Exploring the Relation Between Religiosity and Sexual Health Outcomes

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EXPLORING THE RELATION BETWEEN RELIGIOSITY AND SEXUAL HEALTH OUTCOMES

A Dissertation
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy
International Family and Community Studies

by
Kayla Lee Weston
May 2020

Accepted by:
Dr. Martha Thompson, Committee Chair
Dr. Edmond Bowers
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Dr. Bonnie Holaday
ABSTRACT

Despite a decline in adolescent fertility rates in the United States, unplanned pregnancy rates remain among the highest in the developed world and sexually transmitted infections (STIs) are on the rise. With U.S. sexuality education remaining inconsistent, exploring other platforms, such as religious institutions, to make an impression about sexuality on young people may provide an additional strategy to further reduce unplanned pregnancies and prevent the spread of STIs. While prior research has demonstrated links between religiosity and sexual health, a gap exists with respect to influences that may mediate the relation between religiosity and experiencing STIs and unplanned pregnancy. Additionally more remains to be understood about how lifetime religiosity levels influence long-term sexual health outcomes.

Using Waves I through IV of the National Longitudinal Study of Adolescent to Adult Health (Add Health), this study sought to assess the relation between religiosity and the sexual health outcomes of lifetime experiences of chlamydia, gonorrhea, HPV, any of these three STIs, and unplanned pregnancy. In the investigation of adolescent religiosity’s link to these outcomes, mediation analyses were conducted to assess whether attitudes toward sex, parent-child connectedness, peer religiosity, problem alcohol use, condom use knowledge, sexual debut, and number of sexual partners produced indirect effects. Additionally, logistic regression analyses were conducted to determine if there were differences in sexual health outcomes (chlamydia, gonorrhea, HPV, any STI, and unplanned pregnancy) between those who sustained religiosity from adolescence into
adulthood and groups with lower levels of lifetime religiosity (late adopted religiosity, discontinued religiosity, and no religiosity).

Results showed religiosity to be significantly protective against poor sexual health outcomes (chlamydia, gonorrhea, HPV, any STI, and unplanned pregnancy) through the significant indirect effects of attitudes toward sex, parent-child connectedness, problem alcohol use, condom use knowledge, sexual debut, and number of sexual partners. However, the outcomes for which each mediator demonstrated significance varied. Peer religiosity did not demonstrate significant indirect effects for any of the STIs examined or unplanned pregnancy. Additionally, logistic regression results showed sustained religiosity to be most protective of having ever experienced chlamydia, gonorrhea, HPV, any STI, and unplanned pregnancy.

The findings of this study support prior research showing religiosity as a protective factor with respect to sexual health. Understanding more about the role religiosity plays in the long-term sexual health outcomes of adolescents and young adults is a helpful tool to inform parents, practitioners, and policymakers in the efforts to continue reducing unplanned pregnancies and preventing the spread of STIs.

Keywords: religiosity, sexual health, STIs, gonorrhea, chlamydia, HPV, unplanned pregnancy, sexual health outcomes, sexual debut, number of sexual partners
DEDICATION

In his award-winning song, “Lose Yourself,” Eminem posed the question, “If you had one shot or one opportunity to seize everything you ever wanted in one moment, would you capture it or just let it slip?” Earning a Ph.D. at my age was the opportunity of a lifetime and I could not have captured it without leaning on my family. Therefore, I dedicate this dissertation to my husband and children who have been nothing but supportive of me in this amazing endeavor. Your encouragement and patience mean more to me than you’ll ever know.

To my husband, Peter – you set the example with your passionate love of learning, which inspired me to continue pursuing my education nearly twenty years after finishing my undergraduate degree. Thank you for always believing in me and for talking me off the ledge the many times I doubted myself. I am eternally grateful to you for pushing me to step outside of my comfort zone and test my limitations.

To my children, Elizabeth and Jack – it is unusual for a mom to be a student at the same time as her children, so thank you for staying on top of all of your schoolwork so that I could focus on my own. Elizabeth – thank you for keeping me updated on the countdown until graduation and vacation. Jack – thank you for always asking me how many pages I wrote each day. You have no idea how important your interest in my dissertation progress was in keeping me accountable in reaching my deadlines. You two were my biggest cheerleaders and I never would have been able to successfully complete this journey without your love and support. I am so blessed to have such a wonderful family. Thank you all for everything!
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Next, I would like to thank the Departments of Defense, the Navy, and Veterans’ Affairs for funding my bachelor’s, master’s, and doctoral degrees. The entirety of my education would not have been possible without this support.

Finally, I would like to thank my committee for their constant encouragement and support. Dr. Martie Thompson, you spent countless hours with me pouring over variables, code, and analyses. Thank you for allowing me to invade your office for the better part of three months, for your prompt responses to my many questions, and for providing me with such helpful feedback throughout the process. Dr. Ed Bowers, thank you not only for your thorough feedback, but also for encouraging me to pursue a doctorate even though I thought you mistakenly emailed the wrong student when you first suggested it. I would never have followed this path without your urging. Dr. Arelis Moore de Peralta, thank you for always providing such helpful feedback and for changing my heart and mind on various social issues for which I had already developed woefully uninformed opinions. Dr. Bonnie Holaday, thank you for your encouraging feedback and for your seemingly boundless knowledge of globalization and health, which was highly influential as I went about choosing a dissertation topic. You have all been incredibly supportive and I am so thankful you agreed to serve on my committee. Thank you!
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CHAPTER ONE
INTRODUCTION TO THE STUDY

U.S. teen pregnancy rates resulting in live births have declined since the 1990s, with a sharp dip occurring over the past two decades and recently plunging to a record low of 18.8 births per 1000 women, ages 15-19 (Martin, Hamilton, Osterman, Driscoll, & Drake, 2018a). While such a drop may appear as cause for celebration, sexually transmitted infections (STIs) continue to rise. Since 2014, cases of chlamydia increased 19% and cases of gonorrhea increased 63% (Centers for Disease Control and Prevention [CDC], 2019a). Additionally, 79 million Americans carry the HPV (Human Papilloma Virus) infection (CDC, 2017), which can lead to various forms of cancer (National Library of Medicine [NLM], 2019a). The population with the highest risk for obtaining the most common STIs of chlamydia, gonorrhea, and HPV includes young people between the ages of 15 and 19 (CDC, 2019a).

Unfortunately, the U.S. public school system, which has the potential to reach the bulk of the youth population, fails to provide adequate information to young people about sexual and reproductive health (Baker, 2019). Only 29 states and the District of Columbia mandate sexuality education training and only 17 states require medically accurate information be provided (Guttmacher Institute, 2019a). It is unclear whether information that is being provided in the remaining states is medically accurate or not, despite not having a requirement for it to be accurate (Guttmacher Institute, 2019a). However, some programs have been accused of embellishing failure rates of contraception measures in efforts to encourage abstinence (U.S. House of Representatives
Committee on Government Reform, 2004). With the increased risk of contracting STIs and the limits of sexuality education in public schools, other avenues that communicate messages about sexual health to young people, such as religious institutions, should be explored as potential means to protect youth from poor sexual health outcomes.

Sexuality education in the religious context may not necessarily be delivered in a classroom setting, as in the public school system, but young people of faith may be just as influenced by their religion’s philosophies on sex (Vasilenko, Duntzee, Zheng, & Lefkowitz 2013; Vazsonyi & Jenkins, 2010). Religious institutions tend to communicate various messages to young people about sexuality. For instance, many religions proscribe premarital sexual activity and promote procreative sexual relations (Rostosky, Regnerus, & Wright, 2003) over those driven by the desire for pleasure (Vasilenko et al., 2013). Some Evangelical Christian and Orthodox Jewish institutions emphasize both pleasure and procreation, but only within the confines of marriage (Avishai & Burke 2016). Previous studies have demonstrated a link between religiosity (consisting of some combination of service attendance frequency, importance of religion, prayer, and participation in religious activities) at one time point (typically during adolescence or emerging adulthood) and sexual health and sexual behaviors, suggesting that religiosity plays a protective role against sexually risky behaviors in most cases, such as being associated with an older age at sexual debut (Gold et al., 2010; Haglund & Fehring, 2010; Manlove, Terry-Humen, Ikramullah, & Moore, 2006; Meier, 2003; Rostosky et al., 2003; Rostosky, Wilcox, Wright, & Randall, 2004; Thornton & Camburn, 1989) and a lower number of sexual partners (Gold et al., 2010; Haglund & Fehring, 2010; Landor, Simons,
Simons, Brody, & Gibbons, 2011). However, some studies have shown religiosity to be a risk factor with respect to low or inconsistent condom use (Shaw & El-Bassel, 2014; Zaleski & Schiaffino, 2000).

Despite some conflicting findings, the majority of extant research points to religiosity as a protective factor with respect to sexual health, but leaves gaps regarding religiosity’s influence on specific STIs individually (i.e., chlamydia, gonorrhea, and HPV) through mediating influences, both of which this study seeks to fill. Previous researchers have suggested that religious youth who internalize messages they hear about sex in the church setting (Vasilenko et al., 2013; Vazsonyi & Jenkins, 2010), tend to have healthier connections with parents (Cheshire, Kaestle, & Miyazaki, 2019; Manlove, Logan, Moore, & Ikramullah, 2008; Quinn & Lewin, 2019), select peer groups adopting sexually restrictive attitudes (Landor et al., 2011), and have fewer problems with alcohol use (Murray, Ciarrocchi, & Murray-Swank, 2007; Nonnemaker, McNeely, & Blum, 2003; Poulson, Eppler, Satterwhite, Wuensch, & Bass, 1998). While the U.S. population is becoming increasingly less religious, the large majority (76.5%) of Americans still claim a religious identity (Pew Research Center, 2015). Thus, religion serves as a viable alternate mechanism to the public school system to communicate important messages to youth about protecting their sexual health.

In response to a congressional order to explore multiple facets of adolescent health, The National Longitudinal Study of Adolescent to Adult Health (Add Health) began in 1994 with its first wave of data collection (Harris et al., 2009). While Chapter 3 provides more in-depth detail on the dataset itself, it is important to note that the Add
Health study is comprised of a nationally representative sample following the same participants over the past two decades with five different data collection points to date, all of which assess both religiosity and several aspects of sexual health (Harris et al., 2009). Studies utilizing the Add Health data to examine a number of issues related to religiosity and sexual and reproductive health are plentiful. Prior Add Health research has assessed links between religiosity and abortion practices (Adamcyzk & Felson, 2008), coital debut (Adamcyzk, 2009; Rostosky et al., 2003), number of sexual partners (Chesire et al., 2019), and sexually risky behaviors (Grossman, Tracy, & Noonan, 2013; Nonnemaker et al., 2003). Due to the quality of the data included in Add Health as demonstrated by the aforementioned studies, the dataset provided a rich and thorough resource for this dissertation to fulfill its purpose of expanding the literature by examining the role of religiosity in the individual sexual health outcomes of lifetime diagnoses of chlamydia, gonorrhea, HPV, and unplanned pregnancies. A greater understanding of the relation between religiosity and STIs and unplanned pregnancies can inform parents, practitioners, and other stakeholders, allowing them to adjust educational approaches, policies, and programming to reflect the role of religiosity in multiple sexual health outcomes. For instance, religious parents may encourage their children to participate in religious activities, policymakers may work to promote influences, such as reduced alcohol use, that are also associated with religiosity and sexually healthy outcomes, and practitioners may consider the sexual health benefits of religiosity in creating programming for young people or recommending a course of action for patients or clients.
Using Ajzen’s (1991) Theory of Planned Behavior (TPB) (Figure 1.1), which is discussed in more detail in Chapter 2, this dissertation examined how attitudes (personal attitude about whether a behavior is favorable or unfavorable), subjective norms (social pressure to engage in or avoid a behavior), perceived behavioral control (perception of ease or difficulty performing a behavior), behavioral intentions (motivation to engage in behavior), and behaviors are influenced by religiosity and play a mediating role between religiosity and sexual health outcomes. Mediation analyses were conducted to determine whether attitudes toward sex, parent-child connectedness, peer religiosity, problem alcohol use, condom use knowledge, sexual debut, and number of sexual partners play mediating roles in the relation between religiosity and the specific STIs of chlamydia, gonorrhea, and HPV, individually, as well as unplanned pregnancies. Additionally, logistic regression analyses were used to compare participants’ lifetime histories of having ever experienced an STI or unplanned pregnancy. Comparisons were made between those who sustained religiosity from adolescence into adulthood and those who later adopted religiosity, those who discontinued religiosity after adolescence, and those who never adopted religiosity. Age, gender, race/ethnicity, and parent education served as control variables.
Figure 1.1. Theory of Planned Behavior (Ajzen, 1991)
This dissertation is relevant for three reasons. First, it examines the relation between religiosity and specific STI outcomes individually. While previous studies have assessed religiosity’s associations with STIs (Ford et al., 2005; Gold et al., 2010) in general or specifically with HIV/AIDS (Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome) (Shaw & El-Bassel, 2014), a gap exists with respect to the link between religiosity and the more common STIs of chlamydia, gonorrhea, and HPV, individually. Second, this dissertation adds to the body of knowledge through the examination of seven hypothesized mediators (attitudes toward sex, parent-child connectedness, peer religiosity, problem alcohol use, condom use knowledge, age of sexual debut, and number of sexual partners) in the relation between religiosity and specific STIs individually. Additionally, while unplanned pregnancy has been examined as an outcome in previous studies centered on religiosity, it has not been studied as an outcome with respect to religiosity and the mediating variables investigated in this study. Third, it provides a deeper understanding of the influence of religiosity on sexual health outcomes by assessing religiosity at different points in the participants’ lifetimes, rather than at one specific time point, as has been done in most prior studies (Adamczyk & Felson, 2008; Bearman & Brückner, 2001; Beck, Cole, & Hammond, 1991; Cheshire et al., 2019; Davidson, Moore, & Ullstrup, 2004; Gold et al., 2010; Haglund & Fehring, 2010; Hall, Moreau, & Trussell, 2012; Hull, Hennessy, Bleakly, Fishbein, & Jordan, 2011; Landor et al., 2011; Manlove et al., 2008; Martin, Baralt, & Garrido-Ortega, 2018b; Miller & Gur, 2002; Moore, Berkeley-Patton, & Hawes, 2013; Murray et al., 2007; Nonnemaker et al., 2003; Poulson et al., 1998; Quinn & Lewin, 2019; Regnerus,
Definitions of Terms

The following section provides definitions for the terms that are used throughout this dissertation. Sexual health, sexual and reproductive health, and sexual health knowledge are defined in order to provide context to the study. The remaining definitions include the predictor variable of religiosity; the mediators of attitudes toward sex, parent-child connectedness, peer religiosity, problem alcohol use, condom use knowledge, sexual debut, and number of sexual partners; and the outcome variables of chlamydia, gonorrhea, HPV, and unplanned pregnancies. The explanations of each measure are provided in Chapter 3.

Sexual Health and Sexual and Reproductive Health

The terms “sexual health” and “sexual and reproductive health” are often used interchangeably throughout the literature. The World Health Organization (WHO) (2019a), defines “sexual health” as “a state of physical, emotional, and mental well-being in relation to sexuality, and not merely the absence of disease, dysfunction, or infirmity” (para. 2). Similarly, the UN Population Fund (UNFPA) (n. d.) states “sexual and reproductive health is a state of complete physical, mental, and social well-being in all matters relating to the reproductive system” (para. 1). Whereas both definitions emphasize wellness, the current study will assess poor sexual and reproductive health outcomes, that is, STIs and unplanned pregnancies, with the idea of raising awareness of how to promote an overall state of wellness with respect to sexual health. For the sake of
simplicity, the term “sexual health” will be used throughout this study in reference to both “sexual health” and “sexual and reproductive health.”

**Sexual Health Knowledge**

Sexual health knowledge refers to the level of awareness as it relates to contraception, STI prevention, and other important aspects of sexual health such as pregnancy testing, STI testing, preventive gynecological care, and the HPV vaccine (Martin et al., 2018b).

**Religiosity**

The *International Encyclopedia of the Social & Behavioral Sciences* defines religiosity as “a characteristic of individuals and collectivities that displays various features of beliefs about the supernatural and how individuals and social groups engage in behaviors related to the supernatural” (Sheerkat, 2015, p. 377). For the purposes of this study, religiosity includes an individual’s perception of the importance of religion, frequency of prayer, frequency of service attendance, and participation in religious activities.

**Attitudes Toward Sex**

Attitudes toward sex include both relational and personal attitudes. Relational attitudes refer to how sexual activity will affect relationships with others, (e.g., it will upset one’s mother), whereas personal attitudes include whether one associates the sexual act with pleasurable physical feelings or positive social outcomes (Meier, 2003).
**Parent-Child Connectedness**

Parent-child connectedness refers to “closeness to mother and/or father, perceived caring by mother and/or father, satisfaction with the relationship to mother and/or father, and feeling loved and wanted by family members” (Resnick, et al., 1997, p. 825).

**Peer Religiosity**

Peer religiosity refers to how one’s peers view the importance of religion, peers’ frequency of prayer, peers’ frequency of service attendance, and peers’ participation in religious activities (Adamcyzk, 2009; Adamczyk & Felson, 2006).

**Problem Alcohol Use**

Problem alcohol use refers to drinking alcohol to the point of intoxication and whether the use of alcohol has caused trouble within families, schools, and relationships with others (Swahn & Donovan, 2004).

**Condom Use Knowledge**

Condom use knowledge refers to how well one understands proper use and effectiveness of condoms (Resnick et al., 1997). More specifically, this definition captures some of the common misperceptions about condom use, such as a belief that lamb’s skin condoms are equally or more effective than latex condoms.

**Sexual Debut**

Sexual debut refers to the age at which one engaged in vaginal sexual intercourse for the first time, as has been defined in prior research (Adamczyk & Felson, 2006; Gold et al., 2010; Haglund & Fehring, 2010; Landor et al., 2011; Manlove et al., 2006; Meier, 2003; Rostosky et al., 2003; Rostosky et al., 2004).
Number of Sexual Partners

This study defines the number of sexual partners as the complete number of vaginal sex partners over the course of a lifetime. To remain consistent with previous research defining “sex partners” as those with whom participants engaged in vaginal intercourse (Cheshire et al., 2019; Gold et al., 2010; Haglund & Fehring, 2010; Landor et al., 2011; Manlove et al., 2008; Vasilenka & Espinosa-Hernández, 2019), anal and oral sex partners are outside the scope of this study.

Sexually Transmitted Infections (STIs) and Sexually Transmitted Diseases (STDs)

The literature uses the terms STI and STD interchangeably. According to the Mayo Clinic (2019), STIs and STDs are “generally acquired by sexual contact. The organisms (bacteria, viruses, or parasites) that cause sexually transmitted diseases may pass from person to person in blood, semen, vaginal, and other bodily fluids” (para. 1). For the purposes of consistency, the term “STI” is used throughout the dissertation.

Chlamydia

Chlamydia is a bacterial infection that is spread through vaginal, oral, or anal sex (NLM, 2019b). It often does not present symptoms. However, it can infect the cervix (in women), the urethra (in men), the rectum, or the throat (NLM, 2019b).

Gonorrhea

Gonorrhea is also a bacterial infection spread through vaginal, oral, or anal sex (NLM, n. d.). It causes infections of genital tract, mouth, and anus, but can often go undetected, as symptoms do not always emerge (NLM, n. d.).
**Human Papilloma Virus (HPV)**

The Human Papilloma Virus (HPV) is a viral infection transmitted through sexual contact (NLM, 2019a). It is the most common STI in the United States, mainly affecting the genitals. HPV can go undetected for years, however it can also cause genital warts and a variety of cancers (NLM, 2019a).

**Unplanned Pregnancies**

For the purposes of this study, unplanned pregnancies refer to pregnancies the birth parents did not intentionally plan, regardless of the outcome of the pregnancies (e.g., live births, miscarriages, abortions, adoptions).

**Research Questions and Hypotheses**

This dissertation utilized Add Health data in a secondary data analytic approach to answer the following four research questions:

1. Does adolescent religiosity predict the likelihood of lifetime STI outcomes (having ever been diagnosed with chlamydia, gonorrhea, HPV, or any of the three STIs) through the mediating roles of attitudes toward sex, parent-child connectedness, peer religiosity, problem alcohol use, condom use knowledge, sexual debut, and number of sexual partners?

   *Hypotheses 1 - 7*: The association of adolescent religiosity and the likelihood of lifetime STI outcomes will be mediated by relational attitudes toward sex (hypothesis 1a), personal attitudes toward sex (hypothesis 1b), parent-child connectedness (hypothesis 2), peer private religiosity (hypothesis 3a), peer public religiosity (hypothesis
3b), problem alcohol use at Wave II (hypothesis 4a), problem alcohol
use at Wave III (hypothesis 4b), condom use knowledge (hypothesis
5), sexual debut (hypothesis 6), and number of sexual partners
(hypothesis 7).

2. Does adolescent religiosity predict the likelihood of unplanned pregnancies
through the mediating roles of attitudes toward sex, parent-child
connectedness, peer religiosity, problem alcohol use, condom use knowledge,
sexual debut, and number of sexual partners?

Hypotheses 8 - 14: The association of adolescent religiosity and the
likelihood of unplanned pregnancies will be mediated by relational
attitudes toward sex (hypothesis 8a), personal attitudes toward sex
(hypothesis 8b), parent-child connectedness (hypothesis 9), peer
private religiosity (hypothesis 10a), peer public religiosity (hypothesis
10b), problem alcohol use at Wave II (hypothesis 11a), problem
alcohol use at Wave III (hypothesis 11b), condom use knowledge
(hypothesis 12), sexual debut (hypothesis 13), and number of sexual
partners (hypothesis 14).

3. How do lifetime STI outcomes (likelihood of having ever been diagnosed
with chlamydia, gonorrhea, HPV, or any of the three STIs) compare for those
who sustained religiosity from adolescence into adulthood, those who later
adopted religiosity, those who discontinued their religiosity, and those who
never adopted religiosity?
Hypothesis 15: Individuals who never adopted religiosity, those who discontinued religiosity, and those who later who adopted religiosity, will have a significantly higher likelihood of having experienced lifetime STIs than those who sustained religiosity.

4. How does the likelihood of unplanned pregnancies compare for those who sustained religiosity from adolescence into adulthood, those who later adopted religiosity, those who discontinued their religiosity, and those who never adopted religiosity?

Hypothesis 16: Individuals who never adopted religiosity, those who discontinued religiosity, and those who later adopted religiosity will have a significantly higher likelihood of having experienced unplanned pregnancy than those who sustained religiosity.

In summary, it is hypothesized that adolescent religiosity will influence the likelihood of sexual health outcomes through the mediating roles of attitudes toward sex, parent-child connectedness, peer religiosity, problem alcohol use, condom use knowledge, sexual debut, and number of sexual partners such that higher levels of adolescent religiosity will be associated with fewer poor sexual health outcomes. Additionally, it is hypothesized that sustained religiosity will have the most protective influence on sexual health outcomes, compared to late adopters of religiosity, those who discontinued religiosity, and those who never adopted religiosity.

As STIs continue to rise in the United States, youth remain vulnerable to experiencing poor sexual health outcomes (CDC, 2019a). Young people receive mixed
or no messages about sexuality education in the public school setting (Guttmacher Institute, 2019a). Therefore, it is important to explore alternate avenues for preventing poor sexual health outcomes among the youth population. This study shows how religiosity plays a protective role in sexual health by providing an additional platform from which religious adolescents may internalize messages and expectations about sex.

**Organization**

Chapter 2 provides a literature review elaborating on topics relevant to the aforementioned research questions. A snapshot of the current sexual health status of Americans is provided to demonstrate the need for improved sexual health in the United States. Findings of previous studies examining the role of religiosity in a variety of sexual health outcomes and behaviors are presented. The application of the Theory of Planned Behavior (Ajzen, 1991) is also discussed. Chapter 3 provides information on the research design, sampling, participants, measures, and the data analytical approach. Chapter 4 presents the study’s results. Finally, Chapter 5 presents a discussion and analysis of the key findings and also discusses implications for practice, contributions to the body of knowledge, study strengths, limitations, and recommendations for future research.
CHAPTER TWO
REVIEW OF THE LITERATURE

The following chapter explores and analyzes the existing literature relevant to religiosity and sexual health in order to support the research questions posed in Chapter 1. The chapter provides a brief review of the current sexual health status of Americans (i.e., status of chlamydia, gonorrhea, HPV, and adolescent pregnancies) and the state of sexuality education in U.S. public schools. A description of the framework used to guide the research is followed by the literature review’s methodology, including how the literature review was conducted, the search terms, the databases searched, and the inclusion/exclusion criteria. The remaining components of the literature review are structured around the emergent themes and variables of interest, whose contributions are explained by a modified version of the Theory of Planned Behavior (Ajzen, 1991).

Background

Despite being a world super-power, the United States leads the developed world in adolescent fertility rates (World Bank, 2017) and STIs (National Academy of Public Administration, 2018). In recent years, the United States adolescent fertility rate was nearly 20 births per 1000 women between the ages of 15 and 19, compared to an overall rate of 13 in other high-income countries (Martin et al., 2018a; World Bank, 2017). Additionally, STI rates have continued to rise on a national level over the past five years, reaching an historic high and primarily affecting teenagers and young adults (CDC, 2019a). The combination of high STI and teen pregnancy rates poses a public health crisis, as STIs continue to spread through unprotected sex and through childbirth (CDC,
Patients infected with STIs, particularly chlamydia, gonorrhea, and HPV often do not develop symptoms, thus may be unaware of their STI status (NLM, 2019a; NLM, 2019b; NLM, 2019, n. d.). Not only do they risk infecting others, their STIs, when left untreated, can develop into full-blown diseases, such as pelvic inflammatory disease or cancer, and can ultimately result in death (WHO, 2019b). Increasing Americans’ knowledge of STI risk and prevention can help curb the recent increases by raising awareness, testing, and treatment, thus improving the overall sexual health of the population (National Academy of Public Administration, 2018).

