-0.03
Oral sex	0.04	-0.10**
Vaginal intercourse	0.03	-0.08**

**= $p<0.001$

Table 8

Results of independent sample t-tests comparing age of first experience

Variable	Female Mean (SD)	Male Mean (SD)	df	*t*	*p*	Cohen's *d*
Masturbation	12.51 (4.14)	11.99 (2.11)	3529	4.59	<0.001	0.17
Orgasm	14.22 (4.23)	12.33 (1.96)	3521	16.512	<0.001	0.61
Kiss/touch	14.82 (3.09)	14.79 (3.51)	3597	0.28	n.s	0.28
Oral sex	16.92 (2.44)	17.29 (2.58)	3440	-4.38	<0.001	0.15
Vaginal intercourse	17.53 (2.33)	18.01 (2.41)	3312	-5.89	<0.001	0.20

Table 9

Results of chi square test for differences in incidence rates between males an females

Behavior	Overall chi square	df	Cohen's *d*
Masturbation	48.38**		0.23
Orgasm	89.13**	1	0.32
Oral sex	36.50**	1	0.20
Vaginal intercourse	23.63**	1	0.16

**= $p<0.001$

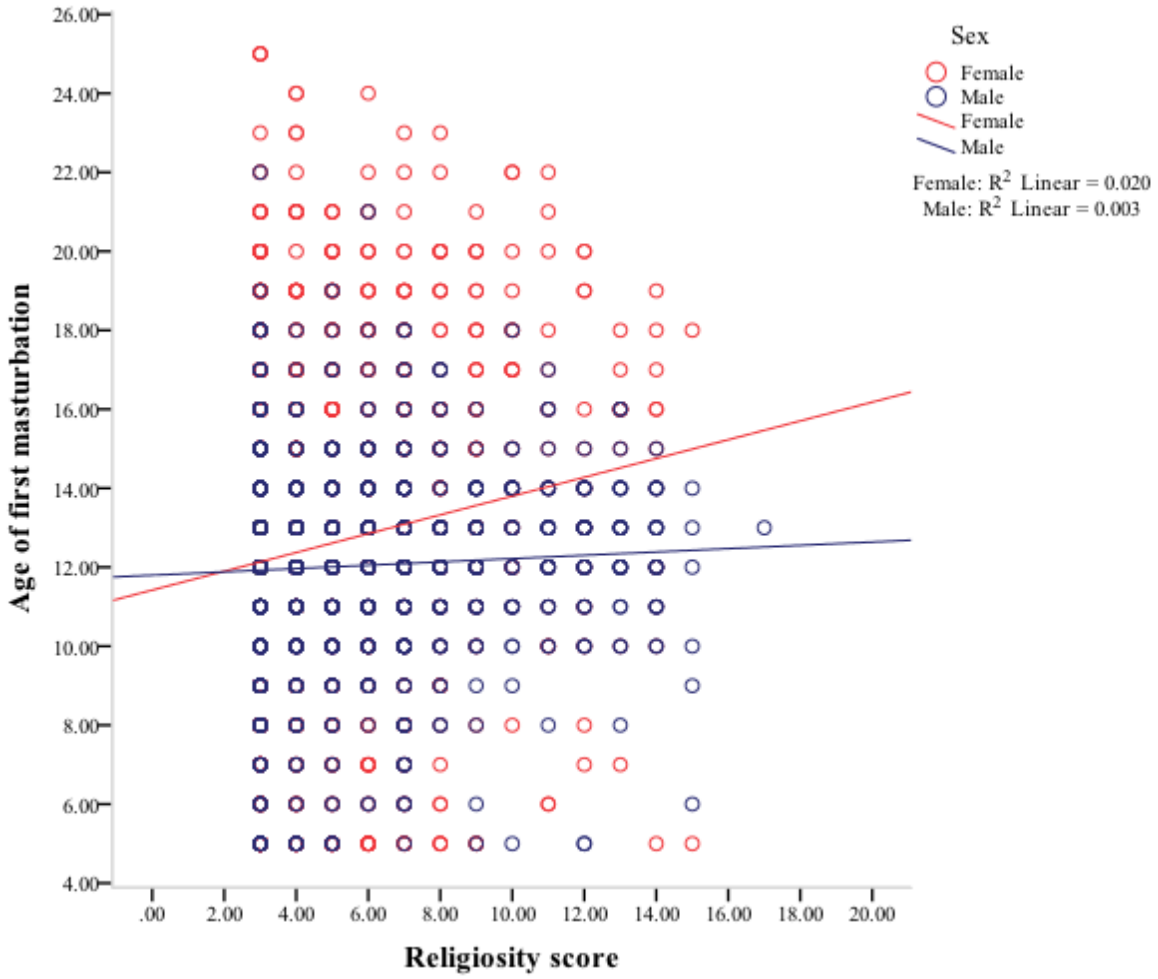

Figure 1. Strength of religiosity predicting age of first masturbation. Religiosity and age of first masturbation were more strongly related in females than males. There was a small effect size for this interaction between religiosity and sex.

