Risk for Infertility as a Function of Sexual Identity, Sexual Behavior, and Race among Women in the United States

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Abstract

Infertility affects approximately ten percent of women in the United States every year. There has been consistent evidence indicating that sexually transmitted infections (which are commonly cited risks for infertility) disproportionately affect non-White women, and racial minority women are nearly twice as likely as White women to experience infertility issues. However, comparable research that addresses the prevalence of sexually transmitted infections and/or infertility among sexual minority women is limited and inconsistent. Varied reports are due in part to researchers' restricted focus on behavior rather than identity-based approaches to sexual minority women's health experiences. The dearth of information is exacerbated by the operating definition of infertility (i.e., the failure to conceive following 12 months of heterosexual intercourse), which does not typically apply to sexual minority women. A framework of stratified reproduction, which takes into account the contribution of systemic inequities to minority women's reproductive health, may help reveal and explain disparities in risk for infertility among racial and sexual minority-identified women. Moreover, stratified reproduction also suggests that an underlying social experience common to both racial minority and sexual minority women (such as adolescent housing instability), may partially explain disparities in risk for infertility.

The present study examined the sexually transmitted infection prevalence and overall risk for infertility among women in the United States as a function of race, sexual identity, and—so as to better differentiate the role of identity versus behavior—sexual behavior. The present study thus had three aims. The first aim was to establish the rates of various sexually transmitted infections that can threaten women's fertility as a function of sexual identity, sexual behavior, and race. The second aim was to determine how other commonly studied risk factors for infertility, (i.e., certain reproductive illnesses, alcohol consumption, tobacco use, and high or low bodyweight) might also be associated with sexual identity, sexual behavior, and race. These factors were examined in conjunction with

findings about sexually transmitted infections to construct a novel Risk for Infertility measure that allowed for a comparative risk assessment among women as a function of their racial identity, sexual identity, and sexual behavior. The third and final aim of this study was to test whether adolescent housing instability—for which sexual minority and racial minority individuals have both been at increased risk—might mediate the disparity in risk for infertility that emerged as a function of sexual identity, sexual behavior, and race among participants.

The sample consisted of 4,990 women (representative of over 53 million women in the United States), ages 15-44, who participated in the 2011-3013 National Survey of Family Growth. As expected, sexual behavior was the clearest predictor of sexually transmitted infections. It was also the clearest predictor other risks for infertility. However, sexual identity and race also demonstrated important effects on women's fertility risk. The Risk for Infertility measure revealed that Bisexual women and women who have sex with both men and women had the highest overall Risk for Infertility scores compared to peers. Contrary to expectations, Black and White women experienced risk for infertility at equivalent rates. Women's experiences with adolescent housing instability provided some explanation for disparate experiences in overall fertility risk as a function of sexual identity and sexual behavior, but did not explain differences that emerged as a function of race. Results suggested that adolescent experiences of housing instability may play an important role in women's long term reproductive health. Furthermore, the contemporary construct of infertility may exclude many women who are at increased risk for reproductive issues. An alternative assessment of infertility may be instrumental in researchers', physicians', and policymakers' future efforts to reduce reproductive health disparities among women in the United States.

Keywords: infertility, women's health, reproductive health sexual identity, racial identity, sexual behavior, sexually transmitted infections, adolescent housing instability, nationally representative data

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The desire to be a parent is nearly universal. A majority of the world's adults endorse the belief that having children is vital to one's personal sense of fulfillment (Gallup, 1997). The ubiquity of this sentiment is validated by the United Nations, which includes the right to found a family in its Universal Declaration of Human Rights (United Nations General Assembly, 1948). In the United States, 74% of adults ages 18-40 have children (Newport & Wilke, 2013). Of those individuals without children, 86% express a desire to become a parent sometime in the future (Newport & Wilke, 2013). Even among childless adults over the age of 40 (which approaches the typical upper limit for childbearing years, according to the American Society for Reproductive Medicine [ASRM]), the desire for parenthood is still common—nearly 70% of these nulliparous adults report that they would have had children if given the opportunity (Gallup, 2013). The wish to become a parent is especially prevalent among adult women in the U.S., 90% of whom have either already had or report intending to have children (Chandra, Martinez, Mosher, Abma, & Jones, 2005).

Literature Review

Prevalence of infertility. Unfortunately, many individuals experience difficulty becoming parents. Infertility, defined as the inability to conceive after 12 months of unprotected heterosexual intercourse, affects anywhere from 10-20% of individuals in the U.S every year (ASRM, 2008). Men and women seem to experience impediments to fertility at approximately the same rates (ASRM, 2008). Thirty percent of problems facing heterosexual couples who have trouble conceiving are the result of impairments to the female reproductive system, 30% are

attributed to male health issues, 30% result from a mutual problem, and the remaining 10% of issues have unclear origins (ASRM, 2008). There is also some indication that rates of infertility have been increasing over the past several decades (ASRM, 2008).

Psychological impact of infertility. As the desire to become a parent is clearly very common, any difficulties conceiving may incite distress (Bell, 2014). One representative survey of adults ages 24-40 in the U.S. found that 55% of respondents who experienced infertility believed it to be more stressful than unemployment, and 61% believed it to be more stressful than divorce (Reproductive Medicine Associates of New Jersey, 2015). However, infertility appears to have a more resoundingly negative psychological impact on women than men (Throsby, 2004). Despite the fact that men and women are equally likely to experience fertility issues, women in heterosexual couples that have trouble conceiving report lower self-esteem and greater rates of depression and self-blame than do their male partners (Greil, 1997; Boivin and Schmidt, 2005; Cousineau & Domar, 2007; Slade et al., 2007). It is possible that a disparity in internalizing symptoms emerges due to social stigma surrounding a woman's failure to achieve the gendered expectation of becoming pregnant (Cousineau & Domar, 2007). Moreover, pressure to conceive may be amplified by "social deadlines" that exaggerate the limited biological timeframe for childbearing and childrearing, especially among women (Billari et al., 2010).

The adverse psychological impact of infertility for women may indeed be severe. Researchers have employed a framework of identity theory (Stryker, 1980) to demonstrate how infertility, which is an involuntary interruption in achieving a valued identity such as motherhood, might result in a traumatic failure in identity verification for some women (Greil, McQuillan, & Sanchez, 2016). Infertility has been described as potentially being a

"developmental crisis" for a woman, one that "disrupts her identity, her relationships, and her sense of meaning" (Bergart, 2000). Elevated feelings of grief and anxiety are common among women during experiences with impaired fecundity (Lukse & Vaac, 1999). One study found that women who were diagnosed with infertility reported clinical levels of depression at twice the rate of their peers in a control group (Domar et al., 1997). Women experiencing infertility have also been found to report levels of anxiety and depression equivalent to those of women with cancer, HIV, and other serious medical conditions (Domar, Zuttermeister, and Friedman, 1993). Furthermore, as a period of infertility extends, over time, women continue to report a progressively lower quality of life (Chachamovich, Ezer, Fleck, Knauth, & Passos, 2010). This mental burden can extend to the partners of infertile women (Burns, 2007) and negative attitudes may strain a couple's relationship thereby creating additional stressors for the affected woman (Cousineau & Domar, 2007). Even relationships outside the dyad may suffer. As family members and friends may not be equipped to provide a distressed woman with appropriate moral support, their inattention to or concerns about her fertility challenges may further contribute to feelings of unhappiness and alienation (Cousineau & Domar, 2007). Clearly women who experience infertility are at risk for an array of psychological issues.

Prevalence of infertility among U.S. women. The most recent estimates indicate that 6.7 million women in the United States—approximately 11% of the female population—experience physical impediments to becoming pregnant every year (Chandra et al., 2005). In a probability-based sample of women ages 25–50 in 12 Midwestern states, 38 percent of all women reported infertility at some point in their lives (White, McQuillan, Greil, & Johnson, 2006). Infertility, as either a temporary or permanent impediment to motherhood, is thus a fairly common experience among women. Given its strong association with significant mental health

problems and its frequent occurrence among women in the U.S., female infertility is an important topic for psychologists and medical service providers.

Financial costs of care. Efforts to treat infertility and alleviate some of its negative psychological impact have fueled a market for assisted reproductive services. In 2012, the market value for infertility services in the U.S.—including fertility clinics and drugs, reproductive endocrinologists, sperm banks, egg donors, and surrogacy programs—was estimated at more than $3.5 billion (LaRosa, 2013). This valuation has steadily increased over time. Indeed, researchers estimate that fertility service revenues have risen nearly 4% annually since 2012, and that economic recession has had little impact on individuals' and couples' willingness to pay for costly fertility services (LaRosa, 2013).

People's readiness to pay burdensome costs to treat infertility is suggestive of the societal value of reproduction, and of distress among those unable to achieve it. In the U.S., the average initial cost for a diagnostic fertility consultation alone is $324 (LaRosa, 2013). More intensive treatments, such as in vitro fertilization (IVF), cost an average of $12,000 per cycle (LaRosa, 2013). Currently, only 15 states mandate the coverage of fertility services in healthcare insurance, and this coverage is often limited (Resolve, 2015). Most fertility care mandates include restrictive stipulations, such as providing fertility coverage only for specific treatments or upon specific diagnoses, and often include low lifetime coverage caps relative to costs (ASRM, 2015). Due to the financial costs of treating infertility, reproductive medicine has been considered a privilege afforded to wealthy individuals and families (Bell, 2014). However, there is substantial evidence to suggest that some women—particularly those in underprivileged

minority groups—may be in greater need of fertility services than others (Marsh & Ronner, 1996; Bell, 2014).

Stratified Reproduction. Evidence for disparities in access to reproductive healthcare has given rise to the concept of "stratified reproduction," a framework that recognizes that political, social, and economic structures may benefit some women—particularly affluent White women—and may disadvantage other women who want to have children in achieving those goals (Colen, 1986; Greil, McQuillan, Shreffler, Johnson, & Slauson-Blevins, 2011). Historically, the discourse surrounding women's family planning choices and fertility status has been informed by disparaging ideologies about gender, race, and class (McCormack, 2005). A stratified reproductive framework can help explain how harmful ideologies led to, for example, state-forced sterilization of African-American and Native-American women in the U.S. during the early twentieth century on the grounds of their "mental deficiency" (Davis, 1983), or the stereotype of "welfare mothers" in the late 1990s, which denigrated the reproductive and lifestyle choices of poor Black and Hispanic women (McCormack, 2005). From the standpoint of stratified reproduction, the influence of prevailing social values regarding race, class, and gender may continue to explain why Medicaid (which provides healthcare to low-income individuals) covers contraceptive but not infertility care, supporting the reproductive desires of some but not other women (Bell, 2014).

Though less frequently studied in the framework of stratified reproduction, sexual orientation may also play an important role in social hierarchies regarding procreation (Blanchfield & Patterson, 2014). In many countries, lesbian and gay couples are prohibited by law from employing reproductive technologies (Burnett, 2005). Even in the U.S, where the right

to same-sex marriage was secured in 2015, there is evidence that sexual minority individuals and couples may still face serious social and political impediments to becoming parents. Specifically, while a majority (63%) of adult Americans agree that gay and lesbian couples should be allowed to adopt (Jones & Saad, 2014), biological reproduction for sexual minority individuals is still very controversial (Robertson, 2005). Lesbian couples planning to have a biological child may receive critical questions from family and friends, and may undergo psychological evaluation from medical providers (Bos, van Balen, & van de Boom, 2003; Gerrity, 2001). The questioning of same-sex parents' motivations for pursuing biological parenthood is a distinctly atypical experience for heterosexual couples seeking to reproduce (Bos, et al., 2003). Such interrogations (and the forced reflections on parenthood they might inspire) may well contribute to sexuality-based stratification in reproductive desires or intentions.

Furthermore, while the fertility industry may provide opportunities for sexual minority individuals who wish to pursue biological parenthood, its lack of consistent regulation may allow for overt discrimination by care providers, as well as for subtle institutionalized bias against lesbian and gay individuals and same-sex couples (Appel, 2006). A prime example of such a stratified perspective in reproduction lies in the heteronormative operational definition of infertility itself. In order for a woman to be diagnosed as infertile by traditional medical standards, she must have engaged in twelve months of regular, unprotected heterosexual intercourse without becoming pregnant (ASRM, 2008). Lesbian and bisexual women who do not have sex with men may thus be barred from infertility diagnoses by default (Bell, 2014; Fairyington, 2015). The lack of diagnosis may consequently disqualify them from receiving reproductive assistance, or when applicable, bar them from receiving insurance coverage for the same treatments that would be provided to a heterosexual couple (Fairyington, 2015).

Furthermore, while federal policy prohibits discrimination on the basis of race and ethnicity in healthcare (Civil Rights Act, 1964), no such equivalent law protects the healthcare rights of sexual minority individuals. Thus providers may choose to deny fertility treatments to sexual minority women (Johnson, 2012).

It is clear that, consistent with the concept of stratified reproduction, there are social and structural barriers to minority women's reproductive experiences as a function of their sexuality, and in addition to their race and social class. Limited social and/or biological opportunities may cooperatively impact how women who identify as a member of one or more marginalized groups may be deterred from achieving reproductive goals, while majority-group peers are advantaged in their pursuits of motherhood (Bell, 2014; Walks, 2008). The research in the present study examines health disparities among racial and/or sexual minority women in infertility risk, as seen through the lens of stratified reproduction.

Disparities in infertility. Investigations of disparities in fertility have focused most often on differences between White/Caucasian and racial minority individuals (Greil et al., 2011). Historically, racial minority women have experienced greater rates of impaired fecundity than their White counterparts (Boyd, 1989; Huddleston et al., 2010; Bell, 2014). Researchers analyzing data from the 1982-2002 United States National Surveys of Family Growth (NSFG) found that rates of infertility (as defined by the inability to conceive after 12 months of intercourse, or by way of other physical barriers to fertility) were much higher among Black women (at 20%) and Hispanic women (at 18%) than among White/Caucasian women (at 7%) (Bitler & Schmidt, 2006). Another study found that Black women in four population-based samples in the U.S. were twice as likely to experience infertility compared to their White

counterparts (Wellons et al., 2008). While there is no consensus as to the exact rates of infertility among women in the U.S. as a function of race, researchers are in agreement that non-White women are more likely than others to experience infertility (Greil et al., 2016).

Racial minority women may also experience other unique psychological burdens associated with infertility. For many non-White women, infertility challenges not only one's individual identity in the failure to achieve motherhood, but may challenge one's ethnic and racial identity as well. Having children may be considered a fundamental aspect of being fully immersed members of their ethnic communities (Szkupinski-Quiroga, 2002). There is some evidence that Black (Dunlap, Golube, & Johnson, 2006; Kendall, Afable-Munsuz, Speizer, Avery, Schmidt, & Santelli, 205) and Hispanic (Rocca, Doherty, Padian, Hubbard, & Minnis, 2010; Greil et al., 2016) women are more committed than White women to having children. However, the pervasive belief that infertility is a "White thing" might limit women's sense of efficacy in seeking treatment when they encounter impediments to becoming pregnant (Ceballo, Graham, & Hart, 2015). In one study, Black and Hispanic women were 30% more likely than White women to report perceiving threatening social taboos about expectations of femininity in respect to infertility; Asian women were 50% more likely than White women to report the same (Yano et al., 2014). Similarly, a qualitative interview study of 50 African-American women in the Midwest who were experiencing infertility found that 98% referred to a "code of silence" within their communities surrounding infertility, which contributed to feelings of isolation and alienation from a community-driven "motherhood mandate," or expectation (Ceballo, Graham, & Hart, 2015). The threat infertility poses to a woman's identity may thus be particularly severe for racial minority women.

Despite the elevated rates of infertility and associated distress experienced by racial minority women, however, non-White women are less likely to receive any medical fertility assistance. In one study, while 16% of White women reported receiving medical help to become pregnant, fewer than 12% of Black and Hispanic women reported receiving any aid (Bitler & Schmidt, 2006). A recent push to reduce race-based disparities in the access to and receipt of medical care in the U.S. has motivated a substantial body of research aiming to explain disparities in receipt of fertility care by racial minority women (Bitler & Schmidt, 2006; White et al., 2006; Blanchfield & Patterson, 2014). However, researchers have consistently found that differences in income, education level, insurance coverage, and other indicators of socioeconomic status—which are common predictors of fertility care in the general population—are only partially responsible for disparities in the receipt of fertility care by racial minority women (Greil et al., 2011; White et al., 2006; Blanchfield & Patterson, 2014). Given the difficulty of identifying determinants of inequities in infertility service, prevention-oriented efforts that seek to reduce infertility *risk* among minority women may be more fruitful for reducing reproductive care disparities in the long term.

There is also some evidence suggesting that reproductive disparities may exist for sexual minority women. Data from the National Survey of Family Growth (NSFG) have shown that childless lesbian women may be, on average, slightly less desirous of having children compared to their heterosexual counterparts (Riskind & Pattterson, 2010). Nevertheless, those lesbian-identified women who desired children were just as likely as their heterosexual peers to express firm intentions to have those children (Riskind & Patterson, 2010). This might suggest that sexual minority women would be more likely to employ medical assistance to become pregnant,

even if simply motivated by a need for sperm. However, a recent investigation using representative data from the 2002 and 2006-2010 NSFG found that women who identified as a member of a racial minority and/or sexual minority were half as likely as White, heterosexual women to receive medical fertility help (though there is no study yet determining whether minority women are equally as likely to seek it) (Blanchfield & Patterson, 2014).

Blanchfield & Patterson's (2014) study is the only investigation of fertility trends among sexual minority women and women who identify as members of both racial and sexual minority groups on a nationally representative level. It is also one of few studies to address the fertility experiences of women who identify as members of racial and sexual minority groups. Otherwise, the fertility experiences of lesbian and bisexual women have been largely neglected in research and practice (Ross, Steele, & Epstein, 2006; Amato & Jacob, 2004). Given the emphasis on heterosexual sex in the definitional measure of infertility, it is difficult to diagnose sexual minority women who do not have regular sex with men as infertile, posing a distinct challenge in determining how they are affected by infertility.

Clearly, racial minority and sexual minority women may both experience reproductive inequities. This is clear in the elevated rates of infertility experienced by racial minority women, and the failure of care providers and researchers to address the specific fertility concerns of sexual minority women. Because both racial minority and sexual minority women are less likely to receive help treating infertility (despite being documented as being more likely to experience infertility, or due to a limiting heterosexual framework or infertility), it would be valuable for research to assess minority women's potential *risk* for infertility. By identifying how racial minority and sexual minority women may experience risk factors for infertility differently than

their heterosexual, White peers, researchers may be better able to ultimately reduce disparities in infertility experiences and improve reproductive care for all women.

Risk factors for infertility. There are several well-known risk factors for infertility, which may be important to consider when assessing women's relative risk as a function of sexual orientation and race. Apart from advanced age, the most notable risk factors for infertility (as noted by the American Society for Reproductive Medicine [ASRM], 2014) include sexually transmitted infections (STIs), reproductive illnesses (including pelvic inflammatory disease [PID], endometriosis, and certain cancers), alcohol consumption, tobacco use, and atypical body weight. While there is some research assessing these risk factors for infertility as function of race, their role as threats to sexual minority women's fertility has been largely unexplored. A discussion of each risk factor and its associated disparities among racial minority and sexual minority women follows below.

Sexually transmitted infections. Fertility issues for women—as well as related complications during and after pregnancy—are a common result of sexually transmitted infections (STIs) (CDCP, 2015d). Sexually transmitted infections (sometimes referred to as "sexually transmitted diseases" or "venereal diseases") are spread predominantly by sexual contact, including vaginal, oral, and anal sex (World Health Organization, 2007). While women comprise a majority of STI cases diagnosed every year (51%), the fertility problems that women may experience as a result of contracting an STI are often more debilitating than those experienced by men (CDCP, 2015d). In the U.S., several consistently pervasive STIs may affect fertility, including the human papilloma virus (HPV), chlamydia, gonorrhea, syphilis, herpes simplex virus 2 (HSV-2, or simply "herpes"), and human immunodeficiency virus (HIV) (Mark, Dhir, & Roth, 2015). The Centers for Disease Control and Prevention estimates that there are

nearly 20 million new cases of STIs diagnosed in the U.S. annually, contributing to the estimated 110 million people in the country who are infected with an STI at any given point in time (Satterwhite et al., 2013).

Rates of HIV infections in the United States have remained stable over the past five years (Satterwhite et al., 2013), but the rates of most other STIs have increased (CDCP, 2015d). The largest number of reported chlamydia cases ever —over 1.4 million—was documented in 2014 (CDCP, 2015d). Similarly, estimates from 2008 indicated a 5% increase in cases of gonorrhea (totaling over 350,000 cases in that year) in the U.S., and a 15% increase in cases of syphilis (approximately 20,000 cases in the year 2008) since prior national estimates (CDCP, 2015d). In addition, new cases of herpes exceed 750,000 annually (CDCP, 2015d). Finally, and most notable, are new cases of HPV, which were estimated to exceed 14 million per year —a 41% increase from prior estimates (CDCP, 2015d). Evidently, STIs are a persistent issue, and the rate of infections has surged in recent years.

Sexually transmitted infections are most commonly linked to infertility when they are left untreated, but in some cases, they may impact women's fertility whether treated or not (CDCP, 2015d). Bacterial infections such as chlamydia, gonorrhea, and syphilis may be cured with antibiotics, but if left untreated, the progression of the infections may permanently damage female reproductive organs (CDCP, 2015d). Furthermore, bacterial sexually transmitted infections may go unnoticed without regular testing, due to a delayed onset (or occasionally, the entire absence) of physical symptoms (Stamm, 2008).

Viral infections, like herpes, HPV, and HIV may be treated across the lifespan, but are generally considered to be incurable (CDCP, 2015d). Each viral infection may affect fertility in its own way. For example, women with HIV have historically experienced dramatically lower

fecundity compared to uninfected peers, even when controlling for potential symptom confounds (like low bodyweight) (Chen, Phillips, Kanouse, Collins, & Miu, 2001). Outbreaks associated with genital herpes, on the other hand, may limit the sexual activity of women during ovulation, thereby limiting chances of becoming pregnant (CDCP, 2015d). Incidentally, the contraction of genital herpes during the first or third trimester of a pregnancy may result in miscarriage (CDCP, 2015d). Many HPV infections may also develop into cervical cancers that may cause irreparable damage to reproductive organs, or compromise a woman's ability to carry a pregnancy to term (Depuydt et al, 2011). There is also some evidence that the medications and treatments required to treat viral STIs may be toxic to neonatal development (Kushnir & Lewis, 2011). Finally, it is important to note that all STIs—both bacterial and viral—come with an increased risk of contracting other STIs, compounding a woman's risk for infertility (CDCP, 2015d).

*Race and STIs***.** A substantial body of research has focused on the disproportionate incidence of STIs among racial minority populations in the United States, largely due to disparate rates of infection among non-White Americans (IOM, 2006; Neman & Berman, 2008; Hogben & Leichliter, 2008). Only the diagnoses of some STIs—namely chlamydia, gonorrhea, and syphilis—are recorded nationally (the rest are estimated via representative assessments), but records indicate staggering disparities in both reported and estimated rates of sexually transmitted infections as a function of race.

In 2014, the rate of chlamydia among Black women was nearly six times the rate among White women (CDCP, 2015d). Similar trends were apparent for Hispanic Americans (at twice the rate), American Indians and Alaska Natives (at six times the rate), and Native Hawaiians and other Pacific islanders (at nearly four times the rate) compared to White Americans (CDCP,

2015d). Only Asian Americans were less likely to be diagnosed with chlamydia than White Americans, at about 40% the rate (CDCP, 2015d).

Similarly, nearly 56% of diagnosed cases of gonorrhea in 2014 were among Black Americans, such that Black women were nearly ten times as likely as White women to report infections (CDCP, 2015d). Female American Indian and Alaska Natives were diagnosed at six times the rate of White women, Native Hawaiian and Other Pacific Islander women were diagnosed at three times the rate, and Hispanic women were diagnosed at twice the rate as White women (CDCP, 2015d). Once again, however, Asian women were only half as likely as White women to be diagnosed with gonorrhea. These trends parallel documented incidences of syphilis among women in the U.S.; Black and Native Indian/Alaskan Native women were nine times as likely as White women to contract syphilis, while Hispanic and Native Hawaiian/other Pacific Islander women were diagnosed at twice the rate (CDCP, 2015d). Once again, Asian American women were approximately half as likely to contract syphilis as White women (CDCP, 2015d).

Estimates regarding the rates of herpes and HPV infections as a function of race demonstrate comparable disparities. Data from the 2005-2008 National Health and Nutrition Examination Survey (NHANES) indicated that the seroprevalence of herpes among Black women was approximately 48%, compared to 16% of White women, and 13% of Hispanic women (Xu, Sternberg, & Markowitz, 2010). Further data from the 2003-2004 NHANES indicated that 24% of both White and Hispanic women were infected with HPV, compared to a slightly higher proportion (28%) of Black women.

There have been many suggested explanations for the observed disparities in rates of sexually transmitted infections. Most explanations consider that historically poorer social conditions in the U.S. for minority individuals may be responsible (IOM, 2006; CDCP, 2015d).

Factors often associated with racial disparity in the U.S., including poverty, high rates of unemployment, and low levels of education act as social determinants of many race-based differences in sexual health (Hogben & Leichliter, 2008; Gonzalez, Henrdicksen, Collins, Duran, & Safren, 2009). Other explanations point to the comparatively limited access by racial minority individuals to quality healthcare services, and an associated mistrust of available healthcare providers—both of which may pose barriers to many racial minority women from being regularly tested or treated for infections (Laumann & Youm, 1999). Finally, there may be partner network effects, such that sexually active people in communities with higher rates of STIs may be more likely contract an STI given the increased odds of selecting a partner who is infected (Laumann & Youm, 1999; Hogben & Leichliter, 2008). While research has indicated that no single factor can fully account for the disproportionate representations of racial minority individuals among STI-affected populations, the consensus is that most racial minority-identified women are at increased risk for infection.

*Sexual orientation and STIs***.** Unlike research on STI prevalence as a function of race, knowledge about the role of sexual orientation in women's experiences of STIs is limited. While investigations of STI risk for sexual minority men are extensive, relatively little has been published about the role of sexuality in women's experiences of STIs (Gorgos & Marrazzo, 2004). Furthermore, sexual identity has historically not been included as a demographic item in national surveillance system for STIs (or in many national health surveys) making it difficult to establish population-based estimates of infection as a function of sexual orientation (Xu et al., 2010).

Within the limited body of work that addresses lesbian and bisexual women's experiences of STIs, some researchers have found that sexual minority women are at an

increased risk for some infections, while others have found that sexual minority women are *less* likely to contract STIs. One frequently cited reason for the conflicting reports about sexual minority women's experiences of STIs is that a substantial portion of health research employs behavioral measures to define sexual orientation (Dolan & Davis, 2003; Young & Meyer, 2005). That is, researchers prioritize women's reports of engaging in sexual activity with other women in defining sexual minority status, often neglecting to examine participants' sexual identities. As most health research considers as its target population to be women who have sex with women ("WSW") as opposed to women who identify as lesbian or bisexual, our understanding of the sexual health experiences of sexual minority-identified women may be limited (Gorgos & Mazzaro, 2011; Dolan & Davis, 2003; Young & Meyer, 2005).

Even within different operational definitions of sexual orientation, inconsistencies suggest that the role of STIs for sexual minority women is complex and requires further investigation. For example, many studies using behavioral measures of sexual orientation have found that women who have sex with women are disproportionately more likely to contract STIs compared to their peers who are exclusively sexually active with men. One study of 1,432 women receiving treatments at a sexual health center found that rates of both bacterial and viral STIs were higher among women who reported engaging in sexual activity with other women, compared to those who did not report same-sex activity (Fethers, Marks, Mindel, & Estcourt, 2000). Similarly, a study using representative data from the NHANES found that women who reported having sex with women were twice as likely as opposite sex-only peers to be infected with herpes (Xu et al., 2010). These findings appear to support the analysis of medical records of 368 women at an urban health center in Boston, which found that a disproportionate 27% of

women recently infected with STIs (including HIV, chlamydia, gonorrhea, syphilis, HPV, and herpes) reported ever having sex with women (Reisner et al., 2010).

While these studies would suggest that women who have sex with women may be at an increased risk for STIs, other investigations among similar populations have found that the overall risk for infection among sexual minority women is fairly low. A British clinic-based survey of 708 women who had sex with other women found that less than 2% were diagnosed with herpes or HPV, and less than 1% were diagnosed with chlamydia or gonorrhea (Bailey, Farquhar, Owen, & Mangtani, 2004). Furthermore, in a U.S. study, 13% of women who had sex with women reported having ever been diagnosed with an STI—nearly half the rate of the general population (Bauer & Welles, 2000). Due to the limited pool of research on STIs among women who have sex with women, however, it is difficult to determine whether they are truly at elevated or reduced risk for STIs. These inconsistent findings suggest that women's sexual identity and sexual behavior may share some health implications, but may also have be associated other unique health implications. Regardless of their comparative risk though, it is important to note that that women who have sex with women are not at negligible risk for infection, as is sometimes believed (Johsnon, Smith & Guenther, 1987; Bauer & Welles, 2000).

Research that has specifically evaluated the role of sexual identity in STI prevalence is even more limited in breadth than that employing a behavioral definition of sexual orientation. An increasing number of researchers are in agreement, however, as to the importance of employing identity-based definitions in the evaluation of the health experiences of sexual minority women (Young & Meyer, 2004; Institute of Medicine, 2011). Agreement arises especially due to the fact that bisexual-identified women have been consistently found to be at increased risk for contracting STIs (Johsnon et al., 1987; Lindley, Barnett, Brandt, Hardin, &

Burcin, 2008; Logie, Navie, & Loufty, 2015; Everett, 2013). A survey of 2,345 lesbian and bisexual women who participated in the 2006 National College Health Assessment found that bisexual-identified women were the most likely to report having had an STD in the past year (at 9%), lesbian women were the least likely to report the same (at 2%), and heterosexual women were in between (at 6%) (Lindley et al., 2008). Similarly, in a Canadian sample of women who have sex with women, bisexual-identified women were more likely than lesbian women to have ever been diagnosed with an STI (Logie, 2015). Finally, in a study investigating the intersection of sexual identity and sexual behavior among participants of the National Longitudinal Survey of Adolescent Health, women who identified as bisexual and heterosexual were nearly three times as likely as lesbian women to report having ever been diagnosed with and STI, regardless of their previous partners' genders (Everett, 2013).