Researchers have found education to be an effective method of preventing poor sexual health outcomes (Kirby, 2008; Kirby, Laris, & Rolleri, 2007). The public school system presents a platform to reach a large proportion of the youth population. However, the delivery of sexuality education in public schools remains controversial and inconsistent. Advocates for comprehensive sexuality education (CSE) support the notion that young people should learn about contraception as well as abstinence, while supporters of abstinence-only education back a marital-only approach to sexuality, rejecting the idea of teaching youth about contraception (Santelli et al., 2017). Others suggest school is not the appropriate venue for youth to learn about sex and that the responsibility to educate children about sex falls solely upon the parents (Blonigen, 2002). Studies have found CSE to be the most effective approach to educating youth about sex (Kirby, 2008; Kirby et al., 2007), but American youth tend to receive mixed or no messages about sex in the public school setting. According to the Guttmacher Institute (2019a), just over half of the states and the District of Columbia mandate some
type of sex education in schools and only about 20 require the provision of information on contraception.

With the limitations schools place on sexuality education and the alarming rates of poor sexual health outcomes, young people need an additional platform from which they may receive messages about sex. Religious doctrines typically include specific teachings about sex that adolescents may internalize as part of their own moral code, such as a requirement that sex occur only within the marital union and the type of acts that are permitted (e.g., vaginal intercourse) (Avishai & Burke, 2016). Religious teachings about sex are also very often aligned with parental values, which are then communicated to their children (Regnerus, 2005). Additionally, religious practice influences adolescents’ peer groups, which is related to delayed sexual debut (Adamczyk, 2009; Adamczyk & Felson, 2006). Since the large majority of Americans (76.5%) identify with a religious affiliation (Pew Research Center, 2015), religious institutions provide an alternative for religious young people to learn about sex in the context of their faith and their family belief system.

**Theoretical Framework**

The literature examined for this review is organized according to the Ajzen’s (1991) Theory of Planned Behavior (TPB) (Figure 1.1). The TPB provides a useful model in explaining the pathway between religiosity and sexual health outcomes, as it provides a framework for connecting beliefs to behaviors (Ajzen, 1991). TPB includes four different components that influence one’s behavior. The first component includes “Attitude towards the Behavior,” which refers to one’s attitude about whether a behavior
is favorable or unfavorable (e.g., whether one will derive pleasure from sexual activity or whether having sex may disappoint a parent). This component is influenced by behavioral beliefs in which one connects a behavior to a certain expected outcome or the risk and benefits associated with engaging in the behavior. The next component is “Subjective Norm,” which refers to the social pressure to participate or not participate in a behavior (e.g., close connections to parents who communicate restrictive messages about sex and selection of a religious peer group may discourage sexual activity). This component is influenced by normative beliefs in which one gauges whether others will approve or disapprove of the particular behavior. The third component is “Perceived Behavioral Control,” which refers to one’s beliefs about the ease or struggles associated with performing a behavior (e.g., condom use knowledge). This component is influenced by control beliefs, which describe how much control one believes they have over engaging in the behavior as well as the resources and opportunities available to participate or obstacles prohibiting the behavior. The interplay of the three aforementioned components then influences the fourth component of “Behavioral Intention,” which refers to motivational influences to engage in a behavior (e.g., religious beliefs encouraging abstinence or alcohol use encouraging sexual activity). The stronger the intentions are to engage in the behavior, the more likely the behavior will occur, thus the “Behavioral Intention” component then leads to engaging in the behavior itself. It is important to note that, like the other TPB components, “Perceived Behavioral Control” can act in concert with “Behavioral Intention” to directly influence behavioral achievement. “Perceived Behavioral Control” may also directly influence the behavior as
designated by the dashed line in Figure 1.1, if the perceived control is realistic (Ajzen, 1991). For instance, if one perceives herself to have a great deal of control over the timing of her sexual debut, and she actually does possess such control because of her selection into a less sexually permissive peer group, it is more likely that she will delay her sexual debut until she deems appropriate.

In the context of the TPB, this study explored the following variables to gain a greater understanding of religiosity’s role in the sexual health outcomes of specific STIs individually and unplanned pregnancy. With respect to the “Attitude toward the Behavior” component of TPB, both relational and personal attitudes toward sex were examined. Regarding “Subjective Norms,” parent-child connectedness and peer religiosity were examined. With respect to “Perceived Behavioral Control,” problem alcohol use and condom use knowledge were examined. It was expected that the previously mentioned variables, having been influenced by religiosity, would influence behavioral intention, thus lead to sexual behaviors, such as timing of sexual debut and number of sexual partners, which would then contribute to sexual health outcomes. Ultimately, the TPB model explains how religiosity-influenced behaviors may predict the likelihood of the poor sexual health outcomes of chlamydia, gonorrhea, HPV, any STI, and unplanned pregnancies.

Ajzen’s (1991) TPB provides a useful tool in understanding the relation between religiosity and sexual health outcomes, as religiosity influences beliefs, norms, and perceived control, which then influence intentions to engage in behavior, which ultimately leads to behavioral outcomes. Sexual health outcomes then occur after the
behaviors. The different components of the theory provide distinctive features contributing to behavior and can act as a starting point to alter behavior. Thus, the TPB is a helpful tool in not only understanding behavior, but in creating interventions to change it (Ajzen, 1991). Figure 2.1 presents a conceptual framework that provides a visual representation of how the TPB components are positioned to mediate the relation between religiosity and sexual health outcomes.

Using the modified TPB structure as shown in Figure 2.1 to organize findings related to study variables, the following literature review examines previous research linking religiosity and sexual health to provide a foundation for this study’s purpose of exploring the role religiosity plays in the individual sexual health outcomes of lifetime diagnoses of chlamydia, gonorrhea, HPV, any STI, and unplanned pregnancies.
Figure 2.1. Modified TPB model to demonstrate mediating effects (based on TPB, Ajzen, 1991)
Literature Review Methodology

Five databases were searched, using the following search terms: religiosity, religion, religious practice, faith, spirituality, sexual health, reproductive health, STIs, STDs, chlamydia, gonorrhea, HPV, unplanned pregnancies. Including all search terms at once provided too narrow of a search. Therefore, the search was broadened to include the various words representing religiosity and each of the terms related to sexual health one at a time. For example, “religion OR religiosity OR religious practice OR faith OR spirituality AND chlamydia.” The articles included in this review were restricted to dates ranging from 1994 – 2020. These dates were chosen to align with the initiation of the Add Health Study, as a number of articles have been published on religiosity and sexual health using the study’s dataset. The database search returned the following results: PubMed (323 total, of which 28 were relevant to religiosity and sexual health); Add Health Publications (99 total, of which 15 were relevant to religiosity and sexual health); PsychInfo (56 total, of which 11 were relevant to religiosity and sexual health); Medline (24 total, of which 7 were relevant to religiosity and sexual health); Cochrane Database for Systematic Reviews (17 total, of which 0 relevant to religiosity and sexual health). After accounting for duplicates appearing in multiple databases and reviewing titles and abstracts for studies investigating both religiosity and sexual health within the United States, 41 articles remained.

In addition to reviewing titles and abstracts for relevance, a number of inclusion/exclusion criteria were used. To meet the inclusion criteria, articles were required to be empirical studies, or meta-analyses/systematic reviews, and to have
addressed both religiosity and some aspect of sexual health (e.g., coital debut, condom use, HIV/AIDS). No restrictions were placed on age groups, as most studies examined young adult (college age) populations or younger. Excluded articles consisted of those not written in English, grey literature, such as organizational reports and commentaries generated outside of academic journals, studies examining religion OR sexual health but not both, studies specific to sexual minorities, that is LGBT (Lesbian, Gay, Bisexual, Transgender) individuals, and studies conducted on populations outside of the United States. After this process, 28 articles remained. A synthesis of their findings as they relate to the present study follows.

Religiosity

Religiosity influences various aspects of sexual health, including knowledge, behaviors, and outcomes. Despite some mixed findings suggesting that religiosity is both a protective factor and a risk factor, the majority of the research reviewed for this study suggests religiosity plays a protective role in sexual health (Adamcyzk, 2009; Adamcyzk & Felson, 2006; Adamczyk & Felson, 2008; Bearman & Brückner, 2001; Beck et al., 1991; Cheshire et al., 2019; Gold et al., 2010; Haglund & Fehring, 2010; Hall et al., 2012; Landor et al., 2011; Manlove et al., 2006; Manlove et al., 2008; Martin et al., 2018b; Meier, 2003; Miller & Gur, 2002; Moore et al., 2013; Murray et al., 2007; Nonnemaker et al., 2003; Poulson et al., 1998; Quinn & Lewin, 2019; Regnerus, 2005; Rink, Tricker, & Harvey, 2007; Rostosky et al., 2003; Rostosky et al., 2004; Shaw & El-Bassel, 2014; Thornton & Camburn, 1989; Vazsonyi & Jenkins, 2010; Vasilenka & Espinosa-Hernández, 2019; Wigfall et al., 2012). The following sections discuss extant
research on religiosity’s link to the broad categories of sexual health knowledge, behaviors, and outcomes that surfaced during the review. Throughout the review, more specific variables related to the relation between religiosity and sexual health (i.e., attitudes toward sex, parent-child connectedness, peer religiosity, problem alcohol use, condom use knowledge, sexual debut, and number of sexual partners) emerged and are also discussed.

It is important to note that the reviewed studies used varied measurements for religiosity. Some included only one dimension such as service attendance or religious affiliation, whereas others included composite measures examining multiple dimensions, such as participation in religious activities (e.g., youth group, choir, alter-serving, etc.) and frequency of prayer. The more recent literature has trended toward utilizing multi-component measurements.

**Religiosity’s Link to Sexual Health Knowledge, Behaviors, and Outcomes**

Studies assessing the link between religiosity and sexual health have examined a number of variables represented by the broad themes of sexual health knowledge, behaviors, and outcomes. The following section describes the emergent research findings within the previously mentioned three themes.

**Sexual Health Knowledge**

Prior research has demonstrated a clear link between religiosity and sexual health knowledge. Findings of one study investigating a sample of co-ed college students from a public university in California showed that higher levels of religious service attendance were associated with lower levels of sexual health knowledge for women, meaning that
more religious female participants had less awareness of contraception, STI prevention, and other aspects of sexual health such as pregnancy and STI testing and preventive care (Martin et al., 2018b). Similarly, Hall and colleagues (2012) found a negative association between being more religious and utilizing sexual health services in their nationally representative sample of 15-24 year-old women. Findings from another study with a nationally representative sample showed an inverse association between regular service attendance and parent-child communication about sex and birth control (Regnerus, 2005), suggesting that more religious youth may have less knowledge of sexual health than their less or non-religious counterparts. Additionally, researchers studying the nationally representative Add Health dataset have suggested that religious belief systems forbidding pre-marital sex may be related to lower knowledge levels of contraception among girls practicing those faiths (Miller & Gur, 2002). These findings are not surprising, considering a common belief that teaching young people about sex and contraception promotes sexual activity (Davidson et al., 2004). This misconception has not been supported (Kirby, 2008). However, religious parents tend to demonstrate discomfort with the idea of discussing any sexual matters with their children and prefer to discuss the moral over the health implications of sexual activity with them (Regnerus, 2005). Thus, it appears that religious youth may encounter a knowledge gap with respect to sexual health knowledge, particularly when it comes to contraception.

**Sexual Health Behaviors**

Behavior extends from knowledge. As previously discussed, religiosity has been associated with sexual health knowledge, and in turn, sexual behaviors, both as a
protective and as a risk factor. The most common findings suggested religiosity plays a role in delaying sexual debut (Adamczyz, 2009; Adamczyk & Felson, 2006; Gold et al., 2010; Haglund & Fehring, 2010; Meier, 2003; Quinn & Lewin, 2019; Rostosky et al., 2003; Rostosky et al., 2004), and a reduced number of sexual partners (Gold et al., 2010; Haglund & Fehring, 2010; Landor et al., 2011; Simons, Burt, & Peterson, 2009).

With respect to religiosity as a risk factor, Zaleski and Schiaffino (2000) found that unsafe sex practices among a small sample of college freshmen at an urban Catholic university were more likely for individuals who identified as religious but had already initiated sexual intercourse, as they may not possess the necessary knowledge to protect themselves from unplanned pregnancy and disease with contraception, and may, consequently, be unprepared when the opportunity for sexual relations presents itself. Wigfall and colleagues (2012) however, found the opposite to be true in their sample of predominantly Caucasian college women. They found a significant positive relation between religious affiliation and condom use as well as the avoidance of substance use and partaking in sexually risky behaviors, such as sex with multiple partners. Additionally, Quinn and Lewin (2019) found that higher levels of individual religiosity were associated with a higher likelihood of condom use among college students. And, like numerous other studies, they also found that religious individuals were more likely to delay their sexual debut, which will be discussed in further detail in a later section.

In an effort to delay their sexual debut and avoid pregnancy, many young people retain what they consider “technical virginity,” in which they perform anal and oral forms of genital contact in lieu of vaginal intercourse (Rostosky et al., 2003). While they
remain “technical virgins,” they are still at risk for contracting STIs, especially considering the use of barrier contraceptive measures during such acts is less likely than would be during vaginal intercourse (Quinn & Lewin, 2019). While oral sex practices are on the rise, those claiming religious affiliation are less likely to engage in such practices (Quinn & Lewin, 2019; Vazsonyi & Jenkins, 2010).

The differences with respect to whether religiosity is a risk factor or a protective factor for sexual health behaviors in the aforementioned studies may be explained by the timing of the studies. More recent studies have investigated newer generations who may have adopted a more liberal, accepting view of contraception use, regardless of their denomination’s teachings on the subject and they may opt to use contraception in order to conceal their sexual activity from parental monitoring, which is more likely in religious households (Quinn & Lewin, 2019).

**Sexual Health Outcomes**

Not as much is known about the impacts of religiosity on STIs, but what is known is somewhat inconsistent. Gold and colleagues (2010) found that female adolescents between the ages of 13 and 21 demonstrating higher levels of religiosity were less likely to have ever contracted an STI. Ford and colleagues (2005) found that students who attended faith-based schools were less likely to have contracted an STI than those who did not. However, in the same longitudinal study using Waves I and III of the Add Health dataset, the authors also found that participants’ perceptions of the importance of religion did not predict whether youth tested positive for an STI six years later. In a systematic review of literature on the impacts of religion on HIV risk, Shaw and El-
Bassel (2014) found religion to be both a protective and a risk factor. The authors indicated that studies suggesting religion as a protective factor with respect to HIV credited positive religious influences from clergy, individual wishes to conform to religious expectations, and a general fear of HIV itself. The studies suggesting religion as a risk factor for HIV identified belief systems connecting sexual activity with penance and religious opposition to condom use as contributing factors. In other words, condom use is discouraged, which increases HIV risk in the event individuals choose to become sexually active (Shaw & El-Bassel, 2014). More research is needed on religiosity and STIs to reconcile inconsistent findings and to identify how religiosity is linked to specific STI outcomes individually (i.e., lifetime diagnoses of chlamydia, gonorrhea, and HPV) through other related variables that may play a role in sexual health outcomes and how religiosity over time influences specific STI outcomes.

Much like research on religiosity’s link to specific STIs individually, more remains to be studied about the link to unplanned pregnancies, which are more likely to occur outside of marriage (Guttmacher Institute, 2019b). Previous research using an all-female sub-sample from Waves II and III of the Add Health dataset shows that religious individuals are less likely to experience premarital pregnancies (Adamczyk & Felson, 2008). In fact, in a cross-sectional study investigating female participants from Wave I of the Add Health dataset, Miller and Gur (2002) found a positive association between religious service attendance and risk perception of unplanned pregnancy from the failure to use contraception, and Rostosky and colleagues (2003) found a weak, but significant, positive correlation between religiosity and anticipation of negative pregnancy
consequences for both boys and girls in Wave I of the Add Health dataset. Additionally, in their cross-sectional sample of co-ed college students, Quinn and Lewin (2019) found parental monitoring to be higher in religious households and also a protective factor with respect to unplanned pregnancies among religious youth, as young people may avoid sex, use condoms, or engage in other forms of genital contact for fear disappointing parents with an unplanned pregnancy. Interestingly, Adamczyk and Felson (2008) found premarital pregnancies to occur more commonly in the context of committed relationships among religious women than non-religious women. However, secular women are more likely to experience a premarital pregnancy and terminate it than religious women, who are more likely to continue the pregnancy into marriage. Religiosity serves as a protective factor with respect to premarital pregnancies in that it reduces the amount of time between sexual debut and marriage and is also associated with a fewer number of sexual partners (Adamczyk & Felson, 2008).

While a great deal of overlap may exist between premarital and unplanned pregnancies, it is important to note that planned pregnancies can certainly occur outside of the context of marriage and unplanned pregnancies can occur within a marital relationship. Due to a current culture in which premarital pregnancies have become increasingly more common and not necessarily unplanned (Pew Research Center, 2014), the present study focuses specifically on unplanned pregnancy, with which there are increased risks, such as substance abuse habits or delayed prenatal care (CDC, 2019b), regardless of relationship status. Thus, it is worth examining unplanned pregnancy to
gain a deeper understanding of how religiosity is linked to it through other related variables and how religiosity over time influences unplanned pregnancy outcomes.

Findings are somewhat inconsistent with respect to the association between religiosity and the broad categories of sexual health knowledge, behaviors, and outcomes. Religiosity may pose the most risk with respect to sexual health knowledge than in the other two categories, as the evidence suggests religious youth are less knowledgeable about contraception and sexual health in general, due to the restrictive nature of their faith’s teachings (Martin et al., 2018b; Miller & Gur, 2002; Regnerus, 2005). However, religious youth appear to be more protected in terms of behaviors, particularly sexual debut and number of partners (Quinn & Lewin, 2019; Wigfall et al., 2012). Findings on sexual health outcomes remain somewhat inconsistent, which point to the need for more research, as is being conducted in the present study. In an effort to understand more about religiosity’s link to the knowledge, behaviors, and outcomes categories, the following section explores more specific themes emerging from the literature review.

**Emerging Variables of Interest**

Research exploring the relation between religiosity and sexual health in the broader categories of knowledge, behavior, and outcomes lays the foundation for the exploration of more specific variables that may further explain religiosity’s influence on sexual health. In review of the literature at a broad level, a number of variables emerged that may increase understanding of religiosity’s role in sexual health in a more specific area of sexual health outcomes, including individual STIs and unplanned pregnancies. Within the context of the TPB (Ajzen, 1991), the following section discusses the roles
played by the variables of attitudes toward sex, parent-child connectedness, peer religiosity, problem alcohol use, condom use knowledge, sexual debut, and number of sexual partners in the link between religiosity and sexual health.

**Attitudes toward the Behavior**

The first component of the TPB consists of “Attitudes Toward the Behavior” that are influenced by behavioral beliefs about whether one believes a certain behavior is favorable or unfavorable (Ajzen, 1991). The following section describes how religiosity influences attitudes toward sex and how those attitudes are related to sexual health behaviors.

**Attitudes toward Sex.** Whether in the context of family or peers, religiosity is typically linked with conservative sexual attitudes (Lefkowitz, Gillen, Shearer, & Boone, 2004). Several studies have demonstrated how religiosity influences attitudes toward sex and sexual health outcomes (Davidson et al., 2004; Haglund & Fehring, 2010; Meier, 2003; Rostosky, 2003). Davidson and colleagues (2004) defined “sexual attitudes” as “a composite of the life-long lessons learned about their sexuality from many sources” (p. 335-336). In their sample of female college students, the researchers found an association between more frequent service attendance and more traditional attitudes toward sex, such as retaining virginity until marriage and valuing love as a precursor to sex. Additionally, Meier (2003) studied how both personal (e.g., belief that sexual activity will result in pleasure) and relational attitudes (e.g., how becoming sexually active would affect relationships with others) mediated the relation between religiosity and sexual debut for 15-18 year-olds in Waves I and II of the Add Health dataset. She
found that both personal and relational attitudes served mediating roles between religiosity and sexual debut. In other words, when religiosity leads to less permissive sexual attitudes, it then contributes to older age at sexual debut, thus demonstrating religiosity as a protective factor with respect to sexual activity (Meier, 2003). Similarly, when investigating Waves I and II of the Add Health dataset, Rostosky and colleagues (2003) found an indirect effect of religiosity on sexual debut through attitudes anticipating poor outcomes from sexual activity. When study participants anticipated negative consequences, such as guilt or disappointing others, they were less likely to initiate sexual activity. In another similar longitudinal study of adolescents ages 14-16 from a major northeastern U.S. city, Hull and colleagues (2011) found that religiosity was inversely associated with sexual debut through the mediating effect of attitudes toward sex. Finally, in a large, nationally representative male and female sample of 15-21 year-olds, Haglund and Fehring (2010) found that individuals holding religious attitudes toward sex were 27-54% less likely to have experienced sexual debut and had significantly fewer sexual partners than their peers without religious attitudes toward sex.

Overall, religiosity’s influence on sexual attitudes suggests a clear and protective link with respect to sexual debut (Davidson et al., 2004; Meier, 2003; Rostosky, 2003) and number of sexual partners (Haglund & Fehring, 2010). More research examining religiosity’s influence on attitudes toward sex as they relate to other sexual health outcomes, including STIs and unplanned pregnancies, would be beneficial in the pursuit of avoiding negative sexual health outcomes.
Subjective Norm

The next component of the TPB is the “Subjective Norm,” which refers to social pressures to engage or not engage in a behavior by estimating whether they will gain the approval or disapproval of others (Ajzen, 1991). The following two sections discuss how religiosity influences parent-child connectedness and peer religiosity and how the links relate to sexual health behaviors.

Parent-Child Connectedness. Despite many parents being uncomfortable discussing sex with their children (Regnerus, 2005), they play a role in their children’s sexual health through parental monitoring (Haglund & Ferhing, 2010; Quinn & Lewin, 2019), authoritative parenting (Landor et al., 2012), and parent-child connections (Cheshire et al., 2019; Manlove et al., 2008). In a recent cross-sectional study on college students, Quinn and Lewin (2019) found that parental monitoring, defined as setting clear rules and boundaries and being knowledgeable of a child’s peer groups and activities, mediated the relation between family religiosity and sexual risk behavior. The authors noted that youth living in religious families reported higher levels of parental monitoring, which was then associated with less sexually risky behavior, such as avoiding unprotected sex when already sexually active. They suggested that religious parents are more aware of their children’s activities and whereabouts. Therefore, adolescents are more inclined to protect themselves from tangible outcomes of pregnancy and STIs in efforts to keep parents from learning about their sexual behaviors (Quinn & Lewin, 2019). In a cross-sectional nationally representative study of adolescent and young adult men and women, Haglund and Ferhing (2010) also found an inverse relation between
parental monitoring and sexual risk taking such that children who had received parental education about sex were less likely to have experienced their sexual debut and were likely to have fewer partners than peers whose parents did not educate them about sex.

Parental monitoring plays a role in the concept of authoritative parenting. Authoritative parents demonstrate a warm and loving connection to their children through communication, expressing an interest and active role in their lives, closely monitoring their activities, and holding them accountable for their actions (Rodgers, 1999). In a longitudinal study of male and female African-American adolescents, Landor and colleagues (2011) found a positive link between religiosity and authoritative parenting. Authoritative parenting, more likely in religious families (Gunnoe, Hetherington, & Reiss, 1999; Power & McKinney, 2013; Quinn & Lewin, 2019), was also positively related to the selection of more sexually restrictive peers, which was then associated with lower levels of sexually risky behaviors (Landor et al., 2011). The association was only significant for girls, suggesting that parents are more proactive in discussing sex and providing limitations with daughters than with sons (Landor et al., 2011). Interestingly, mothers typically assume responsibility for initiating conversations about sex with their children (Angera, Brookins-Fisher, & Inungu, 2008), but in a longitudinal study of Waves I and II of the Add Health dataset, Rink and colleagues (2007) found that girls who reported close connections with their fathers were more likely to delay sexual debut than those who did not, suggesting that fathers also play an important role in delaying their daughters’ onset of sexual activity.
In a study of the first four waves of the Add Health dataset, Cheshire and colleagues (2019) examined parent religiosity and a specific parent-child connectedness variable, which included aspects of parental monitoring and authoritative parenting. They found both parent religiosity and parent-child connectedness predicted fewer lifetime sexual partners. Similarly, Manlove and colleagues (2008) found an indirect relation between family religiosity and sexual activity through the mediating role of family cohesion (measured by parental monitoring and quality of the parent-child relationship) in a longitudinal, nationally representative sample of adolescents. However, the association was only significant for girls.

Overall, positive connections with parents appear to serve a protective role in the relation between religiosity and sexual health. Unfortunately, boys may not benefit from parental connections as much as girls in terms of sexual health. While boys are not susceptible to pregnancy, they are vulnerable to STIs and can risk impregnating their partners. The literature points to a need to increase awareness of STI and pregnancy risks among both genders and that both parents play an important role in the sexual health of their children.

**Peer Religiosity.** Much like connections with parents, relationships with peers also influence sexual health (Adamczyk & Felson, 2006; Landor et al., 2011; Manlove et al., 2008). Manlove and colleagues (2008) found positive peer behaviors to mediate the association between family religiosity and fewer sexual partners as well as consistent use of contraceptives in their nationally representative sample of adolescents. They also found that sexually active youth reported fewer friendships with religious peers and more
negative peer behaviors. Landor and colleagues (2011) found a significant association between higher levels of adolescent religiosity and the selection of a less sexually permissive peer group in their longitudinal study of African-American adolescents. Additionally, they found adolescent religiosity to have an impact on reducing sexually risky behavior through the selection of a less sexually permissive peer group. Religious youth tend to affiliate with other youth who have a disapproving attitude toward sexual activity, which becomes the group norm, thus, reducing the potential for poor sexual health outcomes (Landor et al., 2011).

In a study of Waves I and II of the Add Health dataset, Adamczyk and Felson (2006) took a more intensive look at peer religiosity, that included both public (e.g., service attendance and participation in church activities) and private aspects (e.g., frequency of prayer and importance of religion) of peers’ religious practice. The authors did not find peers’ public religiosity to influence sexual debut, which they attributed to the notion that some youth attend church related activities to please their parents and may not have internalized the faith’s teachings and values, as would those reporting higher levels of private religiosity. Not surprisingly, they found that peers’ private religiosity was related to a reduced likelihood of sexual debut. The researchers suggested that youth who affiliate with privately religious peers have limited opportunities for available sexual partners within their group, that sexual activity may reduce social status within the group, and that youth may adopt the same morally conservative views about sex as their peers. They also suggested that youth who belonged to dense networks of religious peers in which their peers’ friends were also religious were less likely to be sexually active for
fear of compromising their status in the group and endangering their friendships (Adamczyk & Felson, 2006). Interestingly, in another similar study using Waves I and III of Add Health, Adamczyk (2009) suggested that in the event individuals sexually debut, they may either experience rejection from their religious peer group or may intentionally select a new group of non-religious, more sexually permissive friends.

