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Relationships Between Sexual Health Knowledge, Self-Efficacy, and Trauma on Sexual Risk-Taking Among Women

by

Danielle C. Richner, M.S.

A dissertation

submitted in partial fulfillment

of the requirements for the degree of

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To the Graduate Faculty:

The members of the committee appointed to examine the dissertation of DANIELLE C. RICHNER find it satisfactory and recommend that it be accepted.

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RE: Study Number IRB-FY2021-168 : Relationships Between Sexual Health Knowledge, Self-Efficacy, and Trauma Among Women

Dear Ms. Richner,

Thank you for your responses to a previous review of the study listed above. These responses are eligible for expedited review under OHRP (DHHS) and FDA guidelines. This is to confirm that I have approved your application.

Notify the HSC of any adverse events. Serious, unexpected adverse events must be reported in writing within 10 business days.

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Sincerely,

Ralph Baergen, PhD, MPH, CIP
Human Subjects Chair

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"At times our own light goes out and is rekindled by a spark from another person. Each of us has cause to think with deep gratitude of those who have lighted the flame within us."
– Albert Schweitzer

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Dissertation Abstract – Idaho State University

Human immunodeficiency virus (HIV) and sexually transmitted disease (STD) infection among women has increased dramatically in recent years (CDC, 2018), and this has been attributed to a variety of demographic, social, and physical factors. The CDC has designated women ages 18-44 as a particularly vulnerable group, in part due to higher frequency of risk behaviors, such as unprotected sex, multiple sexual partners, and frequent substance use (CDC, 2008). The current study assessed women's knowledge of HIV and STD transmission and risk factors, sexual self-efficacy, and sexual violence history, as well as frequency of sexual risk behaviors. A total of 282 female-identified respondents completed the study via the online platform MTurk. Younger women, and women who identified as single, White, and/or LGBTQ+ reported significantly higher numbers of risk behaviors. Sexual violence history was significantly associated with more sexual risk behaviors, but was not related to sexual self-efficacy or HIV/STD knowledge. There was a moderating effect of HIV knowledge and sexual self-efficacy; as HIV knowledge and sexual self-efficacy increased, number of sexual risk behaviors decreased. STD knowledge and sexual self-efficacy did not moderate sexual risk-taking behaviors, but were independently associated with fewer risk behaviors. These findings highlight the need for comprehensive, widespread, and identity-inclusive sexual health education.

Key Words: HIV/AIDS, STDs, women, sexual violence, self-efficacy, risk-taking

Chapter I: INTRODUCTION

Relationships between Sexual Health Knowledge, Self-Efficacy, and Trauma on Sexual Risk-Taking Among Women

The prevalence of human immunodeficiency virus (HIV) infection in women has increased worldwide within the last 10 years. As of 2016, HIV/AIDS was the global leading cause of death among women of reproductive age, and an estimated 18.2 million women were living with HIV (UNAIDS, 2018). Within the United States, women accounted for 19% of all new HIV diagnoses in 2017 (CDC, 2018). The proportion of AIDS diagnoses among women has tripled since the early years of the AIDS epidemic, from 7% in 1984 to 24% in 2016 (CDC, 2018). Approximately 1.1 million people in the United States are living with HIV/AIDS, about 270,000 of whom are women (CDC, 2018). According to CDC estimates, the most common methods of transmission for women are heterosexual contact (approximately 86% of new diagnoses), and injection drug use (IDU) (approximately 14% of new diagnoses). In particular, women have a higher risk of contracting HIV through sexual contact than do male partners, and women may frequently lack knowledge of risk and transmission factors for HIV. At least 1 in 9 women with HIV are unaware that they have it (Evans et al., 2018).

Young and early adult women appear to be at greater risk for HIV infection. Worldwide, women aged 15 through 24 are at the highest risk of new HIV infection among demographic groups, and HIV is the leading cause of death among women of reproductive ages (UNAIDS, 2010). In part, these higher numbers have previously been attributed to higher rates of risk behaviors in university samples, including unprotected sex, sex with multiple partners, and frequent substance use, particularly alcohol (Duncan et al., 2006). Importantly, many current

young adults may be subject to generational forgetting (see below), thereby limiting their exposure to knowledge of and prevention strategies for HIV/AIDS (Volkow, 2015).

Additionally, scholars have noted that an unintended consequence of the HIV/AIDS prevention campaigns has been relatively limited attention given to prevention of other sexually transmitted diseases (STDs). This is a significant concern in light of epidemiological findings; the CDC (2018) estimates that individuals between the ages of 15-24 acquire half of all new STD diagnoses each year, indicating heightened risk in this age group. Currently, approximately 1 in 4 sexually active adolescent and adult females have an STD. Jaworksi and Carey (2008) note that a combination of lack of exposure to information about STDs, as well as new and rapidly changing information about STDs, have contributed to the paucity of broader STD knowledge among current adolescents and young adults. In fact, the United States government designated colleges and other settings where young adults frequently congregate as specific targets for STD reduction and knowledge expansion, beginning with its Healthy People 2010 Initiative (U.S. Department of Health and Human Services, 2012). However, it is unclear how effective this campaign has been or what the general level of STD and HIV knowledge is among women in the US. It is therefore imperative to assess women's current understandings of HIV/AIDS as well as broader STDs, and the related factors that can influence sexual risk-taking behaviors.

Sexual Health Education

One reason that knowledge of STDs and HIV is uncertain is because the quality and extent of sexual health education within the United States varies widely. According to the CDC (2020):

> *"Quality sexual health education (SHE) provides students with the knowledge and skills to help them be healthy and avoid human immunodeficiency virus (HIV), sexually*

> *transmitted diseases (STD), and unintended pregnancy. A SHE curriculum includes medically accurate, developmentally appropriate, and culturally relevant content and skills that target key behavioral outcomes and promote healthy sexual development. The curriculum is age-appropriate and planned across grade levels to provide information about health risk behaviors and experiences. Sexual health education should be consistent with scientific research and best practices; reflect the diversity of student experiences and identities; and align with school, family, and community priorities."*

A 2018 review of nationwide school curriculums found that fewer than half (43%) of high schools and 18% of middle schools teach key CDC topics for sexual health education (National Health Education Standards, 2019). At present, sex education laws are decided by state and local legislatures, leading to rampant inconsistency in the ways sexual education is (or is not) delivered.

According to the Sexuality and Education Council of the United States' 2020 report, 29 states and the District of Columbia currently mandate any form of sex education to be taught in schools, though there is generally some form of opt-in sexual education offered in every state. Only 16 states require instructions on condoms or contraceptives. Fifteen states do *not* require that HIV/STD instruction be any of the following: age-appropriate, medically accurate, culturally responsive, or evidence-based/evidence-informed – in direct opposition of the CDC guidelines. This is not to suggest that remaining states lead by example; in fact, only 7 states require explicit instruction on HIV/STDs, and only 8 states require culturally-responsive sex education and HIV/STD instruction. Thirty-five states require schools to stress abstinence when sex or HIV/STD education is provided. Although federal abstinence-only guidelines do not prohibit the discussion of contraceptive or other protective use during such lessons, it has been noted that it is

"nearly impossible" to discuss contraceptives without opposing U.S. Congress's abstinence definitions (Devaney et al., 2008, p. 7). Even as states indicate desire for sexual education to rest on parents and caregivers, rates of doing so are low, and arguably do not adequately compensate for gaps in formal, school-based instruction (Hall et al., 2016).

While early literature indicated that abstinence-only curricula in primary and secondary schools demonstrated short-term benefits in reduction of sexual risk behaviors (primarily as delayed engagement in sex) in some samples, such findings have not been replicated (Jeynes, 2020). Meta-analytic results from nearly two-decades of research indicate that, as young adults begin to engage in sexual behavior, such programs have repeatedly demonstrated adverse consequences. Students who received abstinence-only education are less likely to utilize contraceptives compared to their peers when engaging in sexual activity (Santelli et al., 2017; Hauser, 2004; Kantor et al., 2008; Underhill et al., 2010), and show reduced understanding of other aspects of safe sex, such as consent (Borawski et al., 2005). These concerns can have long-standing direct and indirect effects on students' physical and mental health, by increasing risk of contracting STI/STDs (CDC, 2016), pregnancy (Tripp & Viner, 2005), sexual trauma (Ortiz & Schafer, 2017), and reducing relationship communication, particularly as individuals reach adulthood (Kantor et al., 2008). Authors have also argued that abstinence-only sexual education disproportionately harms and disadvantages female students, by perpetuating gender stereotypes (e.g., emphasizing females as the gatekeepers of male sexuality), and increasing physical and associated mental health consequences via unique (e.g., pregnancy) and higher likelihood (e.g., STDs) consequences for girls and women (Woebse, 2013).

By the time adolescents reach young adulthood, individuals who received abstinence-only education report dissatisfaction with such programs. For example, qualitative and

quantitative surveys of college students who had received abstinence-based sexual education in high school have found that such programs generally had mixed value, and low impact on their sexual behaviors (Gardner, 2015). College students have further indicated strong support for more comprehensive instruction in secondary schools, with less emphasis on strictly negative outcomes of sexual activity (Gardner, 2015). In another study, college students reported that their abstinence-based high school education did not prepare them for safely engaging in sex, and/or did not highlight the multitude of risk factors and prevention strategies to consider when doing so (Walcott et al., 2011).

Scholars have long noted that the willingness to engage in HIV/STD risk behaviors is predicated on the belief that they may be at risk of contraction (Crosby et al., 2014). Given the current state of sexual education within the United States, it is perhaps unsurprising that behaviors that put individuals at direct risk are frequently unrecognized or feature inaccuracies (Crosby et al., 2014). Implementation of inclusive, modern, equitable, and evidence-based comprehensive sex education has long been complicated by political and other sociocultural barriers (Boonstra et al., 2009; Hall et al., 2016; Schalet et al., 2014), evident in the diversity of quality and quantity of sex education that students across the United States receive each year. Education is one tool that could lead to realistic perceptions of risk, as well as knowledge about health promotion, which can ultimately reduce the risk of contracting HIV and other STDs.

Women and HIV/AIDS

HIV/AIDS Factors Among Women in the United States

Race

Within the United States, prevalence rates vary widely among women as a function of race. In 2017, Black women accounted for 59% of all new HIV diagnoses, despite accounting for

only 13.7% of the United States population (CDC, 2018). Although new diagnoses among Black and African-American women decreased by 25% between 2010-2016, the rate for this group remained over 15 times higher than the rate of White women (CDC, 2018). Hispanic and Latina women accounted for 16% of all new diagnoses in 2017, at a rate of nearly 5 times that of White women. American Indian/Alaska Native women and Asian or Pacific Islander women accounted for 4% of new diagnoses, at rates of 4.5 times and 1.1 times that of White women, respectively. Additionally, while the numbers of new HIV cases have generally declined across races over the past decade, HIV-related deaths continue to show racial disparities. As of 2019, Black women were the only racial group in the United States with HIV-related illness as one of the 10 leading causes of death for women over age 20. In part, the CDC has attributed these discrepancies to stigma, fear, discrimination, and higher rates of socioeconomic concerns for Black women, which can limit access to high quality healthcare and prevention education. Thus, the current literature suggests that women of color are at increased risk of HIV.

Age

In addition to race, the CDC considers age to be an important factor for both prevention of HIV and for address of care. Most new HIV/AIDS diagnoses for women are in young women, with women ages 13-44 accounting for 64% of all new diagnoses in 2017 (CDC, 2018). Young women between 13-24 accounted for 13% of new diagnoses in their age group, though it should be noted that young women are significantly less likely to seek or receive HIV testing than young men, and over half of all youth living with HIV do not know they are infected. Importantly, rates of HIV contraction between 13-44 have shown the *slowest* decline across age brackets in recent years. Scholars have attributed the increased risk in adolescence and younger adulthood to a combination of factors, including sexual experimentation, drug use, and peer

influence (NIH, 2015). Further, it has been argued that women ages 13-44 may be subject to "generational forgetting." This generation may be less likely to perceive the dangers associated with HIV than older Americans, who witnessed the early AIDS epidemic in the 1970s and 1980s (Volkow, 2015).

Rurality

Recently, scholars have focused attention on geographic location and its links with HIV/AIDS diagnoses. While rural rates of HIV and AIDS can be difficult to establish, given that individuals frequently seek treatment in the nearest urban areas, estimates indicate that rural transmission accounts for 5-8% of all AIDS cases in the United States, and over two-thirds of rural residents infected with HIV report having been infected locally (Rural Center for AIDS/STD Prevention, 2009). Nonurban regions are the only areas in the United States with increasing AIDS diagnoses over the past 10 years, and Indigenous populations, individuals of color, and women are disproportionally represented in rural HIV diagnoses (CDC, 2015).

The challenges faced by rural populations with HIV diagnoses are numerous, and include stigma (Brems et al., 2010), social isolation (Vyavaharkar et al., 2012), long distances to care and limited transportation (Reif et al., 2005), suboptimal care (Pellowski, 2013), and lack of providers with HIV expertise (White et al., 2015). Of note, women in rural communities also report higher perceived stigma, and lower ability to receive HIV-related care compared to their male counterparts (Casteñada, 2000). As a result of these factors, individuals in rural communities have lower rates of HIV testing, delayed HIV diagnoses, later use of antiretroviral therapy, and higher rates of HIV mortality (see Schafer et al., 2017, for a review). Rural populations also experience higher rates of several linked risk factors for HIV/AIDS, including higher rates of poverty, lower average educational attainment, food insecurity, and substandard

housing (Schafer et al., 2017). Additionally, while several prevention, treatment adherence, and support programs have been designed and tested in urban settings, scholars have argued that the validity and generalizability to rural populations has not been established, and therefore may not be appropriately addressing the unique needs of rural HIV/AIDS populations (Rhodes, 2014).

Methods of Transmission

Methods of transmission for women differ from men in the United States. As of 2017, heterosexual contact accounted for 86% of all HIV/AIDS infections in women (CDC, 2018). Injection drug use accounted for approximately 13%, and the remaining 1% was attributable to other causes (e.g., from mother to child during pregnancy, birth, or breastfeeding). For women ages 13-26 and women of color, heterosexual transmission rates are even higher at around 90%. As the CDC (2019) notes, receptive sex is most often riskier than insertive sex, such that women engaging in heterosexual sex are at much higher risk for contracting HIV during anal or vaginal sex than their partners. In one survey of sexual behaviors for women at increased risk of HIV, 93% of HIV-negative women reported vaginal sex without a condom in the past year, and 26% reported having anal sex without a condom (Sionean et al., 2016), thus highlighting the need to increase education and prevention efforts that emphasize safer sexual practices.

An increasingly small percentage of HIV transmissions occur through mother-to-child transmission, and this category is the third most common for women in the United States (CDC, 2018). With the rise in HIV screening for pregnant women and availability and use of antiretroviral therapy (ART), these numbers have decreased dramatically. The annual number of perinatal transmissions has decreased by 95% since the early 1990s, and in 2017, an estimated 73 children under the age of 13 received a diagnosis of perinatally-acquired HIV in the United States. The CDC (2019) notes that less than 1% of individuals who have HIV and take ART

medications during pregnancy transmit HIV to their children, and additional prevention efforts (e.g., Cesarean sections, formula feeding) can further reduce risk. However, it should be noted that the large majority (64%) of new perinatal infections occur in Black and African Americans, followed by Hispanic and Latino/as, highlighting further social disparities among women of color.

Specific HIV/AIDS Risk Factors for Women

As knowledge about HIV and prevention efforts increased in the 1990s, scholars noted that research regarding women's specific vulnerabilities and thus, development of preventative interventions, was scarce (Mallory & Fife, 1999). Recent HIV/AIDS trends within the United States emphasize the importance of addressing prevention, knowledge, and care gaps. Specific risk factors at the individual, partner, and structural level for women should also be examined, given that these trends continue to affect women on a daily basis. To date, several of these risk factors have been identified.

Individual Level Factors

Physical Factors

Women are at greater risk for HIV infection for a number of physical reasons. HIV is spread through blood, pre-seminal fluids, semen, vaginal fluids, rectal fluid, or breast milk contact with a person infected with HIV. Receptive sex is generally riskier than insertive sex, as receptive sex is much more likely to lead to micro cuts or abrasions in the vaginal area during intercourse (CDC, 2019). Current estimates indicate that a woman is 10-12 times more likely to contract HIV from an infected partner during heterosexual vaginal sexual intercourse than a male counterpart, due in part to the larger surface area of the lining of the vagina compared to the penis (CDC, 2016). Other factors, such as thinning and dryness of the vagina due to age,

medications, etc. can further increase the risk of abrasion. Semen also stays in the vagina for up to several days after sex, leading to longer exposure to the virus (CDC, 2019).

Experiencing at least one other sexual health concern or sexually transmitted disease (STD) can also substantially increase the likelihood of contracting HIV among women (Peterman et al., 2014). For women who experience bacterial yeast infections, bacterial vaginosis, or other STI's such as syphilis or gonorrhea, these can increase the probability of experiencing small cuts in the skin, and may bring potentially infectible white blood cells into the vaginal area (CDC, 2016). While not specifically physical risk factors, the behaviors that led to one STD can put an individual at risk of other infections (e.g., not using condoms, multiple partners, anonymous partners, etc.) (CDC, 2016). College students consistently have higher than average rates of STDs, and young adults ages 15-24 accounted for half of all new STDs (Satterwhite et al., 2008). By some estimates, 1 in 4 sexually active adolescent and young adult females has an STD, such as chlamydia or human papilloma virus (HPV) (Forhan et al., 2009). While the aforementioned physical factors may partially explain current HIV trends in the United States, several other factors are also likely.

Lack of Information about Risk

In general, there is lack of information about the public's knowledge regarding male and female sexual anatomy. Evidence from HIV providers suggests that many women still lack basic information about how their bodies function in a sexual context (e.g., Weinman et al., 2009). Gomez (2011) notes that lack of education is frequently related to cultural norms and "sexual silence" (p. 290), which can make women uncomfortable and these conversations taboo. With this lack of education also comes an unknown or potentially lower perception of vulnerability to HIV among women. When asked to report how they became infected, an alarming number of

women are unaware of their transmission category, dependent on state. For example, 60% of newly diagnosed women in New York State in 2008 did not know how they became infected (Bureau of HIV/AIDS Epidemiology of New York State), and 25% of HIV-positive Idaho women are unaware of their transmission category (Idaho Epidemiological Profile, 2010). Perhaps contributing to these numbers, women who have sex with men most frequently assume that their male partner is monogamous (Bonacquisti & Geller, 2013), heterosexual (Seale, 2009), and not injecting drugs (Fordyce et al., 1991), though there are some exceptions to this. Even when faced with situations in which there is a high probability that HIV risk occurred (e.g., confirmed multiple partners, a male partner's IDU, incarceration, etc.), many women do not challenge these assumptions (Comfort et al., 2005).

Psychological Difficulties

Less-widely studied is how different psychological disorders may be related to HIV/AIDS among women. However, there is evidence that psychological distress is related to engagement in major risk factors related to HIV. For example, Posttraumatic Stress Disorder (PTSD) has been linked to greater drug-related behavior (e.g., IDU) and risky sexual behavior (e.g., Chilcoat & Breslau, 1998; Katz & Nevid, 2005; Weiss et al., 2012). Although the reasons remain unclear, individuals who experienced childhood or adult sexual trauma further report significantly higher rates of IDU and risky sexual behavior, as well as fewer health-protective behaviors (Lang et al., 2010; VanDorn et al., 2005), indicating potentially greater risk related to these specific traumas. These risk factors may partially explain why, for women, PTSD and HIV frequently co-occur. In one meta-analysis of 5,930 individuals, the estimated rate of PTSD among HIV-positive women was about 30%, or 3 times the national rate of PTSD (Machtinger et al., 2012).

Structural Risk Factors

While individual and partner factors are critically important to understand women's risk of HIV/AIDS, researchers have noted that interventions must also work at the macro-level, targeting the contextual factors that more broadly lead to HIV risk (Gomez, 2011).

Issues of Gender Norms and Power in Relationships

Sociologists have long acknowledged that, across most cultures, there is an implicit and/or explicit assumption of differential roles for men and women, assuming a traditional binary system (Sirin et al., 2004; Eagly, 1997; Acker & Van Houten, 1974). Often, traditional gender roles have assumed that women possess less power (Diekman et al., 2004). Such power differentials, whether known or implicit, influence the steps that women can take to protect their bodies. For example, male condoms are much more widely available than female condoms in the United States, and when made available, female condoms are cost-prohibitive, typically priced 400-500% higher than male condoms (Smith, 2017). As a result, women are at a disadvantage when attempting to utilize personal protection, and may be in a position where they must negotiate condom use with a male partner. There is some literature to suggest that sexual relationship power may be a key variable in negotiating condom use. In one study of 388 urban women, women with high levels of self-reported relationship power were five times more likely than women with low reported power to report consistent condom use, even after controlling for sociodemographic and psychosocial variables (Pulerwitz et al., 2010).

However, as Gomez (2011) notes, "proponents of simple condom promotion ... fail to consider gender based power imbalances, and how power imbalances may influence a woman's ability to demand condom use..." (p. 289). For a variety of reasons, women may face barriers to having these discussions, including embarrassment, fear of partner's reaction, lack of knowledge

about safer sex, fears of promiscuity perceptions, desire for privacy about their own STD status, and fear of rejection (Cook, 2014). Potentially compounding these issues, women who have experienced sexual abuse, assault, or coercion have been shown in some literature to more strictly adhere to traditional gender roles, giving sexual decision making power to their partners out of fear or preference (e.g., Arriola et al., 2005). Indeed, fear of a partner's reaction (e.g., anger, violence, rejection), is frequently cited as a large impeding factor in initiating safer sexual practices for women (Hahm et al., 2011).

Sexual gender norms must also be considered at the intersection of cultural norms, which can further exacerbate these issues for women. For example, Latinx and Hispanic sociologists have coined the term *marianismo* to refer to underlying assumptions of how some Latina women should think and behave (e.g., passive, obedient, and subordinate to men) (Stevens, 1973). Inherent in these beliefs can be the societal norm that women do not talk about sex with men, as this could be distasteful or suggestive of promiscuous behavior (Pérez-Jiménez et al., 2009). Thus, not only may discussions about safer sexual practices be difficult, but they may also conflict with cultural norms for women.

Social Status

Related to social and cultural issues of power is social status. Globally, social status is intricately linked to economic status (Campbell et al., 1986), and poverty is a major social factor linked to HIV vulnerability (CDC, 2016). Although not every study has found an increase in HIV risk as a function of poverty (e.g., Rodrigo & Rajapaske, 2010), much of the literature has identified the importance of considering poverty in HIV research. In one study of 9,078 individuals living in urban areas, the prevalence of HIV among individuals living in poverty was nearly 20 times the United States national average, at a rate of about 2.1% (Denning & DiNenno,

2017). This rate far exceeds the international 1% cutoff that the United Nations AIDS Council (UNAIDS, 2017) designates as a generalized HIV epidemic, and is similar to rates of developing countries that have identified epidemics (e.g., Burundi, Ethiopia, Haiti, etc.). Interestingly, HIV prevalence rates in these urban poverty areas did not significantly differ by race or ethnicity, contrasting United States general population numbers. However, the authors note that poverty likely contributes to ethnic and racial disparities in HIV prevalence rates. Nationally, individuals of color are disproportionately living in poverty (U.S. Census Bureau, 2016).