Studies aiming to determine origins of disparities in STI rates among sexual minority women have most commonly cited sex with men as an important risk factor (Everett, 2013). Among studies using either behavioral or identity-based definitions of sexual orientation, unprotected sex with men accounts for most infections among women, regardless of their sexuality (Everett, 2013). However, it appears that women who also have sex with women are at elevated risk (Reisner et al., 2010, Fethers et al., 2000, Xu et al., 2010). It is likely that many women who identify as lesbian or bisexual contract STIs through sex with men, as there is evidence to suggest that a majority of young bisexual and lesbian women in the U.S. have engaged in sex with men (Tornello, Riskind, Younger, & Patterson, 2014). Furthermore, incidences of unprotected sex and lifetime number of sexual partners are augmented among sexual minority-identified women—particularly among bisexual women—as compared with heterosexual-identified peers (Tornello et al, 2014; Bauer & Welles, 2001). Notwithstanding the

integral role of male sexual partners in the transmission of STIs, however, studies also indicate that women who do not have sex with men may also be at risk for contracting venereal diseases (Bauer & Welles, 2000; Lindley, 2015).

While previous research has indicated that identifying as a member of a racial minority is typically associated an increased risk for contracting and STI, there continues to be conflicting evidence as to the role of sexual minority identity in STI risk. Consequently, future studies seeking to clarify STI seroprevalance among sexual minority women would benefit from an identity-driven investigation among a representative sample of women. Furthermore, STI prevalence remains largely uninvestigated among women who identify as members of both a racial and sexual minority.

***Other reproductive illnesses*.** Apart from STIs, there are several other reproductive illnesses that have been found to contribute to infertility among women. These include pelvic inflammatory disease (PID), endometriosis, and cervical and ovarian cancers. Each of these illnesses can have damaging effects on the female reproductive system; however, research on the epidemiology of each disease among racial minority populations is limited, and virtually absent among sexual minority populations.

Pelvic inflammatory disease. Pelvic inflammatory disease, an infection originating at a woman's cervix, usually (though not exclusively) develops as a complication of an untreated STI (CDCP, 2015c). Over 1 million women are diagnosed with PID every year, and ten percent of these women may consequently be diagnosed with infertility as a result (Sutton, Sternbergm Zaidi, St. Louis, & Markowitz, 2005). In addition, nearly 100,000 ectopic pregnancies result from PID every year, causing miscarriages that may be lethal to the affected women (Sutton et al., 2005). An early study of women in a representative sample found that non-White women

were between 1.6 and 2.7 times as likely as their White peers to be diagnosed or hospitalized for PID (Gordstein & Rothman, 1994). The determinants of racial disparities in PID, however, remain unclear (Grodstein & Rothman, 1994). Only one study has investigated the role of PID among sexual minority women. Researchers found that, among 29 lesbian and bisexual identified young women interviewed, three (or just over 10%) reported having been diagnosed with PID (Marrazzo, Coffey, Bingham, 2005).

Endometriosis. Endometriosis, a disorder that causes uterine tissue to grown outside the uterus, affects approximately 10% women in the United States, and may cause infertility in 25-40% of those affected (Cramer & Missmer, 2002). An analysis of White women's medical records found that 1.6 per 1000 of the women were diagnosed with endometriosis (Houston, Noller, Melton, Selwyn, & Hardy, 1984). Another clinical study indicated that Asian women were nearly nine times more likely to develop the condition compared to non-Asian women, while Black women were the least likely group to develop endometriosis (Kyama, D'Hooghe, Debrock, Machoki, Chai, & Mwenda, 2004). Once again, the reasons for these disparities are largely unknown (CDCP, 2015c). No studies have documented the rates of endometriosis specifically among sexual minority women.

Cervical, ovarian, and endometrial cancers. Finally, cervical and ovarian cancers are linked to infertility through the destructive progression of the disease and its treatments (which may include radiation therapy, or the surgical removal of the uterus or at least one ovary) (CDCP, 2015b). Approximately 12,000 cases of cervical cancer are diagnosed annually in the U.S. (Franco, Schlecht, & Saslow, 2003). Racial minority women are particularly affected; African American, Native American, Hispanic, Vietnamese, and Korean women have been diagnosed with cervical cancer at anywhere from two to five times the rates of White women

(Wu, Hotes, Fulton, 2003). While epidemiological studies have not accounted for women's sexual orientation in the development of these cancers, a survey of 224 lesbian women found that they did not screen for cervical cancer at recommended rates (Tracy, Lydecker, & Ireland, 2010). Similarly, given that lesbian and bisexual women are less likely to receive the HPV vaccine that prevents contraction of the most cervical cancer-causing strains of the virus because of limited medical and financial resources, research with representative samples has indicated that they are likely at increased risk for cervical cancer (Reiter & McRee, 2014). Actual rates of ovarian and cervical cancer as a function of sexual orientation, however, have not been documented.

Ovarian cancer affects one in seventy women in the U.S., resulting in over 22,000 new diagnoses annually (American Cancer Society, 2006). Unlike cervical cancer, ovarian cancer affects White women (14.3 per 100,000) at higher rates than Hispanic (11.5 per 100,000), Black (10.1 per 100,000) and Asian women (9.7 per 100,000) (Permuth-Wey & Sellers, 2009). There are no reports documenting the rates of ovarian cancer among sexual minority women.

Alcohol use. Early research examining the reproductive experiences of women as a function of alcohol use demonstrated that high, chronic consumption of alcohol was associated with menstrual and ovulatory irregularities and with an inability to become pregnant (Wilsnack, Klassen & Wilsnack, 1984; Becker, Tennesen, Kaas-Claesson, & Gluud, 1989). Subsequent research has demonstrated that even moderate drinking (i.e., less than five drinks a week) can increase infertility among women (Jensen et al., 1998; Eggert, J., Theobald, H., & Engfeldt, 2004).

Research investigating the role of alcohol use as a function of ethnicity has revealed some general trends in drinking behaviors among several groups of racial minority women. Rates of

alcohol abuse in the U.S. are typically highest among American Indians and lowest among Asians and Pacific Islanders (Collins & McNair, 2002). According to national estimates, approximately 65% of White women, 46% of Black women, 50% of Hispanic women, 36% of Asian women, and 52% of Native American women are considered regular drinkers by the National Institute on Alcohol Abuse and Alcoholism (Chartier & Caetano, 2006). Of those drinkers, 14% of White women and 13% of Black women can be categorized as binge drinkers, while 22% of Native American women and 8% of both Asian women and Hispanic women can be categorized in this way (Chartier & Caetano, 2006).

While environmental and biological factors are commonly cited as determinants of individuals' alcohol use and abuse, the cultural norms and practices of ethnic groups have also been cited as influential in women's drinking behaviors (Collins & McNair, 2002). For example, church participation among African-American women may buffer against chronic or heavy alcohol use, while a history of European disruption of American Indian tribal traditions has been associated with maladaptive alcohol consumption among some reservation communities (Collins & McNair, 2002). There is also evidence that stressful experiences associated with identifying as a racial minority, such as discriminatory experiences and impoverished neighborhood settings, may promote the use of alcohol as a coping mechanism (Keyes, Hatzenbuehler, & Hasin, 2011).

The role of stressful life experiences has been central to the exploration of high rates of alcohol abuse among sexual minority women, as well (Meyer, 2011; Keyes, et al., 2011). Researchers analyzing data from a large sample of college students found that, compared to their heterosexual peers, lesbian and bisexual women were more likely to be drinkers, as well as more likely to binge drink (Coulter, Marzell, Saltz, Stall, & Mair, 2016). A random sample of adult Californians also found that sexual minority women were twice as likely as heterosexual peers to

be heavy drinkers (Gruskin & Gordon, 2006). These findings are supported in previous qualitative work that suggested lesbian and bisexual women's normative risky use of alcohol was often driven by a sense of community connection (Drabble & Trocki, 2013). It is possible then that, especially for many sexual minority women and White women, alcohol consumption trends may contribute to higher incidences of infertility.

Tobacco use. While the role of smoking during pregnancy has long been publicized as a health risk to fetal development, the impact of tobacco usage on women's ability to become pregnant has been controversial (Augood, Duckitt, Templton, 1998). Meta-analyses, however, have indicated that female smokers experience infertility at 1.23 to 1.61 the odds of non-smoking women, even when controlling for age, weight, alcohol consumption, caffeine intake, previous experiences of infertility or pregnancy, frequency of intercourse, partner characteristics, and many other possible confounds (Augood et al., 1998; Pineles, Park, & Samet, 2014). Furthermore, research has indicated that there is a dose-relationship regarding the role of tobacco use in women's ability to become pregnant, such that, for every additional cigarette smoked per day, women can expect a 1% increased likelihood in experiencing impaired fecundity (Pineles et al., 2014). The mechanism by which women's fertility is reduced though smoking tobacco remains unclear (Augood et al., 1998), though ASRM (2014) notes that effects of certain chemicals in cigarette smoke may speed egg production (and consequently induce early menopause) that is irreversible in women.

Tobacco use as a function of race and sexual orientation is similar to women's experiences of alcohol abuse in many ways. First, a larger percentage of American Indians/Alaska Natives (29%) and multiracial individuals (28%) are considered regular smokers, compared to only 18% of Black and White individuals (CDCP, 2014). Approximately 10% of

Asians and 11% of Hispanics in the U.S. smoke, as well (CDCP, 2014). While women (at 15%) are slightly less likely to smoke than men (18%), the effect of race remains the same across genders (CDCP, 2014).

Researchers have also found that tobacco usage is elevated among lesbian and bisexual women (King, Dube, & Tynan, 2012). In one study, lesbian women were nearly twice as likely as heterosexual women to be smokers (Gruskin & Gordon, 2006). Researchers have gone so far as to identify smoking among lesbian and bisexual women as a "serious problem" (Tang, Greenwood, Cowling, Lloyd, Roeseler, & Bal, 2004). Similar to research investigating the determinants of alcohol usage, explanations as to the origin of disparities in smoking rates among minority women suggest that experiences of minority stress might promote tobacco use as a coping mechanism (Meyer, 2011; Keyes et al., 2011). Consequently, women who identify as a member of a sexual minority may find themselves at increased risk for impaired fecundity due to their use of tobacco—and White and Black women may also be at increased risk on this dimension compared to Hispanic women

Body mass index (BMI). A final important influence on fertility among women is body mass index (BMI), or body weight. Among adult women in the U.S., a BMI score between 20 and 25 is considered a healthy ideal (CDCP, 2015). Numerous studies have documented that clinical obesity (defined by a BMI of 30 or higher) can impact a women's menstrual cycle and hormone regulation, adversely affecting her chances of becoming pregnant (Rich-Edwards, Siegelman, Garlan, Hertzmark, Hunter, Colditz,…& Manson, 2002). Furthermore, women who are overweight (with a BMI between 25 and 29.9) or underweight (with a BMI below 18.5) may also experience impaired fecundity (Pasquali, Patton & Gambineri, 2007). Some estimates

indicate that as many as 12% of cases of infertility are attributable to low BMI, and 25% of cases are attributable to high BMI (Rich-Edwards et al., 2002).

As public interest has turned to addressing surging rates of obesity in the U.S., it has become clear that there are substantial and persistent disparities in obesity rates among American women. Two-thirds of women in the U.S. (66%) are overweight or obese (Ogden, Carroll, Kit, & Flegal, 2014). Representative estimates from NHANES indicate that 63% of White women contribute to this national percentage, while 77% of Hispanic women and 82% of Black women can be categorized as overweight or obese (Ogden et al., 2014). Asian women are the least likely to be overweight or obese, at 35% (Ogden et al., 2014). Conversely, fewer than 3% of adult women in the U.S. qualify as underweight, and no differences as a function of race have been recorded (CDCP, 2015a).

To date, three studies have specifically addressed bodyweight patterns of non-White, sexual minority adult women. In one study of 1,209 lesbian and bisexual women who were recruited via snowball sampling, White and Black women were at increased risk of being overweight compared to their same-race heterosexual counterparts (Yancey, Cochran, & Corliss, 2003). A second study investigating the interaction of sexual orientation and race in BMI among a nationally representative adult sample found that sexual minority women had higher BMIs than heterosexual women, and that non-Asian racial minority women were at increased risk for obesity (Katz-Wise et al., 2014). Furthermore, these trends seem to persist and grow more pronounced throughout adulthood, as longitudinal data from the Nurses Health Study found that lesbian and bisexual nurses were more likely than heterosexual nurses to experience adverse weight gains between their mid-twenties through menopause (Jun, Corliss, Nichols, Pazaris, Spiegelman, & Austin, 2012).

Summary of risks. In sum, there is evidence that women may experience risks for infertility at disparate rates as a function of their racial or sexual identity. Furthermore, sexual minority women (particularly bisexual) women, and often racial minority women more likely to be represented among groups affected by STIs, reproductive illnesses, alcohol consumption, tobacco use, or extreme BMI. As risks for infertility, however, the experiences of the risks have never been examined collectively, particularly as a function of sexual orientation and race. Given that a quarter of all individuals who experience physical impediments to becoming pregnant have more than one factor that contributes to their infertility (ASRM, 2008), an investigation that examines the cumulative occurrence of risk factors for infertility as a function of sexual orientation and race is warranted. Inequities in the experience of fertility risk would support the concept of stratified reproduction (Colen, 1986), particularly if a common, disadvantageous social experience might explain some of that risk's origin.

Adolescent housing instability. One such example might be in the experience of youth homelessness, sometimes discussed as adolescent housing instability. Recent research has revealed that homelessness is a high priority health concern for women and sexual minority and racial minority individuals in the U.S., given their overrepresentation among homeless populations (Cray, Miller, & Durso, 2013; Fernandes-Alcantara, 2013). The problem is especially severe among youth. While most estimates indicate that less than ten percent of the U.S. population identify as a member of a sexual minority, as many as 40% of homeless youth identify as lesbian, gay, or bisexual (Durso & Gates, 2012). Similarly, the Congressional Research Center has estimated that 32% of homeless youth are Black, though they comprise only 15% of the U.S. population (Fernandes-Alcantara, 2013).

Estimates about the rates of homelessness, however, may be biased by researchers' reliance on recruiting participants from convenience samples at shelters (Durso & Gates, 2012). In reality, the living situations of unsupervised youth are often complex and varied. This is reflected in the language of policies aimed at providing services for homeless youth. For example, the Runaway and Homeless Youth Act defines homelessness for youth as "individuals under age 18 […] who are unable to live in a safe environment with a relative and lack safe alternative living arrangements" (Fernandes-Alcantara, 2013). Alternative living situations for adolescents include transient arrangements with friends, romantic and/or sexual partners, strangers, or even living alone in public spaces (Cray et al., 2013). Furthermore, some youth may not define themselves as homeless, despite living unsupervised and without stable housing. For example, the results of one study indicated that non-White youth were more likely than White counterparts to reject "homeless" as a label, due to heightened perceptions of stigma surrounding the term (Hickler & Auserwald, 2009). In order to expand the limited representation of homelessness (particularly of minority youth) in research, some investigators have operated with a broader classification of homelessness: adolescent housing instability (Blanchfield, Tornello, & Patterson, in prep; Yen, Hammond, & Kushel, 2009). This classification includes the experiences of youth who (even though they may have not lived in shelters) have not maintained a supervised, stable home throughout adolescence.

Housing instability during adolescence has been associated with a myriad of severe detrimental health outcomes that may endure throughout adulthood, especially in reproductive and sexual health (Stablein & Appleton, 2013; Marshall et al., 2009). Some estimates indicate that homeless youth are nearly ten times as likely as stably housed counterparts to be infected with an STI (Marshall et al., 2009). Other studies indicate that these youth are at risk for a range

of substance abuse issues, including alcohol and tobacco (Cray, et al., 2013). One representative study using data from the 2006-2010 NSFG found that sexual minority women were nearly twice as likely as their heterosexual counterparts to report adolescent housing instability, and were consequently at an increased risk for a host of negative health outcomes including substance abuse and sexual victimization, even into adulthood (Blanchfield, Tornello, & Patterson, in prep).

A suggested explanation for the health disparities associated with adolescent housing instability that persist through adulthood has been that homeless youth have limited access to routine and quality health care services (Yen et al., 2009). Furthermore, homeless women in particular have reported feeling stigmatized by healthcare providers when receiving medical assistance, especially when seeking sexual health care (Ensign & Panke, 2001). An interview study of homeless women found that many simply did not see their sexual and reproductive health as a priority (Gelberg, Browner, Leijano, & Arangua, 2004). Given the importance of early treatment of STIs and other reproductive illnesses to prevent permanent impediments to infertility, the lack of regular healthcare for women who experience housing instability during adolescence may be especially detrimental to women's ultimate ability to achieve parenting goals.

Present Study

The present study was designed to examine the risk of infertility among women in the United States as a function of race and sexual identity. It simultaneously aimed to compare the effects of sexual identity with those of sexual behavior (as defined via the gender of participants' previous sexual partners), so as to help distinguish whether identification as a sexual minority is different (and perhaps more indicative of stratified reproduction) than is sexual behavior.

The present study thus had three main goals. The first goal was to establish the rates of various sexually transmitted infections that have been documented as threats to woman's fertility among women in the U.S. (i.e., human papilloma virus, syphilis, chlamydia, herpes simplex-2, and gonorrhea), as a function of race, sexual identity, and sexual behavior. Identity-based analyses of STI prevalence among women is inconsistent and usually limited by convenience sampling; the proposed analysis employed nationally representative data to determine whether there are effects of racial identity, sexual identity, and sexual behavior on STI experiences among women in the U.S. It also aimed to determine whether effects differed as a function of sexual behavior and race, and sexual identity and race.

The second aim of this study was to determine how other commonly studied risk factors for infertility, (i.e., certain reproductive illnesses, alcohol consumption, tobacco use, and high or low bodyweight) might also be associated with sexual identity, sexual behavior, and race within the same nationally representative sample. The results on these factors were integrated with findings about sexually transmitted infections to create a composite measure of Risk for Infertility. This measure was used to assess the relative risk for infertility women experience as a function of their sexual identity, sexual behavior, and race.

The third and final aim of this study was to test whether adolescent housing instability—for which sexual minority and racial minority individuals are both at increased risk—might mediate the disparity in infertility risk that was expected to emerge as a function of sexual identity and race and sexual behavior and race among women in the sample. This line of inquiry serves as a foundation for future conceptualizations of infertility and has implications for researchers and physicians seeking to incorporate women's sexuality in discussions of reproductive health and infertility.

Hypotheses

Sexual behavior hypotheses. In order to better distinguish the roles of sexual identity and sexual behavior in women's risk for infertility, the sexual behavior of women in the sample (as defined via the gender of participants' sexual partners) was explored. Sexual behavior groups were determined by the reported gender of previous sexual partners (i.e., women with exclusively male sexual partners, women with exclusively female sexual partners, and women with both male and female sexual partners). Consistent with research on variability in women's sexual behavior and identity (Diamond, 2000), it was expected that women's self disclosed sexual identity will mostly—though not uniformly—match the associated sexual identity. For example, it was expected that women who report having only male sexual partners will also identify as heterosexual. Furthermore, because there is evidence that most lesbian and bisexual women have had at least one male sexual partner (Riskind, Tornello, & Patterson, 2014), it is likely that more women report having had both male and female sexual partners than report identifying as bisexual.

Sexually transmitted infection hypotheses. In respect to the first central aim of the proposed study, it was hypothesized that there will be effects of race, sexual identity, and sexual behavior on STI experience among women in the sample. Furthermore, due to the integral role of sexual behavior in STI transmission, it was expected that most differences between groups would emerge as a function of sexual behavior. Specifically, bisexual-identified women and women with both male and female sexual partners of all races were anticipated to be most likely to report having experienced any (and each) STI. It was also expected that they would report having experienced the most STIs on average compared to heterosexual and lesbian counterparts, or those with exclusively male or exclusively female sexual partners, respectively. Lesbian-

identified participants were expected to be the least likely to report having contracted any STI, and also to report the lowest average total number of STIs, regardless of race. Racial minority (Black or Hispanic-identified) women were expected to be more likely than White peers to report contracting any STI, as well as to report having experienced more STIs on average compared to their White peers.

Other infertility risks hypotheses. In respect to the second central aim of the proposed study, it was expected that there would also be effects of race, sexual identity, and sexual behavior on each of the other common risks for infertility. Women who either identified as sexual minority (i.e., lesbian or bisexual) or reported any non-heterosexual sexual behavior were expected be the most at risk for tobacco use, alcohol use, and extreme BMI. It was hypothesized that sexual identity would be a stronger predictor of these risks than sexual behavior, given theories on the additional risk for negative health outcome associated with identifying as a sexual minority. White women were expected to be at elevated risk for alcohol and tobacco use compared to racial minority peers, though Black and Hispanic women were expected to report the highest BMIs.

In respect to the analysis of the Risk for Infertility measure constructed in this study, effects for race, sexual identity, and sexual behavior are also anticipated. It was expected that Black and Hispanic women would report higher overall risk for infertility compared to White women. It is was expected that bisexual women would report higher risk than heterosexual or lesbian women, and that women with both male and female sexual partners would report higher levels of risk than lesbian or heterosexual women. Once again, due to theories associating poor health outcomes with identifying as a member of a sexual minority, it was expected that sexual identity and race would be clearer predictors of overall Risk for Infertility than sexual behavior.

Housing instability and path model hypotheses. Finally, rates of housing instability were expected to be elevated among non-White women, lesbian and bisexual women, and women with either both or exclusively female sexual partners. It was expected that experiences of housing instability will be associated with women's infertility risk, and would partially mediate the association between race and sexual identity, as well as race and sexual behavior, on women's overall Risk for Infertility. Specifically, women's experiences with adolescent housing instability were expected to reduce the direct effects of race and sexual identity or sexual behavior on women's risk scores. It was further hypothesized that direct effects of race and sexuality on Risk for Infertility as well as the indirect effects of adolescent housing experience would be reduced when factoring in the socioeconomic status of participants' household of origin. Consistent with expectations that sexual identity would be a clear predictor of overall Risk for Infertility, it was hypothesized that the best model for predicting overall risk would include sexual identity, race, adolescent housing instability, and mother's education level (as a proxy for socioeconomic status).

Methods

Materials

The present study examined data from the 2011-2013 NSFG, a nationally representative survey of family planning and sexual health that has been administered by the U.S. Department of Health and Human Services in regular cycles since the 1970s. The 2011-2013 cycle of NSFG included 10,416 individuals "of childbearing years," aged 15 to 44 years (5,601 women). Data were based on a nationally representative multistage area probability sample drawn from 121 strata across the United States. Survey weights, determined by oversampling reflecting the census-determined age, race, and ethnicity of residents in each stratum were assigned to each

participant. Reponses to the survey were collected continuously over three years through in-home, in-person interviews by trained female interviewers. For sensitive questions, including those assessing sexual orientation, sexually transmitted infection status, bodyweight, and substance use, participants employed Audio Computer-Assisted Self-Interviewing (ACASI), so as to ensure their privacy when responding to these items. Questions were delivered in English and/or Spanish, depending on participants' preference as expressed during the interview. The present study qualified for IRB exemption due to its analysis of publicly available secondary data. Additional details on sampling and survey methodology are available in the NSFG User's Guide (U.S. Dept. Health and Human Services, 2014).

Participants

The present study employed the female subsample of the 2011-2013 NSFG (n = 5601). All women who were pregnant at time of interview (n = 238), and who did not respond to self-report items assessing either sexual identity (n = 67) or race (n =1) were excluded from analyses. Women who self-identified as a race other than White, Black, or Hispanic on the race assessment were also excluded, due to concerns about statistical viability of the small sample sizes (n = 305). With these exceptions, the resulting sample was representative of 53,942,946 women in the United States between the years 2011-2013, (N = 4990), (M(Age at interview) = 28.67, SD = 8.46). Of the resulting final sample, 64% self-identified as White (n = 2517), 16% as Black/African-American (n = 1191), 20% as Hispanic (n = 1282). The self-reported sexual identity of participants in the final sample indicated that 93% identified as heterosexual (n = 4562), 1% as lesbian (n = 76), and 6% as bisexual (n = 352). See Table 1 for sample descriptives, including the education level and household income reported by participants. Table 2 provides a

breakdown of the sexual orientation of participants in the final sample as a function of race.

Measures

Sexual identity, racial identity, and sexual behavior. Participants' race, sexual identity, and sexual behavior (as operationalized via the gender of previous sexual partners) were assessed in the 2011-2013 NSFG via self-report items. Race was determined by participants' responses to a multiple choice item, as listed on a pre-survey screener (Black or African American/White/ Hispanic/Other). Participants were allowed to endorse a single response that best reflected their race/ethnicity. Sexual identity was reported in response to the item, *"Do you think of yourself as…"* (Heterosexual or straight/Lesbian or homosexual/Bisexual), which was delivered in Audio ACASI format as part of a series of questions assessing participants' sexual history and sexual health. Also delivered in the ACASI were questions pertaining to sexual behavior. Participants responded to two items, *"Have you ever had any sexual experience of any kind with another female"* (Yes/No) and "*Have you ever had any sexual experience of any kind with a male"* (Yes/No). If they responded "yes" to both items, they were considered members of the behavioral group of women with "both male and female sexual partners." Otherwise, participants who responded affirmatively to only one of the sexual behavior items were considered as having "exclusively male partners" or "exclusively female partners," accordingly. Women who reported no sexual partners of either gender were excluded from analyses involving sexual behavior.

Sexually transmitted infections. Items in the 2011-2013 NSFG assessed the diagnosis of five STIS: gonorrhea, chlamydia, herpes, syphilis, and HPV. Participants' HIV status was not included in the survey, and thus was not included in the STI assessments. All STI items were asked of every participant. Experience with bacterial infections (gonorrhea and chlamydia) was

assessed by asking participants to reflect upon the previous year: gonorrhea, *"In the last 12 months, have you been told by a doctor or other provider that you had gonorrhea?"* (Yes/No/Other), and chlamydia, "*In the last 12 months, have you ever been told by a doctor or other medical care provider that you had chlamydia?"* (Yes/No/Other).

The three viral infections (herpes, HPV, and syphilis), were assessed as lifetime diagnoses: herpes, *"At any time in your life, have you ever been told by a doctor or other medical care provider that you had genital herpes?"* (Yes/No/Other), HPV: *"At any time in your life, have you ever been told by a doctor or other medical care provider that you had genital warts or human papillomavirus also called HPV?"* (Yes/No/Other), and syphilis: *"At any time in your life, have you ever been told by a doctor or other medical care provider that you had syphilis?"* (Yes/No/Other).

Reproductive illnesses. Five items assessed women's lifetime experiences with PID, endometriosis, and ovarian, cervical, and endometrial cancers. Women's experience with pelvic inflammatory disease was assessed through a response to the question, *"Have you ever been treated for an infection in your fallopian tubes, womb, or ovaries, also called a pelvic infection, pelvic inflammatory disease, or P.I.D.?"* (Yes/No/Other). Women who responded "yes" are considered at risk for infertility for the "Pelvic Inflammatory Disease" item in analyses. Experience with endometriosis was assessed with a similar item, "*Has a doctor or other medical care provider ever told you that you had endometriosis?"* (Yes/No/Other). Women who reported having been diagnosed with endometriosis are considered to be at risk for infertility for the "Endometriosis" item in analyses. The items assessing PID and endometriosis experiences were asked of all participants in the sample.

Finally, all women surveyed were asked, "*Have you ever been told by a doctor or other health care provider that you had cancer?*" (Yes/No/Other). Women who responded "yes" were next presented with a list of possible cancers, including ovarian and cervical cancers, and asked, "*What type of cancer was it? If you had cancer more than once, please say what your first cancer was."* Women who reported being diagnosed with either cervical cancer, ovarian cancer, or endometrial cancer were considered to be at risk for infertility for the "Cervical Cancer," "Ovarian Cancer," and "Endometrial Cancer" items in analyses on the grounds of their respective diagnoses.

Alcohol use. Alcohol consumption was assessed with two items that were used to compute women's average weekly consumption of alcohol. The first item determined whether or not women reported drinking any alcohol during the past 30 days, *"During the past 30 days, that is, since [mo/day/yr], on how many days (per week) did you have at least one drink of any alcoholic beverage such as beer, wine, a malt beverage or liquor?"* (0 days per week/1 day/2 days/3 or more days/Other). The second item assessed the amount of drinks generally consumed on these occasions, "*One drink is equivalent to a 12-ounce beer, a 5-ounce glass of wine, or a drink with one shot of liquor. During the past 30 days, on the days when you drank, about how many drinks did you drink on the average?*" (0-95 drinks). As the most common metric associating alcohol consumption to infertility in previous research refers to the average number of drinks consumed per week, the NSFG's "Average Drinks Per Week" imputation of these two items was assessed in the present study. The reclassification of the alcohol consumption responses as relative to risk for infertility resulted in a binary assessment of women's potential risk. Women who did not report drinking, or reported drinking 14 or fewer drinks per week were considered "no risk" drinkers. Women who reported drinking more than 14 drinks per week were

considered "at risk." This consumption cutoff (at 14 drinks per week, or an average of 2 drinks per day) has previously been determined as being associated with reduced fertility (Jensen et al., 1998; Eggert et al., 2004).