The literature indicates that positive connections with religious peers (Landor et al., 2011; Manlove et al., 2008) and higher levels of peer religiosity (Adamczyk, 2009; Adamczyk & Felson, 2006) can influence sexual health behaviors, such as delayed sexual debut and a reduced number of partners. While research has consistently explored the influences of peer connections on sexual health in the context of family and individual religiosity, peer religiosity has not been studied as extensively. Given peer religiosity’s initial demonstration as a protective factor, it warrants further study as a potential mediator between religiosity and sexual health outcomes.

Perceived Behavioral Control

“Perceived Behavioral Control” is the third component of the TPB, which describes one’s perceptions of the ease or struggles associated with performing a particular behavior (Ajzen, 1991). Because participants’ behavioral decisions and choices may have been influenced by their respective faiths’ teachings on alcohol and condoms, problem alcohol use and condom use knowledge were categorized as “Perceived Behavioral Controls.” In other words, strengthened by the backing of their faith, they may have perceived they were more in control of whether they drank or how much they drank. On the other hand, if their faith avoided providing information about
condoms, they may have perceived they were not knowledgeable enough, and therefore had little control over how to properly use them. The following two sections describe the impacts religiosity has on problem alcohol use and condom use knowledge and how they relate to sexual health behaviors.

Problem Alcohol Use. Alcohol is the most popular drug of choice among young people (Johnson, O’Malley, Bachman, Schulenberg, & Miech, 2014) and it is not uncommon for it to negatively influence their sexual behaviors and choices (Graves & Leigh, 1995). In fact, Cooper (2002) found a correlation between drinking alcohol and failing to use contraception. Religiosity can have a positive influence on the use of alcohol, though. In a cross-sectional analysis of Wave I of the Add Health dataset, Nonnemaker and colleagues (2003) found both public and private religiosity to be a protective factor in alcohol use. Thus, higher levels of religiosity were related to less alcohol use. Religiosity as it relates to both alcohol use and sexual behavior also presents findings suggesting a mostly protective role. In a sample of male and female college students in the “bible belt,” Poulson and colleagues (1998) found that religious women were less likely to drink alcohol, to binge drink, and to take sexual risks. Moore et al. (2013) found that religious beliefs were associated with reduced alcohol use and sexually risky behaviors among college athletes. According to Murray and colleagues’ (2007) study of a male and female convenience sample of undergraduate and graduate students from a small liberal arts Catholic college on the east coast, religious students are less likely to engage in sex after having consumed alcohol. Finally, while religiosity did not present as a protective factor in their sample of all-female college students in the mid-
west, Davidson and colleagues (2004) found no significant difference between more and less religious women with respect to having been under the influence of alcohol at their sexual debut.

Overall, religiosity appears to play a protective role in the use of alcohol and in sexual behaviors (Moore et al., 2013; Murray et al., 2007; Nonnemaker et al., 2003; Poulson et al., 2008). While there are numerous studies examining religiosity’s influence on sexual behavior and alcohol use, not as many examine the three variables together. Because alcohol use often leads to risky sexual behavior, such as the failure to use condoms (Cooper, 2002), understanding its role in the relation between religiosity and sexual health outcomes can help raise awareness of the sexual risk associated with drinking alcohol and how religiosity can play a protective role in sexual health through the responsible use of alcohol.

**Condom Use Knowledge.** Prior studies have shown inconsistent findings with respect to religiosity and condom use (Davidson et al., 2004; Gold et al., 2010; Landor et al., 2011; Martin et al., 2018b; Quinn & Lewin, 2019; Wigfall et al., 2012; Zaleski & Schiaffino, 2000). Examining a small sample of college freshmen at a Catholic University, Zaleski and Schiaffino (2000) found that, while religiosity serves as a protective factor in delaying sexual activity, it may pose a risk to sexually active individuals. Participants reported a significantly lower rate of condom use compared to their rate of sexual activity. In a sample of college women, Davidson and colleagues (2004) found a significantly higher proportion of women who attended weekly religious services than those attending monthly or yearly who claimed they were “too naïve or
dumb” (p. 341) to use condoms at their sexual debut. Interestingly, the same study also found that more religious women were more likely than less religious women to use contraception during their first sexual experience. Quinn and Lewin (2019) found greater religiosity to be associated with a higher likelihood of condom use in their male and female sample from a different university. Similarly, Landor and colleagues (2011) found a negative relation between religiosity and inconsistent condom use in their sample of African-American youth. Wigfall and colleagues (2012) also found a significant association between religiosity and increased likelihood of condom use in their sample of college women. Finally, Gold and colleagues (2010) found no significant association between religiosity and use of contraceptives in their all-female sample of 13-21 year-olds recruited from an urban community.

With respect to condom knowledge, Martin and colleagues (2018b) found both college men and women to be knowledgeable. However, they found that women who attended weekly religious services had significantly less knowledge of sexual health, including condom use knowledge, than those who attended less frequently or never attended religious services. Findings for religious men’s sexual health knowledge were non-significant (Martin et al., 2018b).

Depending on the analytical sample and how religiosity was measured, religiosity can serve as either a protective or risk factor for condom use and sexual health knowledge. Studies investigating smaller or less diverse samples appeared to demonstrate findings suggesting religiosity is a risk factor (Davidson et al., 2004; Zaleski & Schiaffino, 2000) and studies employing a more robust measure of religiosity,
expanding beyond religious affiliation and service attendance, pointed to religiosity as a protective factor with respect to condom use and sexual health knowledge (Davidson et al., 2004; Landor et al., 2010; Quinn & Lewin, 2019; Wigfall et al., 2012), suggesting the importance of using a multi-dimensional measure to assess levels of religiosity. Despite inconsistencies in the literature on condom use, much of the overall research suggests religiosity is a protective factor with respect to sexual health. However, little research examines the specific variable of condom use knowledge as it relates to religiosity. Gaining a greater understanding of religiosity’s influence on condom use knowledge may provide insight into some of the inconsistencies in the literature and provide further evidence to support the need for comprehensive sexuality education (Kirby, 2008).

**Sexual Health Behaviors**

The last component of the TPB refers to the “Behavior” itself. Behaviors are influenced by “Behavioral Intentions,” which refer to one’s motivation to engage or not engage in the behavior (Ajzen, 1991). The reviewed literature has mostly shown a pattern of decreased motivation to engage in sexually risky behaviors among religious individuals. The intention then impacts whether one engages in the behavior or not. The following two sections discuss how religiosity impacts the sexual health behaviors of sexual debut and the number of sexual partners.

**Sexual Debut.** Religiosity has repeatedly shown an association with delayed sexual debut (Adamczyk, 2009; Adamczyk & Felson, 2006; Gold et al., 2010; Haglund & Fehring, 2010; Landor et al., 2011; Manlove et al., 2006; Meier, 2003; Quinn & Lewin, 2019; Rostosky et al., 2003; Rostosky et al., 2004). However, such effects may vary by
race, gender, and type of religion. For instance, in a longitudinal study of the first two waves of Add Health, Meier (2003) found that higher levels of religiosity (measured using the same four constructs as the present study) reduced the probability of participants having experienced sexual debut, however the effect was greater for girls than for boys. Using a slightly different measure of religiosity than Meier (2003) that did not include frequency of prayer, Rostosky and colleagues (2003) also found that religiosity was significantly associated with a reduced likelihood of sexual debut for both boys and girls in a longitudinal study of the first two waves of the Add Health dataset. In a cross-sectional nationally representative sample of male and female adolescents and adults, Haglund and Fehring (2010) found that religious youth were 27-54% less likely to have initiated sexual activity than non-religious counterparts. However, the authors did not find significant gender differences in their sample with respect to having already engaged in sexual intercourse. In a systematic review of studies on religiosity and adolescent sexual health, Rostosky and colleagues (2004) found that Caucasian females who frequently attended religious services were more likely to delay sexual debut. In Waves I and II of the Add Health dataset, Bearman and Brückner (2001) found that higher levels of religiosity were associated with delayed sexual debut for Caucasians, Asian, and Hispanic adolescents, but results were non-significant for African-American youth. Additionally, in a longitudinal study examining only Caucasian adolescents identifying with Christian faiths, more conservative Christians, such as those claiming Fundamentalist and Baptist denominations, had a stronger association with delayed sexual debut than less conservative faiths (Beck, Cole, and Hammond, 1991). In a more
recent study, Landor and colleagues (2011) found religiosity to increase the likelihood that African-Americans would delay their sexual debut.

Family and peer religiosity also appear to play roles in sexual debut. Manlove and colleagues (2006) found family religiosity to be associated with delayed sexual debut among male, female, and Caucasian teens in a large, nationally representative sample. Similarly, Quinn and Lewin (2019) found an association between higher levels of family religiosity and reduced likelihood of engaging in sexual intercourse in their sample of male and female college students. However, the authors noted that students who were sexually active may have already separated themselves from their religion’s doctrines on sex well before their debut and therefore, family religiosity had no effect on the timing of their sexual debut. With respect to peer influence, Adamczyk (2009) found that greater levels of peer private religiosity contributed to a delay in sexual debut in a longitudinal analysis of Waves I and III of Add Health. In another study using Waves I and II of Add Health, Adamczyk and Felson (2006) found that a delay in sexual debut was more dependent upon whether religious friends within an adolescent’s peer network are friends with each other than on the amount of time spent with religious peers. The authors suggested membership in such a dense religious peer group contributes to a normative culture of sexual conservatism and a desire to maintain a reputation consistent with the group’s moral values regarding sexual activity.

Sexual debut is typically measured as an outcome variable in studies assessing religiosity and sexual health. Because religiosity appears to play a protective role when it comes to the onset of sexual activity (Adamczyk, 2009; Adamczyk & Felson, 2006; Gold
et al., 2010; Haglund & Fehring, 2010; Landor et al., 2011; Manlove et al., 2006; Meier, 2003; Quinn & Lewin, 2019; Rostosky et al., 2003; Rostosky et al., 2004), sexual debut is likely to play a mediating role in the relation between religiosity and sexual health outcomes, as individuals who delay sexual onset are at less risk of experiencing STIs and unplanned pregnancies (Abbott, White, & Felix, 2010). Understanding more about how religiosity influences sexual health outcomes can assist in the creation of prevention measures in the face of public health crises driven by poor sexual health outcomes.

**Number of Sexual Partners.** Religiosity has also consistently demonstrated an influence on the number of partners individuals acquire after becoming sexually active (Adamczyk & Felson, 2008; Cheshire et al., 2019; Gold et al., 2010; Haglund & Fehring, 2010; Landor et al., 2011; Manlove et al., 2008; Vasilenka & Espinosa-Hernández, 2019). According to Gold and colleagues’ (2010) study of females, ages 13-21, living in an urban community, individuals with higher levels of religiosity reported fewer lifetime sexual partners. Based on their analysis of an all-female sub-sample from Waves II and III of the Add Health dataset, Adamczyk and Felson (2008) found there to be a shorter time between sexual debut and marriage for more religious individuals, which may account for their fewer number of partners than their less or non-religious counterparts. Landor and colleagues (2010) also found a negative relation between religiosity and number of sexual partners within their male and female African-American sample from low-income neighborhoods in Iowa and Georgia. Additionally, Haglund and Fehring (2010) found that adolescents and emerging adults, from a nationally representative sample, who perceived religion as important, attended services at least once per week,
and held high religious attitudes about sexuality had significantly fewer partners than those who did not view religion as important, did not attend services frequently, and had lower religious attitudes. Finally, in a longitudinal study of Waves I and III of the Add Health dataset, Vasilenka and Espinosa-Hernández (2019) found that individuals identifying with multiple dimensions of religiosity (e.g., importance of religion, affiliation, beliefs, service attendance, participation in religious activities, and frequency of prayer) had fewer sexual partners than those identifying with fewer dimensions of religiosity.

Other studies investigating family or parent religiosity have also found an association with fewer sexual partners. As previously mentioned, in a study of Waves I through IV of the Add Health dataset, Cheshire and colleagues (2019) found that individuals who reported higher levels of parent religiosity had fewer sexual partners than those who reported lower levels of parent religiosity. Manlove and colleagues (2008) also found family religiosity to be related to fewer sexual partners within a nationally representative sample of adolescents. Although these associations are not based on individual religiosity, they suggested that parent and family religiosity can still influence youths’ sexual behavior either through high levels of parental monitoring (Manlove, 2008) or the impression of religious values onto children (Landor et al., 2011).

Much like sexual debut, the number of sexual partners is commonly studied as an outcome variable when examining religiosity and sexual health. Prior studies have repeatedly shown higher levels of religiosity, whether individual or family, to be related to fewer sexual partners (Gold et al., 2010; Haglund & Fehring, 2010; Landor et al.,
Having fewer sexual partners then reduces the opportunities for exposure to STIs (American College of Obstetrics and Gynecology [ACOG], 2017) and experiencing unplanned pregnancies (Ashenhurst, Wilhite, Harden, & Fromme, 2017). Thus, examining number of sexual partners as a mediating variable is worth attention, as it can provide additional insight into religiosity’s role in outcomes related to sexual health, including rates of chlamydia, gonorrhea, HPV, and unplanned pregnancies.

**Reasoning for Mediation Analyses**

The reviewed literature demonstrates mostly protective links between religiosity and other influences falling into the TPB (Ajzen, 1991) categories of attitudes (attitudes toward sex), subjective norms (parent-child connectedness and peer religiosity), perceived behavioral control (problem alcohol use and condom use knowledge), and behaviors (sexual debut and number of sex partners). The aforementioned influences are then linked to sexual health behaviors and outcomes. For instance, higher levels of religiosity are associated with reduced levels of problem alcohol use, which is associated with fewer sexual risks, such as having sex after binge drinking (Murray et al., 2007). Avoiding or minimalizing sexually risky behaviors then removes or reduces opportunities to experience poor sexual health outcomes, such as STIs and unplanned pregnancies. The pattern between religiosity, the influencing variables emerging from this review, and sexual health outcomes, suggests the influencing variables play a mediating role and will show a protective indirect effect between religiosity and the sexual health outcomes of STIs and unplanned pregnancies as demonstrated in Figure 2.1.
Socio-Demographic Variables

To facilitate a better understanding of the relation between religiosity and sexual health outcomes, the following influential socio-demographic variables were explored as controls: race/ethnicity, gender, age, and parent education. Including these variables as controls removed the effects they may have had on the outcome variables. This section describes the trends in the literature with respect to this study’s controls and their respective roles in the association between religiosity and sexual health.

Race/ethnicity. Previous research provided mixed findings with respect to race/ethnicity’s role in religiosity and sexual health. In their study using Waves I and II of the Add Health dataset, Rostosky and colleagues (2003) found that religious African-American males who signed virginity pledges were more likely to have experienced their sexual debut than less religious Caucasian males. Unfortunately, the authors did not provide a potential explanation for the aforementioned surprising finding, but did suggest it is in need of further investigation. In a different study, Bearman and Brückner (2001) found an association among Caucasians, Asians, and Hispanics with higher levels of religiosity and delayed sexual debut within Waves I and II of the Add Health dataset. However, the authors did not find a significant association between religiosity and sexual debut among religious African-Americans within the same sample. Conversely, Landor and colleagues (2011) found an association between higher levels of religiosity and delayed sexual debut as well as consistent condom use after the onset of sexual activity among their male and female adolescent African-American study participants. Overall, it appears that race/ethnicity is related to both religiosity and sexual health. Therefore
controlling for race/ethnicity allows for a clearer understanding of the link between religiosity and sexual health outcomes.

**Gender.** Religiosity appears to provide a more protective role for females than for males. While Rostosky and colleagues (2003) and Haglund and Fehring (2010) did not find significant differences between religious boys and girls and the likelihood of delaying sexual debut in their nationally representative samples, other studies found that girls who reported higher levels of individual and family religiosity were more likely to delay sexual debut and avoid engaging in sexually risky behaviors (Landor et al., 2011; Manlove et al., 2008; Meier, 2003). It is not surprising that girls would receive a greater benefit from religion, as they tend to be more faithful to their religion’s rules about sexual activity than boys (McFarland, Uecker, & Regnerus, 2011) and they also tend to receive more information and conversations with parents about sexuality and pregnancy and STI prevention measures than do boys (Angera et al., 2008), which suggests they have a stronger understanding of religious and parental expectations. Therefore, controlling for gender provides a clearer picture of how religiosity influences sexual health.

**Age.** As age increases, so does the likelihood of sexual activity, but religiosity can play a role in delaying sexual debut (Adamczyk, 2009; Adamczyk & Felson, 2006; Gold et al., 2010; Haglund & Fehring, 2010; Landor et al., 2011; Manlove et al., 2006; Meier, 2003; Quinn & Lewin, 2019; Rostosky et al., 2003; Rostosky et al., 2004). It is important to control for age when examining the relation between religiosity and sexual health outcomes, as the age at sexual debut may influence the effect that religiosity has on other sexual health outcomes. For instance, an older age at sexual debut influenced by
religiosity is associated with fewer lifetime sexual partners (Simons et al., 2009), and thus it may impact the likelihood of experiencing poor sexual health outcomes, including STIs and unplanned pregnancies. Controlling for age also allows for the potentially changing levels of religiosity throughout the lifetime. As age increases, it is possible for some individuals’ religiosity levels to decrease, which may remove or reduce the protective influence of religiosity. For example, if one no longer feels bound to their religion’s teachings on sexual monogamy and takes on multiple partners as they progress into adulthood, they are at higher risk for experiencing STIs (ACOG, 2017) and unplanned pregnancies (Ashenhurst et al., 2017). In contrast, it is also possible for religious levels to increase with age, allowing religiosity to provide a protective factor later in the participants’ lives. Overall, it appears that age is related to both religiosity and sexual health. Therefore controlling for age allows for a clearer understanding of the link between religiosity and sexual health outcomes.

**Parent Education.** The role of parent education is somewhat inconsistent with respect to sexual activity. For example, Rostosky and colleagues (2003) found in a nationally representative sample, that girls (ages 15-21) whose mothers held college degrees were less likely to have experienced sexual debut. The authors suggested the effect may be due to girls hoping to reach the same educational achievements as their mothers, and thus are less inclined to take sexual risks. Unfortunately, the authors did not find the same effect for boys and father’s level of education was not included as a measure. In a longitudinal study using the first four waves of the Add Health dataset, Cheshire and colleagues (2019) found that adolescents whose parents attended college
had fewer partners at the age of 18 than their counterparts whose parents did not attend college. However, by the age of 28, they had more partners, suggesting that adolescents with college-educated parents sexually debut later, but may accrue partners at a faster rate during late adolescence and early adulthood (Cheshire et al., 2019). Despite inconsistent findings, parent education appears to exert some influence on sexual health outcomes, therefore it provides valuable insights as a control.

Socio-demographic variables appear to play a role in religiosity and sexual health. It appears that the protective effects of religiosity vary by race/ethnicity, with some studies showing African-Americans to be more at risk. Girls and individuals whose parents hold a college degree appear to be most protected by religiosity. As age increases, levels of religiosity may change, which may increase or decrease sexual health risk depending on the level of religiosity. Overall, the socio-demographic controls appear to be related to both religiosity and sexual health. Therefore, controlling for these variables allows for a clearer understanding of the link between religiosity and sexual health outcomes.

**Changes in Religiosity over Time**

It is important to mention that religiosity was measured at only one time point for most of the studies reviewed above. None of the reviewed studies examined how changes in religiosity over the course of a lifetime are related to sexual health outcomes. However, in a study consisting of emerging adults between the ages of 21 and 28, Arnett (2002) found that religious adolescents tend to reduce their religious participation during late adolescence and emerging adulthood and that religious participation increases when
individuals become married and begin a family. Additionally, in a sample of college students from a large university in Pennsylvania, Lefkowitz (2005) found that when young people enter the college environment, they are more in control of whether they attend and/or participate in religious activities than when living at home, exposure to other religious practices increases, and opportunities for new sexual experiences become more available. Thus, it is clear that changes in levels of religiosity occur over the lifetime as the opportunities to explore one’s sexuality increase. Religiosity has been mostly shown as a protective factor with respect to sexual health in the literature reviewed for this study. Therefore, individuals who do not practice a faith, cease practicing, or decrease religious practice as they enter into late adolescence/emerging adulthood (when opportunities for sexual activity increase) may be less protected by religiosity than those who adopt, increase, or maintain high levels of religiosity later in adolescence or in emerging adulthood.

Methodology Concerns for Previous Studies

There are a number of concerns regarding the methodology of the reviewed studies that are worth pointing out. First, most of the reviewed studies measured religiosity as a predictor at only one time point, which limits what can be inferred about religiosity’s impacts on long-term outcomes, as levels of religiosity may change over the course of the lifetime.

Next, while a number of the studies reviewed utilized the Add Health dataset, a standard measure of religiosity was not used. One included only one measure of religiosity (Rink et al., 2007), while others used composite measures (Adamcyzk, 2009;
Adamcyzk & Felson, 2006; Adamcyzk & Felson, 2008; Cheshire et al., 2019; Ford et al., 2005; Meier, 2003; Miller & Gur, 2002; Nonnemaker et al., 2003; Regnerus, 2005; Rostosky et al., 2003; Rostosky et al., 2004) including up to six dimensions (Vasilenka & Espinosa-Hernández, 2019). Similarly, studies not using the Add Health dataset were diverse in their measurement of religiosity. A number of studies used a one-item measure (Davidson et al., 2004; Martin et al., 2018; Wigfall et al., 2012) while others used multi-dimensional measures (Haglund & Fehring, 2010; Landor et al., 2011; Manlove et al., 2006; Manlove et al., 2008; Murray et al., 2007; Poulson et al., 2010; Quinn & Lewin, 2019; Vazsonyi & Jenkins, 2010), with one having up to fourteen items (Zaleski & Schiaffino, 2000). Overall, most of the literature has shown a trend of using multi-component measures.

Third, several of the studies reviewed did not include a nationally representative sample. A number of them studied convenience samples from colleges (Davidson et al., 2004; Murray et al., 2007; Poulson et al., 1998; Quinn & Lewin, 2019; Wigfall et al., 2012), some of which were faith-based universities (Murray et al., 2007; Zaleski & Schiaffino, 2000). A focus on a college demographic excludes a substantial part of a nationally representative sample, therefore demonstrating a bias towards college students. Additionally, studies sampling from faith-based universities may be even less representative than other colleges, particularly with respect to levels of religiosity.

Finally, a number of studies were limited by sample size, gender, or race. Studies examining nationally representative samples included several thousand participants (Adamcyzk, 2009; Adamcyzk & Felson, 2006; Cheshire et al., 2019; Ford et al., 2005;
Haglund & Fehring, 2010; Miller & Gur, 2002; Nonnemaker et al., 2003; Regnerus, 2005; Rink et al., 2007; Rostosky et al., 2003; Rostosky et al., 2004; Vasilenka & Espinosa-Hernández, 2019). However, some of the smaller, less representative samples included relatively small sample sizes, ranging from 231 (Zaleski & Schiaffino, 2000) to 683 participants (Davidson et al., 2004). Some studies sampled exclusively girls or women (Davidson et al., 2004; Gold et al., 2011; Wigfall et al., 2012), Caucasian adolescents (Beck et al., 1991), or African-Americans (Landor et al., 2011). Limitations on sample size, gender, or race make it difficult or impossible to generalize to a larger population. Despite some of the limitations of the reviewed studies, however, the overall research shows a mostly protective link between religiosity and sexual health.

**Summary**

Despite some conflicting findings in the literature, religiosity appears to mostly provide a protective role with respect to sexual health. It appears that religious adolescents tend to grow up in homes with higher levels of parental monitoring and connectedness, which can positively influence their sexual behavior. They also tend to select into religious peer groups in which group norms dictate sexual conservatism. Although the literature is robust, very little has developed in the past decade, possibly due to Americans’ decreased identity with religion. Nevertheless, a large majority of Americans continue to claim religious affiliation. Thus, religiosity’s role in sexual health is worthy of continued study, as more remains to be learned about the association between the two, particularly with respect to sexual health outcomes. Whereas previous studies have linked religiosity to delayed sexual debut, a lower number of sexual
partners, lower likelihood of contracting STIs, and lower likelihood of unplanned pregnancies, opportunities remain for further study. For instance, several studies measured religiosity only at one time point, used samples of convenience, or limited their samples to a certain race or gender. This study seeks to understand more about how religiosity over time influences specific STIs individually and unplanned pregnancies through mediating variables using a nationally representative sample. Understanding more about how religiosity can influence the sexual health outcomes of the overall general population can lay the groundwork for future interventions in the fields of religion, public health, social science, and education.
CHAPTER THREE
RESEARCH DESIGN AND METHODS

The following chapter discusses the research design and methods of the present study. A brief description of the study design is provided, followed by sampling, participants/procedure, measures, data analytic strategy, and descriptions of how the hypotheses were tested.

Study Design

A secondary data analysis approach was utilized for this non-experimental study. Longitudinal data collected from the same participants at four time points over the course of fourteen years consists of information on religiosity, attitudes toward sex, parent-child connectedness, peer religiosity, problem alcohol use, condom use knowledge, sexual debut, number of sexual partners, and self-reports of chlamydia, gonorrhea, HPV, and unplanned pregnancy experiences. After applying weights for a complex sample design accounting for individuals who participated in all four waves of the study, the nationally representative analytical sample included 9,421 participants (Chen & Chantala, 2014).

Sampling

The National Longitudinal Study of Adolescent to Adult Health (Add Health) restricted use dataset was used for this dissertation. Add Health is the largest, most inclusive and robust longitudinal survey of adolescents ever conducted (Harris et al., 2009). The restricted use dataset includes more extensive data and provides a larger sample size than the public use dataset. The Add Health researchers used a stratified sample of 80 nationally representative high schools. To be eligible, schools had to
include an 11\textsuperscript{th} grade and have at least 30 students enrolled. Schools were stratified by U.S. region, urbanicity, size of student body, type of school, and race/ethnicity. High schools were paired with middle schools in their respective communities, yielding one pair of schools in most of the 80 communities. In the event a middle school chose not to participate, a similar school was chosen. However, schools including 7\textsuperscript{th}-12\textsuperscript{th} grades were not paired with other schools. Ultimately, 132 schools participated in the study (Harris et al., 2009).