For women living in poverty, information about sexual safety is less available, and HIV transmission is a less urgent concern compared to homelessness, food insecurity, and unemployment (De La Vega & Lennon-Dearing, 2015). As a result, poverty is often associated with other deficits, such as lack of access to, or lack of control over resources, leading to a multifaceted array of difficulties for women. Lack of health insurance can prevent both preventative care and treatment for infected persons, and low-income women are more than twice as likely to be uninsured as the general population of women in the United States (Kaiser Family Foundation, 2010).

Financial insecurity can also lead to greater economic dependence on one's partner(s). This dependence can increase difficulty in asking for safer sex, such as using condoms (Gillespie et al., 2007). It is also consistently a risk factor for women to engage in relationships that are emotionally, physically, and sexually unstable and violent, further increasing risk (Basu & Famoye, 2004; Gielen et al., 2007). Despite these significant disparities for women, HIV/AIDS prevention researchers continue to note that preventions and interventions routinely do not account for the inequity, lack of resources, and lack of autonomy that frequently accompanies

low socioeconomic status; perhaps due to the fact that such interventions are routinely designed by individuals in power (Krishnan et al., 2008; Pellowski et al., 2013; Piot et al., 2007).

Young Adult Women and HIV/AIDS

As mentioned previously, women ages 18-44 currently represent the age group of highest risk for new HIV infection. Duncan and colleagues (2006) partially attribute this to a multitude of risk behaviors that occur with higher frequency during these years, including removal from the home caregiving unit, exploration of sexual relationships (including unprotected sex and sex with multiple partners), substance use, and limited exposure to information or knowledge about HIV and other STI/STD prevention strategies. As a result, women frequently underestimate their HIV risk (Roberts & Kennedy, 2006).

Women and Concern About Risk of HIV/AIDS.

Data on women's concern about HIV/AIDS are sparse, and much of the literature on risk behaviors and risk perceptions stems from the late 1980s and early 1990s as a consequence of the AIDS epidemic during this time (e.g., MacDonald et al., 1990; DiClemente et al., 1990; Rothspan & Reed, 1996). More recent data has indicated mixed conclusions on men and women's perceptions and understandings of HIV. While individuals in their 20s and 30s appear to have at least some level of knowledge regarding HIV transmission (Demmer & Caroleo, 2001), this does not appear to reduce sexual risk behaviors, nor does it reduce related perception of risk (Bazargan et al., 2001; Valentine et al., 2003). In college samples, students also frequently perceive that their peers are engaging in risky sexual behaviors, leading to overestimations that their peers will contract HIV (Hines et al., 2002). However, for students who perceive themselves to be in good health, they typically do *not* identify as being self-susceptible for contracting the virus, even when engaging in the same risk behaviors as their

peers (Fletcher et al., 2007). In a sample of 390 students in a predominately African-American university in the Midwest, male and female participants reported generally low concern about HIV risk: 54% of students above age 30, 48% of 20-29 year olds, and 58% of those below age 20 perceived themselves as not having *any* chance of being infected with HIV, despite being sexually active (Adefuye et al., 2009). Interestingly, within this study, participants who engaged in more risk behaviors (e.g., multiple partners, low condom use, marijuana and alcohol consumption, etc.) were *more* likely to perceive HIV contraction as a personal risk. Despite this, pervasive misconceptions about HIV transmission exist among young adults, such as the belief that sitting on a toilet seat can lead to contraction (Yi, 1998), or that spermicidal jellies or foams will prevent sexual transmission of HIV (Lewis et al., 2009). Even when HIV prevention is not the primary focus of protective behaviors, this lack of knowledge can have broader significant consequences and contribute to other STDs.

Women and Rates of HIV/AIDS Testing

The CDC recommends routine HIV/AIDS testing for all sexually active adolescents and adults, and recommends at least yearly testing for those who engage in risk behaviors (CDC, 2015). About half (55%) of women between 18-64 in the U.S. report having been tested at some point in their lives, but only 1 in 5 (22%) report having been tested in the past year (Kaiser Family Foundation, 2014). In at least one study, women who reported the *highest* risk factors for HIV transmission, including anal sex, sex without a condom, multiple partners, and history of other STDs such as syphilis, had the *lowest* rates of HIV testing of all sexually-active women in previous research (Evans et al., 2019). Approximately 50% of 13-24 year olds living with HIV are unaware they have it (Campsmith et al., 2010).

Currently, both rapid and lab-based HIV testing is available at most primary care, urgent care, and federally-qualified health centers, in line with CDC recommendations (CDC, 2018). However, availability of testing does not necessarily translate to its utilization (e.g., Bontempi et al., 2009; Buhi et al., 2010, Crosby et al., 2005; Thomas et al., 2008). Demographically, testing rates are higher among women (Crosby et al., 2005), racial and ethnic minorities (Buhi et al., 2010), and older (i.e., > 30 years old) individuals (Crosby et al., 2005; Thomas et al., 2008). Individuals are also more likely to seek testing if they have frequent sex without condoms, have a greater number of sexual partners, and/or meet criteria for drug/alcohol dependence (Bontempi et al., 2009; Caldiera et al., 2012; Crosby et al., 2005), though these findings have not always been consistent (e.g., Dennison et al., 2014). It remains unclear whether knowledge about HIV transmission and risk factors is directly related to receiving HIV tests. As Caldiera and colleagues (2012) note, women are frequently asked about risk behaviors during primary care visits, which may prompt care providers to suggest testing.

Women and HIV/AIDS Concern Following Trauma

Importantly, women's concerns about HIV/AIDS increase dramatically following trauma. Up to 90% of individuals will experience at least one PTSD Criterion A event within their lifetime, and up to 30% will go on to develop symptoms of Acute Stress Disorder or Posttraumatic Stress Disorder (Kessler et al., 2008; Norris & Slone, 2013). Although many forms of trauma can result in traumatic distress and PTSD symptoms, sexual assault remains the most studied within the HIV literature. Women, and particularly women of minority status, remain the most prevalent victims of sexual assault in the United States, and current estimates indicate that one in four women will be the victim of attempted and/or completed assault in their lifetimes (National Intimate Partner and Sexual Violence Survey, 2010). Risk of injury, and therefore

potential risk of transmission, is substantially higher during nonconsensual intercourse. In a review of the literature, Draughon (2013) found that between 40-75% of medically reported sexual assaults led to injuries (e.g., broken skin) that greatly increase the likelihood of HIV transmission from perpetrators. In a sample of 92 recent female rape victims receiving medical care, 91.6% reported at least mild concern about contracting HIV post-rape, and 72.6% reported that they were "extremely fearful" of contraction (Resnick et al., 2002). Concern is often highest among women who sustained greater injury during the assault, or whose perpetrator was a stranger or unknown (Loufty et al., 2008; Baker et al., 1990). Medical preventative measures, such as HIV post-exposure prophylaxis (PEP), and HIV knowledge courses, are routinely provided when medical care is sought, and up to 70% of victims accept this treatment due to personal anxiety (Loufty et al., 2008). Notably for the current study, young and early adulthood women experience significantly higher rates of sexual assault than the general public. For example, current estimates indicate that between 20-30% of female-identified college students experiencing at least one sexual assault prior to graduation (e.g., Krebs et al., 2009).

HIV Knowledge and Sexual Risk-Taking

Since the 1980s, extensive efforts have been undertaken worldwide to increase HIV knowledge with the aim of reducing sexual risk behaviors, and ultimately, reducing new HIV infections. In part, education remains one of the most modifiable factors in HIV prevention, and it is well-established that greater knowledge about HIV is correlated with fewer risk behaviors (e.g., unprotected sex, multiple partners, needle sharing, etc.) (e.g., Costa et al., 2018; DiClemente et al., 1993; Eissen et al., 2010; Young & Rice, 2009). However, young adults have lower levels of HIV knowledge compared to older samples, and generally perceive themselves to be at low HIV risk despite engagement in risk behaviors (Haile et al., 2017; Iconis, 2011;

Shiferaw et al., 2015;). Among women ages 18-25, findings have also diverged from broader community samples, with several studies finding that knowledge about HIV prevention did *not* translate into more safe sex behaviors (Opt & Leffredo, 2004; Sutton et al., 2011). Extant HIV psychoeducation programs are frequently geared toward this population – that is, those who are explorative in sexual experiences, engage in substance use, experience social situations that encourage or pressure sexual engagement, and/or who may not have otherwise received sexual education from their school or caregiving unit (CDC, 2018). At the same time, researchers have lamented the limited availability of HIV/STD prevention knowledge available to young adults, which most frequently is restricted to free distribution of condoms and pamphlets at health centers (El Bcheraoui et al., 2013).

Even when HIV knowledge is widely available, less is known about the specific factors that may influence the translation between HIV knowledge and subsequent protective behaviors. As noted, a history of trauma or traumatic distress symptoms has a demonstrable association with HIV infection, via greater likelihood of engaging in risk behaviors both prior to and following trauma (e.g., Lang et al., 2010). Indeed, dozens of programs throughout the world have been developed in recent years with emphasis on trauma-informed HIV prevention education, given this bidirectional relationship (see Sales et al., 2017 for a review). This is particularly salient for women, as up to 95% of HIV-infected women report experiencing intimate partner violence during their lifetime (Hatcher et al., 2015). As mentioned previously, it is possible that trauma exposure or traumatic distress may increase HIV knowledge, particularly if HIV concern is elevated after sexual assault (Loufty et al., 2008). This could, in turn, be associated with fewer risk behaviors. At the same time, consistently high comorbidities between PTSD and HIV (Ayano et al., 2020; Neigh et al., 2016; Sherr et al., 2011) may suggest the opposite – that HIV

knowledge does *not* impact subsequent sexual risk behaviors. Additionally, specific risk factors for trauma exposure (e.g., poverty, gender, etc.) are also related to a lower likelihood of access or exposure to HIV information within the United States. While the complexity of these relationships creates a challenge for establishing temporal order, it also highlights the need for better understanding of the relationships among HIV knowledge, traumatic distress, and sexual-risk taking behaviors.

Women and Sexually Transmitted Diseases

STD Prevalence in the United States

Sexually transmitted diseases (STDs) represent a broad range of infections that can be transmitted person-to-person through any type of sexual contact. This may include kissing, oral-genital contact, genital-genital contact, use of sexual toys, as well as penetrative sexual contact (CDC, 2019). As of 2018, within the United States, chlamydia (540 per 100,000 people), gonorrhea (179 per 100,000 people), syphilis (35 per 100,000 people), genital herpes, hepatitis B, HIV, and human papillomavirus (HPV) are the most common STDs. The CDC has designated the continued increase of STDs in the United States as an epidemic, with nearly 2.5 million new cases reported in the year 2018 alone.

Following a slow decline in the early 2000s, STD rates among women have increased steadily since 2014 (CDC, 2020), with variation among diagnoses. For syphilis, between 2014-2018 alone, rates among women increased 172.7%, from 1.1 to 3.0 cases per 100,000 women in the United States. This rise was highest among women of reproductive age (15-44), with a 165.4% increase, from 2.6 to 6.9 cases per 100,000 women. Chlamydia infections have increased approximately 12% since 2013, reaching a rate of 692.7 cases per 100,000 women in 2018. Gonorrhea cases have increased as well – from 232,587 cases in 2017 to 241,074 cases in 2018.

Similar to HIV, STDs appear to disproportionately impact women of color. For example, in the year 2018, the positivity rate of chlamydia for females aged 14-24 was about 1.5 times higher among non-Hispanic Blacks than among White women (CDC, 2019).

An important consideration within prevalence estimates is access to STD testing. A number of barriers exist for both the identification and treatment of STDs. These include reduced federal, state, and local programming budgets in recent years, limited access to clinics and reduced clinic hours/staffing, increased patient co-pays for testing and prescription treatment, and individual and provider level knowledge about where, when, and why to get tested (CDC, 2018). As a result, all of these prevalence estimates must be interpreted with caution. While chlamydia, gonorrhea, and syphilis are the most commonly reported STDs, a large number of cases continue to go undetected and unreported each year. Additionally, data on other common STDs (e.g., human papillomavirus, herpes simplex) are not routinely reported to the CDC. As such, these numbers likely only represent a small fraction of the true scope of America's STD epidemic (CDC, 2019).

STD Considerations for Women

With regard to STD transmission risk for women, many of the same individual, partner, and structural level factors that contribute to HIV risk are similar across a range of STDs. However, the CDC has also noted that, compared to men, women disproportionately bear the long-term consequences of STDs (2019). For example, several types of STDs cause pelvic inflammatory disease (PID), which leads to infertility for an estimated 24,000 women in the United States alone each year. Thousands more will experience ectopic pregnancy as a consequence of PID. Comparatively, while chlamydia is one of the most common causes of PID, there are generally few complications for men as a result of this disease. As another example,

untreated syphilis in pregnant woman results in infant death in up to 40% of cases, and even if infection is known, genital herpes, syphilis, and HIV can be passed to infants during pregnancy and delivery. Mother-to-infant transmission is one of the leading causes of low birth weight, blindness, and deafness among infants (CDC, 2019). Finally, human papillomavirus (HPV) is the most common sexually transmitted disease (i.e., up to 85% of sexually active adults will contract it in their lifetimes). Among women, HPV can long-term lead to the development of cervical cancer. Although an HPV vaccine developed in the early 2000s has reduced cervical cancer incidences by 40% among vaccinated women (CDC, 2020), it should be acknowledged that most infected men have few to no serious health problems as a result of HPV.

In addition to these severe outcomes, the CDC highlights a number of different ways that women are differentially affected by STDs. As with HIV infection, female anatomy can confer unique risk of infection compared to men, as the lining of the vagina is thinner and more prone to breakage compared to the penis, allowing for more viruses and bacteria to penetrate. The environment of the vagina, including temperature, pH, and moistness all allow for bacteria to grow more rapidly. Women are also much less likely to have symptoms of common STDs, such as chlamydia and gonorrhea compared to men, and symptoms can also go away even if the infection remains. These symptoms can also easily be confused with other conditions or biological processes, as women frequently misinterpret STD symptoms for normal vaginal discharge or a yeast infection. Finally, women face barriers in identification of STDs, as many symptoms (e.g., genital ulcers from herpes or syphilis) can occur inside the vagina, and may not be easily visible. By contrast, the same symptoms are frequently readily identifiable on external male anatomy (CDC, 2019). Barriers to identification remain an extremely important consideration. Despite the fact that several STDs, including syphilis, gonorrhea, and chlamydia

(i.e., bacterial STDs) can all be cured via antibiotics, structural and individual-level (e.g., stigma, see below) barriers can significantly impede detection and treatment for women.

Young Adult Women and STDs

As noted previously, early adult women consistently have higher than average rates of STDs, and young adults ages 15-24 account for approximately half of all new STDs each year (Satterwhite et al., 2008). Biologically, women of early reproductive age are at a heightened risk for infection, as having an immature cervix increases susceptibility to infections such as HPV or chlamydia (CDC, 2018; Ho et al., 1998). By some estimates, 1 in 4 sexually active adolescent and young adult females has an STD, such as chlamydia or human papillomavirus (HPV) (Forhan et al., 2009). However, these numbers are likely to be underestimations. In recent national surveys, approximately 7.7% of male (Trepka et al., 2010) and 20.2% of female (Cuffe et al., 2016) sexually active college students reported STD testing within the past 12 months. Burak and Meyer (1999) found that female college students, in particular, are at *higher* risk of contracting STDs than their same-age peers not attending college, in part due to greater tendency to use alcohol more frequently and have multiple sex partners. In the 2006 National College Health Assessment, college women who had multiple partners in the past year, partners of both sexes, who had binged alcohol prior to their most recent sexual encounter, and those who did not use condoms at last vaginal intercourse had significantly increased odds of having an STD (Lindley et al., 2008).

As with HIV, scholars have highlighted the macro-level factors (e.g., media portrayal, peer influence, etc.) that impact the greater degree of sexual-risk taking behaviors among young and early adult women (DiClemente et al., 2007). It is important to note that, when compared to males, women face unique influences on their sexual and romantic development. For example,

college students report engaging in “traditional” sexual scripts in heterosexual relationships, whereby women are expected to take a passive role while simultaneously acting as a sexual gatekeeper (Kim et al., 2006; Olmstead et al., 2013; Rudolph et al., 2020). Relatedly, women report “double-standards,” in which men who engage in casual/non-committed sexual relationships are viewed positively, while women who engage in the same behaviors face social repercussions (e.g., name-calling, focal point of negative rumors, etc.) (Hamilton et al., 2009). These same mixed messages can also impede women’s comfort with initiating STD prevention and screening (see below).

Whether influenced by macro or micro-level influences, many of the same risk behaviors for HIV infection also apply to STDs. However, given the relative ease through which STDs can be transmitted compared to HIV (i.e., skin-to-skin contact rather than exchange of bodily fluids), the frequency and range of sexual risk behavior among young adult women is worth noting. Across a number of studies within university samples, women often report engaging in risk behaviors at least occasionally. These include sexual relationships with multiple partners/“one-night stands” (Owen et al., 2011), unplanned or impulsive sexual encounters (Cooper, 2002), sex with high-risk partners and/or not discussing sexual history prior to engagement in sex (Cooper, 2002; Flannery & Ellingson, 2003), unprotected sex (Patrick et al., 2007), and engaging in sex after consuming alcohol or other drugs (Scott-Sheldon et al., 2010). In a study of 2,000 sexually active college women, Littleton et al. (2014) found that nearly 16% of women had three or more partners, 17% had a one-night stand, and 48% had sex while intoxicated in the past year.

In the most recent study to date, women reported engaging in a wide range of sexual risk behaviors. In a sample of 1,534 college women, Rudolph and colleagues (2020) found the most common sexual risk behaviors reported were using alcohol prior to sex in the last 6 months

(52.1%), sex with someone who has had many sexual partners (35.5%), sexual contact with someone who is not well-known (28.6%), and sex without discussing sexual history (26.2%). Notably, a large number of women reported engaging in multiple types of sexual risk behaviors within the past 6 months, with a small subset of the sample engaging in all or nearly all of the risk behaviors surveyed in this study. Particularly for consideration of STD transmission, these results support the need for assessment of the breadth of sexual risk behaviors that women engage in.

Women and Concern About Risk of STDs.

A number of studies support the notion that, despite engagement in at least one risk behavior, many women generally do not consider themselves to be at risk of contracting an STD (e.g., Hickey & Cleland, 2013; Ingledue et al., 2004; Robinson-Cladwell, 2013; Valentine et al., 2003). This is important to consider, given the consequences of inaccurate perceptions (e.g., engagement in more risk behaviors, delayed or no STD testing and treatment, etc.). In one of the few longitudinal studies to date, Ethier and colleagues (2003) surveyed 209 sexually active women ages 18-24, with specific focus on unprotected sex and number of sexual partners as risk factors. The majority (88.9%) of the sample perceived little or no risk of being diagnosed with an STD in the coming year. Additionally, among women who had already received a diagnosis of an STD in the past, only 20.3% perceived "some" or a "very good" chance of being diagnosed with another STD in the next year, even when still engaging in risk behaviors. Chlamydia and gonorrhea infection were assessed via urine samples at baseline, 6, and 12-months post-initial survey. Strikingly, among those receiving at least one positive diagnosis (n = 49, 23% of the sample), 81.3% of these women had perceived themselves to be of little or no risk at baseline.

Interestingly, misperception of peer behaviors/norms appears to be correlated with increased engagement in risk behavior – a finding that is stronger for women than men (Barriger & Velez-Blasini, 2013). Thus, while women are able to *identify* specific risk behaviors in their peers, they may inaccurately estimate the *frequency* and *normativity* of these behaviors, leading to greater likelihood of they themselves engaging in these risk behaviors and reduced concern about the consequences of doing so (Lewis et al., 2007). Although STDs are not subject to the same pattern of generational forgetting as HIV/AIDS, a lack of exposure to adequate STD information, particularly about self-risk for contraction, may still be an important factor in women's concern (or lack thereof) about infection, as well as their ability or intention to utilize services such as regular STD testing.

Women and Rates of STD Testing

As noted, survey data indicates that sexually-active women have low rates of STD testing. Cuffe and colleagues (2016) found that 20.2% of female sexually active college students reported STD testing within the past 12 months. In other samples, lower likelihood of STD testing has been associated with demographic factors: self-identified heterosexual students, and younger students (ages 18-24) are generally less likely to have ever been tested for HIV or STDs (Lindley et al., 2020). A number of barriers exist to seeking sexual health care, including issues of practicality (clinic hours, location, transportation), knowledge of risk and symptoms, awareness of interventions, social support, and concern about stigma and shame (Rusch et al., 2008).

Scholars have noted that STD-related stigma (i.e., personal fears about negative societal attitudes toward STD infection, and STD-related shame (i.e., anticipated negative feelings resulting from a positive STD test) contribute to low STD testing numbers among young adults

(Cunningham et al., 2009; Lichtenstein, 2003). These considerations are particularly salient for women, given the aforementioned standards and societal expectations around female sexual behavior (Hamilton et al., 2009), and women are more likely to delay treatment and report embarrassment and stigma-related feelings (Darroch et al., 2003; Meyer-Weitz et al., 2000). To partially address these concerns, the CDC (2019) recommends consideration and implementation of the needs of adolescent and young adult populations, including extended hours at clinics, online appointment booking, increased privacy in waiting rooms, and less invasive (i.e., urine-based) specimen collection. Self-testing may also be an innovative way to address these concerns as well. In a unique study by George Mason University, 88% of college students surveyed said they would be "likely" or "extremely likely" to use STD self-testing services if available to take home, and 59% would self-test in a private room on campus (Lindley et al., 2020).

Access to testing is a critical consideration for this population. Habel and colleagues (2019) surveyed 885 colleges across the United States from 2014-2015 in order to evaluate the array of sexual health care services provided by post-secondary institutions. Nearly 71% of institutions reported having a designated health center on their campus, and 73% of these health centers offered STD/HIV diagnosis and treatment, and about 68% of health centers offered free condoms to students. An important finding in Habel et al.'s (2019) study was that *free* STI testing was only offered by 10.3% of college health centers, and colleges qualitatively reported that students frequently seek services off-campus to avoid high co-pays or deductibles. Financial considerations represent a significant barrier to accessing care. This is critical to consider, as literature indicates that women of lower socioeconomic status are at higher risk for STD contraction, (Harling et al., 2013) and may disproportionately be uninsured, under-insured, or utilize Medicaid services (Habel et al., 2016). Even when clinic care can be accessed, due to

campaign efforts and increased funding following the AIDS epidemic, HIV testing is frequently offered for free within clinics, whereas STD testing generally is not (Dean et al., 2018).