Tobacco use. Cigarette smoking was assessed though two items. First, *"In your entire life, have you smoked at least 100 cigarettes?"* (Yes/No/Other). This item has been commonly employed to determine whether an individual is currently or was ever previously a regular smoker (Bond, Victor, & Diemert, 2009). Women who respond "no" to this item were not considered at risk for infertility for the "Tobacco Use" item in analyses. Women who responded "yes" were considered at risk, and were further asked, "*During the last 12 months, that is since [INTERVIEW MONTH, INTERVIEW YEAR-1], how many cigarettes did you smoke a day, on average?"* (0 – 25+ cigarettes). Women who had previously smoked 100 or more cigarettes but did not report smoking any cigarettes in the past month were considered "previous smokers." The remaining women were considered "current smokers"; if a current smoker reported smoking the sample median number of cigarettes daily or fewer, she was considered a "moderate smoker," and if she reported smoking more than the median number of cigarettes daily, she was considered a "heavy smoker." This resulted in a single 0-3 measure of alcohol consumption that assessed women's tobacco use such that the dose-response and permanent affects of smoking on women's fertility were addressed (Pineles et al., 2014).

BMI. BMI was calculated using women's responses to weight and height items. Participants' self-reported body mass by responding to the item, *"How much do you weigh? Please answer in pounds"* (open-ended response). Women's height was also recorded through a self-report item, *"What is your height? Please answer in inches"* (open-ended response).

Women's BMI scores were computed through the height/weight conversion articulated by the CDCP (2015), and grouped on an ordinal measure of risk relative to infertility (consistent with the ranges for risk found in Patton & Gambineri, 2007). Those participants whose BMIs ranged from 20 to 24.9 were considered to have healthy and have "no risk" BMIs. Women with BMIs above 25, through 29.9 (traditionally considered "overweight") as well as those women with BMIs higher than18.5 but lower than 20 (traditionally considered "underweight"), were grouped as being "at moderate" risk for infertility based on their bodyweights. Finally any women who had BMIs lower than 18.5 ("very underweight") or greater than or equal to 30 ("obese") were considered "at high risk" for infertility based on their BMI. This classification resulted in a three-point measure (0-2) that assessed BMI-based risk among women in the sample

Adolescent housing instability. Adolescent housing instability was assessed with the item,*"(Have you ever lived/Before you turned 18, did you ever live) away from your parents or guardians? Please include times you were away at college or in the Armed Forces. But, do not include times you were away at boarding school for elementary, middle, or high school, or living in an institution or jail or group home. Also, please do not include temporary supervised arrangements such as summer camp."* (Yes/No/Other). Women who responded "yes" to this item were considered to have experienced adolescent housing instability in the analyses. This assessment is consistent with other work by Blanchfield, et al. (in prep).

Socioeconomic status. As previous research has suggested that socioeconomic differences may be partially responsible for health disparities observed among both sexual minority and racial minority groups, the current study included an assessment of socioeconomic status in path analyses. However, because the sample included women ages 15-44, and the mediating variable assessed experiences of adolescent housing instability before the age of 18,

women's reported household income were considered inaccurate indicators of her family of origin's socioeconomic status. That is to say, a woman whose family of origin was wealthy might report a low household income if she permanently left her family's home before age 18, and a woman who did not experience housing instability but whose household of origin had a low income would be classified in the same group. Therefore, in order to better assess women's socioeconomic status in their household of origin, mother's educational attainment was used a proxy. Mother's education has been determined an appropriate proxy measure for household income, especially in research concerning adolescent respondents (Lien, Friestad, & Klepp, 2001). The four-point measure employed in the present study was determined from the question, *"What is the highest level of education (your mother/she) completed?"* (0 = "less than high school," 1 = "high school graduate or GED," 2 = "some college or 2 year degree," 3 = "bachelor's degree or higher)."

Risk for Infertility Scale. Prior to testing the path models with structural equation modeling (SEM), each of the five conceptual risks for infertility (i.e., sexually transmitted infections, reproductive illnesses, alcohol consumption, tobacco use, and body mass index) was standardized into a metric ranging from 0 to 1. This allowed for the construction of a Risk for Infertility Scale, on which participants' scores represented their overall mean risk for infertility. As there were five items assessing sexually transmitted infections, a participant's summed total of reported sexually transmitted infections (0-5) was divided by 5 to determine her standardized STI risk score. Similarly, participant's summed total of reported reproductive illnesses (0-5) was divided by 5 to determine her mean reproductive illness risk score. Participants' smoking frequency, as determined on the 0 (never smoked) to 3 (smokes more than the samples' average number of cigarettes per week) scale, was divided by 3 to determine her standardized smoking

risk score. Likewise, women's BMI, as classified on a 0 (normal) to (very over/underweight) was divided by 2 to determine her standardized BMI risk score. Finally, as women's risky alcohol consumption was already categorized as binary (0 = not at risk, 1 = 0 at risk), its standardized score remained the same.[1] Subsequently, participants' standardized scores on each dimension were summed and divided by 5 (the total number of conceptual risk factors for infertility), resulting in an overall mean risk score on the Risk for Infertility Scale (scaled from 0 = no overall risk, to 1 = maximum potential overall risk).

Analytic Plan

All analyses were planned in Stata 14 using the predetermined survey weights so as to achieve nationally representative estimates. An initial chi-square test determined whether there were any differences in women's reported sexual identity as a function of their reported racial identity. This was followed by a parallel series of chi-squares testing the distribution of sexual behavior and race, as well as the distributions of sexual identity and sexual behavior.

In order to achieve the first aim of the project—establishing rates of sexually transmitted infections—participants' responses were assessed on an individual and cumulative level. Responses were compared as a function of sexual identity and race, and compared to the rates

[1] Prior to its implementation in analyses, exploratory factor analysis indicated that none of the standardized items in the Risk for Infertility scale loaded together on a single factor, and thus should be included in the scale. Each item demonstrated high uniqueness (of .88 or higher). Confirmatory factor analysis using maximum likelihood as a robust estimator determined that the standardized factor loading of STIs onto the latent construct of risk for infertility was 0.26 with a standard error of 0.49, $p < .001$. For reproductive illness, it was 0.39 with a standard error of 0.06, $p < .001$; for alcohol use it was 0.06 with a standard error of 0.03, $p = .018$; for tobacco use it was 0.39, with a standard error of 0.06, $p < .001$; and finally, for BMI it was 0.22, with a standard error of 0.04, $p < .001$. A reliability analysis of these five standardized items indicated that there was low reliability between each of the risks (Cronbach's alpha = 0.19). The item-test correlation for STIs was 0.25, for reproductive illnesses the item test correlation was 0.26, 0.30 for drinking, 0.64 for smoking, 0.76 for BMI; the disparities in item-test correlations are likely responsible for the low reliability of the composite scale. The model was a poor fit, explaining only 1.4% of the variance in the latent construct of Risk for Infertility (as determined by the SMSR) and the CD was 0.33, exceeding the 0.08 cut off for "good fit." However, because the present study is defining the construct of risk for infertility through the aggregation of previously unassociated and uncorrelated health risks for infertility, this is not an unexpected result.

observed as a function of sexual identity and race. The former analyses resolved the question, "what proportion of women are affected by each STI (gonorrhea, chlamydia, HPV, herpes, and syphilis) as a function of race, sexual identity, and sexual behavior?" The latter answered the questions, "how many STIs (0-5) do participants report having experienced, as a function of race, sexual identity, and sexual behavior?" and "which women are most likely to experience any STI?" Chi-square tests (with Bonferroni corrections for multiple comparisons in post-hoc tests) determined if there were differences in the rates of infection for each STI among women as a function of sexual identity, sexual behavior, and race. Linear regressions assessed the roles of sexual identity, behavior, and race in the total number of STIs reported by women.

The second goal of the present study was to assess participants' responses to the remaining infertility risk items (endometriosis, pelvic inflammatory disease, uterine cancer, cervical cancer, endometrial cancer, alcohol consumption, tobacco use, and healthy BMI) as a function of race, sexual behavior, and sexual identity through adjusted Chi-square tests. Subsequently, all participants were assigned an overall Risk for Infertility score, which was computed in a composite measure, comprised of standardized versions of the five categories of risk types. ANOVAs revealed whether there were effects of race, sexual identity, and sexual behavior on Risk for Infertility sores. Next, pairwise comparisons between the means demonstrated the comparative risk for each sexual identity, sexual behavior, and race subgroup.

Finally, structural equation modeling was employed to address the role of adolescent housing instability in the expected association between racial and sexual identity and overall Risk for Infertility, as well as racial identity and sexual behavior and Risk for Infertility. Specifically, the Preacher and Hayes (2014) method for mediation analysis with a

multicategorical independent variable was employed to assess how the experience of adolescent housing instability mediated the associations between race and sexuality and Infertility Risk. Finally, Mother's education (as a proxy for the socioeconomic status of a woman's household of origin) was included in the model as a covariate, to see if observed effects could be attributed to socioeconomic disparities. See Figure 1 for the general planned path analysis for the expected best-fit model. Fit indexes were used determine which of the models was the most predictive of risk for Infertility.

Results

Results for the present study are reported in corresponding order to the project goals outlined previously in the methods section. Specifically, the first set of results documents the sexual behavior of women in the sample. These results are the foundation for examinations of women's risk for infertility as a function of their sexual behavior, and are presented in juxtaposition to the results on sexual identity throughout the results section.

The next set of results reports on the prevalence of STIs among women in the sample, as well as documents the incidence of other risks associated with infertility (i.e., reproductive illness, alcohol use, tobacco use, and BMI). These results are presented as a function of participants' race[2], sexual identity, and sexual behavior, and together they comprise the elements of the proposed measure of Risk for Infertility.

[2] As fewer women responded to sexual behavior items than were in the whole sample of women (all of whom reported sexual identity), there were small differences in the descriptive details about race as a function of sexual identity and sexual behavior. In order to avoid redundancy, only the descriptives about race for the whole sample are reported in-text for each item throughout the results (unless trends differed dramatically in the subsample, in which case both are reported). Effects, however, are reported throughout the results for both the whole sample and the subsample of women responding to sexual behavior items.

The final section of results integrates women's experiences of adolescent housing instability with the measure of Risk for Infertility. These results also include the proposed mediation models that aimed to determine the association between sexual identity/sexual behavior and race, adolescent homelessness, and women's overall risk for infertility. All analyses were performed in Stata 14 programming.

Sexual Behavior

Of the total sample of women, 90.6% (n = 4470) reported ever having sexual contact with men, while 9.1% (n = 511) of women reported never having any male partners, and 0.3% (n = 9) did not respond to the item assessing sexual contact with opposite-sex partners. Furthermore, 16.7% (n = 930) of women reported having ever had sexual contact with a female partner, 83.0% (n = 4047) reported never having a female partner, and 0.3% (n = 13) did not respond to the item assessing sexual contact with same-sex partners.

Further analysis indicated that 13.2% of all women (n = 892) reported having both male and female sexual partners (such that 95.9% of women who reported sexual contact with another woman also reported sexual contact with a man). Approximately 5% of the sample (n = 473) reported no sexual history with either male or female partners, and 0.2% of the sample (n = 9) did not respond to any sexual behavior items.

Sexual behavior groups for further analyses were determined by the reported gender of sexual partners. Groups included women who reported exclusively male sexual partners (73.7%, n = 3567), women who reported exclusively female partners (0.5%, n = 37), and women who reported both male and female partners (13.2%, n = 892). Women who did not respond to sexual behavior items or reported no partnered sexual history (8.6%, n = 582) were excluded from analyses assessing fertility risks as a function of sexual behavior.

Table 3 details the full distribution of sexual behavior as a function of race. A chi-square test indicated that there were differences in the distributions of sexual behavior experiences among White, Black, and Hispanic women who reported partnered sexual experiences, $X^2(2,4496) = 32.5$, $p < .001$. Eighty-eight percent (88.0%, n = 1753) of Hispanic women reported having only male sexual partners, which was more than the 80.0% of White women (n = 863) and 81.1% of Black women (n = 951) who reported the same. White women were least likely to report having only female partners (0.6%, n =12), but most likely to report having both male and female partners, at 19.4% (n = 513). Black women reported having only female partners (1.0%, n = 11) at similar rates to Hispanic women (1.2%, n = 14). Like White women, however, they were more likely to report having both male and female partners (17.7%, n = 210) than their Hispanic peers (11.0%, n = 169).

Table 4 details the distribution of sexual behavior as a function of sexual identity. Eighty-seven percent of heterosexual women (87.1%, n = 3526) in the sample reported having only male sexual partners. Of the remaining women who identified as heterosexual, 12.8% (n = 564) reported having both male and female partners and 0.2% (n = 6) reported having only female partners. Among lesbian-identified women, 34.2% (n = 17) reported a sexual history with only female partners; 63.7% (n = 53) reported having both male and female partners and 2.1% (n = 2) reported only male partners. Of bisexual-identified women, 80.7% (n = 275) reported sexual experiences with both male and female partners, while 16.4% (n = 39) reported exclusively male partners and 2.9% (n = 14) reported exclusively female partners.

Sexual behavior summary. Most women in the sample reported having had a partnered sexual history, and most of those women reported having had sexual contact with a male partner (either exclusively with male partners, or in addition to sexual experiences with female partners).

More women therefore reported sexual experiences with both men and women than reported identifying as bisexual. Similarly, fewer women reported exclusively female sexual partners than identified lesbian. In respect to race and sexual behavior, Hispanic women were slightly more likely than White and Black peers to report having had only sexual male partners, as well as were slightly less likely to report having partners of both genders. White women were most likely to report having had male sexual partners (either with exclusively male partners, or in addition to female partners).

STI Prevalence

The most frequently reported STI by women in the entire sample was genital warts. Nearly one in ten (9.9%, n = 486) of all women reported having experienced genital warts in the past 12 months. Fewer women reported having been diagnosed with chlamydia (1.5%, n = 107) or gonorrhea (0.8%, n = 55) in the past 12 months, or having been diagnosed with herpes (3.8%, n = 181) or syphilis (0.4%, n = 29) in their lifetimes. Most women in the sample reported having not experienced any of the assessed STI items (86.4%, n = 4286). However, 11.4% (n = 579) reported having been diagnosed with one of the five STIs, and a further 1.8% (n = 101) reported having experienced two of the five. Another 0.2% (n = 14) of women reported experiencing three of the STIs, and though no women reported experiencing four of the STIs, a final 0.2% (n = 14) reported having experienced all five of the STI items (M = 0.16, SD = 0.47).

Table 5 depicts the rates at which women reported having experienced each individual STI as a function of sexual identity and race, and Table 6 depicts the same for sexual behavior and race. All post-hoc tests were conducted using Bonferroni adjusted alpha levels of 0.017 (0.05/3) per test, so as to control the inflated familywise error rate associated with multiple comparisons. Hispanic women in the sample reported having experienced fewer STIs on average

(M = .12, SD = .40) compared to their White (M = .18, SD = .48) and Black (M = .18, SD = .48) peers, $F(2,4987) = 5.35$, $p = .005$. While White and Black women reported having experienced as many as five STIs, the maximum total number of STIs reported by Hispanic women was three. These effects were maintained among participants in the subsample of women who responded to sexual behavior items, $F(2, 4488) = 4.26$, $p < .001$.

Across sexual identity groups, the range in the total number of STIs reported was consistent—the minimum and maximum number of affirmative responses to STI items were 0 and 5, respectively. However, bisexual-identified respondents reported having experienced the greatest number of the STIs assessed on average (M = 0.27, SD = 0.68), followed by heterosexual- (M = 0.17, SD = 0.47) and lesbian- (M = 0.13, SD = 0.62) identified women, $F(2,4987) = 9.01$, $p < .001$ (see Table 5).

Table 6 depicts the rates at which women reported having experienced each individual STI as a function of race and sexual behavior. In contrast to sexual identity, total number of affirmative responses to STI items differed dramatically as a function of sexual behavior. Women who had a sexual history with both men and women or exclusively with men reported experiencing anywhere from 0 to 5 of the STIs. However, women whose sexual history was exclusively with female partners reported either 0 or a maximum of 1 the assessed STIs. Women who reported a sexual history with both male and female partners reported the most STIs on average (M = 0.28, SD = 0.57), followed by women with exclusively male (M = 0.15, SD = 0.44), or exclusively female (M = 0.01, SD = 0.44) sexual partners, $F(2, 4493) = 57.43$, $p < .001$.

Gonorrhea. Among White women in the sample, 0.5% (n = 16) reported having been diagnosed with gonorrhea, while 1.3% of Hispanic women (n = 13) and 1.6% of Black women (n = 30) reported the same (see Table 5). A chi-square test confirmed there was an effect of race on

gonorrhea experience, $X^2(2,4990) = 24.96$, $p < .001$. This effect remained significant in the subsample of women who responded to sexual behavior items, $X^2(2,4496) = 25.38$, $p < .001$ (see Table 6).

Among bisexual women, 2.3% women (n = 12) reported having been diagnosed with gonorrhea, while only 1.3% of lesbian woman (n = 1) and 0.7% of heterosexual women reported the same (see Table 5). As two of the 6 cells (33.3%) in the 3x2 crosstab of sexual identity and gonorrhea experience had less than the expected cell count of 5, a Fisher's exact test collapsing lesbian and bisexual groups was used to determine that there was an effect of sexual identity on gonorrhea experience, Fisher's exact $X^2(1,4990) = 12.33$, $p = .002$.

Among women who reported only male partners, 0.6% (n = 38) reported having been diagnosed with gonorrhea; 0.8% (n = 1) of women with only female partners reported the same (see Table 6). Women who reported a sexual history with both male and female partners reported being diagnosed with gonorrhea at a rate of 1.5% (n = 16). However, a Fisher's exact test that collapsed women with exclusively male or female partners did not produce a significant effect of sexual behavior on gonorrhea experience, Fisher's exact $X^2(1,4496) = 4.56$, $p = .099$.

Chlamydia. Black women were most likely to report having been diagnosed with chlamydia, at 2.8% (n = 48) (see Table 5). Nearly two percent (1.9%, n = 25) of Hispanic women reported having experienced chlamydia, and only 1.0% (n = 38) of White women reported the same. A chi-square analysis revealed an effect of race on chlamydia experience, $X^2(2,4990) = 24.21$, $p < .001$. A chi-square analysis revealed the effect of race on chlamydia experience was the same among women who responded to sexual behavior items, $X^2(2, 4496) = 23.86$, $p < .001$.

Heterosexual (n = 91) and lesbian (n = 1) women reported experiencing chlamydia at the same rate of 1.3% (see Table 5). Bisexual women were over three times as likely to report the

same, at 4.5% (n = 19). A Fisher's exact test collapsing lesbian and bisexual women confirmed there was an effect of sexual identity on chlamydia experience, $X^2(2,4990) = 17.69$, $p < .001$.

None of the women with exclusively female sexual partners reported experiencing chlamydia (see Table 6). Of women with exclusively male sexual partners, 1.2% (n = 73) reported being diagnosed with chlamydia, as did 3.0% (n = 34) of those with both male and female partners. A chi-square analysis confirmed there was an effect of sexual behavior on chlamydia experience, $X^2(2, 4496) = 0.87$, $p = .009$.

Herpes. Nearly five percent (4.5%, n = 104) of White women reported having been diagnosed with herpes, as did 4.0% (n = 52) of Black women (see Table 5). Only 1.4% (n = 29) of Hispanic women reported the same. A chi-square test indicated that there was an effect of race on herpes experience, $X^2(2 ,4990) = 10.22$, $p = .006$. The effect of race remained among participants who responded to sexual behavior items, $X^2(2, 4496) = 9.49$, $p = .009$ (see Table 6).

Among lesbian women, 1.3% (n = 1) reported having been diagnosed with herpes, compared to 3.6% (n = 164) of heterosexual women and 7.3% (n = 20) of bisexual women. However, a Fisher's exact test collapsing lesbian and bisexual women did not reveal a significant effect of sexual identity on herpes experiences, $X^2(2 ,4990) = 5.22$, $p = .070$.

None of the women who reported exclusively female sexual partners reported experiencing herpes. Among women with exclusively male partners, 3.6% (n = 114) reported having been diagnosed with herpes, compared to 6.2% (n = 67) of women with both male and female partners. A chi-square test resulted in a significant effect of sexual behavior on herpes experiences, $X^2(2,4496) = 35.96$, $p < .001$.

Genital warts. White women reported experiencing genital warts (11.2%, n = 308) at a higher rate than Black (8.3%, n = 89) and Hispanic (7.2%, n = 90) women (see Table 5). A chi-

square test resulted in an effect of race on genital warts, $X^2(2,4990) = 35.53$, $p < .001$. The effect remained significant among the subsample of women who responded to sexual behavior questions, $X^2(2, 4496) = 34.10$, $p < .001$ (see Table 6).

Among lesbian-identified women, 5.9% (n = 5) reported having been diagnosed with genital warts; 9.9% (n = 442) of heterosexual women and 12.2% (n = 40) of bisexual women reported the same (see Table 5). However, an effect of sexual identity on experiences of genital warts failed to emerge in a chi-square test, $X^2(2,4990) = 1.93$, $p = .392$.

None of the women reporting exclusively female sexual partners experienced genital warts (see Table 6). Of women with exclusively male sexual partners 9.4% (n = 336) reported having been diagnosed with genital warts; 16.8% (n=150) with both male and female sexual partners reported the same. A chi-square test indicated that there was an effect of sexual behavior on genital warts experience, $X^2(2,4496) = 13.49$, $p = .001$.

Syphilis. Black women were most reported having been diagnosed with syphilis, at 0.8% (n = 13), followed by Hispanic women at 0.4% (n = 7) and White women at 0.3% (n = 10) (see Table 5). However, with the adjusted alpha-level for multiple comparison, there was no effect of race on experiences of syphilis, $X^2(2,4990) = 6.61$, $p = .037$. Likewise, no effect of race emerged among women who responded to sexual behavior items, $X^2(2,4496) = 7.38$, $p = .025$ (see Table 6).

Rates of syphilis were higher among lesbian (1.8%, n = 2) and bisexual women (1.3%, n = 6) compared to their heterosexual peers (0.3%, n = 22) (see Table 5). A Fisher's exact test confirmed that there was an effect of sexual identity on syphilis experience, $X^2(1, 4990) = 13.48$, $p = .001$.

None of the women who reported sex exclusively with female partners were diagnosed with syphilis (see Table 6). Rates of syphilis were highest among women who had both male and female sexual partners, at 0.9% (n = 13), followed by women with exclusively male sexual partners at 0.2% (n = 16). A chi-square test indicated there was a significant effect of sexual behavior on experiences of syphilis, $X^2(2, 4496) = 11.57$, $p = .003$.

Reduced STI factor. As reports of total STI experience were positively skewed (with less than 3% of the sample reporting having experienced more than one STI), all five STI items were reduced into a single binary factor in order to facilitate the construction of the Risk for Infertility Scale. Women who responded affirmatively to having experienced one or more of the assessed STIs were considered "at risk" (coded as 1) for the reduced STI variable, while those participants who did not report any of the STIs were considered "not at risk" (and remained coded at 0). Table 7 depicts the rates at which women reported experiencing one or more STI as a function sexual identity, sexual behavior, and race; all post-hoc results analyses were conducted using Bonferroni adjusted alpha levels of 0.017 (0.05/3) per test.

An effect of race emerged on the reduced STI factor for women in the entire sample, $X^2(2, 4990) = 20.57$, $p < .001$ (see Figure 2). Ten percent (10.0%, n = 133) of Hispanic women reported experiencing one or more STI, as did 14.3% (n = 175) of Black women and 14.5% (n = 396) of White women. Among women who reported a partnered sexual history, there was also an effect of race on STI experience, though the distribution differed slightly, $X^2(2, 4496) = 19.61$, $p < .001$. In the sample of women who belonged to the sexual behavior subsample, 15.8% (n = 394) of White women reported having experienced at least one STI, followed by 15.4% (n = 173) of Black women and 10.9% (n = 130) of Hispanic women.

An effect of sexual identity also emerged on the reduced STI factor, $X^2(2, 4990) = 12.56$, $p = .002$ (see Figure 3). Only 6.4% (n = 6) of lesbian women reported having experienced an STI, while 13.4% (n = 628) of heterosexual women and 18.5% (n= 70) of bisexual women reported the same.

Finally, there was an effect of sexual behavior on the reduced STI factor among women who reported sexual partners, $X^2(2, 4496) = 88.97$, $p < .001$ (see Figure 4). Nearly a quarter (23.4%, n = 228) of women who had sex with both male and female partners reported ever having been diagnosed with least one of the assessed STIs. Thirteen percent (13.0%, n = 468) of women who had sex with only male partners also reported ever having had at least one STI; only 0.8% (n = 1) of women with exclusively female partners reported ever having had at least one STI.

STI results summary. Generally speaking, sexual behavior (as defined via the gender of participants' previous sexual partners) was more predictive of women's experience of STIs than their sexual identity. Specifically, only one woman in the sample with exclusively female sexual partners (i.e., less than one percent of the subgroup) reported being diagnosed with an STI (gonorrhea). By contrast, nearly 1 in 20 lesbian-identified women reported having been diagnosed with an STI—over six times the rate reported by women who reported exclusively female sexual partners. Furthermore, women who reported both male and female partners were the most likely to experience an STI (at approximately 1 in 4 reporting a diagnosis), while those who identified as bisexual slightly less likely to report the same (with approximately 1 in 5 bisexual women reporting an STI). Rates of STIs among heterosexual women and women who reported exclusively male partners were the same (at approximately 13%, or just over 1 in 8 women reporting any STIs). In respect to race, Hispanic women who identified as heterosexual

or reported exclusively male partners were generally less likely to be diagnosed with an STI (with 1 in 10 Hispanic women reporting any STIs) compared to Black and White peers, who generally reported comparable rates of STIs (with 1 in 7 women reporting any diagnosis).

Reproductive Illness Prevalence

Incidences of reproductive illness were rare. Five percent (5.1%, n = 251) of all women reported having endometriosis and 4.2% (n = 210) reported having experienced pelvic inflammatory disease. Fewer women reported having been diagnosed with cervical cancer (1.5%, n = 74), ovarian cancer (0.3%, n = 16), or endometrial cancer (0.2%, n = 7). Most women in the sample reported never having experienced any of the reproductive illnesses (90.2%, n = 4014). However, 8.7% (n = 416) of all women reported having ever experienced one of the reproductive illnesses, 1.3% (n = 62) of women reported experiencing two reproductive illnesses, and a final 0.1% (n = 5) reported experiencing three of the illness (M = 0.11, SD = 0.36). Hispanic women in the entire sample reported having experienced fewer reproductive illnesses on average (M = .13, SD = .41) compared to their White (M = .19, SD = .49) and Black (M = .19, SD = .55) peers, $F(2, 4983) = 7.90$, $p < .001$.

Table 8 shows the rates at which women reported having experienced each individual reproductive illness as a function of sexual identity and race; Table 9 shows these rates as a function of sexual behavior and race. White women in the sample reported having experienced more reproductive illnesses on average (M = .13, SD = .39) compared to their Hispanic (M = .07, SD = .29) and Black (M = .10, SD = .32) peers, $F(2, 4987) = 12.42$, $p < .001$. White women reported having experienced as many as three of the five assessed reproductive illnesses, while the maximum total number of illnesses reported by Hispanic and Black women was two. The

effects of race were identical among the subsample of women who responded to sexual behavior items, $F(2,4987) = 12.42$, $p < .001$.

Ranges of total number of illness experienced also differed as a function of sexual identity. Lesbian women report experiencing a range of 0 to 1 total reproductive illness, bisexual women reported 0 to 2, and heterosexual women reported 0 to 3. However, bisexual-identified respondents reported having experienced more reproductive illnesses on average ($M = 0.17$, $SD = 0.46$), compared to heterosexual- ($M = 0.11$, $SD = 0.35$) and lesbian- ($M = 0.11$, $SD = 0.31$) identified women, $F(2, 4987) = 12.87$, $p < .001$.

Ranges also differed as a function of sexual behavior. None of the women who reported having exclusively female partners experienced any of the reproductive illnesses. Women who had either exclusively male partners or both male and female partners reported a minimum of 0 and a maximum of 3 reproductive illnesses. Women with both male and female partners reported more reproductive illnesses on average ($M = 0.19$, $SD = 0.46$) compared to their exclusively male-partnered counterparts ($M = 0.11$, $SD = 0.35$), $F(2,4987) = 12.90$, $p < .001$.

Pelvic inflammatory disease. Among White women in the sample, 3.9% (n = 107) reported having been diagnosed with PID as did 4.0% (n = 66) of Black women (see Table 8). Three percent (3.3%, n = 37) of Hispanic women reported the same. A chi-square test confirmed there was an effect of race on PID experience, $X^2(2, 4990) = 10.82$, p = .004. The effect of race also emerged among women in the subsample who responded to sexual behavior items, $X^2(2, 4496) = 9.77$, p = .008 (see Table 9).

Among bisexual women, 8.8% women (n = 31) reported having been diagnosed with PID, while only 1.3% (n = 1) of lesbian woman and 3.5% (n = 178) of heterosexual women

reported the same (see Table 8). A Fisher's exact test collapsing sexual minority groups indicated there was an effect of sexual identity on PID experience, $X^2(2, 4990) = 21.11$, p = .002.

None of the women who had exclusively female partners reported having a reproductive illness (see Table 9). Of women who reported exclusively male sexual partners, 3.8% (n = 147) reported experiencing PID; 5.9% (n = 63) women with both male and female partners reported the same. A chi-square test indicated there was also an effect of sexual behavior on PID experience, $X^2(2, 4496) = 15.96$, p < .001.

Endometriosis. White women were most likely to report having been diagnosed with endometriosis, at 6.5% (n = 160) (see Table 8). Approximately 5% (5.3%) of Black women (n = 63) reported having experienced endometriosis, and only 2.7% of Hispanic women (n = 28) reported the same. A chi-square analysis revealed an effect of race on endometriosis experience, $X^2(2,4990) = 24.21$, p <.001. Among women who reported partnered sexual experiences, a similar effect of race emerged on endometriosis experience, $X^2(2, 4496) = 40.67$, p <.001.

