The Influence of Knowledge in Improving Long-Term Safer Sex Behaviors: A Theoretical Exploration

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Dedication

To my parents – Zaigham Mahmood Rizvi and Talat Rizvi for always supporting me in every way they could and for encouraging me to pursue and complete my doctorate.

To my siblings – Maliha Ilias & Ghazanfar Shah for setting the bar high and for being my greatest cheerleaders.

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Abstract of Dissertation

The Influence of Knowledge in Improving Long-Term Safer Sex Behaviors: A Theoretical Exploration

Although recent data from the Youth Risk Behavioral Survey (YRBS) 2015, has reported that safer sex behaviors among youth has increased in the past decade, 43% of youth were still engaging in unprotected sex (Kann et al., 2016). This has resulted in high STD rates among US youth and young-adults between the ages of 15- 24 (CDC, 2018). Lack of awareness and knowledge around sexual risk-taking at a young age can result in continued engagement in unprotected sex. The future health and wellbeing of the nation's youth can be severely compromised for those who are not educated on the harms of unsafe sexual behavior.

In this study, a theoretically driven examination was conducted to understand the short-term and long-term influence of correct knowledge of safer sex on safer sex behaviors. The study also accounted for the possible and indirect influence of an individual's health beliefs on safer sex behaviors in the short-term as well as in the long-term. In order to examine this influence, the study utilized a quantitative analysis of secondary data from the National Longitudinal Study of Adolescent Health (Add Health).

The study results were overall supportive of the theoretical presumption that correct knowledge was significantly associated with positive safer sex behaviors in high school and young adulthood. Correct knowledge of safer sex behaviors was also significantly associated with health beliefs. The role of health beliefs to health behaviors, however was not as well supported by study findings. The influence of correct knowledge of safer sex behaviors was not mediated by health beliefs. Based on the findings of this

study, recommendations are for increased sex education in US high schools in combination with skill-building interventions that improve self-efficacy around sexual decision making. This would ensure that youth in the US not only engage in safer sex at an early age but also continue to adopt safer sex behaviors in young adulthood in order to reduce their risk for STDs and HIV/AIDS.

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Chapter 1: Introduction

Background of Study

In the United States, an estimated 47% of youth are known to initiate sex when they are in high school and between the ages of 15-19 years (CDC, 2018; Finer et al., 2013). Although, recent data from the Youth Risk Behavioral Survey (YRBS) 2015, has reported that safer sex behaviors among youth has increased in the past decade, 43% of youth were still engaging in unprotected sex (Kann et al., 2016). Unprotected sex and sexual risk-taking among youth are mechanisms that elevate the risks for high STD and HIV rates among US youth and young-adults.

Among STDs, the highest rate of chlamydia (63.1%) and gonorrhea is found primarily among high school aged youth. If we examine the national average of STD rates per 100,000 by age category, we see that the number of reported chlamydia cases increased from 1854.2 in 2015 to 1929.2 in 2016 among those aged 15-19 years (CDC, 2018). Among those aged 20-24, chlamydia cases increased from 2594.5 to 2643.8 (CDC, 2018). Gonorrhea cases also increase 11.3% among persons aged 15-19 years and 10.9% among persons aged 20-24 years, during 2015-2016 (CDC, 2018). These increases in STD rates can be attributed to unsafe sexual behaviors among youth which will be discussed below.

Although chlamydia and gonorrhea are treatable diseases – if diagnosed – other diseases such as HIV do not have a cure and are also transmitted through unsafe sexual behavior such as engaging in sex without condoms. HIV is also found to be more transmissible among individuals with an existing, untreated STD which is why youth need be encouraged to practice safer sex behaviors (CDC, 2018).

Data from YRBS data in 2015 reported that although use of contraception increased 3% from 2003, there was however a 6% decrease in condom use among adolescents in that same timeframe (CDC, 2015).

The statistics provided above preliminary evidence that not only are youth in the United States engaging in unsafe sexual behaviors (i.e., sex without condoms), but these risks are not being reduced as they get older which results in youth being exposed to and infected with HIV/AIDS by the time they reach their early twenties.

Evidence suggests the need for health education programs in order to encourage youth to adopt safer-sex practices (Mueller et al., 2008, Wilson. 2000; Landry et al., 2003). A study conducted with students at a Midwestern University found that of 650 students surveyed, the majority (77%) felt that they were knowledgeable around HIV prevention but 33% had indicated inaccurate knowledge about sexually transmitted diseases and HIV/AIDS when they were actually asked about specifics ways to practice safer sex (Inungju et al., 2009). Furthermore, youth are rarely counseled on the risk of reinfection or the risk of incurable diseases such as HIV/AIDS at the time of a positive STD diagnosis (National Campaign to Prevent Teen and Unplanned Pregnancy, 2012). Recognizing this need, public high schools in 21 states have mandated sex education and HIV education with topics that include safer-sex knowledge and condom use negotiation skills with sexual partners (NCSL, 2016).

Statement of the Problem

Lack of awareness and education around sexual risk-taking at a young age can result in continued engagement in unprotected sex and thus lead to the likelihood of being exposed to STDs as well as other serious and incurable diseases such as HIV/AIDS. The

future health and wellbeing of the nation's youth can be severely compromised if they are not educated on the harms of unsafe sexual behavior.

A possible solution to preventing unsafe sexual behaviors among youth is through implementation of sex-education programs in high schools which enable youth to not only have correct knowledge of safer sex but also improved perceptions of severity and susceptibility of sexually transmitted diseases as well as skills in making informed sexual health choices. If an association through a theoretical lens is found between the possession of correct knowledge of safer sex among youth and their safer sex behaviors in high-school and in the long-run when they reach young adulthood, a realistic recommendation would be to implement a national policy to provide comprehensive sex education to all high-school aged youth in order to prevent future STD and HIV infection. If no association is found between the possession of correct knowledge of safer sex among youth and their safer sex behaviors in high-school and in the long run, then further research needs to be conducted to assess which protective factors at a young age would encourage youth to engage in safer sex behaviors.

Thus, it is important to conduct a theoretically assess this relationship between knowledge and safer sex both at a cross-sectional level but also as a possible predictor of future safer sex while also accounting for the indirect influence of health beliefs.

Purpose of the Study

In this study a theoretically driven examination was conducted into the role of knowledge of safer sex behaviors and health beliefs on actual safer sex behaviors. The study followed a conceptual framework (Figure 1.1) to understand the short-term and long-term influence of correct knowledge on safer sex behaviors while also taking into

account the possible and indirect influence of an individual's health beliefs on their safer sex behaviors in high-school as well as when they reach young adulthood. In order to examine this influence, the dissertation completed a quantitative analysis of secondary data from the National Longitudinal Study of Adolescent Health (Add Health).

AddHealth data has been collected and managed by the University of North Carolina (UNC) Population Center through a longitudinal study of a representative sample of adolescents in the US between grades 7-12. AddHealth data is also one the largest longitudinal data set to successfully follow a representative sample of adolescents in the US from early adolescent towards early-adulthood and adulthood starting from 1994-1995 with the most recent wave of data collection (Wave Five) in 2017 (UNC, 2018. For the purposes of this project, High School Aged Youth is defined as adolescents between the ages of 15-19 years old while Young Adults are defined as youth between the ages of 20-28 years old.

Study Aims

To test the influence of correct knowledge of safer sex and health beliefs on sexual behaviors, the study followed a theoretical framework (Figure 1.1) to examine the direct influence of correct knowledge on safer sex behaviors over-time as well as the indirect influence of health beliefs on safer sex behaviors over-time. Safer Sex Behaviors is defined as consistent use of condoms and contraception. Following this theoretical focus, the study used a non-equivalent comparison group design to compare students with different levels of correct knowledge of safer sex with their health beliefs and health behaviors using both cross-sectional and longitudinal surveys. A non-equivalent comparison group design is most feasible for this study since randomization of subjects is

not possible in secondary, retrospective analysis. However, by comparing groups according to their knowledge level, I was able to deduce generalizability of my study's findings for youth across the United States. Overall, this research aimed to explore the importance of health education interventions such as sex education among high school aged youth through a theoretical lens. Based on the findings of this study, policy, practice and research recommendations will be made around increasing sex education programs and similar sexual health services which improve health beliefs and skills among high-school students in the United States.

Research Questions and Hypotheses

The study addresses four main research questions:

Research Question 1. What is the influence of correct knowledge of safer sex practices on individual health beliefs regarding safer sex behaviors of adolescents in high school?

Hypothesis 1. Adolescents with higher levels of correct knowledge of safer sex report (a) higher self-efficacy in sexual decision making, (b) higher perceived severity of HIV/AIDs & STDs and (c) higher perceived susceptibility to HIV/AIDS & STDs.

Research Question 2: What is the influence of correct knowledge of safer sex on individual sexual health behaviors of adolescents in high school?

Hypothesis 2: Adolescents with higher levels of correct knowledge of safer sex are more likely to practice safer-sex behaviors in high school.

Research Question 3: What is the influence of correct knowledge of safer sex reported among adolescents in high school on sexual health behaviors five to seven years later during young adulthood?

Hypothesis 3: Adolescents with higher levels of correct knowledge of safer sex are more likely to practice safer-sex behaviors five to seven years later in young-adulthood.

Research Question 4: What is the mediating influence of adolescent's health beliefs in high school on safer sex behaviors in high school and later in young-adulthood?

Hypothesis 4: Higher self-efficacy in decision making around sexual choices, higher perceived severity of HIV/AIDS & STDs and higher perceived susceptibility to HIV/AIDS & STDs in high school mediate the influence of correct knowledge on safer sex behaviors in high school and later in young-adulthood.

Description of Data

For this study, the National Longitudinal Survey of Adolescent Health (Add Health) was used for secondary quantitative data analysis. Add Health data has been collected by the University of North Carolina, Population Center through a longitudinal study of a representative sample of adolescents in the US between grades 7-12. The sample was recruited from 80 high schools and 52 Middle Schools that were geographically dispersed across the United States. For this study, only the sample of students from high-school were used in the analysis.

The first data collection (Wave One) occurred in the 1994-95 school year with a sample size of 20,745. Subsequently, the Add Health sample was then followed into young

adulthood to complete the four waves of in-home interviews (Wave II, III, IV, V) with the most recent in 2016, when the Add Health cohort was between the ages of 32 and 40. The sample size for the other waves were Wave Two (14,736), Wave Three (15,197) and Wave Four (15,701). Wave Five data has only been partially released.

The surveys consisted of an In-School Survey, and In-Home Survey, School Administrator Survey, Parent/Partner survey and Bio-marker specimen collection. The surveys particularly relevant to answer the proposed study questions were the In-Home Surveys at Wave One and Wave Three.

Conceptual Framework

The conceptual framework that will primarily guide this research is depicted below in Figure 1.2. This conceptual framework is constructed based on the Extended Health Belief Model (Becker, 1986; Rosenstock et al., 1988). The Health Belief Model has been widely used as a conceptual model in health promotion research and practice (Downing-Matibag et al., 2009; Petosa, 1991) and it theorizes that an individuals' health behavior is determined not only by their existing knowledge but also their perceptions of that particular health condition (Becker, 1986). The model originally included four key constructs; perceived susceptibility, perceived severity, perceived benefits and perceived barriers (Becker, 1986). This model was reintroduced in 1988 with the inclusion of self-efficacy as a construct and is often also referred to as the Extended Health Belief Model (EHBM) in health promotion research (Rosenstock et al., 1988). Since its reintroduction, the EHBM has been used widely to explain different health outcomes and concerns (Bayat et al., 2013; Reynolds et al., 2016, Wilson et al., 2017). Figure 1.1 (below)

illustrates the EHBM and posits that health-related knowledge can affect health behavior and health outcomes but through an indirect change in health perceptions and skills.

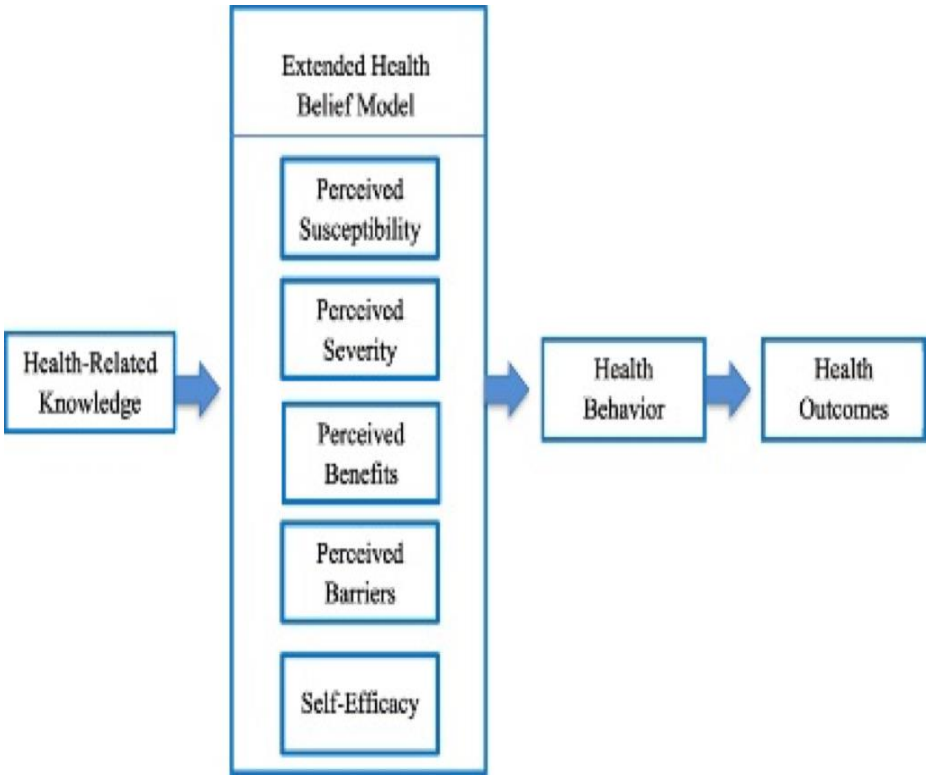

Figure 1.1. Extended Health Belief Model (Rosenstock et al., 1988)

When we examine constructs from the Health Belief Model (HBM) in closer detail, we see that these constructs have also been used in the past to explain health behavior particularly around sexual health of youth and HIV/STD (Downing-Matibag et al., 2009; Petosa, 1991). For specific safer- sex behaviors, HBM constructs that have been most relevant and widely used have been self-efficacy in engaging in healthy behavior, perceived risks of HIV, perceived threat of HIV and perceived barriers and

benefits to adopting safer sex behaviors (Liau et al., 2000; Maguen et al., 2000; Downing-Matibag et al., 2009).

Self-efficacy is an individual's "perceived ability" to take action towards certain behavior (Menon et al., 2008; Bandura, 1977). Since it has been widely used to explain differences in health behavior, it is a construct that was later included in the HBM model (Menon et al., 2008; Rosenstock, 1988; Bandura, 1977). In sexual health interventions, self-efficacy has been the perceived ability to take action around behavior to protect individuals from HIV & STD transmission (Becker., 1984). In fact, in regards to safer-sex behaviors such as use of condoms during sexual relations, decrease in number of sexual partners, and a decrease in the number of unprotected sexual encounter, self-efficacy has constantly been shown to be a of strong predictors (Liau et al., 2000; Maguen et al., 2000; Wulfert et al., 1995; Ford et al., 1995).

Perceived threat in HBM is formed by a combination of perceived susceptibility and perceived severity to/of a negative health outcome (Becker, 1971). Various studies around unprotected sexual behaviors have found a significant relationship between safer sex behaviors such as condom use and perceived susceptibility to HIV and STDs (Wulfert et al., 1995). Perceived severity in regards to sexual risks and HIV prevention are personal evaluation of their seriousness of the health outcomes.

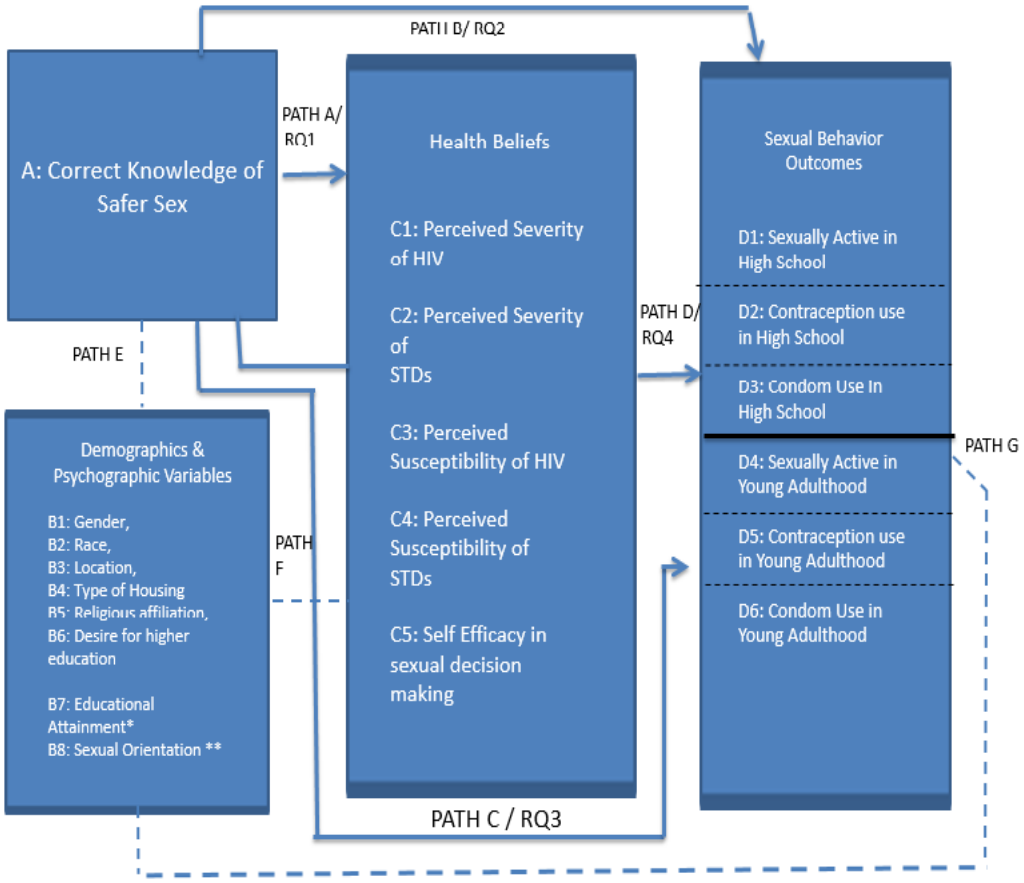

Figure 1.2: Conceptual Framework of the Study (Baker, 1974)

Notes:
*Educational attainment data was only collected at Wave Three when respondents were in young adulthood
** Sexual Orientation data was only collected at Wave Three when respondents were in young adulthood.

The basis of this study is to examine a theoretically driven analysis to discern whether predicting factors such as correct knowledge of safer sex behaviors at a young age encouraging youth to take action to adopt known healthier sexual behaviors and whether health belief constructs mediate that influence. Hence, as noted above, Path A will first aim to answer Research Question 1 by examining the influence of correct

knowledge of safer sex on health beliefs (perceived threat to HIV & STDs & self-efficacy around sexual decision making) at a cross-sectional level.

Research Question Two, which aims to examine the influence of correct knowledge of safer sex on actual sexual health behaviors at a cross-sectional level will be answered by examining Path B. Similarly, Research Question Three will be answered through an examination of Path C which aims to assess the influence of correct knowledge on sexual behavior at the longitudinal level when the same youth have reached young adulthood.

Finally, the study hypothesizes that individual perceptions and health beliefs (*Perceived Threat* and *Self-Efficacy*) mediate and account for behavior change in youth to take action around the adoption of safer-sex behaviors at both cross-sectional and longitudinal levels and that will be explored through Path D in our conceptual framework.

Significance of the Study

The results from this dissertation will inform further decision regarding the education of adolescents in the US on sexual health and well-being. The questions asked will assess the theoretical significance of correct knowledge of safer sex among the high-school age group and its ability to predict health behaviors in young adulthood. Although there still remains to be a debate around the inclusion of comprehensive sex education in schools, this dissertation will add to the debate with an analysis that is theoretically driven and includes a large nationally representative longitudinal dataset of youth in the United States.

Organization of Dissertation

Chapter 1 (present chapter) provides an introduction, the background, statement of the public health issue, an overview of the theoretical framework, the research questions and hypotheses, the significance of the study, an overview of the proposed methods used in this study. Chapter 2 is a review of the literature pertaining to the proposed role of knowledge and health beliefs on safer sex behaviors and the theoretical framework guiding the program and study. Chapter 3 presents the methodology including the design, study population, data collection methods, and the data analysis procedures. Chapter 4 presents the findings of the study. Chapter 5 summarizes the findings and discusses the research, practice, and policy implications of the study. References follow.

Chapter 2: Literature Review

Due to unsafe sexual practices and a lack of access to preventive sexual health services such as sex education; STD incidence remain highest (CDC, 2018) among high school aged youth in the United States. Furthermore, lack of correct knowledge around unprotected sex at a young age can lead to continued engagement in unprotected sex which further places youth in the US at a higher risk of acquiring HIV in the future. This chapter reviews the available and published literature on the state of sexual health among youth in the US while also shedding light on the current state of sex education in schools. In addition, literature reviewed to inform the theoretical basis of this study particularly in regards to the role that knowledge of safer sex and health beliefs play in the adoption of safer sex practices. By reviewing scientific literature on this topic, this chapter will not only explain the theoretical purpose of this study but also establish the importance of sex education programs for youth in order to improve behavioral and health outcomes not just during high school years but also when youth reach adulthood.

The organization of this chapter follows the conceptual model shared in Chapter One (Figure 1.1). Literature on the current state of sexual health will be presented first followed by an analysis of published research around the current state of sex education in the United States. Following that discussion, published findings which illustrate the connection and pathways of our conceptual model, specifically the relationship between correct knowledge of safer sex among youth, health beliefs and their impact on sexual behaviors will be presented as they indicate the basis of Path A, B, C, D in our conceptual model.

The Current State of Sexual Health Among US Youth

STD incidence is extremely high among US youth which also puts them at risk for future HIV transmission (CDC, 2018). Before we examine the STD rates in more detail, it is important to acknowledge that the biggest risk factor for STD and HIV transmission is unprotected sex (CDC, 2018). Recent data shows that youth are engaging in sex at a young age and safer sex behaviors are not adopted at the time of sexual initiation (Finer et al., 2013). A study conducted to examine data on sexual initiation and safer sex utilizing the National Survey of Family Growth found that youth between the ages of 17-19 are most sexually active while 30% of adolescents between the ages of 15 and 16 have already initiated sex (Mueller et al., 2008). In addition to the young an adolescent was when it came to engaging in sex the less likely they were to report any form of contraception use (Finer et al., 2013). To understand sexual activity among youth, we must also examine data on sexual initiation and safer sex in more detail.

Sexual Initiation & Safer Sex Behaviors

The most common reported age for people in the US to initiate sex is when they are in high school and between the ages of 15-19 years old and between 9th and 12th grade (CDC, 2018; Finer et al., 2013). The Centers for Disease Control (CDC) presented the most recent results of the National Survey of Family Growth where it reported that between the years 2011-2015, the average of sexual intercourse was 17 (CDC, 2018). The Youth Risk Behavioral Survey (YRBS) from 2005-2015 indicated that although sexual behaviors (oral, vaginal and anal) among youth had increased from 46.8% to 47.4% prevalence from 2005 to 2011, it decreased significantly from 47.4% in 2011 to 41.2% in 2015 (CDC, 2018). However, it should also be noted that a decrease in sexual initiation in

2015 does not automatically translate to safer sex behaviors and we should also closely examine contraception and condom use data among those youths are engaging in sex.