Women and STD Concern Following Sexual Trauma

Given the high rates of sexual trauma among young and early adult women (i.e., 20-30% or more; Krebs et al., 2009), it is not surprising that concern about STD contraction increases following victimization. Much like HIV, the likelihood of STD infection is substantially higher following forced, coerced, non-consensual, and/or violent sexual experiences. As such, in their 2015 guidelines, the CDC focused on the identification, prophylaxis, and treatment of STDs among adult and adolescent sexual violence (SV) survivors. Reporting on the 2011-2013 National Survey of Family Growth, the CDC (2016) calculated odds ratios for women's STD infection following SV, controlling for age, race/ethnicity, poverty level, and education. Women with an SV history were more likely to have ever been diagnosed with herpes (AOR 1.94) and genital warts (AOR 2.55). Notably, women with a SV history were also significantly *less* likely to have received STD treatment compared to those without an SV history. Specific to university women, Krebs et al. (2009) estimated that nearly 40% of SV survivors on college campuses contract at least one STD. However, also similar to STDs, a history of sexual trauma is also associated with increased likelihood in sexual risk behaviors (e.g., early onset sexual activity, multiple partnerships, substance use, etc.), indicative of a potentially dangerous and reciprocal relationship between trauma and STDs.

Because likelihood of STD transmission increases, women report substantial concern about contraction after sexual trauma. This concern appears to be slightly higher for contraction of HIV compared to other STDs, perhaps owing to the narrative of the relative severity of HIV infection (Gobin & Allard, 2016). In a study of 3001 female rape survivors concern about STDs

was found to be one of the most common stressors for survivors, and this concern was correlated with post-rape medical attention (Zinzow et al., 2012). However, only 21% of this sample sought medical attention immediately or after a delay. A wealth of research has noted the micro and macro-level barriers that women face in accessing medical care after sexual trauma (e.g., Cybulska, 2013; Logan et al., 2005; Kahn et al., 2018; Sable et al., 2006; Ullman & Townsend, 2007). Concern about STD contraction without medical confirmation and/or care may only heighten the emotional and psychological distress for survivors, and is likely compounded by the stigma and shame that often surround both sexual trauma and STDs (Kennedy & Prock, 2018).

Even when care is sought, when women present to a healthcare provider or the emergency department immediately following sexual trauma, STD screenings may not be able to accurately identify infections acquired during assault (Seña et al., 2015). As a result, many providers do not routinely offer STD screening, but rather offer antimicrobial prophylaxis at initial evaluation. Seña and colleagues (2015) recommend follow-up with sexual violence survivors when possible, as well as sensitive assessment of sexual violence history during routine STD screenings. Specific figures are not currently available, but the CDC highlights that STD follow-up care for SV survivors is generally poor (Ackerman et al., 2006).

STD Knowledge and Sexual Risk-Taking

Despite increased knowledge about and attention given to HIV over the years, knowledge about STDs remains low, particularly among individuals under the age of 40 (Jaworski & Carrey, 2001). In developing the STD Knowledge Questionnaire, Jaworski and Carrey (2007) attribute this low knowledge (in part) to lack of exposure to such information, and to new and ever-changing information about STD transmission and treatment. At the same time, STD knowledge remains a determinant of risk behaviors in several major health behavior theories

(e.g., Health Belief Model, Becker, 1974; Theory of Reasoned Action, Fishbein & Ajzen, 1975) wherein individuals acquire STD knowledge and evaluate it in terms of its personal relevance for risk reduction (Jaworski & Carrey, 2007).

For example, within the Information-Motivation-Behavior (IMB) Skills Model (Fisher & Fisher, 1992), STD knowledge includes: a) information about transmission and other factors such as etiology, treatment, and consequences, b) misinformation about sexual health, and c) cognitive processing that biases knowledge and sexual decision making (Fisher & Fisher, 1992; as cited in Jaworski & Carrey, 2007). Knowledge would then operate to influence behavior, in conjunction with motivation and understanding of biases that may impede self-protective behaviors. It is critical to note that, among all of the major extant theories behind STD prevention campaigns, there is *no* specific level of STD knowledge that has been identified to effectively promote protective behaviors, and reduce risk behaviors among young and early adult individuals.

Research on the specific effects of STD knowledge on risk behaviors is slim, and has instead primarily focused on the relationships between HIV knowledge and risk reduction. The limited extant data to date, however, do suggest that increased STD knowledge demonstrates reductions in risk-behavior. In a study of 1190 urban high school students, Gaydos and colleagues (2008) evaluated the effectiveness of an HIV and STD intervention. Among students who completed the program, there was a significant reduction in risk behaviors at 6 and 12-month follow-ups, and significant increases in condom negotiation skills as well as communication with partner(s) about safe sex and sexual history. This study was unique in its urine-based analysis of STDs as well. The authors reported significant decreases in positive STD

tests across all diseases sampled during follow-up collection. While the reasons for this are speculative, it is possible that STD knowledge may also foster greater initiation of care as well.

Similar results have been found in other intervention studies, though all have been within the context of combined HIV and STDs risk-reduction (Downs et al., 2004; Ehrhardt et al., 2002; Jemmott et al., 2011). Of course, STDs are similar to HIV with respect to transmission and prevention, and this overlap makes sense for efficiency and scalability of interventions. At the same time, given that STDs are substantially more common among women of reproductive age and continue to increase each year, it remains imperative to gain a better understanding of the relationships between STD knowledge and risk-reduction, and the specific factors that might influence these relationships.

Sexual Self-Efficacy

Individual factors may play a meaningful role in greater likelihood of *protective* behaviors, particularly if HIV/STD knowledge is already held. One possible, albeit understudied, route through which HIV and STD knowledge may reduce sexual risk behaviors may be via greater sexual self-efficacy. In evaluating current sexual education programs, it is notable that most curricula do not incorporate topics such as communication skills and increasing self-efficacy in sexual relationships. Scholars have argued that these skills are just as important to reducing HIV risk as knowledge of HIV and STDs and safe sex. Women with self-efficacious communication skills are often better able to negotiate with sexual partners on sexual preferences as well as safety precautions (St Lawrence et al., 1997; Valera et al., 2017). Researchers have connected this to social cognitive theory (SCT), first proposed by Albert Bandura. In the context of sexual education, SCT posits that individuals must understand themselves to be self-efficacious agents (Bandura, 2001), who feel competent in sexual health knowledge and are able

to incorporate this information despite individual, partner, or structural-level challenges (DiClemente & Wingood, 1995).

Sexual self-efficacy, specifically, refers to the belief in one's ability to successfully accomplish behaviors and manage affective responses in a sexual context (Bailes et al., 1998). Positive sexual self-efficacy has been associated with better sexual adjustment (Creti & Libman, 1989), fewer HIV risk behaviors (Devieux et al., 2002), and better overall sexual satisfaction. Notably, numerous studies have identified low sexual self-efficacy as a leading predictor of risky sexual practices among undergraduate populations (e.g., Wulfert & Wan, 1993; Cohen & Fromme, 2002; Reising et al., 2005; Dilorio et al., 2000). For example, in a study of multiethnic college women, those who scored high on sexual assertiveness and affirmed consistent intentions to use condoms were significantly more likely to use protection, and end sexual encounters deemed "unsafe" (Roberts & Kennedy, 2006). Thus, among university students, sexual self-efficacy appears to be a key factor in predicting sexual risk-taking behaviors.

Sexual Self-Efficacy and HIV/STD Knowledge

To date, little is known about the relationship between one's knowledge of HIV/STDs and sexual self-efficacy. In applying Social Cognitive Theory to the AIDS epidemic, Bandura (1994) emphasized the need for widespread psychoeducation regarding HIV, in order for individuals to then utilize this knowledge in the prevention of HIV and other sexually-transmitted diseases. Results from extant studies suggest that women who are already HIV positive and score higher on measures of self-efficacy report greater frequency of safe-sex behaviors, thereby reducing the risk of secondary infection to new partners (Crepaz & Martz, 2002; Raiford et al., 2007), indicating multiple pathways through which this self-efficacy can prevent both self-infection and infection of others. This theory has been extended and reiterated

in several other STD reduction/health promotion models, such as the Theory of Reasoned Action (Fishbein & Ajzen, 1975) and Information-Motivation-Behavior-Skills Model (Fisher & Fisher, 1992).

In one study of urban adolescents ages 13-15, HIV and STD knowledge was shown to be modifiable via psychoeducation, but this increase was not associated with self-efficacy for sexual risk behaviors (Mahat et al., 2015). In this study, however, parental monitoring *was* predictive of higher self-efficacy for risk-reduction – a factor that is frequently absent from the college experience. In a study of 229 Nepalese undergraduate students, greater HIV/STD knowledge was associated with higher sexual self-efficacy, and subsequently significantly fewer sexual risk behaviors in the year following initial assessment (Mahat & Pradnan, 2012). Interestingly, in a follow-up 2 years later, Mahat and colleagues (2014) compared Nepalese and American university students. Although HIV/STD knowledge was similar across both samples, American students reported significantly higher sexual self-efficacy – a finding that increased after receiving additional psychoeducation around HIV and STDs. These findings were hypothesized to be related to norms of individualism present within the United States, and may be indicative of the moderating role of culture in increasing sexual self-efficacy.

The delivery of HIV and STD education may also be critical in cultivating sexual self-efficacy among adolescents and young adults. Increasingly, HIV and STD prevention has incorporated the peer delivery model – that is, facilitation of educational groups by a leader who is matched with group members along a dimension (Slain et al., 2004). For example, Project SAFE (Sexual Awareness for Everyone) was a CDC-recommended STD education program for women that included role playing, videos, demonstrations, and lectures delivered by an ethnically-matched group facilitator (Slain et al., 2004). Researchers partially attributed the

success of this program to the "peer" component, as group participants reported feeling more empowered to incorporate this information as it was delivered by perceived peers. In one study, university students reported strong intentions of changing sexual behavior after attending an HIV/AIDS awareness event led by a student LGBTQ+ group, which may be indicative of increased self-efficacy following this attendance (Smith et al., 2012). Similar results have been found among HIV/STD prevention programs in Greek (Sleap et al., 2010) and athletic (Taylor et al., 2019) organizations.

Notably, in Smith and colleagues' (2012) study, female participants were 14 times more likely than their male counterparts to perceive high importance of their role in incorporating HIV prevention behaviors. While there may be many reasons for this, these results coincide with extant data that suggest women are frequently expected to take greater responsibility for their own and others' sexual behaviors and sexual health (e.g., Loew et al., 2017; Martin et al., 2014; Moran & Lee, 2011; Trinh, 2016). Thus, it is possible that when adolescents and young adults have been exposed to sexual health knowledge or sexual self-efficacious attitudes by peers, they are more likely to view the knowledge and skills as more applicable to the self, and this may be particularly true among female-identified students.

Sexual Self-Efficacy and Trauma

To date, no literature has explicitly examined the potential effects of trauma exposure on sexual self-efficacy. Broadly, trauma exposure has a complex relationship with self-efficacy, as self-efficacy can both *influence* and be influenced *by* trauma exposure. Bandura and Benight (2004) outlined this in their examination of Social Cognitive Theory as it relates to posttraumatic stress. Traumatic exposure has demonstrable links with self-blame, and negative self-appraisals about managing traumatic reactions (Dunmore et al., 1999; Foa et al., 1999; American

Psychiatric Association, 2013). Additionally, trauma survivors often report reduced perception of ability to manage one's environment and their role in it, given the frequently sudden, unpredictable, or chaotic ways in which trauma can occur (Foa et al., 1999). When the world is perceived to be uncontrollable, then, it can be difficult for survivors to perceive themselves as self-efficacious agents capable of acting upon their surroundings.

By the same token, in their work, Bandura and Benight (2004) highlighted that coping with trauma creates a strong need for self-management of recovery. Specifically, they delineated the role of coping self-efficacy as a key self-evaluative variable, which referred to the perceived ability to manage internal and external post-traumatic recovery demands. They further highlighted the adaptive role of coping self-efficacy, as it provides a sense of control in present and future adaptive coping (Bandura & Benight, 2004). Coping self-efficacy has subsequently been used to predict post-trauma recovery for number of different trauma types (e.g., Cieslack et al., 2008; Benight et al., 2005; Flatten et al., 2008; Hirschel & Schulenberg, 2009, etc.), and has been emphasized as an important intervention target in trauma treatment (Benight et al., 2015).

While coping self-efficacy has been a focal point in the posttraumatic growth literature, it remains unclear whether *sexual* self-efficacy is impacted by trauma exposure. It could be argued that sexual self-efficacy, particularly following trauma such as sexual assault, could serve as an avenue through which survivors reclaim a sense of control over their selves and/or their bodies. It is also at possible that sexual self-efficacy, given its relatively specific focus, may not be impacted by trauma exposure, particularly if the trauma type is unrelated (e.g., a hurricane).

Only two studies to date have evaluated trauma and sexual self-efficacy specifically. Perhaps unsurprisingly, both studies evaluated current sexual self-efficacy as it related to a history of sexual violence. In a longitudinal study of 739 adolescent boys and girls ages 14-18,

participants who reported a history of childhood sexual abuse had lower sexual self-efficacy scores over time, and this was mediated by "silencing the self" (i.e., de-prioritizing ones' sexual needs) attitudes (Vaillancourt-Morel et al., 2019). In a study of adults, Alan-Dikmen and Cankaya (2020) collected data from 469 Turkish women, and approximately 38% of the sample reported exposure to sexual violence. In this study, women who were exposed to adult sexual violence had significantly lower sexual self-efficacy scores. Given that this was the first comparison of its kind, the authors caution the interpretation of these findings. It is possible that sexual violence exposure negatively impacts survivors' interpretations of their role in sexual contexts. However, it is also plausible that initial low levels of sexual self-efficacy could be taken advantage of in nonconsensual or forcible situations (Alan-Dikman & Cankaya, 2020). It is critical to note that this does *not* implicate the survivor in any way for sexual violence, and rather, may be an important consideration in victimization or revictimization. With the potential impact of sexual self-efficacy on a variety of physical and mental health outcomes, it is imperative to gain a better understanding on the role of trauma on the development and maintenance of sexual self-efficacy.

Current Study

Women of reproductive age have been a focal point of the HIV/AIDS epidemic within the last 15 years (CDC, 2008). Despite this, it is unclear the degree to which women are aware of specific precautions and risk factors for HIV infection, given factors such as generational forgetting (Volkow, 2015). Additionally, infrequent, non-comprehensive, or absent sexual health education in middle and high schools (Duncan, 2006) likely contribute to the fact that adults appear to be frequently unaware of specific risk factors for HIV and other STDs, which may in turn impact their frequency of risk behaviors for both. The current study evaluated the

relationship between sexual health knowledge and sexual risk-taking behaviors among female-identified individuals between the ages of 18-44, as this age range has been identified by the CDC as time of highest risk for HIV/STD contraction. Given the limited literature, this study explored the associations between sexual violence exposure, sexual health knowledge, sexual self-efficacy, and risk-taking behaviors. Finally, the current study evaluated the potential moderating effect of sexual self-efficacy between sexual health knowledge and risk behaviors.

Based on the existing literature, the following were hypothesized:

Hypothesis 1

In a sample of female-identified individuals, participants who report a history of sexual violence (i.e., SV survivors) would report lower sexual health knowledge, lower sexual self-efficacy, and greater frequency of sexual risk-taking behaviors when compared to individuals without sexual violence histories.

Hypothesis 2

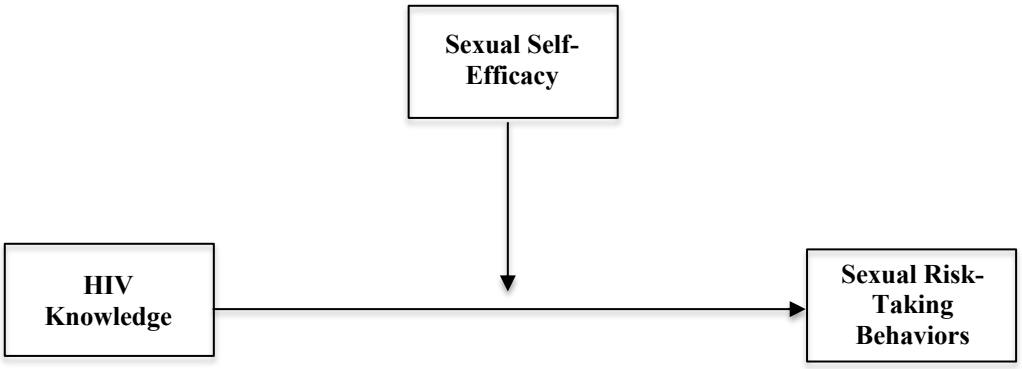
Sexual self-efficacy would moderate the relationship between HIV knowledge and sexual risk-taking behaviors (see Fig. 1).

2a) Specifically, it was hypothesized that higher levels of sexual self-efficacy would interact with higher levels of HIV knowledge, and would be associated with fewer sexual risk-taking behaviors.

2b) Conversely, lower sexual self-efficacy would interact with lower HIV, and would be associated with greater risk-taking behaviors.

Figure 1

Proposed Hypothesis 2 model.



Hypothesis 3

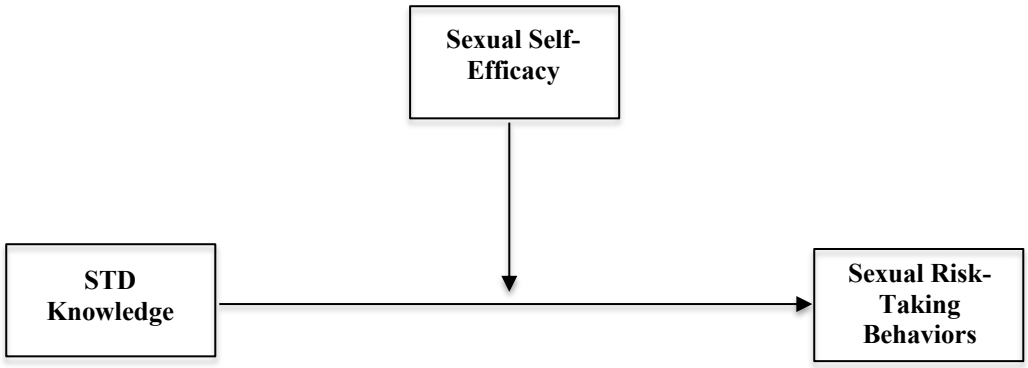
Sexual self-efficacy would moderate the relationship between STD knowledge and sexual risk-taking behaviors (see Fig. 2).

3a) Specifically, it was hypothesized that higher levels of sexual self-efficacy would interact with higher levels of STD knowledge, and would be associated with fewer sexual risk-taking behaviors.

3b) Conversely, lower sexual self-efficacy would interact with lower STD knowledge, and would be associated with greater risk-taking behaviors.

Figure 2

Proposed Hypothesis 3 model.



Data Analyses

SPSS and the PROCESS macro (Hayes, 2020) were used to conduct all analyses. To compare levels of HIV and STD knowledge, sexual self-efficacy, and sexual risk-taking behaviors between the sexual violence and non-sexual violence groups, Hypothesis 1 was examined using a one-way MANOVA. This method includes a multivariate test to determine whether levels of HIV knowledge, sexual self-efficacy, and sexual risk-taking differ dependent on sexual violence history, and also incorporates univariate *F* tests to determine the significance of each respective effect, if applicable (Stahle & Wold, 1990). This method has been shown to be preferable to conducting a series of ANOVAs, as MANOVA reduces the risk of Type I error and allows for the inclusion of covariates if needed (French et al., 2010).

Hypotheses 2 and 3 were examined via moderation models, examining how the relation between sexual health knowledge and sexual risk-taking behaviors differ at different levels of sexual self-efficacy. Prior to conducting the analyses, data were evaluated for the core assumptions of moderation. Namely, this included continuous independent and dependent variables, independence of observations, linearity, homoscedasticity, and normal distribution of errors (see below). Notably, numerous scholars have commented on frequent multicollinearity (i.e., high correlation between M and X) in moderation analyses, which is expected in a product of two variables. In the event multicollinearity is a concern, mean centering (e.g., standardizing the main effects) is recommended to remediate this issue (Kromrey & Foster-Johnson, 1998). Although Hayes (2013) notes that this may not always fully reduce multicollinearity, it is still recommended in moderation analyses to aid in meaningful interpretation of coefficients.

To evaluate the moderated effect (if any), this begins by testing the interaction effect of X (sexual health knowledge) and M (sexual self-efficacy) on Y (sexual risk-taking behaviors) via

the PROCESS macro. That is, a regression is run on X, M, and X*M on Y; if the coefficient for XM is 0, there is no moderation. Embedded in the PROCESS macro will be percentile bootstrap confidence intervals, generated automatically. If XM > 0, M appears to moderate the effect of X on Y, and the interaction will be probed via the Pick-a-Point approach (Hayes, 2018; Aiken & West, 1991). Most frequently, this entails estimating the conditional effect of X on Y when M is equal to the mean, a standard deviation below the mean, and a standard deviation above the mean.

Chapter II: METHOD

Participants

Power analyses were conducted via G*Power (Faul et al., 2009). In order to detect a small to moderate effect, a sample size at least 265 was required for the proposed analyses. To account for error and allow for covariates if needed, a sample size of 300 was collected. In this sample, 11 participants were excluded due to failing one or more attention checks, 4 were excluded for selecting "married" on the demographics questionnaire, and 3 participants were excluded due to failing the seriousness check, leaving a final *N* of 282 (M_{age} = 29.75, SD_{age} = 6.18). Participants reported a wide range of employment statuses, education levels, and annual incomes (see Table 1). The majority of the sample (*n* = 180, 63.8%) were currently single, and 105 (37.2%) were in a relationship. Next, 72.3% of the sample identified as heterosexual, and 72.6% of the sample identified as White. Last, 96.8% of this sample was assigned female at birth.

Table 1
Sample Demographics Characteristics

Item	M (SD)	Min-Max	N	%
Age	29.75 (6.18)	18-44		
Children				
Yes		1-5	65	23
No			217	77
Education				
High School or GED			29	10.3
Technical College or Occupational Certificate			10	3.5
Associate's Degree			28	9.9
Some College			40	14.2
Currently Attending College			13	4.6
Bachelor's Degree			116	41.1
Master's Degree			43	15.2
Doctorate or Professional Degree			3	1.1
Employment Status				
Unemployed			47	16.7

Employed part-time	58	20.6
Employed full-time	164	58.2
Not employed for pay	3	1.1
Other	10	3.5
Annual Income		
Less than $10,000	18	6.4
$10,001-$15,000	18	6.4
$15,001-$25,000	34	12.1
$25,001-$50,000	106	37.6
$50,001-$75,000	62	22.0
Over $75,001	44	15.6
Relationship Status*		
Single	180	63.8
In Relationship	105	37.2
Divorced/Separated	9	3.1
Widowed	1	0.4
Never Married	13	4.6
Sexual Orientation		
Heterosexual	204	72.3
Gay/Lesbian	10	3.5
Bisexual	52	18.4
Queer	4	1.4
Pansexual	7	2.5
Asexual	1	0.4
Other	3	1.1
Prefer not to say	1	0.4
Sex Assigned at Birth		
Female	273	96.8
Male	8	2.8
Prefer not to say	1	0.4
Gender Identity		
Female	275	97.5
Trans Female	6	2.1
Genderqueer/Other	1	0.4
Race or Ethnic Background*		
White	205	72.6
Hispanic/Latina	30	10.6
African-American/Black	32	11.3
Asian-American/Asian	23	8.1
Middle Eastern/North African	2	0.7
Native American/American Indian	5	1.8
Multi-racial		

*Percentages may be over 100% as participants were invited to select all that apply

Measures

Demographics

Demographics Questionnaire. The demographics questionnaire designed for this study included questions assessing age, geographic location (i.e., zip code, county, and state to determine urban or rural status), gender identity, income, education level, ethnic identity, relationship status, sexual orientation, religious affiliation, and parental status (See Appendix 1 for assessment measures).