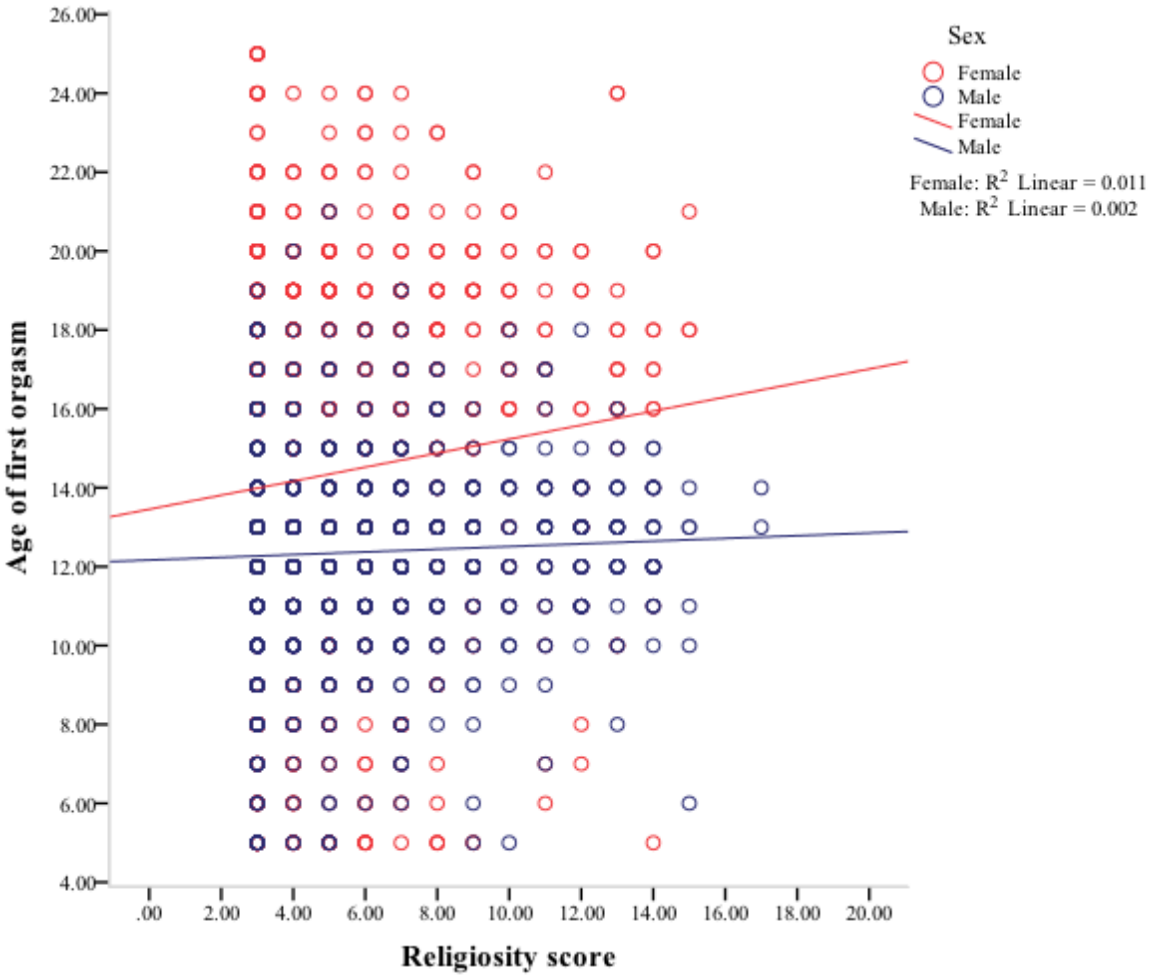

Figure 2. Strength of religiosity predicting age of first orgasm. Religiosity and age of first orgasm were more strongly related in females than males. There was a small effect size for this interaction between religiosity and sex.

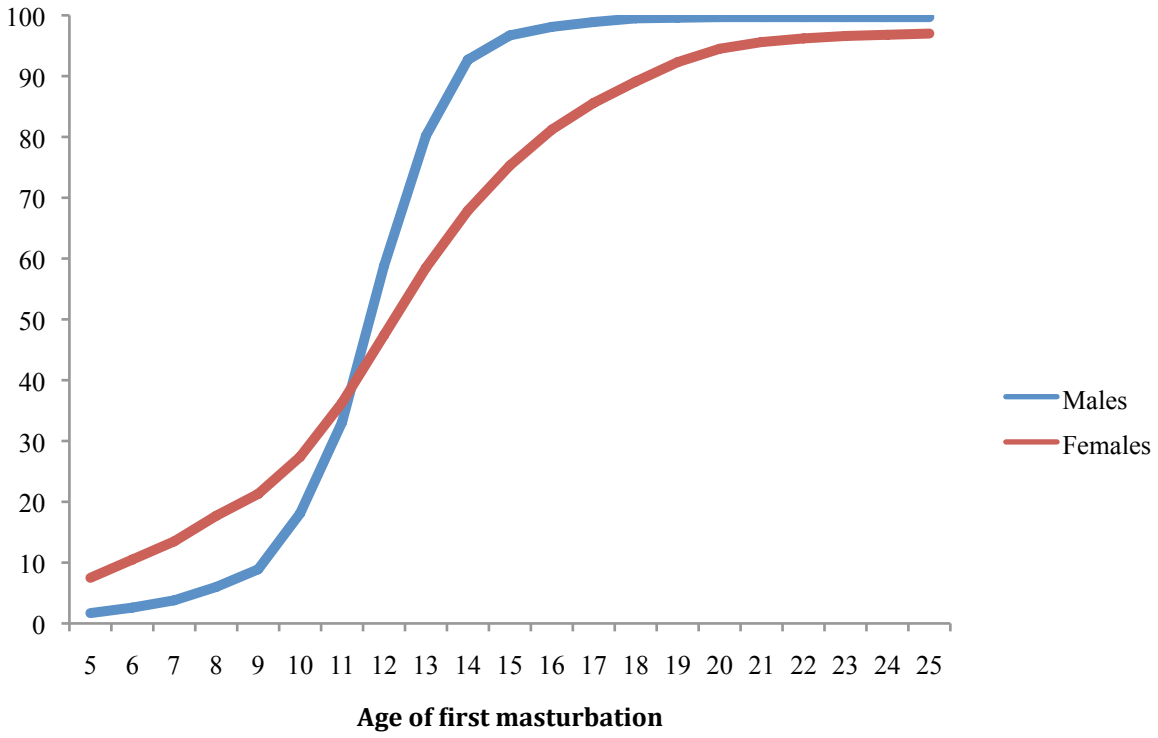

Figure 3. Cumulative percent graph of age of first masturbation from data obtained in this study. Before males enter puberty a larger percentage of females have experience with masturbation, whereas after puberty, the percentage of males experiencing masturbation increases more quickly than that of females.