As mentioned earlier, a study which examined the latest findings from the National Survey of Family Growth reported similar results that less than although less than 1% of adolescents under the age of 12 reported sexual initiation and the majority of sexually active adolescents were between of 17-19 years old, it also reported that younger adolescents who were sexually active were also less likely to report safer sex and contraception use as compared to their older peers (Finer et al., 2013). Findings from the Youth Risk Behavioral Survey (YRBS) 2015 have also reported that 41.2% of high school students have reported being sexually active and approximately 12% have had sexual intercourse with multiple sexual partners. Among those engaging in sex, 56.9% had reported using a condom at their last sexual encounter (Kann et al., 2016).

When we look at demographics around sexual engagement we see that more males (43.2%) had reported that they were sexually active than their female peers (39.2%) and black and Hispanic high school students were most sexually active (48.5%) and (42.5%) as compared to their Caucasian (39.9%) peers (CDC, 2018).

Furthermore, by the time youth reach college years and early-adulthood, safer sex behavior is still not adopted consistently (Eaton et al., 2017; Grello et al., 2006; Flannery et al., 2003; King et al., 2001). A study that was conducted with a sample of 404 college students in the United States to assess casual sex patterns, reported that not only were 72% of the sample were sexually active but more than half had engaged in casual sex with a partner they were not romantically involved with (Grello et al., 2006). It was also reported that more males (52%) than females (36%) had reported engaging in casual sex

(Grello et al., 2006). Another study which was conducted slightly earlier in 2003 with a sample of 778 college students in California reported that a majority of college students indicated condom use with 60% of females and 63% of males reporting condom use for vaginal intercourse (Flannery et al., 2003). However, a closer examination of the data indicated that only 37% of females and only half (50%) of males had indicated condom use for anal intercourse (Flannery et al., 2003). Furthermore, only 24% females and 19% males had been screened for HIV (Flannery et al., 2003).

Data on safer sex behaviors (condom use) has consistently shown an increase in condom use among adolescents since the early nineties (CDC 2002; CDC 2017). In the early 1990s, the Youth Risk Behavior Survey reported a steady increase in condom use from 38% in 1991 among females to 51% in 2001 and an increase from 54% to 65% among males (CDC 2002). Although blacks (46%) adolescents were more sexually active than their Caucasian peers (31%), they also reported higher condom use (67%) than their Caucasian (56%) peers (CDC2002).

The findings in the Youth Risk Behavioral Survey (YRBS) also report a similar trend that the proportion of high school students initiating sexual activity has decreased significantly from 47% in 2005 to 41% in 2015 (CDC, 2018). However, it is important to note that decrease is only among 9th and 10 graders and not those in the 11th and 12th grade (CDC, 2018). The demographic examination reveals that male high school students (43%) were more sexually active than their female peers (39%) while blacks continued to report being more sexually active (48%) than their Caucasian (39%) peers (CDC, 2018).

In regards to condom use, YRBS data from 2015 reported that condom use among adolescents decreased from 63% in 2003 to 57% in 2015 (CDC, 2015). Use of any form

of contraception including birth control increased from 11.3% in 2003 to 13.8% in 2015, however it significantly decreased from 16.8% in the early nineties (CDC 2015). The 2015 YRBS data also reported that 43% of high school students did not report using a condom at their last sexual encounter while 14% did not use any form of contraception including birth control (CDC 2015).

It is also important to mention here that the YRBS data excludes youth who may not be enrolled in high school and thus it does not include unprotected sex data for those youth who may not be enrolled in school but also engaging in unprotected sex.

STDs and Youth

Unprotected sex is a known risk-factor among youth in the United States. In light of the discussion above regarding unsafe sex among high school aged students, it is no surprise that the highest rates of STD and HIV are also most prevalent among youth and young-adults (CDC, 2018). The Centers for Disease Control and Prevention (CDC) reported that adolescents between the ages of 15-24 account for only a quarter of the sexually active population in the United states but also account for 10 million (half) of the estimated 20 million new STD infections in the United States (CDC, 2018).

If one were to examine specific state-level data across the US, one would also find that most states reported an average of 5-6% positivity rate of STDs among their youth residents (CDC, 2011). In the United States, almost one in four (26%) of all new HIV infections occur among youth between the ages of 20 and 24 (CDC, 2012; CDC, 2016). The age-group with the highest HIV rates (7.964) in 2016 were among young-adults between the ages of 25 - 29 (CDC, 2016) followed by the 20-24-year-old age bracket (6776).

Chlamydia. Among adolescents between the ages of 15-24, there were 1,008, 403 cases of chlamydia reported in 2016 (CDC, 2018). Among the high school age bracket of 15-19, the reported cases of chlamydial infection in 2016 were 407,230 which was a 4% increase from 2015 and among the college-aged group of 18-24, the reported cases were even higher (601,173) and also a 1.9% increase from the year before (CDC, 2018). Females reported higher chlamydial infections – 346,430 cases among 15-19-year-old and 400, 620 cases among 20-24-year olds – as compared to their male peers – 86,150 among 15-19-year-old and 152,772 cases among 20-24-year olds (CDC, 2018). Table 2.1 presents the reported cases and rates per thousand of chlamydia cases in the United States by age and sex for the year 2016.

Table 2.1

Chlamydia: Reported Cases and Rates of Reported Cases by Age and Sex, 2016

Age Group	Total Cases	Male	Female	Un-known Sex	Total Rates per 1000	Male	Female
0- 4	597	225	368	4	3.0	2.2	3.8
5- 9	188	25	161	2	0.9	0.2	1.6
10-14	10,571	1,341	9,206	24	51.3	12.7	91.1
15-19	407,230	89,899	316,639	692	1,929.2	832.6	3,070.9

20-24	601,173	181,857	418,388	928	2,643.8	1,558.6	3,779.0
25-29	298,176	114,484	183,222	470	1,327.5	1,003.4	1,657.8
30-34	133,062	58,583	74,226	253	613.9	538.0	688.2
35-39	66,669	31,671	34,872	126	327.2	311.3	341.8
40-44	32,548	16,784	15,705	59	161.0	167.3	154.2
45-54	32,316	19,569	12,683	64	74.8	91.9	57.9
55-64	9,321	5,942	3,354	25	22.8	30.1	15.8
65+	1,772	1,161	597	14	3.7	5.5	2.2
Unknown Age	4,731	1,329	3,298	104			
TOTAL	1,598,354	522,870	1,072,719	2,765	497.3	330.5	657.3

Source: CDC, 2018

Gonorrhea. The rate of gonorrhea increased 11% from 2015 to 2016 among the 15-19-year-old age bracket as well as for the 20-24-year-old age bracket (CDC, 2018). When look at the gender breakdown we see that women had higher reported cases per 100,000 (540.8) as compared to their male (455.3) peers (CDC, 2018). Table 2.2 below presents the reported cases and rates per thousand of gonorrhea cases in the United States by age and sex for the year 2016.

Table 2.2

Gonorrhea: Reported Cases and Rates of Reported Cases by Age and Sex, 2016

Age Group	Total Cases	Male	Female	Unknown Sex	Total Rates per 1000	Male	Female
0- 4	187	72	113	2	0.9	0.7	1.2
5- 9	98	16	81	1	0.5	0.2	0.8
10-14	2,436	498	1,929	9	11.8	4.7	19.1
15-19	80,172	30,316	49,710	146	379.8	280.8	482.1
20-24	138,130	71,967	65,930	233	607.5	616.8	595.5
25-29	101,283	62,189	38,881	213	450.9	545.1	351.8
30-34	57,646	38,193	19,306	147	265.9	350.7	179.0
35-39	34,058	23,744	10,230	84	167.2	233.4	100.3
40-44	19,104	14,116	4,935	53	94.5	140.7	48.5
45-54	24,142	19,762	4,330	50	55.9	92.8	19.8
55-64	8,138	6,947	1,178	13	19.9	35.2	5.6

65+	1,599	1,403	191	5	3.3	6.7	0.7
Unknown Age	1,521	810	685	26			
TOTAL	**468,514**	**270,033**	**197,499**	**982**	**145.8**	**170.7**	**121.0**

Source: Centers for Disease Control, 2018

The statistics indicated above provide preliminary evidence that not only are youth in the United States engaging in unprotected sex but high rates of STD incidence at young adulthood prove that unsafe sexual behaviors possibly are not being reduced as youth get older.

Although it is easier to deduce the connection between unprotected sex and STD infection, it is harder to deduce the possible causes of what may lead youth to engage in unprotected sex or what protective factors successfully prevent youth from engaging in unprotected sex. This study hopes to answer some of those questions through theoretically examining the possible - direct and indirect influence - of knowledge and health beliefs on safer sex behaviors not just at a cross-sectional level but also in predicting the maintained adoption of safer sex behaviors overtime.

In the conceptual framework shared in Chapter One (Figure 1.1), it was presented that a possible reason why youth may be engaging in unprotected sex could be their lack of correct knowledge of safer sex behaviors (Path A) and poor health beliefs (Path D) in regards to their susceptibility to these diseases as well as the severity of these diseases (Mueller et al., 2008, Wilson., 2000; Landry et al., 2003). In addition, some youth may

lack the skills (Path D) that are essential for safer sex behaviors such as condom negotiation with their sex partners (Halkitis et al., 2013; Downing-Matibag et al., 2009; Liau et al., 2000; Maguen et al., 2000; Wulfert et al., 1995). A possible first step towards gaining a better theoretical understanding of what risk and protective factors influence safer sex behaviors, one must first try to examine the available published research on knowledge, health beliefs and skill regarding safer sex behaviors.

In order to understand and assess the current level of correct knowledge and health beliefs regarding safer sex behaviors among high school youth, it is imperative that we first start with examining the present state of sex education interventions in US schools.

Sex Education in US Schools

The data shared above provided rates for two major age-brackets of youth, 15-17-year olds and 20-24-year olds. These brackets can also be referred to as high-school aged youth and college-aged youth. As mentioned earlier, the average age for sexual initiation among youth is 17 years of age that is also the time when majority of the youth are also enrolled in high school (CDC, 2018). A possible reason that youth have been found to not engage in safer sex behaviors at the age when they begin to experiment with their sexuality, could be a possible lack of education and awareness around sexual health (CDC 2014; Stanger-Hall et al., 2011). Sex education in schools could prove to be beneficial not only because youth primarily initiate sex during these formative years but school environments are also where youth interact socially, romantically, emotionally and sexually with other peers in their network – a network where STD rates are also known to be highest (CDC, 2018).

Sex Education: A Historical Perspective. In earlier studies conducted in the area of comprehensive sex education in high schools, the perceived goal of school-based sex education programs was on ensuring student knowledge of anatomy and physical development indicators. As the field progressed, these programs included topics of sexual activity, decision making and safer sex practices such as condom use and mutual monogamy (Stanger-Hall et al., 2011., Advocates for Youth., 2007 Haffner., 1997). As the majority of school-based sex education programs were broadening their scope, it must be noted that a significant number of schools (34%) were still mandating abstinence as the only method of safer sex in their curriculum, 51% of schools recommended abstinence while the remaining 15% included both abstinence along with education on condom/contraception as safer sex options in their curriculum (Stanger-Hall et al., 2011., Advocates for Youth., 2007 Haffner., 1997).

One of the challenges around implementing sex education in schools was the fact that schools relied heavily on teachers and educators for the delivery of such programs instead of school-based health educators (Darroch et al., 2000). Historically sex education had been taught by seasoned teachers who had either undergone supplemental training or possessed past experience in sex education instruction (Darroch et al., 2000). This remains somewhat true to this day as well where sex education does not fall under the teacher's primary job function but in fact a part of other various curriculums that they teach from biology to health education (Lloyd et al., 2012; Darroch et al., 2000).

Studies conducted in the early 2000s, reported that teachers who taught sex education often faced considerable resistance from parents, local community and even school administration when including topics beyond abstinence within sex education

curriculums (AAP, 2002; Sonfield et al., 2001; Stanger-Hall et al., 2001). Teachers who included topics of HIV and STD prevention were limited to abstinence as the most preferred method of safe sex while topics around homosexuality were deemed even more controversial and rarely ever included within the curriculums (Advocates for Youth., 2001).

Even with the support from teachers to include topics around condom use and contraception use, educators remain limited by the scope of the federally funded "abstinence only" programs in certain parts of the United States particularly states like Idaho, Louisiana, Texas and Virginia (Landry et al., 2003). It is important to also discuss the few schools that recognized the critical need of comprehensive sex education in place of abstinence only education from very early on. Rhode Island was among some of the first states in the United States to actually implement mandatory sex education in schools (Inman et al., 2011; Zinth et al., 2007).

One of the reasons why abstinence education was more pervasive in school sex education curriculums is the simple fact that "abstinence only" programs received more federal funding as opposed to HIV/AIDS education and contraception programs (Kirby., 2006). It has been estimated that $1 billion dollars have been allocated by the federal government since 1996 for "abstinence only" programs. Some of the funding sources for such programs include Title V, Community Based Abstinence Education Grant Program and the Adolescent Family Life Act (Denny et al., 2006). In addition, Section 510 of the Social Security Act allocated up to $50 billion for "abstinence only until marriage" programs in schools (Sonfield et al., 2001). All the above-mentioned federal programs discourage the inclusion of topics around contraception and condom use, as they are

assumed to encourage and promote early sexual initiation among adolescents (Advocates for Youth., 2001).

Although the majority of the literature pertaining to sex education in US schools has been published from 1980- to 2000, some of the more recent literature indicates that a comprehensive sex education curriculum has still not been implemented across all schools in the United States, with some schools still implementing abstinence only programs in schools (Stanger-Hall et al., 2011). The following section sheds light on the current state of sex education in US schools and whether any progress has been made around this particular issue.

Sex education: The current state. Even today a large number of teachers agree that HIV/AIDS, STD and pregnancy prevention topics should always be included in existing sex education curriculums yet, very little progress has been made around implementing a uniform curriculum of comprehensive sex education across the United States (Planned Parenthood 2018; CDC 2014). It should also be noted that the decision to implement sex education in schools still rests largely on the specific schools instead of district wide mandates (Planned Parenthood 2018; Zinth., 2007). Although the policies have improved somewhat since the early nineties, all districts in the Unites States have yet to establish official policies regarding the provision of sex education in schools (Zinth., 2007).

Currently 24 states mandate sex education while 34 have gone on to mandate HIV education in their high schools (Planned Parenthood 2018). One important point to note is that the specific curriculums of sex education differs across regions in the United States. Schools in states like Idaho, Louisiana, Texas and Virginia are still not mandated

to provide sex education and HIV education in schools and thus are still more likely to encourage "abstinence only" topics while schools in other regional areas could include education around condom use and contraception use (Planned Parenthood 2018; Lloyd et al., 2012).

Another study conducted in 2008 which sought to assess the different sex education programs in Illinois reported that although sex education was provided in some form in all or most schools, some extremely important topics around correct use of condoms, sexual orientation, and HIV transmission remained omitted from the curriculum (Lindau et al., 2008). An agenda for improved sex education published in 2010 in the Journal of American College Health, went as far as to recommend that sex education programs for male ethnic minorities should begin even earlier than high school (Lindberg et al., 2012; Buhi et al., 2010).

The majority of the public has overall supportive of sex education in schools. A survey conducted in 2012 by the National Campaign to Prevent Teen and Unplanned Pregnancy reported that a vast majority (93%) of adults in America supported comprehensive sex education in schools while seven in 10 American did not find "abstinence only" programs to be "realistic" for youth (National Campaign to Prevent Teen and Unplanned Pregnancy, 2012). Another poll conducted in 2008 with parents of high school students in Washington DC reported the exact same majority (93%) parents supportive age-appropriate comprehensive sex education as opposed to abstinence-only education (Swenson, S., 2008). However, this particular issue continues to spark controversy among citizens of more conservative states like Idaho ad Texas where some parents still argue that sex education in schools could be a reason for increased sexual

activity among students (Planned Parenthood 2018; Lloyd et al., 2012; Lindberg et al., 2012). Even though studies have been conducted to demonstrate that sex education does not promote early sexual activity but in fact such programs only increase correct knowledge of safer-sex and which could increase the likelihood of students engaging in safer sex behavior when they do initiate sex (Stanger-Hall et al., 2011).

Youth have also expressed their support for sex education in schools and a national survey found that 87% of youth supported comprehensive sex education (National Campaign to Prevent Teen and Unplanned Pregnancy, 2012). A qualitative study which explored some of the challenges that youth face when seeking STD preventive and diagnostic services, found that inaccurate knowledge as well as myths around STDs were some of the biggest challenges that youth faced when making the decision to seek sexual health services (Maley, 2013). Students in the focus group advocated for increased education around sexual health to help clear certain misunderstandings to make it easier for them to make the safer sex decisions (Maley, 2013).

There has also been support and advocacy from national organizations such as the American Medical Association and the American Academy of Pediatrics for widespread implementation of sex education in schools to encourage education around the proper use of safer sex methods to reduce risks for HIV, STDs and unintended pregnancies among youth (McKeon, 2006; AAP., 2002).

Although, there is overwhelming support for sex education and some progress has been made since the early nineties, recent data from the School Health Policies and Practices Study indicated that in 2014, 76% of US schools still taught abstinence to be the

most effective method to prevent unintended pregnancies, STD and HIV infections (CDC 2014). The study also found that a little over half (53%) of schools gave students information on how to obtain contraception while only half (50%) of schools gave students information how to obtain condoms (CDC 2014). Only 35% of the schools taught students the skills on how to correctly use condoms (CDC 2014). Public support for abstinence-only education has existed in the past primarily because sex education has been viewed as a method to encourage early sexual initiation while abstinence only education is believed to not only discourage and delay sexual initiation but also prevent teenage pregnancy (Rector, 2002; Manlove et al., 2004). However, even with support for abstinence only education, nationwide polls have found that, when surveyed only 15% of parents want only abstinence-only education while a majority (90%) wanted an inclusion of broader topics around safer sex as well (Daillard, 2001; Santelli et al., 2006)

The above analysis of data and published literature confirms the need for youth-focused programs that provide age-appropriate sex education curriculums that include topics on correct methods of safer sex as well as HIV/AIDS and STD prevention education. The provision of such interventions before the mean onset of sexual intercourse (at age 17) would encourage youth to adopt safe-sex practices from the outset and therefore reduce their likelihood of acquiring HIV as they proceed into young adulthood. It is because of this association between education, knowledge, beliefs and behavior that public health experts across the United States have urged for increased sex education for youth as a preventive strategy (Mueller et al., 2008, Wilson. 2000; Landry et al., 2003).

This study aims to delve deeper into a theoretical examination of the short-term and long-term influence of correct knowledge and health beliefs on safer sex behaviors. Thus, it is important to now review the available literature on the relationship between correct knowledge of safer sex behaviors and health beliefs (Path A) but also the role of correct knowledge on safer sex behaviors – short-term and long-term - which is Path B and Path C in our conceptual framework. Published literature on any influence – direct or indirect – of health beliefs and skills on safer sex behaviors (Path D) will also be reviewed.

Theoretically Driven Analysis of Safer Sex Behaviors

In this chapter so far, we have reviewed published literature to able to establish the fact that youth are engaging unprotected sex as evident by high STD rates among youth in the United States (CDC, 2018), and we have also attempted to assess the current state of sex education programs and poor knowledge about safer sex among youth in high school, to attempt to better understand a possible cause for unprotected sex among youth. This study, aims to utilize a theoretical framework to delve deeper and better understand the influence of high knowledge of safer sex on safer sex behaviors not only in high school but also assess whether the correct knowledge of safer sex remains to be a strong predictor of safer sex behaviors overtime.

Before proceeding with the analysis however, an important question to address is whether correct knowledge of safer sex directly influences safer sex behaviors of whether it influences an individual's health beliefs which in turn mediate that influence. Thus, our conceptual framework aims to theoretically examine the same sample of youth overtime through proposed pathways to establish the direct influence of correct

knowledge on safer sex (Path B and C) but also establish the relationship between correct knowledge and health beliefs (Path A) and the possible mediating influence of health beliefs (Path D).

Let us now, review the published literature on these proposed pathways from our conceptual model and deconstruct not just literature on our independent/predictor variable (correct knowledge of safer sex) but also our mediating variables which are constructs from the health belief model (perceived severity of HIV & STDs, perceived susceptibility to HIV & STDs, self-efficacy in sexual decision making)

The Role of Correct Knowledge on Safer Sex Behaviors

The primary method to prevent STDs and HIV among sexually active individuals remains to be through the proper use of safer sex barriers, namely condoms. Studies have been conducted to evaluate knowledge around STDs and HIV but also to assess factors that lead to consistent use of condoms among youth (Futterman., 2005., Inungju et al., 2009, Flack et al., 2007). Most of the studies found that a lack of accurate information around sexual health continues to exist among youth to this day. One of the main reasons young women used condoms is to avoid pregnancy as opposed to a fear of STD transmission (Mueller et al., 2008, Wilson., 2000, Landry et al., 2003, Chandler et al., 2016, Bearman et al., 2001, Basen-Enquist et al., 2001). Such findings become particularly troubling since there may be various forms of contraception but all of them do not necessarily prevent youth from STDs or HIV. A majority of the women who had been diagnosed with an STD, had inaccurate knowledge about sexually transmitted diseases and had also never been counseled on the risk of reinfection or the risk of

incurable diseases such as HIV/AIDS at the time of their positive STD diagnosis (Futterman., 2005., Inungju et al., 2009).

Comprehensive sex education in schools can significantly increase the level of correct knowledge that youth have around safer sex behaviors and youth who have high correct knowledge of safer sex methods have shown to be more likely to postpone their sexual initiation to the age of 17-19 years old while those who may engage in sex prior to that age report a lack of contraception and condom use (Finer et al., 2013, CDC, 2018, Stanger-Hall et al., 2011, McKeon et al., 2006, Kirby, 2002., Bearman et al., 2001). When women do become sexually active at a later age, they are more likely to use condoms and other means of contraception (Finer et al., 2013, CDC, 2018). On the other hand, students who are taught that abstinence is the only option, often engage in either incorrect use of condoms and in some cases no use of condoms at all when they do become sexually active (Stanger-Hall et al., 2011., Advocates for Youth., 2007, Bearman et al., 2001). Most of the studies that measured the influence of sex education and increased knowledge of safer sex behaviors on actual safer sex behaviors were conducted in the eighties and nineties and there is a lack of recent research with US youth although there have been studies that have been conducted in other parts of the world (Zhao et al., 2016) In addition, among most studies that were conducted at a cross-sectional level and thus it is still difficult to determine whether these programs had any positive effect on actual behavior over time (Zinth et al., 2007, Warren et al., 2008, Mueller et al., 2008). A study published in 2008 which analyzed results from the National Survey of Family Growth 2002 did find that receiving sex education not only delayed sexual activity among males (OR=0.42) and females (OR=0.41) but males who were sexually active also

indicated greater odds of using contraception (OR=2.77). However as mentioned earlier, this study only measured the effect at a cross-sectional level (Mueller et al., 2008). Another study conducted in the early nineties, found that sex education, programs that included topics around postponement of sexual activity and birth control led to greater condom use. (Strunin et al., 1990). However not only was this study also cross-sectional in nature but conducted decades ago.

When we examine demographics, we discover that African Americans and Latinos are less likely than their Caucasian peers to have correct knowledge of sex education in schools while more women than men have indicated correct (Inungu et al., 2009). However, this study was conducted at a cross-sectional level only to assess knowledge and misconceptions among a small sample of 1000 students at a Midwestern University and thus although this study sheds light on the possible influence of knowledge on sexual behaviors, it cannot be generalizable to a representative sample of youth in the United States (Inungu et al., 2009).