**Participants & Procedure**

The dataset includes a total of five data collection points. Wave I included in-school and in-home surveys administered to 7\textsuperscript{th} – 12\textsuperscript{th} graders in 1994-1995. Waves II – V were administered via in-home surveys in 1996, 2001-2002, 2008-2009, and 2016-2018, respectively. Wave I includes 20,745 students in 7\textsuperscript{th}-12\textsuperscript{th} grades. At Wave II, approximately one year later, researchers re-interviewed 14,738 of the original participants. At Wave III, roughly seven years after the first wave, 15,197 participants (ages 18-26) were re-interviewed. Approximately thirteen years following the first wave, 15,701 participants (ages 24-32) completed follow-up interviews for Wave IV. The following table (Table 3.1) includes race and gender information for Waves I – IV.
Table 3.1

Race/ethnicity and gender, Waves I – IV

<table>
<thead>
<tr>
<th></th>
<th>Race/Ethnicity</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Caucasian</td>
<td>African-American</td>
</tr>
<tr>
<td>Wave I</td>
<td>50.4%</td>
<td>20.9%</td>
</tr>
<tr>
<td>Wave II</td>
<td>51.4%</td>
<td>20.4%</td>
</tr>
<tr>
<td>Wave III</td>
<td>51.9%</td>
<td>20.4%</td>
</tr>
<tr>
<td>Wave IV</td>
<td>52.9%</td>
<td>20.7%</td>
</tr>
</tbody>
</table>

The University of North Carolina’s School of Public Health Institutional Review Board (IRB) approved the Add Health study, based on the guidelines derived from the Code of Federal Regulations on the Protection of Human Subjects 45CFR46. Clemson University IRB approval for the secondary analysis of the data also was obtained. Participants in the study provided written informed consent in all study aspects. For sensitive questions, participants utilized computer-assisted self-interviews (CASI) in which they listened to audio recorded versions of the questions and entered their own responses. For less sensitive questions, interviewers read the questions to them and recorded their answers. At the University of North Carolina, Chapel Hill, Kathleen Mullan Harris directed the Add Health project and designed it in collaboration with J. Richard Udry and Peter S. Bearman. Along with 23 other federal agencies and foundations, The Eunice Kennedy Shriver National Institute of Child Health and Human Development funded grant P01-HD31921 (Harris et al., 2009). No direct support for these analyses was received from the aforementioned grant.
Measures

Socio-Demographic Variables

Age, gender, race/ethnicity, and parent education were included as covariates. Gender was coded as 0 = male and 1 = female. Race/ethnicity was coded 0 = Caucasian, 1 = African-American, 2 = Hispanic, and 3 = other. Parent education was coded as 0 = does not have college degree and 1 = has college degree. Age was computed using the difference between the interview date and the birthdate. It was included as a continuous variable. All socio-demographic variables were taken from Wave I data.

Predictor Variable

Religiosity served as the main predictor variable for all statistical analyses. For Research Questions 1-2, Wave 1 religiosity was used to measure long-term influences of adolescent religiosity. A religiosity scale, including four variables representing both public and private religiosity (Meier, 2003) was used. Importance of religion was measured on a scale of 1 = very important to 4 = not important at all. Frequency of service attendance in the twelve months leading up to the interview was measured on a scale of 1 = once a week or more to 4 = never. Frequency of prayer was measured on a scale of 1 = at least once a day to 5 = never. Finally, participation in religiously sponsored activities (e.g., Bible studies, youth group, choir, etc.) in the twelve months leading up to the interview was measured on a scale of 1 = once a week or more to 4 = never. The items were reverse coded for each individual variable such that higher scores indicated higher levels of religiosity. Z scores were taken for each item before combining in order to standardize the scale. The items were then combined into a
summed scale, with higher numbers representing higher levels of religiosity. The scale demonstrated good internal consistency reliability at Wave I (\(\alpha = .86\)) and at Wave IV (\(\alpha = .83\)), both of which were utilized for this study. For Research Questions 3-4, religiosity was measured at Waves I and IV to capture sustained, later adopted, discontinued, and no religiosity. Using the same 4-item religiosity scale, a median split was taken to group religious and non-religious participants accordingly at each of the two waves. At Wave I, the split was 0.53 and at Wave IV, the split was -0.24. The participants scoring higher than the median split were coded as (1) to indicate religiosity, while those scoring lower than the median split were coded as (0) to indicate non-religiosity. The reference group consisted of those scoring high levels at Waves I and IV. Table 3.2 provides a representation of how religiosity was coded for each group at both waves.

Table 3.2

<table>
<thead>
<tr>
<th>Religiosity groups (% of sample)</th>
<th>Wave I</th>
<th>Wave IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustained Religiosity (34.4%)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Discontinued Religiosity (15.6%)</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Later Adopted Religiosity (17.1%)</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>No Religiosity (32.9%)</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Outcome Variables**

Chlamydia, gonorrhea, HPV, any of the three STIs, and unplanned pregnancies served as the outcome variables of interest for this study. Wave IV was the only data
point in which participants were asked to provide information on lifetime diagnoses of specific STIs. Participants were asked in three separate questions whether a doctor, nurse, or other health professional had ever told them they had chlamydia, gonorrhea, or HPV. Response options included, 0 = not selected (to indicate not having experienced the outcome), 1 = selected (to indicate having experienced the outcome), 6 = refused, and 8 = don’t know. New dummy coded variables were used for each of the three Wave IV STIs to indicate whether participants had ever been diagnosed with them, such that 0 = no and 1 = yes. To determine whether participants had been diagnosed with any STI at Wave IV, a dummy coded variable was created, such that 0 = none and 1 = at least one of the three STIs assessed. Those who “refused” or reported “don’t know” were excluded from the analyses.

Information about unplanned pregnancies was collected at all four data points. However, for the purposes of this study, unplanned pregnancy as assessed at Wave IV was used, as over 95% of the participants in the first two waves had not yet experienced a pregnancy; Wave IV provided the most current data regarding pregnancy for each participant; and in order to be consistent with the assessment points of the other outcome variables. Participants who had either become pregnant or impregnated a partner were asked whether they wanted to have a child before the pregnancy occurred. Response options included, 0 = no, 1 = yes, 6 = refused, 7 = legitimate skip, 8 = don’t know, and 9 = not applicable. “Legitimate skip” and “not applicable” options refer to those not yet having experienced a pregnancy and were coded as 0 = no. Those who “refused” or reported “don’t know” were excluded from the analyses.
Hypothesized Mediators

Attitudes toward Sex. Attitudes toward sex were measured using two scales that assess relational and personal attitudes toward sex (Meier, 2003). These mediators were analyzed at Wave II as it provided a separate time point between Wave I religiosity and Wave IV outcomes. Additionally, data about attitudes toward sex were not collected after Wave II. Consistent with Meier’s (2003) prior research using Add Health data, relational attitudes toward sex included three items assessing whether participants believed if they had sexual intercourse, “your partner would lose respect for you,” “afterward you would feel guilty,” and “it would upset your mother.” Personal attitudes toward sex included four items assessing whether participants believed if they had sexual intercourse, “friends would respect you more,” “it would give you a great deal of physical pleasure,” “it would make you more attractive to men/women,” and “you would feel less lonely.” Response options for all items included $1 = \text{strongly agree}$ to $5 = \text{strongly disagree}$ and $6 = \text{refused}$, $7 = \text{legitimate skip}$, $8 = \text{don’t know}$, and $9 = \text{not applicable}$. Only responses including the options on the scale of strongly agree to strongly disagree were included in the analyses. The responses for the personal attitudes scale were reverse coded and the relational attitudes scale remained the same. The items were summed for each scale so that higher scores indicated more permissive attitudes toward sex. The relational attitudes scale demonstrated adequate internal consistency reliability ($\alpha = .68$) and the personal attitudes scale also demonstrated adequate internal consistency reliability ($\alpha = .72$).
Parent-Child Connectedness. Parent-child connectedness was measured using a 13-item scale that assesses closeness to parents, perceived parental caring, satisfaction with the parental relationship, and feeling loved and wanted (Resnick et al., 1997). This mediator was analyzed at Wave II, as it provided a relevant and separate time point between Wave I religiosity and outcomes at IV. Participants had the opportunity to respond to thirteen Likert-type items. Sample items included, “Most of the time your father is warm and loving to you” and “You are satisfied with the way your mother and you communicate with each other.” Response options included 1 = strongly agree to 5 = strongly disagree and 6 = refused, 7 = legitimate skip, 8 = don’t know, and 9 = not applicable. Another example item included, “How close do you feel to your mother?” Response options included 1 = not at all, 2 = very little, 3 = somewhat, 4 = quite a bit, 5 = very much and 6 = refused, 7 = legitimate skip, and 8 = don’t know. Only responses including the options on the scale of “strongly agree” to “strongly disagree” and “not at all” to “very much” were included in the analyses. The responses for the first set of items were reverse coded before combining. The mean of all thirteen items was taken so that higher numbers indicated greater parent-child connectedness. The scale demonstrated good internal consistency reliability (α = .88). Table 3.3 provides a complete list of all thirteen items included in the scale.
Peer religiosity. Peer religiosity was measured using two scales that assess peers’ private and public religiosity (Adamczyk, 2009; Adamczyk & Felson, 2006).

These mediators were analyzed at Wave II, as it provided a relevant and separate time

Table 3.3

*Parent-child connectedness*

<table>
<thead>
<tr>
<th>Items</th>
<th>Scoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most of the time, your mother is warm and loving toward you.</td>
<td>1 = strongly agree</td>
</tr>
<tr>
<td>Your mother encourages you to be independent.</td>
<td>2 = agree</td>
</tr>
<tr>
<td>You are satisfied with the way your mother and you communicate with each other.</td>
<td>3 = neither agree nor disagree</td>
</tr>
<tr>
<td>When you do something wrong that is important, your mother talks about it with you and helps you understand why it is wrong.</td>
<td>4 = disagree</td>
</tr>
<tr>
<td>1 = strongly agree</td>
<td>5 = strongly disagree</td>
</tr>
</tbody>
</table>

You feel loved and wanted.

<table>
<thead>
<tr>
<th>Items</th>
<th>Scoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>How close do you feel to your mother?</td>
<td>1 = not at all</td>
</tr>
<tr>
<td>How much do you think she cares about you?</td>
<td>2 = very little</td>
</tr>
<tr>
<td>How close do you feel to your father?</td>
<td>3 = somewhat</td>
</tr>
<tr>
<td>How much do you think he cares about you?</td>
<td>4 = quite a bit</td>
</tr>
<tr>
<td>How close do you feel to your father?</td>
<td>5 = very much</td>
</tr>
</tbody>
</table>
point between Wave I religiosity and Wave IV outcomes. Peers’ private religiosity included peers’ perceptions of the importance of religion, which is measured on a scale of \(1 = \text{very important}\) to \(4 = \text{not important at all}\) and frequency of prayer, which is measured on a scale of \(1 = \text{at least once a day}\) to \(5 = \text{never}\). Peers’ public religiosity included peers’ frequency of service attendance and participation in religiously sponsored activities (e.g., Bible studies, youth group, choir, etc.) in the twelve months leading up to the interview. Both items were measured on a scale of \(1 = \text{once a week or more}\) to \(4 = \text{never}\). It is important to note that the measure is not based on individuals’ perceptions of peer religiosity, but on the reports of the peers themselves, who were also study participants. The items were reverse coded for each individual variable such that higher scores indicated higher levels of religiosity. \(Z\) scores were taken for the private religiosity items before combining in order to standardize the private religiosity scale. The items were then combined into two separate mean scales, with higher numbers indicating higher levels of religiosity. The peer private religiosity scale demonstrated good internal consistency reliability (\(\alpha = .87\)) and the peer public religiosity scale demonstrated adequate internal consistency reliability (\(\alpha = .76\)).

**Problem Alcohol Use.** Problem alcohol use was measured using an 8-item scale created from questions addressing problem drinking (Swahn & Donovan, 2004). This mediator was taken from the Wave II and Wave III data to capture problem alcohol use in both adolescence and emerging adulthood. Participants were asked a number of questions related to frequently drinking to excess and negative consequences resulting from drinking. A sample item addressing frequency included, “Over the past 12 months,
on how many days did you drink five or more drinks in a row?” The response options included 1 = every day or almost every day, 2 = 3-5 days a week, 3 = 1 or 2 days a week, 4 = 2 or 3 days a month, 5 = once a month or less (3-12 times in the past 12 months), 6 = 1 or 2 days in the past 12 months, and 7 = never. A sample item addressing negative consequences included, “Over the past 12 months, how many times have you had problems with your friends because you had been drinking?” Response options included, 0 = never, 1 = once, 2 = twice, 3 = 3 to 4 times, and 4 = 5 or more times. The items were coded in such a way that higher numbers indicated higher levels of alcohol use and problem drinking. Z scores were taken for each item before combining in order to standardize the scale. The sum of all items was taken so that higher numbers reflected higher levels of problem alcohol use. The scale demonstrated good internal consistency reliability at Wave II (α = .83) and adequate internal consistency reliability at Wave III (α = .78). Table 3.4 provides a complete list of all eight items included in the scale.
Table 3.4

**Problem alcohol use**

<table>
<thead>
<tr>
<th>Items</th>
<th>Scoring*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td></td>
</tr>
<tr>
<td>Over the past 12 months, on how many days did you drink five or more</td>
<td>1 = every day or almost every day</td>
</tr>
<tr>
<td>drinks in a row?</td>
<td>2 = 3-5 days a week</td>
</tr>
<tr>
<td></td>
<td>3 = 1 or 2 days a week</td>
</tr>
<tr>
<td></td>
<td>4 = 2 or 3 days a month</td>
</tr>
<tr>
<td></td>
<td>5 = once a month or less (3-12 times in the</td>
</tr>
<tr>
<td></td>
<td>past 12 months)</td>
</tr>
<tr>
<td></td>
<td>6 = 1 or 2 days in the past 12 months</td>
</tr>
<tr>
<td></td>
<td>7 = never</td>
</tr>
<tr>
<td>Over the past 12 months, on how many days have you gotten drunk or</td>
<td></td>
</tr>
<tr>
<td>“very, very high” on alcohol?</td>
<td></td>
</tr>
<tr>
<td>Negative Consequences</td>
<td></td>
</tr>
<tr>
<td>Over the past 12 months, how many times has each of the following</td>
<td></td>
</tr>
<tr>
<td>things happened?</td>
<td></td>
</tr>
<tr>
<td>You got into trouble with your parents because you had been</td>
<td></td>
</tr>
<tr>
<td>drinking. (Not asked at Wave III)</td>
<td></td>
</tr>
<tr>
<td>You had problems at school, with schoolwork or work because you</td>
<td>0 = never</td>
</tr>
<tr>
<td>had been drinking.</td>
<td>1 = once</td>
</tr>
<tr>
<td>You had problems with your friends because you had been drinking.</td>
<td>2 = twice</td>
</tr>
<tr>
<td>You had problems with someone you were dating because you had</td>
<td>3 = 3 to 4 times</td>
</tr>
<tr>
<td>been drinking.</td>
<td>4 = 5 or more times</td>
</tr>
<tr>
<td>You did something you later regretted because you had been</td>
<td></td>
</tr>
<tr>
<td>drinking. (Not asked at Wave III)</td>
<td></td>
</tr>
<tr>
<td>You got yourself into a sexual situation that you later regretted</td>
<td></td>
</tr>
<tr>
<td>because you had been drinking.</td>
<td></td>
</tr>
</tbody>
</table>

*Scoring for frequency items is based on Wave II; Wave III was scored in the reverse manner*
**Condom Use Knowledge.** Condom use knowledge was measured using five items that assessed the participants’ knowledge of proper condom use (Resnick et al., 1997). This mediator was analyzed at Wave II as it provided a separate time point between Wave I religiosity and Wave IV outcomes. Additionally, data about condom use knowledge were not collected after Wave II. Items included the following true or false statements: “As long as the condom fits over the tip of the penis, it doesn’t matter how far down it is rolled,” “Natural skin (lamb skin) condoms provide better protection against the AIDS virus than latex condoms,” “Vaseline can be used with condoms, as they will work just as well,” “When putting on a condom, it is important to have it fit tightly, leaving no space at the tip,” and “When using a condom, it is important to have it fit tightly, leaving no space at the tip.” Response options for all items included 1 = true, 2 = false, 6 = refused, 7 = legitimate skip, 8 = don’t know, and 9 = not applicable. Only responses choosing true/false options were included in the analyses. Items were coded and summed, such that higher numbers indicated higher and more accurate levels of condom use knowledge.

**Age of Sexual Debut.** The age of sexual debut was measured as a single-item continuous variable at each of the waves. This mediator was taken from the Wave III data, as 86% of the sample reported being sexually active at that point and it provided a time point between Wave I religiosity and Wave IV outcomes. At Wave III, participants were asked to provide the age at which they first engaged in sexual intercourse. The reported ages ranged from 10 to 25 years old. Participants not reporting having had sexual intercourse were not asked this question.
**Number of Sexual Partners.** The number of sexual partners was also measured as a single-item continuous outcome variable at each wave. This mediator was also taken from the Wave III data since a large majority of the participants were already sexually active at that point and it provided a time point between Wave I religiosity and Wave IV outcomes. At Wave III, participants were asked to report the number of partners with whom they had ever had vaginal intercourse. Responses ranged from 1 to 50. Participants who had not yet reached their sexual debut were not asked the question and were coded as having 0 partners.

**Data Analysis**

SPSS Version 25 was used to obtain descriptive statistic information, bivariate correlations, and multivariate logistic regression analyses. MPLUS Version 7.2 was used to conduct the mediation analyses. Descriptive statistics were conducted and are presented in Chapter 4 in order to provide an overview of the predictor and outcome variables in this study. Mediation analyses and multivariate logistic regression were used to test the hypotheses for the research questions being addressed in this study. It is important to note that missing values that could not be re-coded with certainty (e.g., missing values for number of sexual partners were recoded as 0 for participants not yet reaching sexual debut) were excluded from these analyses.

All analyses in this study were conducted using the weighted sample, consisting of 9,421 participants. A smaller proportion of the weighted sample was utilized for the peer private and public religiosity variables, as the values were taken from a saturated sample of 3,702 participants at only 16 of the schools participating in the survey (Harris,
The sample for the analysis addressing the hypothesis pertaining to peer religiosity was further decreased, as not all identified friends answered questions about religiosity at Wave II, despite there being a “legitimate skip” option for those not practicing religion. Thus, missing values were not included in analyses involving peer private and public religiosity. It is also important to note that a smaller sample was studied for the condom use knowledge variable, as participants under the age of fifteen were not asked the questions addressing condom use knowledge.

**Testing for Hypotheses 1 – 14**

To test the hypotheses for Research Questions 1 and 2, mediation models using MPLUS with weighted least square mean and variance adjusted (WLSMV) estimators were run to test each of the seven potential mediators for each question. It is important to note that while there were seven mediators, one mediator (problem alcohol use) was tested in two different waves and two other mediators are presented in two parts (attitudes toward sex – relational and personal attitudes toward sex) and (peer religiosity – peer private religiosity and peer public religiosity). Therefore, ten indirect effects were tested for the outcomes in Research Questions 1 and 2. In order to test hypotheses 1-7, three of the outcomes for Research Question 1 (lifetime diagnoses of chlamydia, gonorrhea, and HPV) were included in each mediation model. Separate models for each mediator were conducted to test the outcome of any STI. Thus, a total of twenty mediation models were conducted. Ten additional models were run to test hypotheses 8-14 for the single outcome (unplanned pregnancies) in Research Question 2. All models included the
covariates outlined in the earlier part of this chapter. Table 3.5 provides a visual representation of the variables of interest and the waves at which they were assessed.

Table 3.5

*Mediation model variables for research questions 1 and 2*

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>Mediating Variables (Assessment Wave)</th>
<th>Outcome Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Religiosity (Wave I)</td>
<td>Relational Attitudes Toward Sex (Wave II)</td>
<td>Chlamydia (Wave IV)</td>
</tr>
<tr>
<td>Peer Private Religiosity (Wave II)</td>
<td>Personal Attitudes Toward Sex (Wave II)</td>
<td>Gonorrhea (Wave IV)</td>
</tr>
<tr>
<td>Peer Public Religiosity (Wave II)</td>
<td>Parent-Child Connectedness (Wave II)</td>
<td>HPV (Wave IV)</td>
</tr>
<tr>
<td>Problem Alcohol Use (Wave II)</td>
<td>Problem Alcohol Use (Wave III)</td>
<td>Any STI (Wave IV)</td>
</tr>
<tr>
<td>Condom Use Knowledge (Wave II)</td>
<td>Age of Sexual Debut (Wave III)</td>
<td>Unplan Pregnancy (Wave IV)</td>
</tr>
<tr>
<td>Number of Partners (Wave III)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Testing for Hypotheses 15 – 16**

Prior to conducting each of the analyses for Research Questions 3 and 4, four comparison groups were created, reflecting consistency in religiosity over time: 1. Participants who reported high levels of religiosity at Waves I and IV (sustained
religiosity). 2. Participants who did not report high levels of religiosity at Wave I, but did at IV (later adopted religiosity). 3. Participants who reported high levels of religiosity at Wave I but did not at Wave IV (discontinued religiosity). 4. Participants who never reported high levels of religiosity (no religiosity).

Multivariate logistic regression analyses were conducted to test the hypotheses for Research Questions 3 and 4. To test for hypothesis 15, four multivariate logistic regression models were conducted to determine if there was a significant difference between groups who sustained religiosity from adolescence into adulthood and those reporting lower levels of lifetime religiosity with respect to lifetime diagnoses of chlamydia, gonorrhea, HPV, and any STI. One additional model was run to test hypothesis 16 and determine if there were significant differences with respect to the outcome of unplanned pregnancies. All models included the covariates outlined in the earlier part of this chapter.
CHAPTER FOUR

RESULTS

The following chapter provides the results of this study. Descriptive statistics are included, followed by bivariate correlations among study variables, and results structured in the same order as the research questions and hypotheses posed in this dissertation. The chapter concludes with a brief summary of the results.

Descriptive Statistics

Within the weighted sample at Wave I, the mean age of study participants was 15.27 ($SD = 1.61$); 25.5% of participants’ parents held a college degree while 74.5% of participants’ parents did not hold a college degree; the sample consisted predominantly of Caucasians (54.5%), followed by African-Americans (19.3%), Hispanics (15.3%), and other races/ethnicities (10.8%); and the sample was fairly evenly split with 45.4% male participants and 54.6% female participants. Additional descriptive statistics from the weighted sample for the predictor, mediating, and outcome variables are presented in Table 4.1.
Table 4.1

Descriptive statistics

<table>
<thead>
<tr>
<th>Predictors</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>Min.</th>
<th>Max.</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wave I Religiosity</td>
<td>9,420</td>
<td>0.00</td>
<td>3.37</td>
<td>-5.98</td>
<td>4.30</td>
<td>.86</td>
</tr>
<tr>
<td>Sustained Religiosity</td>
<td>3,240</td>
<td>34.4%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Late-Adopted Religiosity</td>
<td>1,611</td>
<td>17.1%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discontinued Religiosity</td>
<td>1,470</td>
<td>15.6%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Religiosity</td>
<td>3,097</td>
<td>32.9%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mediators</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>Min.</th>
<th>Max.</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relational Attitudes Toward Sex (Wave II)</td>
<td>9,133</td>
<td>8.10</td>
<td>2.69</td>
<td>1.00</td>
<td>15.00</td>
<td>.68</td>
</tr>
<tr>
<td>Personal Attitudes Toward Sex (Wave II)</td>
<td>9,129</td>
<td>10.15</td>
<td>3.06</td>
<td>1.00</td>
<td>20.00</td>
<td>.72</td>
</tr>
<tr>
<td>Parent-Child Connectedness (Wave II)</td>
<td>9,418</td>
<td>4.24</td>
<td>0.58</td>
<td>1.00</td>
<td>5.00</td>
<td>.88</td>
</tr>
<tr>
<td>Peer Private Religiosity (Wave II)</td>
<td>2,206*</td>
<td>0.07</td>
<td>0.84</td>
<td>-1.73</td>
<td>0.92</td>
<td>.87</td>
</tr>
<tr>
<td>Peer Public Religiosity (Wave II)</td>
<td>2,871*</td>
<td>2.30</td>
<td>0.99</td>
<td>1.00</td>
<td>4.00</td>
<td>.76</td>
</tr>
<tr>
<td>Problem Alcohol Use (Wave II)</td>
<td>9,421</td>
<td>0.00</td>
<td>5.40</td>
<td>-2.47</td>
<td>57.63</td>
<td>.83</td>
</tr>
<tr>
<td>Problem Alcohol Use (Wave III)</td>
<td>9,412</td>
<td>0.00</td>
<td>4.17</td>
<td>-2.68</td>
<td>35.09</td>
<td>.78</td>
</tr>
<tr>
<td>Condom Use Knowledge (Wave II)</td>
<td>7,567**</td>
<td>8.52</td>
<td>1.45</td>
<td>1.00</td>
<td>10.00</td>
<td>***</td>
</tr>
<tr>
<td>Age of Sexual Debut (Wave III)</td>
<td>8,019</td>
<td>16.46</td>
<td>2.23</td>
<td>10</td>
<td>25</td>
<td>***</td>
</tr>
<tr>
<td>Number of partners (Wave III)</td>
<td>9,320</td>
<td>5.28</td>
<td>7.27</td>
<td>0</td>
<td>50</td>
<td>***</td>
</tr>
</tbody>
</table>

Outcomes (Wave IV)

<table>
<thead>
<tr>
<th></th>
<th>Positive Report</th>
<th>Negative Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlamydia</td>
<td>9,224</td>
<td>10.9% 89.1%</td>
</tr>
<tr>
<td>Gonorrhea</td>
<td>9,224</td>
<td>3.3% 96.7%</td>
</tr>
<tr>
<td>HPV</td>
<td>9,224</td>
<td>6.5% 93.5%</td>
</tr>
<tr>
<td>Any STI</td>
<td>9,224</td>
<td>17.9% 82.1%</td>
</tr>
<tr>
<td>Unplanned Pregnancy</td>
<td>9,281</td>
<td>18.0% 82.0%</td>
</tr>
</tbody>
</table>

*Reduced n, due to the availability of peer religiosity data in a smaller subset
**Participants under 15 not asked questions about condom use knowledge
***α score not applicable, due to true/false scale or single item variables
**Bivariate Association between Socio-Demographic Control Variables and Study Variables**

Bivariate correlation analyses were conducted on socio-demographic control variables and all variables examined in this study. They are presented below in Table 4.2. With the exception of the correlation between gender and late adopted religiosity, all socio-demographic control variables demonstrated significant, but weak associations with the predictor variables. Additionally, the socio-demographic controls demonstrated significant, but weak associations with the majority of mediating variables and at least three or more of the outcome variables.