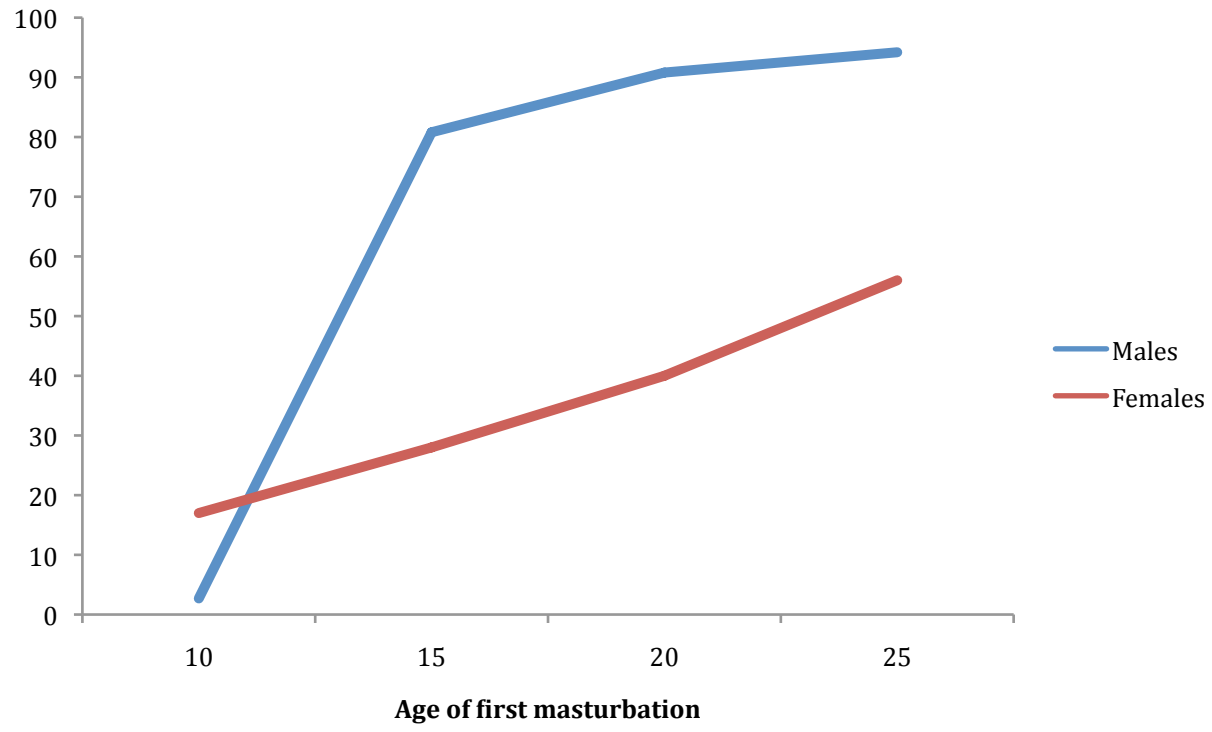

Figure 4. Cumulative percent graph of age of first masturbation using Kinsey data. The pattern seen in data collected 60 years ago strongly reflects the pattern seen using today's data- before males hit puberty more females have experience with masturbation, and this relationship reverses once males begin to enter puberty. Approximately 100% of males have experience with masturbation, while about 60% of females have experience with masturbation.