The Role of Health Beliefs on Safer Sex Behaviors

The conceptual framework for this study included constructs from the Health Belief Model while hypothesizing that these constructs could possibly mediate the influence of correct knowledge of safer sex on actual safer sex behaviors over-time (Downing-Matibag et al., 2009; Petosa, 1991). There have been several published studies on theoretical predictors of unsafe sexual behavior and STD/HIV testing behavior. Among existing conceptual frameworks, the one most commonly used to explain health behavior particularly around sexual health of youth is the Health Belief Model (HBM) (Carpenter et al., 2010, Downing-Matibag et al., 2009; Petosa, 1991). HBM constructs

that have been found to be most applicable to sexual health behavior and HIV/STD prevention have been self-efficacy of engaging in safer sex behavior and the perceived threat of HIV and STDs (Carpenter et al., 2010, Halkitis et al., 2013; Downing-Matibag et al., 2009; Liau et al., 2000; Maguen et al., 2000; Wulfert et al., 1995). Perceived barriers and perceived benefits of engaging in safer sex behaviors have also been known to be relevant constructs from HBM in regards to understanding sexual health behavior.

Perceived Threat and Safer Sex Behaviors. Perceived threat in HBM is formed by a combination of perceived susceptibility and perceived severity to/of a negative health outcome. (Carpenter et al., 2010). Perceived susceptibility is the personal evaluation of individuals of how great their risk of a negative health outcome may be while perceived severity in regards to sexual risks are personal evaluations of the seriousness of the health outcomes.

Various studies around unsafe sexual behaviors have found a significant relationship between safer sex behaviors such as condom use and Perceived Susceptibility to HIV and STDs however the majority of those studies have been cross-sectional in nature (Zhao et al., 2012; Liau et al., 2000; Maguen et al., 2000; Wulfert et al., 1995). A study was conducted with college students in the US which aimed to examine HBM as a comprehensive model on predictive patterns around both safer sex behaviors as well as testing practices (Zak-Place et al., 2004). The study found that self-efficacy had the highest predictive value for both condom use as well as testing practices. In addition, perceived susceptibility and perceived severity were also found to be significant predictors for HIV testing intentions (Zak-Place et al., 2004). However, this study was also only cross-sectional in nature. Another study conducted with gay and

lesbian youth specifically found that perceived susceptibility to disease as well as perceived barriers to testing were the main predictors to HIV testing practices among youth however outcomes variables on actual safer sex behaviors were not collected. The study recommended increasing awareness programs and education among youth who indicate low perceived susceptibility to sexually transmitted diseases including HIV however since this study was only cross-sectional, it is important measure the effect of these constructs overtime as well (Maguen et al., 2000).

Although scant, longitudinal studies have been conducted on the direct effect of health beliefs on behaviors – not necessarily sexual behaviors (Carpenter et al., 2010). However, specific research on the mediating effect of health belief constructs on sexual behavior overtime while including correct knowledge of safer sex as an independent variable in a theoretical model remains to be studied in more detail. In 2010, The University of Illinois conducted an updated meta-analysis on longitudinal studies of the effect of health belief constructs as predictors of different behaviors – not specifically safer sex behaviors – and found that health belief constructs did not indicate a strong correlation with behaviors in the long run (Carpenter et al., 2010). As mentioned earlier, although this study reviewed longitudinal studies, the meta-analysis did not focus on specifically safer sex behaviors. The meta-analysis also reported the limitation of not reviewing enough studies. Furthermore, although studies could assess the longitudinal effect of health beliefs, it is important to note that these studies focused on health belief constructs primarily as an independent variable instead of mediating variables on another independent variable while also accounting for demographic. This dissertation aims to add to existing research through an analysis that is theoretically driven and sheds light on

the relationships between sex education and health beliefs and their effect on safer sex behaviors specifically as a public health issue.

Research regarding demographic differences regarding health beliefs particular to safer sex behaviors is scant. Most studies have been conducted with racial and sexual minority groups separately. In addition to the study cited above (Maguen et al., 200) which was conducted with LGBTQ youth, another qualitative study was conducted with a sample of racial/ethnic minority youth in New York City. This cross-sectional study aimed to qualitatively assess, the level of health beliefs among city youth regarding HIV risks and transmission (Schnall et al., 2016). The study found that a majority (73%) of the focus group respondents indicated high perceived severity of HIV but only 15% believed that they were at risk for HIV (Schnall et al., 2016). Respondents were not asked specifically about their perceived threats to STDs or self-efficacy in sexual decision making. In addition, this study was localized with urban youth in New York City so it cannot be generalizable to all youth in the US and thus it is important to also compare beliefs with youth who live in rural and urban areas. Another qualitative study which was conducted with college students in a college in Iowa, did include questions regarding health beliefs specific to STDs and found low levels of perceived threats for HIV and STDs among students, however this study was conducted only with college students in the mid-west and cannot be generalizable to all US youth (Downing-Matibag et al., 2009). In addition, the study was only conducted with college students and excluded high-school aged youth.

Literature also indicates that racial minority youth are less likely to have received a curriculum-based sex educational program in high school as compared to their

Caucasian peers (Inungu et al., 2009). Furthermore, racial minority youth have been found to be more sexually active than their Caucasian peers (YRBS 2015). This may explain why the current disease burden of HIV/AIDS among youth seems to be more prevalent among racial minorities particularly African American youth and Latino youth and young men who have sex with men (CDC, 2016).

Self-Efficacy and Safer Sex Behaviors. In addition to knowledge-based health belief constructs, literature has also indicated the important of skill-based constructs such as self-efficacy. Self-efficacy is a construct that can be defined as an individual's "perceived ability" to take action towards certain behavior (Bandura., 1977; Rosenstock., 1988). Since it has been widely used to explain differences in health behavior, it is a construct that was later included in the HBM model (Rosenstock., 1988; Bandura., 1977). For safer-sex behaviors such as condom-use, HIV testing practices and a decrease in the number of unprotected sexual encounters, qualitative studies have reported that self-efficacy is also a strong predictor (Downing-Matibag et al., Maguen et al., 2000).

A study conducted at the University of Mississippi, aimed to assess the association between safe sex self-efficacy and safe sex behavior among college students. The study did find a strong association (OR=1:08) between self-efficacy score and safe sex practice (Addoh, Sng, & Loprinzi, 2017). Once again, this study measured level of self-efficacy at a cross-sectional level and among young-adults thus it does not provide information of the sample's level of self-efficacy when they were in high school and if this strong association is due to the strong pervasiveness of self-efficacy as a construct or whether it has a strong association at a cross-sectional level and among older youth.

A study in sex workers in China combined HBM and Social Cognitive Theory for a health education intervention (Zhao et al., 2012). The intervention aimed to increase not only knowledge of HIV prevention but also perceived threat (perceived severity + perceived susceptibility) and self-efficacy among sex workers exposed to the health education intervention. The study found that use of HBM constructs led to a significant increase in safer sex behavioral outcomes such as condom use among the population. However, this strong association was found not only with a sample outside of the United States but also with a different population than high-school aged youth.

Once again, it is important to note that most studies – both quantitative and qualitative - around the influence of self-efficacy and safer sex behaviors were only conducted at a cross-sectional level.

Conclusion

In light of the high rate of STDs among youth in the United States, there is a need for increased sexual health interventions which increases correct knowledge of safer sex and improves safer sex health beliefs among adolescents to mitigate unsafe sexual behaviors at that particular time as well as in the long-run. Since it has been hard to attribute positive health outcomes as a result of knowledge based interventions on a longitudinal level with very few studies that measure the influence of knowledge and health beliefs on safer sex behaviors at a longitudinal level, this study will aim to add to current literature through a theoretically driven analysis of secondary data from a nationally representative sample of high-school aged youth who indicate correct knowledge of sexual health and its effect on safer sex behaviors over time while accounting for differences in demographics and the possible mediating effects of health

belief constructs. Findings from this particular study will add valuable input to existing cross-sectional research that emphasizes upon the importance of the formulation of a responsive health education programming for adolescent youth in the United States.

Chapter 3: Methods

This chapter describes the research methodology that was used to conduct the study. It includes the research questions, study design, study sample, data collection and acquisition as well as data analysis procedures. This chapter also describes the protection of human subjects as well as possible study limitations. This study utilized secondary quantitative data to answer all four of the research questions. The study protocol was approved by the Institutional Review Board at the George Washington University (IRB#061332).

Overview

The purpose of this research was to conduct a theoretically driven examination to assess whether possessing correct knowledge of safer sex among high-school aged youth significantly increased the adoption of safer sex behaviors in high school as well as when those same youth reached young-adulthood while also assessing whether individual health beliefs play a role in mediating the outcome. This theoretical examination was achieved by a quantitative analysis of secondary data from the National Longitudinal Study of Adolescent Health (Add Health). Add Health data has been collected by the University of North Carolina, Population Center through a longitudinal study of a representative sample of adolescents in the US between grades 7-12 from 1994 to 2016. This chapter will describe the methodology that was applied to test the study hypothesis.

Research Questions and Hypotheses

This study addressed four main research questions which were all based on the different pathways (Path A, B, C and D) in our conceptual framework (Figure 1.1). Each

research question below aims to explore a path in our conceptual framework and test the following hypotheses.

Research Question 1. What is the influence of correct knowledge of safer sex practices on individual health beliefs regarding safer sex behaviors of adolescents in high school?

Hypothesis 1.1.: Adolescents with higher levels of correct knowledge of safer sex report (a) higher self-efficacy in sexual decision making, (b) higher perceived severity of HIV/AIDs & STDs and (c) higher perceived susceptibility to HIV/AIDS & STDs.

Research Question 2: What is the influence of correct knowledge of safer sex on individual sexual health behaviors of adolescents in high school?

Hypothesis 2.1: Adolescents with higher levels of correct knowledge of safer sex are more likely to practice safer-sex behaviors in high school.

Research Question 3. What is the influence of correct knowledge of safer sex reported among adolescents in high school on sexual health behaviors five to seven years later during young adulthood?

Hypothesis 3.1: Adolescents with higher levels of correct knowledge of safer sex are more likely to practice safer-sex behaviors five to seven years later in young-adulthood

Research Question 4. What is the mediating influence of adolescent's health beliefs in high school on safer sex behaviors in high school and later in young-adulthood?

Hypothesis 4.1: Higher self-efficacy in decision making around sexual choices, higher perceived severity of HIV/AIDS & STDs and higher perceived

susceptibility to HIV/AIDS & STDs in high school mediate the influence of correct knowledge on safer sex behaviors in high school and later in young-adulthood.

Study Design

The goal of this study was to assess the contribution of correct knowledge of safer sex and health beliefs among high-school aged youth on safer sex behaviors through a theoretical lens. Based on the conceptual framework (Figure 1.1), the research questions and corresponding hypotheses, the outcome variables tested in this study for safer sex behaviors are 1) currently sexually active, 2) contraception use at last sexual encounter, and 3) condom use at last sexual encounter. In addition, the predictor/independent variable that was used in this study was 1) correct knowledge of safer sex. The study also included theoretically selected mediator, particularly 1) self-efficacy in sexual decision making, 2) perceived severity to HIV, 3) perceived severity to STDs, 4) perceived susceptibility to HIV, and 5) perceived susceptibility to STDs.

The study design closely followed the conceptual framework (Figure 1.1) shared in Chapter One which not only displays our independent variable, our mediator variables and our outcome variables. Also included in the framework are four major pathways which aim to answer all four of our research questions. Path A was explored first which aimed to answer Research Question 1 by examining the influence of correct knowledge of safer sex (independent variable) on our mediator variables, which are health beliefs (perceived threat to HIV & STDs and self-efficacy around sexual decision making) at a cross-sectional level. Path B aimed to answer Research Question 2, by examining the influence of correct knowledge of safer sex (independent variable) on actual sexual health

behaviors (outcome variables) at a cross-sectional level while Path C aimed to answer Research Question 3 by assessing the influence of correct knowledge (independent variable) on safer sex behavior (outcome variables) at the longitudinal level when the same youth have reached young adulthood. Lastly, Path D explored the possible mediating influence of health beliefs (mediator variables) by assessing the influence of correct knowledge (independent variables) on safer sex behaviors at a cross-sectional level and longitudinal level (outcomes variables) while including our mediator variables in the analysis.

This theoretical examination was conducted through a quantitative analysis of secondary data. A secondary quantitative analysis was judged to be most appropriate for our research questions using the AddHealth data since it is the one of the largest longitudinal data sets that has successfully followed a representative sample of adolescents in the US from early adolescent towards early-adulthood and adulthood (UNC., 2013).

Data analysis occurred at the cross-sectional level as well as at a longitudinal level. The initial cross-sectional analysis aimed to assess whether there was a bi-directional theoretical relationship between correct knowledge of safer sex with individual health beliefs and safer sex behaviors. In addition, the relationship between correct knowledge and health behaviors was also examined at the cross-sectional level. The second phase of analysis occurred on a longitudinal level to assess whether a theoretical relationship existed between correct knowledge of safer sex as predictors of positive behavioral outcomes over time by assessing whether safer sex behaviors were maintained overtime through young-adulthood.

Study Population

The sample for this study was drawn from a stratified, nationally representative sample of students from public and private high schools in the United States with a maximum possibility of student sample to be at 20,745 (N = 20,745). The original AddHealth sample was recruited from 80 high schools and 52 Middle Schools. The Quality Education Data was used to recruit the schools and were selected from a stratum which was diversified based on regional settings (urban versus rural), type of schools as well as racial and ethnic composition. Quality Education Data is a large dataset utilized mostly since its inception in 1981 to offer marketing and promotional services to the education sector (MCH 2014).

For this study, only the sample of students from high-schools was used in the analysis thus the inclusion criteria for the study population was to include only students who were in high-school (> or equal to 15 years of age) and who had completed the In-Home Surveys at Wave One and Three (n=10,766).

Data for this study included demographic information as well as health and health behavior information. The data was compiled by merging Waves One and Three of the In-Home survey. The surveys were merged using student identification numbers.

Protection of Human Subjects

Expedited approval for ethical clearance was obtained from the Internal Review Board (IRB) of The George Washington University, Office of Human Research (OHR) (IRB# 061332). There were no ethical concerns involved with this study and it was determined that this study posed minimal risks to subjects since it is a secondary analysis and thus fell under the expedited review category of research.

The researcher and all committee members verified completion of the (Collaborative Institutional Training Initiative) CITI training. According to the Data User Agreement (Available upon request) once the restricted AddHealth data were released to the researcher it was only accessible to the researcher and the committee chair in strict confidence. Data were stored on a stand-alone and password protected computer which had been identified by the GWU Informational Technology (IT) Department. The service tag for the computer was 73MHTH1. The computer remained in a locked office which only the researcher and the committee chair had access to. All data analysis was completed in this designated space. Data files were only used for the statistical analysis as per the study hypothesis and no attempts were made to seek identifying information on the subjects.

Data

The National Longitudinal Study of Adolescents Health was conducted by the University of North Carolina Population Center from 1994 to 2016. It is a nationally representative sample of adolescents in the US between grades seven through 12. The study used a cluster sample design, with a sample of 80 high schools and 52 middle schools that were stratified into 80 clusters with unequal probability. It should be noted that the clusters were also the primary sampling unit for the survey.

Adolescents in the selected schools were all eligible for participation in the study including all four waves of data collection. Although all students in schools completed the in-school survey, a sample of those students were then surveyed and followed up for the additional surveys across the remaining three waves. Those additional surveys consisted of an In-Home Survey, Parent/Partner survey and Bio-marker specimen

collection. The specific surveys which are of most importance to this study are the In-Home Surveys at Wave One and Wave three as those surveys included the variables of interest for this study.

The first wave of data collection (Wave One) occurred in the 1995 school year with an N of 20, 745. Subsequently, the Add Health sample was then followed into young adulthood for in-home interviews at Wave Two in 1996, Wave Three in 2002 when individuals were approximately 20-25 years old (college-aged), Wave Four in 2008 individuals were approximately between 26-30 years old (young adults) and Wave Five in 2016 when individuals were approximately between 31-38 years old. The N for the other waves was Wave Two (14,736), Wave Three (15,197) and Wave Four (15, 701). Wave Five data has only been partially released.

Description of Variables

For the purpose of this study, the way the variables were measured depended on the questions that were asked in the *In-Home Questionnaire*. Some variables had more than one question to measure the construct thus it was important to construct variables in a way that they could be measured as a single variable. Some variables were dichotomized as dummy variables for the analysis while others were kept as continuous variables. Respondents who were below the age of fifteen were excluded from the analysis as specific questions around sexual health were not asked of these respondents during the survey in Wave One.

In the original dataset, the total sample in Wave One was 20,745 and in Wave Three it was 15,197. Once the relevant variables were constructed, both Wave One and

Wave Three data were merged and linked based on the unique identifiers. The total sample of subjects (N) for this analysis once the datasets were merged was 10,766.

Table 3.1 lists the variable measured, the time (Wave) when the variables were measured to distinguish between the cross-sectional analysis (Wave One) from the longitudinal analysis (Wave Three), the level of measurement and the possible range of responses.

Table 3.1

Measurement of Variables

Variable	Data wave	Data level	Data codes
Demographic & Psychographic variables			
Gender	One	Nominal	0 = Male 1 = Female
Race (Recoded from the original variables)	One	Nominal	0 = White 1 = Minority
Location	One	Nominal	0 = Rural 1 = Urban 2 = Suburban
Religious Inclination	One	Nominal	0 = No, Not Religiously Inclined 1 = Yes, Religiously Inclined
Desire to Gain Higher Education	One	Ordinal	0 = Very Low 1 = Low 2 = Moderate 3 = High 4 = Very High
Educational Attainment at Young Adulthood	Three	Nominal	0 = High School or less 1 = Some College

			2 = College Graduate or more
Sexual Orientation	Three	Nominal	0 – Heterosexual 1 - LGBQ
Predictor/Independent Variable			
Correct Knowledge of Safer Sex (Tabulation of Five True/False questions to gauge knowledge score)	One	Ordinal	0 = No Knowledge 1 = Very Low 2 = Low 3 =Moderate 4 =High 5 = Very High
Health Belief Variable			
Perceived Severity to HIV	One	Ordinal	1 = Very Low 2 = Low 3 = Moderate 4 = High 5 = Very High
Perceived Severity to STDs	One	Ordinal	1 = Very Low 2 = Low 3 = Moderate 4 = High 5 = Very High
Perceived Susceptibility to HIV	One	Ordinal	1 = None 2 = Low 3 = Moderate 4 = High 5 = Very High
Perceived Susceptibility to STDs	One	Ordinal	1 = None 2 = Low 3 = Moderate 4 = High 5 = Very High
Self-Efficacy in Sexual Decision Making	One	Ordinal	1 = None 2 = Low 3 = Moderate 4 = High 5 = Very High
Outcome Variables			

Sexually Active in High School	One	Nominal	0 = Not Sexually Active 1 = Sexually Active
Sexually Active in Young Adulthood	Three	Nominal	0 = Not Sexually Active 1 = Sexually Active
Contraception Use in High School	One	Nominal	0 = No Contraception 1 = Contraception
Contraception Use in Young Adulthood	Three	Nominal	0 = No Contraception 1 = Contraception
Condom Use in High School	One	Nominal	0 = No Condom Use 1 = Condom Use
Condom Use in Young Adulthood	Three	Nominal	0 = No Condom Use 1 = Condom Use

Outcome/Dependent variables.

Wave One. Sexually Active in High-School. At Wave One, respondents were asked the question "Have you ever had sexual intercourse?" The responses were no or yes and this question was kept as a nominal variable for the analysis.

Contraception Use in High School: Of the respondents, who indicated being sexually active at Wave One, respondents were asked "Did you or your partner use any method of birth control when you had sex most recently?" The responses were no or yes and this question was kept as a nominal variable for the analysis.

Condom Use in High School: Of the same sample of respondents who indicated being sexually active at Wave One and who indicated using some form of contraception at their last sexual encounter, the respondents were then asked specifically about the form of birth control "What method of birth control did you or your partner use?" The response

options that ranged from condoms to withdrawal, rhythm, diaphragm, birth control pills, depo provera and other forms of contraception used primarily for birth control. This question was kept as a numeric categorical variable with options. This question was reconstructed and dichotomized as a nominal variable with two categories "Condom Use in High School" and "No Condom Use in High School."

Wave Three. Sexually Active at Young Adulthood. At Wave Three, respondents were asked the question "Have you ever had vaginal intercourse?" The responses were no or yes and this question was kept as a nominal variable for the analysis. It must be noted that although this question was not ideal since it excludes respondents who may have had other forms of sex, this was the only question that was comparable to the sexually active question in Wave One.

Contraception Use at Young Adulthood: Of the respondents who indicated being sexually active at Wave Three, the respondents were asked if they used any form of contraception (including condoms) during their last sexual encounter. The question was phrased "The most recent time you had vaginal intercourse, did you or your partner use some form of birth control?" The responses were no or yes and this question was kept as a dichotomized variable for the analysis.

Condom Use at Young Adulthood: Of the same sample of respondents, who indicated being sexually active at Wave Three, the respondents were asked if they specifically used condoms during their last sexual encounter. The question was phrased "The most recent time you had vaginal intercourse, did you or your partner use a condom?" The responses were no or yes and this question was kept as a dichotomized variable for the analysis.

Independent/Predictor Variables. Respondent's level of correct knowledge of safer sex during high school was included as the predictor/independent variable in the analysis. This variable was constructed by including a total of five (True/False) questions about knowledge of condom use which were asked of the respondents at Wave One. These questions were only collected at Wave One and included the following:

1. When using a condom, the man should pull out of the woman right after he has ejaculated? True/False
2. Natural (lamb skin) condoms provide better protection against the AIDS virus than latex condoms? True/False
3. When putting on a condom, it's important to have it fit tightly, leaving no space at the tip? True/False
4. Vaseline can be used with condoms and they will work just as well? True/False
5. As long as the condom fits over the tip of the penis, it doesn't matter how far down its unrolled? True/False

A count of correctly answered question (0 to 5 possible range) was then used to categorize respondents as 0= no correct knowledge to 5=very high Knowledge. Individuals who answered all the answers incorrect were categorized as having no correct knowledge (0), those who only got one correct answer were categorized as having very low knowledge (1), respondents who only got two correct answers were categorized as having low knowledge (2), respondents who got three correct answers were categorized as having moderate knowledge (3), respondents who got four correct answers out of the

five were categorized as having high knowledge (4) while those respondents who scored correctly on all five questions were categorized as having very high knowledge (5).

Health Belief Variables.

Perceived Severity to HIV: At Wave One, respondents older than fifteen were asked the question "If you got the AIDS virus, you would suffer a great deal?" with responses that ranged from strongly agree to strongly disagree. This particular question assessed their perception of severity of HIV/AIDS. This question was maintained in its original form as an ordinal variable for the analysis.

Perceived Severity to STDs: At Wave One, respondents older than fifteen were asked the question "It would be a big hassle to do the things necessary to completely protect yourself from getting a sexually transmitted disease?" with responses that ranged from strongly agree to strongly disagree. This particular question assessed their perception of severity of STDs. This question was also kept as an ordinal variable for the analysis.

Perceived Susceptibility to HIV: At Wave One, respondents were also asked the question "What do you think are your chances of getting HIV/AIDS?" with responses that ranged from Very High to None. This particular question assessed their perception of susceptibility to HIV and this question was kept as an ordinal variable for the analysis.

Perceived Susceptibility to STDs: At Wave One, respondents were asked the question "What do you think are your chances of getting a sexually transmitted disease?" with responses that ranged from Very High to None. This particular question assessed their perception of susceptibility to STDs. This question was also kept as an ordinal variable for the analysis.

Self-Efficacy in Sexual Decision Making: At Wave One, respondents were also asked the question "How sure are you that you could resist sexual intercourse if your partner did not want to use some sort of birth control?" with responses that ranged from Very Sure to No. This particular question assessed their Self Efficacy in sexual decision making. This was also kept as an ordinal variable for the analysis.