Of heterosexual women, 5.4% (n = 229) reported experiencing endometriosis (see Table 8). More bisexual women (7.8%, n = 16) and lesbian women (8.8%, n = 6) reported the same, as determined by a chi-square testing for effects of sexual identity on endometriosis experiences, $X^2(1,4990) = 40.49$, p <.001.

Women with exclusively female sexual partners did not report any experiences of endometriosis (see Table 9). Of women with exclusively male sexual partners, 5.5% (n = 182) reported experiencing endometriosis, as did 7.7% (n = 64) of women with both male and female partners. A chi-square indicated that there was an effect of sexual behavior on endometriosis experience, Fisher's exact $X^2(1, 4496) = 7.41$, p = .020.

Ovarian cancer. White women reported experiencing ovarian cancer (n = 12) at a higher rate (0.5%) than Black (0.2%, n = 3) and Hispanic (<.01%, n = 1) women (see Table 8). A Fisher's exact test collapsing Black and Hispanic groups revealed an effect of race on ovarian cancer, $X^2(2, 4990) = 5.67$, $p < .001$. As sample sizes were reduced, an effect of race on experiences of ovarian cancer failed to emerge among women in the subsample who responded to items assessing sexual behavior, Fisher's exact $X^2(1, 4496) = 3.97$, $p = .126$ (see Table 9).

None of the lesbian-identified women reported having been diagnosed with ovarian cancer (see Table 8). Of heterosexual women, 0.3% (n = 14) reported experiencing ovarian cancer, as did 0.4% (n = 2) of bisexual women. An effect of sexual identity on experiences of ovarian cancer failed to emerge, Fisher's exact $X^2(1, 4990) = 1.25$, $p = .468$.

None of the women with exclusively female sexual partners reported experiencing ovarian cancer (see Table 9). Of women with exclusively male-partnered sexual experiences 0.3% (n = 11) reported experiencing ovarian cancer, as did 0.4% (n = 3) of women with both male and female partners. An effect of sexual identity on experiences of ovarian cancer failed to emerge, Fisher's exact $X^2(1, 4496) = 0.70$, $p = .935$.

Cervical cancer. White women were the most likely to report having been diagnosed with cervical cancer, at 1.9% (n = 51), followed by Black women at 0.9% (n = 10) and Hispanic women at 0.6% (n = 13) (see Table 8). A chi-square test confirmed there was an effect of race on experiences of cervical cancer, $X^2(2, 4990) = 10.13$, $p = .006$. Among the subsample of women who reported a partnered sexual history, the effect of race on experiences of cervical cancer remained significant, $X^2(2, 4496) = 10.21$, $p = .006$ (see Table 9).

Lesbian (1.3%, n = 1) and bisexual (1.1%, n = 7) women reported experiencing cervical cancer at approximately equivalent rates. Heterosexual women (n = 66) reported being diagnosed

with cervical cancer at a slightly higher rate of 1.5% (see Table 8). However, there were no significant effects of sexual identity on cervical cancer experience, Fisher's exact $X^2(1, 4990) = 0.95$, $p = .602$.

None of the women who reported exclusively female sexual partners reported being diagnosed with cervical cancer (see Table 9). Of women with exclusively male partners, 1.3% (n = 51) reported experiencing cervical cancer; 3.1% (n = 23) of women with both male and female sexual partners reported the same. There were no significant effects of sexual behavior on cervical cancer experience, $X^2(2, 4496) = 5.38$, $p = .063$.

Endometrial cancer. Only one Hispanic woman (<.01%, n = 1) in the sample reported being diagnosed with endometrial cancer, while eight White women (0.5%, n = 8) reported the same; no Black women reported having experienced endometrial cancer (see Table 8). An effect of race on experience of endometrial cancer failed to emerge, Fisher's exact $X^2(1, 4990) = 4.69$, $p = .068$. The effect of race also did not emerge among women who responded to sexual behavior items, $X^2(2, 4496) = 5.38$, $p = .063$ (see Table 9).

None of the lesbian-identified women reported having experienced endometrial cancer (see Table 8). Of heterosexual women, 0.1% (n = 6) reported being diagnosed with endometrial cancer, and 3.8% (n = 3) of bisexual women reported the same. A Fisher's exact test confirmed that there was an effect of sexual identity on endometrial cancer experience, $X^2(2,4990) = 9.57$, p = .008.

None of the women who reported exclusively female sexual partners reported having experienced endometrial cancer (see Table 9). Of women who reported exclusively male sexual partners, 0.1% (n = 3) reported being diagnosed with endometrial cancer, as did 3.8% (n = 6) of

women with both male and female partners. Analysis confirmed that there was an effect of sexual behavior on endometrial cancer experience, Fisher's exact $X^2(2, 4496) = 12.47$, $p = .002$.

Reduced reproductive illness factor. As was done with the STI items, all five reproductive illness items were reduced into a single binary item. Women who reported having experienced one or more of the reproductive illness were considered "at risk" (coded as 1) for the reduced reproductive illness variable, while those participants who did not report any of the illness were considered "not at risk" (and remained coded at 0). Table 10 depicts the rates at which women reported experiencing one or more reproductive illnesses as a function sexual identity and race, as well as by sexual behavior and race.

An effect of race emerged on the reduced reproductive illness factor, $X^2(2, 4990) = 36.88$, $p < .001$ (see Figure 5). Reproductive illness experiences were most common among White women (11.5%, n = 303), followed by Black (9.3%, n = 113) and Hispanic women (5.9%, n = 75). Among women who reported a partnered sexual history, the effect of race on reproductive experience remained significant, $X^2(2,4496) = 20.57$, $p < .001$.

An effect of sexual identity also emerged on the reduced reproductive illness factor, $X^2(2, 4990) = 8.22$, $p = .025$ (see Figure 6). Only 9.6% of heterosexual women (n = 433) reported having experienced an STI, while 11.2% (n = 8) of lesbian women and 16.4% of bisexual women (n = 50) reported the same.

Finally, a chi-square test revealed an effect of sexual behavior on the reduced reproductive illness factor among women who reported sexual partners, $X^2(2,4496) = 34.22$, $p < .001$ (see Figure 7). While none of the women who reported exclusively female partners were diagnosed with any reproductive illness, 15.4% (n = 133) of women who reported both male and

female sexual partners and 9.9% (n = 349) of women who reported exclusively male partners reported having experienced at least on reproductive illness.

Reproductive illness summary. As with STIs, sexual behavior served as a better indicator of women's experiences with reproductive illnesses than did sexual identity. Most women reported never being diagnosed with a reproductive illness, including all women with exclusively female partners. However, more than 1 in 10 lesbian-identified women reported having experienced at least one of the illnesses. Furthermore, Bisexual women and women with both male and female partners were approximately 50% more likely than their heterosexual and exclusively male-partnered counterparts to report an illness. Finally, White women were slightly more likely to be diagnosed with a reproductive illness than Black women, and reported experiencing any reproductive illness at nearly twice the rates of Hispanic women.

Alcohol Consumption

Analyses revealed effects of race, sexual identity, and sexual behavior on women's reports of alcohol consumption. An effect of race emerged on alcohol use among women in the sample, $X^2(2, 4990) = 8.01$, $p = .018$ (see Table 11). Only 1.0% (n = 18) of Black women reported consuming an average of more than 14 drinks per week, while 1.9% (n = 64) of White women and 2.5% (n = 42) of Hispanic women reported the same. The effect remained among the subsample of women who responded to sexual behavior items, $X^2(2, 4496) = 10.78$, $p = .004$ (see Table 12).

An effect of sexual identity on alcohol use also emerged, Fisher's exact $X^2(1, 4990) = 13.68$, $p = .001$ (see Table 11). Lesbian women (8.0%, n = 6) were more likely than bisexual (4.2%, n = 16) and heterosexual women (1.8%, n = 102) to report drinking more than 14 drinks per week.

Analyses revealed a similar effect of sexual behavior on alcohol use among women in the sample, Fisher's exact $X^2(1, 4496) = 10.78$, $p = .004$ (see Table 12). Women who reported exclusively female partners were most likely to report consuming more than 14 drinks per week on average, at 7.2% (n = 1). By contrast, only 1.6% (n = 82) of women with exclusively male partners and 3.8% (n = 39) of women with both male and female partners reported the same drinking habits considered risky for fertility.

Alcohol consumption summary. While most women reported consuming fewer than 14 drinks per week on average (i.e., fewer drinks than considered negatively impactful to female fertility), rates of potentially harmful drinking were elevated among lesbian and bisexual women. Hispanic women in all groups were most likely to consume more than the recommended weekly limit, followed by White women. Black women were least likely to exceed 14 alcoholic drinks per week.

Tobacco Use

Effects of race, sexual identity, and sexual behavior emerged on tobacco use among women in the sample. An effect of race emerged on tobacco use among women in the whole sample, $X^2(6, 4990) = 280.13$, $p < .001$ (see Table 13) and remained an effect among the subsample of women who responded to sexual identity items, $X^2(6, 4496) = 489.61$, $p < .001$ (see Table 14). White women were most likely to be current or previous smokers, with only 59.7% (n = 1464) reporting having never smoked. Non-smokers were substantially more common among Black women (at 77.6%, n = 919) and Hispanic women (at 80.6%, n = 1024). White women were most likely to report being previous smokers (11.7%, n = 280), as compared to Black (6.6%, n = 57) and Hispanic (6.7%, n = 86) women (see Table 13). White women who reported being current smokers were also most likely to smoke more than the sample average; 29.3% of

them reported smoking more cigarettes per week than the sample median, compared to 19.1% of Black current smokers and 13.7% of Hispanic current smokers.

An effect of sexual identity on tobacco use also emerged, $X^2(6, 4990) = 71.91$, $p < .001$ (see Table 13). Under half of bisexual women (48.1%, n = 179) reported never smoking, while 66.3% (n = 43) of lesbian women and 67.9% (n = 3185) of heterosexual women reported the same. Approximately 40% (39.2%, n = 138) of bisexual women reported being current smokers, with 32.8% (n = 43) reporting smoking more than the median number of cigarettes per week. Nearly one third of all lesbian women (30.5%, n = 29) were also current smokers. Furthermore, 50.1% (n = 11) of current lesbian smokers reported smoking more than the median number of cigarettes per week. By contrast, only 21.8% (n = 993) heterosexual women were identified as current smokers. Even fewer of the heterosexual current smokers consumed more than the average number of weekly cigarettes, at 25.4% (n = 237). Lesbian women were least likely to have been previous smokers (3.3%, n = 4), followed by heterosexual women (9.8%, n = 384) and bisexual women (12.7%, n = 35).

A similar effect of sexual behavior emerged on tobacco use, $X^2(6, 4496) = 218.28$, $p < .001$ (see Table 14). A vast majority of women with exclusively female partners (92.3%, n = 32) reported never having smoked, as did 68.7% (n = 3488) of women with exclusively male partners, and only 40.2% (n = 405) women with both male and female partners. While no women with exclusively female partners (n = 0) reported being previous smokers, 10. 6% (n = 323) of women with exclusively male partners and 12.3% (n = 93) of women with both male and female partners reported having been smokers (but not in the past year). Of the women with both male and female partners who reported being current smokers (15.5%, n = 394), 32.6% (n = 121) reported smoking more than the weekly median number of cigarettes. Of the current smokers

with exclusively male partners (21.2%, n = 756), 24.1% (n = 170) reported the same. All of the current smokers with exclusively female partners (7.7%, n = 5) reported smoking the median number of cigarettes or fewer per week.

Tobacco use summary. Tobacco use differed most dramatically as a function sexual behavior, such that all women with exclusively female partners reported either never being smokers, or being current smokers that consumed fewer than the median number of cigarettes per week. Furthermore, a majority (approximately 60%) of women with both male and female sexual partners reported either being previous or current smokers. Women's sexual identity was also strongly associated with smoking behaviors; participants who identified bisexual were almost twice as likely to be current or past smokers compared to their heterosexual counterparts; lesbian women were also the heaviest current smokers, with half of the current lesbian smokers reporting consuming more than the sample's weekly average. Finally, White women's reports of tobacco use also indicated that they were most likely to smoke and/or be heavy smokers, as compared to Black and Hispanic counterparts.

BMI Classification

Tables 15 and 16 detail how women's BMIs differed as a function of race as well as sexual identity and sexual behavior. Fewer White women in the sample were classified as very over/underweight (24.6%, n = 671) compared to their Hispanic (28.8%, n = 363) or Black (36.0%, n = 469) peers, $X^2(4, 4990) = 71.56$, $p < .001$ (see Table 15). Hispanic women were modestly more likely to be slightly over/underweight (25.0%, n = 308) than White (23.8%, n = 555) or Black (21.8%, n = 252) women. The effect of race on BMI was maintained among women in the sample who reported sexual behavior, as well, $X^2(4, 4496) = 37.30$, $p < .001$ (see Table 16).

No effect of sexual identity emerged on BMI, $X^2(4, 4990) = 5.09$, $p = .275$ (see Table 15). Approximately 50% (50.4%, n = 185) of bisexual-identified women were classified as having normal BMIs, as were 49.0% (n = 2156) of Heterosexual women and 47.8% (n = 31) of Lesbian women. Approximately 22-24% of women across sexual identities were classified as slightly over/underweight, and 27-30% of women across identities were classified as very over/underweight.

While there was no effect of sexual identity on BMI, an effect of sexual behavior did emerge, $X^2(4, 4496) = 30.63$, $p < .001$ (see Table 16). Women with both male and female sexual partners were more likely to be classified as very over/underweight (at 33.5%, n = 298) compared to women with only female partners (17.5%, n = 7) or male partners (28.2%, n = 1145). A vast majority (77.7%, n = 26) of women with exclusively female partners were classified as having normal BMIs, while less than half of women with both male and female partners (42.1%, n = 359) or those exclusively male partners (45.7%, n = 1563) were considered the same. Only 4.8% (n = 4) women with exclusively female partners qualified as slightly over/underweight, though 26.1% (n = 859) of women with exclusively male partners and 24.4% (n = 235) of women with both male and female partners were slightly over/underweight as well.

Effects of race, sexual identity, and sexual behavior remained the same when tests excluded underweight participants (i.e., tested only for the distributions of "normal," "slightly," and "very overweight BMIs"), as well as when the "slightly" and "very over/underweight" groups were collapsed into a single "at risk" group. Furthermore, supplemental ANOVAs documenting women's BMI as a continuous measure was also performed. Once again, an effect of race on BMI emerged, $F(2, 3896) = 49.94$, $p < .001$. Though approaching significance, no effect of sexual identity emerged on BMI, $F(2, 4003) = 2.42$, $p = .089$. As a continuous measure,

BMI was not significantly different as a function of sexual behavior, either, $F(2, 3896) = 1.72$, $p = .179$.

BMI classification summary. While participants' sexual identity was not associated to body mass in this sample, their sexual behavior served as a significant indicator of BMI. Women with exclusively female partners were most likely to have "normal" BMIs, while a majority of all others were classified as either "slightly-" or "very over/underweight." Women with both male and female partners were most likely to be "very over/underweight." White women were least likely to be classified as having BMIs that pose risk to fertility, and Black women were the most likely.

Adolescent Housing Instability

Rates of adolescent housing instability differed only slightly between groups as a function of race. White women were less likely (at 18.3%, n = 513) than their Black (21.8%, n = 274) and Hispanic (23.4%, n = 307) peers to report having experienced adolescent housing instability $X^2(2, 4982) = 7.32$, $p = .026$ (see Table 17 and Figure 8). The effect of race on experiences of housing instability remained significant in the subsample of women who reported a partnered sexual history, $X^2(4, 4490) = 7.48$, $p = .020$ (see Table 18 and Figure 9).

The effects of sexual identity were more pronounced; over one-third of bisexual-identified women (34.8%, n = 120) reported experiencing adolescent housing instability, compared to 19.8% (n = 15) of lesbian and 19.0% (n = 959) of heterosexual identified women, $X^2(4, 4982) = 32.58$, $p < .001$ (see Table 17 and Figure 8).

The distribution of women reporting adolescent housing instability differed as a function of sexual behavior, $X^2(4, 4490) = 53.29$, $p < .001$. Only 11.4% (n = 8) women with exclusively female partners reported living on their own before age 18, compared to 18.9% (n = 765) of

women with exclusively male partners and 33.7% (n = 295) of women with both male and female partners (see Table 18 and Figure 9).

Adolescent housing instability summary. While there were effects of race on adolescent housing experience among women in the sample (such that White women were less likely than their Black and Hispanic peers to report living on their own before age 18), the most dramatic differences emerged as a function of sexual behavior and sexual identity. More than one in three bisexual women reported experiencing adolescent housing instability, while fewer than one in five heterosexual or lesbian-identified women reported the same. By contrast, slightly more than one in ten women with exclusively female sexual partners reported having experienced adolescent housing instability, while fewer than 1 in 5 women with exclusively male partners and 1 in 3 women with both male and female partners reported accordingly.

Risk for Infertility Scores

In the entire sample, women's Risk for infertility scores ranged from 0 (minimum) to 0.60 (maximum), $M = 0.14$, $SD = .12$. Risk for Infertility scores varied as function of race, $F(2, 4987) = 26.07$, $p < .001$. White women ($M = 0.14$, $SD = 0.13$) and Black women ($M = 0.13$, $SD = 0.12$) scored similarly on the Risk for Infertility measure. Post hoc tests also indicated that Hispanic women ($M = 0.11$, $SD = 0.11$) scored significantly lower on the Risk for Infertility scale compared to their Black and White peers. Similarly, an effect of sexual identity emerged, $F(2, 4987) = 15.74$, $p < .001$. Heterosexual women scored lower ($M = 0.13$, $SD = 0.12$) on the Risk for Infertility Scale than did Lesbian ($M = 0.16$, $SD = 0.16$) or Bisexual ($M = 0.17$, $SD = 0.13$) (post hoc tests indicated no difference in mean Risk for infertility Scores between Lesbian and Bisexual women). Finally, risk for infertility scores varied as function of sexual behavior, $F(2, 4493) = 82.34$, $p < .001$. Post hoc tests indicated that all groups differed from one another;

women who had only female sexual partners reported the lowest Risk for Infertility scores (M = 0.07, SD = 0.10), followed by women who reported only male sexual partners (M = 0.13, SD = 0.13) and women who reported both male and female sexual partners (M = 0.20, SD = 0.13). Table 19 documents the mean Risk for Infertility Scores as a function of sexual identity and race, as well as sexual behavior and race.

Path Models

The final series of analyses employed SEM to assess associations of race, sexual identity, and sexual behavior with overall risk for infertility, incorporating experiences of adolescent housing instability as a moderator. Four global path models were tested. These models differed only as a function of the definition of sexual identity or sexual behavior, given the current study's emphasis on differentiating sexual identity- and sexual behavior-based classifications in women's relative risk for infertility. The classification of race remained constant across all models as a function of majority/minority group membership (i.e., White/non-White).

The first two full models each included race (White/Non-White) and sexual identity (categorized as Heterosexual/Sexual Minority in the first model, and as Bisexual/Others in the second model). The next two full models included race (White/Non-White) and sexual behavior (categorized as Male Partners Only/Others in the third model, and as Both Male and Female Partners/Other in the fourth model). Because the subsample of women who identified as lesbian was extremely small and the subsample of women who reported exclusively female sexual partners was even smaller, none of the models used lesbian-identified or female-only partnered women as a distinct comparison group. Each of the four models tested adolescent housing experience as a mediator of the association between race and sexual identity or sexual behavior group membership, and women's Risk for Infertility score. Each model was also tested using

mother's educational attainment as a proxy for socioeconomic status, so as to better understand how social context might contribute to the observed associations (see Figure 10 for a conceptual illustration of the path analyses utilized in each of the 4 models). Wald chi-square tests were ultimately used to determine the individual and joint significance of each factor's contributions to the complete model. Prior to testing each full model, the total and direct effects on Risk for Infertility by each of the exogenous variables, as well as the endogenous mediator variable, were also tested.

As traditional fit indexes (the root mean squared error of approximation [RMSEA] and baseline comparison index [CFI]) do not account for the multilevel sampling structure employed in the NSFG methods, a more robust fit index appropriate for complex survey data was used. Namely, the present study employed the maximum-likelihood based absolute fit index, Standardized Root of Mean Square Residuals (SRMSR), along with the Coefficient of Determination (R^2), to determine goodness-of-fit and explained variance for each model (Bollen, Tueller, & Oberski, 2013). A fit was considered good if its SMSR did not exceed 0.08 (Hu & Bentler, 1999). All models tested demonstrated good fit with a SMSR of 0.03 or less (see Table 20). Finally, adjusted Wald tests were used to determine which variables significantly contributed to the final models.

Total effects of race, sexual identity, and sexual behavior. As an independent predictor of Risk for Infertility, race ("non-White" = 1, "White" = 0) was associated with Risk for Infertility (β= -0.06, p = .002), such that White women scored higher on the Risk for Infertility Scale than did Black and Hispanic women (see Figure 11a). The same result emerged among the subsample of women who responded to items about sexual behavior (see Figure 12a). Race alone explained 0.4% of the variance in Risk for Infertility scores in both models (see Table 16).

Sexual identity, classified as "sexual minority" = 1, "heterosexual" = 0, was positively associated with Risk for Infertility when it served as an independent predictor ($\beta = 0.08$, $p < .001$), indicating that women with sexual minority identities (i.e., lesbian or bisexual) scored higher on the Risk for Infertility Scale than did heterosexual women (see Figure 11b). Sexual identity results were identical when bisexual women served as an indicator group (i.e., "bisexual" = 1, "lesbian and heterosexual" = 0), ($\beta = 0.08$, $p < .001$), indicating that women who identified as bisexual had increased Risk for Infertility compared to their lesbian and heterosexual-identified peers. Less than one percent (0.7%) of the variance in Risk for Infertility was explained by sexual identity, regardless of how it was classified (see Table 20).

When sexual behavior served as an independent predictor (such that women with "exclusively male partners" = 1, and women with either "exclusively female partners, or both male and female partners" = 0) there was a significant association with Risk for Infertility ($\beta = -0.19$, $p < .001$). This result suggested that a sexual history with women (either exclusively, or in addition to a male-partnered sexual history) was associated with increased Risk for Infertility scores. Less than four percent (3.6%) of the variance in Risk for Infertility was explained by this classification sexual behavior alone. By contrast, when sexual behavior was classified such that women with "both male and female partners" = 1, and "exclusively male, or exclusively female partners" = 0, sexual behavior was more highly associated with Risk for Infertility ($\beta = 0.21$, $p < .001$), indicating that women with both male and female partners had higher Risk for Infertility scores than did their exclusively male- or female-partnered peers (see Figure 12b). This classification of sexual behavior explained slightly more variance (for a total of 4.3%) in Risk for Infertility (see Table 20).

Effects of race and sexuality. When controlling for any correlation of race with sexual identity or sexual behavior, associations between race, sexual identity, sexual behavior and Risk for Infertility remained largely the same. When sexual identity was defined as "sexual minority" = 1, "heterosexual" = 0, the correlation between race and sexual identity was not significant (r = 0.02, p = .360) and the associations between race, sexual identity and Risk for Infertility scores remained the same (see Figure 11c). Likewise, there were no changes in effects when sexual identity was defined as "bisexual" = 1, "lesbian and heterosexual" = 0; the correlation between race and sexual identity was also not significant (r = 0.02, p = .267). In both cases, race and sexual identity together explained approximately 1% of the variance in Risk for Infertility (see Table 16).

Among the subsample of women who responded to sexual behavior items, the correlation between race and sexual behavior (when defined as "male partners only" = 1, "others" = 0) was significant (r = 0.06, p = .002), and had a slight impact on the direct effect of race on Risk for Infertility (β = -0.05, p = .001), while the association between sexual behavior and Risk for Infertility remained the same (β = -0.19, p < .001). Race and sexual behavior in this version of the model explained approximately 4% of the variance in Risk for Infertility. When sexual behavior was classified as "both male and female partners" = 1, and those with "exclusively male or female partners" = 0, the significant correlation between race and sexual behavior (r = 0.07, p < .001) once again had a slight impact on the effect of race and Risk for Infertility (β = -0.05, p = .013), but demonstrated no change on the direct effect of sexual behavior on Risk for Infertility (β = 0.21, p < .001) (see Figure 12c). This version of the model explained slightly more of the variance in Risk for Infertility, at approximately 5% (see Table 20).

Effects of housing instability. When considered independently, there was an effect of adolescent housing experience (considered as a function of whether or not women reported having experienced hosing instability, 1 = "yes", 0 = "no") on Risk for Infertility ($\beta = 0.20$, $p < .001$), such that women who reported experiencing adolescent housing instability had higher Risk for Infertility scores (see Figure 13). Housing instability alone explained 4% of the variance in Risk for Infertility (see Table 20).

Race was positively associated with adolescent housing situation ($\beta = 0.05$, $p = .007$), as was sexual identity (where "sexual minority" = 1, "heterosexual" = 0), ($\beta = 0.09$, $p < .001$), indicating that non-White and sexual minority-identified women were more likely to report adolescent housing instability. A similar trend emerged when sexual identity was classified as a function of bisexuality (where "bisexual" = 1, "lesbian and heterosexual" = 0), such that both race ($\beta = 0.06$, $p = .006$), and [bi]sexual identity ($\beta = 0.10$, $p < .001$) were positively associated with adolescent housing situation; in other words, non-White and bisexual women were also more likely than their White and lesbian or heterosexual counterparts to report adolescent housing instability.

Race and sexual behavior were also associated with adolescent housing situation, for both classifications of sexual behavior. When sexual behavior was defined as "male partners only" = 1, "others" = 0, both race ($\beta = 0.06$, $p = .002$) and sexual behavior ($\beta = -0.13$, $p < .001$) were associated with adolescent housing experience, such that non-White women with either exclusively female or both male and female partners were most likely to report experiences adolescent housing instability. When sexual behavior was defined as "both male and female partners" = 1, and those with "exclusively male or female partners" = 0, both race ($\beta = 0.06$, $p = .002$) and sexual behavior ($\beta = 0.14$, $p < .001$) were positively associated with adolescent

housing experience; non-White women and women reporting both male and female sexual partners were most likely to report adolescent housing instability.

Race, sexual identity, and housing instability. Direct effects of race and sexual identity on Risk for Infertility changed slightly when adolescent housing situation was included in the models as a mediator. When race and sexual identity ("sexual minority" = 1, "heterosexual" = 0) were included in the model with housing instability (which served as a mediator to Risk for Infertility), the direct effect of sexual identity on Risk for Infertility was slightly reduced to $\beta = 0.06$, $p = .002$ (from $\beta = 0.08$). Furthermore, the magnitude of the direct effect of race on Risk for Infertility actually increased, from $\beta = -0.06$ to $\beta = -0.07$, $p < .001$ (see Figure 14). Results were identical when sexual identity was classified as a function of bisexual identity ("bisexual" = 1, "lesbian and heterosexual" = 0). In other words, when sexual identity served as a predictor of Risk for Infertility, housing instability appeared to partially mediate the association between sexual identity and Risk for Infertility, while also contributing a small additive effect to the association between race and Risk for Infertility. Experiences of adolescent housing instability accounted for some of the augmented risk among women who identified as lesbian or bisexual, while simultaneously amplifying non-White women's risk for infertility. Both models incorporating sexual identity, race, and housing situation explained 2% of the variance in women's Risk for Infertility scores (see Table 20).

Finally, the inclusion of mother's education (a proxy for socioeconomic status) as covariate in the models had no effect on direct or indirect effects, or the overall variance explained in Risk for Infertility scores (see Table 20). Despite the fact that mother's education negatively correlated with race ($r = -0.23$, $p < .001$), indicating that White participants' mothers reported higher education levels than did non-White peers, there were no changes in the direct or

indirect effects throughout the model. Mother's education was not significantly correlated with either classification of sexual identity. The final models thus did not include mother's education as a covariate (see Figure 14). Adjusted Wald's tests determined that race (F = 10.35), sexual identity (defined as "sexual minority" = 1, "heterosexual" = 0, F = 11.67), and housing instability (F = 57.83) were all significant contributors to the first final model (all $p < .001$). Similarly, adjusted Wald's tests determined that race (F = 10.42), sexual identity (defined as "bisexual" = 1, "others" = 0, F = 14.40), and housing instability (F = 57.34) were all significant contributors to the second final model (all $p < .001$).

Race, sexual behavior, and housing instability. As observed in the models that included sexual identity as predictors, the direct effects of race and sexual behavior on Risk for Infertility also changed slightly when adolescent housing situation was included in the models as a mediator. When race and sexual behavior (defined as "male partners only" = 1, "others" = 0) were included in the model with housing instability as the mediator, the magnitude of the direct effect of sexual behavior on Risk for Infertility was slightly reduced to β = -0.17, $p < .001$ (from β = -0.19). By contrast, the magnitude of the direct effect of race on Risk for Infertility increased from β = -0.07 to β = -0.06, $p < .001$. Adolescent housing instability partially mediated the association between sexual behavior and risk for infertility, while once again strengthening the association between race and Risk for Infertility. This model explained 5.4% of the variability in women's Risk for Infertility scores (see Table 20). Results for race were identical when sexual behavior was classified as "both male and female partners" = 1, and those with "exclusively male or female partners" = 0 (see Figure 15). When classified this way, the direct effect of sexual behavior on Risk for Infertility reduced to β = 0.18, $p < .001$, and the model explained 6.1% of

the variance in risk scores (nearly 1% more variance than the previous grouping of sexual behavior).

Once again, when mother's education was included as a covariate in the model, it was significantly correlated with race ($\beta = -0.23$, $p < .001$) but not with sexual behavior ($\beta = 0.04$, $p = .061$), indicating that non-White women reported lower maternal educational achievement. However, the inclusion of mother's education as a proxy for socioeconomic status offered no changes to direct or indirect effects in the model. Its inclusion did reduce the variance explained by both models by 0.1% (see Table 20).