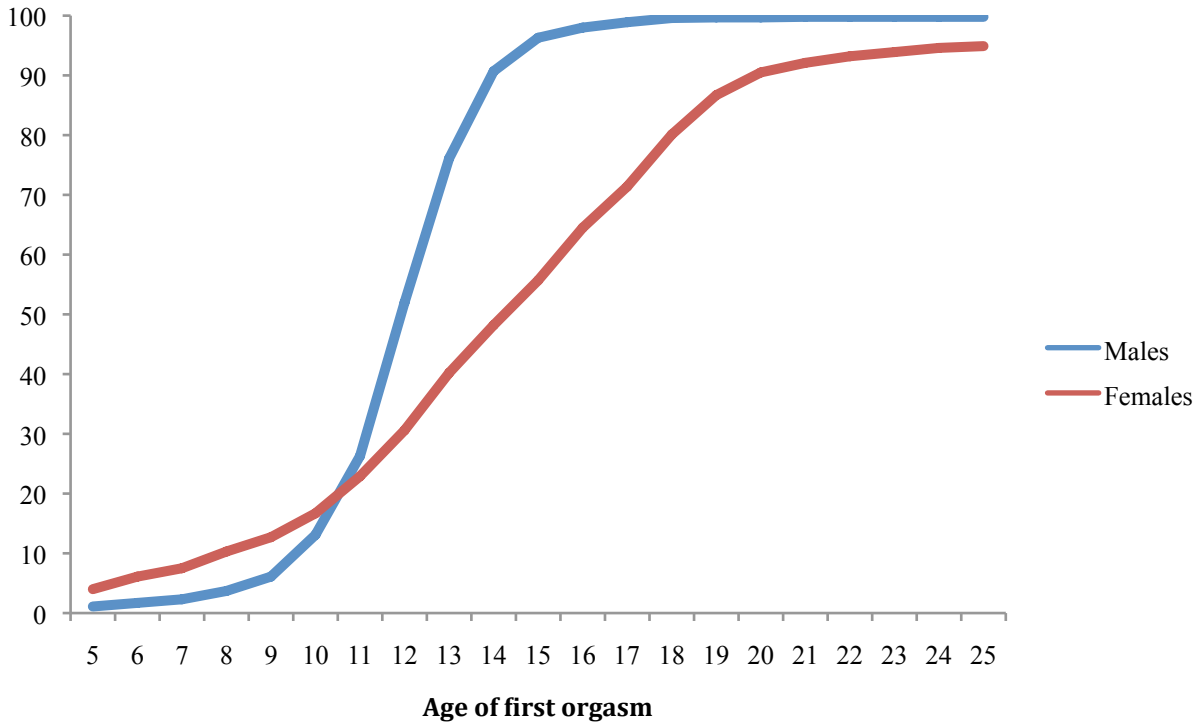

Figure 5. Cumulative percent graph of age of first orgasm using data from the current sample. The sex difference here is similar to that seen for masturbation in figures 3 and 4. Additionally, by age 20 about 100% of males have experienced orgasm, whereas the percent of females experiencing orgasm plateaus around 94%.