Demographic & Psychographic Variables. Relevant population characteristics were examined from the entire dataset which included demographic variables such as gender, age, race and residential location (urban, rural, suburban) as well as psychographic variables such as respondents' religious inclination and desire to gain a higher education. Psychographic variables are slightly different than demographic variables, because unlike demographic variables, psychographic variables are mostly pertinent to a respondent's values, attitudes interests, and lifestyle.

Among psychographic variables, desire for higher education was based on a question at Wave One which asked respondents to indicate on a scale of one to five with one being low and 5 being high, "How likely is it that you will go to college?" Similarly, religious inclination was assessed by the question "In the past 12 months how often did you attend religious services?" where respondents could choose between four options Once a week or more (1), Once a month or more/less than once a week (2), less than once a month (3) and Never (4). This question was originally an ordinal variable which was dichotomized by including option 3 and 4 as being No, not Religiously Inclined (0) and option 1 and 2 being categorized as Yes, religiously inclined (1).

Most of the demographic variables were collected as nominal variables however desire for higher education (Wave One) was an ordinal variable collected on a Likert

response format. In the merged dataset at Wave Three, two additional demographic variables of the respondents were included in the analysis. These included the respondent's actual educational attainment which was originally an ordinal variable where respondents were asked "What is the highest grade or year of regular school you have completed?" where respondents could select any option from the 6th grade to 5 or more years of graduate school. This variable reconstructed as a categorical variable based on the distribution of the variable where individuals who only completed high school or less were categorized as 0, individuals who had attended some college were categorized as 1 and individuals who had graduated college and/or gained further education were categorized as 2.

The second demographic variable included from Wave Three was respondent's sexual orientation. Respondents were originally asked to "choose the best description of how [they] felt about [themselves]?" This was also originally an ordinal variable where respondents could select from six options; 100% heterosexual (1), mostly heterosexual/somewhat attracted to the same sex (2), Bisexual (3), Mostly homosexual (4), 100% Homosexual (5). This variable was dichotomized where respondents who were 100% heterosexual were categorized as Heterosexual (1) while all others were categorized as LGBQ (1).

Data Analysis Procedures

Data were analyzed with the SPSS statistical software package version 24**.** Data analysis was managed primarily by the researcher.

Descriptive Analysis. Univariate analysis was used to describe study variable and sample summaries. Basic descriptive statistics included frequency distributions of all

study variables including demographic variables (i.e., gender, age, race and metropolitan location, educational attainment, sexual orientation), psychographic variables (i.e. religious inclination, desire to gain higher education), independent/predictor variable (i.e. correct knowledge of safer sex behaviors), health belief variables (perceived severity to HIV, perceived severity to STDs, perceived susceptibility to HIV, perceived severity to STDs, self-efficacy in sexual decision making) and outcome variables (i.e. sexually active, contraception use and condom use).

Bivariate analysis was conducted on all study variables to explore a relationship between variables to discern a possible association between the variables including the strength of the association as well as the differences between the variables. Chi-squares were used to test the strength of the association between variables that were categorical (nominal, binary). ANOVA was used when one variable of interest was nominal and the other was continuous (numeric) and subsequently a t-test was also used when one variable of interest was dichotomous and the other was continuous (numeric). A correlation coefficient was tabulated when both variables of interest were continuous (numeric).

It is important to report these summary statistics since they help describe our data in a more meaningful way and also indicate the patterns that emerge from our data.

Test of Hypotheses. After the preliminary analysis was completed, the hypotheses for the research questions were tested as outlined below. An alpha of 0.05 was used to assess the statistical significance of findings. To create parsimonious final multivariate equations, variable that were not found to be statistically significant in the bivariate analysis were not included in the multivariate analysis.

Hypothesis 1.1. Adolescents with higher levels of correct knowledge of safer sex report (a) higher self-efficacy in sexual decision making, (b) higher perceived severity of HIV/AIDs & STDs and (c) higher perceived susceptibility to HIV/AIDS & STDs. To test hypothesis 1.1a, a linear regression was conducted at the cross-sectional level as health belief constructs (perceived severity to HIV, perceived severity to STDs, perceived susceptibility to HIV, perceived susceptibility to STDs, self-efficacy in sexual decision making) as outcomes and correct knowledge of safer sex behaviors as the independent/predictor variable. This also followed Path A in the conceptual framework (Figure 1.1).

Hypothesis 2.1. Adolescents with higher levels of correct knowledge of safer sex are more likely to practice safer-sex behaviors in high school. To test hypothesis 2.1, a logistic regression was conducted at the cross-sectional level with safer sex behaviors (currently sexually active in high school, contraception use in high school, condom use in high school) as outcomes and correct knowledge of safer sex behaviors as the independent/predictor variable. This hypothesis was tested to explore Path B in our conceptual framework.

Hypothesis 3.1. Adolescents with higher levels of correct knowledge of safer sex are more likely to practice safer-sex behaviors five to seven years later in young-adulthood. To test hypothesis 3.1, a logistic regression was conducted at the longitudinal level with safer sex behaviors (currently sexually active in young adulthood, contraception use in young adulthood, condom use in young adulthood) as outcomes and correct knowledge of safer sex behaviors as the independent/predictor variable. Hypothesis 3.1 aimed to explore Path C in our conceptual framework. It is also important

to mention that testing for hypothesis 3.1 did include two demographic variables which were only collected at Wave Three (sexual orientation, educational attainment at young adulthood) since these were also found to be statistically significant in the bivariate analysis.

Hypothesis 4.1. Higher self-efficacy in decision making around sexual choices, higher perceived severity of HIV/AIDS & STDs and higher perceived susceptibility to HIV/AIDS & STDs in high school mediate the influence of correct knowledge on safer sex behaviors in high school and later in young-adulthood. To test hypothesis 4.1, a logistic regression was conducted at both the cross-sectional level and the longitudinal level (predictor-outcome) with correct knowledge of safer sex in high school included as the independent/predictor variable and safer sex behaviors (currently sexually active, contraception use, condom use) in both high school and young-adulthood as outcomes variables. To test for mediation, our mediator variables which were health belief constructs (perceived severity to HIV, perceived severity to STDs, perceived susceptibility to HIV, perceived susceptibility to STDs, self-efficacy in sexual decision making were included in the logistic regression were.

Demographic and psychographic variables which were not considered statistically significant in the bivariate analysis were excluded from the multivariate analysis. Testing for hypothesis 4.1 (longitudinal level) also included the two demographic variables which were only collected at Wave Three (Sexual Orientation and Educational Attainment at young adulthood) since these were also found to be statistically significant in the bivariate analysis.

Chapter 4: Results

The purpose of this chapter is to present the results of the study. The first part of this chapter will present the descriptive statistics of the study variables followed by bivariate analyses. The chapter will conclude with results from the testing of the study's research hypotheses.

Descriptive Analysis

In this section, descriptive statistics of all variables of interest will be presented. The first part of this section will provide descriptive characteristics of youth who participated in the In-Home interview at the first data collection (Wave One) of the Add Health data collection process. We will then examine the bivariate relationship at Wave One using a theoretically driven approach noted in figure 1.1. Results from Path E, F and G will be presented first as they depict the relationship between our demographic and psychographic variables with our independent variable, mediator variables and outcome variables. To be more specific, Path E will be explored by presenting the findings of the relationship between our independent variable of interest (correct knowledge of safe sex) with our demographic/psychographic variables. After that, relationship between our mediator variables of health belief constructs with our demographic and psychographic variables (PATH F) will be presented and then Path G will be explored by reporting the relationship between our outcomes variables and demographic and psychographic variables. These three paths may not specific to our research hypotheses, however they are important in understanding the role of demographics and psychographics with all our variables of interest.

At the bivariate level, we will also begin to answer our research question one (Path A), by presenting the bivariate relationship between correct knowledge of safe sex and our mediator variables (health beliefs) at the cross-sectional level. A bivariate analysis of research question two (Path B) will be presented by showing the relationship between correct knowledge of safer sex behaviors with safer sex behaviors at the cross-sectional level (Wave One) and research question three (Path C) will show a bivariate analysis of the relationship between correct knowledge of safer sex with safer sex behaviors at the longitudinal level (Wave Three). In order to better understand Research Question 4 and Path D which aims to explore the mediating influence of health beliefs on the influence of correct knowledge of safer sex on safer sex behaviors, a bivariate analysis will be presented to indicate the relationship between health beliefs and our outcomes variables (safer sex behaviors) at both the cross-sectional and longitudinal level.

For this analysis, data from Wave One and Wave Three were merged and cases (students) were linked based on a unique identifier provided in the datasets, in order to include only that sample who had provided data at both cross-sectional and longitudinal levels. Those youth that were lost to follow-up from high-school (Wave One) to Young-Adulthood (Wave Three) were excluded from the analysis.

Once the data were merged, a total of 10,766 youth were included in the analysis. At Wave One those individuals were between the ages of 15 to 21 and at Wave Three they were between the ages of 20 to 28. The following tables will present the frequency distribution of the descriptive variables.

Univariate Analysis. Table 4.1 provides the numerical breakdown of our demographic variables. The demographic variables that were included in the analysis were gender, race, metropolitan location and type of housing of the respondents. In addition, two demographics variables; educational attainment and sexual orientation were only collected at Wave Three and were included in the univariate analysis.

Of the total sample of 10,766, 51% (n=5533) identified as female while 49% (n=5233) identified as male. Respondents who identified as white were 57% (6178) while 43% (4588) identified as a minority. In the sample, 24% (2607) lived in rural settings, 36% (3904) lived in a suburban setting while 34% (3674) lived in an urban setting. Additionally, 5% (581) lived in a setting that did not fall under any of these three categories. Of the total sample, more respondents 76% (8232) lived in non-single-family dwellings such as mobile homes, apartments or divided house while 24% (2534) lived in a single-family home.

In addition to demographics, selected psychographic variables from Wave One and Wave Three were also included in the analysis. Psychographic variables are slightly different than demographic variables, because unlike demographic variables, psychographic variables are mostly pertinent to a respondent's values, attitudes, interests and lifestyle. At Wave One, respondents were asked how religiously inclined they felt during their high school years and a majority 86% (8265) of youth indicated being religiously inclined while 14% (1501) indicated not being religiously inclined. A majority of the sample indicated a desire to gain higher education with nearly half of the sample (54%) indicating a very high desire to gain higher education while 6% (630) indicated a very low desire to gain higher education after high school.

When respondents were in their young adulthood, demographic data about their actual educational attainment from Wave Three were also included in the analysis. At Wave Three, 45% (4825) of respondents had completed high school or less, 34% (3694) were enrolled in college while 21% (2238) had graduated college or went on to gain higher education beyond the undergraduate level. Respondents were also asked about their sexual orientation (sexual preference) during the data collection at Wave Three when they were young adults. This was also included as demographic variables in the analysis. Out of 10,766 respondents a majority (89%) indicated only being attracted to the opposite sex while 11% (1201) indicated some or complete attraction to the same sex.

Table 4.1

Respondent Demographics & Psychographics

Variable Type	n	Percentage
Demographic Variables		
Gender		
Female	5533	51%
Male	5233	49%
Race		
White	6178	57%
Minority	4588	43%
Metropolitan Location		
Rural	2607	24%
Suburban	3904	36%
Urban	3674	34%
Other	581	5%

Type of Housing		
Single Family Home	8232	76%
Other/Non-Single-Family Home	2534	24%
*Educational Attainment at Young Adulthood**		
High School or Less	4825	45%
Some college	3694	34%
College graduate or more	2238	21%
Missing **	9	0.1%
*Sexual orientation**		
LGBQ	1201	11%
Heterosexual	9565	89%
Psychographic Variables		
Religious Inclination		
Religious Inclination	9265	86%
No Religious Inclination	1501	14%
Desire to Gain Higher Education		
Very Low	630	6%
Low	570	5%
Moderate	1670	16%
High	2135	20%
Very High	5761	54%

**These demographic variables were only collected at Wave Three*
*** Missing values were not included beyond the univariate analysis.*

Correct Knowledge of Safer Sex Behaviors. Tables 4.2 is a description of the responses to the questions used to construct the correct knowledge of safer sex behaviors variable. This variable was constructed by calculating the cumulative score of correct

answers for a series of five questions asked of youth at Wave One that pertained to safer sex behaviors and condom use. The correct responses to each individual question are detailed in Table 4.2a first and then the description of the predictor variable (correct knowledge of safer sex behaviors) will be shared in Table 4.2b.

Of the 10,766 youth that were asked at Wave One whether they felt that a man should pull out of a woman right after he has ejaculated even when using a condom, 70% (7514) correctly selected the "false" option while 30% (3252) gave an incorrect answer or did not know the answer. Similarly, 75% youth (8046) correctly responded that lambskin condoms did not provide better protection against the AIDS virus over latex condoms, while 25% youth (2720) gave an incorrect answer. When youth were asked about the correct method of putting on a condom, only a little over half, 55% (5915) gave the correct answer, while 45% (4851) gave an incorrect answer. Similarly, 64% (6882) of youth correctly answered that Vaseline was not an appropriate form of lubrication to be used with condoms while 36% (3883) incorrectly felt that it was. Respondents were asked another question regarding the correct method of putting on a condom and 83% (8960) answered correctly that a condom should cover more than just the tip of the penis while 17% (1806) incorrectly answered that as long as the condom fits over the tip of the penis, it does not matter how far down it is unrolled.

Table 4.2a

Knowledge of Condom Use (Wave One)

Variable	n	%
Knowledge of Condom Use - Pulling Out		
Incorrect Response	3252	30%

Correct Response	7514	70%
Knowledge of Condom Use - Lamb Skin vs Latex		
Incorrect Response	2720	25%
Correct Response	8046	75%
Knowledge of Condom Use - Putting on a Condom		
Incorrect Response	4851	45%
Correct Response	5915	55%
Knowledge of Condom Use - Lubrication		
Incorrect Response	3884	36%
Correct Response	6882	64%
Knowledge of Condom Use - Putting on a Condom 2		
Incorrect Response	1806	17%
Correct Response	8960	83%

Correct scores on the five knowledge questions were cumulated to create the variable; correct knowledge of safer sex. A count of correctly answered question (0 to 5 possible range) was then used to categorize respondents as 0= no correct knowledge to 5=very high knowledge. Table 4.2b presents the distribution of the correct knowledge of safer sex behaviors variable. Of the 10,766 youth, 3% (365) had answered all five items incorrectly while 23% (2520) had very high knowledge of safer sex behaviors. The overall mean for the population was 3.47, with a standard deviation of 1.29.

Table 4.2b

*Correct Knowledge of Safer Sex Behaviors - (Wave One)**

Variable	n	Percentage
No Knowledge (0)	365	3%
Very Low Knowledge (1)	557	5%
Low Knowledge (2)	1296	12%
Moderate Knowledge (3)	2544	24%
High Knowledge (4)	3484	32%
Very High Knowledge (5)	2520	23%

*Note: M = 3.47, SD = 1.29

Health Beliefs. At Wave One, respondents were asked to respond to questions regarding their health beliefs, specifically their perceived severity to HIV and STDs, their perceived susceptibility to HIV and STDs, and their self-efficacy in sexual decision making. Regarding respondent's perceived severity to HIV at Wave One, more than half 60% (6504) of the respondents indicated having very high perceived severity to HIV while 25% (2667) also indicated high perceived severity to HIV. Nearly 10% of youth had neither high nor low perceived severity to HIV while 4% (415) and 2% (210) did not feel that HIV was a severe disease. When it came to perceived severity to STDs, less than half, 42% (4377) of the respondents indicated a very high perceived severity to STDs. and 8% (902) had low and very low perceived severity of STDs respectively.

Regarding perceived susceptibility to HIV 44% (4761) of the youth did not feel that they were at risk for HIV while 33% (3495) had very low perception that they were

at risk. Only 4% respondents (424) had high perception of risk while 2% (209) had very high perceived susceptibility to HIV. Results for perceived susceptibility to STDs were similar as half of the respondents felt that they were not at any risk for STD transmission while 30% (3232) felt that they had low risk and 15% (1561) had moderate perceived susceptibility to STDs. Only 4% respondents (390) and 1% (155) felt that they had a high or very high risk for STD transmission.

More than half of the respondents did feel that they were in control when it came to decision making around safer sex choices as 55% (5952) indicated very high self-efficacy while only 5% (536) indicated no self-efficacy at all when it came to decision making around safer sex choices. Tables 4.3 is a description of the health variables among our sample of youth.

Table 4.3

Health Beliefs (Wave One)

Variable	n	Percentage
Perceived Severity of HIV (M = 4.38; *SD* = 0.94)		
Very Low (1)	210	2%
Low (2)	415	4%
Moderate (3)	970	9%
High (4)	2667	25%
Very High (5)	6504	60%
Perceived Severity to STDs (M = 2.13; *SD* = 1.28)		
Very Low (1)	902	8%
Low (2)	1092	10%

Moderate (3)	930	9%
High (4)	3465	32%
Very High (5)	4377	41%
Perceived Susceptibility to HIV (M = 1.87; *SD* = 0.97)		
No Susceptibility (1)	4761	44%
Low (2)	3495	33%
Moderate (3)	1877	17%
High (4)	424	4%
Very High (5)	209	2%
Perceived Susceptibility to STDs (M = 1.76; *SD* = 0.93)		
No Susceptibility (1)	5428	50%
Low (2)	3232	30%
Moderate (3)	1561	15%
High (4)	390	4%
Very High (5)	155	1%
Self-Efficacy in Sexual Decision Making (M = 4.14*; SD* = 1.6)		
No Self Efficacy (1)	536	5%
Low (2)	490	5%
Moderate (3)	1901	18%
High (4)	1887	18%
Very High (5)	5952	55%

Safer Sex Behaviors. The outcome variables of interest focused on safer sex behaviors such as contraception and condom use during sexual relations among

respondents. These were measured both at Wave One and at Wave Three. Table 4.4 is a description of the outcome variables measured at both waves.

Of the total sample at Wave One when youth were in high school, 48% (5207) were sexually active while 52% (5559) were not engaging in any form of sex. For the proceeding outcome variables, only the students who were engaging in sex (5207) were asked about their safe sex behaviors. Of the 5207 youth who were engaging in sex, a majority 66% (3422) used some form of contraception method including condoms during their last sexual encounter while 34% (1785) did not use any form of birth control. When asked if they used condoms specifically as a form of contraception in order to prevent STDs and HIV in addition to unwanted pregnancy, just a little over half 52% (2711) used condoms during their last sexual encounter while 48% (2496) did not.

In Wave Three when youth were surveyed again in their young adulthood, a vast majority 88% (9463) were sexually active while only 12% (1303) were not engaging in any form of sex. Of the 9463 respondents who were engaging in sex at young adulthood, contraception use dropped down to 53% at last sexual encounter. Similarly, Condom Use among sexual active respondents also dropped to 32% at their most recent sexual encounter.

Table 4.4

Safer Sex Behaviors in High School (Wave One) and Young Adulthood (Wave Three)

Variable	n	Percentage
Sexually Active in High School		
Sexually Active	5207	48%

Not Sexually Active	5559	52%
Contraception Use in High School Among Sexually Active Respondents		
Contraception	3422	66%
No Contraception	1785	34%
Condom Use in High School Among Sexually Active Respondents		
Condom Use	2711	52%
No Condom Use	2496	48%
Sexually Active in Young Adulthood		
Sexually Active	9463	88%
Not Sexually Active	1303	12%
Contraception Use in Young Adulthood Among Sexually Active Respondents		
Contraception	5701	53%
No Contraception	3762	35%
Condom Use in Young Adulthood Among Sexually Active Respondents		
Condom Use	3460	32%
No Condom Use	6003	56%

Bivariate Analysis

Subsequent to the univariate analyses, bivariate analyses were conducted amongst the study variables from Wave One and then including variables from Wave Three. Each of the bivariate analysis was constructed to explore the different pathways in our conceptual model (Figure 1.1).

Path E.: **Relationship of Correct Knowledge of Safer Sex with Demographic and Psychographic Variables**. Path E in the conceptual framework (Figure 1.1) aimed to explore the relationship between respondent's demographics and psychographics with

their level of correct knowledge. That particular bivariate analysis is displayed in Table 4.5. The sample size is presented as well as the percentage to the right for the total row and the percentage underneath for the total in the column. To indicate the strength of the association between the variables, ANOVA was used and the F-statistics are also included in the table

At the bivariate analysis of gender and correct knowledge of safer sex at Wave One, females and males had similar mean scores with females (mean =3.46) and males (3.48). There was also no statistical significance ($p>0.05$). Regarding the analysis of race by correct knowledge of safer sex at Wave One, minority respondents had a significantly lower score (mean = 3.41) than white respondents (mean = 3.50). Respondents who resided in a suburban setting had the highest level of correct knowledge of safer sex (mean=3.55) while urban respondents had the lowest scale score (mean=3.40). These differences were found to be statistically significant. At the bivariate analysis of religious inclination by correct knowledge of safer sex at Wave One, there was no statistical difference found between those who were religiously inclined (mean=3.46) and those who were not religiously inclined (mean=3.49) with regard to correct knowledge of safer sex. Respondents who lived in single-family housing had higher means (3.49) for correct knowledge. Correct knowledge was also positive associated with desire for higher education ($r=0.072$).

Respondents who graduated from college and/or gained higher education in young adulthood had also scored the highest mean score for correct knowledge of safer sex when they were in high school (mean=3.67) followed by those who attended some college (mean=3.50) and then those who only completed high school or less

(mean=3.35). These results were all statistically significant. At the bivariate analysis of sexual orientation at Wave Three with correct knowledge of safer sex at Wave One, there was no statistical difference between respondents who did not identify as heterosexual (3.48) and respondents who identified as heterosexual (mean=3.46).

Table 4.5

Respondent Demographic/Psychographic variables with Correct Knowledge of Safer Sex (Path E)

Variable	n (%)	Mean (SD)	F
Gender			
Female	5533 (51%)	3.46 (1.30)	0.68
Male	5233 (49%)	3.48 (1.29)	
Race			
Minority	4588 (43%)	3.41 (1.32)	12.63*
White	6178 (57%)	3.50 (1.27)	
Location			
Rural	2607 (24%)	3.42 (1.30)	9.234*
Suburban	3904 (36%)	3.55 (1.26)	
Urban	3674 (35%)	3.40 (1.32)	
Other	581 (5%)	3.50 (1.25)	
Type of Housing			
Single Family Housing	8232 (76%)	3.49 (1.28)	8.74*
Non-Single-Family Housing	2534 (24%)	3.39 (1.32)	
Religious Inclination			
Religious Inclination	9265 (86%)	3.46 (1.29)	0.57
No Religious Inclination	1501 (14%)	3.49 (1.35)	
*Desire Higher Education Educational Attainment**			
High School or less	4825 (45%)	3.35 (1.33)	50.52*
Some College	3694 (34%)	3.51 (1.27)	
College graduate or more	2238 (21%)	3.67 (1.21)	
Sexual Orientation			

LGBQ	1201 (11%)	3.48 (1.39)	0.111
Heterosexual	9565 (89%)	3.46 (1.28)	

** For Educational Attainment there were 9 missing responses and thus the total n for this variable was 10757*

Path F: Relationship between Demographic & Psychographic Variables and Health Beliefs. Path F in the conceptual framework (Figure 1.1) aimed to explore the relationship between respondent's demographics and psychographics with their health beliefs regarding safer sex. That particular bivariate analysis is displayed in table 4.6. The sample size is presented as well as the percentage to the right for the total row and the percentage underneath for the total in the column. To indicate the strength of the association between the variables, ANOVA was used and the F-statistics are also included in the table.