In the final behavioral-based models, the adjusted Wald's tests determined that all exogenous variables were significant contributors. Race ($F = 8.93$), sexual behavior (defined as "male partners only" = 1, "others" = 0; $F = 42.32$), and housing instability ($F = 38.48$) were all significant contributors to the third final model (all $p < .001$). Likewise, the adjusted Wald's tests determined that race ($F = 8.92$), sexual behavior (defined as "both male and female partners" = 1, "others" = 0, $F = 52.70$), and housing instability ($F = 36.75$) were all significant contributors to the fourth final model (all $p < .001$), which accounted for the most (6.1%) variance in risk scores compared to other models.

Path models summary. Four path models (and their components) tested the role of race, sexual identity/behavior, and adolescent housing experience in women's overall Risk for Infertility. The models differed in their determination of sexuality as a predictor variable; the first two employed different classifications (or cross-sections) of sexual identity, while the third and fourth models employed different classifications of sexual behavior (as a function of partner gender) instead. Trends were similar across all models. Race as well as both classifications of sexual orientation and sexual behavior demonstrated significant direct effects on Risk for

Infertility, such that Black and White women, bisexual-identified women, and women who reported both male and female sexual partners were the most at risk. Race and sexual identity/behavior classifications were also significantly associated with adolescent housing experiences (such that non-White women were more likely than White peers to report adolescent housing instability, as were bisexual women and women who reported both male and female sexual partners). Adolescent housing experiences were in turn associated with Risk for Infertility (such that women who reported instability of adolescent housing experiences had higher Risk for Infertility scores). As a mediator between group membership and Risk for Infertility, adolescent housing instability performed partial mediation on dimensions of sexual identity and sexual behavior, but had the opposite effect of (mildly) enhancing the role of race. Finally, mother's education, which served as a proxy for participants' socioeconomic status, did not substantively contribute to any of the models (regardless of whether sexual identity or sexual behavior was included, or how it was classified).

In determining the optimal model between the final four for predicting Risk for Infertility, the variations in classification within sexual identity and sexual behavior appeared to do little in differentiating the overall strength and fit of the models compared to their within-group classifications, as all four models had good fit (with SMSR scores ≤ 0.03). However, there were differences in the amount of variance explained by each of the models; models that included sexual behavior as predictors explained nearly three times as much variance in Risk for Infertility as did the models that included sexual identity. The most variance was explained by the model that classified sexual behavior as a function of whether or not women reported having both male and female sexual partners.

Discussion

The present study was designed to examine the sexually transmitted infection rates and overall risk for infertility experienced by women in the United States as a function of sexual orientation and race. Using the 2011-2013 NSFG's nationally representative sample of non-pregnant women of childbearing age (i.e., 15-44 years), the prevalence of five categories of common risks for infertility—STIs, reproductive illnesses, alcohol consumption, tobacco use, and BMI—was compared as a function of race, sexual identity, and sexual behavior. These risks were then integrated into a Risk for Infertility measure and compared across groups. Finally, participants' experience with adolescent housing instability was tested as a mediator of risk for infertility, and a best fitting model was identified. Central results indicated that bisexual women and women who reported both male and female sexual partners appeared to be at elevated risk for infertility—even though conventional measures of infertility might not identify them as such. The subsequent sections begin by summarizing the specific hypotheses that were tested in the study along with associated findings in the context of previous research. Following these summaries is a discussion of the study's implications, as well as its strengths, limitations, and potential avenues of future research. The section concludes with a discussion of the implications of the study's findings across several domains.

Summary of Findings in Context

Sexual identity and behavior summary. One of the most notable characteristics of the present study's sample is that a fairly large portion (7%) of participants identified as a member of a sexual minority (i.e., lesbian or bisexual). Compared to previous studies that have employed representative data to approximate national estimates of sexual minority populations (including previous iterations of the NSFG [Chandra, Mosher, & Copen, 2011]), this is a sizeable portion of

the population (Gates, 2011). While the 1% of women in the present study who identified as lesbian is consistent with most other estimates (Gates, 2011), it is the remaining 6% of women in this sample who identified as bisexual that is particularly striking. Most samples suggest that anywhere from 1% to 4% (Gates, 2011) of women in the U.S. identify as bisexual. However, there is some evidence to suggest that decreasing social stigma and increased discourse on sexual variability may be responsible for growing rates of sexual (and particularly bisexual) identity disclosure in the U.S. (Gates & Newport, 2012; Copen, Chandra, & Febo-Vazquez, 2016). This secular change in attitudes may explain why such a comparatively large portion of women in the sample identified as bisexual.

Initial exploratory findings on participants' sexual behavior, as defined via the reported gender(s) of participants' previous sexual partners yielded several important results. First, a vast majority of (i.e., nine in ten) women who ever engaged in any partnered sex reported having had at least one male sexual partner. This finding is consistent with previous research that has reported that a majority of sexual minority women have engaged in heterosexual sex (Bailey, Farquhar, Owen & Whittaker, 2003). It also served to support the pursuit of an investigation comparing rates of sexually transmitted infections and infertility risk as a function of sexual identity and sexual behavior (as was done in this study), as sexual identity and behavior may either be indicators of distinct risks, or may demonstrate different effects on risks.

In addition, more women in the sample reported having had both male and female partners than identified as a sexual minority (i.e., lesbian or bisexual). This finding reinforces the previous one, that sexual identity is not necessarily analogous to sexual behavior, especially among women (Diamond, 2000). It also suggests that women who identify as a member of a sexual minority may experience different health risks compared to their behaviorally-comparable

counterparts, potentially due to stressors associated with stigmatized group membership (Feinstein & Dyar, 2017). Once again, these findings warranted a comparative investigation of infertility risk as a function of both sexual identity and sexual behavior.

There were no differences in the rates at which women reported their sexual identities as a function of race, but there were differences in how women reported their sexual behavior. Specifically, Hispanic women were more likely than Black and White peers to report having only male partners, and they were less likely to report having both male and female partners. Analyses of previous cycles of the NSFG have found differences in the rates at which White, Hispanic, and Black women identify their sexual orientations. Specifically Black women have been found more likely than White or Hispanic women to identify as lesbian, and White women have been more likely to identify as bisexual (Chandra et al., 2011). This was not the case in the present study, where no differences in the rates at which women identified as heterosexual, lesbian, or bisexual were identified. However, trends of sexual behavior as a function of race have remained fairly consistent over time. Previous studies have indicated that Hispanic women are less likely than White or Black women to report same-sex sexual behavior, and that White women are the most likely to report having female sexual partners (Chandra et al. 2011). These effects were similar to those found in the present study, though the differences were small, and a greater percentage of women than previously documented reported same-sex behaviors across groups (Chandra et al. 2011).

In sum, diminishing disparities between racial groups in respect to sexual behavior and identity are once again consistent with theories associating increased social acceptance with increased disclosure of same-sex sexual experiences and sexual minority identities (Gates & Newport, 2012). Moreover, the sexual identity and sexual behavior characteristics of the sample

demonstrated that, in order to better understand the role of sexual identity in the risks for infertility, comparisons across sexual identity and sexual behavior (both in conjunction with race) were warranted.

STI prevalence summary. A principal aim of this study was to determine how the rates of STIs differed among women as a function of sexual identity, sexual behavior, and race. Overall, few women in the sample reported any STIs. In respect to sexual identity, it was hypothesized that there would be an effect on women's experiences of each of the five STIs. An effect of sexual identity was also expected on the total number of STIs reported, and the likelihood that women experienced at least one STI. Results were consistent with the hypothesis. As expected, bisexual women were most likely to report experiencing each of the five assessed STIs, as well as most likely to report having experienced at least one STI, and finally also reported being diagnosed with the most STIs on average (compared to heterosexual or lesbian-identified peers). Lesbian women reported the lowest rates of STIs on all counts, and heterosexual women fell between the other two groups. In fact, approximately twice as many heterosexual women and three times as many bisexual women reported being diagnosed with any of the assessed STIs compared to lesbian women. This finding reinforces some previous work indicating that bisexual women are indeed at an increased risk for some STIs relative to both lesbian and heterosexual peers, on a nationally representative level (Johnson et al., 1987; Lindley, et al., 2008; Logie, et al., 2015; Everett, 2013). These results are also consistent with several prior studies indicating that lesbian women are at lower (but not negligible) risk for STI transmission (Young & Meyer, 2005; Bauer & Welles, 2000). The present study thus answered the call of numerous researchers to document STI seroprevalence as a function of sexual identity (Bauer & Welles, 2000; IOM, 2011).

It was also hypothesized that there would be an effect of sexual behavior on the experiences of each STI (or the experience of any STI, as well as on the total number of STIs reported) among women in the sample. It was expected that women who reported both male and female partners would be the most likely to report experiencing each or any of the five STIs (as well as report the most STIs on average), followed by women with exclusively male and then women with exclusively female partners. As expected, the differences in STI experience as a function of sexual behavior were stark—even more so than those as a function of sexual identity. Women who reported having both male and female partners were most likely to contract any of the five STIs, except for gonorrhea (which they were equally as likely to contract as women with exclusively male partners). These findings are in line with those of many studies investigating the STI rates among "women who have sex with women" (WSW) (Fethers et al., 2010; Reisner et al., 2010; Xu et al., 2010) but in opposition to several others, where WSW have been reported to be at reduced risk (Bailey et al., 2004; Bauer & Welles, 2000). Because the research on sexual minority women's health (both in respect to sexual identity and sexual behavior) is still fairly limited and conflicted, this is not surprising. However, the present study has the advantage of not relying on convenience samples, which may account for the ambiguity of the role of sexual partner gender on STI experiences in previous literature. Women who have sex with only women demonstrated virtually no risk for STIs in our sample (with only one woman reporting an STI, gonorrhea), while nearly a quarter of all women who had sex with both men and women reported an STI.

The effects of sexual identity and sexual behavior on STIs together suggest that most sexually transmitted infections reported among lesbian and bisexual identified women in the sample transpired among those women who have (or had) male sexual partners. Furthermore,

bisexual women and women with both male and female sexual partners experienced STIs at greater rates than peers, and sexual behavior was a clearer predictor of STI experience than was sexual identity. However, it is important to reiterate that the results of sexual identity also demonstrated that lesbian women are in fact at some risk for STIs. While this study could not confirm whether a sexual encounter with a male partner was responsible for the transmission of the STI itself, as suggested by others (Everett, 2013), the results did indicate that women without male sexual partners were largely unaffected by STIs. It is also important to note that sex with men was not the only critical factor in STI seroprevalance; it was the women who had male sexual partners *and* female partners who were the most at risk. Whether this is due to partner gender or other factors cannot be determined here.

It was also hypothesized that Black women would be most likely to report any STIs, followed by White and Hispanic women. However, while the results of the present study indicated that Hispanic women reported the fewest STIs on average, Black and White women reported equal cumulative numbers of STIs on average. White and Black women were also equally as likely to report having at least one STI, both at a greater rate than Hispanic women. These trends were generally reflected across the individual STIs. These findings are not entirely consistent with previous research that has shown Black women to be at substantially greater risk for many STIs compared to White women (CDCP, 2015d). Previous research has also found Hispanic women to be twice as likely as White women to experience chlamydia and gonorrhea (CDC, 2015d), which was also not the case in the current study. There was an additive effect of race and sexuality on sexually transmitted infection experience, though not entirely as expected. Women who identified as White or Black were at an increased risk for STIs compared to their peers; women who further identified as bisexual, or reported both male and female partners, were

potentially at even greater risk for STIs above and beyond those observed as a function of sexual identity. However, given the low rates of STI incidence and small subgroup sample size, an interaction effect could not be tested.

Other risks for infertility summary. The second aim of this study was to determine the rates at which each of the other common risks for infertility (reproductive illnesses, alcohol consumption, tobacco use, and extreme BMI) occurred among women in the sample as a function of race, sexual identity, and sexual behavior.

Reproductive illnesses. Few women in the sample reported having had reproductive illnesses, though results may be specific to the sample as the mean age of women in the current study was approximately 29 years and most reproductive illnesses are diagnosed later in women's lives (CDCP, 2015e). Initial predictions suggested that there would be an effect of sexual identity on reproductive illness, such that lesbian and bisexual women would be more likely than heterosexual counterparts to report experiencing each (or at least one) reproductive illness, as well as report the most reproductive illness. Results indicated, however, that lesbian and heterosexual women reported an equal number of total reproductive illnesses, which were fewer than those identified by bisexual women. However, lesbian and bisexual women were more likely than heterosexual women to report experiencing at least one reproductive illness. Bisexual women were the most likely to report having experienced at least one reproductive illness, at nearly twice the rate of heterosexual women. While there has been one study investigating the experiences of a small sample of sexual minority women with PID (Marrazzo et al., 2005), the results of the current study are the first to document the rates of endometriosis and cervical, ovarian, or endometrial cancer as a function of sexual identity. Though the incidence of the assessed reproductive illnesses among women in the sample was low, the disproportionate

distribution of illnesses affecting lesbian and bisexual women is noteworthy and will require further investigation. This is especially the case as there is evidence that sexual minority-identified women receive reproductive health screenings less often than their heterosexual counterparts (Tracy et al., 2010).

As observed with STI prevalence, the effect of sexual behavior on reproductive illnesses was even more pronounced than that of sexual identity. Once again, it was hypothesized the women with only same-sex or both male and female partners would be more likely than women with exclusively male partners to report reproductive illnesses, but this was not entirely the case. None of the women with exclusively female partners reported any reproductive illnesses. Women with both male and female partners did report more reproductive illness on average, and were more likely to report having at least one reproductive illness compared to peers with only male partners. Disparities in reproductive illness as a function of sexual identity and sexual behavior were even more apparent than those observed with STIs. This was contrary to expectations that identity would be more determinative of disparities than behavior. While STIs are contracted sexually via bodily fluids, reproductive illnesses are (generally speaking) not contagious, so the effect of sexual behavior on the experience of reproductive illness is not entirely clear. Only cervical cancer has a direct association with sexual activity, as it may develop if certain strains of HPV/genital warts go untreated. It is thus possible that the clear effect of sexual behavior and not sexual identity on reproductive illnesses experience is partially associated with the increased prevalence of genital warts among women with both male and female sexual partners.

As predicted, there were several different expected outcomes in respect to race and reproductive illnesses. As previous research suggested (Gorstein & Rothman, 1994), rates of PID

were expected to be higher among Black and Hispanic women compared to White women. Hispanic women in the current study were, however, slightly less likely than Black or White women to be diagnosed. White and Hispanic women were also expected to report higher rates of endometriosis than Black women, but this was also not supported in the current study, despite previous research suggesting Black women are least affected by endometriosis (Kyama et al., 1994). In respect to the three types of cancer treated, Black and Hispanic women were also expected to report experiencing cervical, ovarian, and endometrial cancer at greater rates than White women, given previous evidence (Wu et al., 2003). However, this was also not the case; White women were nearly twice as likely as Hispanic women and three times as likely as Black women to report the being diagnosed with cervical cancer. Low sample sizes revealed no effects of race on ovarian or endometrial cancer.

It was also hypothesized that there would be a effect of race on reproductive illness experience, such that Black and Hispanic women would be more likely than White women to experience at least one reproductive illness. This was not the case in the current sample. White women were the most likely to report experiencing any reproductive illnesses, followed by Black women (both similar to many national estimates of 10%) (Cramer & Missmer, 2002), though almost half as many Hispanic women reported the same. This may be a signal of decreasing risk, or it may due to another underlying factor such as a disparity in diagnoses—perhaps Black and Hispanic women are more likely to receive a late diagnosis for many reproductive illness—though that cannot be determined from the data available in this study. Ultimately, the effect of race and the effects of sexual behavior and sexual identity demonstrated that all three were important contributors to overall experience of reproductive illness.

***Alcohol consumption*.** Rates of heavy drinking (i.e., consuming more than 14 alcoholic beverages per week) were generally low across the sample. Effects of sexual identity, sexual behavior, and race were expected to emerge. It was hypothesized that women who identified as bisexual or lesbian and would report higher rates of heavy drinking compared to heterosexual-identified peers. In fact, lesbian participants were the most likely to report heavy drinking, at twice the rates of bisexual and four times the rate of heterosexual women. These findings are consistent with those of other studies, including those employing random samples (Gruskin & Gordon, 2006; Coulter et al., 2016). It was also expected that women with exclusively same-sex sexual partners or both male and female sexual partners would report more heavy drinking that peers who had only male partners. Women with exclusively same-sex partners were also the most likely to report heavy drinking, followed by women with both male and female partners, and those with exclusively male partners. Consistent with hypotheses, however, sexual identity appeared to be a stronger predictor of alcohol use than sexual behavior.

As a function of race, White women were expected to report the highest rates of heavy drinking in the sample, followed by Hispanic and Black women. Contrary to expectations, however, Hispanic women were most likely to describe themselves as heavy drinkers, followed by White and Black women. This is not consistent with previous research that has found that under half of Black and Hispanic women are regular drinkers, while a majority of White women qualify as the same (Chartier & Caetano, 2006). It is possible that the specific criteria for "heavy drinking" for this study along with the small sample sizes may be responsible for these inconsistencies.

Tobacco use. Lesbian and bisexual women were expected to report higher rates of smoking than heterosexual women; this was supported in the present study. Bisexual women

were twice as likely as heterosexual women to be current smokers, and lesbian women were one and a half times as likely. Lesbian women also reported smoking the most cigarettes of all women in the sample. It was also hypothesized that women with exclusively female partners and women with both male and female partners would be heavier smokers than women with exclusively male partners. An effect of sexual behavior emerged in the current study, comparable to that of sexual identity, such that women with exclusively female partners were the heaviest smokers, followed by women with both male and female partners and women with only male partners. However, contrary to expectations, it appeared that sexual behavior was a more clear predictor of tobacco use than sexual identity. Finally, White and Black women were expected to report higher rates of smoking than Hispanic women. This effect was partially supported, such that White women were slightly more likely than Black women to be smokers, and nearly twice as likely as Hispanic women to be smokers. Results of sexual identity and race are consistent with those of previous research on tobacco use (King et al., 2012; CDCP, 2014), though the results associating tobacco use specifically with sexual behavior are the first of their kind.

BMI. The findings on BMI risk (relative to fertility) differed substantially from expectations. Overall, women in the present study were less likely to be considered overweight or obese than was expected; approximately half of the women in the sample qualified as having normal BMIs (that indicated no risk for infertility), while in other estimates, less than 40% of American women qualify as the same (Ogden et al., 2014). Initial hypotheses anticipated that lesbian and bisexual women would report higher risk in BMI compared to heterosexual women, however no effect of sexual identity emerged on BMI. This result was surprising given the preponderance of evidence that lesbian women in particular are at risk for being overweight or obese (Yancey et al. 2003; Katz-Wise et al., 2014). As this finding was incongruous with

previous research, supplemental analyses were performed that considered BMI as a continuous measure (as opposed to within the infertility-risk paradigm), however still no effect of sexual identity emerged. It is possible that these results are specific to this sample, given that nearly ten percent of the sample failed to report BMI—it may be that those women were especially likely to have extreme BMIs and did not report due to weight-related stigmas (Puhl, 2010), or perhaps some were not aware of their weight at the time of survey. Incidentally, there was an effect of sexual behavior on BMI, but not entirely as expected; women with both male and female sexual partners were more likely to be classified as having high risk BMIs, though women who had only female partners were the least likely to be especially over- or under-weight.

Finally, it was expected that there would be an effect of race on BMI, such that Black and Hispanic women would be more likely than White women to report risky BMIs. This hypothesis was supported in the current study, such that fewer White women reported risky BMIs compared to their Hispanic or Black peers. This was consistent with a robust body of literature that has found disparities in healthy BMIs as a function of race (IOM, 2006).

Adolescent housing instability and path model summary. The third aim of the study was to determine the overall relative risk for infertility among women in the sample (via a composite Risk for Infertility Measure), the prevalence of adolescent housing instability among participants, and most centrally, whether adolescent housing experiences mediated associations between race, sexual identity or behavior, and women's overall risk for infertility.

Overall risk for infertility. It was hypothesized that Black and Hispanic women would demonstrate higher scores on the overall Risk for Infertility scale, given that they are the most likely experience infertility (Bell, 2014; Wellons et al., 2008; Greil et al., 2011). However, the composite measure of Risk for Infertility assembled in the current study did not show this effect;

White women reported the highest overall Risk for Infertility, approximately the same overall as Black women, and Hispanic women reported the lowest risk. It is important to note that the Risk for Infertility scale used in this study measures *risk* for infertility and not the *experience* of infertility. This is a crucial distinction.

There are a couple of potential explanations for the fact that Black and Hispanic women were not demonstrating higher rates of risk than White women, as consistent with their higher rates of experience with infertility. First, it is possible that behavioral risks like alcohol consumption and tobacco use are the ones that are most common among White women; as these behavioral risks are the most prone to intervention (i.e., a woman can reduce her weekly alcohol consumption but not necessarily cure a reproductive illness), White women who are planning to become pregnant may more easily reduce their risk for infertility. Alternatively, White women may generally have access to more health resources than Black and Hispanic women (IOM, 2006), and this could explain why, despite higher overall risk for infertility, they may ultimately experience fewer issues becoming pregnant. For example, they may receive treatment for an STI sooner than their peers, limiting potential adverse affects on fertility. It may also be that there are other risks for Infertility not included in the current study that are responsible for the disparity in the observed risk versus diagnosed experience of infertility.

It was also hypothesized that bisexual and lesbian women would report higher rates of overall risk when compared to heterosexual women; this was supported in the current study. Lesbian and bisexual women experienced the highest (and equivalent) rates of overall risk for infertility, compared to heterosexual women. As sexual minority women often face additional social impediments to forming families, evidence for further physical risk for infertility is important to consider. It is important to note that lesbian and bisexual women in the present

study appeared to have different profiles of risk; for example, lesbian women demonstrated lower risk for STIs compared to bisexual women, but demonstrated high risk on alcohol and tobacco items. These differences suggest that there may be important differences in women's health experiences relative to their sexual identity, even among those who identify as a sexual minority; understanding the interaction between sexual identity and sexual behavior may be useful in addressing reproductive disparities. In sum, findings on risk for infertility as a function of sexuality in this study are the first of their kind, but are generally consistent with research that has found sexual minority women's general health to be poorer than that of their heterosexual counterparts (IOM, 2011).

Finally, women with both male and female sexual partners were expected to have the highest Risk for Infertility scores compared to women with only female or only male partners. This was also supported in the present study; women with only female partners demonstrated very low overall risk, while those women with both male and female partners demonstrated the highest overall risk compared to all other groups.

Women's race, sexual identity, and sexual behavior each demonstrated an effect on their overall Risk for Infertility, and the largest differences were observed as a function of sexual behavior. The results support the expectation of an additive effect of race and sexuality (either as a function of identity and/or behavior) on women's risk for infertility—though the effect of race was slightly different from what had been expected.

***Housing instability*.** In respect to sexual identity and adolescent housing experience, it was anticipated that heterosexual women would be less likely than lesbian or bisexual women to report living alone away from home before age 18. This was partially supported in the present study. With nearly a third of bisexual women reporting adolescent housing instability, they were

much more likely than lesbian or heterosexual women (who were equally likely, at about 20%) to report the same. This disparity is largely consistent with previous research (Cray et al., 2013) though the attribution of the disparity to bisexual but not lesbian-identified women is novel. Expectations about the effect of sexual behavior were also supported such that women with both male and female partners were the most likely to report adolescent housing stability, followed by heterosexual and then lesbian women. Lesbian women appeared more likely than women with same-sex only partners to report adolescent housing instability, suggesting that identity may play a role in whether adolescents experience housing instability.

Finally, as predicted, White women were less likely than Black and Hispanic counterparts to live away from home before the age of 18, however, these differences were small between groups. The effects of sexual identity, sexual behavior, and race collectively indicate that that are disparities in the rates at which women experience adolescent housing instability—particularly as a function of their sexual behavior and identity. Given previous research that has found that sexual minority individuals are more likely to be cast away or to run away from their childhood homes, this is not entirely surprising (Cray et al., 2013). However the motivations for women's early departure from their parents or guardians' homes are not discernable in this dataset, so it is impossible to distinguish whether adversity at home is correlated with or responsible for adolescent housing instability.

Final models. The remaining, central aim of the present study was to determine whether differences in overall risk for infertility as a function of women's race, sexual identity, and sexual behavior could be partially explained by their experiences of adolescent housing instability. Further, the study sought to determine whether socioeconomic status might also be a (partial) explanation of these effects. Models compared the role of race and either sexual identity

or sexual behavior as predictors of overall Risk for Infertility scores, with adolescent housing experience included as a mediator. Furthermore, mother's education (the proxy for socioeconomic status in this study) was included as a control for each model, in order to compare whether effects would still be maintained above and beyond socioeconomic differences within the sample. Given the central role of sexuality in this study (as there is especially limited information speaking to the health experiences of women in respect to their sexual identity), further attention was paid in the models to distinguish the experiences of bisexual women from lesbian women. For the sake of comparing the role of sexual identity and sexual behavior in women's overall risk, parallel models differentiating how women who have sex with men and women differed from any women who have sex with women were also tested.

It was expected in all of these models that housing instability would partially mediate the relationship between a woman's race, her sexual identity or sexual behavior, and her overall risk for infertility. It was further expected that the inclusion of a socioeconomic covariate would reduce the effect of the mediator on predicting women's overall risk. Finally, models incorporating sexual identity were expected to explain more of the variation in overall risk than those including sexual behavior.

However, results were not entirely consistent with these hypotheses. As expected, housing instability was correlated with risk for infertility scores and did partially mediate the association between risk for infertility and sexual identity or sexual behavior. In other words, the effects of sexual behavior and sexual identity on risk for infertility were reduced after considering early experiences of housing instability. Sexual minority women (classified as either bisexual, or bisexual and lesbian) and any women who had female sexual partners (or just those with both and female sexual partners) were more likely to report living away from home before

age 18, and in turn demonstrated higher overall risk for infertility. When their experiences of adolescent housing instability were taken into account (specifically their increased likelihood to live away from home before age 18), the association between sexuality and risk for infertility was reduced. In essence, adolescent housing experiences explained some of the effect of sexuality on risk for infertility.

The inclusion of adolescent housing experiences in the models had a different impact on the effect of race; housing instability did not reduce the effect of race on risk for infertility—it (albeit, very modestly) increased it. That is to say, while non-White women were slightly more likely than White peers to experience adolescent housing instability (which was associated with increased risk for infertility), it was White women who experienced higher risk for infertility. Housing experiences thus did not explain away any of the effect of race on risk for infertility—it actually added to it. White women were less likely to experience housing instability, but those who did were more likely than other White women to experience risk for infertility. Similarly, non-White women were slightly more likely to report adolescent housing instability than were White women, but Hispanic women had lower overall risk for infertility scores than did both Black and White women. Though race and housing instability were associated with one another, it appeared that—in respect to their risk for infertility—their impact on risk for infertility did not entirely overlap. This unexpected finding stems from the unexpected result of race on risk for infertility—that White and Black women demonstrated comparable levels of risk[3].

[3]While not originally included in the study's hypotheses and thus not presented within the results, all models were also tested with race categorized as a function of Hispanic identity (where 0 = Hispanic, 1 = White & Black). However, the results remained nearly identical to those where race was considered as a function of minority identities (i.e., 0 = White, 1 = non-White). This is likely due to the inconsistent direction of effects associated with Hispanic identity and housing instability, and Hispanic identity and Risk for Infertility scores.

Finally, the inclusion of mother's education (as a proxy for socioeconomic status) as a control in the models was expected to reduce the overall effects of race, sexuality, and even housing instability observed in the models. However, its inclusion appeared to provide no additional explanation as to the role of the predictors on risk for infertility of the models—none of the effects observed were reduced as a function of its inclusion. This is suggestive of two possibilities. First, mother's education may not have been not an especially apt proxy for socioeconomic differences (despite the evidence of its efficacy in this way in other studies [Lien et al., 2001]). Alternatively, it is possible that disparities in socioeconomic status did not play a an important role in women's risk for infertility, as measured here—the differences observed as a function of race and sexuality are appear to arise from another source. While this is unexpected given previous research that has found socioeconomic status as being at least partly contributory to disparities in racial and sexual minority individuals' health experiences (Greil et al., 2011; White et al., 2011; IOM, 2006; IOM, 2011), it is possible that, for these particular health risks, socioeconomic status is less relevant that other potential factors.

Ultimately, one path model was determined to be the most predictive of women's risk for infertility: this was the model that contained race, sexual behavior (defined by those women who had both male and female sexual partners) and adolescent housing experience as factors. This model explained the most variance in overall Risk for Infertility scores (6%) compared to all other tested permutations of race and sexuality. It is important to note, however, that this model was only very modestly more explanatory than the model that included sexual identity (defined via bisexual identity) as a predictor instead (it only explained 1% more variance in overall Risk for Infertility). However, given that the overall variance explained by the final model was modest, this difference is an important one.

Overall interpretation. This study was the first of its kind to aggregate commonly cited risks for infertility so as to offer a better way of understanding who among the population of women in the U.S. might be at risk for infertility. While previous research has determined that a history of STIs, experiences of reproductive illnesses, alcohol consumption, tobacco use, and extreme BMI are all predictors of difficulty becoming pregnant (ASRM, 2014), no study has yet examined these risks in conjunction with one another to determine the overall risk for infertility that women may face. The construction of the "Risk for Infertility" measure in this study thus serves an alternate way of predicting and operationalizing infertility, and provides a more tangible way of examining how disparities in women's health may emerge.