Condom Usage and Sexual Risk Behaviors

Sexual Health and Behavior Survey. To date, many researchers have called for standardized measurements for condom usage, STD, and HIV-risk behaviors (Schroder et al., 2003; Noar et al., 2006). However, researchers have traditionally created study-specific forms in order to assess these variables. Such measures are often limited in scope (e.g., HIV Risk Questionnaire, 9 items; Brooner et al., 1993) or designed for specific groups (e.g., men who have sex with men, Li et al., 2010). Additionally, standardization of these measures requires questions related to time frame (e.g., in the last 30 days). In a meta-analysis of trends in condom use measurement for HIV prevention programs, Fonner, Kennedy, O'Reilly, and Sweat (2014) lamented the continued lack of widely-accepted standardized measurements, and made recommendations for measures to include items in 3 key areas: 1) condom use at last sex, 2) consistent condom use, and 3) number of protected and unprotected sex acts. Within these domains, the authors further recommended that type of sex (i.e., vaginal, oral, or anal) be specified, and response choices should generally avoid dichotomous responses (Fonner et al., 2014). The authors note that these recommendations are in line with the United Nations General

Assembly Special Session guidelines, as they can be made easy to understand, can minimize recall bias, and reduces ceiling and floor effects.

On the basis of these guidelines, condom usage and HIV risk behaviors were assessed through questions adapted from the CDC Sexual Behavior Questionnaire (CSBQ) (2015). The CSBQ was originally an 80-item, multi-tiered questionnaire developed by the CDC HIV-STD Behavioral Surveillance Working Group. Questions were selected in order to assess number of sexual partners, frequency of sexual acts, frequency of condom usage, current or past risk behaviors (i.e., drug use, tattooing, etc.), and sexual contact with others who have risk factors. Adaptations were made in order to exclude items for male participants, include greater response options for items (e.g., *always*, *usually*, *sometimes*, *rarely*, *never*), and to shorten questions and definitions. Additionally, the time frame for this measure was modified from past 1 year to past 2 years. This was based on the timing of the COVID-19 pandemic, and the potential impact of reporting on sexual behavior during a year of significantly reduced social contact for many people. The adapted measure included a total of 27 items. In line with the CDC's scoring of this measure, for the purposes of this study, endorsement of each sexual risk behavior was summed. Use of the measure in this way provides information on breadth of sexual risk-taking behaviors, and was less likely to be impacted by recall concerns for number of specific sexual acts (Graham et al., 2003). A total of 22 risk behaviors (see Appendix 1B) were included in the final scoring of the measure, with scores ranging from 0-22. Chronbach's alpha for this measure was calculated ($\alpha = 0.89$).

Lifetime Sexual Violence

Sexual Experiences Survey – Short Form Version (SES-SFV): The SES-SFV (Koss et al., 2007; Koss & Oros, 1982) consists of 10 self-report items that assess experiences of unwanted

sexual contact, sexual coercion, attempted sexual coercion, rape, and attempted rape. Participants indicate how many times (0, 1, 2, or 3+) a given experience occurred a) since age 14, and b) within the previous 12 months. This measure demonstrates good psychometric properties. In creating the measure, Koss and colleagues found an internal consistency of .74, with 93% agreement across two administrations. More recently, Johnson, Murphy, and Gidycz (2017) found an internal consistency of .92 with 70% agreement across three administrations. Consistent with previous research (e.g., Ullman & Brecklin, 2002) the SES-SFV also demonstrates good predictive validity for trauma symptomatology; the SES-SFV significantly predicted dissociation (partial $\eta^2 = .04$), anxiety (partial $\eta^2 = .04$), depression (partial $\eta^2 = .04$), and sleep disturbances (partial $\eta^2 = .05$). In the current study, Chronbach's alpha was 0.97.

Scoring for this measure can render either categorical or continuous outcome responses. The revised SES-SFV (2007) includes scoring for both frequency (i.e., no victimization to up to 15 instances of victimization) and severity (i.e., in order of unwanted sexual contact, attempted or completed coercion, attempted rape, and completed rape). The measure may also be used to categorize individuals as victims or non-victims (e.g., Gidycz, Orchowski, King, & Rich, 2008). For the purposes of this study, victimization was included as a binary categorical variable, whereby participants were categorized into sexual assault survivors (i.e., at least 1 reported attempted or completed penetrative experience of sexual violence since age 14) and individuals without a sexual violence history.

HIV/AIDS Knowledge

The HIV Knowledge Questionnaire – 18 (HIV-K-Q). The HIV-K-Q (Carrey & Schroder, 2002) is an 18-item questionnaire that measures knowledge about sexual transmission (e.g., vaginal, oral, or anal), prevention (e.g., condom use, monogamy, etc.), and consequences (e.g.,

treatment, disease course) of HIV infection. Participants may respond with *True*, *False*, or *Don't Know*, to statements in these areas. Total scores are obtained by summing the total correct items; items marked *Don't Know* are scored as incorrect. Thus, total scores can range from 0 to 18, and percentage correct scores are then calculated.

The HIV-K-Q 18 is a shortened version of the original 45-item version. In developing the HIV-K-Q, Carrey et al. (2002) note this measure takes less than 5 minutes to complete, and questions were developed at a fourth to seventh grade reading level. The original HIV-K-Q has demonstrated extensive reliability across age groups, genders, sexual orientations, racial and ethnic groups, and education levels (Carrey et al., 1997; Carrey et al., 1998; Fields, 2005; Jannulis, Newcomb, Sullivan, & Mustanski, 2018). Specific to the HIV-K-Q 18, Carrey and colleagues found an internal consistency across three samples to be between .75 and .89, with high test-retest reliability across over 1 (r = .94) and 3 (r = .76) week intervals. Carrey and colleagues noted the measure's extremely high overlap (r = .97) with the more extensive HIV-K-Q 45-item version, thus arguing that this briefer version assesses nearly exactly the same dimensions as its longer predecessor. Importantly, Carrey and colleagues also evaluated the HIV-K-Q 18's sensitivity to change following a psychoeducational intervention. As part of a larger study on motivation for HIV risk reduction, the authors found that the HIV-K-Q 18 effectively assessed change in pre and post-intervention knowledge. For the current study, Chronbach's alpha was 0.86.

STD Knowledge

STD Knowledge Questionnaire (STD-K-Q): The STD-K-Q is a 27-item questionnaire, developed as a continuation of the HIV-K-Q and HIV-K-Q 18 in order to better assess broader STD knowledge (Jaworski & Carey, 2007). It measures general knowledge about transmission,

prevention, and causes of the 6 most common sexually transmitted diseases (i.e., chlamydia, genital herpes, gonorrhea, hepatitis B, HIV, and human papillomavirus) for adults within the United States. Like the HIV-K-Q, respondents indicate *True*, *False*, or *Don't Know*, to various statements. The STD-K-Q demonstrates good psychometric properties, including internal consistency (r = .86), test-retest reliability over a 2-week period (r = .88), and sensitivity to change following an educational STD program. Given that no other broad assessment of STD knowledge exists, convergent validity was assessed via the HIV-K-Q 18, with a Pearson correlation coefficient of r = .64. The authors note that this moderate correlation supports the validity of the STD-K-Q, even after acknowledging that shared method variance may account for some of the covariation (DeVellis, 2003). For the current study, Chronbach's alpha was 0.91.

Self-Efficacy in Sexual Health Practices

Sexual Health Practices Self-Efficacy Scale (SHPSES): The SHPSES consists of 20 items representing a variety of sexual health practices (Koch et al., 2004; as cited in Fisher et al., 2010). Respondents indicate their confidence (self-efficacy) in performing these practices, on a scale from 1 (*not at all confident*) to 5 (*extremely confident*). Confidence is defined as having the knowledge, skills, practice, and comfort necessary to carry out the sexual health practice (Fisher et al., 2010). This scale was designed based upon Bandura's (1977) theory of self-efficacy, and Koch and colleagues noted that self-efficacy is believed to be one of the most important prerequisites for behavioral change (Holloway & Watson, 2003; as cited in Koch et al., 2004), and measures of self-efficacy are shown to be related to outcomes in other health-related contexts, such as HIV treatment adherence, hypertension, and pain management (Johnson et al., 2007). This measure demonstrates good convergent validity with other measures of sexual self-efficacy (e.g., the Sexual Risk Behavior Beliefs and Self-Efficacy Scales; Basen-Engquist et al.,

1999). Chronbach's alpha for the entire measure was 0.89, and was measured at 0.92 for the current study. The SHPSES can be further divided into six subscales, including self-efficacy in regards to Sexual Relationships (5 items, $\alpha = 0.82$), Sexual Health Care (4 items, $\alpha = 0.81$), Sexual Assault (3 items, $\alpha = 0.78$), Safer Sex (4 items, $\alpha = 0.71$), Sexual Equality/Diversity (3 items, $\alpha = 0.72$), and Abstinence (1 item, Chronbach's alpha not measured). Among university samples, this measure has also demonstrated the ability to discriminate between participants whom have taken sexual health classes and those who have not, and has shown positive correlation with actual practice of safer sexual behaviors in the month following its administration (Millstein, 2006). Total scores for this measure are obtained by summing the scores from individual items, and range from 20 (lowest self-confidence) to 100 (highest self-confidence).

Procedure

Participants were eligible for the study if they identified as female, were between the ages of 18-44, were not currently married, and had been sexually active, in-person, with at least one other person in the past 2 years. In line with recommendations from other MTurk research, participants were required to have at least a 95% approval rating on MTurk (the vast majority of MTurk workers), as these workers score better on measures of attentiveness compared to those with a < 94% approval ratio (Peer et al., 2017).

MTurk

The present project recruited participants from Amazon's Mechanical Turk (MTurk) platform. MTurk is an internet-based platform that allows for data collection from individuals across the globe, though geographic restrictions can be placed (e.g., United States participants only). Extant data indicate that MTurk participants offer a broad range of sociodemographic

diversity for researchers that can far exceed convenience sampling, while still allowing for more efficient and cost-effective data collection (Buhrmester et al., 2017; Tompkins & Swift, 2019). Researchers are able to create surveys through online platforms such as Qualtrics (Buhrmester, Kwang, & Gosling, 2011) and ultimately link their survey to the MTurk website for online participation.

Comprehensive data on the sociodemographics of MTurk workers are not publicly available as workers disclose this information on an opt-in basis only. However, existing data suggest that MTurk is highly suitable for gathering data that would meet the inclusion criteria for the current study. An ongoing project, known as MTurk Tracker (Iperiotis, 2010) provides a daily update on MTurk worker demographics, which workers can update once per month. In a summary update in 2019, Difallah, Filatova, and Iperiotis published 28 months of data on MTurk demographics. In this evaluation of over 40,000 MTurk workers, 75% of participants were from the United States, 55% of U.S. respondents were female, 88% were under the age of 49, and 40% were single (i.e., non-married). While the current inclusion criteria could also be collected within a university convenience sample, a plethora of research to date indicate that the representation of MTurk workers is equal to or exceeds that of traditional college samples, thus allowing for broader generalization of results (e.g., Behrend et al., 2011; Casler et al., 2013; Chandler & Shapiro, 2016; Pontin, 2007). In other sociodemographic samples, MTurk has been found to be a valid way to assess for sexual health, risk-behaviors, as well as trauma variables (Beymer et al., 2018; Strickland et al., 2020; Struckman-Johnson et al., 2020).

Recruitment

On the MTurk worker platform, this study was advertised using the title: Sexual Health, Trauma, and Risk-Taking Among Women. Additionally, the MTurk description included the following text:

> *WARNING: This HIT may contain adult content. Worker discretion is advised. Help us understand people's sexual health knowledge (e.g., what do condoms protect you from?) and behaviors, and experiences of trauma. Please read qualifications before beginning the survey.*

Prior to beginning the study, participants were asked to confirm that they identified as female, were between the ages of 18-44, were not currently married, and had been sexually active in the past 2 years. In line with recommendations from other MTurk research, participants were required to have at least a 95% approval rating on MTurk (the vast majority of MTurk workers), as these workers score better on measures of attentiveness compared to those with a < 94% approval ratio (Peer et al., 2017).

The study's purpose, informed consent, benefits of participation (e.g., incentives, self-awareness), foreseeable risks (e.g., discomfort) and freedom to skip questions or withdraw without penalty was included at the beginning of the survey. The survey required a forced response to agree to the consent form prior to proceeding with the study. Participants then completed the survey measures via Qualtrics. All questionnaires and attention checks were administered in randomized order, with the exception of the seriousness check to be administered at the end of participation (see below).

Attention Checks

With the rise in online data collection, attention checks are recommended to increase the quality of the data (e.g., Aust et al., 2013). Such checks can help to reduce random responding, and increase the seriousness/validity of answers in the event participants are seeking to quickly finish surveys, and/or aimlessly selecting answers out of curiosity rather than well-thought out responses (Reips, 2009). For this study, a total of four attention-check questions were inserted randomly throughout the survey, based on Aust et al.'s (2013) recommendations. In addition, there was a 1-item seriousness check administered at the end of the survey, such that participants indicated whether they responded seriously to all items (see Appendix 1G). While there is no accepted standard for a minimum (or maximum) number of attention checks, it is recommended that at least a few be inserted within survey studies (Hauser et al., 2018; Thomas & Clifford, 2015) These insertions should be mindful of adding extra time to participation, and should attempt to be relatively neutral or innocuous, so as not to bias responses to later questions (Hauser & Schwarz, 2015). For the current study, participants were required to score 100% on all 5 attention and seriousness items in order for their data to be included in analyses.

No participants completed the survey in less than 7 minutes (i.e., those who spend approximately 3 seconds per question, as per Bardos et al. 2015). Such responses likely reflect random responding and would have been excluded. The average time for completion in this sample was 28 minutes and 31 seconds. Additionally, although participants were allowed to complete the survey only once, multiple responses were checked in two ways to prevent ballot box stuffing (Bardos et al., 2015): 1) their MTurk identification number 2) their internet protocol (IP) address. In the current study, no participants were excluded due to duplication of MTurk number or IP address.

MTurk Timeline

The current study collected data from 300 participants. MTurk Data Consultants, a company that aids organizations and universities with MTurk data collection, suggest that for studies with less than 500 participants, most data can be completed within 24 hours (2018). However, MTurk Data Consultants note that this is more likely to be the case when specific qualifiers or inclusion criteria are limited. For this study, a pilot batch of 10 surveys was posted on March 27, 2021 and was completed on March 28, 2021. Given no errors with this initial batch, the remaining 290 surveys were published on April 8, 2021 and the batch was completed on May 12, 2021 (34 days).

MTurk Compensation

Although compensation for MTurk workers tends to be lower than that of convenience sampling, data suggest that this factor neither reduces level of participation, nor the quality of data gathered (Mason & Suri, 2012; Tompkins, 2019). Participants in the current study were compensated at a rate of $0.50 for completing the survey, as this rate has been shown to effectively generate quality samples (Tompkins, 2019). Many MTurk workers report alternative motivations for completing tasks or surveys, such as the desire to contribute to research, to have fun, or to spend time doing a productive activity (Ipeirotis, 2010).

MTurk Debriefing

Due to the nature of this project and questions asked, a debriefing form was included at the end of each survey to provide participants with a brief explanation of the study's aims and resources for those that may want additional mental health and/or sexual health support (see Appendix 1H).

Chapter III: RESULTS

Descriptive Statistics

With regard to sexual health history, 47.5% (*n* = 134) of participants had ever been tested for HIV/AIDS, and 156 (55.3%) had been tested for STDs/STIs (see Table 2). Within the total sample, seven participants (4.9%) reported that they were HIV positive. Additionally, the following lifetime positive results were reported for the following STDs/STIs: chlamydia (*n* = 32, 11.3%), gonorrhea (*n* = 10, 3.5%), genital herpes (*n* = 14, 5.0%), genital warts or human papillomavirus (*n* = 18, 6.4%), hepatitis B (*n* = 6, 2.1%), and syphilis (*n* = 6, 2.1%).

Table 2
Sexual Health Testing History from Sexual Health and Behavior Survey

	Yes (%)	No (%)
Lifetime HIV/AIDS Testing	134 (47.5)	138 (48.9)
Lifetime STD/STI Testing	156 (55.3)	122 (43.3)

On the Sexual Health and Behavior Survey, participants reported an average age of initial sexual contact of 16.8 (*SD* = 4.1), and 170 (60.3%) reported using a condom when they had sexual intercourse for the first time. Over the last 2 years, only 11.3% (*n* = 32) of respondents reported carrying condoms "all of the time," and 35.1% (*n* = 99) reported "never" carrying condoms. Among individuals who had sexual contact with male partners in the last 2 years, fewer than one third of respondents reported using condoms "all of the time" during vaginal (*n* = 76, 29.5%), oral (*n* = 24, 9.8% of respondents), and anal sex (*n* = 34, 21.8%) with male partners. For those who had sexual contact with female partners in the last 2 years, fewer than one in six respondents reported using condoms "all of the time" during vaginal (*n* = 10, 9.7%), oral (*n* = 12, 11.5%), and anal sex (*n* = 12, 14.8%) with female partners.

For participants who had sexual intercourse with a *new* partner in the last 2 years, 50.4% (*n* = 104) discussed sexual histories prior to sex, and 49.5% (*n* = 102) did not. Given this data was collected during the COVID-19 pandemic, participants reported the following regarding their current in-person sexual activity compared to prior to the pandemic: greatly increased (8.5%), somewhat increased (15.6%), stayed the same (37.6%), somewhat decreased (19.9%), and greatly decreased (18.4%).

A total of 22 HIV/STD contraction risk items were included in final analyses, based on affirmative answers on the Sexual Health and Behavior Survey. Participants reported a mean of 7.7 sexual risk behaviors (*SD* = 5.07, range = 0-22) within the last 2 years. In line with previous research, the most common risk behavior within this sample was sex with multiple male partners (*N* = 266, 94.3%), followed by unprotected oral sex (*N* = 220, 78.0%) and vaginal sex (*N* = 181, 64.2%) with male partners. See Table 3 for full results of risk behaviors.

Table 3
Sexual Risk Behaviors in the Last 2 Years

Sexual Risk Item	Yes (%)	No (%)
1. Taken street drugs using a needle	37 (13.1)	245 (86.9)
2. Shared needles within the last 2 years	25 (8.9)	257 (91.1)
3. Shared cotton, cooker, or rinse water	26 (9.2)	256 (90.8)
4. Shared needles via front-loading or back-loading	23 (8.2)	259 (91.8)
5. Engaged in group sex	93 (33.0)	189 (67.0)
6. Had sex with a person you paid for sex, or who paid you for sex	62 (22.0)	220 (78.0)
7. Multiple male partners in the last 2 years	266 (94.3)	16 (5.7)
8. Multiple female partners in the last 2 years	95 (33.7)	187 (66.3)
9. Had sex with a partner who injects drugs	68 (24.1)	214 (75.9)
10. Had sex with men who have sex with prostitutes/sex workers	59 (20.9)	223 (79.1)
11. Had sex with men who have sex with men	58 (20.6)	224 (79.4)
12. Had sex with a person who is HIV+	40 (14.2)	242 (85.8)
13. One night stand(s) with a male partner	156 (55.3)	126 (44.7)
14. One night stand(s) with a female partner	40 (14.1%)	242 (85.9)
15. Had sex while under the influence of alcohol	132 (46.8)	150 (53.2)

16. Had sex while under the influence of marijuana or other drugs	85 (30.1)	197 (69.9)
17. Male partner(s): Unprotected – vaginal intercourse	181 (64.2)	101 (35.8)
18. Male partner(s): Unprotected – anal intercourse	122 (43.3)	160 (56.7)
19. Male partner(s): Unprotected – oral intercourse	220 (78.0)	62 (22.0)
20. Female partner(s): Unprotected – vaginal intercourse	93 (33.0)	189 (67.0)
21. Female partner(s): Unprotected – anal intercourse	69 (24.5)	213 (75.5)
22. Female partner(s): Unprotected – oral intercourse	92 (32.6)	190 (67.4)

Preliminary Analyses

This sample yielded extremely low rates of missing data across variables: SHBS (0%), SHPSES, (n = 1, 0.3%), SES-SFV (0%), HIV-K-Q (n = 1, 0.3%), and STD-K-Q (0%). Accordingly, the data appeared to be missing completely at random and did not appear to be related to specific items or measures (Little's MCAR test $\chi^2 = .547$, $p = .761$). Although items within the survey were not forced choice, low levels of missing data are common in MTurk samples that require a >95% HIT approval rating, as these respondents have demonstrated high completion rates of other surveys (Peer et al., 2017).

Outliers were assessed via evaluation of Mahalanobis, Cook's, and Leverage distances (Hayes et al., 2013). No significant outliers were detected via these three tests, thus the complete sample of 282 was retained. Prior to addressing the hypotheses of the current study, the identified variables (i.e., sexual risk behaviors, sexual self-efficacy, and STD/HIV knowledge) were assessed for normality (see Table 3). As a binary variable, sexual violence history was not assessed in this way. In line with scoring recommendations from Koss and colleagues (2007), participants were considered sexual violence survivors if they responded affirmatively to at least one experience of attempted or completed penetration on the SES-SFV. In this sample, 186

(66.0%) of participants reported at least one sexual violence experience since age 14, and 96 (34.0%) did not.

Table 4
Descriptive Statistics for Variables

Item	Mean	SD	Min-Max	Skewness	Kurtosis
SHPSES	72.25	15.43	20-100	-.304	.145
HIV-K-Q	11.43	4.57	0-18	-.608	-.491
STD-K-Q	13.48	6.48	0-27	-.177	-.754
SHBS	7.70	5.07	0-22	.967	.054

Note: SHPSES = Sexual Health Practices Self-Efficacy Scale; HIV-K-Q = HIV Knowledge Questionnaire; STD-K-Q = STD Knowledge Questionnaire; SHBS = Sexual Health and Behavior Survey, Sexual Risk Items

With regards to normality, the SHPSES, SHBS, HIV-K-Q and STD-K-Q demonstrated normality, linearity, homoscedasticity, and normal distribution of errors and were therefore used in their original form.

Knowledge about HIV and STDs was generally low within this sample. On the HIV-K-Q, respondents scored an average of 11.43 items correctly, corresponding to a score of 63.5% on the measure. Eleven (3.9% of sample) respondents received a score of 100% on this measure. Knowledge about STDs was lower, and respondents scored an average of 13.48 (49.9%) items correctly on the STD-K-Q. No respondents scored 100% on this measure, and 6 (2.1% of sample) scored above a 90%.

Pearson's *r* correlations and *t* tests were used to assess for demographic differences associated with outcome variables for MANOVA and moderation analyses, respectively (see Table 5). Namely, these demographic variables included age, ethnicity, relationship status, and sexual orientation. Due to cell size limitations, participants were recoded and grouped into two categories for ethnicity (White as "1," $n = 191$, Women of Color as "2," $n = 91$), sexual orientation (heterosexual as "1," $n = 204$, and all other sexual identities as "2," $n = 78$), and relationship status (single as "1," $n = 173$, and in a relationship as "2," $n = 82$).