***Perceived Severity of HIV*.** In regards to perceived severity of HIV, very little difference was noted between genders and their perception of how severe HIV was as a disease. Females and males reported similar mean scores (mean=4.38 for females and mean=4.37 for males). Racial minority respondents did indicate significantly lower perceived severity of HIV but no significant differences were found for the bivariate analysis of metropolitan location by perceived severity to HIV at Wave One. Youth who lived in single family housing had a slightly higher mean score (mean=4.39) for perceived severity of HIV. Respondents who reported being religiously inclined reported a significantly higher perception (mean score) of their perception of severity of HIV. Desire for higher education was also positively associated (r=0.70) with perceived severity of HIV. Respondents who had graduated from college and/or gained higher education in young adulthood had also indicated the highest level of Perceived Severity

of HIV when they were in high school (mean=4.50). Sexual orientation was only found to be significantly related to perceived severity of HIV with heterosexual respondents reporting statistically higher mean scores compared to LGBQ respondents

Table 4.6a

Perceived Severity of HIV with Demographic/Psychographic variables (Path F)

Variable	n (%)	Mean (SD)	F
Gender			
Female	5533 (51%)	4.38 (0.92)	0.524
Male	5233 (49%)	4.37 (0.95)	
Total	10766	4.37 (0.93)	
Race			
Minority	4588 (43%)	4.31 (0.99)	40.30*
White	6178 (57%)	4.43 (0.89)	
Total	10766	4.37 (0.94)	
Location			
Rural	2607 (24%)	4.38 (0.93)	
Suburban	3904 (36%)	4.39 (0.93)	
Urban	3674 (35%)	4.37 (0.96)	
Non-Urban/ Rural/Suburban	581 (5%)	4.37 (0.96)	
Total	10766	4.38 (0.94)	
Type of Housing			
Single-Family Housing	8232 (76%)	4.39 (0.92)	5.39*
Non-Single-Family Housing	2534 (24%)	4.34(0.99)	
Total	10766		
Religious Inclination			

Religious Inclination	9265 (86%)	4.26 (1.02)	27.92*
No Religious Inclination	1501 (14%)	4.39 (0.92)	
Total	10766	4.38 (0.94)	
Educational Attainment			
High School or Less	4825 (45%)	4.29 (0.99)	44.970*
Same College	3694 (34%)	4.42 (0.91)	
College Graduate or more	2238 (21%)	4.50 (0.82)	
Total	10757	4.38 (0.94)	
Sexual Orientation			
LGBQ	1201 (11%)	4.28 (0.98)	14.953*
Heterosexual	9565 (89%)	4.39 (0.93)	
Total	10766	4.38 (0.94)	

*Significant < .05
**Significant < .01

Perceived Severity of STDs. Females had lower perceived severity of STDs (mean=2.01) than males (2.26) while minority respondents had higher perceived severity to STDs. Metropolitan location was found to be significantly related to perceived severity to STDs with urban dwelling respondents reporting a significantly higher score at Wave one compared to rural residents (mean=2.09) and suburban residents (mean=2.02). Youth who lived in single family housing had a significantly lower mean score (mean=4.39) for perceived severity of STDs. Desire for higher education was also negatively associated (r=-0.141) with perceived severity of STDs. Respondents with higher levels of attained education at Wave Three had reported the lowest level of

Perceived Severity of STDs in high school (mean=1.78) with those respondents who only completed high school or less in young adulthood (mean=2.37) reporting the highest Perceived Severity of STDs when they were in high school. Although not statistically significant, heterosexual respondents reported higher mean scores for Perceived Severity of STDs.

Table 4.6b

Perceived Severity of STDs with Demographic/Psychographic variables (Path F)

Variable	n	Mean (SD)	F
Gender			
Female	5533 (51%)	2.01 (1.24)	104.186*
Male	5233 (49%)	2.26 (1.30)	
Total	10766	2.13 (1.27)	
Race			
Minority	4588 (43%)	2.36 (1.37)	249.75*
White	6178 (57%)	1.97 (1.18)	
Total	10766	2.13 (1.28)	
Location			
Non-Urban/ Rural/Suburban	581 (5%)	2.22 (1.29)	27.824*
Rural	2607 (24%)	2.09 (1.26)	
Suburban	3904 (36%)	2.02 (1.20)	
Urban	3674 (35%)	2.27 (1.35)	
Total	10766	2.13 (1.28)	
Type of Housing			
Single Family Housing	8232 (76%)	2.08 (1.25)	55.00*

Non-Single-Family Housing	2534 (24%)	2.29 (1.35)	
Total	10766	2.13(1.28)	
Religious Inclination			
No Religious Inclination	1501 (14%)	2.14 (1.25)	0.01
Religious Inclination	9265 (86%)	2.13 (0.96)	
Total	10766	2.13 (0.97)	
Educational Attainment			
High School or Less	4825 (45%)	2.37 (1.36)	180.123*
Same College	3694 (34%)	2.04 (1.22)	
College Graduate or more	2238 (21%)	1.78 (1.07)	
Total	10757	2.13 (1.28)	
Sexual Orientation			
LGBQ	1201 (11%)	2.07 (1.23)	3.309
Heterosexual	9565 (89%)	2.14 (1.28)	
Total	10766	2.13 (1.28)	

***Perceived Susceptibility to HIV*.** In regard to perceived susceptibility to HIV at Wave One, females were significantly less likely to report they were at risk for HIV while their male peers reported significantly higher perceived susceptibility to HIV. Minority respondents also felt that they were at more risk for HIV transmission than their Caucasian peers. Suburban residents reported a higher perceived susceptibility to HIV than rural residents (1.84) and urban residents (1.84). Youth who lived in single family housing had a significantly lower mean score (mean=1.86) for perceived severity of HIV. Desire for higher education was also negatively associated (r=-0.61) with perceived

susceptibility to HIV. In regard to religious inclination, respondents who reported being religiously inclined reported a significantly lower mean score on Perceived Susceptibility to HIV as compared to those without a Religious Inclination. Youth who lived in single family housing had a significantly lower mean score (mean=1.86) for perceived severity of HIV. Desire for higher education was also negatively associated (r=-0.061) with perceived severity of STDs.

No statistical difference was noted among respondents who graduated from college and/or gained higher education (mean=1.80) and those who attended some college (mean=1.80). Heterosexual respondents had reported lower levels of perceived susceptibility to HIV, when they were in high school as compared to LGBQ peers, however this association was not found to be statistically significant.

Table 4.6c

Perceived Susceptibility to HIV with Demographic/Psychographic variables (Path F)

Variable	n	Mean (SD)	F
Gender			
Female	5533 (51%)	1.76 (0.87)	156.552*
Male	5233 (49%)	1.89 (0.96)	
Total	10766	1.76 (0.93)	
Race			
Minority	4588 (43%)	1.90 (1.02)	8.51*
White	6178 (57%)	1.85 (0.93)	
Total	10766	1.87 (0.97)	
Location			
Non-Urban/ Rural/Suburban	581 (5%)	1.93 (1.03)	5.294*

Rural	2607 (24%)	1.83 (0.94)	
Suburban	3904 (36%)	1.91 (0.96)	
Urban	3674 (35%)	1.84 (0.98)	
Total	10766	1.87 (0.97)	
Type of Housing			
Single Family Housing	8232 (76%)	1.86 (0.95)	7.41*
Non-Single-Family Housing	2534 (24%)	1.91 (1.02)	
Total	10766		
Religious Inclination			
No Religious Inclination	1501 (14%)	1.97 (0.97)	20.90*
Religious Inclination	9265 (86%)	1.85 (0.96)	
Total	10766	1.87 (0.96)	
Educational Attainment			
High School or Less	4825 (45%)	1.89 (1.02)	6.877*
Same College	3694 (34%)	1.88 (0.95)	
College Graduate or more	2238 (21%)	1.80 (0.86)	
Total	10757	1.87 (0.97)	
Sexual Orientation			
LGBQ	1201 (11%)	1.91 (0.98)	2.239
Heterosexual	9565 (89%)	1.86 (0.96)	
Total	10766	1.87 (0.97)	

*Significant < .05

Perceived Susceptibility to STDs. Similar to perceived susceptibility to HIV, females were also significantly less likely to report that they were at risk for either STDs while their male peers reported significantly higher perceived susceptibility to STDs.

Minority respondents also had higher perceived susceptibility to STDs (similar to the results regarding race and perceived susceptibility to HIV as compared to Caucasian peers however unlike perceived susceptibility to HIV, this association was not found to be statistically significant. Desire for higher education was negatively associated (r=-0.085) with perceived susceptibility of STDs. Suburban residents (mean=1.80) had higher perceived susceptibility to STDs as compared to rural residents (mean= 1.73) and urban residents (1.76). Respondents who only completed high school or less in young adulthood had the highest level of perceived susceptibility to STDs in high school (mean=1.80) followed by respondents who attended some college (mean=1.76) and then respondents who graduated from college and/or gained higher education (mean=1.66). The relationship between sexual orientation and perceived susceptibility to STDs was, once again, not found to be statistically significant.

Table 4.6d

Perceived Susceptibility to STDs with Demographic/Psychographic variables (Path F)

Variables	n	Mean (SD)	F
Gender			
Female	5533 (51%)	1.63 (0.88)	201.698*
Male	5233 (49%)	1.89 (0.97)	
Total	10766	1.76 (0.93)	
Race			
Minority	4588 (43%)	1.78 (9.74)	3.28
White	6178 (57%)	1.74 (0.89)	
Total	10766	1.76 (0.93)	
Location			
Non-Urban/	581 (5%)	1.81 (0.95)	6.069*

Rural/Suburban			
Rural	2607 (24%)	1.72 (0.92)	
Suburban	3904 (36%)	1.80 (0.93)	
Urban	3674 (35%)	1.72 (0.93)	
Total	10766	1.76 (0.93)	
Type of Housing			
Single Family Housing	8232 (76%)	1.76 (0.92)	2.86
Non-Single-Family Housing	2534 (24%)	1.78 (0.96)	
Total	10766		
Religious Inclination			
No Religious Inclination	1501 (14%)	1.89 (0.95)	33.66*
Religious Inclination	9265 (86%)	1.74 (0.93)	
Total	10766	1.76 (0.93)	
Educational Attainment			
High School or Less	4825 (45%)	1.80 (0.98)	17.248*
Same College	3694 (34%)	1.76 (0.92)	
College Graduate or more	2238 (21%)	1.66 (0.83)	
Total	10757	1.76 (0.93)	
Sexual Orientation			
LGBQ	1201 (11%)	1.76 (0.91)	0.78
Heterosexual	9565 (89%)	1.76 (0.93)	
Total	10766	1.76 (0.93)	

***Self-Efficacy in Sexual Decision Making*.** Females reported significantly higher perceived self-efficacy in sexual decision-making scores than males. While Minority

respondents had significantly lower self-efficacy in sexual decision-making scores than White respondents.

Rural residents (mean=4.17) and suburban residents (mean=4.15) reported higher self-efficacy in sexual decision making as compared to urban residents (mean=4.11). Although respondents who were religiously inclined also reported higher self-efficacy in sexual decision making, the difference was not statistically significant. Youth who lived in single family housing had a significantly higher mean score (mean=4.16) for self-efficacy in sexual decision making. Desire for higher education was positively associated (r=-0.151) with perceived severity of STDs. Respondents who graduated from college and/or gained higher education in young adulthood had indicated the highest level of Self-Efficacy in sexual decision making (mean=4.30) when they were in high school followed by respondents who attended some college (mean=4.21) and then respondents who only completed high school or less (mean=4.01). All of these results were also statistically significant. Heterosexual respondents reported lower self-efficacy in sexual decision making compared to LGBQ peers but once again this was not found to be statistically significant.

Table 4.6e

Self-Efficacy in Sexual Decision Making with Demographic/Psychographic variables (Path F)

Variable	n	Mean (SD)	F
Gender			
Female	5533	4.38 (1.04)	521.164*
Male	5233	3.88 (1.21)	

Total	10766	4.14 (1.16)	
Race			
Minority	4588	4.08 (1.21)	19.54*
White	6178	4.18 (1.12)	
Total	10766	4.14 (1.16)	
Location			
Non-Urban/ Rural/Suburban	581	4.03 (1.26)	2.996*
Rural	2607	4.17 (1.13)	
Suburban	3904	4.15 (1.15)	
Urban	3674	4.11 (1.17)	
Total	10766	4.14 (1.16)	
Type of Housing			
Single Family Housing	8232 (76%)	4.16 (1.14)	16.25*
Non-Single-Family Housing	2534 (24%)	4.05 (1.22)	
Total			
Religious Inclination			
No Religious Inclination	1501	4.08 (1.16)	3.79
Religious Inclination	9265	4.14 (1.16)	
Total	10766	4.14 (1.16)	
Educational Attainment			
High School or Less	4825	4.01 (1.23)	60.648*
Same College	3694	4.21 (1.11)	
College Graduate or more	2238	4.30 (1.03)	
Total	10757	4.14 (1.16)	

Sexual Orientation			
LGBQ	1201	4.18 (1.13)	1.875
Heterosexual	9565	4.13 (1.16)	
Total	10766	4.141.16)	

*Significant < .05

Path G: Relationship between Safer Sex Behaviors and Demographic and Psychographic Variables. Path G in the conceptual framework (Figure 1.1) aimed to explore the relationship between respondent's demographics and psychographics with safer sex behaviors both at a cross-sectional level when respondents were in high school (Wave One) and then later at the longitudinal level when respondents had reached young adulthood (Wave Three).

That particular bivariate analysis is displayed in tables 4.7 for the cross-sectional analysis and 4.8 for the longitudinal analysis. The sample size is presented as well as the percentage to the right for the total row and the percentage across and underneath for the total in the columns. To indicate the strength of the association between the variables, Chi-squares were used and are also included in the table.

Cross Sectional (Wave One)

The results from the cross-sectional bivariate analysis will be presented first.

Sexually Active in High School. Both genders reported similar percentages of being sexually active in high school (48% females and 49% males), and there was no statistical significance. Students who identified as a minority were less (46%) sexually active in high school compared to peers who identified as white (54%). On the other hand, respondents who lived in urban and suburban settings were slightly more sexually active than their peers who lived in rural settings or in settings that did not fall in any of

the three categories. Also, at Wave One, youth who lived in single family housing were more sexually active (75%) than those who did not (25%). Youth who were more religiously inclined were significantly more sexually active in high school (84%) as compared to those who were not religiously inclined (16%). The higher the desire for higher education that youth indicated the more sexually active they were as well.

Table 4.7a

Sexually Active in High School with Demographic/Psychographic Variable, Wave One

	Sexually Active in High School	Not Sexually Active in High School	Total	Chi-Square
Gender				
Female	2666 (48%) (51%)	2867 (52%) (52%)	5533 (100%)	0.15
Male	2541 (49%) (49%)	2692 (51%) (48%)	5233 (100%)	
Total	5207 (100%)	5559 (100%)	10766	
Race				
Minority	2399 (52%) (46%)	2189 (48%) (39%)	4588 (100%)	49.28*
White	2808 (46%) (54%)	3370 (55%) (61%)	6178 (100%)	
Total	5207 (100%)	5559 (100%)	10766	
Location				
Rural	277 (48%) (5%)	304 (52%) (5%)	581 (100%)	11.54*
Suburban	1277 (49%) (25%)	1330 (51%) (24%)	2607 (100%)	

Urban	1810 (46%) (35%)	2094 (54%) (38%)	3904 (100%)	
Other	1843 (50%) (35%)	1831 (50%) (33%)	3674 (100%)	
Total	5207 (100%)	5559 (100%)	10766	
Type of Housing				
Non-Single-Family Housing	1325 (52%) (25%)	1207 (48%) (22%)	2534 (100%)	20.43*
Single Family Housing	3882 (47%) (75%)	4350 (53%) (78%)	8232 (100%)	
Total	5207 (100%)	5559 (100%)	10766	
Religious Inclination				
No Religious Inclination	847 (56%) (16%)	654 (44%) (12%)	1501 (100%)	45.42*
Religious Inclination	4360 (47%) (84%)	4905 (53%) (88%)	9265 (100%)	
Total	5207 (100%)	5559 (100%)	10766	
Desire for Higher Education				
Very Low	434 (69%) (8%)	196 (31%) (4%)	630 (100%)	315.28*
Low	375 (66%) (7%)	195 (34%) (4%)	570 (100%)	
Moderate	941 (56%) (18%)	729 (44%) (13%)	1670 (100%)	
High	1044 (49%) (20%)	1091 (51%) (2-%)	2135 (100%)	
Very	2413 (42%) (46%)	3348 (58%) (60%)	5761 (100%)	

Total	5207 (100%)	5559 (100%)	10766

*Significant < .05

Contraception Use in High School. Among respondents who were sexually active in high school, a greater percentage of males (69%) indicated using contraception during last sexual encounter, than females (63%). Youth who lived in single family housing reported greater (75%) contraception use compared to 25% who did not live in single family housing. Metropolitan location, race and religious inclination was not found to be associated with contraception use or condom use during last sexual encounter in high school. The higher the desire of higher education that was reported, the more contraception use was reported as well.

Table 4.7b

Contraception Use in High School with Demographic/Psychographic Variables, Wave One

	Contraception	No Contraception	Total	Chi-Square
Gender				
Female	1672 (63%) (49%)	994 (37%) (56%)	2666 (100%)	21.88*
Male	1750 (69%) (51%)	791 (31%) (44%)	2541 (100%)	
Total	3422 (100%)	1785 (100%)	5207	
Race				
Minority	1534 (64%) (45%)	865 (36%) (48%)	2399 (100%)	6.22

White	1888 (67%) (55%)	920 (33%) (52%)	2808 (100%)	
Total	3422 (100%)	1785 (100%)	5207	
Location				
Rural	185 (67%) (5%)	92 (33%) (5%)	277 (100%)	4.28
Suburban	857 (67%) (25%)	420 (33%) (24%)	1277 (100%)	
Urban	1202 (66%) (35%)	608 (34%) (34%)	1810 (100%)	
Other	1178 (64%) (34%)	665 (36%) (37%)	1843 (100%)	
Total	3422 (100%)	1785 (100%)	5207	
Type of Housing				
Single Family Housing	2576 (66%) (75%)	1306 (34%) (73%)	3882 (100%)	23.34*
No Single-Family Housing	846 (64%) (25%)	479 (36%) (27%)	1325 (100%)	
Total	3422 (100%)	1785 (100%)	5207	
Religious Inclination				
No Religious Inclination	543 (64%) (16%)	304 (36%) (17%)	847 (100%)	1.17
Religious Inclination	2879 (66%) (84%)	1481 (34%) (83%)	4360 (100%)	
Total	3422 (100%)	1785 (100%)	5207	
Desire for Higher Education				
Very Low	242 (56%) (7%)	192 (44%) (11%)	434 (100%)	60.57*

Low	220 (59%) (6%)	155 (41%) (9%)	375 (100%)
Moderate	578 (61%) (17%)	363 (39%) (20%)	941 (100%)
High	679 (65%) (20%)	365 (35%) (20%)	1044 (100%)
Very	1703 (71%) (50%)	710 (29%) (40%)	2413 (100%)
Total	3422 (100%)	1785 (100%)	5207

*Significant < .05

Condom Use in High School. Similar to contraception use, more males (58%) indicated using condoms than females (46%). Youth who lived in single family housing also reported greater (76%) contraception use compared to 24% who did not live in single family housing. Metropolitan location and race was not found to be associated with condom use during last sexual encounter. However, respondents who were religiously inclined were more likely to report condom use at their last sexual encounter. Similar to previous findings, the more desire for higher education that youth indicated the more condom use they reported as well.

Table 4.7c:

Condom Use in High School with Demographic and Psychographic Variables, Wave One

	Condom Use	No Condom Use	Total	Chi-Square
Gender				
Female	1230 (45%) (46%)	1436 (54%) (54%)	2666 (100%)	76.92*

Male	1481 (55%) (58%)	1060 (42%) (42%)	2541 (100%)	
Total	2711 (100%)	2496 (100%)	5207	
Race				
Minority	1263 (53%) (47%)	1136 (47%) (46%)	2399 (100%)	0.61
White	1448 (52%) (53%)	1360 (48%) (54%)	2808 (100%)	
Total	2711 (100%)	2496 (100%)	5207	
Location				
Rural	144 (52%) (5%)	133 (48%) (5%)	277 (100%)	0.31
Suburban	673 (53%) (25%)	604 (47%) (24%)	1277 (100%)	
Urban	941 (52%) (35%)	869 (48%) (35%)	1810 (100%)	
Other	953 (52%) (35%)	890 (48%) (36%)	1843 (100%)	
Total				
Type of Housing				
Single-Family Housing	2043 (53%) (76%)	1839 (47%) (74%)	3882 (100%)	22.47*
Non-Single-Family Housing	668 (50%) (24%)	657 (50%) (26%)	1325 (100%)	
Total	2711 (100%)	2496 (100%)	5207	
Religious Inclination				
No Religious Inclination	407 (48%) (15%)	440 (52%) (18%)	847 (100%)	6.53*

Religious Inclination	2304 (53%) (85%)	2056 (47%) (82%)	4360 (100%)	
Total	2711 (100%)	2496 (100%)	5207	
Desire for Higher Education				
Very Low	189 (44%) (7%)	245 (56%) (10%)	434	35.10*
Low	169 (45%) (6%)	206 (55%) (8%)	375	
Moderate	459 (49%) (17%)	482 (51%) (19%)	941	
High	560 (54%) (21%)	484 (46%) (19%)	1044	
Very	1334 (55%) (49%)	1079 (45%) (43%)	2413	
Total	2711 (100%)	2496 (100%)	5207	

Longitudinal (Wave Three)

The results from the longitudinal bivariate analysis, when respondents were in their young adulthood are presented below.

Sexually Active in Young Adulthood. At Wave One, when youth had reached young adulthood, males were found to be slightly less sexually active than females and similar to what was noted in the cross-sectional analysis, racial minority respondents were still less sexually active than their Caucasian peers. Respondents who lived in single family housing when they were in high school remained to be more sexually active in young adulthood (79%) than those who had not lived in single-family dwellings (21%). Also, in young adulthood, those who had indicated being religiously inclined in high

school also remained to be more sexually active (86%) as compared to those who were not as religiously inclined (14%). The higher the desire for education indicated by youth the more sexually active they were as well.

Among the respondents who were Sexually Active in Young Adulthood, 36% had lived in Urban areas in High School, 34% had lived in suburban areas in high school while 25% had lived in rural settings. All of these associations were statistically significant. In young adulthood, 46% respondents who were sexually active had only completed high school or less while 34% of those who were sexually active had attended some college. Of those who had graduated college or gained further education, only 20% indicated also being sexually active at the time. Sexual orientation was related to sexual activity with significantly less LGBQ young adults reporting being sexually active compared to heterosexual young adults (10% compared to 90%).