In summarizing the results of the present study, it is important to appreciate the difference between results' statistical and practical significance. For some of the items assessed, results indicated there were statistically significant effects, although practically speaking the differences observed between groups were quite small. For example, post-hoc tests revealed that there were differences between all race groups in the rates at which women experienced adolescent housing instability. However, Hispanic and Black women reported experiencing housing instability within a 2% margin of each other; while statistically different, the similarity of these rates does not suggest a particularly substantial disparity in these women's' housing experiences. Because of the large sample, and despite conservative post-hoc corrections were employed, some of the significant findings that emerged do not necessarily carry as much weight as others, from a practical perspective. The discussion of the findings of this study thus takes practical as well as statistical significance into account.

A central finding of this study was that women who identified as a member of a sexual minority experienced higher overall risk for infertility than did their heterosexual counterparts.

Given the dearth of information specific to sexual minority women's health, this (along with the documentation of all the individual health risks as a function of identity) is an important finding. Differences in overall risk were, however, more dramatic as a function of sexual behavior, compared to those determined via sexual identity. This suggests that many (but not all) risks for infertility are better considered as a function of sexual behavior. Once again, though, not all indicators of risk were entirely attributable to sexual behavior—while STIs, for example, were clearly linked to sexual partner history, important differences emerged as a function of sexual identity in respect to alcohol and tobacco use. Ultimately, the results indicate that there is substantial overlap between the health experiences of sexual identity and sexual behavior groups (especially between bisexual women and women who reported both male and female partners), and both facets of sexuality may be important to consider when assessing women's risk for infertility. In addition, women's racial identity was also predictive of women's overall risk for infertility, though the differences observed were smaller in size compared to those observed as a function of sexual identity or sexual behavior. Furthermore, they were not necessarily reflective of the disproportionate rates of diagnosis of infertility among racial minority women that has been reflected in previous studies (Bell, 2014). Instead, White and Black women in the sample experienced equal rates of risk, and more risk than Hispanic women.

Given the findings in respect to sexual identity and sexual behavior observed in this study, a foremost implication is that the construct of infertility (as it is typically defined by researchers and medical professionals) excludes any women who are not having regular, heterosexual sex. While few women who only had female sexual partners qualified as having any risk for infertility, some indeed did. Furthermore, lesbian and bisexual women reported varied levels of risk; these women in particular may not have male partners during the periods of

the life during which they wish to start a family, and thus despite their (often elevated) risks for infertility, may not be considered or diagnosed as experiencing infertility.

Another major finding of this study is that experiences of adolescent housing instability may have long-term ramifications for women's health. Adolescent housing instability was strongly associated with women's overall risk for infertility, explaining more variance in Risk for Infertility scores than any other factor. While there have been many studies associating adolescent homelessness and experiences of STIs on "problem behaviors" (such as drinking or drug and tobacco use) (Cray et al., 2013), this is the first study to consider how adolescent housing instability might affect health experiences in a way that affects long term reproductive health. In the present study, bisexual women and women with both male female partners were especially likely to report having experienced adolescent housing instability. While associations tested do not indicate the direction of the effect (such that is impossible to determine whether adolescent women who had both male and female partners, for example, were more likely to leave home early, or whether those women who left home early went on to have both male and female partners), they do indicate that there may be long-term effects of housing instability on reproductive health, even in adulthood.

Strengths and Limitations

A foremost strength of this study is its nationally representative sample. It can be especially challenging for researchers studying minority populations to obtain statistics that are reflective of national demographics, for several reasons. First, due to the relatively small frequencies of individuals identifying as members of a sexual minority, a random sample that is adequately large to power a comparative study such as this one can be difficult to recruit. The recruitment methods of the NSFG involve thorough, quasi-random sampling techniques that are

based on census-derived parameters (and are weighted accordingly in the analysis stage) to help achieve a nationally representative final sample. While sexual identity and sexual behavior were not themselves sampling criteria (though racial identity was), the resulting sample is much more robust and diverse than those in most studies that rely on snowball or convenience samples for their investigations of issues relevant to sexuality.

Furthermore, due to considerable longstanding social stigma relevant to sexual identity and sexual behaviors, it can be difficult for many researchers to ensure that participants feel comfortable enough to divulge honest responses. Interviewers for the NSFG employed an audio computer assisted interview (ACASI) for all questions deemed "sensitive," including those assessing sexual identity, sexual behavior, and sexually transmitted infection history. The privacy and anonymity afforded in these surveys resulted in a more realistic set of responses than may be observed in other studies addressing reproductive health and sexuality. The rigorous attention to representative sampling and response bias in the NSFG contribute to some of the most representative descriptives of women's reproductive health in the United States to date.

There are of course several limitations to this study. One such limitation is relevant to the survey logic. While there is an item in the NSFG that imputes whether women have experienced infertility, it is asked only of women who are currently married or cohabiting with men—it is not even asked of women who are currently single. The NSFG does not have a way to determine whether female participants are married to or cohabiting with another woman, or even if they are in non-cohabiting relationships with a partner of either gender. This is itself problematic in determining whether the women in the sample who identify as lesbian or bisexual are currently partnered. This in turn might contribute to some ambiguity in observed effects between sexual identity groups, given that many women come to define their sexual identity as a function of the

gender of the person with whom they are partnered (and not vice-versa) (Diamond, 2000). However, the absence of female partner items (or the failure to ask the infertility question across all women) also prohibits determination of a woman's fertility status unless she reports being currently married to or cohabiting with a man. This fails to include not only single women, but also women who may be in long-term (heterosexual) relationships and not cohabiting, as well as women who are in same-sex relationships of any kind. Just as the medical definition of infertility relies on the assumption that women are having regular heterosexual sexual intercourse, the NSFG fails to recognize that women having heterosexual sex outside of a cohabiting relationship or marriage with a man may also experience infertility. It is thus impossible to validate the Risk for Infertility scale produced in this study against the NSFG's outcome of infertility status, given that it simply does not apply to many women. This quandary does, however, reveal the importance of a reproductive health measure that holistically accounts for risk for infertility, as opposed to a largely arbitrary infertility diagnosis that is predicated on heteronormative criteria. It would certainly be interesting to see if future Cycles of the NSFG include cohabitation/marriage to another woman as a distinct category (as same-sex marriage was federally constituted in the U.S. in 2015, after the 2011-2013 Cycle of data were collected). If so, the NSFG will need to make a distinct choice about whether to (and how to) include women who are currently partnered with women in the series of questions concerning infertility assessments.

Another limitation of this study emerges in the method used to construct the Risk for Infertility scale. The scale was constructed as a function of five conceptual risks for infertility that have been previously cited as detrimental to one's ability to become pregnant—a history of sexually transmitted infections, reproductive illnesses, alcohol consumption, tobacco use, and "non-normal" BMI. To date, however, these five factors have not been examined in conjunction

with each other in respect to infertility. As such, there is no determination yet as to the relative risk that each of these factors impose on a woman's ability to become pregnant. While one might imagine, for example, that ovarian cancer might have a greater and longer-lasting impact on a woman's fertility than her current drinking behaviors, these claims have not been quantified or verified.

The operationalization of sexual behavior as distinct categories based on previous partner gender was also a potential limitation of this study. There are several other facets of sexual behavior that could be considered (though not necessarily assessed in the NSFG), such as the number of partners with whom participants engaged, the ratio of male to female partners, the frequency of sexual encounters, the sexual acts involved in those encounters, the regularity and type of protection employed at those encounters, etc. However, the choice of defining sexual behavior as a function of *ever* having had male or female partners was settled upon because it answered the specific question of whether simply having engaged in sexual intercourse with a male is what places women at risk for sexually transmitted infections (or any other of the risks for infertility). That is to say, if lesbian-identified women reported sexually transmitted infections, it is possible that those infections were contracted from male partners (as risk for transmission is highest for women via heterosexual penetration [CDC, 2015]), especially given that there are numerous studies indicating that a majority of lesbian-identified women have had male sexual partners (Bailey et al., 2003). The classification of sexual behavior employed in this study allows for a better understanding of the differences between women who identify as a member of a sexual minority versus those who do not identify as sexual minority but have engaged in non-heterosexual sex.

The number of sexual partners was not controlled for in this study. Women who reported having both male and female sexual partners essentially reported at least two lifetime sexual partners (while those women reporting exclusively either male or female partners reported at least one). Though most reports indicate that most women have multiple sexual partners across their lifetimes (Chandra et al., 2011), the inherent additional risk associated with multiple partners might be a source of inflated results among women who had sex with both men and women in the sample. However, given that the women who had sex only with women in this sample reported virtually no STIs (the one risk for which there is tangible cause for concern about this difference), one would not necessarily expect the results of women with both sexual partners to differ from those women who reported sex with only men (as the additional exposure to STIs via female sexual encounters appeared to be minimal).

The classification of race in this study was also limited. The only categories coded in the NSFG are White, Black, non-White Hispanic, and "Other," due to the constraints of recruiting representative samples of minority identity (Copen, et al., 2016). These groups were further collapsed into two groups for path analyses in the present study, as a function of majority or minority group membership (i.e., White or non-White). This means that the experiences of women of many other identities common in the U.S. (including Native American and Alaska Native, Asian American, Native Hawaiian and Other Pacific Islander, and people of two or more races) are not represented in this study. In addition, the NSFG required participants to endorse only one racial identity, thereby neglecting to consider the experiences of women with multiracial identification. Individuals with multiracial backgrounds often have unique health and social experiences not reported by peers who identify with a single race or ethnicity (IOM, 2006). Furthermore, despite the large sample employed in the current study, the limited number

of individuals in some sexual minority identity and behavior categories prevented the testing of interaction effects between race and sexuality. In order to understand the complex ways in which race and sexual identity and sexual behavior together affect women's health above and beyond additive effects, it is crucial to employ a larger, diverse sample. An intersectional perspective that could speak to any interactive effects would be an integral addition to future research.

Finally, the manner in which housing instability was defined in the present study—though an expansion of definitions in most previous research (Cray et al., 2013)—also had some limitations. Research on youth who experience housing instability typically employs samples from homeless shelters or programs that offer services to homeless youth. The present study employed a much broader definition of housing instability, which included any youth who reported as living away from parents or guardians before age 18; this definition allowed for inclusion of youth who may have experienced an array of transient or unsupervised living situations. Given that many youth (especially sexual minority youth [Cray et al., 2013]) may find themselves living temporarily with friends, romantic partners, and even strangers (and thus may be exposed to a wider range of risks than those living at home with parents or guardians), this is an important strength of the present study. However, the prompt used by the NSFG to determine participants' experience of housing instability might be *too* broad. Included among women who experienced adolescent housing instability in the present study were participants who joined the armed forces or lived at college before turning 18 years of age. While these (probably few) women's experiences are unlikely to bias evaluations of health risk among youth with unstable housing in this sample, their experiences were not reflective of the unsupervised and/or unstable adolescent home life that was the subject of the current study (Durso & Gates, 2012). Furthermore, since motivations for participants' adolescent departure from home were not

explored in the NSFG, it is unclear whether leaving home might have been an urgent bid for safety for some youth (for example, if experiencing abuse or neglect). For these young women, the early departure from home might have buffered against more immediate risks to their health. Future research should consider a more nuanced approach to classifying housing instability, so as to understand more clearly why women who reported living on their own before age 18 also reported difficulties in their general and reproductive health.

Future research

Perhaps the most meaningful continuation of the present research would be to validate the Risk for Infertility measure that was assembled in this study against other biological markers associated with infertility, such as ovulation functioning tests (i.e., follicle stimulating hormone [FSH] tests, luteal phase testing, or other hormonal tests). If associations between these biological markers for infertility and the Risk for Infertility measure were assessed in a longitudinal investigation among a general population of women, there might be a better understanding as to whether and how (i.e., to what degree) the five conceptual risks for infertility investigated in the present study actually disrupt women's ability to become pregnant. Furthermore, if associations between the biological markers and the Risk for Infertility measure held, the measure might serve as a cheaper and faster alternative of identifying potential impediments to infertility.

Another potential avenue to investigate would be to investigate further how the various risks for infertility manifest within the sample. While the items assessed in the present study demonstrated low correlation with one another, it is possible that there are some distinct types of risk emerging within certain subsets, or clusters, of the sample. For example, it might be that many of the women who report being heavy smokers are also heavy drinkers, or that women

who have certain STIs might also commonly report specific reproductive illnesses. A person-centered approach that integrates cluster analyses may shed more light on how the various risks manifest themselves within the sample. This approach might serve as a foundation for understanding which women (in respect to race, sexual identity, behavior, adolescent housing experience, or other characteristic) experience which risks for infertility, and why.

In addition to the other potential research possibilities, a corresponding set of data to that which was employed in the present study was released in December 2016, finalizing the 2011-2015 Cycle of the NSFG. This additional set of data serves to effectively double the total Cycle's sample size. While the 2011-2013 sample was weighted to reflect national estimates (and functions effectively as a nationally representative sample), it is possible that incorporating the final two years of data collection in a replication study would enhance the findings of the present study, especially where small subsamples limit possible responses (e.g., lesbian women responding to a reproductive illness item). Moreover, the increased sample size might also allow for the thorough intersectional investigation to which this project initially aspired; instead of simply testing direct effects of sexual identity, sexual behavior, or race, the complete sample might also allow for the testing of interaction effects. A study of interaction effects would allow for a more fine-grained understanding of how a woman's race and her sexuality might work together in creating unique reproductive risks and experiences.

Moreover, with a larger sample, other contextual factors (apart from socioeconomic status, as determined via the proxy of mother's educational attainment in the present study) might be included in the final models. For example, women's experiences with healthcare (such as the frequency of medical visits, or their type of health insurance) might be included as additional mediators for models assessing Risk for Infertility. Given the evidence that racial

minority women, for example, are less likely than White women to receive routine physical care, it would be interesting to test whether early experiences of housing instability affect medical interactions, which in turn affect the risks reported. While not included in the NSFG, other potential mediators (such as level of medical mistrust, religiosity, or supportive social networks) might be included in the model, as these all have been previously associated with health experiences (Greil et al., 2011; White et al., 2006). Given that women's overall risk for infertility across the sample was generally low, and responses to most of the items comprising the scale were highly skewed (such that most women did not, for example, report a reproductive illness or sexually transmitted infection), more variation in the sample might help clarify effects observed in the present study that were limited by sample size, test for interactions, and sustain the inclusion of these other contextual markers.

Future research might also attend more carefully to the role of adolescent housing instability in women's health. Further replication and expansion of the present study could benefit from the evaluation of motivations for youths' departure from home, as well as the nature and durations(s) of their living situations while away. A qualitative assessment of adolescent housing instability would allow for a better understanding of which women are most likely to experiences risks for infertility, and under what circumstances. For example, a bisexual-identified youth who leaves home to stay with friends after experiencing family conflict when coming out might be exposed to different health risks than a peer who is evicted from her home, lives on the street, and engages in survival sex in order to earn money. Accounting for the motivations surrounding young women's departures from home in future research would allow collection of information that could inform interventions for at risk youth and their families.

Finally, it could be important to include women's desire and intention to become pregnant in future models assessing risk for infertility. It is possible that women who experience certain risks for infertility are also less desirous of having children. For example, lesbian women are somewhat less likely to report wanting children than heterosexual peers (Riskind & Patterson, 2004)—perhaps the few women reporting risk for infertility in that group in this study also do not express desire or intention to become pregnant. Of course, desire and intention to become pregnant are not always fixed attitudes. There is evidence to suggest that some women change their minds about having children throughout their lifetimes (Aquilno, Lober, & Losch, 2005), as well as some indication that lesbian couples are more likely to decide to adopt after experiencing difficulty conceiving (in part due to the added financial burdens and lack of medical support often experienced by lesbian women) (Ross, 2006). Infertility is thus perhaps better examined as an intention-dependent condition.

Implications

One of the central implications of the present study is that "infertility" (conceptualized as the inability to become pregnant after a year of unprotected intercourse [ASRM, 2008]), may not be a concept that addresses the needs or actual health experiences of many women. More women in the present study reported experiencing physical risks for infertility than are reported as experiencing infertility each year (ASRM, 2016). Were women in the present study's sample to attempt to become pregnant at the time of survey, it is likely that many would encounter impediments to conception. The Risk for Infertility measure constructed in this study thus indicated that, at any given time, certain groups of women (particularly bisexual women, women with both male and female sexual partners, and Black or White women) are especially at risk for experiencing infertility. However, given that many women may not be diagnosed with infertility

due to the fact that they do not have a regular male sexual partner, the current study suggest that estimates as to rates of infertility in the U.S. may in fact be inaccurate.

This in turn poses a practical question: how should medical practitioners define and diagnose infertility? Integrating the role of intentionality might be a primary requisite to include in future definitions of infertility. It is not expressly indicated in the contemporary definition of infertility that a woman must be aiming to become pregnant in order to be diagnosed with impaired fecundity. Instead it is implied that a woman who has unprotected heterosexual intercourse for a year is attempting to achieve pregnancy. Including women's desires and intentions to become pregnant as a central component of the definition of infertility might not only more accurately apply the diagnosis to women for whom biological reproduction is actually an important endeavor, it would also include those women without a regular heterosexual sexual partner (be they single, in a same-sex partnership, or otherwise). Explicit recognition of desire and intention to become pregnant in the definition of infertility might also allow greater recognition of the psychological aspect of infertility on women's health. Such consideration might promote more attention to the psychological problems experienced by the many women of all identities who experience difficulty conceiving (Bell, 2014).

Following an assessment of desires and/or intentions to become pregnant, infertility could be more readily determined via the many potential avenues for risk in conjunction with some of the previously discussed hormonal tests. By considering a woman's risk for infertility as quantified in this study (with special consideration to her sexual identity, sexual behavior, race, and/or experiences of adolescent housing instability—all of which might serve as indicators to augmented risk) along with her intentions to become pregnant and a biological marker for fertility, physicians may be better able to serve a patient's needs. The contemporary diagnosis of

infertility may be a shortcut in diagnosing many women, but given the growing number of women who openly identify as a member of a sexual minority (and potentially are engaging in same-sex partnerships on the pathway to parenthood), it is important to consider alternative family formation experiences in reproductive health domains. Shifts in medical diagnoses in turn could affect how many health insurance companies determine coverage for fertility services. Tangentially, as transgender issues become more germane in the public sphere, it is important to recognize and consider the future of reproductive medicine and the role of infertility for a growing number of women with special circumstances or impediments on their pathways to parenthood. Modifying the definition of infertility to be more inclusive of women who may require alternative pathways to parenthood could initiate systemic change in how women experience reproductive opportunity. The simple reframing of infertility in this way might be an initial step to reducing systemic disparities noted by the theory of stratified reproduction (Colen, 1986).

A secondary point of consideration from this study is relevant to women's experiences of early adolescent housing instability. While many homeless youth or LGBTQ youth intervention efforts focus (understandably) on urgent, immediate risks to youth health and development, it may be worth considering the long-term impact of adolescent housing instability on seemingly unrelated health experiences. The long-term risks associated with living away from home—even temporarily—may not be immediately apparent to parents or guardians of affected youth. Appeals to youths' long-term and/or reproductive health may encourage more families to consider providing protective environments (especially for their bisexual-identifying) young women. Furthermore, those women whose personal histories include adolescent housing instability may not be aware of how associated health experiences and behaviors may affect their

future family planning. Including questions about adolescent housing experience, sexuality, and experience with risks for infertility in regular health assessments might promote early intervention that would improve the success of women's family planning and opportunity. It is of course paramount that researchers, care providers, and policy makers do not reduce a woman's health to her reproductive capacity. However, especially given public health efforts aimed at informing young women about ways to *prevent* pregnancy (Bell, 2014), it may be important for the many women planning to (eventually) pursue biological reproduction that they also remain consistently informed of the indicators of their ability to do so.

Finally, the seminal nature of much of the work presented here, especially in respect to the health experiences of lesbian and bisexual women, illustrates the importance of inclusive and expanded health and social experience data collection on a national level. Recently (March, 2017) several U.S. government organizations announced changes in their national data collection initiatives that eliminate or reduce the prominence of questions about lesbian, gay, bisexual, and transgender people on multiple major surveys (Sedensky, 2017). These changes in data collection are troubling. Federal data on sexual minority individuals are already scarce; though the Centers for Disease Control and Prevention have been administering the NSFG every few years since the 1970s, only the cycles since 2001 have included questions about sexual identity. Neglecting to recognize sexual identity in surveys of health and social experiences will not erase those individuals' health needs; instead researchers, medical professionals, social workers, and policy makers will no longer have the tools with which to identify those most likely to suffer public health risk among their constituents. If such restrictive trends in data collection continue, it may be that the findings reported in the present study will be the most recent and inclusive for some time.

Conclusion

Infertility can be a distressing experience for many women, and some women are more likely than others to encounter difficulties when trying to become pregnant. There are many different risks for infertility, and the most common types of risk—including a history of sexually transmitted infections or reproductive illnesses, alcohol consumption, tobacco use, and extreme BMI—are experienced among women at very disparate rates. In this nationally representative study, both Black and White women, women with both same-sex and opposite-sex sexual partners, and women who identified as bisexual were found to have higher risks for infertility than their peers. While women's sexual behavior and race were generally the clearest indicators of risks for infertility, women who identified as members of sexual minority also faced many of the same risks as their behaviorally comparable counterparts. That is to say, despite a medical framework of infertility that does not necessarily consider or allow for the inclusion of those women in its definition, women who identified as lesbian and bisexual experienced risks for infertility. The findings of this study are important because they document the varying degrees of risk for infertility that women experience—even when they might not normally be considered candidates for the diagnosis. Future research may further illuminate how sexual behavior, sexual identity, and race interact in women's reproductive heath experiences, and may continue to expand the infertility narrative so as to include a broader range of women's health experiences.

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Table 1.
Participants' race as a function of sexual identity (within group percentages reflect weighted estimates).

	Sexual Identity									
	Heterosexual		Lesbian		Bisexual					
Race	N	*% within race*	N	*% within race*	N	*% within race*	Total (N)	X^2	*df*	*p*
White	2289	92.6%	37	1.2%	191	6.2%	2517			
Black	1090	92.9%	22	1.8%	79	5.3%	1191	3.47	4	*n.s.*
Hispanic	1183	93.8%	17	0.9%	82	5.3%	1282			
Total	4562	92.9%	76	1.8%	352	5.3%	4990			

Table 2.
Demographic characteristics of study sample, (N = 4990); percentages reflect weighted estimates.

	n	%	*M*	*SD*
Age			28.67	8.46
Race				
White	2517	64%		
Black	1191	16%		
Hispanic	1282	20%		
Education (years)			13.01	2.69
Sexual Orientation				
Heterosexual	4562	93%		
Lesbian	76	1%		
Bisexual	352	6%		
Mother's Education Level				
Some high school or less	1190	21%		
High school grad	1505	31%		
Some college/2 year degree	1288	27%		
College grad or more	962	20%		
Household income			$40,607	$30,473

Table 3.
Participants' race as a function of sexual behavior (within group percentages reflect weighted estimates).

	Sexual Behavior									
	Male Partners Only		Female Partners Only		Both partners					
Race	*N*	*% within race*	*N*	*% within race*	*N*	*% within race*	Total (N)	X^2	*df*	*p*
White	1753	80.0%	12	0.6%	513	19.4%	2278			
Black	863	81.1%	14	1.2%	210	17.7%	1087	32.5	4	<.001
Hispanic	951	88.0%	11	1.0%	169	11.0%	1131			
Total	3567	81.7%	37	0.8%	892	17.5%	4496			

Table 4.
Participants' sexual orientation as a function of sexual behavior (within group percentages reflect weighted estimates).

	Sexual Behavior									
	Male Partners Only		Female Partners Only		Both partners					
Sexual Identity	*N*	*% within identity*	*N*	*% within identity*	*N*	*% within identity*	Total (N)	X^2	*df*	*p*
Heterosexual	3526	87.1%	6	0.2%	564	12.8%	4096			
Lesbian	2	2.1%	17	34.2%	53	63.7%	72	1647.39	4	<.001
Bisexual	39	16.4%	14	2.9%	275	80.7%	328			
Total	3567	81.7%	37	0.8%	892	17.5%	4496			

Table 5.
Sexually transmitted infections as a function of sexual identity and race (subgroup percentages reflect weighted estimates).

		Sexually Transmitted Infection									
		Gonorrhea		Chlamydia		Herpes		Genital Warts		Syphilis	
Sexual Identity & Race		N	%	N	%	N	%	N	%	N	%
Heterosexual	White	11	0.3%	29	0.9%	92	2.3%	278	11.1%	5	0.2%
	Black	26	1.6%	44	2.8%	48	4.0%	83	8.3%	11	1.0%
	Hispanic	9	1.2%	18	1.4%	24	1.2%	81	7.1%	6	0.5%
Lesbian	White	1	2.1%	1	2.1%	1	2.1%	3	7.6%	1	2.7%
	Black	0	0.0%	0	0.0%	0	0.0%	1	2.2%	0	0.0%
	Hispanic	0	0.0%	0	0.0%	0	0.0%	1	4.6%	1	5.9%
Bisexual	White	4	2.1%	8	2.9%	11	8.3%	27	13.6%	4	2.1%
	Black	4	3.1%	4	3.3%	4	5.6%	5	9.4%	2	2.5%
	Hispanic	4	2.4%	7	11.2%	5	4.8%	8	9.3%	0	0.0%
X^2 Race:		24.96***		24. 21***		10.22**		35.53***		*n.s.*	
X^2 Sexual Identity:		12.33**		17.69***		*n.s.*		*n.s.*		13.48**	

Notes: $X^2(2, 4990)$ for all cells; *$p < .05$, ** $p < .01$, *** $p < .001$

Table 6.
Sexually transmitted infections as a function of sexual behavior and race (subgroup percentages reflect weighted estimates).

		Sexually Transmitted Infection									
		Gonorrhea		Chlamydia		Herpes		Genital Warts		Syphilis	
Sexual Behavior & Race		N	%	N	%	N	%	N	%	N	%
Male Partners Only	White	7	0.2%	21	0.6%	65	4.6%	206	10.9%	4	0.1%
	Black	23	1.8%	36	3.1%	33	3.6%	64	8.3%	7	0.5%
	Hispanic	8	1.1%	16	1.6%	16	0.1%	66	7.4%	5	0.4%
Female Partners Only	White	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	Black	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	Hispanic	1	3.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Both Partners	White	8	1.2%	16	3.1%	37	5.7%	101	17.7%	5	0.5%
	Black	6	1.7%	11	2.8%	18	7.6%	25	12.8%	6	2.5%
	Hispanic	2	2.7%	7	6.0%	12	10.0%	24	13.1%	2	0.8%
X^2 Race:		25.38***		23.86***		9.49**		34.10***		*n.s.*	
X^2 Sexual Behavior:		*n.s.*		8.87**		35.96***		13.49**		11.57**	

Notes: $X^2(2, 4496)$ for all cells; *$p < .05$, ** $p < .01$, *** $p < .001$

Table 7.
Cumulative STI experience as a function of sexual identity and race vs. sexual behavior and race (subgroup percentages reflect weighted estimates).

		1+ STIs				1+ STIs	
Sexual Identity & Race		N	%	Sexual Behavior & Race		N	%
Heterosexual	White	357	14.4%	Male Partners Only	White	260	14.1%
	Black	160	14.4%		Black	118	13.9%
	Hispanic	111	9.3%		Hispanic	90	9.3%
Lesbian	White	3	7.6%	Female Partners Only	White	0	0.0%
	Black	1	2.2%		Black	0	0.0%
	Hispanic	2	8.3%		Hispanic	1	3.2%
Bisexual	White	36	17.3%	Both Partners	White	134	23.1%
	Black	14	17.9%		Black	55	23.5%
	Hispanic	20	23.7%		Hispanic	39	25.0%
X^2 Race:		20.57***				19.61***	
X^2 Sexual Identity/ Behavior:		12.56**				88.97***	

Notes: $X^2(2, 4990)$ for all sexual identity cells, $X^2(2, 4496)$ for all sexual behavior cells; *$p < .05$, ** $p < .01$, *** $p < .001$

Table 8.
Reproductive illnesses as a function of sexual identity and race (subgroup percentages reflect weighted estimates).

		Reproductive Illness									
		PID		Endometriosis		Ovarian Cancer		Cervical Cancer		Endometrial Cancer	
Sexual Identity & Race		N	%	N	%	N	%	N	%	N	%
Heterosexual	White	88	3.5%	156	6.2%	12	0.5%	48	2.0%	5	0.2%
	Black	59	4.0%	46	5.5%	2	0.1%	8	0.5%	0	0.0%
	Hispanic	31	3.0%	27	2.8%	0	0.0%	10	0.8%	1	0.0%
Lesbian	White	1	2.1%	4	12.0%	0	0.0%	1	1.8%	0	0.0%
	Black	0	0.0%	2	5.7%	0	0.0%	0	0.0%	0	0.0%
	Hispanic	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Bisexual	White	18	9.5%	0	10.5%	0	0.0%	2	0.6%	3	5.6%
	Black	7	5.4%	15	3.0%	1	0.4%	2	1.2%	0	0.0%
	Hispanic	6	8.9%	1	1.5%	1	9.0%	3	2.9%	0	0.0%
X^2 Race:		10.82**		24.21***		5.67***		10.13**		*n.s.*	
X^2 Sexual Identity:		21.11**		40.92***		*n.s.*		*n.s.*		9.57**	

Notes: $X^2(2, 4990)$ for all cells; *$p < .05$, ** $p < .01$, *** $p < .001$

Table 9.
Reproductive illnesses as a function of sexual behavior and race (subgroup percentages reflect weighted estimates).