Age was significantly correlated with STD knowledge ($r = .182$, $p < .01$) as well as HIV knowledge ($r = .136$, $p < .05$), such that as age increased, knowledge in these areas increased as well. Ethnicity was significantly negatively associated with sexual risk behaviors, such that individuals who identified as White had significantly higher numbers of sexual risk behaviors (t (280) = 2.64, $p = .009$). Relationship status was related to several variables, such that individuals who were single reported a greater number of sexual risk behaviors (t (253) = 3.13, $p = .002$), lower sexual self-efficacy (t (252) = -2.18, $p = .03$), and lower STD knowledge (t (253) = -2.09, $p = .04$). Sexual orientation was significantly associated with STD knowledge as well as sexual risk behaviors, such that individuals who identified as heterosexual had fewer sexual risk behaviors (t (280) = -4.13, $p < .001$) and lower STD knowledge (t (280) = -2.08, $p = .04$) compared to individuals who identified with other sexual orientations. See Table 5 for descriptive statistics on risk behaviors based on identity factors.

Table 5
Descriptive Statistics for Risk Behaviors Related to Identity Factors

Item	Mean (SD)	Min-Max
Ethnicity		
White	8.24 (5.34)	0-22
Women of Color	6.55 (4.25)	1-20
Relationship Status		
Single	8.54 (5.71)	0-22
In A Relationship	6.39 (3.61)	1-17
Sexual Orientation		
Heterosexual	6.95 (4.80)	0-22
LGBTQ+	9.65 (5.27)	2-22

Given these findings, age, ethnicity, relationship status, and sexual orientation were included as covariates in the MANOVA analysis. Similarly, given that they were associated with sexual risk taking as an outcome, ethnicity, relationship status, and sexual orientation were also included as covariates in the two moderation analyses.

Associations Among Identified Variables

Given significant associations among the key study variables (see Table 6) and that multicollinearity is a concern for both moderation and MANOVA analyses, a variance inflation factor (VIF) was calculated for each variable (Dodge, 2008). All variables were well below the suggested cutoff for multicollinearity (i.e.,VIF > 5,), suggesting that there was not significant concern for this data set. These results were consistent with the hypotheses that sexual self-efficacy, STD/HIV knowledge, and sexual risk-taking are related, and warranted further investigation into whether sexual self-efficacy may moderate the relationship between knowledge and sexual risk-taking.

Table 6

Correlations Between Identified Variables

Item	1 (VIF)	2 (VIF)	3 (VIF)	4
1. SHPSES	-	-	-	-
2. HIV-K-Q	.175** (1.03)	-	-	-
3. STD-K-Q	.200** (1.04)	.619** (1.62)	-	-
4. SHBS	-.239** (1.06)	-.281** (1.08)	-.156** (1.02)	-

**Correlation is significant at the .01 level

Note: SHPSES = Sexual Health Practices Self-Efficacy Scale; HIV-K-Q = HIV Knowledge Questionnaire; STD-K-Q = STD Knowledge Questionnaire; SHBS = Sexual Health and Behavior Survey, Sexual Risk Items

Primary Analyses

Hypothesis 1

To test hypothesis one, I used a one-way MANCOVA to examine differences in sexual self-efficacy, HIV knowledge, STD knowledge, and sexual risk-taking behaviors between the sexual violence survivor and non-SV survivor groups. As noted above, age, ethnicity, relationship status, and sexual orientation were included covariates in the model. The Box M test was significant, $F(10, 149881) = 3.28$, $p < .001$, indicating that the covariance matrices among the survivor and non-survivor groups were not equal across the dependent variables. Levene's test was not significant for HIV Knowledge $F(1, 252) = 1.33$, $p = 2.49$, or STD Knowledge $F(1,$

252) = 1.37, p = .241, indicating that the error variance across groups was approximately equivalent for these variables. Levene's test was significant for sexual self-efficacy F (1, 252) = 5.41, p = .021, and sexual risk-taking behaviors F(1, 252) = 9.35, p = .002, indicating non-equivalent error variance. Generally, MANOVA and MANCOVA are robust to violations of Box's M if group sizes exceed 30 (Allen & Bennett, 2008). However, given that Levene's test was also violated (i.e., multivariate normality cannot be assumed), Pillai's trace is the recommended statistic for interpretation in this event as it is the most robust to assumption violations (Hayes, 2008).

At the multivariate level, there was a statistically significant difference between the survivor and non-survivor groups,: Pillai's Trace = .107, F (4, 245) = 7.31, p < .001, partial η^2 = .105. There were statistically significant differences in survivor and non-survivor groups based on sexual orientation (Pillai's Trace = .099, F (4, 245) = 6.75, p < .001, partial η^2 = .099), relationship status (Pillai's Trace = .057, F (4, 245) = 3.68, p = .006, partial η^2 = .057), and age (Pillai's Trace = .039, F (4, 245) = 2.47, p = .045, partial η^2 = .039). There was no significant difference based on ethnic identity (Pillai's Trace = .017, F (4, 245) = 1.08, p = .365, partial η^2 = .017).

Univariate analyses identified a significant difference in sexual risk-taking behaviors based on sexual violence history F (1, 248) = 27.62, p < .001, partial η^2 = .052. Individuals with a sexual violence history reported a mean of 8.97 sexual risk behaviors (SD = 5.38) while those without a SV history reported a mean of 5.23 (SD = 3.21) sexual risk behaviors. No significant differences due to survivor status were found for sexual self-efficacy F(1, 248) = 4.69, p = .138, STD knowledge F (1, 248) = 2.99, p = .085, or HIV knowledge F(1, 248) = 2.44, p = .119.

Significant differences based on sexual orientation were found for risk behaviors (F(1, 248) = 12.69, p = < .001, partial η^2 = .022), STD knowledge (F(1, 248) = 5.59, p = .119, partial η^2 = .022), and HIV knowledge F(1, 248) = 4.31, p = .039, partial η^2 = .018). For age, there were significant differences in HIV knowledge (F(1, 248) = 4.87, p = .028, partial η^2 = .019) and STD knowledge (F(1, 248) = 9.45, p = .002, partial η^2 = .037). For ethnicity, there were significant differences in sum of sexual risk behaviors (F(1, 248) = 3.96, p = .047, partial η^2 = .016). With regard to relationship status, there were significant differences in sexual risk behaviors (F(1, 248) = 10.51, p = .001, partial η^2 = .041), sexual self-efficacy (F(1, 248) = 4.69, p = .031, partial η^2 = .019), and STD knowledge (F(1, 248) = 4.72, p = .031, partial η^2 = .019).

Hypothesis 2

To evaluate whether sexual self-efficacy moderates the relationship between HIV knowledge and sexual risk-taking behaviors, Hypothesis 2 was examined via a moderation model, with ethnicity, relationship status, and sexual orientation included as covariates. The hypothesized model was evaluated using SPSS statistical software, version 23 (IBM, 2015) and the PROCESS macro version 3.5.3 (Hayes, 2017) with 10,000 bootstrap confidence intervals. HIV knowledge was entered as the X variable, sexual self-efficacy as the moderator (M), and sexual risk-taking behaviors as the Y variable. Although multicollinearity was unlikely to impact the results of these analyses, Hayes (2013) still recommends mean centering in moderation analysis for meaningful interpretation of coefficients, and when it is important to examine direct effects in addition to interaction effects. As such, the HIV Knowledge and sexual self-efficacy variables were mean centered for evaluation of Hypotheses 2 and 3.

The overall model was significant, F(6, 247) = 14.19, p < .0001, R^2 = .256. The main effect of HIV knowledge on sexual risk behaviors was significant, β = -.295, t(247) = -4.61, p <

.0001, 95% CI [4.59, 10.34], such that for every one standard deviation increase in HIV knowledge, there was a decrease of .295 sexual risk behaviors. The main effect of sexual self-efficacy on sexual risk taking was also significant, β = -0.063, $t(247)$ = -3.37, p = .0009, 95% CI [-.1001, -.0265]. Sexual orientation β = 3.56, $t(247)$ = 5.47, p < .0001, 95% CI [2.28, 4.85], relationship status β = -1.45, $t(247)$ = -2.35, p = .019, 95% CI [-2.68, -.273], and ethnicity β = -1.75, $t(247)$ = -2.84 p = .0009, 95% CI [-2.96, -.541] were all significant covariates in the model.

The interaction of sexual self-efficacy and HIV knowledge reached significance, β = .0076, $t(247)$ = 1.95 p = .05, 95% CI [.0001, .0152], indicating that the moderation model was supported. The conditional effects of X, M, and X*M on Y were further probed via the pick-a-point approach, using the mean centered values of HIV Knowledge and sexual self-efficacy (see Table 7). At low levels (i.e., 1 SD below the mean; SHPSES = 56.7) of sexual self-efficacy, the following was calculated: β = -.413, $t(247)$ = -4.60, p < .0001, 95% CI [-.590, -.236]. At average levels (SHPSES = 72.25) of sexual self-efficacy the following was calculated: β = -.295, $t(247)$ = -4.62 p < .0001, 95% CI [-.422, -.169]. Finally, at high levels (i.e., 1 SD above the mean; SHPSES = 87.7) of sexual self-efficacy, the following was calculated: β = -.178 $t(247)$ = -2.08, p = .039, 95% CI [-.347, -.009].

In evaluation of the Johnson-Neyman values, when sexual self-efficacy scores were at or below 1 SD above the mean (i.e., scores of 88.5 or more), HIV knowledge and sexual self-efficacy were significantly related to fewer risk behaviors, (β = -.172, t (247) = -1.97, p = .05, 95% CI [-.345, .001]; HIV knowledge did not significantly predict sexual risk behaviors at sexual self-efficacy scores of 92.08 and above (β = -.145, t (247) = -1.49, p = .136, 95% CI [-.337, .046]. Taken together, the moderating effect for HIV knowledge and sexual self-efficacy related to fewer sexual-risk taking behaviors was strongest at lower levels of sexual self-efficacy,

and weaker as sexual self-efficacy increased. See Figure 3 for graphed value of sexual risk behaviors at low, average, and high values of HIV knowledge and sexual self-efficacy.

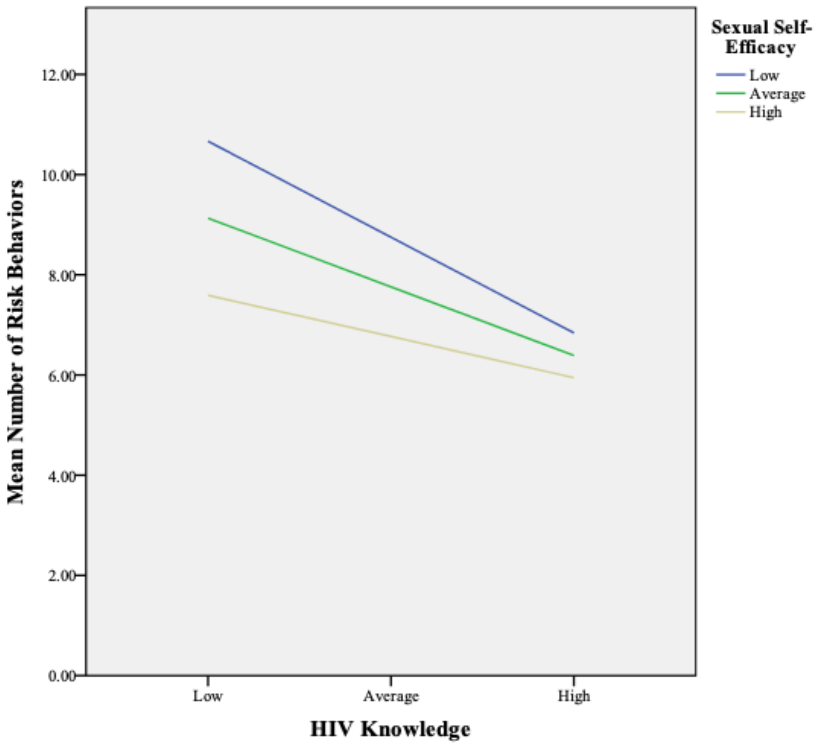
Table 7

Conditional Effects of HIV Knowledge at Values of Sexual Self-Efficacy

SHPSES	HIV-K-Q	*t*	*P*	LLCI	ULCI
-15.547	-.4133	-4.60	.0000	-.5903	-.2364
.0000	-.2958	-4.62	.0000	-.4220	-.1696
15.547	-.1783	-2.08	.0385	-.3470	-.0095

Figure 3

Conditional effects of risk behaviors at levels of HIV knowledge and self-efficacy.



Hypothesis 3

To evaluate whether sexual self-efficacy moderated the relationship between STD knowledge and sexual risk-taking behaviors, Hypothesis 3 was examined via a moderation

model, with ethnicity, relationship status, and sexual orientation as covariates. STD knowledge was entered as the X variable, sexual self-efficacy as the moderator (M), and sexual risk-taking behaviors as the Y variable.

The overall model was significant, $F(6, 247) = 10.27$, $p < .0001$, $R^2 = .199$. The effect of STD knowledge on sexual risk-taking behaviors was significant, $\beta = -.107$, $t(247) = -2.24$, $p = .03$, 95% CI [-.202, -.013]. For every one standard deviation increase in STD Knowledge, there was a .107 unit decrease in sexual risk behaviors. Similarly, sexual self-efficacy had a significant effect on sexual risk behaviors, $\beta = -.072$, $t(247) = -3.66$, $p = .0003$, 95% CI [-.111, -.033], such that for every one standard deviation increase in sexual self-efficacy, there was a .072 unit decrease in sexual risk behaviors. Sexual orientation $\beta = 3.32$, $t(247) = 4.91$, $p < .0001$, 95% CI [1.98, 4.65], relationship status $\beta = -1.59$, $t(247) = -2.46$, $p = .014$, 95% CI [-2.86, -.3192], and ethnicity $\beta = -1.89$, $t(247) = -2.95$, $p = .003$, 95% CI [-3.15, -.6302] were all significant covariates in the model. The interaction between X*M was not significant, $\beta = -.0004$, $t(247) = -2.46$, $p = .89$, 95% CI [-.0062, .0054]. Because the interaction term was not significant, conditional effects of X (STD Knowledge) on Y (Sexual Risk-Taking) at different levels of M (Sexual Self-Efficacy) were not generated. Thus, while sexual self-efficacy and STD knowledge appear to be independently related to number of sexual risk behaviors, there was no moderating effect of STD knowledge and sexual self-efficacy on sexual risk behaviors.

Chapter IV: DISCUSSION

The current study examined sexual self-efficacy, HIV/STD knowledge, and their relations with a variety of sexual-risk taking behaviors among female-identified individuals. The CDC has highlighted women ages 18-44 as one of the highest risk groups for new HIV and STD infections (2016). Given this area of concern, it is imperative to explore potential pathways of reducing sexual risk behavior, which may thereby reduce new infections. Within this study, knowledge about HIV and STD transmission, as well as sexual self-efficacy (i.e., the perceived ability to autonomously and successfully make informed decisions during sexual activity) were proposed as individual and interacting pathways of reducing risk. HIV knowledge and sexual self-efficacy independently were associated with d fewer risk-taking behaviors as well as significantly interacted in association with fewer sexual risk-taking behavior, while the interaction of STD knowledge and sexual self-efficacy was not associated with sexual risk taking. Rather, STD knowledge and self-efficacy appear to be related to fewer risk behaviors independently.

An additional aim of this study was to explore the potential relation between sexual violence history and HIV/STD knowledge, sexual self-efficacy, and sexual risk-taking behaviors. Women under the age of 40 report some of the highest rates of sexual violence, and this has been linked to a variety of physical and mental health risks (Combellick et al., 2014). Indeed, findings from the current sample indicate a high prevalence of sexual violence history, with 66% (n = 186) reporting an experience of attempted and/or completed sexual assault since age 14. Although these findings corroborate previous research indicating high frequency of sexual violence among female-identified individuals, these numbers are higher than previously reported for this age group (e.g., 15-35% of women experiencing SV; Beaver, 2017; Krebs et al., 2009).

This is also important to consider within the context of this study's recruitment description, which did not explicitly seek sexual violence and/or trauma survivors. In this sample, sexual violence was related to increased sexual risk-taking but was not associated with HIV/STD knowledge or sexual self-efficacy.

Sexual Health and Risk Behaviors

The CDC estimates that approximately 1 in 4 sexually active women contract an STD (including HIV) each year, with the vast majority of new cases occurring in women under the age of 44. While it's noted that this is generally highly correlated with frequency of sexual risk behaviors (e.g., sex with multiple partners, sex while under the influence of drugs/alcohol, unprotected sex, group sex, etc.) in this age group, additional ancillary factors may also contribute to engagement in these behaviors and/or increased likelihood of contraction. These factors include lack of exposure to HIV/STD information, rapidly changing available information, removal from the oversight of the home caregiving unit, and implicit and explicit messages about the acceptability of sexual exploration (Jaworski & Carrey, 2008).

Following the HIV/AIDS epidemic of the 1980s and 1990s, assessment of sexual risk-taking has most frequently focused on unprotected sex and condom use, as this provided a concrete and measurable way to address transmission via bodily fluids (Fonner et al., 2014). However, scholars have lamented the lack of data surrounding broader sexual risk behaviors, particularly as condoms may not be fully effective against STDs that can be contracted via other means of contact (El Bcheraoui et al., 2013). When engagement in broader sexual risk behaviors is less well-known, it then becomes challenging to understand specific target points for intervention and risk-reduction (Pedlow & Carrey, 2004; Rudolph et al., 2020). The current

study aimed to address this gap in the literature, by measuring a broader range of sexual risk-taking behaviors via affirmative responses to 22 different risk items within the last 2 years.

The Sexual Health and Behavior survey assessed incidence of 22 sexual risk behaviors in the last two years, with participants reporting engaging in more than seven behaviors on average ($M = 7.7$) . It is important to acknowledge that engagement in any one of these behaviors does not inherently mean risk of HIV/STD contraction. For example, unprotected sex with a partner in the past 2 years may indeed be safe if both parties have been monogamous, and have been negative for HIV/STDs during this time. Similar precautions could be utilized for many of the items on this survey, the depth of which was not the focus of this study. Yet, it is also critical to note that only 3 participants did not have any risk behaviors in the past 2 years, over half (57.1%) had engaged in 6 or more, and 15% engaged in 15+ risk behaviors.

The cumulative nature of exposure to multiple forms of risk is concerning, particularly given that only 47.5% of this sample had *ever* been tested for HIV/AIDS, and 55.3% had been tested for STDs/STIs. A number of individuals also reported HIV+ status, or a lifetime positive result for a number of STDs. While some STDs are curable (e.g., gonorrhea, syphilis), it is unknown whether treatment had been received. Having at least one other sexual health concern substantially increases the likelihood of contracting HIV and other STDs via behavioral (e.g., greater likelihood of risk behaviors) and biological (e.g., weakened immune responses, greater risk of injury) pathways (Peterman et al., 2014). Given the frequency and breadth of risk behaviors in this sample, it cannot be ruled out that participants in this sample could be at high risk for contraction of HIV/STDs, but also for transmitting to other partners as well. When engaging with new sexual partners in the last 2 years, only roughly half of participants discussed sexual histories prior to sex.

The CDC (2019) cites engagement in risk behaviors as one of the primary contributors to increased risk of HIV/STD contraction for women under the age of 45. Yet, studies on female risk behaviors often only evaluate one or a few risk behaviors in isolation (e.g., sex under the influence of substances, sex without condom use, etc.). When restricted to the most common risk behavior(s), such as unprotected sex, women of reproductive age report risk behavior rates similar to those reported in the current study (Campbell et al., 2004; Choi et al., 2011; Duncan et al., 2006). Rudolph and colleagues (2020) conducted the most comprehensive evaluation of sexual risk behavior in college-aged women to date, including a total of 12 risk behaviors in the past 6 months. The current study is somewhat comparable to Rudolph et al.'s findings across a number of overlapping items: sex under the influence of alcohol (current study: 46.8%, Rudolph et al.: 52.2%), "hookups" or "one night-stands" with a male partner (current study: 55.3%, Rudolph et al.: 20.8%), multiple male sexual partners (current study: 84.1%, Rudolph et al.: 94.3%). These numbers should be interpreted with caution, as Rudolph and colleagues restricted evaluation to the previous 6 months, while this study extended as far as 2 years. Still, the data remain limited in characterizing a range of sexual behavior for women. This work will ideally continue to inform evaluation methods, and in particular, call attention to the substantial breadth of risk behaviors that warrant consideration in sexual health research and education efforts.

Of note for the current study, the timing of data collection (March-April 2021) occurred approximately 1 year into the COVID-19 pandemic in the United States. First, it is important to note that given the reduced in-person gatherings in many locations, the timeline of the Sexual Health and Behavior Survey was extended to include the prior two years. However, participants also answered a qualitative question regarding sexual activity during the pandemic and over one-third of respondents indicated their sexual behavior stayed about the same, while 24.1 percent

indicated increased sexual activity compared to prior to the pandemic. Thus, for many participants, sexual activity was not restricted, and risky behaviors were likely ongoing during COVID-19.

Recognizing that a global pandemic of this scale has not occurred in over 100 years, the literature on female sexual behavior in distress or emergencies is mixed at best (Hall et al., 2014; Liu et al., 2010). Indeed, preliminary findings, both domestic and abroad, suggest a wide array of impacts on sexual behavior during the pandemic. A recently published work from Turkey found that women's sexual desire and frequency of intercourse significantly increased during the pandemic, while their use of contraceptives decreased (Yuksel & Ogser, 2021). Li et al. (2020) highlighted the negative impacts of cohabitation 24 hours per day, including space limitations, increased childcare responsibilities, as well as ongoing experiences of anxiety, isolation, etc. on sexual desire and frequency of sex. Similarly, in a study of cohabitating couples in Italy, women who lived with their partners reported significantly reduced sexual activity from March 2020 – December 2020 (Schiavi et al., 2021). By contrast, in an American study, cohabitating couples reported no change (42.8%) or an improvement (13.6%) in their sex life, while individuals who did not live with a partner reported significantly increased sexual desire. Although Lehmiller and colleagues (2021) note increases in masturbatory behavior among single study participants, this subsample also reported that they were more likely to seek out sexual partners and ignore social distancing guidelines as the months of the pandemic went on.

Yuksel and Ogser (2021) note that the COVID-19 pandemic was unique in the forced/suggested emphasis on staying home and spending time with as few others as was possible. As noted, this may look different for a study participant who is at home with their live-in partner, rather than one who was single and would have regularly engaged in a broader range

of sexual behavior under normal circumstances. It is not clear whether the similar/increased sexual activity by the current sample was with limited partners. Participants reported a mean of 4.39 (*SD* = 8.25) new partners in the *last 2 years*, though the current study did not specifically evaluate comparisons of risk behaviors (e.g., sex with multiple partners, one night stands, etc.) prior to and during the COVID-19 pandemic, leaving open the possibility that new partners were more common prior to the pandemic. The ever-shifting nature of COVID-19 on daily life has led to unique ways of examining social behavior, and this study contributes to our understanding of sexual behavior under a time of worldwide distress.