Table 4.8a

Sexually Active in Young Adulthood with Demographic and Psychographic Variables, Wave One

	Sexually Active in Young Adulthood	Not Sexually Active in Young Adulthood	Total	Chi-Square
Gender				
Female	4949 (89%) (52%)	584 (11%) (45%)	5533 (100%)	25.64*
Male	4514 (86%) (48%)	719 (14%) (55%)	5233 (100%)	
Total	9463 (100%)	1303 (100%)	10766	

Race				
Minority	3974 (87%) (42%)	614 (13%) (47%)	4588 (100%)	12.31*
White	5489 (89%) (58%)	689 (11%) (53%)	6178 (100%)	
Total	9463 (100%)	1303 (100%)	10766	
Location				
Rural	485 (83%) (5%)	96 (17%) (7%)	581 (100%)	12.94*
Suburban	2315 (89%) (25%)	292 (11%) (22%)	2607 (100%)	
Urban	3440 (88%) (36%)	464 (12%) (36%)	3904 (100%)	
Other	3223 (88%) (34%)	451 (12%) (35%)	3674 (100%)	
Total	9463 (100%)	1303 (100%)	10766	
Type of Housing				
Non-Single-Family Housing	1212 (21%) (48%)	1322 (26%) (53%)	2534(100%)	34.93*
Single Family Housing	4489 (79%) (55%)	3743 (74%) (46%)	8232 (100%)	
Total	5701 (100%)	5065 (100%)	10766	
Religious Inclination				
No Religious Inclination	1349 (90%) (14%)	152 (10%) (12%)	1501 (100%)	6.40*
Religious Inclination	8114 (88%) (86%)	1151 (12%) (88%)	9265 (100%)	
Total	9463 (100%)	1303 (100%)	10766	

Desire for Higher Education				
Very Low	553 (88%) (6%)	77 (12%) (6%)	630	13.15*
Low	510 (90%) (5%)	60 (10%) (5%)	570	
Moderate	1478 (89%) (16%)	192 (11%) (15%)	1670	
High	1914 (90%) (20%)	221 (10%) (17%)	2135	
Very High	5008 (87%) (53%)	753 (13%) (58%)	5761	
Total	9463	1303	10766	
Educational Attainment				
High School or less	4342 (90%) (46%)	483 (10%) (37%)	4825 (100%)	64.03*
Some College	3254 (88%) (34%)	440 (12%) (34%)	3694 (100%)	
College graduate or more	1865 (83%) (20%)	373 (17%) (29%)	2238 (100%)	
Total	9461 (100%)	1296 (100%)	10757	
Sexual Orientation				
LGBQ	917 (76%) (10%)	284 (24%) (22%)	1201 (100%)	169.34*
Heterosexual	8546 (89%) (90%)	1019 (11%) (78%)	9565 (100%)	
Total	9463 (100%)	1303 (100%)	10766	

*Significant < .05

Contraception Use in Young Adulthood. Of those engaging in sex in young adulthood, more Females (53%) than Males (47%) indicated using contraception during their last sexual encounter in Young Adulthood (Wave Three). In addition, more White respondents (61%) than Minority respondents (39%) used some form of contraception. Among those who used some form of contraception in Young Adulthood, 37% had lived in urban settings in High School, 33% had lived in suburban settings in High School while 25% had lived in rural settings. There was no statistical difference in reported contraception use among the religiously inclined in Young Adulthood. Youth who lived in single family housing in high school remained to report much greater (79%) contraception use compared to 21% who had not lived in single family housing at Wave One. The higher the desire for education indicated by youth the more use of contraception was reported.

In regards to educational attainment at young adulthood, less than half (41%) of respondents who had only completed high school or less had indicated using contraception during their last sexual encounter, 36% of respondents who had attended some college had used contraception during their last sexual encounter while only 23% of respondents who went on to graduate college or gained higher education had used contraception during their last sexual encounter. There was no significant difference by sexual orientation and contraception use in young adulthood.

Table 4.8b

Contraception Use in Young Adulthood with Demographic/Psychographic Variables

	Contraception	No Contraception	Total	Chi-Square
Gender				
Female	3044 (62%) (53%)	1905 (38%) (51%)	4949 (100%)	6.90*
Male	2657 (59%) (47%)	1857 (41%) (49%)	4514 (100%)	
Total	5701 (100%)	3762 (100%)	9463	
Race				
Minority	2220 (56%) (39%)	1754 (44%) (47%)	3974 (100%)	54.93*
White	3481 (63%) (61%)	2008 (37%) (53%)	5489 (100%)	
Total	5701 (100%)	3762 (100%)	9463	
Location Rural	284 (59%) (5%)	201 (41%) (5%)	485 (100%)	15.47*
Suburban	1435 (62%) (25%)	880 (38%) (23%)	2315 (100%)	
Urban	2123 (62%) (37%)	1317 (38%) (35%)	3440 (100%)	
Other	1859 (58%) (33%)	1364 (42%) (36%)	3223 (100%)	
Total	5701 (100%)	3762 (100%)	9463	
Type of Housing				
Single Family Housing	4489 (59%) (79%)	2780 (41%) (74%)	7269	
Non-Single-Family Housing	1212 (55%) (21%)	982 (45%) (26%)	2194	

Total	5701	3762	9463	
Religious Inclination				
No Religious Inclination	808 (60%) (14%)	541 (40%) (14%)	1349 (100%)	0.08
Religious Inclination	4893 (60%) (86%)	3221 (40%) (86%)	8114 (100%)	
Total	5701 (100%)	3762 (100%)	9463	
Desire for Higher Education				
Very Low	280 (50%) (5%)	273 (49%) (7%)	553	88.49*
Low	275 (54%) (5%)	235 (46%) (6%)	510	
Moderate	801 (54%) (14%)	677 (46%) (18%)	1478	
High	1125 (59%) (20%)	789 (41%) (21%)	1914	
Very High	3220 (64%) (57%)	1788 (36%) (48%)	5008	
Total	5701	3762	9463	
Educational Attainment				
High School or less	2307 (53%) (41%)	2035 (47%) (54%)	4352 (100%)	102.06*
Some College	2062 (63%) (36%)	1192 (37%) (32%)	3254 (100%)	
College graduate or more	1332 (71%) (23%)	533 (29%) (14%)	1865 (100%)	
Total	5701 (100%)	3760 (100%)	9461	

Sexual Orientation				
LGBQ	538 (59%) (9%)	379 (41%) (10%)	917 (100%)	1.05
Heterosexual	5163 (60%) (91%)	3383 (40%) (90%)	8546 (100%)	
Total	5701 (100%)	3762 (100%)	9463	

*Significant < .05

Condom Use in Young Adulthood. Among the 9463 respondents who were sexually active in young adulthood, males (53%) indicated a higher use of condoms at their last sexual encounter as compared to their female sexually active peers (47%). In regards to race, minority young adults were less likely to report using condoms and condom use was also found to be related to metropolitan location with Suburban (36%) and Urban (35%) youth were more likely to report condom use while 23% of respondents who spent their high school years in rural areas reported condom use in Young Adulthood. Youth who lived in single family housing in high school remained to report much greater (74%) condom use in young adulthood as compared to 26% who had not lived in single family housing at Wave One. The higher the desire for education indicated by youth the more use of condoms were reported.

Those who were religiously inclined did report higher use of condoms (87%) at their last sexual encounter as compared to those who were not as religiously inclined (13%). In regards to educational attainment, 44% of respondents who had only completed high school or less at young adulthood indicated using condoms during their last sexual encounter at the time while 36% of respondents who attended some college

used condoms during their last sexual encounter. Of those respondents who had graduated college or gained higher education, only 20% reported using condoms when they last had sex.

Table 4.8c

Condom Use in Young Adulthood with Demographic/Psychographic Variables

	Condom Use	No Condom Use	Total	Chi-Square
Gender				
Female	1634 (33%) (47%)	3315 (67%) (55%)	4949 (100%)	56.27*
Male	1826 (40%) (53%)	2688 (60%) (45%)	4514 (100%)	
Total	3460 (100%)	6003 (100%)	9463	
Race				
Minority	1698 (43%) (49%)	2276 (57%) (38%)	3974 (100%)	112.24*
White	1762 (32%) (51%)	3727 (68%) (62%)	5489 (100%)	
Total	3460 (100%)	6003 (100%)	9463	
Location				
Rural	186 (38%) (5%)	299 (62%) (5%)	485 (100%)	14.27*
Suburban	802 (35%) (23%)	1513 (65%) (25%)	2315 (100%)	
Urban	1217 (35%) (35%)	2223 (65%) (37%)	3440 (100%)	
Other	1255 (39%) (36%)	1968 (61%) (33%)	3223 (100%)	
Total	3460 (100%)	6003 (100%)	9463	

Type of Housing				
Single Family Housing	2580 (35%) (74%)	4689 (65%) (78%)	7269 (100%)	20.71*
Non-Single-Family Housing	880 (40%) (26%)	1314 (60%) (22%)	2194 (100%)	
Total	3460 (100%)	6003 (100%)	**9463**	
Religious Inclination				
No Religious Inclination	456 (34%) (13%)	893 (66%) (15%)	1349 (100%)	5.17*
Religious Inclination	3004 (37%) (87%)	5110 (63%) (85%)	8114 (100%)	
Total	3460 (100%)	6003 (100%)	9463	
Desire for Higher Education				
Very Low	188 (34%) (5%)	365 (60%) (6%)	553	6.58*
Low	171 (34%) (5%)	339 (66%) (6%)	510	
Moderate	546 (37%) (16%)	932 (63%) (15%)	1478	
High	735 (38%) (21%)	1179 (62%) (20%)	1914	
Very High	1820 (36%) (53%)	3188 (64%) (53%)	5008	
Total	3460 (100%)	6003 (100%)	9463	
Educational Attainment				
High School or less	1527 (35%) (44%)	2815 (65%) (47%)	4352 (100%)	71.09*

Some College	1237 (38%) (36%)	2017 (62%) (34%)	3254 (100%)	
College graduate or more	695 (37%) (20%)	1170 (63%) (20%)	1865 (100%)	
Total	3459 (100%)	6002 (100%)	9461	
Sexual Orientation				
LGBQ	311 (34%) (9%)	606 (66%) (10%)	917 (100%)	3.07
Heterosexual	3149 (37%) (91%)	5397 (63%) (90%)	8546 (100%)	
Total	3460 (100%)	6003 (100%)	9463	

*Significant < .05

Path A: Relationship between Correct Knowledge of Safer Sex and Health Beliefs. Table 4.9 explores not only Path A in our conceptual framework and also begins to answer our first hypothesis, by reporting on the bivariate analysis of respondent's correct knowledge of safer sex (our independent/predictor variable) as compared to their health beliefs variables (our mediator variables). Correct knowledge of safer sex has a positive correlation with perceived severity of HIV (r = 0.40) but a negative correlation with perceived severity of STDs (r = -0.159). As for perceived susceptibility to HIV and STDs, we note that correct knowledge of safer sex has a positive correlation with both perceived susceptibilities to HIV (r = 0.107) as well as perceived susceptibility to STDs (r = 0.104). Correct knowledge of safer sex also has a positive correlation with self-efficacy in sexual decision making (r = 0.080). All of these associations were found to be statistically significant.

Thus, we can see that the higher a respondent's level of correct knowledge of safer sex in high school, the more likely they are to perceive HIV as a severe disease and also feel that they may be at risk for both HIV and STDs. Furthermore, the higher a respondent's level of correct knowledge, the more likely are they to feel in control of their sexual decision making. However, it should be noted that higher correct knowledge lead to a lower perceived severity of STDs.

Table 4.9

Bivariate Correlation Between Respondents' Correct Knowledge of Safer Sex and Health Beliefs

Knowledge of Safer Sex	Correlation with Health Beliefs
Perceived Severity of HIV	r = 0.040*
Perceived Severity of STDs	r = -0.159*
Perceived Susceptibility of HIV	r = 0.107*
Perceived Susceptibility of STDs	r = 0.104*
Self-Efficacy in Sexual Decision Making	r = 0.080*

*Significant at < .05

Path B: Relationship between Correct Knowledge of Safer Sex and Safer Sex Behaviors in High-School. Hypothesis two in our study aimed to explore Path B in our conceptual framework (Figure 1.1), which assessed the relationship between correct knowledge of safer sex with actual safer sex behaviors at a cross-sectional level. Table 4.10 is the bivariate analysis of Path B.

Sexually Active in High School. Correct knowledge of safer sex in high school was found to be related to sexual activity in high school. Youth who scored high on the correct knowledge scores around safer sex were also more sexually active (mean=3.69).

Table 4.10a

Respondent Sexually Active in High School with Correct Knowledge

	n	Mean (SD)	F
Sexually active in High School (Wave One)	5207	3.69 (1.17)	337.769*
Not Sexually Active in High School (Wave One)	5559	3.25 (1.35)	

*Significant < .05

Contraception Use in High School

Among the 5207 respondents who were sexually active in high school, those who had scored higher on the scale for correct knowledge of safer sex in high school also reported higher contraception use in high school (mean=3.78).

Table 4.10b

Respondent Contraception Use in High School with Correct Knowledge, Wave One

	n	Mean (SD)	F
Contraception Use in High School	3422	3.78 (1.14)	51.192*
No Contraception Use in High School	1785	3.54 (1.20)	
Total	5207	3.69 (1.17)	

*Significant < .05

Condom Use in High School

In high school, respondents who had scored higher on the correct knowledge of safer sex scores also reported higher means for condom use in high school (mean=3.77).

Table 4.10c

Respondent Condom Use in High School with Correct Knowledge, Wave One

	n	Mean (SD)	F
Condom Use in High School (Wave One)	2711	3.77 (1.14)	18.963*
No Condom Use in High School (Wave One)	2496	3.63 (1.19)	
Total	5207	3.69 (1.17)	

*Significant < .05

Path C: Relationship between Correct Knowledge of Safer Sex and Safer Sex Behaviors in Young Adulthood. Hypothesis three in our study was based on Path C in our conceptual framework (Figure 1.1), which tested the association between correct knowledge of safer sex in high school as predictor to safer sex behaviors in young adulthood. Table 4.11 presents the bivariate analysis of Path C.

Sexually Active in Young Adulthood. In young adulthood, once again those who were sexually active remained to be those who had higher correct knowledge of safer sex in high school (3.53) than those who did not (mean=3.01).

Table 4.11a

Respondent Sexually Active in Young Adulthood with Correct Knowledge, Wave One

	n	Mean (SD)	F
Sexually Active in Young Adulthood	9463	3.53 (1.25)	188.655*
Not Sexually Active in Young Adulthood	1303	3.01 (1.49)	
Total	10766	3.47 (1.29)	

*Significant < .05

Contraception Use in Young Adulthood

Among the respondents who reported being sexually active in young adulthood, those who had scored higher on the scale for correct knowledge of safer sex in high school continued to report higher contraception use in young adulthood (mean=3.59).

Table 4.11b

Respondent Contraception Use in Young Adulthood with Correct Knowledge, Wave Three

	n	Mean (SD)	F
Contraception Use in Young Adulthood	5701	3.59 (1.23)	32.984*
No Contraception Use in Young Adulthood	3762	3.44 (1.28)	
Total	9463	3.53 (1.25)	

*Significant < .05

Condom Use in Young Adulthood

Behavior specific to condom use was found to change at the longitudinal level when the sample reached young adulthood. Those who reported a higher score on the correct knowledge of safer sex scale no longer reported use of condoms at last sexual encounter. However, it must be noted that the difference in condom use in young adulthood was not found to be statistically significant.

Table 4.11c

Respondent Condom Use with in Young Adulthood with Correct Knowledge, Wave Three

	n	Mean (SD)	F
Condom Use in Young Adulthood	3460	3.51 (1.24)	1.509
No Condom Use in Young Adulthood	6003	3.54 (1.26)	
Total	9463	3.53(1.26)	

Path D: Relationship between Health Beliefs and Safer Sex Behaviors in High-School and Young Adulthood. Path D in the conceptual framework (Figure 1.1) was explored by hypothesis four in our study which tested the possible mediating influence of health beliefs in regards to the relationship between correct knowledge of safer sex and safer sex behaviors.

Tables 4.12 and 4.13 below, present the bivariate analysis to determine the association between health beliefs and safer sex behaviors both at a cross-sectional level (Wave One) and at the longitudinal level (Wave Three). The sample size is presented for

the total row and to indicate the strength of the association between the variables, ANOVA was used and the F statistic is also included in the table.

Cross Sectional (Wave One)

The results from the cross-sectional bivariate analysis will be presented first.

Sexually Active in High School

Sexual activity in high school was significantly related to all health belief variables except for perceived severity of HIV. Those who were sexually active in high school reported a higher level of perceived severity of STDs (mean=2.16) than those who were not sexually active in high school (mean=2.11). Respondents who were sexually active in high school also reported a much higher mean score of being at risk for HIV (mean=2.05) and STDs (mean=1.97) than those who were not sexually active in high school. Those who were not sexually active in high school did report being more in control (self-efficacy) in sexual decision making (mean=4.21) than those who were sexually active in high school (mean=4.05).

This, we see that youth who had higher perceived severity of STDs and higher perceived susceptibility to HIV and STDs were more sexually active however those who were sexually active also reported feeling less in control (self-efficacy) of their sexual decision making.

Table 4.12a

Respondent Health Beliefs with Sexually Active Behavior in High School, Wave One

	n	Mean (SD)	F
Perceived Severity of HIV			

Sexually active in High School	5207	4.38 (0.94)	0.000
Not Sexually Active in High School	5559	4.38 (0.93)	
Total	10766	4.38 (0.94)	
Perceived Severity of STDs			
Sexually active in High School	5207	2.16 (1.29)	5.195*
Not Sexually Active in High School	5559	2.11 (1.27)	
Total	10766	2.13 (1.28)	
Perceived Susceptibility to HIV			
Sexually active in High School	5207	2.05 (0.98)	377.141*
Not Sexually Active in High School	5559	1.69 (0.91)	
Total	10766	1.87 (0.97)	
Perceived Susceptibility to STDs			
Sexually active in High School	5207	1.97 (0.96)	547.186*
Not Sexually Active in High School	5559	1.56 (0.85)	
Total	10766	1.76 (0.93)	
Self-Efficacy in Sexual Decision Making			

Sexually active in High School	5207	4.05 (1.22)	49.983*
Not Sexually Active in High School	5559	4.21 (1.09)	
Total	10766	4.14 (1.16)	

*Significant < .05

Contraception Use in High School

Respondents who reported contraception use in high school had higher perceived severity of HIV (mean=4.41) but low perceived severity of STDs (mean=2.08). In regards to whether respondents felt that they may be at risk for HIV and STDs, those who reported contraception use in high school had lower perceived susceptibility to HIV (mean=2.03) but no difference – and no statistical significance- among the groups was noted for perceived susceptibility to STDs. Respondents who did report use of some form of contraception in high school when they last had sex also had higher self-efficacy in sexual decision making (mean=4.19) than those who did not use any contraception in high school (mean=3.80).

Table 4.12b

Respondent Health Beliefs with Contraception Use in High School, Wave One

	n	Mean (SD)	F
Perceived Severity of HIV			
Contraception Use in High School	3422	4.41 (0.92)	9.043*
No Contraception Use in High School	1785	4.32 (0.99)	

Total	5207	4.38 (0.95)	
Perceived Severity of STDs			
Contraception Use in High School	3422	2.08 (1.28)	39.735*
No Contraception Use in High School	1785	2.32 (1.29)	
Total	5207	2.16 (1.29)	
Perceived Susceptibility to HIV			
Contraception Use in High School	3422	2.03 (0.96)	4.444*
No Contraception Use in High School	1785	2.09 (1.02)	
Total	5207	2.05 (0.98)	
Perceived Susceptibility to STDs			
Contraception Use in High School	3422	1.97 (0.95)	0.191
No Contraception Use in High School	1785	1.96 (0.99)	
Total	5207	1.97 (0.96)	
Self-Efficacy in Sexual Decision Making			
Contraception Use in High School	3422	4.19 (1.15)	118.058*
No Contraception Use in High School	1785	3.80 (1.29)	
Total	5207	4.05 (1.21)	

*Significant < .05

Condom Use in High School

Use of condoms in high school was positively significantly related to two health beliefs measured, perceived severity of STD's and self-efficacy for sexual decision making.

Table 4.12c

Respondent Health Beliefs with Condom Use in High School

	n	Mean (SD)	F
Perceived Severity of HIV			
Condom Use in High School	2711	4.40 (0.93)	3.160
No Condom Use in High School	2496	4.35 (0.97)	
Total	5207	4.38 (0.95)	
Perceived Severity of STDs			
Condom Use in High School	2711	2.08 (1.29)	21.547*
No Condom Use in High School	2496	2.25 (1.28)	
Total	5207	2.16 (1.29)	
Perceived Susceptibility to HIV			
Condom Use in High School	2711	2.04 (0.97)	0.846
No Condom Use in High School	2496	2.07 (1.00)	
Total	5207	2.05 (0.98)	
Perceived Susceptibility to STDs			

Condom Use in High School	2711	1.98 (0.96)	1.496
No Condom Use in High School	2496	1.95 (0.97)	
Total	5207	1.97 (0.96)	
Self-Efficacy in Sexual Decision Making			
Condom Use in High School	2711	4.18 (1.16)	64.710*
No Condom Use in High School	2496	3.91 (1.27)	
Total	5207	4.05 (1.22)	

*Significant < .05

Longitudinal (Wave Three)

The results from the longitudinal bivariate analysis, when respondents were in their young adulthood are presented below.

Sexually Active in Young Adulthood

Sexual activity in young adulthood was related to all of the health belief variables except for self-efficacy in sexual decision making. In young adulthood, respondents who were sexually active had reported higher perceived severity of HIV (mean=4.39) but lower perceived severity of STDs (mean=2.12) in high school as compared to those who were not sexually active. Also, those who had reported being sexually active in young adulthood had reported higher perceived susceptibility to HIV and higher perceived susceptibility to STDs when they were in high school as compared to those who were still not sexually active. These associations were found to be statistically significant. As for

self-efficacy in sexual decision making, those who were sexually active in young adulthood had also reported being more in control of sexual decision making when they were asked about their level of self-efficacy in high school. However, this particular difference was not statistically significant.

Table 4.13a

Respondent Health Beliefs with Sexually Active Behavior in Young Adulthood, Wave Three

	n	Mean (SD)	F
Perceived Severity of HIV			
Sexually Active in Young Adulthood	9463	4.39 (0.93)	13.836*
Not Sexually Active in Young Adulthood	1303	4.29 (0.97)	
Total	10766	4.38 (0.94)	
Perceived Severity of STDs			
Sexually Active in Young Adulthood	9463	2.12 (1.27)	14.444*
Not Sexually Active in Young Adulthood	1303	2.26 (1.31)	
Total	10766	2.13 (1.28)	
Perceived Susceptibility to HIV			
Sexually Active in Young Adulthood	9463	1.89 (0.96)	44.908*
Not Sexually Active in Young Adulthood	1303	1.70 (0.97)	
Total	10766	1.87 (0.97)	

Perceived Susceptibility to STDs			
Sexually Active in Young Adulthood	9463	1.89 (0.96)	96.458*
Not Sexually Active in Young Adulthood	1303	1.70 (0.97)	
Total	10766	1.87 (0.97)	
Self-Efficacy in Sexual Decision Making			
Sexually Active in Young Adulthood	9463	1.79 (0.96)	1.264
Not Sexually Active in Young Adulthood	1303	1.52 (0.87)	
Total	10766	1.87 (0.97)	

*Significant < .05

Contraception Use in Young Adulthood

In young adulthood (Wave Three) respondents who did report contraception use had reported higher perceived severity of HIV (mean=4.40) but low perceived severity of STDs in high school (mean=2.04). The difference in perceived severity of HIV was not statistically significant but the difference in perceived severity of STDs was statistically significant. There was very little difference – and no statistical significance- in perceived susceptibility of HIV and STDs between those who reported contraception use in young adulthood and those who did not. In regards to self-efficacy in sexual decision making, those who did report use of contraception in young adulthood were more in control of their sexual decision making (mean=4.19) than those who did not report contraception use at last sexual encounter (mean=4.07).

Table 4.13b

Respondent Health Beliefs with Contraception Use in Young Adulthood, Wave Three

	n	Mean (SD)	F
Perceived Severity of HIV			
Contraception Use in Young Adulthood	5701	4.40 (0.92)	1.980
No Contraception Use in Young Adulthood	3762	4.37 (0.95)	
Total	9463	4.39 (1.27)	
Perceived Severity of STDs			
Contraception Use in Young Adulthood	5701	2.04 (1.23)	48.94*
No Contraception Use in Young Adulthood	3762	2.23 (1.33)	
Total	9463	2.12 (1.27)	
Perceived Susceptibility to HIV			
Contraception Use in Young Adulthood	5701	1.89 (0.95)	0.074
No Contraception Use in Young Adulthood	3762	1.89 (0.98)	
Total	9463	1.89 (0.96)	
Perceived Susceptibility to STDs			
Contraception Use in Young Adulthood	5701	1.78 (0.92)	0.583

No Contraception Use in Young Adulthood	3762	1.79 (0.96)	
Total	9463	1.79 (0.93)	
Self-Efficacy in Sexual Decision Making			
Contraception Use in Young Adulthood	5701	4.19 (1.14)	25.816*
No Contraception Use in Young Adulthood	3762	4.07 (1.19)	
Total	9463	4.14 (1.16)	

Condom Use in Young Adulthood

Similarly, condom use in young adulthood was positively significantly associated to perceived severity of STD's, but to no other health belief measured.