Age was negatively and significantly associated with adolescent religiosity, sustained religiosity, discontinued religiosity, parent-child connectedness, peer private and public religiosity, problem alcohol use at Wave III, HPV, any STI, and unplanned pregnancy. Age was positively and significantly associated with late adopted religiosity, no religiosity, relational attitudes toward sex, personal attitudes toward sex, problem alcohol use at Wave II, condom use knowledge, sexual debut, and number of partners.

Female gender was significantly and negatively associated with discontinued religiosity, no religiosity, relational attitudes toward sex, personal attitudes toward sex, parent-child connectedness, problem alcohol use at Waves II and III, condom use knowledge, and number of sexual partners. Female gender was significantly and positively associated with adolescent religiosity, sustained religiosity, peer private religiosity, chlamydia, HPV, any STI, and unplanned pregnancy.

Minority status was significantly and negatively associated with discontinued religiosity, no religiosity, parent-child connectedness, problem alcohol use at Waves II
and III, condom use knowledge, sexual debut, and HPV. Minority status was significantly and positively associated with adolescent religiosity, sustained religiosity, late adopted religiosity, relational and personal attitudes toward sex, peer private and public religiosity, chlamydia, gonorrhea, any STI, and unplanned pregnancy.

Having a parent with a college degree was significantly and negatively associated with late adopted religiosity, no religiosity, relational attitudes toward sex, problem alcohol use at Wave II, number of sexual partners, chlamydia, gonorrhea, and unplanned pregnancy. Having a parent with a college degree was significantly and positively associated with adolescent religiosity, sustained religiosity, discontinued religiosity, parent-child connectedness, peer private and public religiosity, problem alcohol use at Wave III, condom use knowledge, sexual debut, and HPV.
Table 4.2

<table>
<thead>
<tr>
<th>Bivariate associations between socio-demographic control and study variables</th>
<th>Age</th>
<th>Gender</th>
<th>Race/Ethnicity</th>
<th>Parent Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adolescent Religiosity (Wave I)</td>
<td>-0.09**</td>
<td>0.08***</td>
<td>0.12***</td>
<td>0.08***</td>
</tr>
<tr>
<td>Sustained Religiosity (Wave I = 1; Wave IV = 1)</td>
<td>-0.05***</td>
<td>0.12***</td>
<td>0.15***</td>
<td>0.05***</td>
</tr>
<tr>
<td>Late Adopted Religiosity (Wave I = 0; Wave IV = 1)</td>
<td>0.09***</td>
<td>0.02</td>
<td>0.07***</td>
<td>-0.05***</td>
</tr>
<tr>
<td>Discontinued Religiosity (Wave I = 1; Wave IV = 0)</td>
<td>-0.08***</td>
<td>-0.05***</td>
<td>-0.04***</td>
<td>0.04***</td>
</tr>
<tr>
<td>No Religiosity (Wave I = 0; Wave IV = 0)</td>
<td>0.04***</td>
<td>-0.09***</td>
<td>-0.17***</td>
<td>-0.04***</td>
</tr>
<tr>
<td>Relational Attitudes (Wave II)</td>
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<td>Problem Alcohol Use (Wave III)</td>
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*p < .05; **p < 0.01; ***p < .001

Pearson’s coefficient: dichotomous/continuous and continuous/continuous correlations
Phi coefficient: dichotomous/dichotomous correlations
**Bivariate Correlations among Predictor, Mediator, and Outcome Variables**

Bivariate correlation analyses were also conducted on the predictor, mediating, and outcome variables (see Table 4.3). As shown below, Wave I religiosity demonstrated a significant association with all hypothesized mediators and one outcome, such that higher religiosity was associated with less permissive attitudes toward sex, higher levels of parent-child connectedness and peer religiosity, lower levels of problem alcohol use, condom use knowledge, sexually risky behaviors, and a reduced likelihood of experiencing HPV. With the exception of peer public religiosity, each hypothesized mediator demonstrated a statistically significant association with one or more of the outcomes. More permissive relational attitudes toward sex were associated with increased likelihood of having experienced chlamydia, gonorrhea, and any STI. More permissive personal attitudes toward sex were associated with a reduced likelihood of having experienced HPV, any STI, and an increased likelihood of experiencing unplanned pregnancy. Higher levels of parent-child connectedness were associated with a lower likelihood of chlamydia, HPV, and any STI. Higher levels of peer private religiosity were associated with an increased likelihood of having experienced gonorrhea. Higher levels of problem alcohol use at Waves I and II were associated with an increased likelihood of having experienced HPV any STI, and unplanned pregnancy. Higher levels of condom use knowledge were associated with increased likelihood of having experienced chlamydia, gonorrhea, HPV, and any STI. A higher age at sexual debut was associated with a reduced likelihood of having experienced chlamydia, gonorrhea, HPV, any STI, and unplanned pregnancy. Finally, higher numbers of sexual partners were
associated with an increased likelihood of having experienced chlamydia, gonorrhea, HPV, any STI, and unplanned pregnancy.
### Table 4.3

**Bivariate correlations among predictor, mediator, and outcome variables**

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*p < .05

1 = Religiosity, 2 = Relational Attitudes toward Sex, 3 = Personal Attitudes toward Sex, 4 = Parent-child Connectedness, 5 = Peer Private Religiosity, 6 = Peer Public Religiosity, 7 = Problem Alcohol Use (Wave II), 8 = Problem Alcohol Use (Wave III), 9 = Condom Use Knowledge, 10 = Sexual Debut, 11 = Number of Sexual Partners, 12 = Chlamydia, 13 = Gonorrhea, 14 = HPV, 15 = Any STI, 16 = Unplanned Pregnancy

Religiosity was measured at Wave I; Excepting Wave III alcohol use, debut, and partners, all mediators were measured at Wave II, and all outcomes at Wave IV

Pearson’s coefficient: dichotomous/continuous and continuous/continuous correlations

Phi coefficient: dichotomous/dichotomous correlations
Testing for Hypotheses 1 – 7

The following section presents the results of the analyses conducted to investigate RQ1, which hypothesized that adolescent religiosity would predict the likelihood of the sexual health outcomes of chlamydia, gonorrhea, HPV, and any of the three STIs through the mediating roles of relational attitudes toward sex (hypothesis 1a), personal attitudes toward sex (hypothesis 1b) parent-child connectedness (hypothesis 2), peer private religiosity (hypothesis 3a), peer public religiosity (hypothesis 3b), problem alcohol use at Wave II (hypothesis 4a), problem alcohol use at Wave III (hypothesis 4b) condom use knowledge (hypothesis 5), sexual debut (hypothesis 6), and number of sexual partners (hypothesis 7). Two mediation analyses were conducted for each hypothesis. One investigated hypothesized mediation effects on chlamydia, gonorrhea, and HPV. The other investigated hypothesized mediation effects on any STI as an individual outcome. A total of twenty mediation analyses were conducted for hypotheses 1 – 7.

Hypothesis 1a – Mediating role of relational attitudes toward sex on STIs

Significant standardized beta coefficients are presented in Figure 4.1 for predictor, mediator, and outcome variables. Adolescent religiosity was significantly associated with the hypothesized mediator, relational attitudes toward sex ($b = -0.20$, 95% CI [-0.21, -0.16]; $z = -13.59$) and HPV ($b = -0.03$, 95% CI [-0.05, -0.02]; $z = -3.51$) such that higher religiosity was associated with less permissive relational attitudes toward sex and a lower likelihood of experiencing HPV. Relational attitudes toward sex were significantly associated with chlamydia ($b = 0.04$, 95% CI [0.02, 0.06]; $z = 3.44$), gonorrhea ($b = 0.04$, 95% CI [0.02, 0.07]; $z = 3.32$), and any STI ($b = 0.04$, 95% CI [0.02, 0.05]; $z = 4.29$) such
that more permissive relational attitudes toward sex were associated with an increased likelihood of experiencing chlamydia, gonorrhea, and any STI. A significant indirect effect demonstrated that relational attitudes toward sex accounted for the association of adolescent religiosity on chlamydia ($\beta = -0.01, \text{SE} = 0.002, z = -3.41, p = .001$), gonorrhea ($\beta = -0.01, \text{SE} = 0.002, z = -3.16, p = .002$), and any STI ($\beta = -0.01, \text{SE} = 0.002, z = -4.06, p < .001$). Findings for indirect effects of relational attitudes toward sex on HPV were not significant. In sum, when controlling for age, gender, race/ethnicity, and parent education, there was an indirect effect of relational attitudes toward sex on the relation between adolescent religiosity and the outcomes of chlamydia, gonorrhea, and any STI.

*Figure 4.1.* Hypothesis 1a (relational attitudes toward sex) standardized beta coefficients

Notes:
n = 7,877

*p < .05; **p < .01; ***p < .001

Only significant coefficients shown
Hypothesis 1b – Mediating role of personal attitudes toward sex on STIs

Significant standardized beta coefficients are presented in Figure 4.2 for predictor, mediator, and outcome variables. Adolescent religiosity was significantly associated with the hypothesized mediator, personal attitudes toward sex ($b = -0.05$, 95% CI [-0.08, -0.03]; $z = -4.08$), HPV ($b = -0.03$, 95% CI [-0.05, -0.02]; $z = -3.34$), and any STI ($b = -0.02$, 95% CI [-0.03, -0.01]; $z = -2.35$) such higher levels of religiosity were associated with less permissive personal attitudes toward sex, and a lower likelihood of experiencing HPV and any STI. Personal attitudes toward sex were significantly associated with chlamydia ($b = 0.04$, 95% CI [0.02, 0.06]; $z = 3.60$), gonorrhea ($b = 0.03$, 95% CI [0.01, 0.05]; $z = 2.20$), and any STI ($b = 0.04$, 95% CI [0.02, 0.05]; $z = 3.81$) such that more permissive attitudes toward sex were associated with an increased likelihood of experiencing chlamydia, gonorrhea, and any STI. A significant indirect effect demonstrated that personal attitudes toward sex accounted for the association of adolescent religiosity on chlamydia ($\beta = -0.002$, SE = 0.001, $z = -2.79$, $p = .005$) and any STI ($\beta = -0.002$, SE = 0.001, $z = -2.85$, $p = .004$). Findings for indirect effects of personal attitudes toward sex on HPV were not significant. Additionally, while the links between adolescent religiosity, personal attitudes toward sex, and gonorrhea were significant, findings for indirect effects on gonorrhea were not significant ($p = .067$). In sum, when controlling for age, gender, race/ethnicity, and parent education, there was an indirect effect of personal attitudes toward sex on the relation between adolescent religiosity and the outcomes of chlamydia and any STI.
Hypothesis 2 – Mediating role of parent-child connectedness on STIs

Significant standardized beta coefficients are presented in Figure 4.3 for predictor, mediator, and outcome variables. Adolescent religiosity was significantly associated with the hypothesized mediator, parent-child connectedness ($b = 0.02$, 95% CI [0.02, 0.03]; $z = 9.69$) and the outcomes of HPV ($b = -0.03$, 95% CI [-0.05, -0.01]; $z = -3.06$) and any STI ($b = -0.02$, 95% CI [-0.029, -0.004]; $z = -2.43$) such that higher religiosity was associated with greater parent-child connectedness, and a lower likelihood of experiencing HPV or any STI. Parent-child connectedness was significantly and negatively associated with HPV ($b = -0.12$, 95% CI [-0.20, -0.03]; $z = -2.30$) and any STI ($b = -0.11$, 95% CI [-0.17, -0.05]; $z = -2.90$) such that higher levels of parent-child connectedness were associated with a lower likelihood of experiencing HPV and any
A significant indirect effect demonstrated that parent-child connectedness accounted for the association of adolescent religiosity on HPV ($\beta = -0.003, SE = 0.001, z = -2.72, p = .02$) and any STI ($\beta = -0.002, SE = 0.001, z = -2.89, p = .004$). Findings for indirect effects of parent-child connectedness on chlamydia and gonorrhea were not significant. In sum, when controlling for age, gender, race/ethnicity, and parent education, there was an indirect effect of parent-child connectedness on the relation between adolescent religiosity and the outcomes of HPV and any STI.

Figure 4.3. Hypothesis 2 (parent child connectedness) standardized beta coefficients

Notes:
$n = 8,109$
*p < .05; **p < .01; ***p < .001
Only significant coefficients shown
Hypothesis 3a– Mediating role of peer private religiosity on STIs

Significant standardized beta coefficients are presented in Figure 4.4 for predictor, mediator, and outcome variables. Despite the lack of significant indirect effects, including gonorrhea ($p = .067$), adolescent religiosity was significantly associated with the hypothesized mediator, peer private religiosity ($b = 0.07$, 95% CI [0.04, 0.11]; $z = 3.76$) and the outcomes of HPV ($b = -0.07$, 95% CI [-0.11, -0.03]; $z = -2.67$) and any STI ($b = -0.05$, 95% CI [-0.08, -0.01]; $z = -2.38$) such that higher religiosity was associated with greater peer private religiosity and a lower likelihood of experiencing HPV and any STI. Adolescent religiosity was not significantly associated with chlamydia or gonorrhea. Peer private religiosity was significantly associated with gonorrhea ($b = 0.22$, 95% CI [0.04, 0.40]; $z = 2.05$) such that higher levels of peer private religiosity were associated with an increased likelihood of experiencing gonorrhea. Peer private religiosity was not significantly associated with chlamydia, HPV, or any STI. In sum, when controlling for age, gender, race/ethnicity, and parent education, there was not an indirect effect of peer private religiosity on the relation between adolescent religiosity and chlamydia, gonorrhea, HPV, or any STI.
Hypothesis 3b – Mediating role of peer public religiosity on STIs

Significant standardized beta coefficients are presented in Figure 4.5 for predictor, mediator, and outcome variables. Despite the lack of significant indirect effects, adolescent religiosity was significantly associated with the hypothesized mediator, peer public religiosity ($b = 0.08$, 95% CI [0.05, 0.11]; $z = 4.74$) and the outcomes of chlamydia ($b = -0.03$, 95% CI [-0.05, -0.01]; $z = -1.96$), HPV ($b = -0.05$, 95% CI [-0.08, -0.01]; $z = -2.31$), and any STI ($b = -0.03$, 95% CI [-0.06, -0.01]; $z = -1.98$) such that higher religiosity was associated with greater peer public religiosity and a lower likelihood of experiencing chlamydia, HPV, and any STI. Peer public religiosity was not significantly associated with chlamydia, gonorrhea, HPV, or any STI. In sum, when
controlling for age, gender, race/ethnicity, and parent education, there was not an indirect
effect of peer public religiosity on the relation between adolescent religiosity and
chlamydia, gonorrhea, HPV, or any STI.

Figure 4.5. Hypothesis 3b (peer public religiosity) standardized beta coefficients

![Diagram of standardized beta coefficients for Hypothesis 3b]

Notes:
n = 2,468
*p < .05; **p < .01; ***p < .001
Only significant coefficients shown

Hypothesis 4a – Mediating role of problem alcohol use at Wave II on STIs

Significant standardized beta coefficients are presented in Figure 4.6 for predictor,
mediator, and outcome variables. Adolescent religiosity was significantly associated
with the hypothesized mediator, problem alcohol use at Wave II ($b = -0.15$, 95% CI [-
0.19, -0.10]; $z = -5.64$), HPV ($b = -0.03$, 95% CI [-0.05, -0.01]; $z = -3.05$), and any STI ($b$
= -0.02, 95% CI [-0.03, -0.01]; $z = -2.30$) such that higher religiosity was associated with
lower levels of problem alcohol use at Wave II and a lower likelihood of experiencing
HPV and any STI. Problem alcohol use at Wave II was significantly associated with HPV ($b = 0.02$, 95% CI [0.01, 0.03]; $z = 3.48$) and any STI ($b = 0.01$, 95% CI [0.01, 0.02]; $z = 3.28$) such that higher problem alcohol use was associated with an increased likelihood of experiencing HPV and any STI. A significant indirect effect demonstrated that problem alcohol use accounted for the association of adolescent religiosity on HPV ($\beta = -0.002$, SE = 0.001, $z = -2.78$, $p = .005$) and any STI ($\beta = -0.002$, SE = 0.001, $z = -2.64$, $p = .008$). Findings for indirect effects of problem alcohol use at Wave II on chlamydia and gonorrhea were not significant. In sum, when controlling for age, gender, race/ethnicity, and parent education, there was an indirect effect of problem alcohol use at Wave II on the relation between adolescent religiosity and the outcomes of HPV and any STI.

*Figure 4.6. Hypothesis 4a (problem alcohol use Wave II) standardized beta coefficients*
**Hypothesis 4b – Mediating role of problem alcohol use at Wave III on STIs**

Significant standardized beta coefficients are presented in Figure 4.7 for predictor, mediator, and outcome variables. Despite the lack of significant indirect effects, adolescent religiosity was significantly associated with HPV ($b = -0.03$, 95% CI [-0.05, -0.02]; $z = -3.23$), and any STI ($b = -0.02$, 95% CI [-0.03, -0.01]; $z = -2.42$) such that higher religiosity was associated with a lower likelihood of experiencing HPV and any STI. Adolescent religiosity was not significantly associated with the hypothesized mediator, problem alcohol use at Wave III, chlamydia, or gonorrhea. Problem alcohol use at Wave III was significantly associated with chlamydia ($b = 0.03$, 95% CI [0.02, 0.03]; $z = 4.47$), HPV ($b = 0.03$, 95% CI [0.02, 0.04]; $z = 5.15$) and any STI ($b = 0.03$, 95% CI [0.02, 0.04]; $z = 5.97$) such that higher problem alcohol use at Wave III was associated with an increased likelihood of experiencing chlamydia, HPV, and any STI. Problem alcohol use at Wave III was not associated with gonorrhea. In sum, when controlling for age, gender, race/ethnicity, and parent education, there was not an indirect effect of problem alcohol use at Wave III on the relation between adolescent religiosity and the outcomes of chlamydia, gonorrhea, HPV, and any STI.
**Figure 4.7.** Hypothesis 4b (problem alcohol use Wave III) standardized beta coefficients

![Diagram of relationships between variables]

Notes:

\( n = 8,082 \)

*\( p < .05 \); **\( p < .01 \); ***\( p < .001 \)

Only significant coefficients shown

**Hypothesis 5 – Mediating role of condom use knowledge on STIs**

Significant standardized beta coefficients are presented in Figure 4.8 for predictor, mediator, and outcome variables. Adolescent religiosity was significantly associated with the hypothesized mediator, condom use knowledge \((b = -0.03, 95\% \text{ CI } [-0.04, -0.02]; z = -3.79)\), HPV \((b = -0.03, 95\% \text{ CI } [-0.05, -0.01]; z = -2.83)\), and any STI \((b = -0.02, 95\% \text{ CI } [-0.030, -0.004]; z = -2.09)\) such that higher religiosity was associated with lower levels of condom use knowledge and a lower likelihood of experiencing HPV and any STI. Condom use knowledge was significantly associated with chlamydia \((b = 0.05, 95\% \text{ CI } [0.01, 0.08]; z = 2.14)\), HPV \((b = 0.07, 95\% \text{ CI } [0.03, 0.11]; z = 3.09)\) and any STI \((b = 0.06, 95\% \text{ CI } [0.03, 0.10]; z = 3.25)\) such that higher condom use knowledge
was associated with an increased likelihood of experiencing chlamydia, HPV, and any STI. A significant indirect effect demonstrated that condom use knowledge accounted for the association of adolescent religiosity on HPV ($\beta = -0.002, \text{SE} = 0.001, z = -2.24, p = .025$), and any STI ($\beta = -0.002, \text{SE} = 0.001, z = -2.53, p = .011$). Findings for indirect effects of condom use knowledge on gonorrhea were not significant. Additionally, while links between adolescent religiosity, condom use knowledge and chlamydia were significant, findings for indirect effects on chlamydia were not significant ($p = .061$). In sum, when controlling for age, gender, race/ethnicity, and parent education, there was an indirect effect of condom use knowledge on the relation between adolescent religiosity and the outcomes of HPV and any STI.

*Figure 4.8. Hypothesis 5 (condom use knowledge) standardized beta coefficients*

Notes:

$n = 6,487$

*p < .05; **p < .01; ***p < .001
Only significant coefficients shown
Hypothesis 6 – Mediating role of sexual debut on STIs

Significant standardized beta coefficients are presented in Figure 4.9 for predictor, mediator, and outcome variables. Adolescent religiosity was significantly associated with the hypothesized mediator, sexual debut ($b = 0.11$, 95% CI [0.09, 0.13]; $z = 8.66$), and HPV ($b = -0.03$, 95% CI [-0.04, -0.01]; $z = -2.73$) such that higher religiosity was associated with older age at sexual debut and a lower likelihood of experiencing HPV. Sexual debut was significantly associated with chlamydia ($b = -0.10$, 95% CI [-0.12, -0.08]; $z = -9.42$), gonorrhea ($b = -0.11$, 95% CI [-0.13, -0.08]; $z = -5.92$), and any STI ($b = -0.09$, 95% CI [-0.11, -0.08]; $z = -8.80$) such that older age at sexual debut was associated with a lower likelihood of experiencing chlamydia, gonorrhea, and any STI. A significant indirect effect demonstrated that sexual debut accounted for the association of adolescent religiosity on chlamydia ($\beta = -0.011$, SE = 0.002, $z = -6.60$, $p < .001$), gonorrhea ($\beta = -0.011$, SE = 0.002, $z = -5.69$, $p < .001$), and any STI ($\beta = -0.010$, SE = 0.002, $z = -6.45$, $p < .001$). Findings for an indirect effect of sexual debut on HPV were not significant. In sum, when controlling for age, gender, race/ethnicity, and parent education, there was an indirect effect of sexual debut on the relation between adolescent religiosity and the outcomes of chlamydia, gonorrhea, and any STI.
Hypothesis 7 – Mediating role of number of sexual partners on STIs

Significant standardized beta coefficients are presented in Figure 4.10 for predictor, mediator, and outcome variables. Adolescent religiosity was significantly associated with the hypothesized mediator, number of sexual partners ($b = -0.24$, 95% CI [-0.30, -0.17]; $z = -6.14$), and HPV ($b = -0.03$, 95% CI [-0.04, -0.01]; $z = -2.73$) such that higher religiosity was associated with a fewer number of sexual partners and a lower likelihood of experiencing HPV. Number of sexual partners was significantly associated with chlamydia ($b = 0.03$, 95% CI [0.026, 0.034]; $z = 11.46$), gonorrhea ($b = 0.03$, 95% CI [0.02, 0.03]; $z = 7.96$), HPV ($b = 0.02$, 95% CI [0.02, 0.03]; $z = 5.13$) and any STI ($b =$}
0.03, 95% CI [0.03, 0.04]; \( z = 13.76 \) such that a greater number of sexual partners was associated with an increased likelihood of experiencing chlamydia, gonorrhea, HPV, and any STI. A significant indirect effect demonstrated that number of sexual partners accounted for the association of adolescent religiosity on chlamydia (\( \beta = -0.01, \text{SE} = 0.001, z = -5.36, p < .001 \)), gonorrhea (\( \beta = -0.01, \text{SE} = 0.001, z = -5.03, p < .001 \)), HPV (\( \beta = -0.01, \text{SE} = 0.001, z = -4.03, p < .001 \)), and any STI (\( \beta = -0.01, \text{SE} = 0.001, z = -5.48, p < .001 \)). In sum, when controlling for age, gender, race/ethnicity, and parent education, there was an indirect effect of number of sexual partners on the relation between adolescent religiosity and the outcomes of chlamydia, gonorrhea, HPV and any STI.

\textit{Figure 4.10.} Hypothesis 7 (number of sexual partners) standardized beta coefficients

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure4_10.png}
\caption{Hypothesis 7 (number of sexual partners) standardized beta coefficients}
\end{figure}

Notes:
\( n = 8,031 \)
*\( p < .05 \); **\( p < .01 \); ***\( p < .001 \)
Only significant coefficients shown
Testing for Hypotheses 8 – 14

The following section presents the results of the analyses conducted to investigate RQ2, which hypothesized that adolescent religiosity would predict the likelihood of unplanned pregnancy through the mediating roles of relational attitudes toward sex (hypothesis 8a), personal attitudes toward sex (hypothesis 8b), parent-child connectedness (hypothesis 9), peer private religiosity (hypothesis 10a), peer public religiosity (hypothesis 10b), problem alcohol use at Wave II (hypothesis 11a), problem alcohol use at Wave III (hypothesis 11b), condom use knowledge (hypothesis 12), sexual debut (hypothesis 13), and number of sexual partners (hypothesis 14). One mediation analysis was conducted for each hypothesis, for a total of ten mediation analyses for hypotheses 8 – 14.

Hypothesis 8a – Mediating role of relational attitudes toward sex on unplanned pregnancy

Significant standardized beta coefficients are presented in Figure 4.11 for predictor, mediator, and outcome variables. Adolescent religiosity was significantly associated with the hypothesized mediator, relational attitudes toward sex (b = -0.18, 95% CI [-0.21, -0.16]; z = -13.25) such that higher religiosity was associated with less permissive attitudes toward sex. Relational attitudes toward sex were significantly associated with unplanned pregnancy (b = 0.03, 95% CI [0.02, 0.05]; z = 3.76) such that more permissive attitudes toward sex were associated with an increased likelihood of experiencing unplanned pregnancy. A significant indirect effect demonstrated that relational attitudes toward sex accounted for the association of adolescent religiosity on
unplanned pregnancy ($\beta = -0.01$, SE = 0.002, $z = -3.74$, $p < .001$). In sum, when controlling for age, gender, race/ethnicity, and parent education, there was an indirect effect of relational attitudes toward sex on the relation between adolescent religiosity and unplanned pregnancy.