Generally speaking, these results corroborate previous research indicating that women under the age of 44 engage in a variety of risk behaviors (e.g., CDC, 2016; Justman et al., 2015; Rudolph et al., 2020), but may not be regularly communicating their sexual histories with their new and/or existing sexual partners. The CDC (2007) recommends discussing the "5 P's" in sexual relationships: Partners, Practices, Protection from STDs, Past History of STDs, and Prevention of Pregnancy prior to the initiation of sexual relationship(s). Research on the *specific* reasons why individuals do not engage/have difficulty with these conversations is sparse, though the stigmatized and taboo nature of sex (particularly for women) has been well-documented (see Askew, 2007; Cleary et al., 2002; Greene & Faulkner; 2005; Noar et al., 2006). Further, it is entirely possible that individuals may not *know* what constitutes self/partner risk behaviors (see below for further discussion on HIV and STD knowledge in this sample), and may not be aware of the importance of these conversations for health promotion (Hall et al., 2016). Given the results of this study, future research should evaluate 1) reasons for engaging/not engaging in sexual health conversations with partners, and ways to encourage and improve this behavior (Noar et al., 2006). In addition to potentially increasing attention to and reducing risk behaviors,

these conversations can empower individuals to hold bodily autonomy, destigmatize sexual relationships, and improve communication in relationships (Brasiliero et al., 2021).

Factors Related to Sexual Risk Behaviors

Beyond evaluating the breadth of sexual risk behaviors in this sample, this study also evaluated factors that appear to be related to number of sexual risk behaviors. Within the current sample, individuals who identified as single, White, and who were of a sexual minority status reported significantly more sexual risk behaviors. Indeed, at least two studies to date support that engagement in sexual risk behavior may vary depending on these demographic variables (Oswalt & Wyatt, 2014; Pflieger et al., 2013).

Relationship Status

That women who were single engaged in a greater number of risk behaviors is perhaps unsurprising given reports of sexual activity among this demographic. For example, in the National Survey of Family Growth, 6,493 single, married, and cohabitating women were surveyed regarding their sexual and reproductive health (Lindberg & Singh, 2008). Approximately 36% of women ages 20-44 were single, and 90% of these women were sexually experienced. Single women were sexually active in at least 7 of the previous 9 months, and 22% had sex with more than one partner during that time (compared with just 8 and 9% of married and cohabitating women, respectively). Whether due to pursuing various partners for relationship purposes, sexual pleasure or enjoyment, or other personal reasons, single women generally engage with more partners, for a shorter period of time, and are more likely to be in social situations in which risk behavior is encouraged or considered normative (e.g., college campuses, bars, parties, etc.) (Turchik & Garsky, 2008). These results indicate the need for continued dialogue around sexual health, particularly for women who have multiple partners.

Racial or Ethnic Background

Previous literature and epidemiological research indicate that women of color are at disproportionally high risk of contracting HIV and other STDs (e.g., CDC, 2016; Hallfors et al., 2007). While this may seem counterintuitive to the current study's results as White women had greater numbers of risk behaviors, there is some literature to indicate that non-White ethnic identity groups may indeed engage in fewer risk behaviors overall. For example, Lansford et al. (2010) found that, while Black individuals engage in sex at an earlier age, they are also less likely to increase their number of sexual partners over time. In another study, Smith (2015) found that Hispanic and Asian-identified respondents were consistently less likely to have multiple sex partners, one-night stands, and sex while under the influence of drugs. While White participants in this study engaged in a greater number of risk behaviors, this does *not* always directly translate to HIV/STD contraction. Rather, the current results may reflect the ongoing disparities in HIV/STD prevention, health promotion, and access to care for women of color within the United States.

The intersectionality of identity cannot be understated. Women of color are more likely to face individual, partner, and structural-level factors related to HIV/STD contraction. Similarly, individuals of color are less likely to have exposure to important protective sexual health information, and face reduced access to quality care around these concerns (Prather et al., 2018). In the first study of its kind, Hallfors and colleagues (2007) utilized theory and cluster analyses to derive 16 sexual risk behavior patterns among 8,706 non-Hispanic Blacks and Whites under the age of 30, and compared this with current HIV/STD status. Among their findings, White young adults were at an elevated STD and HIV risk when they engaged in *high-risk* behaviors. Black young adults, however, were at high risk of contraction even when their behaviors were

normative. Further, within the current study, frequency of all risk behaviors was not assessed, and STD/HIV status based on specific ethnic identities were limited by cell sizes. Thus, it is possible that women of color may engage in fewer types of risk behaviors, but are subject to a variety of micro and macro-level ethnic and racial disparities that elevate their risk for contraction, even with fewer risk behaviors than White women.

Sexual Identity

Relatedly, women of minority sexual identities were also significantly more likely to report engaging in risk behaviors compared to women who identified exclusively as heterosexual. Roughly 28% (n = 78) of this sample identified as gay/lesbian, bisexual, pansexual, queer, asexual, or another sexual identity. While the majority of research in this area has focused on LGBQ+ adolescents and youth, the results of the current study are consistent with previous literature. Compared with heterosexual youth, sexual minority youth have an earlier onset of sexual activity, have sex with more partners, have used drugs/alcohol prior to sex, and are less likely to use condoms (Kann et al., 2017; Rasberry et al., 2018). Studies of adult women who have sex with women (WSW) have yielded similar results: earlier sexual activity (Gonzalez et al., 1999), more frequent unprotected sex (Friedman et al., 2003), and more often trade sex for money (Marrazzo, 2000; Scheer, 2002).

As with ethnic identity, significant individual and societal level factors have been tied to greater likelihood of risk behaviors among sexual minority women. For example, LGBTQ+ women are more likely to experience a number of correlates for risk behaviors, including poverty, abuse and/or trauma exposure, sexism, societal stigma about sexual relationships, and greater frequency of substance use (Ecker et al., 2019; Fethers et al., 2002; Messinger et al., 2019; Ompad et al., 2011). Importantly, less information about sexual risk and prevention-

specific materials are available to LGBTQ+ women. While men who have sex with men (MSM) have been a notable and prominent target of HIV/AIDS and other STD campaigns, WSW and individuals with other marginalized sexual identities have been largely overlooked. Major disparities exist in educational materials, with content largely focused on women's sexual relationships with men (see Aubrey et al., 2020 for a review). According to SEICUS, only 7 states currently have policies that include affirming sexual orientation instruction on LGBTQ+ identities, or discussion of sexual health for this population. Nine states *explicitly require* instruction that discriminates against LGBTQ+ people. Even where available, female condoms, dental dams, and other protective materials are also cost-prohibitive, and less likely to be accessible even at sexual health facilities (Smith, 2017). Within the healthcare system, heteronormative attitudes prevail, and LGBTQ+ women report being asked fewer questions about their sexual health, and are less likely to be offered HIV/STD testing compared to heterosexual women or MSM (Knight & Jarrett, 2017; Marrazzo & Gorgos, 2012).

The preliminary analyses of the current study offer a small glimpse into the important, intersectional nature of identity and sexual risk-taking behaviors. While these demographic factors were used as covariates for the hypotheses of this work, identity remains a critical consideration for future risk-reduction and health promotion work, in addition to the other findings of this study (see below).

HIV and STD Knowledge

As a whole, this sample had low levels of HIV and STD knowledge. Respondents had mean scores of 11.43 (63.5%) on the HIV-K-Q, and 13.48 (49.9%) on the STD-K-Q. Given the number of different risk behaviors reported, these results are concerning, albeit unsurprising. In part, the CDC and other health agencies have targeted individuals under 44 as this age group

reports lower perceived risk of contracting any form of infection (Pollack et al., 2013). While not measured in the current study, the likelihood that women in this sample do not perceive themselves to be at contraction risk, despite engagement in sexual risk behaviors, could be related to this lack of baseline-level knowledge about what is and is not precautious behavior.

Low levels of HIV/STD knowledge is common, particularly among female-identified study participants. In developing the STD-K-Q, Jaworksi and Colleagues (2007) had similar results, with over half of participants scoring 50% or below on the measure. In another study of 405 undergraduate men and women, Talwar & Rahman (2015) reported a median HIV-K-Q 18 score of 7 (38.8%). Consistent with the current study, knowledge does appear to be higher for some infections than others. In a study of 300 sexually active adolescent and young adult females, Downs and colleagues (2004) found that participants had highest scores on knowledge about HIV/AIDS (86%), with scores decreasing among Chlamydia (76%), Gonorrhea (75%), Genital Herpes (73%), Genital Warts (67%), Hepatitis B (63%), and Syphilis (60%). In hierarchal regression analyses, participants also had significantly higher knowledge about a respective infection if they had been diagnosed with it before. Participants therefore appeared to learn about their respective diagnosis only after contraction, and this knowledge was limited to their specific diagnosis (i.e., not translating to knowledge-seeking for other potential infections) – a critical finding that emphasizes the need for earlier instruction (see below).

Researchers have noted that, with the relative severity and mortality associated with HIV, health campaigns and education initiatives shifted their focus to HIV prevention beginning in the 1980s. It is also noted that this emphasis may come at the expense of broader STD education when time and resources are limited. HIV prevention education does incorporate important information that applies to other STDs, but knowledge of HIV alone is insufficient (CDC, 2019).

This focus on HIV/AIDS has been associated with a temporal lag in resources for STDs. While funding and legislation for HIV prevention, education, and treatment has been in place in the United States since the 1990s, the delay for similar programming for STDs is concerning. In a 2014 compendium of state statues explicitly related to STDs *other* than HIV, the department of Public Health Law Research and CDC note that existent state statues largely focus on establishment of clinics, mandatory testing and/or treatment, and confidentiality of STD-related records. That is, the most notable efforts to date regarding STDs emphasize *post*-contraction care, rather than preemptive education.

Even when primary education features STDs in teaching, the depth and breadth of information is (generally) extremely limited. Thirty-five states currently include information on HIV/STDs in sexual education curricula, and the majority of this information emphasizes the importance of not sharing bodily fluids (i.e., a precaution that is necessary for HIV, but insufficient for other STDs) (SEICCA, 2021). Of these 35 states, 33 of them are required to "stress" abstinence for HIV/STD prevention, 8 states cover contraception and HIV/STD harm reduction in a "limited" way, 8 states cover contraception in an "expansive" way, and 19 do not include any contraceptive or harm-reductive means of HIV and STD prevention.

This relative emphasis on HIV prevention may partially explain the slightly higher knowledge scores for HIV vs. other STDs. Further, it has been argued that women ages 13-44 may be subject to "generational forgetting." This generation may be less likely to perceive the dangers associated with HIV than older Americans, who witnessed the early AIDS epidemic in the 1970s and 1980s (Volkow, 2015). Over 700,000 Americans and 34.7 million people worldwide have died from AIDS-related illnesses since 1980 (UNAIDS, 2021), and this number continues to decline as successful antiviral treatments become more widely available. Older

generational cohorts (e.g., Baby Boomers, Generation X, etc.) witnessed the destruction, devastation, and confusion around HIV/AIDS, and report more concern about its contraction for the self and others (Cahill & Valadez, 2013). In comparison, individuals under the age of 45 are more likely to view HIV/AIDS as non-life-threatening, and as diseases of the "other," – something that could happen to someone else, but not me (Kirzinger et al., 2020). No studies have explicitly compared HIV knowledge in the current study's population (i.e., individuals born in 1977 and later) with previous generations whom faced the HIV/AIDS crisis in "real-time," and this would be an important line for future work. That HIV knowledge was somewhat higher than STD knowledge in the current work does not negate the concern that knowledge scores on both measures were just at or above chance levels.

For decades, scholars and health educators have emphasized the importance of understanding risk of HIV/STD contraction in order to help adolescents and adults actively engage in preventative behaviors (Chin et al., 2012). Implicit in most contemporary theories of infection prevention (Theory of Reasoned Action: Fishbein & Azjen, 1975; Health Belief Model, Becker, 1974; Information-Motivation-Behavior Skills: Fisher & Fisher, 1992) is the need for HIV/STD knowledge as a fundamental basis for estimating accurate risk, understanding transmission, using preventative strategies, identifying symptoms, appreciating consequences of infection, and understanding testing and treatment (Jaworski & Carrey, 2007). The current study highlights the imperative nature of comprehensive, widely available, and early education on sexual health. On the Sexual Health and Behavior Survey, participants indicated 16.8 (SD = 4.1) as the mean age of sexual activity onset. That participants in this study ranged in age of 18-44 (M = 27) could reflect the concern that, even after being sexually active for some time, knowledge about HIV and STDs remains low. As noted previously, sexual health curricula early in

education is of critical public health importance (Borawski et al., 2015; Woebse, 2013). However, the predominant requirements for sexual health education in the United States are 1) limited or extremely limited in scope 2) infrequently or inconsistently taught in the classroom, and/or 3) are abstinence-based, rather than harm-reduction based (SEICCA, 2020). Exposure to and absorption of this knowledge *before* engaging in sexual activity could allow individuals to be more likely to engage in protective behaviors, recognize infection symptoms, screen for HIV/STDs in the absence of symptoms, seek earlier treatment, and avoid infecting their partners (Downs et al., 2004).

Sexual Self-Efficacy

Few studies to date have explicitly examined sexual self-efficacy and broad arrays of sexual risk behaviors. The few existing studies exclusively examined undergraduate samples (Cohen & Fromme, 2002; Dilorio et al., 2000; Reising et al., 2005; Roberts & Kennedy, 2006; Wulfert & Wan, 1993). By including a broader study sample that includes female-identified individuals at highest likelihood of sexual risk behaviors, this study expands our knowledge of demographic groups that can benefit from targeted increases in sexual self-efficacy.

Within the current study, participants were asked to indicate their perceived sexual self-efficacy via the Sexual Health Practices Self-Efficacy Scale. Mean scores on this measure were 72.25 (*SD* = 15.4), with scores ranging from 20-100. “Typical” levels of sexual self-efficacy have yet to be established within the literature, a gap lamented by researchers (Assarzadeh et al., 2019). Further, sexual self-efficacy, as measured by the SHPSES in this study, encompasses health-protective behaviors (wearing condoms, discussing sexual histories prior to sex, etc.) but also includes items on happier sexual relationships, addressing sexual assault situations, and sexual equality/diversity, among others. Therefore, the construct of sexual self-efficacy here was

broader than simply physical-based sexual health protection. Previous studies focus on reporting self-efficacy in one or few specific situations (e.g., percentage of respondents who would say no to a partner whose sexual health history is unknown; Rocha-Rdz et al., 2017). Thus, the current use of the SHPSES provides a more global view of perceived ability to navigate sexual situations.

Given its nascency in the literature, extant research has evaluated correlates of sexual self-efficacy instead. In a review of factors related to sexual self-efficacy, Assarzadeh and colleagues (2019) found that age, marital status, ethnic background, higher education, and previous sexual health education were all associated with greater sexual self-efficacy. Consistently, research also finds that higher levels of sexual self-efficacy are associated with greater sexual satisfaction across a variety of domains (e.g., Hajinia & Khalatbari, 2017; Koch et al., 2004; Panjalipour et al., 2017). Notably, over two-thirds of the 25 studies reviewed by Assarzadeh et al. (2019) found that higher sexual self-efficacy, regardless of the measure used, was a key protective factor associated with fewer risk behaviors.

This association with fewer risk behaviors was replicated in the current study. While promising, perceived sexual self-efficacy does *not* always directly translate to actual real-world behavior, and it is imperative that sexual self-efficacy continue to be accurately assessed in relation to actual sexual behavior when possible (Gerke et al., 2016). However, with these findings in mind, sexual self-efficacy can be impacted via formal (e.g., interventions, see below) and informal routes. Heavy implicit and explicit societal emphasis on female responsibility for sexual behavior is well-researched (e.g., Loew et al., 2017; Martin et al., 2014; Moran & Lee, 2011; Trinh, 2016) and may also have the unintended effect of affirming to female-identified individuals that they can and should take responsibility in sexual situations (Burkett & Hamilton,

2012). Ideally, the current study contributes to the characterization of sexual self-efficacy levels among women, while underscoring its importance in sexual health promotion and education (see Hypotheses 2 and 3 below).

Hypothesis 1: MANCOVA Analysis

The first major area of focus of this study was to examine potential differences in levels of sexual self-efficacy, sexual risk-taking, HIV knowledge, and STD knowledge dependent on sexual violence survivor status. No literature to date has directly evaluated the relationship between survivor status and *sexual* self-efficacy, though there has been evidence that trauma exposure is associated with lower self-efficacy in other domains (Benight et al., 2014). Further, while SV survivors often report concern about HIV and STDs following victimization (e.g., Loufty et al., 2008; Baker et al., 1990), it remained unclear whether this concern translates to increased knowledge about HIV/STDs. To date, a number of studies indicate that women who have experienced sexual violence are at increased likelihood of engaging in sexual risk-taking behaviors (Lang et al., 2010; Sales et al., 2017).

While it was hypothesized that SV would be associated with lower sexual self-efficacy, lower HIV/STD knowledge, and greater number of sexual risk-taking behaviors, Hypothesis 1 was only partially supported via a MANCOVA analysis. That is, the sexual violence survivor group reported significantly more sexual risk behaviors than those who had not experienced sexual violence. No differences in HIV knowledge, STD knowledge, or sexual self-efficacy were found between the SV and no SV groups. Although HIV and STD contraction concern is often elevated after sexual violence, the results of the current study suggest that this does not necessarily indicate that survivors increase their knowledge in these domains. It is also possible that individuals who have some level of knowledge about the ways that HIV and STDs can

spread are then at increased risk of transmission *concern* after SV, as they are likely aware that characteristics of an assault (e.g., unprotected sex, injury) can increase the likelihood that an infection is passed. Additionally, if medical care is sought after sexual violence, survivors may rely on their providers to determine or inform them of their contraction risk.

The relationship between sexual risk-taking and survivor status is complex and multidirectional: sexual risk-taking can increase the likelihood of being sexually assaulted, and can also be a response to a trauma history. Risky sexual behavior is a well-documented behavior following a wide variety of traumatic experiences (e.g., Abojabir et al., 2018; Allsworth et al., 2009; Voisin et al., 2015), and can be compounded by increased likelihood of other behaviors (such as substance use) associated with exposure to a trauma (Guo et al., 2002). This appears to be particularly true for interpersonal violence (Combellick et al., 2019). For example, Werner et al. (2018) found that both sexual and physical abuse are important contributors to risky sexual behavior, even when accounting for timing of events, multiple trauma exposure types, substance involvement, psychopathology, and familial factors. Indeed, impulsive or risky sexual behavior is frequently given as an example of PTSD Criterion E2: reckless or self-destructive behavior (APA, 2013). This component is a key consideration, as the current study only evaluated trauma *exposure* as a precursor to sexual risk-taking behavior, rather than traumatic *distress*. Given that a Criterion A event (i.e., sexual violence) precedes the development of traumatic distress, the current study offered an important first step, and future research may examine trauma exposure vs. distress as it relates to risk-taking behaviors.

As noted, the relationship between sexual risk-taking and sexual violence can also be reciprocal – engaging in risky sexual behaviors can increase risk of sexual victimization. Early onset of sexual activity, multiple partners, substance use prior to sexual activity, and

transactional sex among others have demonstrable associations with increased likelihood of sexual victimization (Alleyne et al., 2011; Johnson et al., 2011; Ybarra et al., 2014). Unfortunately, this may place survivors in a loop of revictimization, compounding the negative psychological and physical effects of sexual risk-taking or sexual trauma alone (Classen et al., 2005; Testa et al., 2010). Given that sexual violence survivors are less likely to seek sexual health care or discuss their sexual behaviors with providers (Wendt et al., 2009), these results further highlight the need for both trauma-informed medical care and sexual violence prevention, in addition to inclusion of consent-based sexual education (Basile, 2015; Hegarty & Tarzia, 2019; Palmieri & Valentine, 2021).

The reasons for increased risk-taking after trauma remain under investigation, though several models have been proposed (see Ben-Zur & Zeinder, 2009 for a review). Behavioral models suggest that individual differences in inhibition and impulsivity are associated with differential value placed on risk vs. reward. This can lead to a potential increase in risky sexual behaviors that may be exacerbated by trauma. Affective models posit that risky behaviors may serve as maladaptive coping strategies in order to overcome negative affect that arises after victimization. Cognitive models propose modified information processing when it comes to assessing the evaluation of risk. Neuroscientific and biological approaches emphasize the exaggerated amygdala activation in response to threat that is common after trauma, which may result in an impeded ability to control behavior. Of course, any number of these models may hold partial truth, and the specific mechanisms of trauma-related risky behavior remains a fruitful area for new research.

Novel to this study was the examination of sexual violence as it relates to sexual self-efficacy. To date, only two extant studies have examined the relationship between trauma

exposure and sexual self-efficacy (Alan-Dikmen & Cankaya, 2020; Vaillancourt-Morel et al., 2019). Vaillancourt and colleagues (2019) longitudinally assessed 739 adolescents (ages 14-18), and measured sexual self-efficacy as it related to 1) ability to set clear sexual limits, and 2) ability to use sexual self-protection. In this work, they found that participants who had experienced childhood sexual abuse had significantly lower sexual self-efficacy across both domains, compared to those without a sexual abuse history. Similarly, Alan Dikmen and colleagues (2020) evaluated 438 Turkish women, 38% of whom had experienced adult sexual violence. In their work, they found significantly lower sexual self-efficacy among the sexual violence survivor group, and encouraged further exploration of this topic given the dearth of literature in this area. In the present study, a high proportion of the study sample were sexual violence survivors (i.e., 66%), but there was not a significant difference in sexual self-efficacy between the sexual violence and no sexual violence history groups. While this differs from the previous two studies, these findings should be interpreted with caution. This remains a relatively new research question, and a number of factors (e.g., time since assault, utilization of mental health treatment, etc.) can impact self-efficacy, but were not explored as part of the current research questions.

In other domains of self-efficacy, the relationship with trauma is complex and multi-directional. Trauma survivors often report reduced belief in their ability to manage their environment, particularly in the immediate time period (i.e., up to 1 year) following trauma (Foa et al., 1999). With regard to sexual violence specifically, it is also possible that initial lower levels of sexual self-efficacy are taken advantage of in nonconsensual situations, thereby elevating risk of assault. Yet, sexual violence experiences can also create the need for recovery supported by self-efficacy. For example, Bandura et al. (2004) highlighted coping self-efficacy

and its role in managing internal and external post-traumatic recovery. As such, self-efficacy has become a prominent trauma treatment target and has been linked to a number of posttraumatic growth-based outcomes (i.e., Benight et al., 2005; Cieslack et al., 2008; Flatten et al., 2008; Hirschel & Schulenberg, 2009, etc.). Trauma treatment history was not evaluated in the current study, and for some participants, the assault(s) could have occurred up to 20-30 years ago. Both intervention and time elapsed since trauma are associated with gains in self-efficacy (Benight et al., 2015), which should be considered in light of the current findings.