Table 4.13c

Respondent Health Beliefs with Condom Use in Young Adulthood, Wave Three

	n	Mean (SD)	F
Perceived Severity of HIV			
No Condom Use in Young Adulthood	3460	4.38 (0.96)	1.229
No Condom Use in Young Adulthood	6003	4.39 (0.92)	
Total	9463	4.39 (0.93)	
Perceived Severity of STDs			

No Condom Use in Young Adulthood	3460	2.19 (1.31)	22.768*
No Condom Use in Young Adulthood	6003	2.07 (1.25)	
Total	9463	2.12 (1.27)	
Perceived Susceptibility to HIV			
No Condom Use in Young Adulthood	3460	1.88 (0.97)	0.474
No Condom Use in Young Adulthood	6003	1.89 (0.96)	
Total	9463	1.89 (0.96)	
Perceived Susceptibility to STDs			
Condom Use in Young Adulthood	3460	1.77 (0.93)	2.481
No Condom Use in Young Adulthood	6003	1.80 (0.94)	
Total	9463	1.79 (0.93)	
Self-Efficacy in Sexual Decision Making			
Condom Use in Young Adulthood	3460	4.13 (1.17)	0.723
No Condom Use in Young Adulthood	6003	4.15 (1.16)	
Total	9463	4.14 (1.16)	

*Significant < .05

Multivariate Analysis

Subsequent to the univariate analyses and bivariate analyses, multivariate analysis was conducted to test our hypotheses and explore the pathways in our conceptual model (Figure 1.1).

Testing of Hypothesis

Hypothesis 1. Adolescents with higher levels of correct knowledge of safer sex report (a) higher self-efficacy in sexual decision making, (b) higher perceived severity of HIV/AIDs & STDs and (c) higher perceived susceptibility to HIV/AIDS & STDs (Research Question 1)

The multivariate regression analyses are presented in Table 4.14 and include standardized betas (B) for the variables of interest adjusting for demographic/psychographic variables that were significantly related in the bivariate analysis.

Table 4.14

Influence of Correct Knowledge of Safer Sex on Health Beliefs in High School, Wave One

Variable	Perceived Severity of HIV	Perceived Severity of STD	Perceived Susceptibility to HIV	Perceived Susceptibility to STD	Self-Efficacy in Sexual Decision Making
	Standardized B	Standardized B	Standardized B	Standardized B	Standardized B
Knowledge of Safer Sex	0.24**	-0.14**	0.08**	0.08**	0.06**
Demographic Variables					
Race	0.12**	-0.35**	-0.07**	-0.05**	0.09**

(Reference: White)					
Metropolitan Location (Reference: Rural)	0.11	0.14**	-0.08**	-0.09**	0.02
Metropolitan Location (Reference: Suburban)	-0.01	0.07*	-0.07*	-0.07*	0.05
Metropolitan Location (Reference: Urban)	0.04	0.02	-0.04	-0.04	-0.01
Type of Housing (Reference: Single Family Housing)	0.02	-0.11**	-0.05	-0.02	0.05*
Gender (Reference: Male)	0.002	0.22**	0.22**	0.23**	-0.47**
Psychographic Variables					
Religious Inclination	0.13**	0.03	-0.09**	-0.113**	-0.01
Desire for Higher Education	0.05**	-0.12**	-0.04**	-0.06**	0.12**

*Significant < .05
**Significant < .01

A regression analysis found correct knowledge of safer sex behaviors in high school were significantly related to perceived severity of HIV in high school (B=0.24, $p<0.05$), where youth with a higher knowledge of safer sex behaviors had a corresponding increase in perceived severity of HIV. Conversely, knowledge of safer sex behaviors in high school were significantly negatively related to perceived severity of STDs in high school (B= -0.14, $p<0.05$), and youth with a higher knowledge of safer sex behaviors had a corresponding decrease in perceived severity of STDs. Knowledge of safer sex was positively related to perceived susceptibility of HIV, perceived susceptibility of STD, and self-efficacy in sexual decision making after adjusting for selected demographic variables. Race, gender, religious inclination and desire for higher education maintained statistical significant for the majority of the multivariate analysis with most of the other psychographic variables maintaining the relationships found in the bivariate analyses.

Hypothesis 2.1: Adolescents in high school with higher levels of correct knowledge of safer sex are more likely to practice safer-sex behaviors

The table below lists the results of the logistic regression analyses displaying adjusted Odds Ratio and 95% confidence intervals of the independent/predictor variable of correct knowledge of safer sex in high school and the dependent variables of our health behaviors (sexually active in high school, contraception use in high school, and condom use in high school). Also included are the adjusted odds ratio and 95% confidence intervals for the demographic/psychographic variables that were significantly related.

Table 4.15

Influence of Correct Knowledge of Safer Sex on Safer Sex Behaviors in High-School, Wave One

Variable	Sexually Active in High School	Contraception Use in High School	Condom Use in High School
	Odds Ratio & 95% CI	Odds Ratio & 95% CI	Odds Ratio & 95% CI
Correct Knowledge of Safer Sex in High School	1.38** (1.33, 1.42)	1.17** (1.11, 1.23)	1.11** (1.06, 1.16)
Demographic Variables			
Race (Reference: White)	0.72** (0.66, 0.78)	1.13 (1.00, 1.27)	0.97 (0.86, 1.09)
Location (Reference: Rural)	1.36* (1.12, 1.65)	0.95 (0.71, 1.23)	1.02 (0.78, 1.34)
Location (Reference:Suburban)	1.19 (0.98, 1.44)	0.88 (0.66, 1.16)	0.96 (0.73, 1.25)
Location (Reference: Urban)	1.30* (1.08, 1.57)	0.84 (0.64, 1.11)	0.97 (0.75, 1.26)
Type of Housing (Reference: Single-Family Housing)	0.87* (0.79, 0.96)	1.06 (0.93, 1.21)	1.07 (0.93, 1.22)
Gender (Reference: Male)	Not included	Not included	1.75** (1.57, 1.96)
Psychographic Variables			
Religious Inclination	0.76** (0.67, 0.85)	Not included	1.17* (1.00, 1.36)
Desire for Higher Education	0.73** (0.70, 0.75)	1.18** (1.12, 1.22)	1.15** (1.10, 1.20)

*Significant < .05
**Significant < .01

Correct knowledge of safer sex behaviors in high school was positively significantly associated with higher odds of being sexually active in high school (OR=1.38, 95% CI=1.33, 1.4; P<0.05). Of those individuals engaging in sex in high school, youth who had scored higher on the scale for correct knowledge of safer sex behaviors also had higher odds of using contraception (OR=1.17, 95% CI= 1.11, 1.23 P<0.05) as well as condoms (OR=1.11, 95% CI= 1.06,1.16, P<0.05) during their last sexual encounter.

Desire for higher education and religious inclination were Psychographic variables that were included in the multivariate analysis since they were found to be significant in the bivariate analysis with our outcomes variables (sexually active in high school, contraception use in high school, condom use in high school). They maintained their statistical significance in the multivariate analysis as well.

On the other hand, respondent's race was found to be statistically significant in the bivariate analysis with the outcome variables for Wave One but it did not maintain statistical significance in the multivariate analysis. Gender was only found to be statistically significant with condom use in high school in our bivariate analysis and it also maintained statistical significance in the multivariate analysis as well. The type of housing a respondent lived in during High School only maintained statistical significance for whether respondents were sexually active in high school while their contraception and condom use did not maintain its statistical significance in the multivariate analysis.

Metropolitan location of a respondent was a demographic variable which was found to be statistically significant with outcome variables (Wave One) during the bivariate analysis but it only maintained significance for respondents who lived in rural

settings or urban settings and whether they were sexually active in high school. Respondents Metropolitan location and their contraception and condom Use in High school did not maintain statistical significance in the multivariate analysis.

Hypothesis 3. Adolescents with higher levels of correct knowledge of safer sex are more likely to practice safer-sex behaviors five to seven years later in young-adulthood.

The table below lists the adjusted Odds Ratio and confidence intervals of our independent/predictor variable of correct knowledge of safer sex in high school and the outcome variables of our health behaviors (sexually active in young adulthood, contraception use in young adulthood, and condom use in young adulthood). Also included are the adjusted odds ratio and confidence intervals for the demographic/psychographic variables that were significantly related. Educational attainment and sexual orientation were two demographic variables that were only assessed during Wave Three and those were also included in this hypothesis testing in addition to the demographic and psychographic variables that were included in the analysis for hypothesis 2.1.

Table 4.16

Influence of Correct Knowledge of Safer Sex on Safer Sex Behaviors in Young Adulthood, Wave One

Variable	Sexually Active in Young Adulthood	Contraception Use in Young Adulthood	Condom Use in Young Adulthood
	Odds Ratio & 95% CI	Odds Ratio & 95% CI	Odds Ratio & 95% CI

Correct Knowledge of Safer Sex in High School	1.37** (1.31,1.43)	1.08** (1.04, 1.11)	0.98 (0.95, 1.01)
Demographic Variables			
Race (Reference: White)	1.23** (1.09, 1.39)	1.31** (1.10, 1.43)	0.64** (0.59, 0.70)
Location (Reference: Rural)	1.33* (1.01, 1.76)	0.99 (0.80, 1.23)	1.06 (0.86, 1.31)
Location (Reference: Suburban)	1.30 (1.00, 1.70)	0.94 (0.76, 1.15)	1.04 (0.85, 1.28)
Location (Reference: Urban)	1.30 (0.99, 1.68)	0.91 (0.75, 1.12)	1.11 (0.90, 1.36)
Type of Housing (Reference: Single-Family Housing)	1.12 (0.97, 1.30)	1.17* (1.05, 1.30)	0.86* (0.77, 0.95)
Gender (Reference: Male)	0.61** (0.54, 0.69)	0.93 (0.85, 1.01)	1.43** (1.31. 1.56)
Educational Attainment (Reference: Enrolled in College)	2.26** (1.90, 2.68)	0.52** (0.46, 0.59)	0.84* (0.74, 0.95)
Educational Attainment (Reference: Graduated College/Gained Higher Education)	1.67** (1.43, 1.95)	0.73** (0.65, 0.83)	0.97 (0.86, 1.10)
Sexual Orientation (Reference: LGBQ)	2.99** (2.56, 3.50)	1.16* (1.01, 1.34)	0.99 (0.86, 1.15)
Psychographic Variables			
Religious Inclination	0.78* (0.64, 0.93)	0.95 (0.84, 1.07)	1.09 (0.96, 1.24)
Desire for Higher Education	1.00 (0.94, 1.06)	1.06* (1.02, 1.11)	1.01 (0.97, 1.05)

*Significant < .05

**Significant < .01

A logistic analysis found that youth who possessed correct knowledge of safer sex behaviors in high school had significantly higher odds of being sexually active in young adulthood (OR=1.37, 95% CI=1.31, 1.43; P<0.05). Of those individuals engaging in sex in young adulthood, youth who had possessed correct knowledge of safer sex behaviors in high school had higher odds of using contraception in young adulthood (OR=1.08, 95% CI= 1.04, 1.11 P<0.05), but were less likely to use condoms (OR=0.98, 95% CI= 0.95,1.01) during their last sexual encounter in young adulthood, however this was not found to be statistically significant.

Race and desire for higher education maintained statistical significance from bivariate analysis with the outcome variables of safer sex behaviors in young adulthood (Wave Three). The type of housing that respondents resided in (single family homes versus non-single-family homes) was found to be statistically significant with sexual behaviors in young adulthood during the bivariate analysis, but in the multivariate analysis it did not maintain statistical significance for whether respondents were sexually active in young adulthood but it did maintain significance with contraception and condom use in young adulthood. Religious inclination maintained significance with sexually activity in young adulthood but not for contraception and condom use. Respondents' gender maintained statistical significance for all sexual health behavior variables except for contraception use while sexual orientation maintained statistical significance for all sexual behavior variables except for condom use in young adulthood. Educational attainment levels maintained statistical significant at the multivariate analysis for all sexual behaviors except

for condom use among those who had graduated college and/or gained higher education.

Hypothesis 4.1: Higher Self-Efficacy in decision making around sexual choices, higher Perceived Severity of HIV/AIDS & STDs and higher Perceived Susceptibility to HIV/AIDS & STDs in high school mediate the influence *of correct knowledge on safer sex behaviors in high school and later in young-adulthood.*

To test for mediation, our mediator variables which were health belief constructs (Perceived Severity to HIV, Perceived Severity to STDs, Perceived Susceptibility to HIV, Perceived Susceptibility to STDs, Self-Efficacy in sexual decision making) were included in a logistic regression which was conducted at both the cross-sectional level and the longitudinal level (predictor-outcome) with correct knowledge of safer sex in high school included as the independent/predictor variable and safer sex behaviors (currently sexually active, contraception use, condom use) in both high school and young-adulthood as outcomes variables..

The table below lists the results of our mediation analysis which includes the adjusted Odds Ratio and confidence intervals of our independent/predictor variable of correct knowledge of safer sex in high school and our dependent variables of our health behaviors (sexually active in high school, contraception use in high school and condom use in young adulthood). Also included are the adjusted odds ratio and confidence intervals for the demographic/psychographic variables that were significantly related.

Table 4.17a

Influence of Health Beliefs on Safer Sex Behaviors in High-School, Wave One

Variable	Sexually Active in High School	Contraception Use in High School	Condom Use in High School
	Odds Ratio & 95% CI	Odds Ratio & 95% CI	Odds Ratio & 95% CI
Correct Knowledge of Safer Sex in High School (Wave One)	1.35** (1.30, 1.39)	1.13** (1.07, 1.19)	1.08* (1.03, 1.13)
Mediator Variables			
Perceived Severity to HIV (Wave One)	Not included	1.06 (0.99, 1.13)	1.02 (0.96, 1.08)
Perceived Severity to STD (Wave One)	1.00 (0.97, 1.04)	0.94** (0.89, 0.98)	0.93** (0.89, 0.97)
Perceived Susceptibility to HIV (Wave One)	1.12** (1.06, 1.18)	0.89** (0.82, 0.96)	0.91* (0.84, 0.98)
Perceived Susceptibility to STD	1.43** (1.35, 1.52)	1.13** (1.05, 1.23)	1.10* (1.02, 1.19)
Self-Efficacy in Sexual Decision Making	0.94* (0.91, 0.98)	1.24** (1.18, 1.30)	1.26** (1.19, 1.32)
Demographic Variables			
Race (Reference: White)	0.73** (0.67, 0.80	1.07 (0.95, 1.21)	0.93 (0.82, 1.04)
Metropolitan Location (Reference: Rural)	1.41** (1.15, 1.72)	0.94 (0.70, 1.26)	1.02 (0.77, 1.34)
Metropolitan Location (Reference: Suburban)	1.18 (0.97, 1.44)	0.86 (0.65, 1.15)	0.95 (0.72, 1.24)
Metropolitan Location (Reference: Urban)	1.31* (1.12, 1.64)	0.83 (0.63, 1.10)	0.97 (0.74. 1.27)
Type of Housing	0.87*	1.05	1.06

(Reference: Single Family Housing)	(0.80, 0.97)	(0.91, 1.21)	(0.93, 1.20)
Gender (Reference: Male)	Not Included	Not Included	2.04** (1.81, 2.29)
Psychographic Variables			
Religious Inclination	0.79** (0.70, 0.89)	Not Included	1.19* (1.02, 1.39)
Desire for Higher Education	0.75** (0.72, 0.78)	1.13** (1.08, 1.19)	1.12** (1.07, 1.17)

*Significant < .05
**Significant < .01

A logistic analysis was conducted at the cross-sectional level and with the inclusion of our mediator variables it was found that youth who possessed correct knowledge of safer sex behaviors in high school still had higher odds of being sexually active in high school (OR=1.35, 95% CI=1.30, 1.39; P<0.05). Of those individuals engaging in sex in high school, it was also found that youth who possessed correct knowledge of safer sex behaviors in high school still had higher odds of using contraception (OR=1.13, 95% CI= 1.07, 1.19 P<0.05) as well as condoms (OR=1.08, 95% CI= 1.03,1.13, P<0.05) during their last sexual encounter.

Youth who indicated higher level of perceived severity of HIV had higher odds of using contraception (OR=1.06, 95% CI= 0.99, 1.13) and higher odds of using condoms (OR=1.02, 95% CI= 0.96, 1.08) but neither of these associations were not found to be statistically significant. Youth with higher levels of perceived severity of STDS, on the other hand were less likely to use contraception (OR=0.94, 95% CI= 0.89, 0.98, P<0.05) and also less likely to use condoms at their last sexual encounter (OR=0.93, 95% CI= 0.89, 0.97, P<0.05).

Youth who had higher levels of perceived susceptibility to HIV in high school were found to be more likely to engage in sex in high school (OR=1.12, 95% CI= 1.06, 1.18). Of those youth who were engaging in sex in high school, youth with higher levels of perceived susceptibility to HIV were less likely to use contraception (OR=0.89, 95% CI= 0.82, 0.96, P<0.05) and also less likely to use condoms at their last sexual encounter (OR=0.91, 95% CI= 0.84, 0.98, P<0.05). All of these associations were found to be statistically significant. In regards to perceived susceptibility to STDs, youth with higher levels of perceived susceptibility to STDs in high school were found to be more likely to engage in sex in high school (OR=1.43, 95% CI= 1.35, 1.52) but also more likely to use contraception (OR=1.13, 95% CI= 1.05, 1.23, P<0.05) and condoms at their last sexual encounter (OR= 1.10, 95% CI= 1.02, 1.19, P<0.05).

Youth who indicated higher levels of self-efficacy in sexual decision making in high school were found to be less likely to engage in sex in high school (OR=0.94, 95% CI= 0.91, 0.98). Of those youth who were engaging in sex in high school, youth with higher levels of self-efficacy in sexual decision making were more likely to use contraception (OR=1.24, 95% CI= 1.18, 1.30, P<0.05) and also more likely to use condoms at their last sexual encounter (OR= 1.26, 95% CI= 1.19, 1.32, P<0.05).

In regards to demographic and psychographic variables, gender and desire for higher education maintained statistical significance from bivariate analysis for sexual health behaviors in high school. Race and type of housing only maintained significance in the multivariate analysis for whether respondents were sexually active in high school but it did not maintain statistical significance for contraception and condom use. On the other hand, religious inclination maintained statistical significance for whether respondents

were sexually active and using contraception in high school. Religious inclination was not found to be significant with contraception use in the bivariate analysis so it was not included in this hypothesis testing.

Respondents metropolitan location of residence only maintained significance in the multivariate analysis for respondents who lived in rural setting and urban settings and whether they were sexually active in high school. The table below also lists the results of our mediation analysis which includes the adjusted Odds Ratio and confidence intervals of our independent/predictor variable of correct knowledge of safer sex in high school and our dependent variables of our health behaviors (sexually active in young adulthood, contraception use in young adulthood and condom use in young adulthood) but it also includes the adjusted odds ratio and confidence intervals of our mediator/health belief variables of perceived severity of HIV, perceived severity of STDs, perceived susceptibility of HIV, perceived susceptibility of STDs and self-efficacy in sexual decision making.

Also included are the adjusted odds ratio and confidence intervals for the demographic/psychographic variables that were included in the logistic regression. Certain demographic and psychographic variables that were not considered statistically significant in the bivariate analysis were thus excluded from the multivariate analysis. Educational attainment and sexual orientation were two demographic variables that were only assessed during Wave Three and those were also included in this hypothesis testing in addition to the demographic and psychographic variables that were included in the analysis.

Table 4.17b

Influence of Health Beliefs on Safer Sex Behaviors in Young Adulthood, Wave One

Variable	Sexually Active in Young Adulthood	Contraception Use in Young Adulthood	Condom Use in Young Adulthood
	Odds Ratio & 95% CI	Odds Ratio & 95% CI	Odds Ratio & 95% CI
Correct Knowledge of Safer Sex in High School	1.32** (1.26, 1.38)	1.07** (1.03. 1.10)	0.99 (0.96, 1.02)
Mediator Variables			
Perceived Severity to HIV	1.12** (1.06, 1.19)	0.99 (0.95, 1.04)	0.98 (0.94,1.03)
Perceived Severity to STD	0.94* (0.90, 0.99)	0.96* (0.93, 0.99)	1.06* (1.02, 1.09
Perceived Susceptibility to HIV	1.01 (0.93, 1.10)	1.03 (0.98, 1.10)	0.99 (0.94, 1.06)
Perceived Susceptibility to STD	1.43 (1.20, 1.57)	0.98 (0.92, 1.04)	0.94 (0.89, 1.00)
Self-Efficacy in Sexual Decision Making	0.99 (0.94, 1.04)	1.05* (1.01, 1.09)	1.03 (0.99, 1.07)
	Demographic Variables		
Race (Reference: White)	1.21** (1.08, 1.39)	1.29** (1.18, 1.41)	0.65** (0.59, 0.71)
Location (Reference: Rural)	1.38* (1.05, 1.82)	0.99 (0.80, 1.22)	1.05 (0.85, 1.30)
Location (Reference: Suburban)	1.30 (1.00, 1.70)	0.93 (0.76, 1.14)	1.04 (0.85, 1.28)

Location (Reference: Urban)	1.35* (1.04, 1.75)	0.91 (0.74, 1.12)	1.10 (0.89, 1.35)
Type of Housing (Reference: Single-Family Housing)	1.12* (0.97, 1.30)	1.17* (1.06, 1.29)	0.86* (0.77, 0.95)
Gender (Reference: Male)	0.57** (0.49, 0.64)	0.95 (0.87, 1.04)	1.45** (1.33, 1.59)
Educational Attainment (Reference: Enrolled in College)	2.37** (1.99, 2.82)	0.53** (0.46, 0.60)	0.82** (0.72, 0.93)
Educational Attainment (Reference: Graduated College/Gained Higher Education)	1.67** (1.43, 1.96)	0.74** (0.65, 0.84)	0.97 (0.86, 1.09)
Sexual Orientation (Reference: LGBQ)	3.04** (2.60, 3.57)	1.16* (1.01, 1.34)	0.99 (0.85, 1.15)
Psychographic Variables			
Religious Inclination	0.80* (0.66, 0.96)	0.96 (0.85, 1.08)	1.09 (0.96, 1.23)
Desire for Higher Education	1.01 (0.95, 1.07)	1.06* (1.02, 1.10)	1.01 (0.97, 1.05)

*Significant < .05
**Significant < .01

A logistic analysis was also conducted at the longitudinal level and with the inclusion of our mediator variables and it was found that youth who possessed correct knowledge of safer sex behaviors in high school remained to have higher odds of being sexually active in young adulthood (OR=1.32, 95% CI=1.26, 1.38; P<0.05). Of those individuals engaging in sex, it was found that youth who had possessed correct knowledge of safer sex in high school still had higher odds of using contraception

(OR=1.07, 95% CI= 1.03, 1.10 P<0.05) however, they had lower odds of using condoms in young adulthood (OR= 0.99, 95% CI= 0.96,1.02). The association between correct knowledge and condom use was not found to be statistically significant however.

Youth who indicated higher level of perceived severity of HIV had higher odds of being sexually active in young adulthood (OR=1.12, 95% CI= 1.06, 1.19). However, the association between perceived severity of HIV and contraception use and condom use was not found to be statistically significant. Youth with higher levels of perceived severity of STDs in high school were found to be less likely to engage in sex in young adulthood (OR=0.94, 95% CI= 0.90, 0.99). Among those engaging in sex in young-adulthood, higher perceived severity of STDS high school, resulted in a lower likelihood of use contraception in young adulthood (OR=0.96, 95% CI= 0.99, 0.94, P<0.05) but a higher likelihood to use condoms (OR=1.06, 95% CI= 1.02, 1.09, P<0.05).