*Figure 4.11.* Hypothesis 8a (relational attitudes toward sex) standardized beta coefficients

![Diagram](image)

Notes:
- $n = 7,895$
- *$p < .05$; **$p < .01$; ***$p < .001$
- Only significant coefficients shown

**Hypothesis 8b – Mediating role of personal attitudes toward sex on unplanned pregnancy**

Significant standardized beta coefficients are presented in Figure 4.12 for predictor, mediator, and outcome variables. Adolescent religiosity was significantly and negatively associated with the hypothesized mediator, personal attitudes toward sex ($b = -0.05$, 95% CI [-0.07, -0.03]; $z = -3.94$) and the outcome of unplanned pregnancy ($b = -0.01$, 95% CI [-0.024, -0.004]; $z = -2.26$) such that higher religiosity was associated with less permissive attitudes toward sex and a lower likelihood of experiencing unplanned pregnancy.
pregnancy. Personal attitudes toward sex were significantly associated with unplanned pregnancy ($b = 0.02, 95\% \text{ CI} [0.01, 0.03]; z = 2.57$) such that more permissive attitudes toward sex were associated with an increased likelihood of experiencing unplanned pregnancy. A significant indirect effect demonstrated that personal attitudes toward sex accounted for the association of adolescent religiosity on unplanned pregnancy ($\beta = -0.001, \text{SE} = 0.000, z = -2.29, p = .022$). In sum, when controlling for age, gender, race/ethnicity, and parent education, there was an indirect effect of personal attitudes toward sex on the relation between adolescent religiosity and unplanned pregnancy.

*Figure 4.12. Hypothesis 8b (personal attitudes toward sex) standardized beta coefficients*
Hypothesis 9 – Mediating role of parent-child connectedness on unplanned pregnancy

Significant standardized beta coefficients are presented in Figure 4.13 for predictor, mediator, and outcome variables. Adolescent religiosity was significantly associated with the hypothesized mediator, parent-child connectedness ($b = 0.02$, 95% CI [0.02, 0.03]; $z = 9.85$) and the outcome of unplanned pregnancy ($b = -0.01$, 95% CI [-0.023, -0.004]; $z = -2.26$) such that higher religiosity was associated with greater parent-child connectedness and a lower likelihood of experiencing unplanned pregnancy.

Parent-child connectedness was significantly associated with unplanned pregnancy ($b = -0.17$, 95% CI [-0.22, -0.12]; $z = -5.10$) such that greater parent-child connectedness was associated with a lower likelihood of unplanned pregnancy. A significant indirect effect demonstrated that parent-child connectedness accounted for the association of adolescent religiosity on unplanned pregnancy ($\beta = -0.004$, $SE = 0.001$, $z = -4.38$, $p < .001$). In sum, when controlling for age, gender, race/ethnicity, and parent education, there was an indirect effect of parent-child connectedness on the relation between adolescent religiosity and unplanned pregnancy.
Hypothesis 10a – Mediating role of peer private religiosity on unplanned pregnancy

Significant standardized beta coefficients are presented in Figure 4.14 for predictor, mediator, and outcome variables. Despite the lack of significant indirect effects, adolescent religiosity was significantly associated with the hypothesized mediator, peer private religiosity ($b = 0.07$, 95% CI [0.04, 0.11]; $z = 3.82$) and unplanned pregnancy ($b = -0.03$, 95% CI [-0.06, -0.01]; $z = -2.01$) such that higher adolescent religiosity was associated with higher peer private religiosity and a lower likelihood of unplanned pregnancy. Peer private religiosity was not associated with unplanned pregnancy. In sum, when controlling for age, gender, race/ethnicity, and parent education, there was not an indirect effect of peer private religiosity on the relation between adolescent religiosity and unplanned pregnancy.
Figure 4.14. Hypothesis 10a (peer private religiosity) standardized beta coefficients

![Diagram showing relationships between variables]

Notes:  
n = 1,917  
*p < .05; **p < .01; ***p < .001  
Only significant coefficients shown

Hypothesis 10b – Mediating role of peer public religiosity on unplanned pregnancy

Significant standardized beta coefficients are presented in Figure 4.15 for predictor, mediator, and outcome variables. Despite the lack of significant indirect effects, adolescent religiosity was significantly associated with the hypothesized mediator, peer public religiosity ($b = 0.08, 95\% \text{ CI} [0.05, 0.11]; z = 4.52$) such that higher religiosity was associated with higher peer public religiosity. Peer public religiosity was not associated with unplanned pregnancy. In sum, when controlling for age, gender, race/ethnicity, and parent education, there was not an indirect effect of peer public religiosity on the relation between adolescent religiosity and unplanned pregnancy.
Hypothesis 11a – Mediating role of problem alcohol use at Wave II on unplanned pregnancy

Significant standardized beta coefficients are presented in Figure 4.16 for predictor, mediator, and outcome variables. Adolescent religiosity was significantly associated with the hypothesized mediator, problem alcohol use at Wave II ($b = -0.13$, 95% CI [-0.17, -0.09]; $z = -5.23$) and the outcome of unplanned pregnancy ($b = -0.02$, 95% CI [-0.03, -0.01]; $z = -2.65$) such that higher religiosity was associated with lower levels of problem alcohol use at Wave II and a lower likelihood of experiencing unplanned pregnancy. Problem alcohol use at Wave II was significantly and positively associated with unplanned pregnancy ($b = 0.01$, 95% CI [0.01, 0.02]; $z = 4.07$) such that higher problem alcohol use at Wave II was associated with an increased likelihood of experiencing unplanned pregnancy. A significant indirect effect demonstrated that problem alcohol use at Wave II accounted for the association of adolescent religiosity on
unplanned pregnancy ($\beta = -0.001$, SE = 0.003, $z = -3.32$, $p = .001$). In sum, when controlling for age, gender, race/ethnicity, and parent education, there was an indirect effect of problem alcohol use at Wave II on the relation between adolescent religiosity and unplanned pregnancy.

**Figure 4.16. Hypothesis 11a (problem alcohol use at Wave II) standardized beta coefficients**

![Diagram](image)

Notes:
$n = 8,129$
*p < .05; **p < .01; ***p < .001
Only significant coefficients shown

**Hypothesis 11b – Mediating role of problem alcohol use at Wave III on unplanned pregnancy**

Significant standardized beta coefficients are presented in Figure 4.17 for predictor, mediator, and outcome variables. Despite the lack of significant indirect effects, adolescent religiosity was significantly associated with the outcome of unplanned pregnancy ($b = -0.02$, 95% CI [-0.03, -0.01]; $z = -2.97$) such that higher religiosity was associated with a lower likelihood experiencing unplanned pregnancy. Adolescent
religiosity was not associated with the hypothesized mediator, problem alcohol use at Wave III. Problem alcohol use at Wave III was significantly associated with unplanned pregnancy ($b = 0.02$, 95% CI [0.01, 0.02]; $z = 3.17$) such that higher problem alcohol use at Wave III was associated with an increased likelihood of unplanned pregnancy. In sum, when controlling for age, gender, race/ethnicity, and parent education, there was not an indirect effect of problem alcohol use at Wave III on the relation between adolescent religiosity and unplanned pregnancy.

*Figure 4.17. Hypothesis 11b (problem alcohol use at Wave III) standardized beta coefficients*

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Mediator</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem Alcohol Use (Wave III)</td>
<td>Adolescent Religiosity</td>
<td>Unplanned Pregnancy</td>
</tr>
<tr>
<td>0.07**</td>
<td>-0.02**</td>
<td></td>
</tr>
</tbody>
</table>

Notes:

$n = 8,119$

*p < .05; **p < .01; ***p < .001

Only significant coefficients shown

**Hypothesis 12 – Mediating role of condom use knowledge on unplanned pregnancy**

Significant standardized beta coefficients are presented in Figure 4.18 for predictor, mediator, and outcome variables. Despite the lack of significant indirect effects, adolescent religiosity was significantly associated with the hypothesized
mediator, condom use knowledge \((b = -0.03, 95\% \text{ CI } [-0.04, -0.02]; z = -4.02)\) and the outcome of unplanned pregnancy \((b = -0.01, 95\% \text{ CI } [-0.025, -0.003]; z = -2.16)\) such that higher religiosity is associated with lower levels of condom use knowledge and a lower likelihood of experiencing unplanned pregnancy. Condom use knowledge was not significantly associated with unplanned pregnancy. In sum, when controlling for age, gender, race/ethnicity, and parent education, there was not an indirect effect of condom use knowledge on the relation between adolescent religiosity and unplanned pregnancy.

*Figure 4.18. Hypothesis 12 (condom use knowledge) standardized beta coefficients*

![Diagram](image)

Notes:
\(n = 6,482\)

\(*p < .05; **p < .01; ***p < .001\)

Only significant coefficients shown

**Hypothesis 13 – Mediating role of sexual debut on unplanned pregnancy**

Significant standardized beta coefficients are presented in Figure 4.19 for predictor, mediator, and outcome variables. Adolescent religiosity was significantly associated with the hypothesized mediator, sexual debut \((b = 0.11, 95\% \text{ CI } [0.08, 0.15]; z = 5.68)\) such that higher religiosity was associated with older age at sexual debut. Sexual
debut was significantly associated with unplanned pregnancy ($b = -0.04$, 95% CI [-0.042, -0.037]; $z = -26.33$) such that older age at debut was associated with a lower likelihood of unplanned pregnancy. A significant indirect effect demonstrated that sexual debut accounted for the association of adolescent religiosity on unplanned pregnancy ($\beta = -0.004$, SE = 0.001, $z = -5.42$, $p < .001$). In sum, when controlling for age, gender, race/ethnicity, and parent education, there was an indirect effect of sexual debut on the relation between adolescent religiosity and unplanned pregnancy.

*Figure 4.19. Hypothesis 13 (sexual debut) standardized beta coefficients*

![Diagram](image)

Notes:  
$n = 6,942$  
*p < .05; **p < .01; ***p < .001*  
Only significant coefficients shown

**Hypothesis 14 – Mediating role of number of sexual partners on unplanned pregnancy**

Significant standardized beta coefficients are presented in Figure 4.20 for predictor, mediator, and outcome variables. Adolescent religiosity was significantly associated with the hypothesized mediator, number of sexual partners ($b = -0.30$, 95% CI [-0.40, -0.21]; $z = -5.65$) and the outcome of unplanned pregnancy ($b = -0.01$, 95% CI [-
0.022, -0.003]; \( z = -2.24 \) such that higher religiosity was associated with a lower number of sexual partners and a lower likelihood of experiencing unplanned pregnancy. Number of sexual partners was significantly associated with unplanned pregnancy \( (b = 0.01, 95\% \text{ CI } [0.01, 0.02]; \ z = 11.48) \) such that a higher number of sexual partners are associated with an increased likelihood of experiencing unplanned pregnancy. A significant indirect effect demonstrated that number of sexual partners accounted for the association of adolescent religiosity on unplanned pregnancy \( (\beta = -0.004, \ SE = 0.001, \ z = -5.14, p < .001) \). In sum, when controlling for age, gender, race/ethnicity, and parent education, there was an indirect effect of the number of sexual partners on the relation between adolescent religiosity and unplanned pregnancy.

Figure 4.20. Hypothesis 14 (number of sexual partners) standardized beta coefficients

Notes:
\( n = 8,126 \)
*\( p < .05 \) **\( p < .01 \) ***\( p < .001 \)
Only significant coefficients shown
Testing for Hypotheses 15 and 16

The following section presents the results of the analyses conducted to investigate RQs 3 and 4, which hypothesized that there would be differences in groups with lower levels of lifetime religiosity and those who sustained religiosity throughout their lifetime with respect to the likelihood of experiencing lifetime STIs (hypothesis 15) and unplanned pregnancy (hypothesis 16). Table 4.4 presents the odds ratios and the 95% confidence intervals for the predictor and control variables for each of the outcomes tested in hypotheses 15 and 16.
### Table 4.4

**Logistic regression odds ratios for hypotheses 15 and 16**

<table>
<thead>
<tr>
<th></th>
<th>Chlamydia</th>
<th>Gonorrhea</th>
<th>HPV</th>
<th>Any STI</th>
<th>Unplanned Pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR 95% CI</td>
<td>OR 95% CI</td>
<td>OR 95% CI</td>
<td>OR 95% CI</td>
<td>OR 95% CI</td>
</tr>
<tr>
<td>Late Adopted Religiosity</td>
<td>1.23 [0.92, 1.65]</td>
<td>1.56* [1.04, 2.37]</td>
<td>1.59*** [1.11, 2.29]</td>
<td>1.43*** [1.14, 1.80]</td>
<td>1.16 [0.94, 1.42]</td>
</tr>
<tr>
<td>Discontinued Religiosity</td>
<td>1.48* [1.12, 1.97]</td>
<td>1.27 [0.76, 2.12]</td>
<td>1.75*** [1.19, 2.59]</td>
<td>1.57*** [1.23, 2.00]</td>
<td>1.26*** [1.04, 1.54]</td>
</tr>
<tr>
<td>No Religiosity</td>
<td>1.47* [1.14, 1.90]</td>
<td>1.18 [0.77, 1.83]</td>
<td>2.01*** [1.57, 2.82]</td>
<td>1.65*** [1.33, 2.04]</td>
<td>1.48*** [1.26, 1.75]</td>
</tr>
<tr>
<td>Age</td>
<td>0.98 [0.91, 1.05]</td>
<td>1.04 [0.91, 1.19]</td>
<td>0.90** [0.83, 0.96]</td>
<td>0.95 [0.90, 1.00]</td>
<td>1.05* [1.00, 1.09]</td>
</tr>
<tr>
<td>Gender</td>
<td>2.45*** [1.98, 3.01]</td>
<td>1.44 [0.97, 2.15]</td>
<td>8.57*** [5.90, 12.45]</td>
<td>3.37*** [2.81, 4.04]</td>
<td>1.75*** [1.54, 1.99]</td>
</tr>
<tr>
<td>Race/ethnicity (African-American)</td>
<td>5.34*** [4.25, 6.73]</td>
<td>7.27*** [4.68, 11.28]</td>
<td>0.57* [0.36, 0.90]</td>
<td>3.62*** [2.92, 4.48]</td>
<td>2.41*** [1.96, 2.95]</td>
</tr>
<tr>
<td>Race/ethnicity (Hispanic)</td>
<td>1.63*** [1.20, 2.21]</td>
<td>0.97 [0.49, 1.94]</td>
<td>0.66* [0.44, 0.98]</td>
<td>1.06 [0.82, 1.37]</td>
<td>1.14 [0.86, 1.53]</td>
</tr>
<tr>
<td>Race/ethnicity (Other)</td>
<td>2.30*** [1.56, 3.39]</td>
<td>1.68 [0.85, 3.35]</td>
<td>0.74 [0.47, 1.16]</td>
<td>1.37 [0.99, 1.87]</td>
<td>1.37*** [1.07, 1.77]</td>
</tr>
<tr>
<td>Parent Education</td>
<td>0.66** [0.51, 0.87]</td>
<td>0.57* [0.35, 0.91]</td>
<td>1.75*** [1.37, 2.23]</td>
<td>0.99 [0.83, 1.19]</td>
<td>0.57* [0.48, 0.68]</td>
</tr>
</tbody>
</table>

\( n = 9224 \) (chlamydia, gonorrhea, HPV, Any STI)
\( n = 9421 \) (unplanned pregnancy)

*p < .05; **p < .01; ***p < .001

Reference categories: sustained religiosity, male gender, Caucasian, and no college-educated parent
Hypothesis 15 – Lifetime religiosity predictions of STI outcomes

Four multivariate logistic regression models were conducted to determine if lifetime religiosity would reduce the likelihood of having ever been diagnosed with chlamydia, gonorrhea, HPV, or any of the three STIs when controlling for the demographic variables.

Chlamydia. Religiosity, gender, race/ethnicity, and parent education were significant in the model. Participants having never practiced religion were 1.47 [95% CI = 1.14, 1.90] times more likely and participants having discontinued practicing religion were 1.48 [95% CI = 1.12, 1.97] times more likely than those who had sustained religious practice to have reported experiencing chlamydia. Female participants were 2.45 [95% CI = 1.98, 3.01] times more likely than males to have reported experiencing chlamydia. African-Americans were 5.34 [95% CI = 4.25, 6.73] times more likely, Hispanics were 1.63 [1.20, 2.21] more likely, and participants identifying as “other” were 2.30 [95% CI = 1.56, 3.39] times more likely than Caucasians to have reported experiencing chlamydia. Having a college-educated parent reduced the probability of reporting having experienced chlamydia with a 0.66:1 lower chance than participants without college-educated parents.

Gonorrhea. Religiosity, race/ethnicity, and parent education were significant in the model. There was only one significant difference in religious groups with respect to having reported experiencing gonorrhea. Participants who later adopted religiosity were 1.56 [95% CI = 1.04, 2.37] times more likely than those who had sustained religious practice to have reported experiencing gonorrhea. Additionally, African-Americans were 7.27 [95% CI = 4.68, 11.28] more likely than Caucasians to have reported experiencing
gonorrhea. There were no significant differences between Hispanics, participants identifying as “other,” and Caucasians. Having a college-educated parent reduced the probability of reporting having experienced gonorrhea with a 0.57:1 lower chance than participants without college-educated parents.

**HPV.** Religiosity, age, gender, race/ethnicity, and parent education were significant in the model. Participants having never practiced religion were 2.01 [95% CI = 1.57, 2.82] times more likely, participants having discontinued practicing religion were 1.75 [95% CI = 1.19, 2.59] times more likely, and participants having later adopted religiosity were 1.59 [95% CI = 1.11, 2.29] times more likely than those who had sustained religious practice to have reported experiencing HPV. For each single-point increase in age, there was a 0.90 [95% CI = 0.83, 0.96] lower likelihood of participants having reported experiencing HPV. Female participants were 8.57 [95% CI = 5.90, 12.45] times more likely than males to have reported experiencing HPV. Being African-American reduced the probability of having reported experiencing HPV with a 0.57:1 lower chance than Caucasians. Being Hispanic also reduced the probability of having reported experiencing HPV with a 0.66:1 lower chance than Caucasians. Participants with a college-educated parent were 1.75 [95% CI = 1.37, 2.23] times more likely to report having experienced HPV than participants without college-educated parents.

**Any STI.** Religiosity, gender, and race/ethnicity were significant in the model. Participants having never practiced religion were 1.65 [95% CI = 1.33, 2.04] times more likely, participants having discontinued practicing religion were 1.57 [95% CI = 1.23, 2.00] times more likely, and participants having later adopted religiosity were 1.43 [95%
CI = 1.14, 1.80] times more likely than those who had sustained religious practice to have reported experiencing any of the three STIs analyzed in this study. Female participants were 3.37 [95% CI = 2.81, 4.04] times more likely than males to have reported experiencing any STI. African-Americans were 3.62 [95% CI = 2.92, 4.48] times more likely to have reported experiencing any STI than Caucasians. There were no significant differences between Hispanics, participants identifying as “other,” and Caucasians.

**Hypothesis 16 – Lifetime religiosity predictions of unplanned pregnancy**

One multivariate logistic regression model was conducted to determine if lifetime religiosity would reduce the likelihood of having ever experienced unplanned pregnancy.

Religiosity, age, gender, race/ethnicity, and parent education were significant in the model. Participants having never practiced religion were 1.48 [95% CI = 1.26, 1.75] times more likely and participants having discontinued practicing religion were 1.26 [95% CI = 1.04, 1.54] times more likely than those who had sustained religious practice to have reported experiencing an unplanned pregnancy. For each single-point increase in age, there was a 1.05 [95% CI = 1.00, 1.09] higher likelihood of participants having reported experiencing unplanned pregnancy. Female participants were 1.75 [95% CI = 1.54, 1.99] times more likely than males to have reported experiencing an unplanned pregnancy. African-Americans were 2.41 [95% CI = 1.96, 2.95] and participants identifying as “other” were 1.37 [95% CI = 1.07, 1.77] times more likely to have reported experiencing an unplanned pregnancy than Caucasians. There were no significant differences between Hispanics and Caucasians. Having a college-educated parent reduced
the probability of reporting having experienced an unplanned pregnancy with a 0.57:1 lower chance than participants without college-educated parents.

**Summary of Results**

Four research questions addressing the potential impacts of religiosity on sexual health outcomes were posed in this study. Sixteen hypotheses were proposed and tested. The results fully supported five of the sixteen hypotheses. Three of the hypotheses were not supported. And the remaining eight hypotheses were partially supported. A summary of this study’s overall findings is presented below, followed by Table 4.5, which provides a visual representation of the summary for each of the hypotheses and outcomes tested.

The first seven hypotheses associated with RQ1 tested the mediating roles of attitudes toward sex (both relational and personal), parent-child connectedness, peer religiosity (both private and public), problem alcohol use (at both Waves II and III), condom use knowledge, sexual debut, and number of sexual partners on the lifetime STI outcomes of chlamydia, gonorrhea, HPV, and any of the three STIs. There were indirect effects of relational attitudes toward sex (hypothesis 1a) and personal attitudes (hypothesis 1b) on the relation between adolescent religiosity and both chlamydia and any STI. Relational attitudes toward sex (hypothesis 1a) also demonstrated a significant indirect effect on gonorrhea. Findings for HPV were not significant. Therefore, hypothesis 1 was partially supported. There were indirect effects of parent-child connectedness (hypothesis 2) and condom use knowledge (hypothesis 5) on the relation between adolescent religiosity and HPV and any STI; however, findings for chlamydia
and gonorrhea were not significant. Thus, the findings for hypotheses 2 and 5 were partially supported. Neither peer private religiosity (hypothesis 3a) nor peer public religiosity (hypothesis 3b) demonstrated significant indirect effects on any of the outcomes tested. Thus, hypothesis 3 was not supported. There were indirect effects of problem alcohol use at Wave II (hypothesis 4a) on the relation between adolescent religiosity and HPV and any STI. Problem alcohol use at Wave III (hypothesis 4b) did not demonstrate significant indirect effects. Thus, hypothesis 4 was partially supported. There were indirect effects of sexual debut (hypothesis 6) on the relation between adolescent religiosity and chlamydia, gonorrhea, and any STI. Findings for HPV were not significant. Therefore, hypothesis 6 was partially supported. There were indirect effects of number of sexual partners (hypothesis 7) on all four outcomes tested. Thus, hypothesis 7 was fully supported. Overall, one of the hypotheses for RQ1 was fully supported, five were partially supported, and one was not supported.

The next seven hypotheses associated with RQ2 tested the mediating roles of attitudes toward sex (both relational and personal), parent-child connectedness, peer religiosity (both private and public), problem alcohol use (at both Waves II and III), condom use knowledge, age of sexual debut, and number of sexual partners on the outcome of having experienced an unplanned pregnancy. Relational attitudes toward sex (hypothesis 8a), personal attitudes toward sex (hypothesis 8b), parent-child connectedness (hypothesis 9), problem alcohol use at Wave II (hypothesis 11a), sexual debut (hypothesis 13), and number of sexual partners (hypothesis 14) demonstrated a significant indirect effect on the relation between adolescent religiosity and having
experienced an unplanned pregnancy. Findings were not significant for peer private religiosity (hypothesis 9a), peer public religiosity (hypothesis 9b), problem alcohol use at Wave III (hypothesis 11b), and condom use knowledge (hypothesis 12). Overall, four of the hypotheses associated with RQ2 were fully supported, one was partially supported, and the other two were not supported.

RQ3 hypothesized that there would be significant differences between groups with lower levels of lifetime religiosity and those who sustained religiosity throughout their lifetime with respect to having reported experiencing chlamydia, gonorrhea, HPV, and any STI (hypothesis 15). Results supported the hypothesis that participants who never practiced religion, those who discontinued religious practice, and those who later adopted religiosity would have a significantly higher likelihood of reporting having experienced HPV than those who sustained religiosity. With respect to chlamydia, those not practicing religion and those who discontinued religious practice were more likely to have reported experiencing the infection than those who sustained religiosity. For the outcome of gonorrhea, only the group for those later adopting religiosity demonstrated a significantly higher likelihood of having reported experiencing gonorrhea than those who sustained religiosity. Regarding the outcomes of HPV and any STI, findings were significant for all religious groups. Because only two of the outcomes tested in RQ3 demonstrated significant results for all groups, hypothesis 15 was partially supported.

RQ4 proposed the final hypothesis, stating that there would be significant differences between groups with lower levels of lifetime religiosity and those who sustained religiosity throughout their lifetime with respect to having reported an
unplanned pregnancy (hypothesis 16). Findings were significant for those not practicing religion and those who discontinued religion. However, findings for those who later adopted religiosity were not significant, thus, hypothesis 16 was partially supported.

In summary, religiosity was a significant predictor in all, but three hypotheses tested. Two of the three hypotheses in which religiosity was not a significant predictor tested peer religiosity as a mediator with STIs and unplanned pregnancy as the outcomes, and the other tested condom use knowledge with unplanned pregnancy as the outcome. There were a greater number of significant findings for the outcomes of any STI and unplanned pregnancy, while findings for chlamydia, gonorrhea, and HPV were less prevalent. Additionally, there were more significant findings for the religious categories of no religion and discontinued religion as compared to sustained religion. Significant findings for the category of late adopted religion as compared to sustained religiosity were less prevalent.
Table 4.5

Summary of finding for hypotheses and outcomes

<table>
<thead>
<tr>
<th>Hypothesized Mediators</th>
<th>Chlamydia</th>
<th>Gonorrhea</th>
<th>HPV</th>
<th>Any STI</th>
<th>Unplanned Pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>RQ1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H1a &amp; H8a (Relational Attitudes toward Sex)</td>
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<td>✓</td>
<td>✕</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>H1b &amp; H8b (Personal Attitudes toward Sex)</td>
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<td>✕</td>
<td>✕</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>H2 &amp; H9 (Parent-child Connectedness)</td>
<td>✕</td>
<td>✕</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>H3a &amp; H10a (Peer Private Religiosity)</td>
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<td>✕</td>
<td>✕</td>
<td>✕</td>
<td>✕</td>
</tr>
<tr>
<td>H3b &amp; H10b (Peer Public Religiosity)</td>
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<td>✕</td>
<td>✕</td>
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<td>✕</td>
</tr>
<tr>
<td>H4a &amp; H11a (Problem Alcohol Use-Wave II)</td>
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<td>✕</td>
<td>✓</td>
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</tr>
<tr>
<td>H4b &amp; H11b (Problem Alcohol Use-Wave III)</td>
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<td>✕</td>
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<tr>
<td>H5 &amp; H12 (Condom Use Knowledge)</td>
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<tr>
<td>H6 &amp; H13 (Sexual Debut)</td>
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<tr>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>RQ2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>Comparison Groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Late Adopted Religiosity</td>
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<td>✓</td>
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<tr>
<td>Discontinued Religiosity</td>
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<tr>
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<tr>
<td>Indirect Effect Not Significant:</td>
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CHAPTER FIVE
DISCUSSION

This study expands the body of knowledge on the link between religiosity and sexual health by providing insights into mediators that contribute to the link, effects on specific STIs individually, and a different theoretical framework option to guide research on sexual health. The study also supports prior research showing religiosity as a protective factor with respect to sexual health.