		Reproductive Illness									
		PID		Endometriosis		Ovarian Cancer		Cervical Cancer		Endometrial Cancer	
Sexual Behavior & Race		N	%	N	%	N	%	N	%	N	%
Male Partners Only	White	67	3.7%	127	6.4%	9	2.0%	35	1.7%	2	0.2%
	Black	52	4.5%	32	5.8%	2	5.0%	7	0.6%	0	0.0%
	Hispanic	28	3.4%	23	2.8%	0	80.0%	9	0.7%	1	0.1%
Female Partners Only	White	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	Black	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	Hispanic	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Both Partners	White	40	6.4%	45	9.0%	2	0.6%	16	3.6%	6	2.3%
	Black	14	4.1%	12	5.0%	0	1.2%	3	0.6%	0	0.0%
	Hispanic	9	5.4%	7	4.6%	1	2.9%	4	3.2%	0	0.0%
X^2 Race:		9.77**		40.67***		*n.s.*		10.21**		*n.s*	
X^2Sexual Behavior:		15.96***		7.41*		*n.s.*		*n.s.*		12.47**	

Notes: $X^2(2, 4496)$ for all cells; *$p < .05$, ** $p < .01$, *** $p < .001$

Table 10.
Reduced reproductive illness factor as a function of sexual identity and race vs. sexual behavior and race (subgroup percentages reflect weighted estimates).

		1+ Reproductive Illness				1+ Reproductive Illness	
Sexual Identity & Race		N	%	Sexual Behavior & Race		N	%
Heterosexual	White	267	10.9%	Male Partners Only	White	210	11.1%
	Black	102	9.4%		Black	83	10.3%
	Hispanic	64	5.6%		Hispanic	56	5.8%
Lesbian	White	6	15.9%	Female Partners Only	White	0	0.0%
	Black	2	5.7%		Black	0	0.0%
	Hispanic	0	0.0%		Hispanic	0	0.0%
Bisexual	White	30	19.1%	Both Partners	White	89	17.5%
	Black	9	9.2%		Black	25	8.7%
	Hispanic	11	12.1%		Hispanic	19	12.7%
X^2 Race:			36.88***				20.57***
X^2 Sexual Identity/Behavior:			8.22*				34.22***

Notes: $X^2(2, 4990)$ for all sexual identity cells, $X^2(2, 4496)$ for all sexual behavior cells; *$p < .05$, ** $p < .01$, *** $p < .001$

Table 11. Alcohol consumption as a function of sexual identity (subgroup percentages reflect weighted estimates).

		Alcohol Consumption			
		14 drinks/week or less		More than 14 drinks/week	
Sexual Identity & Race		N	%	N	%
Heterosexual	White	2238	98.3%	51	1.7%
	Black	1071	99.1%	16	0.9%
	Hispanic	1148	98.0%	35	2.0%
Lesbian	White	34	94.7%	3	5.3%
	Black	22	100.0%	0	0.0%
	Hispanic	14	67.1%	3	32.9%
Bisexual	White	181	96.0%	10	4.0%
	Black	77	98.0%	2	2.0%
	Hispanic	78	93.1%	4	6.9%
X^2 Race:		8.01*			
X^2 Sexual Identity:		13.68**			

Notes: $X^2(2, 4990)$ for all cells; *$p < .05$, ** $p < .01$, *** $p < .001$

Table 12. Alcohol consumption as a function of sexual behavior (subgroup percentages reflect weighted estimates).

		Alcohol Consumption			
		14 drinks/week or less		More than 14 drinks/week	
Sexual Behavior & Race		N	%	N	%
Male Partners Only	White	1712	98.4%	41	1.6%
	Black	853	99.1%	10	0.8%
	Hispanic	920	97.4%	31	2.6%
Female Partners Only	White	12	100.0%	0	0.0%
	Black	14	100.0%	0	0.0%
	Hispanic	10	73.1%	1	26.9%
Both Partners	White	491	95.9%	22	4.1%
	Black	202	97.1%	8	2.9%
	Hispanic	160	94.2%	9	5.8%
X^2 Race:			8.19*		
X^2 Sexual Behavior:			10.78**		

Notes: $X^2(2, 4496)$ for all sexual behavior cells; *$p < .05$, ** $p < .01$, *** $p < .001$

Table 13.
Tobacco smoking as a function of sexual identity (subgroup percentages reflect weighted estimates).

		Tobacco Use							
		Never Smoked		Previous Smoker[1]		≤ Median Daily Cigs.[2]		> Median Daily Cigs.[2]	
Sexual Identity & Race		N	%	N	%	N	%	N	%
Heterosexual	White	1366	60.9%	255	11.7%	475	19.8%	193	7.6%
	Black	859	79.1%	47	28.8%	153	12.0%	29	2.8%
	Hispanic	959	81.1%	81	36.9%	128	10.3%	15	1.6%
Lesbian	White	20	65.7%	1	4.1%	8	11.4%	8	21.5%
	Black	15	67.3%	1	12.2%	4	22.7%	2	6.0%
	Hispanic	8	67.2%	2	31.0%	6	19.6%	1	3.1%
Bisexual	White	78	39.7%	24	24.7%	55	28.5%	34	16.9%
	Black	44	56.3%	8	36.5%	21	22.4%	6	5.3%
	Hispanic	57	73.6%	3	6.7%	19	20.9%	3	3.7%
X^2 Race:					280.13***				
X^2 Sexual Identity:					71.91***				

Notes: $X^2(6, 4990)$ for all cells; *$p < .05$, ** $p < .01$, *** $p < .001$
[1]Previously a smoker if reported having smoked 100+ cigarettes in lifetime, but report smoking 0 cigarettes in the 12 months
[2]Current smokers' average (median) number of cigarettes smoked per day = 10

Table 14.
Tobacco smoking as a function of sexual behavior (subgroup percentages reflect weighted estimates).

		Tobacco Use							
		Never Smoked		Previous Smoker[1]		≤ Median Daily Cigs.[2]		> Median Daily Cigs.[2]	
Sexual Behavior & Race		N	%	N	%	N	%	N	%
Male Partners Only	White	1048	61.7%	210	12.8%	357	18.7%	138	6.8%
	Black	670	79.3%	41	5.9%	132	12.5%	19	2.3%
	Hispanic	769	81.2%	72	7.6%	97	9.5%	13	1.7%
Female Partners Only	White	10	91.5%	0	0.0%	2	8.5%	0	0.0%
	Black	13	96.8%	0	0.0%	1	3.2%	0	0.0%
	Hispanic	9	89.3%	0	0.0%	2	10.7%	0	0.0%
Both Partners	White	174	32.5%	66	13.1%	176	35.5%	97	19.3%
	Black	136	12.6%	13	12.6%	43	18.6%	18	7.9%
	Hispanic	95	56.9%	14	6.8%	54	32.9%	6	3.5%
X^2 Race:						489.61***			
X^2 Sexual Behavior:						218.28***			

Notes: $X^2(6, 4496)$ for all cells; *$p < .05$, ** $p < .01$, *** $p < .001$
[1]Previously a smoker if reported having smoked 100+ cigarettes in lifetime, but report smoking 0 cigarettes in the 12 months
[2]Current smokers' average (median) number of cigarettes smoked per day = 10

Table 15.
BMI as a function of sexual identity (subgroup percentages reflect weighted estimates).

		BMI					
		"Normal" BMI		Slightly Over/Underweight		Very Over/Underweight	
Sexual Identity & Race		N	%	N	%	N	%
Heterosexual	White	1174	51.8%	507	24.0%	608	24.4%
	Black	421	41.9%	229	21.1%	440	36.8%
	Hispanic	561	25.6%	289	25.5%	333	29.0%
Lesbian	White	14	43.4%	10	22.4%	13	34.2%
	Black	11	56.0%	5	23.5%	6	20.5%
	Hispanic	6	53.3%	4	16.7%	7	29.9%
Bisexual	White	103	27.9%	38	26.6%	50	25.4%
	Black	38	42.0%	18	31.4%	23	26.6%
	Hispanic	44	55.6%	15	18.9%	23	25.4%
X^2 Race:				71.56***			
X^2 Sexual Identity:				5.09*, n.s*			

Notes: $X^2(4, 4990)$ for all cells; *$p < .05$, ** $p < .01$, *** $p < .001$

Table 16.
BMI as a function of sexual behavior (subgroup percentages reflect weighted percentages).

		BMI					
		"Normal" BMI		Slightly Over/Underweight		Very Over/Underweight	
Sexual Behavior & Race		N	%	N	%	N	%
Male Partners Only	White	859	48.9%	415	26.7%	479	24.4%
	Black	304	38.9%	191	22.9%	368	38.2%
	Hispanic	400	41.2%	253	26.7%	298	32.1%
Female Partners Only	White	7	81.5%	2	5.1%	3	13.3%
	Black	11	87.6%	2	9.2%	1	3.2%
	Hispanic	8	61.0%	0	0.0%	3	38.9%
Both Partners	White	219	39.7%	130	23.9%	164	36.4%
	Black	75	34.1%	54	29.9%	81	43.2%
	Hispanic	65	43.4%	51	32.7%	53	24.0%
X^2 Race:				37.30***			
X^2 Sexual Behavior:				30.63***			

Notes: $X^2(4, 4496)$ for all cells; *$p < .05$, ** $p < .01$, *** $p < .001$

Table 17.
Adolescent housing instability as a function of sexual identity and race (subgroup percentages reflect weighted percentages).

Sexual Identity & Race		Adolescent Housing Instability N	Adolescent Housing Instability %
Heterosexual	White	437	17.2%
	Black	242	20.9%
	Hispanic	280	23.1%
Lesbian	White	11	24.2%
	Black	2	12.1%
	Hispanic	2	13.5%
Bisexual	White	65	34.5%
	Black	30	40.3%
	Hispanic	25	31.8%
X^2 Race:		7.32*	
X^2 Sexual Identity:		32.56***	

Notes: $X^2(2, 4982)$ for all cells; *$p < .05$, ** $p < .01$, *** $p < .001$

Table 18.
Adolescent housing instability as a function of sexual behavior and race (subgroup percentages reflect weighted percentages).

Sexual Behavior & Race		Adolescent Housing Instability N	Adolescent Housing Instability %
Male Partners Only	White	327	16.5%
	Black	187	19.8%
	Hispanic	251	25.4%
Female Partners Only	White	2	8.5%
	Black	4	19.6%
	Hispanic	2	8.5%
Both Partners	White	177	34.4%
	Black	71	35.6%
	Hispanic	47	27.2%
X^2 Race:		7.48*	
X^2 Sexual Behavior:		53.29***	

Notes: $X^2(2, 4490)$ for all cells; *$p < .05$, ** $p < .01$, *** $p < .001$

Table 19. *Risk for Infertility Scores as a function of race, sexual identity, and sexual behavior.*

		Risk for Infertility Score					Risk for Infertility Score		
Sexual Identity & Race		N	*M*	*SD*	Sexual Behavior & Race		N	*M*	*SD*
Heterosexual	White	2289	0.14	0.12	Male Partners Only	White	1753	0.14	0.12
	Black	1090	0.13	0.12		Black	863	0.14	0.11
	Hispanic	1183	0.12	0.11		Hispanic	951	0.12	0.11
Lesbian	White	37	0.17	0.17	Female Partners Only	White	12	0.04	0.10
	Black	22	0.11	0.14		Black	14	0.02	0.06
	Hispanic	17	0.19	0.11		Hispanic	11	0.15	0.09
Bisexual	White	191	0.19	0.13	Both Partners	White	513	0.21	0.13
	Black	79	0.15	0.12		Black	210	0.17	0.13
	Hispanic	82	0.14	0.14		Hispanic	169	0.16	0.12
F Race:			26.07***					21.25***	
F Sexual Identity/Behavior:			15.74***					82.34***	

Notes: $F(2, 4987)$ for all sexual identity cells, $F(2, 4493)$ for all sexual behavior cells; *$p < .05$, ** $p < .01$, *** $p < .001$

Table 20. *Fit indexes for models predicting Risk for Infertility Scores*

Variables in Model	SMSR	CD ($R^{2)}$
1. Housing Instability	<0.01	0.039
2. Race[1]	<0.01	0.004
3. Heterosexual[2]	<0.01	0.007
4. Bisexual[3]	<0.01	0.007
5. Male Only[4]	<0.01	0.036
6. Both[5]	<0.01	0.043
7. Race, Hetero	<0.01	0.011
8. Race, Bisexual	<0.01	0.010
9. Race, Male Only	<0.01	0.039
10. Race, Both	<0.01	0.046
11. Race, Hetero, Housing Instability	<0.01	0.020
12. Race, Bisexual, Housing Instability	<0.01	0.021
13. Race, Male Only, Housing Instability	<0.01	0.054
14. Race, Both, Housing Instability	**<0.01**	**0.061**
15. Race, Hetero, Housing Instability, (Mom's Ed.)[6]	0.03	0.020
16. Race, Bisexual, Housing Instability, (Mom's Ed.)	0.03	0.021
17. Race, Male Only, Housing Instability, (Mom's Ed.)	0.03	0.053
18. Race, Both, Housing Instability, (Mom's Ed.)	0.03	0.060

[1]Race defined in all models as "Non-White" = 1, "White" = 0

[2]Refers to classification of sexual identity as "heterosexual" = 1, "sexual minority" = 0

[3]Refers to classification of sexual identity as "bisexual" = 1, "others" = 0

[4]Refers to classification of sexual behavior as "exclusively male partners" = 1, "others" = 0

[5]Refers to classification of sexual behavior as "both male and female partners" = 1, "others" = 0

[6]Mom's Ed. refers to "mother's education" which was included in models as a covariate

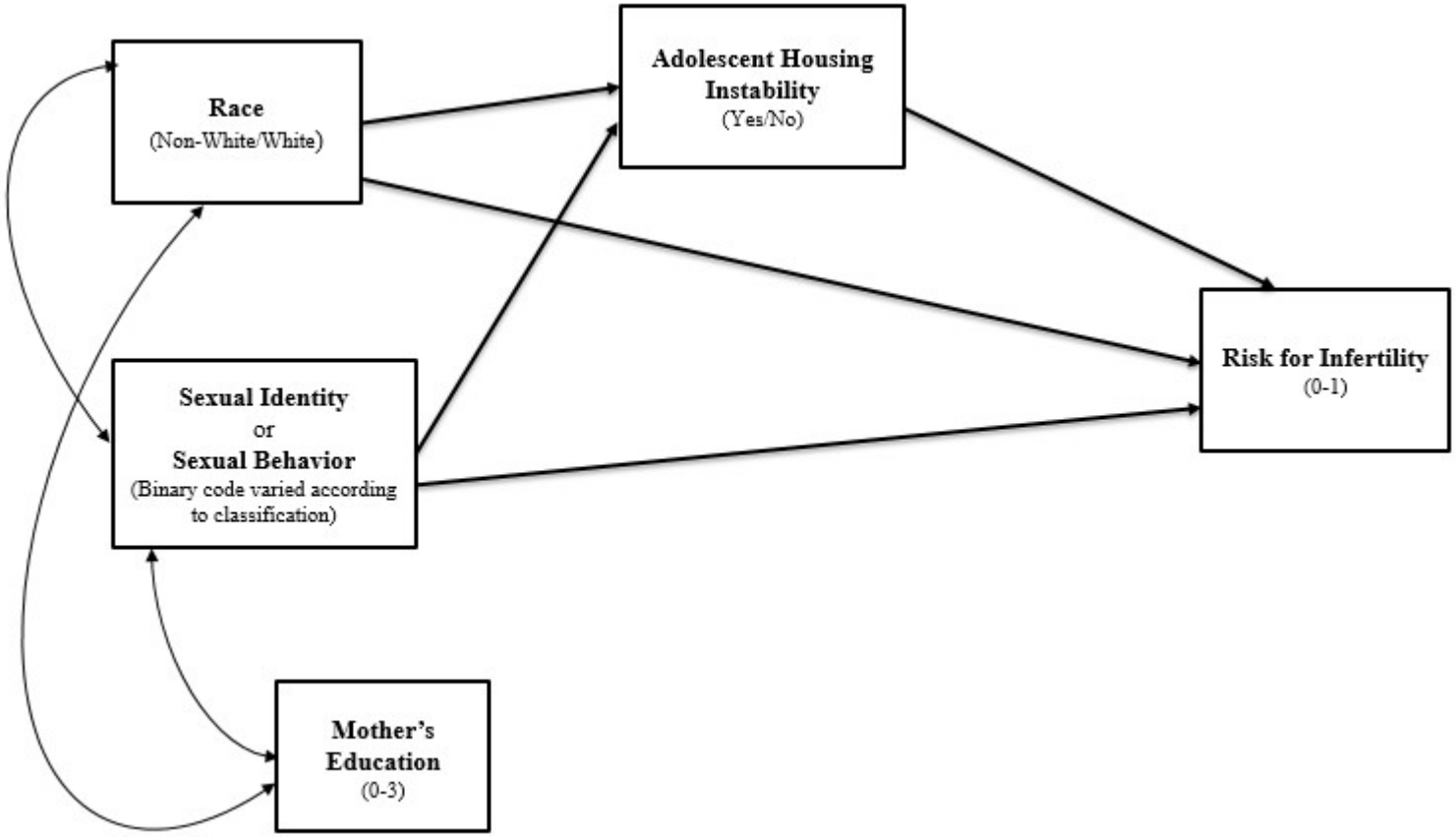


Figure 1. *Path concept applied across all four full models, associating race and sexual identity/behavior with Risk for Infertility (as mediated by adolescent housing situation, and accounting for mother's educational attainment). Models in the study differed as a function of how sexual identity or sexual behavior were classified (always binary).*

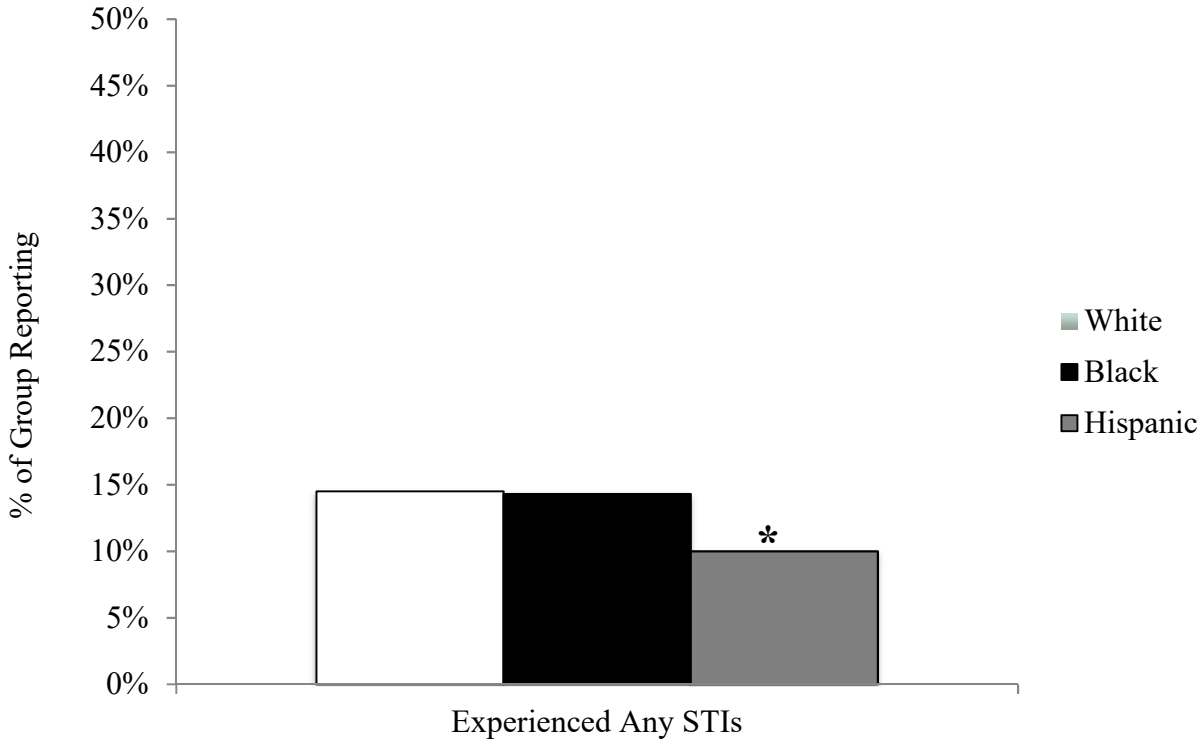


Figure 2. *Percent of women in the sample reporting any STIs as a function of race.*

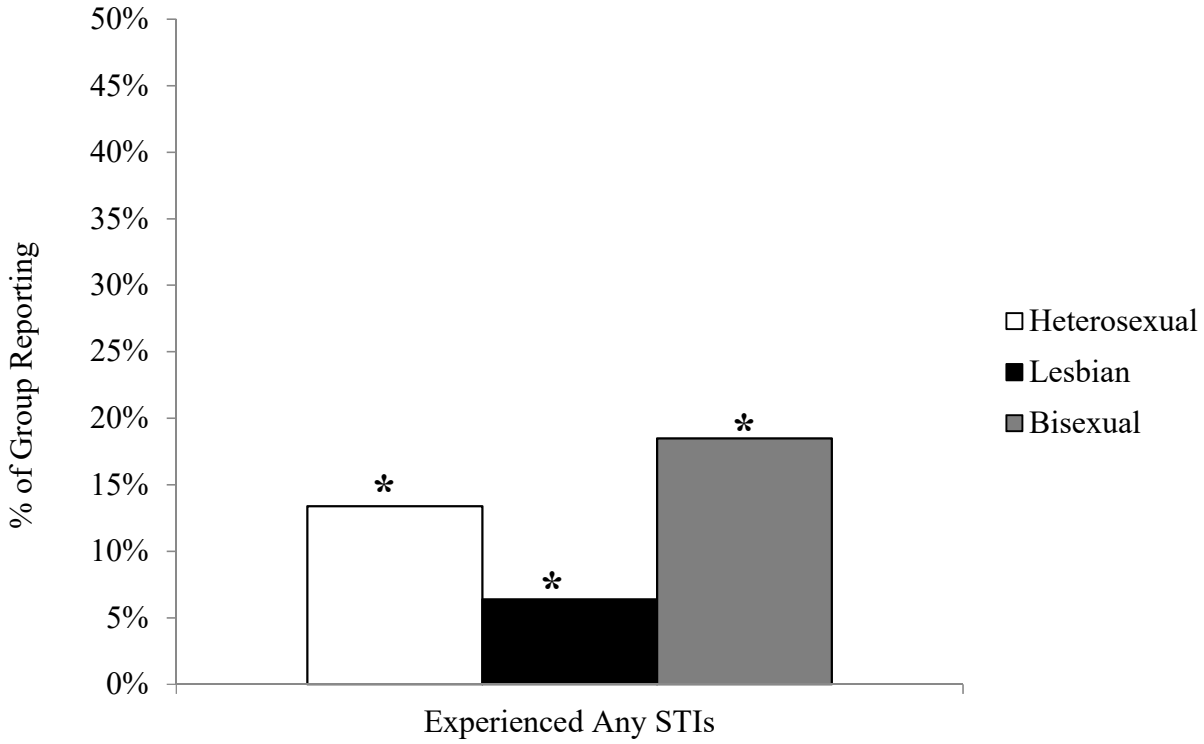


Figure 3. *Percent of women in the sample reporting any STIs as a function of sexual identity.*

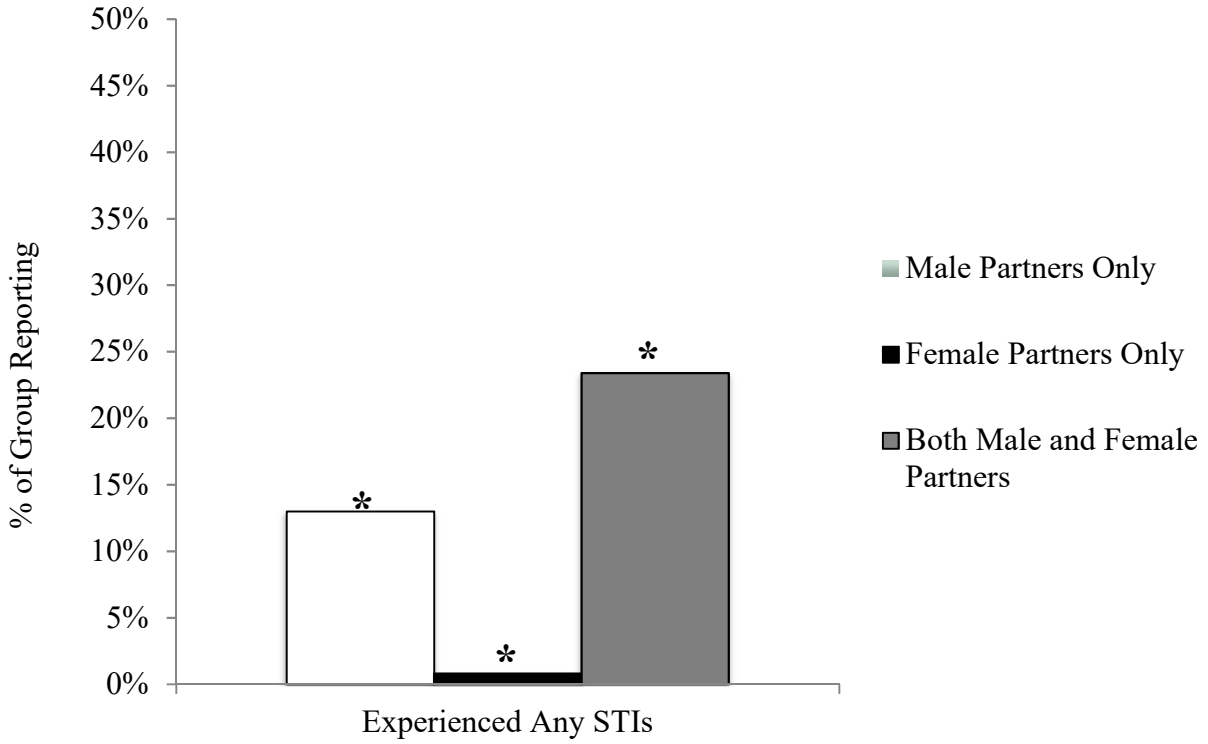


Figure 4. *Percent of women in the sample reporting any STIs as a function of sexual behavior.*

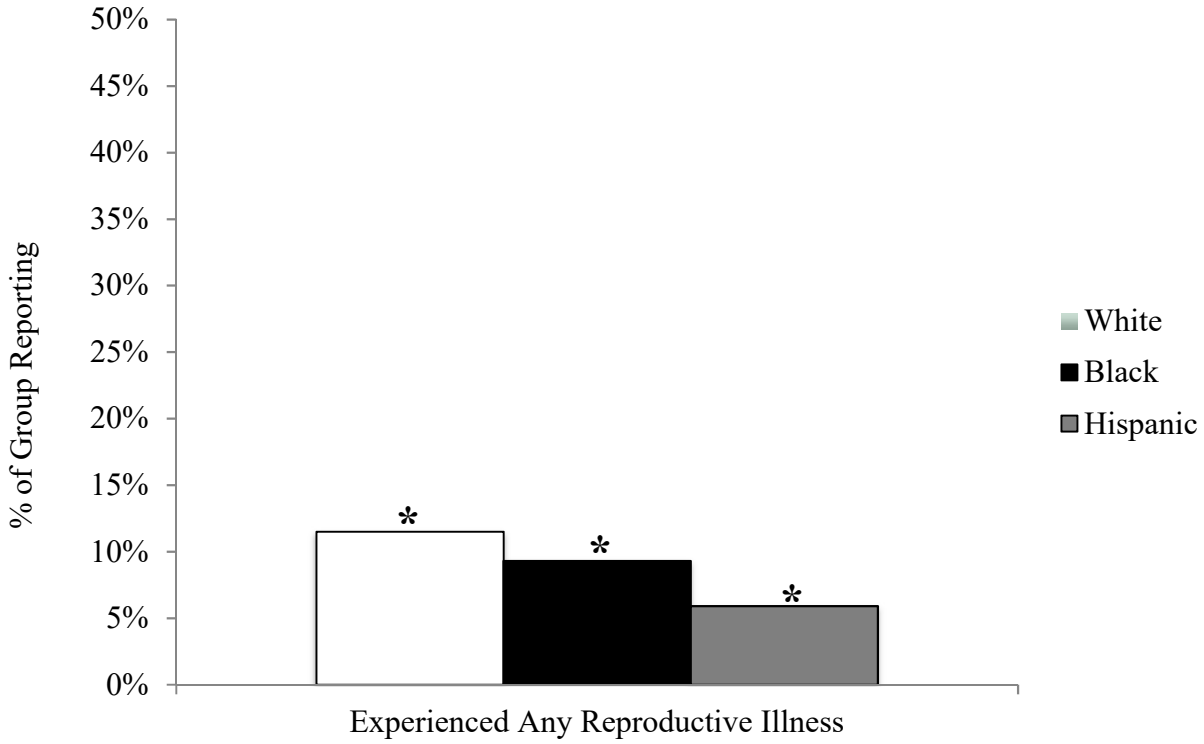


Figure 5. *Percent of women in the sample reporting any reproductive illness as a function of race.*