Although not explored in the current study, it remains plausible that the current findings may also reflect an ability to build or maintain sexual self-efficacy, even following sexual violence event(s) among this sample. It may be that some survivors do not negatively interpret their (past or future) role in sexual contexts. Without denying the well-documented victim and self-blaming culture around sexual assault (e.g., Hackman et al., 2017; Hayes et al., 2013; Rollero & Tartaglia, 2019), a subset of survivors are able to understand that these experiences were unwanted, coerced, and/or entirely the fault of their perpetrator (Kennedy & Prock, 2018). This has been studied in the wake of the changing discourse and increased dialogue around these topics, such as the #MeToo movement (Anderson & Toor, 2020; Gallagher et al., 2019). Indeed, in other domains, some trauma survivors who understand their trauma(s) to be outside of their control actually report unchanged or increased self-efficacy, as they perceive that "the only thing that *is* within my control is *me*" (Benight et al., 2015; Benight & Harper, 2002; Samuelson et al., 2017). This research area will ideally continue to grow, particularly given the finding that sexual violence *was* associated with greater risk-taking behaviors in this study, and could be an important consideration for victimization and revictimization.

Hypothesis 2: HIV Knowledge, Sexual Self-Efficacy and Risk-Taking

The main effects of HIV knowledge and sexual self-efficacy were significantly related to fewer sexual risk-behaviors. Additionally, as hypothesized, there was a moderating effect of sexual self-efficacy and HIV knowledge on sexual risk-taking behaviors. This effect was strongest at low levels of sexual self-efficacy, and this relationship weakened as sexual self-efficacy values increased. In other words, when sexual self-efficacy was lower, having more HIV knowledge was associated with fewer sexual risk-taking behaviors. Although this relationship remained significant at mean and high (i.e., 1 SD above the mean) levels of sexual self-efficacy, the slope of this relationship reduced. At SHPSES scores of 91 and above, there was no longer an interaction effect of HIV and sexual self-efficacy.

From an education standpoint, these results make intuitive sense. As sexual self-efficacy increases, the "need" for HIV knowledge in order to also influence/reduce risky sexual behavior decreases. When interpreted via the lens of Bandura's (2001) social-cognitive theory for HIV, the initial development of self-efficacy is cited as the point at which actual behavior change is most substantial. That is, as individuals are exposed to personally relevant information, they *initially* develop their self-efficacy and understand themselves to be agents capable of acting in sexual situations. Then, they are more likely to act with this "novel" information by understanding that they can do so. As this process is reinforced, health-promotive behavior can be sustained on continued feelings of self-efficacy, empowerment, fewer health consequences, etc. rather than on the initial interaction of self-efficacy and knowledge (Bandura, 1995; Coleman & Ball, 2009; Rimal, 2001). As shown in the current study, we then begin see a reduced impact of HIV knowledge as sexual self-efficacy increases.

Research suggests individuals feel empowered with new knowledge, and are often more motivated to apply this information in the "real-world" (Bandura, 1990; Zimmerman et al., 1996). As early as the 1980s, self-efficacy was proposed as a predictor of health behavior change, and labeled as a "maintenance" tool for healthy living (Stretcher et al., 1986). Supporting these findings, experimental manipulations of self-efficacy have frequently first provided specific, targeted knowledge about a particular health issue, and followed this with continued emphasis on self-efficacy in these contexts. This has been demonstrated in cigarette smoking (Fathelrahman et al., 2009; Thrasher et al., 2016), substance use (Kadden & Litt, 2011; Uzun & Kelleci, 2018), weight control (Faghri & Buden, 2015; Linde et al., 2006; Wingo et al., 2013), diabetes management (Atak et al., 2008), cancer prevention (Boehm et al., 1996) and exercise behaviors (Oman & King, 1998; Rodgers et al., 2013; Woodgate & Brawley, 2008).

Specific to sexual health, empirical evaluations of HIV education programs support the model proposed by the current study. For example, Fasula and colleagues (2013) developed an 8-session HIV education program for women (Providing Opportunities for Women's Empowerment and Risk-Reduction – Project POWER). The structure of this program begins with 2-3 sessions on information and topics around HIV, and remaining sessions target sexual self-efficacy. This includes identifying factors and experiences influencing personal ability to address risk factors for HIV, strategies and empowerment to reduce personal risk behaviors, and sexual communication skills. In part, the development of this program was an expansion of the previously-established Project SAFE, a 9-hour information-based HIV reduction program that emphasized identifying risk behaviors via knowledge and protective skills. Citing social-cognitive theory and a plethora of research around self-efficacy and health promotion, Fasula et

al. (2013) proposed that knowledge should precede self-efficacy, but that self-efficacy would become a more "global" mindset that would sustain healthier sexual relationships long-term.

In a randomized control trial comparing standard HIV knowledge education and Project POWER, those who received Project POWER reported significant reductions in unprotected vaginal intercourse, significantly greater condom use, and a small reduction in number of male sexual partners compared to the HIV-knowledge only group (Fogel et al., 2015). Notably, on other outcome measurements, women in POWER also demonstrated significant increases in HIV knowledge, health-protective communication, reduced condom use barriers, and increased their reported number of social support persons. Similar findings have been noted with other empowerment-based HIV prevention efforts for women (e.g., Wingood et al., 2004). Currently, Women Involved in Life Learning from Other Women (WILLOW; Wingood et al., 2004) is the only federally-supported HIV program that features emphasis on HIV knowledge and self-efficacy. However, in efforts toward scalability, cost-effectiveness, and *intervention*, WILLOW is aimed toward heterosexual women ages 18 and older of any race or ethnicity, *already* living with HIV or AIDS, and who have known their HIV serostatus for at least 6 months (Wingood et al., 2004). Although this change was considered to be in line with the CDC's goal of promoting cost-effective, scalable interventions that can prevent the spread of HIV, this leaves a gap in current *prevention efforts* for women who are HIV-negative. As of 2021, there are no federally supported behavioral programs in place for HIV/AIDS prevention before initial HIV infection.

It is also important to consider that beyond HIV knowledge, many other demographic and identity-related factors have been identified as predictors of self-efficacy for HIV prevention. This includes age (younger women have higher self-efficacy; Takahashi et al., 2006), cohabitation status (women who live with their partner(s) have lower self-efficacy; Lauby et al.,

2001), employment and socioeconomic status (women who are under/unemployed report lower self-efficacy; Lauby et al., 2001), intimate partner violence survivor status (women who have experienced IPV report lower self-efficacy; Swan & O'Connell, 2011; Gullette & Lyons, 2006). For a more comprehensive review of factors related to sexual self-efficacy, see Assarzadeh et al. (2018). Although HIV knowledge is often associated with the highest initial gains in sexual self-efficacy and reduction of risk behavior, attending to inclusive and identity-informed HIV prevention is critical in the development of educational programs (Villegas et al., 2014). In doing so, HIV and other sexual health education will more equitably address and meet varied needs of different identity groups, reduce stigma, increase feelings of personal relevance, and encourage continued conversations around diverse sexual health goals and needs (Evens et al., 2019; Lockhart et al., 2021; Sevelius et al., 2011).

Reducing sexual risk behaviors is a complex process, particularly in light of the barriers often faced by women (Villegas et al., 2014). Further, sexual self-efficacy, as measured in this study, included items beyond health-promotive behavior. Previous research indicates that women who have higher levels of sexual self-efficacy have significantly fewer sexual risk-taking behaviors, and that self-efficacy across a *range* of sexual domains is more likely to reduce risk than just HIV knowledge alone (Mitchell et al., 2018; Rostosky et al., 2008). This research points to a more global view of behavior, affect, and interpersonal navigation in sexual situations, and adds to the growing body of literature that supports sexual health education encompassing more than medically-related HIV and STD information alone.

Specifically, the American College of Obstetricians and Gynecologists (2016) recommends that comprehensive sexual health education be medically-accurate and culturally inclusive, and include topics on prevention of HIV/STDs and unintended pregnancy, forms of

sexual expression, healthy sexual and nonsexual relationships, gender identity and sexual orientation and questioning, communication, recognizing and preventing sexual violence, consent, and decision making. Additionally, programs should cover the variations in sexual expression, including vaginal intercourse, oral sex, anal sex, mutual masturbation, and texting and virtual sex. Confidence in skills/abilities across a breadth of areas lends itself to expanding the definition of sexual health beyond the physical protection from HIV/STDs – it includes the emotional and psychological aspects of "health." Research is still growing in this area, though individuals who perceive self-efficacy in topics such as creating satisfying sexual relationships, affirming sexual equality, communicating with partners, etc. report fewer sexual risk behaviors (Koch et al., 2004). People may reduce risk behaviors for a variety of reasons, and HIV knowledge and sexual self-efficacy are just two pieces of the puzzle that may lend to fewer risk behaviors.

Hypothesis 3: STD Knowledge, Sexual Self-Efficacy, and Risk-Taking

Hypothesis 3 proposed that sexual self-efficacy would moderate the relationship between STD knowledge and sexual risk-taking behaviors. This hypothesis was not supported, and no moderating effect was found within the current sample. However, higher STD knowledge and higher sexual self-efficacy were both significantly related to a fewer sexual risk-taking behaviors. Thus, STD knowledge and sexual self-efficacy appear to be potential target areas for reducing sexual risk.

The finding that STD knowledge was related to reductions in sexual risk-taking is notable in light of the dearth of literature in this area. With heavy emphasis placed on increasing HIV knowledge over the years, less attention has been given to STD knowledge and its sexual health benefits. Four studies to date have examined STD knowledge as it related to sexual risk-taking,

all finding that increases in knowledge were associated with fewer risk behaviors (Downs et al., 2004; Ehrhardt et al., 2002; Gaydos et al., 2008; Jemmott et al., 2011). It should be noted that all four of these studies focused on outcomes following various *combined* HIV/STD knowledge intervention programs. Again, this is appropriate from a public health and transmission overlap standpoint – information on HIV can be relevant for STDs. At the same time, HIV and STD prevention are not synonymous. For example, even if condoms are used consistently and appropriately (as is emphasized in HIV education), this will not fully prevent transmission of the STD syphilis. Syphilis spreads via contact with sores that can occur on or around genitalia, the anus, rectum, lips, or mouth. Condoms can reduce likelihood of transmission, but only if covering the infected area (CDC, 2019).

Without understating the severity of HIV, appropriate attention must be given to STDs for at-risk groups. The current study offers evidence that education must specifically focus efforts on STDs, even if time and resources are limited. For the 7th consecutive year, reported STDs are at an all-time high in the United States, with nearly 27 million new infections in 2019 and an annual estimated healthcare cost of nearly $16 billion (CDC, 2020). The CDC counts HIV in its annual numbers for infections, but chlamydia, trichomoniasis, genital herpes, and HPV accounted for 98% of all prevalent STDs and 93% of all new STDs in 2018. Jaworski and colleagues (2007) note that knowledge about STDs is particularly low among groups that are most at risk, including women under 45. The current study was no exception, and participants' knowledge averaged at chance levels. We don't yet know what specific level might be sufficient for specific levels of risk-reduction, but even so, general increases in knowledge were associated with reductions in risk behaviors here. These results support several leading theories behind STD education (Becker, 1974; Fishbein & Ajzen, 1975; etc.). As we direct our attention toward

addressing these knowledge gaps, CDC STD health director Raul Romaguera (2020) highlights the importance of intersectional lenses while doing so:

> *"STDs are common, but not everyone is equally affected. Social inequity often leads to health inequity and, ultimately, manifests as health disparities. Even when STI rates reached historic lows, disparities have persisted because of the social, cultural, and economic conditions that make it more difficult for sexually active people to stay healthy. And while reported STDs have once again become increasingly common, racial and ethnic minority populations, adolescent and young adults, and gay and bisexual men still bear the brunt of these deeply entrenched social determinants of health."*

Efforts in this direction are starting. In late 2020, the CDC released its first-ever National Strategic Plan for Sexually Transmitted Infections, offering a roadmap for public health, government, community-based organizations, and others to develop, enhance, and expand STD education and prevention.

From the current study, we also know that sexual self-efficacy is another avenue through which sexual risk-taking can be addressed. Individuals must understand themselves to be self-efficacious agents in sexual contexts, and be able to accomplish behaviors and manage affective responses in these situations despite individual, partner, or structural-level challenges (Bandura, 2001; DiClemente et al., 1995; Bailes et al., 1998). Similar to Hypothesis 2, it makes sense that sexual self-efficacy could reduce sexual risk behaviors – women who perceive themselves to be responsible agents in sexual settings may in turn make decisions that promote their well-being. This has been a prominent argument in recent development of risk-reduction programs, as educators have argued that HIV or STD knowledge is inherently limited if people do not perceive that they *can* engage in health promotive behaviors (Valera et al., 2017).

While it was proposed that sexual self-efficacy might be one mechanism through which STD knowledge operates is ultimately associated with fewer risk-taking behaviors, this relationship was not supported in this study. Scholars have proposed several other possible mechanisms through which STD knowledge may function. These include ability to evaluate personal relevance and what constitutes risk, and reduction of biases in decision-making at the individual level (Becker, 1974; Fishbein & Azjen, 1975; Fisher and Fisher, 1992). Sexual self-efficacy, too, can operate by enabling a sense of agency and empowering women to make their own (ideally health promotive) sexual decisions, with or without knowledge of what is an STD risk.

Even if these forms of knowledge and sexual self-efficacy do not interact with one another to be related to fewer sexual risk behaviors, these findings support the aim of incorporating both HIV and STD knowledge and self-efficacy training in risk-reduction programs, ideally at a comprehensive level for both HIV and STDs. Several programs (albeit with heavier focus on HIV than broader STDs) currently incorporate both features in curricula (e.g., Project SAFE, Slain et al., 2004; Sisters Informing Sisters about Topics on AIDS, DiClimente & Wingood, 1995; Project POWER, Fogel et al., 2015). It is clear that this is an exciting area of new research, with opportunities to inform sexual health education and promotion at the individual and larger level.

Limitations and Future Directions

This study offered preliminary findings in a growing area of literature, but it should be noted that several limitations exist. Due to the cross-sectional nature of the data, cause and effect relationships cannot be determined. Specifically, the temporal order of variables remains to be evaluated. This includes the temporal ordering of experiences of sexual violence and sexual risk-

taking behaviors, as well as HIV/STD knowledge and sexual self-efficacy. Future research could establish temporality via longitudinal designs that continually assess for trauma exposure and risk-taking behaviors. Interventional research on HIV/STD education (e.g., Project POWER, Fasula et al., 2015) with pre and post-evaluation of key study variables would also be well-suited to evaluate changes in HIV/STD knowledge as well as sexual self-efficacy. Additionally, given the low scores on both the STD and HIV knowledge assessments, it is possible that some respondents may have guessed or responded by chance. As such, these results may be interpreted with caution as it is possible that these scores do not fully reflect true knowledge in these domains.

Female-identified individuals 18-44 years of age were selected for this study based on 1) their heightened risk for HIV, STDs, sexual violence experiences, and sexual risk-taking, and 2) the dearth of empirical literature evaluating these areas in this population. While greater attention has been given to other identity-oriented demographics (e.g., men who have sex with men), it is clear that this is only the beginning of our understanding of sexual health, knowledge, and behaviors in the United States. Even though specific demographic groups are often foci of education and risk-reduction, partners of any identity are also likely to reciprocally influence sexual risk behaviors (e.g., substance use before sex), warranting exploration of these variables across a range of relationship statuses, gender, and sexual identities (Brown & Vanable, 2007). The results of this study confirm that this is a fruitful area of research, that will ideally work toward characterizing sexual functioning across a broad array of people.

This study also utilized a convenience sample of MTurk workers. This platform strengthened the study by allowing for a more diverse and nationally-representative sample of women, though the results may not be fully generalizable to women whose identities were

underrepresented in this sample (for example, women of color). Limited cell sizes prevented deeper exploration of identity-based factors that have shown previous links with sexual health, sexual health knowledge, trauma exposure, and risk-taking behaviors (Villegas et al., 2014) that could greatly benefit educational and interventional pursuits. Further, employment as an MTurker requires a level of technical knowledge, availability, and accessibility that may not be generalizable to individuals who have more limited resources, time, or functional capabilities. Future research would benefit from an expanded study population with broader recruitment platforms in order to better understand specific components of sexual health, sexual functioning, and these relationships with traumatic exposure and distress.

As the first study of its kind, the current work aimed to identify the breadth of sexual risk behaviors in this population, and utilized a present/absent framework for each of 22 risk items on the Sexual Health and Behavior Survey. As such, the frequency of sexual risk behaviors was not established, and would be an important area of future exploration given the compounding effects that multiple and high-frequency sexual risk behaviors can have on health (Adefuye et al., 2009). While the present/absent framework of this study likely mitigated some recall error for the past 2 years, it is possible that this extended timeframe impacted accurate recall of sexual behaviors.

Another important consideration in sexual health research is the possibility that these surveys were subject to social desirability bias (i.e., likely underreporting sexual risk, overreporting sexual self-efficacy), which is more common in sexual health research given the "taboo" nature of personal sexual health and behavior (Gregson, 2002). At least one study to date has evaluated computer-based versus in-person evaluation of HIV risk behaviors, finding reduced social desirability bias when surveys were administered electronically (Philips et al., 2010). Yet, computerized administration does not remove all elements of desirable responding

(Rao et al., 2017), and in-person sexual health and education programs encompass the majority of funded curricula to date. This study also advertised using keywords such as "sexual health" and "trauma," which could have contributed to response bias of workers willing to take anonymous surveys on these topics. Notably, greater exposure to and normalization of sexual relationship information greatly decreases discomfort around anonymous and identifiable conversations in these areas – a goal that can be achieved via widespread, comprehensive, and inclusive access to sexual education (ACOG, 2016).

Finally, while modifications were made to the inclusion criteria and timeframe for the Sexual Health and Behavior Survey, the timing of this study during the COVID-19 pandemic could have influenced results regarding sexual behaviors and healthcare. Public and private life was upended, and looked very different for many Americans beginning in early 2020. Recall of the previous 2 years of sexual activity may have been limited by memory, distress, or other external factors related to the COVID-19 pandemic, and the results here may not be generalizable to a "normal" year. Further, access to healthcare, particularly for primary and preventative care, was severely limited under the constraints of the pandemic. These settings are the most common places that women receive information, preventative, or reactive services for sexual health (ACOG, 2016; Wimberly et al., 2006). Thus, key points at which women may have otherwise normally come into contact with services, information, etc. were absent for much of 2020 and into 2021. Long-term work, ideally in a post-vaccination and COVID-reduced world, may provide interesting comparison and insight into the results of the current study.

Conclusions

As we increase our understanding of sexual attitudes, knowledge, and functioning, this work supports recommendations for access to inclusive, sensitive, trauma-informed, medically-accurate, and empowerment-based information in these domains. This is particularly true for female-identified individuals, who are not only at high-risk for HIV/STDs and sexual violence, but also bear the brunt of physical and psychological difficulties associated with contraction and/or trauma exposure.

Novel to this study were the evaluations of a breadth of sexual risk-taking behaviors, and assessment of sexual self-efficacy in the context of HIV/STD knowledge and SV experiences. We know that women engage in a variety of risky behaviors, while possibly underestimating their risk of HIV/STD contraction given scores on knowledge measures. Few studies have explicitly measured sexual self-efficacy as a mechanism for risk-reduction, and this study supports the inclusion of sexual self-efficacy and empowerment in conjunction with presentation of HIV/STD information. While some adult-oriented intervention and risk-reduction programs have recently included emphasis on sexual self-efficacy, this construct is missing from most (if not all) sexual education programs at the junior high and high school level.

Beyond didactics at the school-level, these findings also lend themselves to clinician efforts. Sexual violence, sexual health concerns, relationship skills, etc. are extremely common presenting concerns among individuals seeking mental health treatment. A number of treatment modalities easily lend themselves to adapting and implementing sexual health psychoeducation and self-efficacy focused care. For example, cognitive-behavioral therapy (CBT) generally follows a structured approach, beginning with psychoeducation on a given topic (e.g., sexual health), identification of its relevance to the individual, followed by skill-building in cognitive

and behavioral changes that are feasible at personal level (Beck, 2020). Similarly, dialectical behavior therapy (DBT) is frequently implemented with trauma survivors, and incorporates topics on interpersonal effectiveness, reducing impulsive or risky behavior, and building mastery around regulating affect (Linehan, 2014).

In fact, most empirically-supported treatment modalities feature direct or indirect components of self-efficacy, focusing on increasing an individual's ability to act in a cognitively, socially, and/or interpersonally promotive way. Incorporating topics on sexual health and self-efficacy may easily be viewed within the lens of ethical practice, and adaptations or modifications of existing empirically-supported treatments are common in clinical settings. As noted by Forehand and colleagues (2010), "flexible fidelity" (p. 261) can allow for systematic, individualized changes to protocols that do not compromise core elements of the treatment. Guidelines for modifications and adaptations are available (Stirman et al., 2018). Clinicians should also be mindful that the need for these modifications may not be readily apparent at the start of treatment, may be needed at various timepoints during care, and can be helpful for a variety of presenting concerns (for example, a client with Major Depressive Disorder who begins engaging in relationships and expresses hesitancy around communicating sexual needs). The current study suggests it is imperative for clinicians to remain aware of and responsive to the sexual health needs, knowledge, and behaviors of clients when indicated.

This study further demonstrated the ongoing need for earlier discussions around sexual well-being, in line with the CDC's evidence-based guidelines. Making this change will be no easy feat, as instruction on sexual self-efficacy requires messages about bodily autonomy, making decisions in the face of personal and societal pressures, prioritizing one's own needs and wants, and making health-promotive choices. Abstinence-based sex education *does* feature

elements of this message, but insufficiently leaves space for making informed sexual decisions if individuals choose to engage (Majer et al., 2016). Goldfarb and Lieberman (2021) recently published a meta-analysis on 30 years of qualitative and quantitative outcomes of school-based sexual education. Outcomes included appreciation of sexual diversity, dating and intimate partner violence prevention, development of healthy relationships, prevention of child sex abuse, improved social/emotional learning, and increased media literacy. Substantial evidence supported sex education beginning in elementary school, that is scaffolded (and of longer duration), as well as LGBTQ-inclusive education across the school curriculum and a social justice approach to healthy sexuality.

This paradigm shift is long overdue, but will require changes at the school district, state, and even national level. This study may ideally serve the institutions and advocacy groups that are already doing work in these directions: the CDC, American College of Obstetricians and Gynecologists, Planned Parenthood, Advocates for Youth, SIECUS, the National Sexual Violence Resource Center, and more. Continued research with broader sample populations will only add to our ability to provide informed education, resources, and sexual health services, and help to normalize these conversations for generations to come.

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APPENDIX A

DEMOGRAPHICS QUESTIONNAIRE

The biographical information on this page is will be used to generate descriptive information about those who participate in this study without providing details about any one individual.