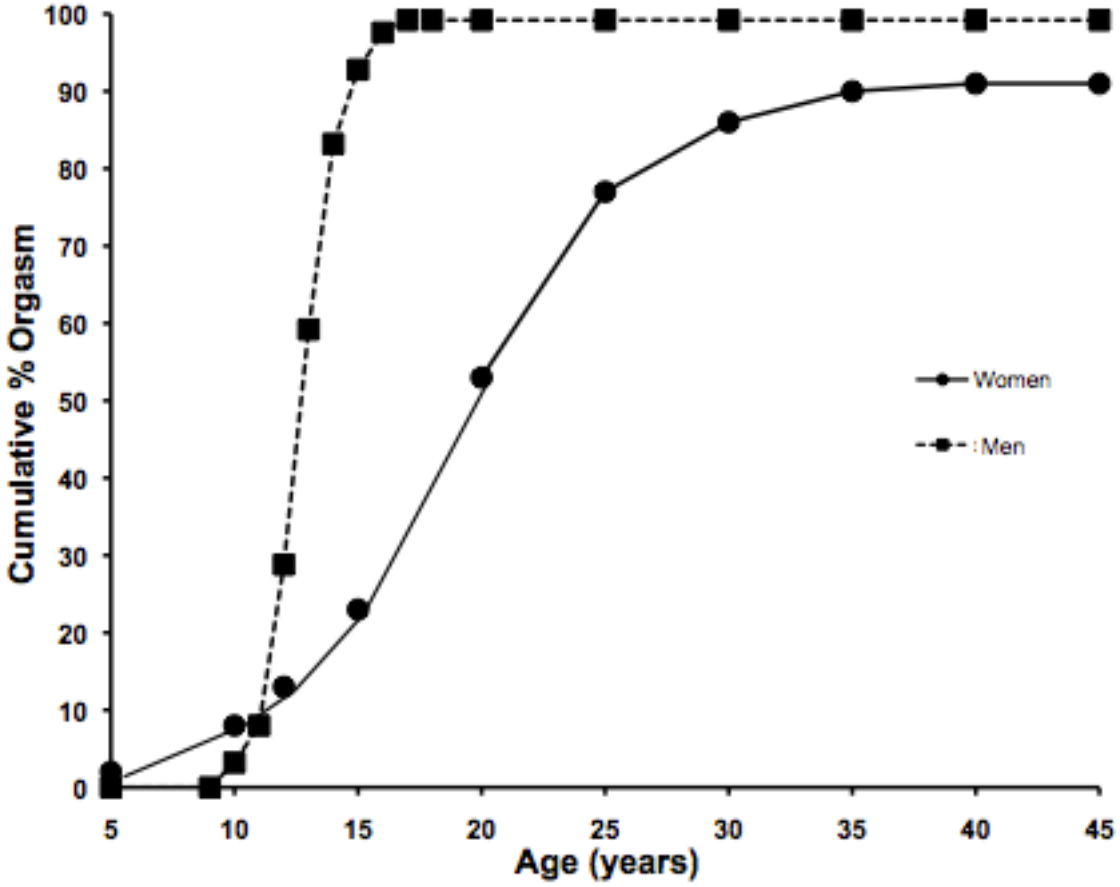

Figure 6. Cumulative percent graph of age of first orgasm using Kinsey data (from Wallen & Lloyd, 2011). The same pattern as seen in figure 5 from current data is seen using Kinsey's data. Additionally, the percent of women experiencing orgasm in Kinsey's sample plateaus around 90%, whereas 100% of males experience orgasm.