The following chapter discusses the findings and relevance of this study. Key findings are presented first, aligning with the structure of the Theory of Planned Behavior (TPB) (Ajzen, 1991). Findings for hypothesized mediators categorized as attitudes are presented first, followed by subjective norms, perceived behavioral control, and sexual health behaviors. Findings examining differences between groups comprised of varying levels of religiosity over time with respect to sexual health outcomes follow. Practice implications are presented next, followed by how the study contributes to the body of knowledge, the study’s strengths and limitations, recommendations for future research, and a conclusion.

Key Findings

Theory of Planned Behavior

The TPB (Ajzen, 1991) was used to guide the research in this study to answer the following research questions:

1. Does adolescent religiosity predict the likelihood of lifetime STI outcomes (having ever been diagnosed with chlamydia, gonorrhea,
HPV, or any of the three STIs) through the mediating roles of attitudes toward sex, parent-child connectedness, peer religiosity, problem alcohol use, condom use knowledge, sexual debut, and number of sexual partners?

2. Does adolescent religiosity predict the likelihood of unplanned pregnancies through the mediating roles of attitudes toward sex, parent-child connectedness, peer religiosity, problem alcohol use, condom use knowledge, sexual debut, and number of sexual partners?

3. How do lifetime STI outcomes (likelihood of having ever been diagnosed with chlamydia, gonorrhea, HPV, or any of the three STIs) compare for those who sustained religiosity from adolescence into adulthood, those who later adopted religiosity, those who discontinued their religiosity, and those who never adopted religiosity?

4. How does the likelihood of unplanned pregnancies compare for those who sustained religiosity from adolescence into adulthood, those who later adopted religiosity, those who discontinued their religiosity, and those who never adopted religiosity?

Using the TPB (Ajzen, 1991) as a foundation, relational and personal attitudes (referring to how one believes having sex will affect their relationship with others and whether it will result in pleasure, respectively) toward sex were examined as hypothesized mediators within the first component of the theory, “attitudes.” Within the next component, “subjective norms,” parent-child connectedness and peer religiosity
were examined as hypothesized mediators. Problem alcohol use and condom use knowledge were examined as hypothesized mediators under the “perceived behavioral norms” component. And, finally, sexual debut and number of sexual partners were examined as hypothesized mediators within the “sexual health behaviors” component.

**Attitudes toward the Behavior**

The following section discusses the key findings for hypotheses investigating the mediating effects of “Attitudes toward the Behavior” (Ajzen, 1991) toward sex. In RQ1, it was hypothesized that relational attitudes toward sex (hypothesis 1a) and personal attitudes toward sex (hypothesis 1b), would mediate the relation between adolescent religiosity and chlamydia, gonorrhea, HPV, and any STI. In RQ2, it was hypothesized that relational attitudes toward sex (hypothesis 8a) and personal attitudes toward sex (hypothesis 8b) would mediate the relation between adolescent religiosity and unplanned pregnancy.

**Attitudes toward Sex.** There were significant indirect effects of both relational and personal attitudes on the relation between adolescent religiosity and chlamydia, any STI, and unplanned pregnancy. Relational attitudes also demonstrated significant indirect effects on gonorrhea. However, neither had indirect effects on HPV. Therefore, the hypotheses assessing indirect effects of relational attitudes toward sex (hypothesis 1a) and personal attitudes toward sex (hypothesis 1b) on chlamydia, gonorrhea, HPV, and any STI were partially supported. Further, the hypotheses assessing indirect effects of relational attitudes toward sex (hypothesis 8a) and personal attitudes toward sex (hypothesis 8b) on unplanned pregnancy were fully supported.
The results indicated that higher levels of religiosity were negatively associated with more permissive attitudes toward sex, which in turn was positively associated with poor sexual health outcomes. Thus, attitudes indirectly accounted for the relation between religiosity and chlamydia, gonorrhea, any STI, and unplanned pregnancy. These findings support prior studies demonstrating religiosity’s influence on attitudes toward sex as a protective factor for sexual health (Davidson et al., 2004; Haglund & Fehring, 2010; Meier, 2003; Rostosky, 2003). The results also suggest that religiosity plays a role not only in how participants personally feel about the benefits and risks of sexual activity, but also how they think others will perceive them if they engage in sexual activity. Many religious faiths proscribe sexual intercourse outside of marriage (Regnerus, 2007), which likely contributes to less permissive attitudes toward sex and, therefore, less premarital sexual activity for those wishing to remain true to their religious teachings. In this study, participants who were more religious tended to report less permissive attitudes toward sex, which was then significantly associated with a lower likelihood of experiencing chlamydia, gonorrhea, any STI, and unplanned pregnancy. Further, a significant indirect effect indicated that higher levels of religiosity were negatively associated with poor sexual health outcomes (i.e., chlamydia, any STI, and unplanned pregnancy) due to the mediating effects of relational and personal attitudes toward sex.

**Subjective Norms**

The next section discusses the key findings of the hypotheses investigating the mediating effects of the “Subjective Norms” (Ajzen, 1991) of parent-child connectedness and peer religiosity. In RQ1, it was hypothesized that parent-child connectedness
(hypothesis 2), peer private religiosity (hypothesis 3a), and peer public religiosity (hypothesis 3b) would mediate the relation between adolescent religiosity and chlamydia, gonorrhea, HPV, and any STI. In RQ2, it was hypothesized that parent-child connectedness (hypothesis 9), peer private religiosity (hypothesis 10a), and peer public religiosity (hypothesis 10b) would mediate the relation between adolescent religiosity and unplanned pregnancy.

**Parent-child Connectedness.** There was an indirect effect of parent-child connectedness on the relation between adolescent religiosity and HPV, any STI, and unplanned pregnancy. There was no significant indirect effect on chlamydia and gonorrhea. Therefore, the hypothesis, assessing the indirect effects of parent-child connectedness (hypothesis 2) on chlamydia, gonorrhea, HPV, and any STI was partially supported. Further, the hypothesis assessing the indirect effects of parent-child connectedness (hypothesis 9) on unplanned pregnancy was fully supported.

The results indicated that more religious adolescents had a higher level of connection with their parents, which was associated with a reduced likelihood of poor sexual health outcomes, aligning with previous research (Cheshire et al., 2019; Manlove et al., 2008). An indirect effect was demonstrated, suggesting that the association between higher levels of religiosity and a lower likelihood of poor sexual health outcomes was in part due to the mediating role of parent-child connectedness. Parents are usually the ones who assume the responsibility for introducing their children to a religion (Ozorak, 1989). Parents who emphasize a religious upbringing of their children may develop strong connections with them as they help their children navigate their faith.
When parents and children are tightly connected and children feel loved, it may facilitate an open dialog about parental and religious expectations with respect to sexuality, establishing a “subjective norm” in which the parent may communicate a disapproving attitude toward the idea of their children becoming sexually active. Children wishing to maintain a strong connection with their parent may avoid sexual activity or take action to protect themselves in the event they do become sexually active, to not disappoint their parents (Quinn & Lewin, 2019). Therefore, it is reasonable that adolescent religiosity would play a protective role on sexual health outcomes through the mediating role of parent-child connectedness.

**Peer Religiosity.** There were no indirect effects of peer private or peer public religiosity on the relation between adolescent religiosity and any of the sexual health outcomes examined in this study. Therefore, hypotheses 3a and 3b, assessing the indirect effects of peer private and public religiosity on chlamydia, gonorrhea, HPV, and any STI were not supported. Likewise, hypotheses 10a and 10b assessing the indirect effects of peer private and public religiosity on unplanned pregnancy were not supported.

Considering that previous research showed peer religiosity as a protective influence on sexual health (Adamczyk, 2009; Adamczyk & Felson, 2006; Landor et al., 2011; Manlove et al., 2008), these findings were unexpected. A number of possible explanations may account for the unexpected findings. First, previous studies investigated different outcomes influenced by religiosity, such as age of sexual debut and selection into less sexually permissive peer groups. The present study utilized the latter outcomes as mediators and investigated specific STIs individually and unplanned
pregnancy as the outcomes. Additionally, previous studies were either cross-sectional or longitudinal over a shorter time period, while the present study examined effects over a fourteen-year period. Therefore, the longitudinal design of this study may account for a difference in findings. Second, the measure of peer religiosity was taken directly from the religiosity survey answers of friends identified by the participants. In other words, they were not participants’ perceptions of their friends’ religiosity, but rather the reported religiosity scores of the friends themselves. However, only participants’ school friends who participated in the survey were included in the analysis, as non-school friends did not participate in the study. Youth who actively participate in their faith may have a number of friends from their place of worship who do not attend their school. Therefore, some of the participants’ closest, most religious friends may not have participated in the Add Health study.

Next, only a subset of the sample was selected to identify friends within the study, which substantially reduced the sample size by roughly 6,000 participants for these particular analyses. A larger sample may have yielded statistically significant findings. Finally, the measure for peer religiosity was taken at Wave II. It is unlikely that participants’ friends remained the same throughout the course of the study; therefore, the “subjective norm” to delay sex until marriage that may be popular among religious friends possibly did not remain constant, either. Participants likely changed friends and joined different peer groups as the study progressed. Thus, it would be difficult to find a link between the religiosity of individuals who may have only temporarily been friends and sexual health outcomes that occurred over a decade later.
Perceived Behavioral Control

The next section discusses the key findings of the hypotheses investigating the mediating effects of the “Perceived Behavioral Controls” (Ajzen, 1991) of problem alcohol use and condom use knowledge. In RQ1, it was hypothesized that problem alcohol use at Wave II (hypothesis 4a), problem alcohol use at Wave III (hypothesis 4b), and condom use knowledge (hypothesis 5) would mediate the relation between adolescent religiosity and chlamydia, gonorrhea, HPV, and any STI. In RQ2, it was hypothesized that problem alcohol use at Wave II (hypothesis 11a), problem alcohol use at Wave III (hypothesis 11b), and condom use knowledge (hypothesis 12) would mediate the relation between adolescent religiosity and unplanned pregnancy.

Problem Alcohol Use. There were indirect effects of problem alcohol use at Wave II on the relation between adolescent religiosity and HPV, any STI, and unplanned pregnancy. There were no indirect effects on chlamydia and gonorrhea. Thus, the hypothesis, assessing indirect effects of problem alcohol use at Wave II (hypothesis 4a) on chlamydia, gonorrhea, HPV, and any STI was partially supported. There were no indirect effects of problem alcohol use at Wave III (hypothesis 4b) on chlamydia, gonorrhea, HPV, and any STI. Thus, the hypothesis assessing indirect effects of problem alcohol use at Wave III on chlamydia, gonorrhea, HPV, and any STI was not supported. Further, the hypothesis assessing indirect effects of problem alcohol use at Wave II (hypothesis 11a) on unplanned pregnancy was fully supported and the hypothesis assessing problem alcohol use at Wave III (hypothesis 11b) on unplanned pregnancy was not supported.
The results demonstrated that participants who were more religious reported lower levels of problem alcohol use during adolescence. Lower levels of problem alcohol in adolescence were associated with a lower likelihood of poor sexual health outcomes. The findings are aligned with previous research, suggesting that religiosity provides a protective factor with respect to alcohol use (Murray et al., 2007; Nonnemaker et al., 2003; Poulson et al., 1998). While it varies by religion, many religious institutions prohibit partaking in alcoholic beverages. While some religions do not restrict alcohol use among their adult members, it is unlikely alcohol use among children is encouraged other than for traditional purposes (e.g., blessed wine used for Holy Communion). It is also important to note that while some religious faiths may not discourage alcohol use, they may consider drinking to the point of intoxication to be sinful. Religious youth may internalize restrictive religious messages about alcohol, whether they are directed at youth, adults, or both, thus reducing the likelihood they would engage in problem alcohol use. In other words, the “perceived behavioral control” may be that religious youth, with the backing of their faith or fear of penance, feel they are in control over whether they drink alcohol or whether they drink to the point of intoxication. The lower levels of problem alcohol use associated with religiosity further explain the protective link that religiosity has on sexual health.

As the findings for problem alcohol use at Wave II were aligned with the literature, it was surprising there were no indirect effects of problem alcohol use at Wave III on any of the outcomes investigated. This unexpected finding could be related to participants becoming less religious over time as is the current trend in the United States.
(Pew Research Center, 2015), and therefore, not being as influenced by their faith’s teachings on alcohol as they enter into adulthood. Additionally, the majority of participants were of legal drinking age at Wave III. Religious proscriptions surrounding drinking may have been less influential at Wave III than at Wave II, when all participants were underage. Despite this unexpected finding, it is important to recognize that adolescent religiosity remains a protective factor with respect to problem drinking during adolescence and long-term sexual health outcomes.

Condom Use Knowledge. There was an indirect effect of condom use knowledge on the relation between adolescent religiosity, HPV, and any STI. There were no indirect effects on chlamydia, gonorrhea, or unplanned pregnancy. Therefore, the hypothesis assessing the indirect effects of condom use knowledge (hypothesis 5) on chlamydia, gonorrhea, HPV, and any STI was partially supported. Further, the hypothesis assessing the indirect effects of condom use knowledge (hypothesis 12) on unplanned pregnancy was not supported.

The results indicated that participants who were more religious demonstrated lower levels of condom use knowledge. Although this finding conflicts with some previous research showing religiosity to be associated with increased condom use and sexual health knowledge (Landor et al., 2010; Quinn & Lewin, 2019; Wigfall et al., 2012), it supports prior research showing religiosity to be a risk factor with respect to condom use and knowledge (Martin et al., 2018b; Zaleski & Schiaffino, 2000). Perhaps the restrictive nature with respect to sex and contraception establishes a “perceived behavioral control” in which young people who were more religious may lack condom
awareness and therefore perceive they have little or no control over how to effectively use a condom.

Unexpectedly, there was a significant positive relation between condom use knowledge and chlamydia, HPV, and any STI. It seems counterintuitive that being knowledgeable about how to use condoms may put one at risk for contracting STIs. However, this unexpected finding could be related to the measure itself. The measure mainly assessed knowledge related to the logistics of condom use, such as whether Vaseline should be used or how far down the shaft of the penis a condom should be rolled. Only one question asks whether latex or lamb’s skin condoms are more effective at preventing HIV/AIDS. No other questions discuss the benefits of using condoms or the risks associated with not using them. Perhaps merely being knowledgeable about how to use condoms falls short of being a protective factor if participants fail to utilize them, despite being knowledgeable. There may also be a “perceived behavioral control” in which young people believe they are in control of how to effectively use condoms, but purposely choose not to use them if they are in a monogamous relationship. Another possible explanation may be that some participants contracted HPV through oral sex in which condoms are rarely used (Quinn & Lewin, 2019). A better measure may have assessed the proportion of the time participants utilized condoms during the history of their sexual activity, including vaginal and anal intercourse, as well as oral sex. Such a question would be most appropriate at Wave III for this study when the majority of participants were sexually active. However, a question assessing overall condom use rates at Wave III was not available in the dataset.
Despite the unexpected finding between the mediator and the outcomes, condom use knowledge did demonstrate a protective indirect effect on the relation between adolescent religiosity and HPV and any STI. However, it is important to note that prior research on the link between religiosity and condom use knowledge has proven inconsistent. The unusual findings presented by this study with respect to condom use knowledge only validate these mixed findings and point to the need to develop a better measure to evaluate condom use and knowledge.

Sexual Health Behaviors

The next section discusses the key findings of the hypotheses investigating the mediating effects of the “Behaviors” (Ajzen, 1991) of sexual debut and number of sexual partners. In RQ1, it was hypothesized that sexual debut (hypothesis 6) and number of sexual partners (hypothesis 7) would mediate the relation between adolescent religiosity and chlamydia, gonorrhea, HPV, and any STI. In RQ2, it was hypothesized that sexual debut (hypothesis 13) and number of sexual partners (hypothesis 14) would mediate the relation between adolescent religiosity and unplanned pregnancy.

Sexual Debut. There was an indirect effect of age of sexual debut on the relation between adolescent religiosity and chlamydia, gonorrhea, any STI, and unplanned pregnancy. Findings for HPV were not significant. Therefore, the hypothesis assessing the indirect effects of age of sexual debut (hypothesis 6) on chlamydia, gonorrhea, HPV, and any STI was partially supported. Further, the hypothesis assessing the indirect effects of sexual debut (hypothesis 13) on unplanned pregnancy was fully supported.
The findings indicated that higher levels of adolescent religiosity were significantly associated with an older age at sexual debut. In turn, older age at sexual debut was significantly associated with a lower likelihood of having been diagnosed with chlamydia, gonorrhea, any STI, and experiencing unplanned pregnancy. These findings support prior research that has found religiosity to be related to an older age at sexual debut (Adamcyzk, 2009; Adamczyk & Felson, 2006; Gold et al., 2010; Haglund & Fehring, 2010; Landor et al., 2011; Manlove et al., 2006; Meier, 2003; Quinn & Lewin, 2019; Rostosky et al., 2003; Rostosky et al., 2004). It is important to note that most studies assessing sexual debut with respect to religion treat sexual debut as an outcome variable. This study is unique in that it examined sexual debut as a mediator, which helped provide some insight into how adolescent religiosity can be a protective factor for long-term sexual health outcomes. As previously mentioned, most religions teach proscriptive messages about sexuality (Regnerus, 2007). After repeatedly receiving restrictive messages about sex, participants may absorb them and incorporate them into their belief systems, which appear to directly influence their “sexual health behaviors.” For instance, religious individuals may make the decision to delay sexual debut in an effort to remain faithful to the teachings of their church. When sexual debut is delayed, participants may have more time to develop sexual health knowledge and increase awareness of the risks associated with sexually risky behaviors. Religious individuals may also delay sex until marriage, which reduces exposure to STIs. Sexual debut as a mediator greatly strengthens the understanding of the protective link between adolescent religiosity and sexual health outcomes through sexual health behaviors.
**Number of Sexual Partners.** There was an indirect effect of number of sexual partners on the relation between adolescent religiosity and chlamydia, gonorrhea, HPV, any STI, and unplanned pregnancy. Therefore, the hypothesis assessing the indirect effects of number of sexual partners (hypothesis 8) on chlamydia, gonorrhea, HPV, and any STI was fully supported. Further, the hypothesis assessing the indirect effects of number of sexual partners (hypothesis 14) on unplanned pregnancy was also fully supported.

The findings indicated that higher levels of adolescent religiosity were significantly associated with fewer numbers of sexual partners. Fewer numbers of sexual partners, in turn, were significantly associated with a lesser likelihood of having been diagnosed with chlamydia, gonorrhea, HPV, any STI, and experiencing unplanned pregnancy. These findings support prior research that has found religiosity to be related to lower numbers of sexual partners (Gold et al., 2010; Haglund & Fehring, 2010; Landor et al., 2011; Simons et al., 2009). Similar to sexual debut, the number of sexual partners is typically examined as an outcome variable. Examining it as a mediator provides further insight into the protective link between religiosity and sexual health outcomes.

Most faith doctrines, particularly the more conservative religions, encourage marital unions while discouraging promiscuous behavior with multiple casual sex partners (Henderson, Ellison, & Glenn, 2018; Regnerus, 2007). Once again, religious messages about sexuality may contribute to participants’ religious belief systems, which directly impact “sexual health behaviors” by influencing the number of partners with whom participants engaged in sexual intercourse. Individuals who are more religious
appear to have fewer partners than their less religious peers. Having fewer partners reduces exposure to STIs and lessens opportunities for unplanned pregnancies.

Examining the number of sexual partners as a mediator provided a more in-depth look at how religiosity influences sexual health outcomes through sexual health behaviors in a protective manner.

**Connection to the TPB (RQs 1 and 2)**

The TPB (Ajzen, 1991) provided a helpful and relevant framework to guide the research questions in this study. The first two questions sought to assess whether attitudes toward sex, parent-child connectedness, peer religiosity, problem alcohol use, condom use knowledge, sexual debut, and number of sexual partners mediated the relation between adolescent religiosity and chlamydia, gonorrhea, HPV, any STI (RQ1) and unplanned pregnancy (RQ2). As discussed in previous chapters, the TPB (Ajzen, 1991) posits that belief systems, such as those formulated through religious practice, give way to attitudes, subjective norms, and perceived behavioral control, which in turn lead to behavioral intentions, behaviors, and outcomes (Ajzen, 1991). Prior research has shown religiosity as a protective factor with respect to sexual health. This study builds upon that link by unpacking it through the examination of the mediating variables that influence the association, which provides insight into some of the contributing factors that account for the protective nature of religiosity on sexual health. The multi-component structure of the TPB framework nicely lends itself to examination of individual variables that are influenced by religiosity, how they are influenced, and how they impact sexual health outcomes.
This study demonstrated a significant association between religiosity and all hypothesized mediators, which were categorized into “attitudes toward the behavior,” (relational and personal attitudes toward sex), “subjective norms,” (parent-child connectedness, peer private and public religiosity), “perceived behavioral controls,” (problem alcohol use and condom use knowledge), and “sexual health behaviors” (sexual debut and number of partners). With the exception of peer public religiosity, all hypothesized mediators demonstrated significant associations with one or more of the sexual health outcomes studied (chlamydia, gonorrhea, any STI, and unplanned pregnancy). Aside from peer private and public religiosity and problem alcohol use at Wave III, indirect effects were demonstrated for all hypothesized mediators on at least one outcome, suggesting that religiosity does not necessarily act alone in its protective role in sexual health, but rather influences other factors that have meaningful impacts on sexual health.

Differences in Religiosity Levels

The next section addresses the remaining two research questions assessing whether there are differences with respect to sexual health outcomes between groups who sustained religiosity and those demonstrating lower levels of religiosity. The four groups examined included those who sustained religiosity from adolescence into adulthood, those who later adopted religiosity, those who discontinued religious practice, and those who never adopted religiosity. The outcomes measured included chlamydia, gonorrhea, HPV, and STI (RQ3), and unplanned pregnancy (RQ4).
**STI Outcomes.** There were significant differences in the likelihood of having experienced poor sexual health outcomes between groups who sustained religiosity and those demonstrating lower levels of religiosity. Findings were significant for the outcomes of chlamydia, gonorrhea, HPV, and any STI. However, there were not significant differences between the sustained religiosity group and each of the religious groups assessed (no religiosity, discontinued religiosity, and late adopted religiosity) for every outcome studied. Thus, hypothesis 15 stating that individuals who never adopted religiosity, those who discontinued religiosity, and those who later adopted religiosity would have a significantly higher likelihood of lifetime STIs than those who sustained religiosity was partially supported. Sustaining religiosity from adolescence into adulthood appears to provide the most protection with respect to sexual health.

Participants who sustained religiosity were significantly less likely than any other group to experience chlamydia, gonorrhea, HPV, or any STI. Those who never practiced religiosity appeared to be most at risk as compared to those who sustained religiosity, with increased likelihood of contracting HPV and any STI than the other groups. The groups comprised of participants who discontinued religious practice was the next most at risk. Although participants who later adopted religiosity only demonstrated significant findings for gonorrhea, HPV, and any STI, this group appeared to be the second most protected, after the sustained religiosity group. Participants who sustained religiosity may have reduced the likelihood of contracting STIs through abstinence. They may also have used condoms for the purposes of avoiding unplanned pregnancy (Quinn & Lewin, 2019), which provides tangible evidence of sexual intercourse and would likely be
frowned upon by their families and faith communities. Using condoms to avoid pregnancy also provides the benefits of protection from STIs. The less religious groups may not have as great a fear as the more religious groups of the social consequences of sexual activity, such as judgment and penance. Thus, they may be less inclined to avoid sexual activity or use condoms.

There was only one significant difference between the groups (late adopted religiosity and sustained religiosity) for the outcome of gonorrhea. This unexpected finding may be related to the fact that only 3.3% of the sample reported having ever been diagnosed with gonorrhea. It may also be related to the fact that gonorrhea is not as common an infection as chlamydia and HPV (CDC, 2019a). The findings for hypothesis 15 suggest that sustained religiosity play the most protective role with respect to the more common STIs.

**Unplanned Pregnancy.** There were significant differences in the likelihood of having experienced unplanned pregnancy between groups who sustained religiosity and those demonstrating lower levels of religiosity. However, not each of the groups was significantly different from the sustained religiosity group. Therefore, hypothesis 16 stating that individuals who never adopted religiosity, those who discontinued religiosity, and those who later adopted religiosity would have a significantly higher likelihood of unplanned pregnancy than those who sustained religiosity was partially supported. Participants who never practiced religion and those who discontinued religious practice were more likely to experience unplanned pregnancy than those who sustained religiosity. Though late adopted religiosity was not significantly different from sustained
religiosity in the model, the results suggest sustained religiosity is more protective than having never practiced religion. It is possible that those who sustain religiosity throughout their lifetimes are influenced by the emphasis most religions place on marriage before children and a negative stigma of having children out of wedlock. Thus, it is likely that long-term religious participants avoided unplanned pregnancy by either abstaining or using contraception. It is possible that non-religious participants did not perceive unplanned pregnancy as negatively or as socially isolating as religious participants. The findings for hypothesis 16 suggest that sustained religiosity from adolescence into adulthood may have protected participants from experiencing unplanned pregnancy.