1. **Age: ____**

2. **What is your geographic location?**

    a. County _____
    b. State _____
    c. Zip Code _____

3. **What sex were you assigned at birth, meaning on your original birth certificate?**

    a. Female
    b. Male
    c. Prefer not to say

4. **Which best describes your current gender identity?**
    a. Female
    b. Male
    c. Trans female
    d. Trans male
    e. Genderqueer
    f. Other _____

5. **What is your race or ethnic background? (indicate all that apply)**

    a. White
    b. Hispanic/Latina
    c. African-American/Black
    d. Asian-American/Asian
    e. Native Hawaiian/Pacific Islander
    f. Middle Eastern/North African
    g. Multi-racial
    h. Other_____

6. **What is your highest level of completed education?**

    a. High school or GED
    b. Technical college or occupational certificate
    c. Associate's degree
    d. Some college
    e. Currently attending college
    f. Bachelor's degree
    g. Master's degree
    h. Doctorate or professional degree

7. **What is your employment status?**
    a. Unemployed
    b. Employed part-time
    c. Employed full-time
    d. Not employed for pay
    e. Retired
    f. Other _____

8. **Approximately what is your annual family income?**
    a. Less than $10,000 per year
    b. $10,000-$15,000
    c. $15,000-$25,000
    d. $25,000-$50,000
    e. $50,000-$75,000
    f. Over $75,000

9. **What is your sexual orientation?**
    a. Heterosexual
    b. Gay/Lesbian
    c. Bisexual
    d. Queer
    e. Pansexual
    f. Asexual
    g. Other _____

10. **What is your current relationship/marital status? (Select all that apply)**
    a. Single
    b. In a relationship
    c. Married
    d. Divorced
    e. Separated
    f. Widowed
    g. Never married

11. **What is your religious affiliation (if any)?**
    a. _____
    b. If religiously affiliated, are you currently active in your faith (e.g., attending services, involved with a specific religious institution, etc.)?
        a) Yes
        b) No
        c) N/A

12. **Do you have any children?**
    a. Yes
        a) If yes, how many children? _____
    b. No

APPENDIX B

SEXUAL HEALTH AND BEHAVIOR SURVEY

The next questions are about your sexual and other behaviors. By sex we mean oral, vaginal, or anal sex, but NOT masturbation. When we talk about condoms, we mean both male as well as female condoms.

1. To the best of your knowledge, how many times have you received blood transfusions in the last 10 years?

_____ Times

2. Have you ever gotten a tattoo?

Y N

3. Have you ever had

a. Hepatitis Type A N Y
b. Hepatitis Type B N Y
c. Hepatitis Type C N Y

4. During the past 24 months (2 years), have you experienced any of the following:

a. Painful/difficult urination N Y
b. Lesions or sores in the genital area N Y
c. Intense chronic itching of the genital area N Y
d. Vaginal discharge N Y

5. Have you ever been tested for HIV/AIDS?

a. Yes
b. No **(If No, skip to question 9)**

6. When was the last time you were tested for HIV/AIDS?

a. Month _____ Year_

7. Are you HIV positive?

a. Yes
b. No
c. Don't know

8. Have you ever been tested for an STD or STI?

a. Yes
b. No

9. When was the last time you were tested STD/STIs?

a. Month _____ Year_____

10. Have you ever received a positive test result for any of the following? (check all that apply)

a. Chlamydia
b. Genital herpes
c. Genital warts or human papillomavirus (HPV)
d. Gonorrhea
e. Heptatis B
f. Syphilis

11. **Have you ever taken any street drugs using a needle? This includes injecting intravenously, muscling, or skin popping.***
    a. Yes
    b. No
12. **If you have taken drugs using a needle, have you shared needles with anyone within the last 2 years?***
    a. Yes
    b. No

13. **If you have taken drugs using a needle, have you shared a cotton, cooker, or rinse water with another drug user in the last 24 months (2 years)?***
    a. Yes
    b. No

14. **If you have taken drugs using a needle, have you shared injection drugs by "front loading" or "back loading" in the last 24 months (2 years)?***
    a. Yes
    b. No

15. **How old were you the first time you had any sexual contact – that is, vaginal (penis to vagina), oral (mouth to penis, vagina, or anus) or anal (penis to anus) intercourse – with another person?**
    a. Age _____
    b. Never had sexual contact

16. **When you had sexual intercourse for the first time, did you use a condom?**
    a. Yes
    b. No
    c. Don't know

17. **Have you ever**

a.	Performed oral sex (mouth to penis/vagina) on a partner?	Y	N
b.	Had anyone perform oral sex on you (mouth to penis/vagina/anus)?	Y	N
c.	Had vaginal intercourse (penis to vagina sex)?	Y	N
d.	Had anal sex (penis to anus sex)?	Y	N
e.	Had group sex: sex with more than one person at a time?*	Y	N
f.	Had sex with a person you paid for sex, or who paid for sex with you?*	Y	N

18. **In the last 24 months (2 years), how often did you carry condoms?**
    a. All of the time
    b. Most of the time
    c. Some of the time
    d. Rarely
    e. Never

19. **Did you ever have sexual intercourse (vaginal, oral, or anal – see definitions above) in the last 24 months (2 years)?**
    a. Yes
    b. No (If No, end survey)

20. **The most recent time you had sexual intercourse (vaginal, oral, or anal – see definitions above), did you use a condom?**
    a. Yes

b. No
c. Don't know

21. How many male sexual partners, if any, did you have in the last 24 months (2 years)?*
a. Number of male partners _____

22. How many female sexual partners, if any, did you have in the last 24 months (2 years)?*
a. Number of female partners _____

23. To the best of your knowledge, how many times in the last month, and in the last 24 months (2 years), did you do the following?

	Number of times in the **last month**	Number of times in the **last 24 months (2 years)**
Had sexual intercourse with partners who injected non-prescription drugs?*	_____	_____
Had sex with men who had sex with prostitutes/sex workers?*	_____	_____
Had sex with men who have had sex with other men?*	_____	_____
Had sex with a person who is positive for the antibody to the HIV virus?*	_____	_____

24. In the last 24 months (2 years), how many of your sexual partners were one-night stands, or someone you had sex with only once?
a. Men* _____
b. Women* _____

25. In the last 24 months (2 years), did you have sexual intercourse while under the influence of alcohol? *
a. Yes If yes, approximately how many times? _____
b. No

26. In the last 24 months (2 years), did you have sexual intercourse while under the influence of marijuana or other drugs?*
a. Yes If yes, approximately how many times? _____
b. No

27. Please circle the number that indicates approximately how many times in the last 24 months (2 years) that you engaged in the following activities with your sexual partners:
a. Vaginal Intercourse (penis to vagina sex)
    a) Does not apply
    b) 0 times
    c) 1-20 times
    d) 21-40 times
    e) 41-60 times
    f) 61-80 times
    g) 81-100 times
    h) 100+ times

b. Anal Intercourse (penis to anus sex)
    a) Does not apply
    b) 0 times
    c) 1-20 times
    d) 21-40 times
    e) 41-60 times
    f) 61-80 times
    g) 81-100 times
    h) 100+ times

c. Performed oral sex on a partner (mouth to penis/vagina/anus):
    a) Does not apply
    b) 0 times
    c) 1-20 times
    d) 21-40 times
    e) 41-60 times
    f) 61-80 times
    g) 81-100 times
    h) 100+ times

d. Partner performed oral sex on you (mouth to penis/vagina/anus):
    a) Does not apply
    b) 0 times
    c) 1-20 times
    d) 21-40 times
    e) 41-60 times
    f) 61-80 times
    g) 81-100 times
    h) 100+ times

e. Other (please specify): _____
    a) Does not apply
    b) 0 times
    c) 1-20 times
    d) 21-40 times
    e) 41-60 times
    f) 61-80 times
    g) 81-100 times
    h) 100+ times

28. When you had vaginal, oral, and/or anal intercourse with your <u>Male</u> partners, if any, during the <u>last 24 months (2 years)</u>, how often did you use condoms?

a. Vaginal intercourse with a male partner:
    a) Does not apply
    b) Always used condoms
    c) Usually used condoms*
    d) Sometimes used condoms*
    e) Rarely used condoms*
    f) Never used condoms*

b. Oral intercourse with a male partner:
    a) Does not apply
    b) Always used condoms

c) Usually used condoms*
d) Sometimes used condoms*
e) Rarely used condoms*
f) Never used condoms*

c. Anal intercourse with a male partner:
a) Does not apply
b) Always used condoms
c) Usually used condoms*
d) Sometimes used condoms*
e) Rarely used condoms*
f) Never used condoms*

29. When you had vaginal, oral, and/or anal intercourse with your <u>Female</u> partner(s), if any, during the <u>last 24 months (2 years)</u>, how often did you use condoms?

a. Vaginal intercourse with a female partner:
a) Does not apply
b) Always used condoms
c) Usually used condoms*
d) Sometimes used condoms*
e) Rarely used condoms*
f) Never used condoms*

b. Oral intercourse with a female partner:
a) Does not apply
b) Always used condoms
c) Usually used condoms*
d) Sometimes used condoms*
e) Rarely used condoms*
f) Never used condoms*

c. Anal intercourse with a female partner:
a) Does not apply
b) Always used condoms
c) Usually used condoms*
d) Sometimes used condoms*
e) Rarely used condoms*
f) Never used condoms*

30. If you had sexual intercourse with a <u>new</u> partner in the last 24 months, did you discuss sexual histories prior to sex?

a. Yes
b. No
c. N/A

31. Generally, compared to before the COVID-19 pandemic, my in-person sexual activity has:

a. Greatly Increased
b. Somewhat Increased
c. Stayed the Same
d. Somewhat Decreased
e. Greatly Decreased

APPENDIX C

HIV Knowledge Questionnaire - 18

For each statement, please circle True (T), False (F), or I Don't Know (DK). If you do not know, please don't guess; instead, please circle "DK."

	True	**False**	**Don't Know**
1. Coughing and sneezing DO NOT spread HIV.	T	F	DK
2. A person can get HIV by sharing a glass of water with someone who has HIV.	T	F	DK
3. Pulling out the penis before a man climaxes/cums keeps a woman from getting HIV during sex.	T	F	DK
4. A woman can get HIV if she has anal sex with a man.	T	F	DK
5. Showering, or washing one's genitals/private parts after sex keeps a person from getting HIV.	T	F	DK
6. All pregnant women infected with HIV will have babies born with AIDS.	T	F	DK
7. People who have been infected with HIV quickly show serious signs of being infected.	T	F	DK
8. There is a vaccine that can stop adults from getting HIV.	T	F	DK
9. People are likely to get HIV by deep kissing (putting their tongue in their partner's mouth) if their partner has HIV.	T	F	DK
10. A woman cannot get HIV if she has sex during her period.	T	F	DK
11. There is a female condom that can help decrease a woman's chance of getting HIV.	T	F	DK
12. A natural skin condom works better against HIV than does a latex condom.	T	F	DK
13. A person will NOT get HIV if he or she is taking antibiotics.	T	F	DK
14. Having sex with more than one partner can increase a person's chance of being infected with HIV.	T	F	DK
15. Taking a test for HIV one week after having sex will tell a person if she or he has HIV.	T	F	DK
16. A person can get HIV by sitting in a hot tub or a swimming pool with a person who has HIV.	T	F	DK
17. A person can get HIV from oral sex.	T	F	DK
18. Using Vaseline or baby oil with condoms lowers the chance of getting HIV.	T	F	DK

APPENDIX D

Sexually Transmitted Disease Knowledge Questionnaire (STD-K-Q)

For each statement, please circle True (T), False (F), or I Don't Know (DK). If you do not know, please don't guess; instead, please circle "DK."

	True	False	Don't Know
1. Genital Herpes is caused by the same virus as HIV.	T	F	DK
2. Frequent urinary infections can cause Chlamydia.	T	F	DK
3. There is a cure for Gonorrhea.	T	F	DK
4. It is easier to get HIV if a person has another Sexually Transmitted Disease.	T	F	DK
5. Human papillomavirus (HPV) is caused by the same virus that causes HIV.	T	F	DK
6. Having anal sex increases a person's risk of getting Hepatitis B.	T	F	DK
7. Soon after infection with HIV, a person develops open sores on his or her genitals (penis or vagina).	T	F	DK
8. There is a cure for Chlamydia.	T	F	DK
9. A woman who has Genital Herpes can pass the infection to her baby during childbirth.	T	F	DK
10. A woman can look at her body and tell if she has Gonorrhea.	T	F	DK
11. The same virus causes all of the Sexually Transmitted Diseases.	T	F	DK
12. Human Papillomavirus can cause Genital Warts.	T	F	DK
13. Using a natural skin (lambskin) condom can protect a person from getting HIV.	T	F	DK
14. Human Papillomavirus can lead to cancer in women.	T	F	DK
15. A man must have vaginal sex to get Genital Warts.	T	F	DK
16. Sexually transmitted Diseases can lead to health problems that are usually more serious for men than for women.	T	F	DK
17. A woman can tell that she has Chlamydia if she has a bad smelling odor from her vagina.	T	F	DK
18. If a person tests positive for HIV the test can tell how sick the person will become.	T	F	DK
19. There is a vaccine available to prevent a person from getting Gonorrhea.	T	F	DK
20. A woman can tell by the way her body feels if she has a Sexually Transmitted Disease.	T	F	DK
21. A person who has Genital Herpes must have open sores to give the infection to his or her sexual partner.	T	F	DK
22. There is a vaccine that prevents a person from getting Gonorrhea.	T	F	DK
23. A man can tell by the way his body feels if he has Gonorrhea.			
24. If a person had Gonorrhea in the past, he or she is immune (protected) from getting it again.	T	F	DK
25. Human papillomavirus (HPV) can cause HIV.	T	F	DK
26. A man can protect himself from getting Genital Warts by washing his genitals after sex.	T	F	DK
27. There is a vaccine that can protect a person from getting Hepatitis B.	T	F	DK

APPENDIX E

Sexual Health Practices Self-Efficacy Scale

Please indicate how comfortable you are at this time, in carrying out the following sexual health practices if you needed to. Think of confidence as having the knowledge, skills, and comfort necessary to effectively do these things. The term "partner" refers to whomever you might choose to share your sexuality with. Use the following scale for your answers:

1 = Not at all confident
2 = Slightly confident
3 = Moderately confident
4 = Highly confident
5 = Extremely confident

1. Performing breast or testicular self-exams.

1 *2* *3* *4* *5*

2. Getting tested for a sexually transmitted infection (STI).

1 *2* *3* *4* *5*

3. Getting an HIV Test

1 *2* *3* *4* *5*

4. Talking with a health care worker about a sexual health issue like an STI.

1 *2* *3* *4* *5*

5. Making thoughtful, good decisions about your sexual behaviors.

1 *2* *3* *4* *5*

6. Practicing sexual abstinence.

1 *2* *3* *4* *5*

7. Establishing a fulfilling sexual relationship.

1 *2* *3* *4* *5*

8. Talking with a (prospective) sexual partner about your sexual histories.

1 *2* *3* *4* *5*

9. Using a condom.

1 *2* *3* *4* *5*

10. Using another form of birth control other than a condom.

1 *2* *3* *4* *5*

11. Negotiating with a sexual partner to practice safer sex.

1 *2* *3* *4* *5*

12. Talking with a sexual partner about a sexual health issue, such as an STI.

1 *2* *3* *4* *5*

13. Talking with a sexual partner about a relationship issue.

1 *2* *3* *4* *5*

14. Dealing with a sexual functioning issue (like difficulty achieving orgasm or ejaculating too quickly).

1 *2* *3* *4* *5*

15. Preventing a sexual assault situation from occurring.

1 *2* *3* *4* *5*

16. Dealing with a sexual assault situation if it occurs to you.

1 *2* *3* *4* *5*

17. Helping a friend who has been sexually assaulted.

1 *2* *3* *4* *5*

18. Eliminating sexual double standards (based on gender) in your life.

1 *2* *3* *4* *5*

19. Eliminating gender stereotyping from your life.

1 *2* *3* *4* *5*

20. Accepting diversity in sexual orientation (heterosexuality, homosexuality, bisexuality, etc.).

1 *2* *3* *4* *5*

APPENDIX F

Sexual Experiences Survey – Short Form Version

The following questions concern sexual experiences that you may have had that were unwanted. We know that these are personal questions, so we do not ask your name or other identifying information. Your information is completely confidential. We hope that this helps you to feel comfortable answering each question honestly. Place a check mark in the box showing the number of times each experience has happened to you. If several experiences occurred on the same occasion--for example, if one night someone told you some lies and had sex with you when you were drunk, you would check both boxes a and c. The past 12 months refers to the past year going back from today. Since age 14 refers to your life starting on your 14th birthday and stopping one year ago from today.

1. Someone fondled, kissed, or rubbed up against the private areas of my body (lips, breast/chest, crotch or butt) or removed some of my clothes without my consent *(but did not attempt sexual penetration)* by:

	How many times in the past 12 months? 0, 1, 2, 3+	How many times since age 14? 0, 1, 2, 3+
a. Telling lies, threatening to end the relationship, threatening to spread rumors about me, making promises I knew were untrue, or continually verbally pressuring me after I said I didn't want to.		
b. Showing displeasure, criticizing my sexuality or attractiveness, getting angry but not using physical force, after I said I didn't want to.		
c. Taking advantage of me when I was too drunk or out of it to stop what was happening.		
d. Threatening to physically harm me or someone close to me.		
e. Using force, for example holding me down with their body weight, pinning my arms, or having a weapon.		

2. Someone had oral sex with me or made me have oral sex with them without my consent by:

a. Telling lies, threatening to end the relationship, threatening to spread rumors about me, making promises I knew were untrue, or continually verbally pressuring me after I said I didn't want to.		
b. Showing displeasure, criticizing my sexuality or attractiveness, getting angry but not using physical force, after I said I didn't want to.		
c. Taking advantage of me when I was too drunk or out of it to stop what was happening.		
d. Threatening to physically harm me or someone close to me.		
e. Using force, for example holding me down with their body weight, pinning my arms, or having a weapon.		

3. A man put his penis into my vagina, or someone inserted fingers or objects without my consent by:

	How many times in the past 12 months? 0, 1, 2, 3+	How many times since age 14? 0, 1, 2, 3+
a. Telling lies, threatening to end the relationship, threatening to spread rumors about me, making promises I knew were untrue, or continually verbally pressuring me after I said I didn't want to.		
b. Showing displeasure, criticizing my sexuality or attractiveness, getting angry but not using physical force, after I said I didn't want to.		
c. Taking advantage of me when I was too drunk or out of it to stop what was happening.		
d. Threatening to physically harm me or someone close to me.		
e. Using force, for example holding me down with their body weight, pinning my arms, or having a weapon.		

4. A man put his penis into my butt, or someone inserted fingers or objects without my consent by:

a. Telling lies, threatening to end the relationship, threatening to spread rumors about me, making promises I knew were untrue, or continually verbally pressuring me after I said I didn't want to.		
b. Showing displeasure, criticizing my sexuality or attractiveness, getting angry but not using physical force, after I said I didn't want to.		
c. Taking advantage of me when I was too drunk or out of it to stop what was happening.		
d. Threatening to physically harm me or someone close to me.		
e. Using force, for example holding me down with their body weight, pinning my arms, or having a weapon.		

5. Even though it didn't happen, someone TRIED to have oral sex with me, or make me have oral sex with them without my consent by:

a. Telling lies, threatening to end the relationship, threatening to spread rumors about me, making promises I knew were untrue, or continually verbally pressuring me after I said I didn't want to.		
b. Showing displeasure, criticizing my sexuality or attractiveness, getting angry but not using physical force, after I said I didn't want to.		
c. Taking advantage of me when I was too drunk or out of it to stop what was happening.		
d. Threatening to physically harm me or someone close to me.		
e. Using force, for example holding me down with their body weight, pinning my arms, or having a weapon.		

6. Even though it didn't happen, a man TRIED to put his penis into my vagina, or someone tried to stick in fingers or objects without my consent by:

	How many times in the past 12 months? 0, 1, 2, 3+	How many times since age 14? 0, 1, 2, 3+
a. Telling lies, threatening to end the relationship, threatening to spread rumors about me, making promises I knew were untrue, or continually verbally pressuring me after I said I didn't want to.		
b. Showing displeasure, criticizing my sexuality or attractiveness, getting angry but not using physical force, after I said I didn't want to.		
c. Taking advantage of me when I was too drunk or out of it to stop what was happening.		
d. Threatening to physically harm me or someone close to me.		
e. Using force, for example holding me down with their body weight, pinning my arms, or having a weapon.		

7. Even though it didn't happen, a man TRIED to put his penis into my butt, or someone tried to stick in objects or fingers without my consent by:

a. Telling lies, threatening to end the relationship, threatening to spread rumors about me, making promises I knew were untrue, or continually verbally pressuring me after I said I didn't want to.		
b. Showing displeasure, criticizing my sexuality or attractiveness, getting angry but not using physical force, after I said I didn't want to.		
c. Taking advantage of me when I was too drunk or out of it to stop what was happening.		
d. Threatening to physically harm me or someone close to me.		
e. Using force, for example holding me down with their body weight, pinning my arms, or having a weapon.		

8. I am: Female Male My age is _____ years and _____months.

9. Did any of the experiences described in this survey happen to you 1 or more times?
Yes No
What was the sex of the person or persons who did them to you?
Female only
Male only
Both females and males
I reported no experiences

10. Have you ever been raped? Yes No

APPENDIX G

Reading Comprehension Check Questions

Questions inserted randomly throughout the survey:

1. **Please select answer "C"**
    1. A
    2. B
    3. C
    4. D

2. **Please select answer "A"**
    1. A
    2. B
    3. C
    4. D

3. **Please select the color "brown"**
    1. Green
    2. Blue
    3. Purple
    4. Brown

4. **Please select the color "blue"**
    1. Green
    2. Blue
    3. Purple
    4. Brown

To be administered at the end of the survey:

1. **It would be very helpful if you could tell us at this point whether you have taken part seriously, so that we can use your answers for our scientific analysis, or whether you were just clicking through to take a look at the survey?**
    a. I have taken part seriously.
    b. I have just clicked through, please throw my data away.

APPENDIX H

Debrief Form

The study you have just completed was designed to investigate women's sexual health, knowledge about HIV/STDs, and experiences of trauma.

Some of the questions in this survey may have been difficult, and your generosity and willingness to participate in this study are greatly appreciated. If answering any of these questions led you to feel distressed and you would like to speak to someone about your thoughts, please contact your community support systems (community healthcare, community hospitals, local mental health agencies), or call the numbers provided below (feel free to share these resources with others). If you feel you are in immediate danger, call 911.

National Suicide Prevention Lifeline

Phone: 1-800-273-8255

Mental Health

Resources for a variety of mental health helplines are available through the National Alliance on Mental Illness: https://www.nami.org/Find-Support/NAMI-HelpLine/Top-HelpLine-Resources

Sexual Health

Resources for a variety of information on sexual health, STD/HIV transmission, and prevention are available via the following links from the Centers for Disease Control (CDC). You may also contact your local community healthcare provider

https://www.cdc.gov/std/prevention/default.htm

https://www.cdc.gov/hiv/default.html

https://www.cdc.gov/sexualhealth/Default.html

Thank you again for your participation and for not discussing the contents of the study with other MTurk workers. If you have any questions about the study, please feel free to contact Danielle Richner (daniellerichner@isu.edu) or Dr. Shannon Lynch (shannonlynch@isu.edu). If you would like to obtain a copy of the results of this study once it is complete, please contact Danielle Richner. As a reminder, results are grouped together making individual results unavailable. Your participation, including your name and answers, will be confidential, even when the results are published.

DO NOT FORGET TO:

Record the unique survey completion code that will be shown after this page. If you were screened out (not eligible for this study) or withdrew before the questionnaire portion began there will be no randomized code presented (a space will be present).

Return to the MTurk window to enter the survey completion code to submit your task and earn compensation.