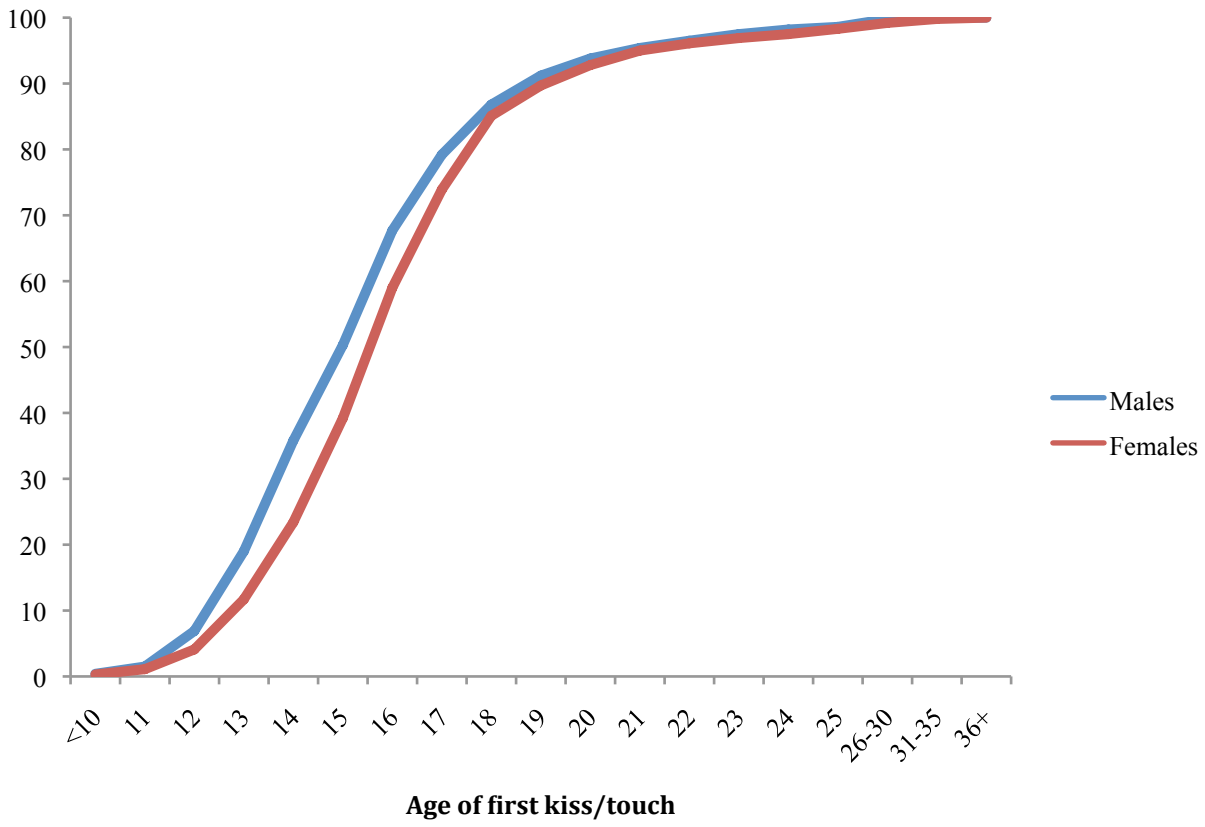

Figure 7. Cumulative percent graph for age of first kiss/sexual touch using data from the current sample. Unlike the graphs for autosexual behaviors, which reflect internal sexual desire, this graph shows no sex differences in the partnered expression of sexual desire.

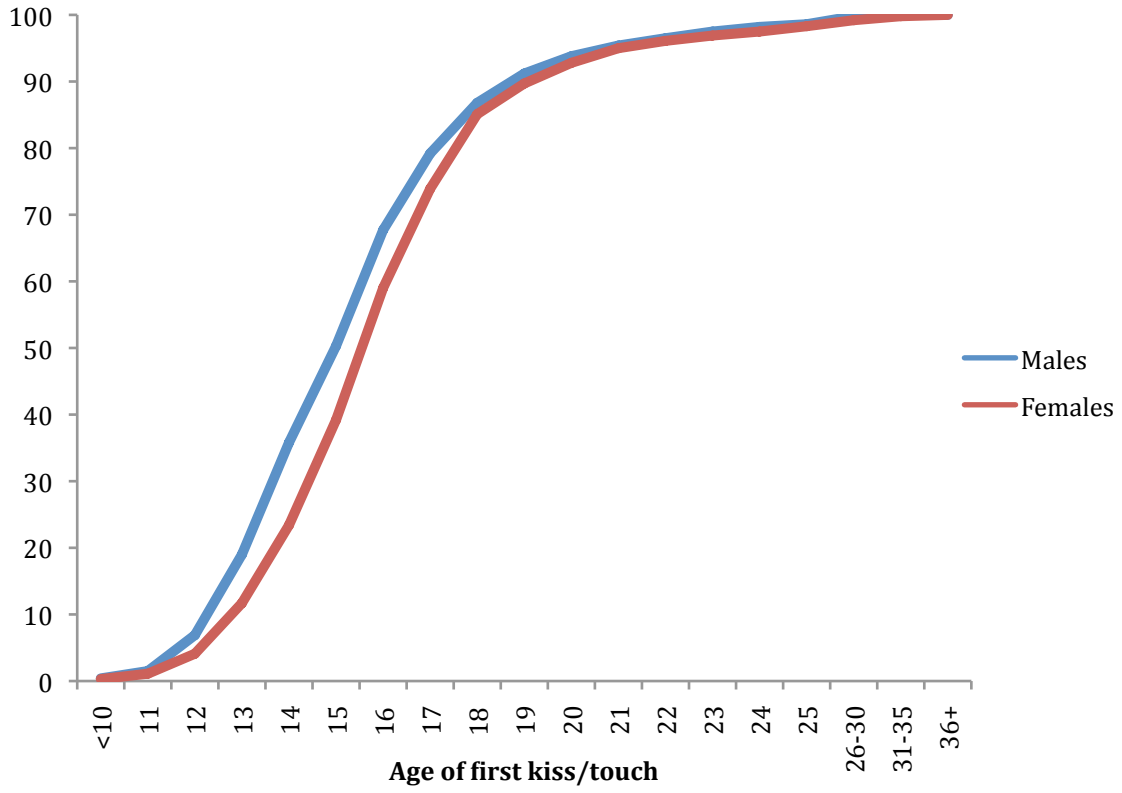

Figure 8. Cumulative percent graph for age of first kiss/sexual touch using data from the current sample. Similar to the graph using data from the current sample, there are little differences between males and females.