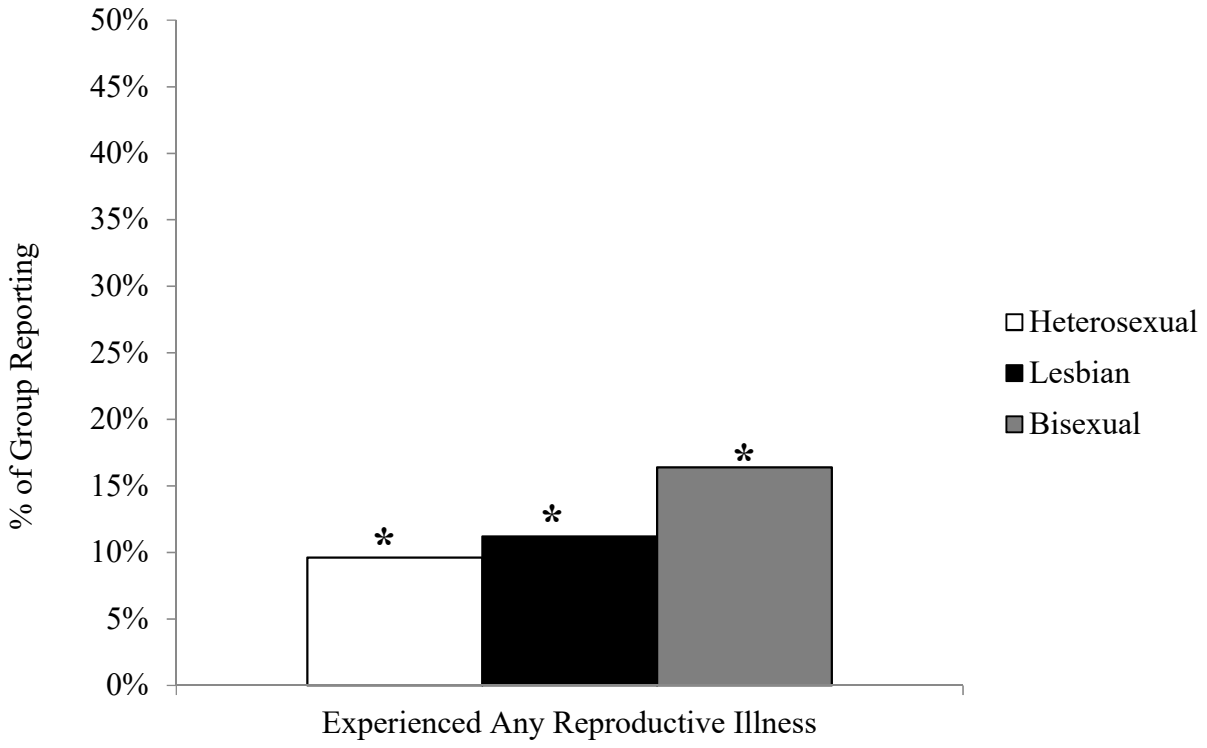


Figure 6. *Percent of women in the sample reporting any reproductive illnesses as a function of sexual identity.*

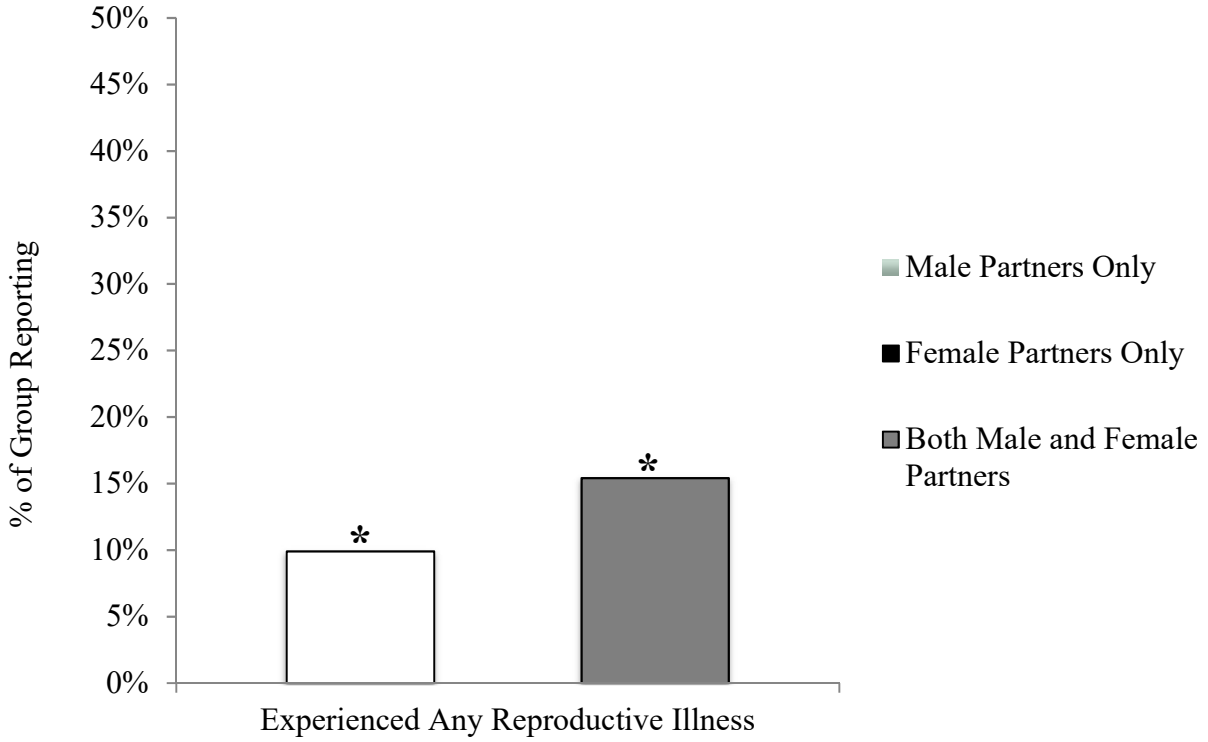


Figure 7. *Percent of women in the sample reporting any reproductive illnesses as a function of sexual behavior.*

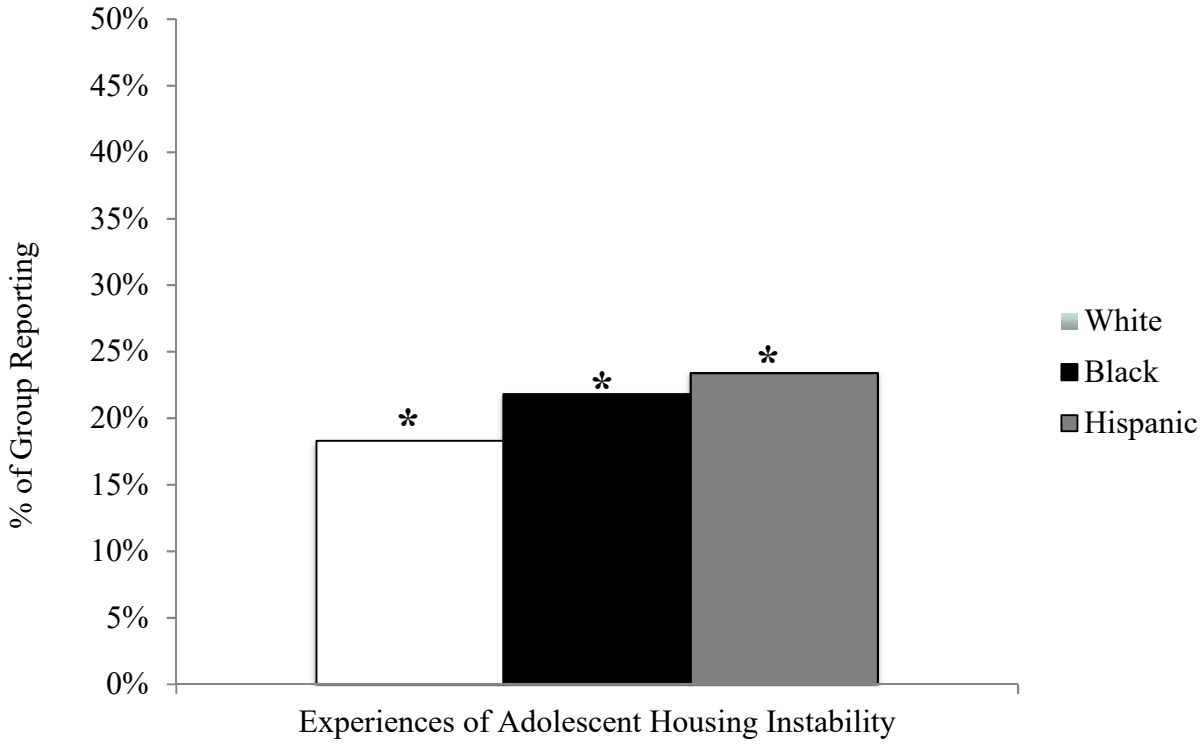


Figure 8. *Percent of women in the sample reporting adolescent housing instability as a function of race.*

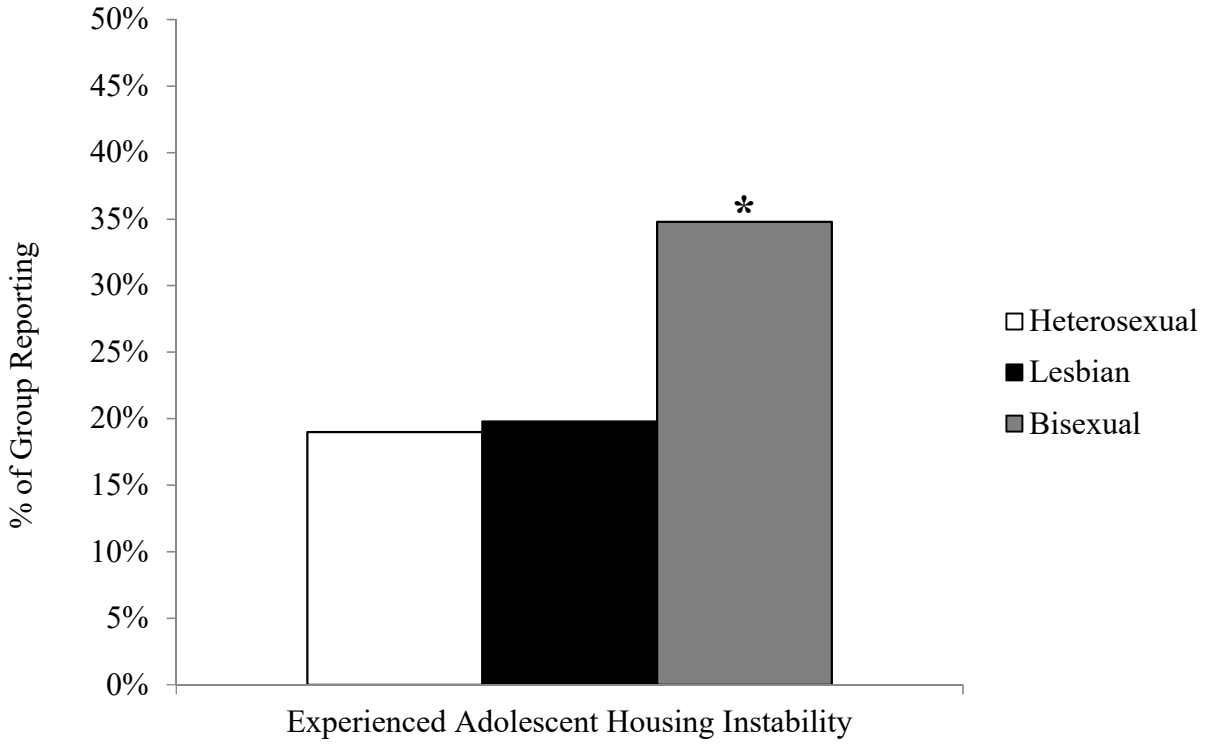


Figure 9. *Percent of women in the sample reporting adolescent housing instability as a function of sexual identity.*

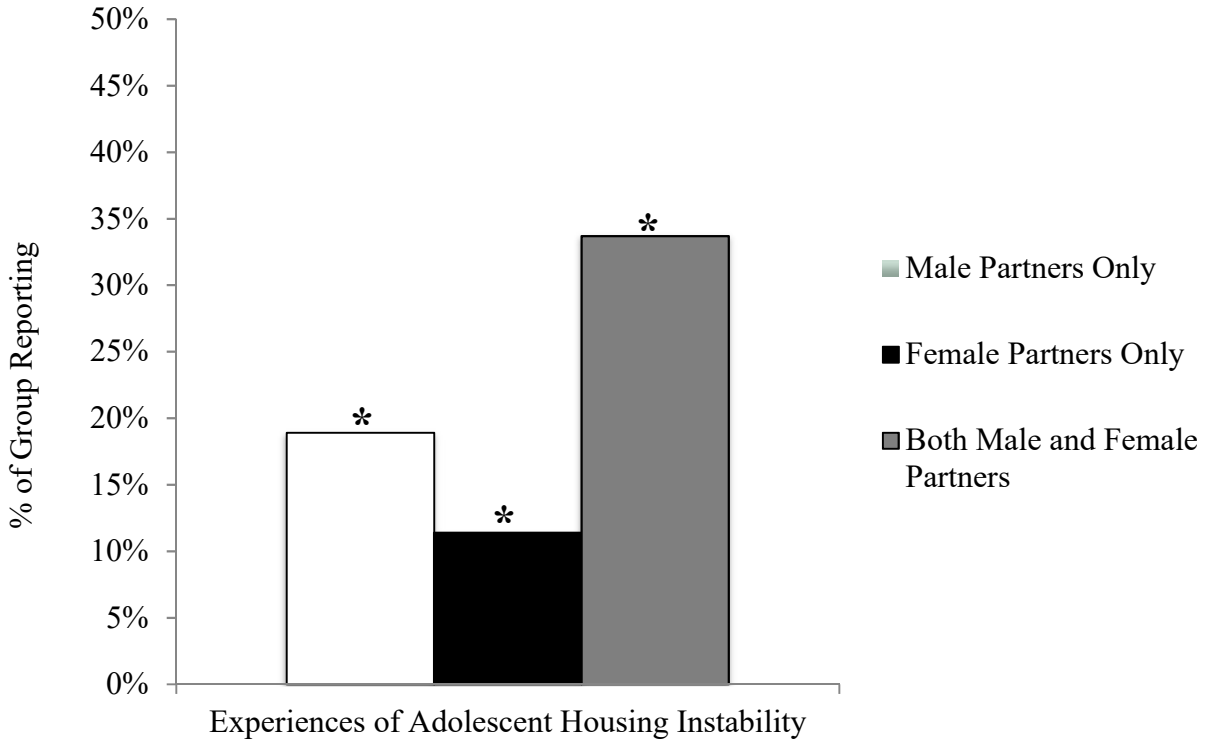
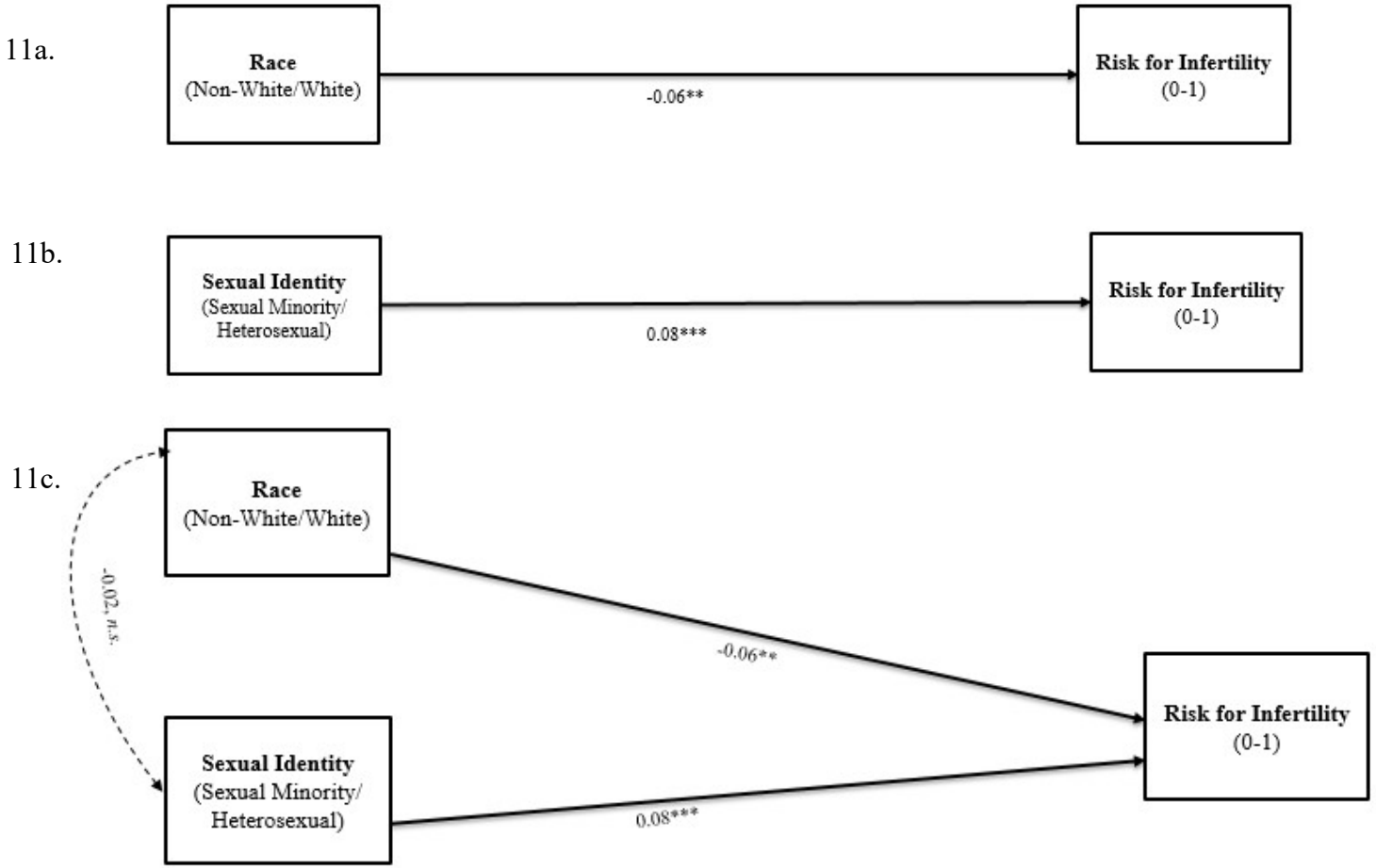


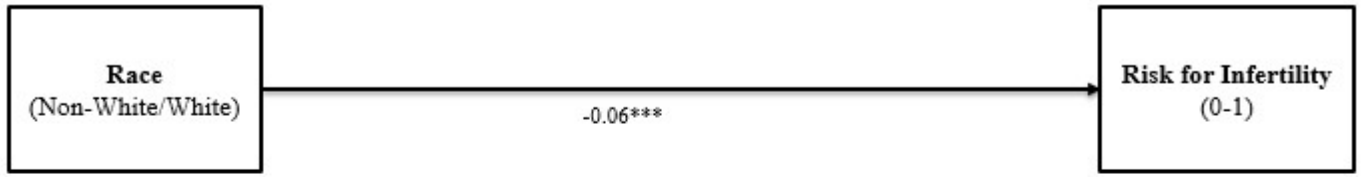
Figure 10. *Percent of women in the sample reporting adolescent housing instability as a function of sexual behavior.*



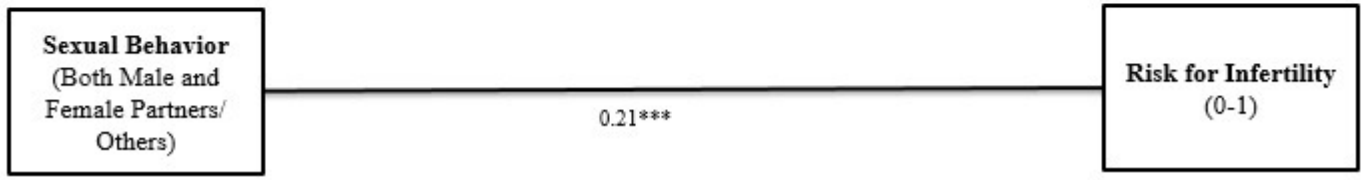
*$p < .05$, ** $p < .01$, *** $p < .001$

Figures 11a-c. *Path models depicting the total effects (11a, 11b) and the joint direct effects 11c) of race (Non-White = 1, White = 0) and sexual identity (Sexual Minority = 1, Heterosexual = 0) on Risk for Infertility. (Results were identical to those with the alternative classification of sexual identity, i.e., Bisexual = 1, Others = 0).*

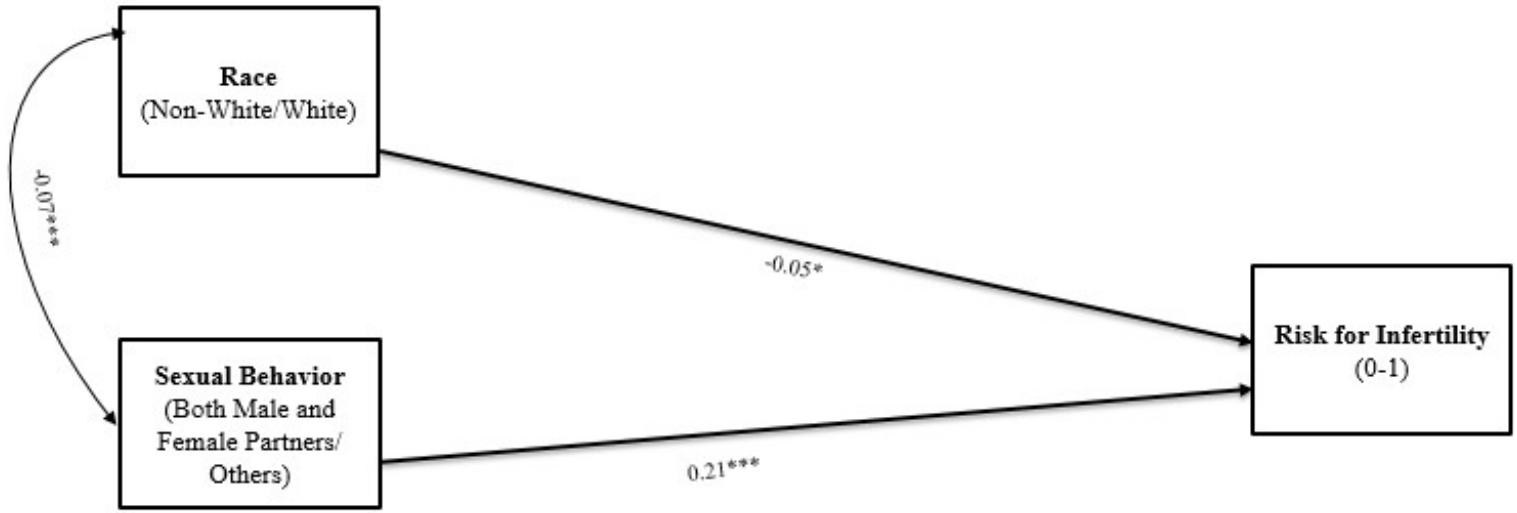
12a.



12b.

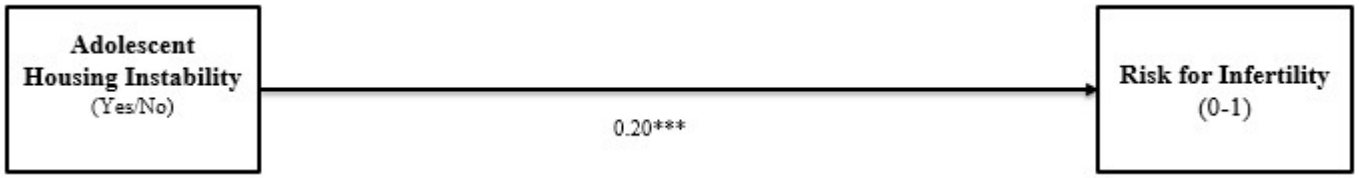


12c.



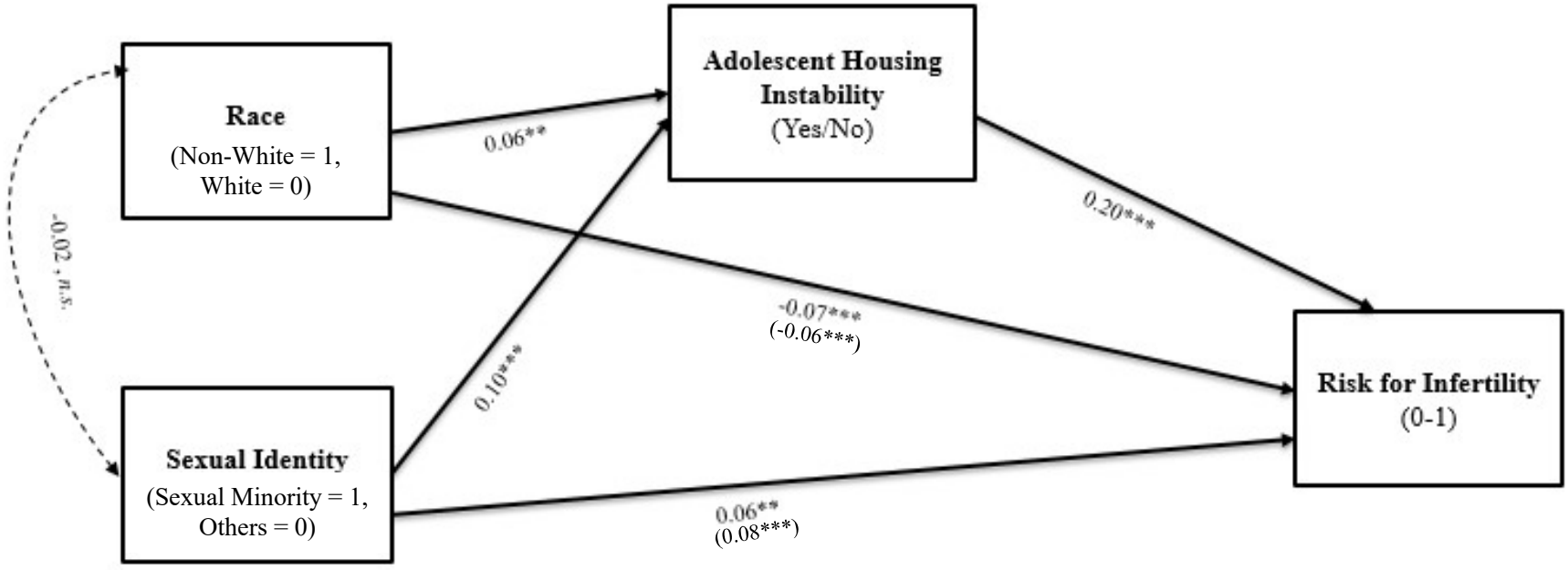
*$p < .05$, ** $p < .01$, *** $p < .001$

Figures 12a-c. *Path models depicting the total effects (12a, 12b) and the joint direct effects (12c) of race (Non-White = 1, White = 0) and sexual behavior (Both Male and Female Partners = 1, Others =0) on Risk for Infertility. (Results were similar to those with the alternative classification of sexual behavior, i.e., Exclusively Male Partners = 1, Others = 0).*



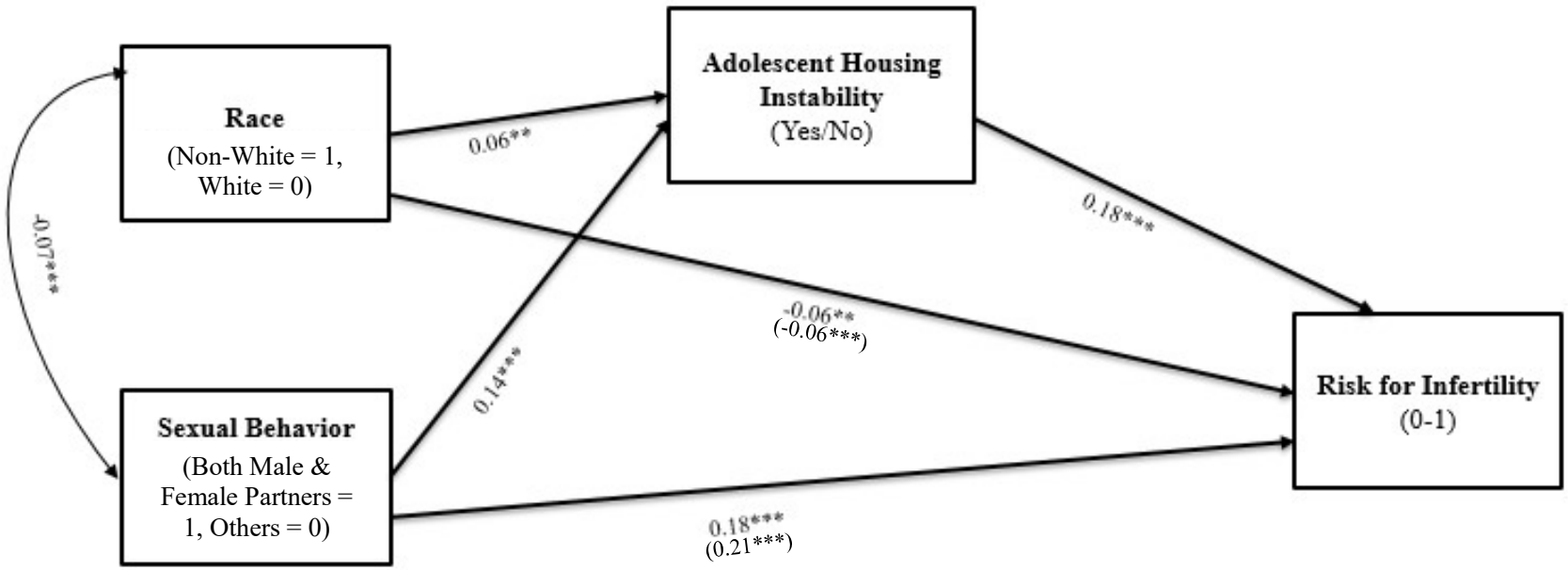
*$p < .05$, ** $p < .01$, *** $p < .001$

Figure 13. *Path model depicting the direct effect of adolescent housing situation on Risk for Infertility.*



Notes: SMSR < 0.01, CD = 0.020; *$p < .05$, ** $p < .01$, *** $p < .001$

Figure 14. *Path model associating race and sexual identity with Risk for Infertility, as mediated by experience of adolescent housing instability (results were similar to those with the alternative classification of sexual identity, i.e., Bisexual = 1, Others = 0).*



Notes: SMSR < 0.01, CD = 0.061; *$p < .05$, ** $p < .01$, *** $p < .001$

Figure 15. *Path model associating race and sexual behavior on Risk for Infertility, as mediated by adolescent housing situation (results were similar to those with the alternative classification of sexual behavior, i.e., Exclusively Male Partners = 1, Others = 0).*