While late adopted religiosity was not significant in each model for hypotheses 15 and 16, it was the second most protected group overall. It is worth noting the commonality between the sustained religiosity and late adopted religiosity groups. It is probable that participants sustaining religiosity and adopting it later did so of their own volition. It is possible that when one chooses to continue or begin practicing religion, they are more committed to the teachings of their faith regarding sexuality than those who only practiced a religion at their family’s behest. Thus, religiosity may be most protective when the participant chooses to practice the faith.

**Connection to the TPB (RQs 3 and 4)**

The last two research questions assessed how lifetime STI outcomes (RQ3) and the likelihood of unplanned pregnancy (RQ4) compared for groups with varying levels of religiosity. Though the findings for the hypotheses associated with RQ3 and RQ4
(hypotheses 15 and 16) were not exactly as hypothesized, they do suggest religiosity is a protective factor with respect to sexual health. The previous hypotheses for RQs 1 and 2 increased understanding of how religiosity influences sexual health outcomes through mediating roles of attitudes toward sex, parent-child connectedness, problem alcohol use, etc. It is clear that religiosity is associated with influences (e.g., attitudes toward sex that are influenced by a religious belief system) and behaviors (e.g., delaying sexual debut until marriage or at least in a committed relationship) defined in the TPB (Ajzen, 1991) that reduce the likelihood of experiencing poor sexual health outcomes. When one sustains religiosity from adolescence into adulthood, it is possible they continue receiving exposure to the same positive influences throughout their lifetime, which guide their decisions and behavior, protecting them from poor sexual health outcomes. In the event one never practices religion or discontinues religious practice, the social influences to which they are exposed may be different or play less of a protective role than their religious counterparts.

Socio-Demographic Control Variables

This study included several demographics as control variables when investigating the research questions. It is worth noting how these were each associated with religiosity, the hypothesized mediators, and sexual health. Risk increased with age, girls and minorities appeared to be the most at-risk for poor sexual health outcomes, and participants with college-educated parents tended to be the most protected.

Age. Age was negatively associated with religiosity, parent-child connectedness, peer religiosity, problem alcohol use at Wave III, and unplanned pregnancy. It was
positively associated with permissive attitudes toward sex, problem alcohol use during adolescence (Wave II), sexual debut, and number of sexual partners. Interestingly, age demonstrated a significant, negative association with HPV. The unexpected association may be explained by the fact that only 6.5% of the sample reported having ever been diagnosed with HPV. Furthermore, HPV is often asymptomatic (NLM, 2019a) and was a less well-known infection at the time of Wave IV data collection, compared to chlamydia and gonorrhea, so it is possible that participants were infected with HPV without knowing it.

**Gender.** Girls reported higher levels of religiosity than boys reported and demonstrated a lower correlation with parent-child connectedness and condom-use knowledge. The negative association with condom-use knowledge was surprising, as girls tend to receive more information about sexual health than boys (Angera et al., 2008). That said, girls reported lower levels of risky behaviors, such as problem alcohol use and number of sexual partners. Ultimately, however, they were significantly more likely to experience the poor sexual health outcomes investigated in the present study. Though girls appeared to not engage in risky behaviors as much as boys, their increased risk for poor sexual health outcomes may be explained by a lack of confidence in negotiating condom use when they do become sexually active (Sionéan et al., 2002). Additionally, girls may experience more pressure from peers and boyfriends to engage in unwanted sexual relations (Teitelman, Bohinski, & Boente, 2009).

**Race.** Minorities also demonstrated negative correlations with parent-child connectedness, despite higher levels of religiosity than Caucasians. They also reported
more risky behaviors than non-minorities, such as lower condom use knowledge, younger age at sexual debut, and increased likelihood of poor sexual health outcomes. The risks facing minorities may be explained by a lack of access to proper sexual health education and services (Sterling & Sadler, 2009). The cultural background of some minorities may also influence their sexual health. For instance, some cultures deem it inappropriate to discuss sexual matters with young people (Kim & Ward, 2007) or may only advise children to not have sex without providing them with additional detail (Moore, Berkley-Patton, Bohn, Hawes, & Bowe-Thompson, 2015). Additionally, English may not be the first language for some minority youth, which may prove challenging to them as they try to understand the U.S. healthcare system, process the risks associated with sexual activity, or procure contraception (Sterling & Sadler, 2009). Thus, young minorities may not be as informed as their non-minority counterparts about how to protect their sexual health.

Parental education. Finally, participants with college-educated parents appeared to be less at-risk for experiencing poor sexual health outcomes than those without college-educated parents. They demonstrated significant positive correlations to religiosity, parent-child connectedness, condom use knowledge, and age at sexual debut and negative correlations with problem alcohol use during adolescence (Wave II), and number of sexual partners. While they were less likely to experience chlamydia, gonorrhea, or unplanned pregnancy, they were more likely to experience HPV than participants whose parents did not attend college. It is surprising that participants with college-educated parents would be at-risk only for contracting HPV. It is possible that
individuals from families with college-educated parents may be more aware of HPV and have better access to STI testing. In other words, they may be more informed of their HPV status than participants whose parents did not attend college.

In summary, the most important findings were the mediating influences on the link between religiosity and sexual health outcomes, particularly parent-child connectedness, attitudes toward sex, and problem alcohol use during adolescence. These mediators demonstrated a protective effect on one or more of the sexual health outcomes examined in this study. The importance of these findings demonstrated that religiosity does not act alone in its protective influence and there are other non-religious factors that can be nurtured by parents, policymakers, and practitioners to facilitate good sexual health outcomes for all individuals.

**Practical Implications**

STI rates in the United States continue to rise among the adolescent and young adult population (CDC, 2019a). In addition, despite a dip in teen pregnancy rates (Martin et al., 2018a), young people are still susceptible to experiencing unplanned pregnancies. Thus, the findings of this study are relevant to parents and individuals who work with or on behalf of young people and families. This section discusses the practical implications of this study and how parents, policymakers, and practitioners may apply the findings. It is important to note that the topic of religiosity can be sensitive in nature and non-religious individuals may find a recommendation to begin practicing a faith offensive. Thus, the practical application of this study’s findings should only be considered for those currently practicing a faith or those who have demonstrated a desire to begin
religious practice. However, it is also important to note that this study identified numerous non-religious influences that are protective against poor sexual health outcomes, such as high levels of parent-child connectedness, that can be considered in the event recommending religious practice and involvement is not appropriate.

Parents

Parents should serve as their children’s primary source of information regarding sexual health and sexuality education (Guilamo-Ramos & Bouris, 2009). However, they often lack confidence or comfort discussing sexual matters with their children (Regnerus, 2005). While it is important for a dialog about sex to occur between parents and children (Guilamo-Ramos & Bouris, 2009; Regnerus, 2005), parents should understand it may not just be the content of the conversations that is critical, but the connection that is established between the parents and the children. This study found religiosity to facilitate a closer connection between parents and children and to provide a protective indirect effect on sexual health outcomes.

Parents whose children already practice a faith can do a number of things to help facilitate sexually healthy outcomes for their children. Continuing to practice their faith as a family by regularly attending services together and discussing religious and parental expectations regarding sex may strengthen the parent-child bond. Family service attendance alone may be inadequate, however, as many youth may feel parents are forcing them to attend services. This may cause them to “check out” and fail to absorb any of the messages being delivered in the context of faith. For this reason, it is important to note that religiosity as measured in this study was multi-faceted. It consisted
of four components assessing not only frequency of service attendance, but also importance of religion, frequency of prayer, and participation in religious activities.

In addition to frequent service attendance, parents may engage their children in conversations about the importance of the faith itself. They could discuss the pros and cons of the faith. They could provide opportunities for children to ask questions about the faith they might find confusing (e.g., how to reconcile evolution and creation). Parents might also communicate to their children why they find religion important. Perhaps it provides them with a strong moral compass, helping them to separate right from wrong. Or perhaps it allows them to place their faith in a higher power when they feel too weak or ill equipped to accomplish a task or overcome a challenge on their own. They may also talk about the role their faith played in their romantic relationships. They may have found it challenging to be involved with someone holding a different belief system or they may have embraced it. If parents are able to deconstruct their faith in such a way the child understands why it is important, the child may develop a deeper devotion to the faith.

Parents may also encourage both family prayer and private prayer. They may begin or continue praying before and after meals, in the morning when they wake, before bedtime, at other appropriate times of day as outlined in their faith, or when they see another person in distress, such as in a hospital or a car accident. Parents may ask their children for their prayer requests. Children may request prayers for success at upcoming exams or an important sporting event. If parents set the example with respect to prayer,
their children may develop a stronger appreciation for the role that religion and prayer play in their lives.

Finally, most places of worship offer events that are supplemental to regular daily or weekly services. Many also offer youth groups, youth choirs, and other activities designed with young people in mind. Parents may encourage their children to attend faith-based activities affiliated with their place of worship. Religious activities provide another opportunity for youth to hear and internalize their faith’s messages about not only sex, but also other risky behaviors, such as drinking alcohol. While peer religiosity did not demonstrate significance in this study with respect to sexual health outcomes, spending time with religious peers may still inspire less permissive attitudes toward sex and fewer issues with problem alcohol use if youth want to remain in good standing with their circle of religious friends.

Parents and their family religious practices may play a bigger role in the sexual health of their children than they realize. Continuing or building upon the four components of religiosity may help strengthen parent-child connectedness, thereby indirectly facilitating long-term sexually healthy outcomes.

**Policymakers**

Due to the sensitive nature of religion and the separation of church and state, policymakers (i.e., lawmakers, elected officials, and public school board members) may be somewhat limited in how to facilitate good sexual health outcomes through religiosity. That said, there are a number of things they can do to promote other elements that are associated both with religiosity and sexual health outcomes.
First, they may create policies requiring parents to be invited to participate alongside their children in sexuality education programming offered in the public school setting. Parental participation should not be made mandatory, but parents should be included at some level if they wish to participate. Parental participation may only be appropriate for certain parts of the training, such as covering medically accurate information about reproduction and STIs. It may be inappropriate for parents to attend other parts of training, such as when youth have the opportunity to ask questions of a medical professional. Youth may feel uncomfortable asking questions in the presence of parents. Parental participation may also be most appropriate in a follow-up manner, such as completing a sex education homework assignment together. Parental participation will vary, depending on the age of the children. However, including parents in the sexuality education of their children will likely strengthen the parent-child bond.

Second, policymakers may ensure that laws and school rules regarding alcohol use and abuse are clearly written, understood by youth, and consistently enforced. Punitive measures alone may not prove effective, though. Providing proper substance abuse education and counseling to all youth may also be necessary to reduce offenses. Lowering the rate of alcohol use may then contribute to fewer cases of poor sexual health outcomes.

Finally, policymakers should ensure ease of access to sexual health services for young people. Services may include educational services, private counseling, free STI and pregnancy testing, and free condoms. Youth privacy should be protected and youth should not feel as though they are being judged when seeking help. Policymakers should
also be sensitive to the fact that girls, minorities, and youth without college-educated parents are most at risk for poor sexual health outcomes, as demonstrated in this study. They should tailor outreach efforts to raise awareness of the available services among youth from these demographic groups. Easy, safe, and approachable access to sexual health services may increase STI awareness, condom use knowledge, and rates of condom use, thus reducing incidents of STIs and unplanned pregnancies.

Policymakers outside of faith-based organizations are unlikely to hold a position where they may encourage religious practice. However, they do have the power to promote some of the same social influences as religiosity, such as increased parent-child connectedness and reduced problem alcohol use, both of which were associated with reduced likelihood of poor sexual health outcomes in this study.

**Practitioners**

Some practitioners (i.e., religious leaders, physicians, nurses, therapists, faith-based educators, youth development leaders) may have a little more leeway than policymakers to encourage religious practice as a method to avoid poor sexual outcomes. Religious leaders, such as pastors, rabbis, bishops, etc., are responsible for communicating faith-based messages about sexuality to their religious followers. In order to maximize the benefits of religiosity on sexual health, religious leaders should reduce any stigma surrounding sexuality in their respective places of worship. They should encourage healthy and open discussion as a faith community and within families, as much as their doctrines will allow. They should be clear about the faith’s rules regarding premarital sex and contraception. They should also share with members the
sexual health benefits of increased prayer frequency, service attendance, and involvement in church-related activities. The more open and intentional religious leaders are with their followers, the more likely it will influence their attitudes toward sex and the connection shared between parents and children.

Healthcare workers may also influence sexual health outcomes for youth through religiosity. For instance, pediatricians, ob-gyns, general practitioners, and mental health therapists may discern their patients’ religious backgrounds as part of collecting patient history. If they choose to recommend religious activities to patients, it is important they educate themselves on a variety of different faiths and some of the rules and nuances associated with each. Whether they are treating a religious patient with poor sexual health outcomes or one who wishes to avoid them, they may recommend the patient get more involved in their place of worship (Mueller, Plevak, & Rummans, 2001; Swihart & Martin, 2020). It is important to note, as previously mentioned, that mere service attendance may be inadequate. Healthcare professionals should explain the numerous sexual health benefits of religiosity as a whole, including importance of religion, frequency of service attendance, frequency of prayer, and participation in religious activities. They may also encourage long-term religious practice by pointing out that sustained religiosity protects against poor sexual health outcomes, as demonstrated in this study.

While healthcare workers have the opportunity to make impacts on adolescent sexual health, they typically do not spend as much time with young people as teachers and youth workers. Educators teaching in faith-based education systems and youth
workers, particularly those serving faith-based organizations, spend a great deal of time with youth. They are in a unique position to design religious-based programming that facilitates sexually healthy outcomes for young people.

The TPB (Ajzen, 1991) used to guide the research for this study may also provide a practical framework to design youth programming. It is intentional in nature and demonstrates how religiosity contributes to social influences and behaviors, indirectly influencing sexual health outcomes. Educators and youth development leaders may use the framework to incorporate programs and activities that facilitate restrictive attitudes toward sex, positive subjective norms, increased perceived behavioral control, and decreased sexually risky behaviors. For instance, teachers and students may create a video in which they present different common sexual scenarios (e.g., a girl being propositioned for sex by a popular boy who has been drinking). They could show religious expectations, common teen expectations, a healthy behavioral response, a risky behavioral response, and highlight the potential long-term risks, such as an unplanned pregnancy. Parents and children could also watch the video together and discuss religious and parental expectations about sex. Such an approach may encourage parent-child connectedness, emphasize having less permissive attitudes about sex, and discourage alcohol use and early sexual debut, thus reducing the likelihood of poor sexual health outcomes.

Youth development leaders may also find the TPB (Ajzen, 1991) a useful tool. They may use it to plan activities, such as camping trips or lock-ins. During the events, youth could play games, participate in team-building activities, and watch age-
appropriate movies. Youth leaders could also lead a bible study and a candid discussion about religiosity and sex. Throughout the event, youth leaders should be intentional about emphasizing the numerous wholesome and fun activities that are available to youth that do not involve sex or alcohol use. Much like the aforementioned video example, this activity would stress less permissive attitudes toward sex and discourage alcohol use and initiating or continuing sexual activity, possibly lowering the likelihood of poor sexual health outcomes.

It is important to note that while this study demonstrated several significant mediators that were influenced by religiosity, those mediators may have implications on sexual health outcomes without the influence of religiosity. In other words, there may be non-religious techniques to help youth decrease permissive attitudes toward sex, improve parent-child connectedness, reduce problem alcohol use, increase condom use knowledge, increase age at sexual debut, and reduce number of sex partners, all of which have been associated with better sexual health outcomes as demonstrated in the present study. This is particularly helpful to non-religious parents, policymakers, and practitioners working with or on behalf of non-religious youth.

This study’s findings present a number of options available to parents, policymakers, and practitioners to influence the sexual health of young people positively. If more people who directly interact with youth or act on their behalf understand how religiosity and other social influences facilitate healthy sexual outcomes and take steps to implement strategies encouraging healthy behaviors, it is possible that STI rates may decrease and unplanned pregnancy rates will further diminish.
Contribution to the Body of Knowledge

The study of the link between religiosity and sexual health is not novel. However, this dissertation offers a unique angle that helps explain what contributes to the link. It also details effects on individual, rather than only general, STI outcomes. Additionally, it supports previous research finding a direct association between religiosity and age of sexual debut and number of sexual partners. Further, due to the longitudinal design of this study, findings also showed that sustained religiosity from adolescence into adulthood to be most protective. Ultimately, this study shows religiosity, particularly long-term practice, is protective of sexual health overall.

Prior studies examining the association of religiosity with sexual health have often used reference group theory (Merton, 1950; Thornton & Camburn, 1989) or social control of sexuality theory (DeLamater, 1981) to guide research. The latter theories are extremely helpful in explaining why families, peers, and religious settings influence adolescent sexual health. However, the theories are broad and make it challenging to discern some of the specific influences that contribute to the link. Using the multi-component TPB, this dissertation sought to unpack the potential explanatory pathways between religiosity and sexual health outcomes in order to increase understanding of how religiosity influences sexual health. Although the TPB has been used to model other health behaviors, it is rarely used to examine religiosity and sexual health together. Thus, it proposes an additional theory to guide future research in the field. Additionally, the multi-component nature of the theory allowed for the exploration of emergent themes and findings indicating attitudes toward sex, parent-child connectedness, problem alcohol use,
condom use knowledge, age at sexual debut, and number of sexual partners to contribute to the indirect link between religiosity and sexual health outcomes significantly. The TPB facilitated a more detailed understanding of how religiosity plays a protective role in sexual health outcomes.

The findings of this dissertation also contribute to the literature by examining specific sexual health outcomes individually. While unplanned pregnancy has been examined as an outcome in prior studies, most studies assessing STIs have not focused on specific STIs individually, but rather STIs in general. This study examined chlamydia, gonorrhea, and HPV individually. Providing parents, policymakers, and practitioners with more specific findings versus ambiguous general findings (e.g., religiosity is protective of sexual health) may more strongly convince them to take action (e.g., establish an open and honest dialog about sex at home and in the religious setting) and implement strategies to embrace religiosity.

Next, this study replicated the findings of previous research indicating that religiosity is directly linked to an older age at sexual debut and a fewer number of sexual partners. This study then expanded upon that link by showing sexual debut and number of sexual partners as playing mediating roles in the association between religiosity and chlamydia, gonorrhea, HPV, any STIs, and unplanned pregnancy. Demonstrating religiosity’s benefits to sexual health beyond sexual debut and number of sexual partners strengthens the argument that religiosity plays a protective role.

Finally, religiosity was examined at more than just one time point, providing an advantage over cross-sectional studies examining religiosity and sexual health. Findings
indicated that long-term religiosity beginning in adolescence and extending into adulthood was more protective of sexual health outcomes than non-religiosity or discontinued religiosity. This finding is notable as it may provide the basis for religious youth, who may otherwise leave their places of worship when they enter adulthood, to continue practicing their faith.

This study built upon previous research and applied a theoretical approach that has been applied to several other health-related issues but is not typically used in the study of religiosity and sexual health outcomes. It also increased understanding of different influences that are associated with both religiosity and sexual health. Ultimately, it strengthened the evidence for why religiosity, particularly sustained religiosity, is protective of long-term sexual health outcomes.

**Study Strengths & Limitations**

There are a number of strengths associated with this study. The Add Health dataset consists of a very large, longitudinal, nationally representative sample. The Add Health study design was rigorous in nature. It was commissioned by the U.S. Congress and funded primarily by the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICH) (Harris et al., 2009). Both public and private schools representing diverse ethnic and socioeconomic backgrounds were selected from all regions of the United States. Further, data were collected over four waves between 1994 and 2008 with a 75% or higher response rate at each wave (Harris et al., 2009).

Due to the complex sample design, the application of sample weights to the analyses was required to make the sample nationally representative. Applying sample
weights that were designed to account for all four waves of the study reduced the initial sample of over 20,000 substantially. Despite the large reduction, the analyzed sample remained large with 9,421 participants. Additionally, the application of sample weights ensured the sample was nationally representative, generalizing to the overall U.S. population.

The longitudinal design of the study presents another strength. Data were collected at different time points over the course of more than a decade, allowing inferences to be made about links between religiosity and other social influences during adolescence and long-term sexual health outcomes. Additionally, the analytical sample consisted of individuals who had participated in all four waves of the study, thus removing potential limitations that may rise in the case of non-response bias. However, it is important to note that, given the longitudinal nature of this study over more than a decade, it remains to be determined whether the same associations found in this study would be found using a more recent cohort.

Examining lifetime occurrences of STIs provides an additional strength. The Add Health dataset consists of a number of questions and measures regarding STIs. For instance, some questions only asked participants about whether they had been told they had an STI in the prior year. Additionally, biomarker information is provided for chlamydia, gonorrhea, and HPV testing at Wave III. However, participants certainly could have been told they had STIs more than one year prior to the survey or could have already been treated for an STI prior to the Wave III testing, therefore would not have been shown to have experienced an STI at those data points. The present study included
data regarding lifetime occurrences to capture all experiences of STIs, rather than restricting it to a relatively smaller period.

There are also a number of limitations to this study. First, secondary data analysis was used to address each of the four research questions. Secondary data analysis can place limits on the types of questions that may be answered and leaves the researcher with no control over which variables were measured. For instance, peer religiosity did not yield significant findings in this study. However, a measure of perceived peer religiosity that encompassed friends who were not included in the study may have significantly influenced religiosity and sexual health, but such a question was not asked in the questionnaire and there is no way to obtain such a measurement from the existing dataset. Despite this limitation, the overall dataset provided robust enough information to answer all four of this study’s research questions adequately.

The questions analyzed for this study consisted of self-report measures. With this study’s emphasis on sexual health, questions were sensitive in nature. Despite using a Computer-Assisted Self Interview (CASI), participants may have still felt uncomfortable truthfully answering questions and opted to give what they believed to be more socially acceptable responses. Thus, some of the more sensitive questions regarding age of sexual debut, number of sexual partners, STI status, and unplanned pregnancy may not provide the most accurate representation of these variables.

A limitation exists within the application of the TPB (Ajzen, 1991) to sexual health. The model suggests that “behavioral intention” leads to the behavior itself, but this may not always be the case. For instance, one may intend to have sex, but may have
no potential opportunities for partners, and therefore may not actually engage in sex. In another case, one may intend to use condoms, but may not have access to them, which could result in having unprotected sex. The present study did not specifically examine behavioral intentions, thus there is more to be learned about their role in the link between religiosity and sexual health outcomes.

The use of the median split technique to categorize participants into four groups representing varying levels of religiosity provides an additional limitation. Such an approach can result in reduced statistical power and effect size (MacCallum, Zhang, Preacher, & Rucker, 2002). Despite this limitation, the use of a median split provided the best option to identify the four groups within the available data.

Finally, it is important to note that over 95% of those in the study identifying with a religion were affiliated with some form of Christianity. Very few participants identified as Muslim, Jewish, Hindu, or Buddhist. Participants were also not categorized by the type of faith, but only scored on their levels of religiosity regardless of faith affiliation. In other words, non-Christians were not examined separately from Christians. Further, Christians were not split into conservative, moderate, and liberal groups. Thus, it is not recommended to generalize this study’s findings outside of the Christian faith in general. Despite this study’s limitations, it remains robust enough to demonstrate significant and practically useful findings regarding the link between religiosity and sexual health.

**Recommendations for Future Research**

The findings of this study generated additional opportunities for future research. Religiosity in this study was only measured in a general sense and there were no analyses
considering differences in religious affiliations. Future research should compare different faith backgrounds to determine if religiosity remains protective of sexual health. For instance, the monotheistic faiths (i.e., Judaism, Christianity, and Islam) could be compared to determine the extent to which they are protective of sexual health outcomes. Differences within Christian sects could also be compared, dividing groups into fundamentalists, moderates, and liberals. Additionally, future research should investigate specific religious messages delivered within each faith group to gain a more detailed understanding of what about religious practice impacts sexual decision-making and behaviors.

This dissertation speculated that minorities might be more at risk than the majority population for poor sexual health outcomes due to lack of sexual health knowledge or access to services and testing. Future research could further explore that theory and examine potential influences that may reduce the protective nature of religiosity for minorities. Aside from inadequate access to sexual health services, there may be cultural influences that are worth investigating.

Additionally, the data from this study suggest that the association between religiosity and sexual health outcomes may vary by gender and race/ethnicity. Thus, future studies should consider a mediated moderation approach to determine whether mediating effects will vary based on the potential moderating effects of race/ethnicity and gender.

Finally, this study focused on sexual intercourse, rather than other non-coital sexual behaviors. With the increased popularity of “technical virginity” to avoid
pregnancy and preserve virginity in terms of vaginal intercourse, oral and anal sex practices are on the rise (Rostosky et al., 2003). It is important to note that non-coital sexual behaviors may still result in contracting chlamydia (NLM, 2019b), gonorrhea (NLM, n.d.), and HPV (NLM, 2019a). Future research should explore whether religiosity remains protective of sexual health outcomes when non-coital sexual behaviors are favored over sexual intercourse.

Conclusion

This study demonstrated the protective effect religiosity has on sexual health outcomes. The findings not only supported prior research, but also expanded it by illuminating the mediating influences that attitudes toward sex, parent-child connectedness, problem alcohol use, condom use knowledge, age of sexual debut, and number of sexual partners have on the relation between religiosity and a variety of sexual health outcomes. Additionally, the longitudinal nature of the study provided the opportunity to compare Wave I religiosity to Wave IV sexual health outcomes and to examine sexual health differences between groups claiming different levels of religiosity from adolescence into adulthood. Higher levels of adolescent religiosity were significantly associated with healthier sexual outcomes during adulthood, and sustained religiosity emerged as the most protective of the four groups examined. The latter findings suggest religious practice during adolescence has long-term sexual health benefits.

The findings of this dissertation lend themselves to important practical implications. Parents and practitioners can incorporate strategies to encourage religious
practice and discussion of sexual health expectations and services within their families, practices, and programs. Additionally, policymakers may implement rules that facilitate good sexual health outcomes through the same social influences impacted by religiosity, such as parent-child connectedness.

Americans will likely continue to battle poor sexual health outcomes for years to come. Individuals who have regular interactions with young people and are concerned about their sexual health have a variety of tools readily available to facilitate good sexual health outcomes, whether they choose to recommend a sexuality education class or connect young people with sexual health services. Awareness of religiosity’s positive influence on sexual health is yet another tool at their disposal. The present study scientifically supports the protective role of religiosity on sexual health outcomes and provides a number of practical applications to anyone seeking to improve the long-term sexual health of young people.
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