Youth who had higher levels of perceived susceptibility to HIV and perceived susceptibility to STDs in high school, was not found to be statistically significant in this hypothesis testing. Youth who indicated higher levels of self-efficacy in sexual decision making in high school were found to be less likely to engage in sex in young adulthood (OR=0.99, 95% CI= 0.94, 1.04). Of those respondents who were engaging in sex in young adulthood and had higher levels of self-efficacy in sexual decision making when they were in high school, were more likely to use contraception (OR=1.05, 95% CI= 1.01, 1.09, P<0.05) and this association was found to be statistically significant and they were also more likely to use condoms (OR=1.03, 95% CI= 0.99, 1.07) but the latter association was not found to be statistically significant.

Among the demographic and psychographic variables, race and type of Housing were the only variables that maintained statistical significance in the multivariate analysis. Gender only maintained significance for whether respondents were sexually active and using condoms in young adulthood but it did not maintained significance for contraception use. On the other hand, desire for higher education only maintained statistical significance for contraception use in young adulthood. Educational attainment and sexual orientation maintained statistical significance – in this hypothesis test – for whether respondents were sexually active and using contraception use in young adulthood but not for condom use. Respondents religious inclination was only found to maintain statistical significance for whether respondents were sexually active in young adulthood. Similarly, respondents' metropolitan location of residence only maintained significance for rural and urban residents and whether they were sexually active in young adulthood.

Chapter 5: Discussion

The main purpose of this research was to conduct a theoretically driven analysis of safer sex practices in adolescence through young adulthood as a function of correct knowledge of safer sex behaviors while assessing for a possible mediational influence of health beliefs regarding safer sex behaviors. This chapter will build upon the findings presented in Chapter Four to provide guidelines and recommendations for future program development or planning for youth sexual health services. This chapter will present the strengths and limitations of the study design and findings and in this context discuss possible implications of these findings in the areas for future research opportunities, practice and policy.

Summary of Findings

The study results were overall supportive in the theoretical presumption that correct knowledge was significantly associated with positive safer sex behaviors in high school and young adulthood and it was also significantly associated with health beliefs. The role of health beliefs to health behaviors was not as well supported by study findings. Students who possessed correct knowledge of safer sex in high school did report increased safer sex behaviors in high school and the safer sex behaviors were maintained, for the most part, when respondents reached young adulthood, with the exception of condom use which decreased by young adulthood but the decrease was also not found to remain statistically significant. On the other hand, students who possessed correct knowledge of safer sex in high school did report more positive health beliefs, however, the influence of correct knowledge of safer sex behaviors was not mediated by health beliefs.

We will now review the findings in light of the different pathways in our conceptual framework (Figure 1) in more detail. We will start with Path E, F, G which established the relationship between our demographic and psychographic variables with our independent/predictor variables (Path E), mediator variables (Path F) and our outcome variables (Path G). This chapter will then delve deeper into the main hypotheses of our study which examined the relationship between correct knowledge of safer sex practices with health beliefs (Path A), the influence of correct knowledge of safer sex practices with safer sex behaviors at a cross sectional level (Path B), the influence of correct knowledge of safer sex practices with safer sex behaviors at a longitudinal level (Path C) and the mediating influence of health beliefs on the influence of correct knowledge of safer sex behaviors both at the cross-sectional and longitudinal levels (Path D).

Relationship between Correct Knowledge of Safer Sex with Demographic & Psychographic Variable: Path E in Conceptual Framework. In regard to the relationship between correct knowledge of safer sex with demographic and psychographic variables, we found that racial minority respondents indicated lower levels of correct knowledge of safer sex than their Caucasian peers and youth who lived in suburban settings indicated the highest level of correct knowledge of safer sex while youth who lived in urban settings indicated the lowest level of correct knowledge. These findings appear to be in line with what was explained by our review of previous literature on the subject which indicated a disparity between minority youth and Caucasian youth when it came to the provision of sexual health services such as sex education where racial minority youth in college were less likely to report having received a curriculum-based

sex educational program in high school as compared to their Caucasian peers (Inungu et al., 2009).

The article referenced above, did indicate in their findings that females were more likely to report having received sex education in high school as compared to males, however our study found that the level of correct knowledge of safer sex was similar among males and females when they were in high school. It should be noted that the study referenced above was conducted with a sample of college students and not high school students (Inungu et al., 2009).

The level of correct knowledge of safer sex was associated with an individual's socio-economic status as our study found that youth who lived in single-family housing had higher knowledge of safer sex practices as compared to those who did not. Furthermore, youth who scored higher on the correct knowledge scale in high school also indicated a higher desire for higher education in the future. This was confirmed at the longitudinal analysis when we found that those who had scored higher of the correct knowledge scale were also found to be more likely to graduate from college and/or gain higher education in young adulthood.

Relationship between Demographic & Psychographic Variables and Health Beliefs: Path F. The section below details the findings from Path F in the conceptual framework (Figure 1.1) which explored the relationship between respondent's demographics and psychographics with their health beliefs (perceived severity of HIV & STDs, perceived susceptibility to HIV & STDs) and skills (self-efficacy) in regard to safer sex.

Perceived Severity of HIV. A disparity was found between racial and sexual minority youth and Caucasian and heterosexual youth, in regard to their perceived severity of HIV. Racial minority and LGBQ youth did not perceive HIV to be as severe and this could somewhat be explained by the finding noted above in Path E that racial minority youth had reported lower levels of correct knowledge of safer sex as well. This is particularly concerning since the current disease burden of HIV/AIDS among youth seems to be more prevalent among racial minorities particularly African American youth and Latino youth and young men who have sex with men (CDC, 2016).

Another finding noted in Path E was that youth who may indicated higher socio-economic status since they resided in single-family housing, had a higher level of correct knowledge of safer sex. Thus, in Path F, we see that those youths also perceived HIV to be a severe disease as compared to those youths who did not live in single-family housing. Youth who were religiously inclined also were more likely to report that HIV was a severe disease as compared to peers who were not as religiously inclined.

Youth who had indicated a greater desire for higher education also were more likely to have perceived HIV to be a severe disease which could also explained by the finding in Path E that they were also found to have scored higher on the correct knowledge of safer sex scale.

Perceived Severity of STDs. In regard to how severe STDs were perceived by youth, males were found to have higher perceived severity of STDs while Caucasian youth did not perceived STDs to be as severe as racial minority youth. This is an interesting finding to note, because even though racial minority youth had not perceived HIV to be severe, they perceived STDs to be severe. Furthermore, youth who lived in

single-family housing also did not perceive STDs to be a severe disease even though they had indicated higher levels of correct knowledge of safer sex. This finding should be researched further to understand the possible reasons why Caucasian youth and youth that belonged to a better socio-economic status did not find STDs to be as severe as HIV even with higher correct knowledge of safer sex.

Youth who indicated a strong desire for higher education had not perceived STDs to be severe and this was confirmed at the longitudinal level when at young adulthood, those who continued to attain higher levels of education in young adulthood had not perceived STDs to be a severe disease. This also needs to be further researched as it shows that not only youth from more privileged backgrounds but also those who do well academically over-time, do not tend to find STDs to be severe diseases.

Perceived Susceptibility to HIV. Males as compared to females felt that they were at greater risk for HIV while racial minorities also felt that they were at greater risk for HIV. This is also an interesting finding because, within our analysis of the same analytic path, we found that racial minorities had not perceived HIV to be a severe disease but they had felt that they were at higher risk for acquiring this same disease. Suburban residents as opposed to urban residents were more likely to have perceived themselves at risk for HIV as compared to urban residents and rural residents.

Youth who were religiously inclined and those that lived in single-family homes were less likely to report a personal risk for HIV and – noted above – they also perceived HIV to be a severe disease. In addition, youth who indicated a strong desire for higher education also did not report they were at risk for HIV. Further qualitative and quantitative research may serve as tools to explore and understand reasons why

Caucasian youth and youth from better socio-economic status are aware that HIV is a severe disease, yet believe that they are at lower risk for it while racial minority youth and those who do not belong to a high socio-economic status feel that HIV is not a severe disease and yet they are at risk for acquiring it.

Perceived Susceptibility to STDs. Similar to perceived susceptibility to HIV, males were also more likely to report an increased susceptibility to STDS and suburban residents were also more likely to perceive themselves to be at risk for STDs. Youth who had indicated strong desire for higher education in high school were less likely to perceive themselves to be at risk for STD transmission similar to results found with HIV. When we compare this finding to their level of educational attainment in young adulthood, we find that those who did perceive themselves at less risk for STD transmission in high school, did in fact attain the highest level of education as well.

Self-Efficacy in Sexual Decision Making. Although females reported a lower perceived susceptibility to HIV and STDs, it may not be surprising to find that they also reported that they felt more in control of making their own sexual choices. Racial minority respondents on the other hand and those who lived in urban areas reported less control of possessing the skills around safer sex negotiation as compared to their Caucasian peers. On the other hand, youth who lived in single-family homes and therefore may have belonged to a better socio-economic status reported a greater level of control in their sexual decision making. Youth with a strong desire for higher education were more likely to report being in control of their sexual decision making. We find that the reported desire for higher education and increased self-efficacy is indeed related to actual educational attainment.

Relationship between Safer Sex Behaviors and Demographic & Psychographic Variables: Path G in Conceptual Framework. The conceptual framework in the study sought to assess the relationship between demographic and psychographic variables with safer sex behaviors at both cross-sectional and longitudinal levels (Path G) and the summary of those findings are below.

Cross-Sectional: Safer Sex Behaviors and Demographic & Psychographic Variables When Respondents Were in High School. Racial minority youth were found to be less sexually active in high school compared to Caucasian youth which is in contrast to previous findings from the Youth Risk Behavioral Survey (2015) and Center for Disease Control's National Survey of Family Growth (2018). In addition, our review of literature had indicated that males were more sexually active than females, however our study's finding did not find a significant difference between genders and sexually activity in high school. Our study also found that males reported a higher use of contraception and condoms in high school, a similar finding to previous literature (Mueller et al., 2008).

Youth who resided in urban and suburban settings were found to be more sexually active than those who lived in rural areas. Higher socio-economic status did not necessarily translate to youth being less sexually active, since youth who lived in single-family housing in high school were also more sexually active at that time. However, among the sexually active sample, these youth indicated higher use of both contraception and condom use as compared to youth in multi-family homes. This finding sheds light on an important concept that youth with higher socio-economic resources may be more

sexually active but also more likely to report safer sex behaviors compared to youth with less socio-economic resources.

Youth who are religiously inclined in high school did predict youth were not sexually active as they were surprisingly found to be more sexually active in high school than those who were not religiously inclined. However, in addition to being more sexually active, they also reported higher use of condoms at their last sexual encounter than those who were not religiously inclined.

Longitudinal: Safer Sex Behaviors and Demographic & Psychographic Variables When Respondents are Young Adults. By the time the sample reached young-adulthood, males report being less sexually active than females but in young-adulthood, safer sex behavior changed from the cross-sectional level as now more females than males reported use of contraception and condoms at their last sexual encounter. Racial minority respondents remained being less sexually active than their Caucasian peers even in young adulthood. However, among those who were sexually active, racial minority youth reported higher contraception use than their sexually active Caucasian peers, which is again conflicting from YRBS (2015) and CDC (2018) reports as noted above. The findings for condom use were not found to remain statistically significant.

Respondents who had a higher socio-economic status at the time of initial data collection (Wave One) remained more sexually and to report positive safer sex behaviors, demonstrating the protective effect socio-economic status may have on the availability to safer sex behaviors both at a cross-sectional level and over-time. Youth who were religiously inclined in high school remained to be more sexually active even at young

adulthood, however, contraception use and condom use did not maintain statistical significance at the longitudinal level.

It should also be noted that even in young adulthood, urban and suburban youth were more likely to report being sexually active than rural youth and in addition were also more likely to use contraception and condoms at their last sexual encounter. Youth who had indicated the strongest desire for high education in high school were more sexually active but also reported greater use of condoms and contraception. When we compare this relationship to their actual educational attainment, at young adulthood we see an interesting finding that respondents who went on to attain the highest level of education, were no longer more sexually active that those whose desire for higher education was not as strong. Sexual orientation and preference was not significantly related to most of the outcome variables in our analysis except for the finding that in young adulthood LGBQ respondents reported being less sexually active than heterosexual peers.

Relationship between Correct Knowledge of Safer Sex and Health Beliefs: Path A in Conceptual Framework. This research question explored the influence of correct knowledge of safer sex on individual health beliefs regarding safer sex behaviors of adolescents in high school. The hypothesis to be tested was that *Adolescents with higher levels of correct knowledge of safer sex report (a) higher self-efficacy in sexual decision making, (b) higher perceived severity of HIV/AIDs & STDs and (c) higher perceived susceptibility to HIV/AIDS & STDs. (Research Question 1)*

This hypothesis was generally supported by the study findings. The study findings indicated that while in high school, a higher level of knowledge of safer sex was related to health beliefs that shape subsequent behavioral engagement such as a higher perceived

severity of HIV, higher level of perceived susceptibility to HIV, higher level of perceived susceptibility to STDs and higher levels of self-efficacy in sexual decision making. These findings support the role of school-based education to enhance the knowledge of high school youth in safer sex towards health beliefs that encourage positive health behaviors as posited by the guiding framework of the Health Belief Model.

It must however be noted that youth who did possess correct knowledge of safer sex in high school were not more likely to perceive STDs to be a severe health issue. One of the reasons as to why the relationship between correct knowledge of safer sex and perceived severity of STDs was not positive can be hypothesized because youth may have been aware of the fact that unlike HIV, STDs can be cured and thus although they believed they were at risk for STDs, they had not perceived STD's to be as severe as HIV/AIDS. It is important to add that there is a dearth of information and research in this area and thus this possible phenomenon should be researched further.

Demographically, it was interesting to note that Caucasian youth who had higher correct knowledge of safer sex still had not perceived HIV & STDs to be severe diseases and neither did they feel that they were at risk for these diseases. This could possibly illustrate that Caucasian youth perceived these diseases to not be prevalent in their own social networks and thus they may not have feel that they would ever possibly be exposed to such diseases. Although further research in needed in this area, there have been studies that were conducted with LGBTQ youth of different ethnicities and found that Caucasian youth did not have less pre-determined predictors for HV transmission as compared to their minority peers (Warren et al., 2008). This finding however should be further explored through qualitative research. At the same time, Caucasian youth with higher

knowledge of safer sex felt more in control of their own sexual decision making and it may be because they may receive positive reinforcement and sexual education both in school but as well as at home through their parents (Warren et al., 2008). Since more males had indicated that they felt more at risk for HIV and STDs, it is a positive finding that shows that males even in high school, realized that they could be at risk for sexually transmitted diseases. On the other hand, more females than males felt that they were in control of their sexual decision making which is surprising since literature has consistently shown women are more likely to indicate lower self-efficacy in their sexual decision making (Seth et al., 2009).

Previous research supports the hypothesis that youth who lived in single-family housing may reside in areas where they were more likely to receive sex education in schools as well as at home which may influence their perceived level of control when it came to making decisions around their safer sex behavior, and therefore their reporting of being less likely to be exposed to HIV and STDs (Alldred et al., 2007). Similarly, youth who were religiously inclined reported they were not at risk for HIV and STDs because even though they were sexually active, they were shown to report higher contraception and condom use in the bivariate analysis.

Youth who had indicated a desire to pursue higher education, were possibly more empowered because not only were they aware of the severity of HIV/AIDS, they reported being in control of their sexual decision making. A finding that could be explained by a feeling of privilege and empowerment that translates to a belief in an invulnerability to be at risk for STDs and HIV (Alldred et al., 2007).

Relationship between Correct Knowledge of Safer Sex and Safer Sex Behaviors in High School: Path B in Conceptual Framework. The research question sought to explore the influence of correct knowledge of safer sex on individual sexual health behaviors of adolescents in high school. The research hypothesis to be tested was that *Adolescents with higher levels of correct knowledge of safer sex are more likely to practice safer-sex behaviors in high school (Research Question 2)*

The hypothesis that knowledge is related to actual behavior was supported by the study findings. The study findings indicated that during their high school years - at the cross-sectional level - youth with higher levels of correct knowledge of safer sex behaviors were more likely to be sexually active in high school but also more likely to practice safer sex behaviors (contraception, condom use) at their last sexual encounter. This relationship supports the hypothesis regarding the important role that correct knowledge of safer sex plays in influencing positive sexual health behaviors.

The study found that Caucasian youth were more likely to have better health behavioral outcomes than their minority peers as they were not only less likely to engage in sex during high school but also more likely to use contraception. Although Caucasian youth were less likely to use condoms during their last sexual encounter, they were also more likely to believe they did not feel they were at risk for STDs and HIV and thus were less likely to use condoms. A possible explanation as to why males were more likely to engage in condom use than their female peers could be an access issue since the 1990's there were only male condoms readily available and a decreased awareness about female condoms (Gallo et al., 2012).

Religiously inclined youth and youth who had expressed plans of pursuing higher education indicated favorable behavioral outcomes in being less likely to engage in sex but more likely to practice safer sex behaviors. This relationship reflects their health beliefs whereby religiously included youth and youth desiring higher education were more likely to report increased severity of HIV/AIDS but has also indicated a higher self-efficacy in regards to sexual decision making.

Relationship between Correct Knowledge of Safer Sex and Safer Sex Behaviors in Young Adulthood: Path C in Conceptual Framework. The research question sought to determine the influence of correct knowledge of safer sex reported among adolescents in high school on sexual health behaviors during young adulthood five to seven years later. The corresponding research hypothesis tested stated: *Adolescents with higher levels of correct knowledge of safer sex are more likely to practice safer-sex behaviors five to seven years later in young-adulthood (Research Question 3)*

This hypothesis that knowledge is positively related to actual behaviors is somewhat supported by the study's findings, however, further studies need to be conducted to measure the longitudinal influence of correct knowledge of condom use over greater extended periods of time. To be more specific, at the longitudinal level, higher levels of correct knowledge of safer sex in high school was found to be a pervasive indicator for a higher likelihood to remain sexually active in young adulthood and also more likely to use contraception at their last sexual encounter. However, this relationship was not sustained for condom use and was shown to not reach statistical significance.

Males remained to be less likely to be sexually active in young adulthood but more likely to use condoms at their last sexual encounter similar to the findings in Hypothesis two. The findings for Caucasians remained the same overtime as well, where they were more likely to be sexually active in young adulthood and more likely to use contraception during their last sexual encounter but less likely to use condoms. This shows that behavioral outcomes did not change longitudinally among these two demographics overtime. In addition, behavioral outcomes remained the same for psychographic variables overtime as well as religiously inclined youth remained less likely to engage in sex even in their later years.

An interesting finding to note was the positive association between those who had expressed a desire to pursue a higher education in high school and contraception use in young adulthood. However, when we compare respondents actual level educational attainment at young adulthood in the analysis, we see that the higher the education they pursued the less likely they were to report contraception and condom use which shows that a respondent's level of education does not necessarily result in better safer sex outcomes over time.

Youth who resided in single family housing in high school remained more likely to engage in safer sex behaviors in young adulthood just as had been reported in high school. Respondents who did not identify as heterosexual were more likely to be sexually active in young adulthood but also indicated a higher likelihood to use contraception at their last sexual encounter. This could primarily be explained by the fact that our variable for sexual orientation was dichotomized by those who only identified as heterosexual and those who had any or some attraction to members of the same sex. Therefore, although

some of the respondents fell under the LGBQ category, they could also simultaneously be engaging in sexual relations with members of the opposite sex as well and thus may have indicated a higher likelihood to also use contraception at their last sexual encounter. A study which conducted a secondary analysis from the 2002 National Survey of Family Growth aimed to examine the prevalence and correlates of same-sex sexual activity among youth in the US found that more females (11%) than males (4%) had reported same-sex sexual experience (McCabe et al., 2011)

Relationship between Health Beliefs and Safer Sex Behaviors in High-School and Young Adulthood: Path D in Conceptual Framework. The research question sought to determine if the health beliefs of adolescents indirectly influenced the relationship between correct knowledge and safer sex behaviors in both high school and later in young-adulthood. The corresponding research hypothesis stated that*: Higher self-efficacy in decision making around sexual choices, higher perceived severity of HIV/AIDS & STDs and higher perceived susceptibility to HIV/AIDS & STDs in high school mediate the influence of correct knowledge on safer sex behaviors in high school and later in young-adulthood (Research Question 4)*

This hypothesis was not supported by the study's findings and it was determined the health belief constructs do not indirectly account for change in safer sex behaviors cross-sectionally nor longitudinally. At the cross-sectional level, even with the inclusion of our mediator variables, higher correct knowledge of safer sex remained to have a significant direct influence on positive sexual health behaviors which shows that health belief constructs do not mediate/account for change in safer sex behaviors and that

correct knowledge (our independent/predictor) variable remains to have a direct effect on safer sex outcomes at the cross-sectional level.

Out of all the health belief constructs included in the analysis, if youth felt that they were at risk for STDs (perceived susceptibility to STDs) and felt that they were in control of their sexual decision making (self-efficacy), they were also more likely to report contraception use and condom use in high school. The strong association between self-efficacy in sexual decision making and safer sex behaviors, at a cross sectional level was similar to what was reviewed in past qualitative literature where college students in Mississippi had also indicated a strong association between safe sex self-efficacy and safe sex practices (Addoh et al., 2017).

On the other hand, if youth perceived a high severity of STDs and reported they may be at risk for HIV (perceived susceptibility to HIV), they were less likely to report condom and contraception use at their last sexual encounter in high school. Perceived severity of HIV did not maintain statistical significance in this hypothesis testing. These findings also indicate that perceived risks do not dissuade youth from engaging in sex unless youth felt that they had higher control in sexual decision making.

At the longitudinal level, correct knowledge of safer sex remained to have a positive influence on sexual health behaviors except for condom use although that was not found to be statistically significant. On the other hand, health belief constructs did not have a pervasive and longer-term influence of being associated with higher odds of safer sexual behavior. This was similar to what our review of the health belief literature had yielded (Addoh et al., 2017; Carpenter et al., 2010; Zak-Place et al., 2004). Our study

confirmed the lack of relationship through the theoretical examination specific to safer sex and the pervasiveness of health beliefs constructs as mediator variables.

The only construct that seemed to have an association with safer sexual behavior was self-efficacy in sexual decision-making. However, this finding was statistically significant for contraception use only and not for condom use. Thus, it can be surmised that even though perceived susceptibility to STDs and self-efficacy may indicate a positive influence on safer sex behaviors at a cross-sectional level, their influence does not remain consistent over time as strongly as the possession of correct knowledge of safer sex. Another interesting point to note is that although perceived severity of STD was not associated with higher odds of condom use at the cross-sectional level, it was found to have increased the odds of reported condom at young adulthood. This finding should be further explored through both qualitative and quantitative research.

Overall Analysis of Findings

The proposed conceptual model presumed that possession of correct knowledge of safer sex would have a positive influence on safer sex behaviors at a cross-sectional level as well as at the longitudinal level and that the influence could possibly be mediated by health beliefs pertaining to safer sex that are formed during high school and be pervasive in high school and into young adulthood.

Although the study results were overall supportive in the presumption that correct knowledge is significantly associated with health beliefs, the role of health beliefs to health behaviors is not as well supported by study findings. A review of literature had indicated health beliefs to have a strong predictive value with health behaviors at a cross-sectional level (Carpenter et al., 2010, Halkitis et al., 2013; Downing-Matibag et al.,

2009; Liau et al., 2000; Maguen et al., 2000; Wulfert et al., 1995) however research remained scant on the pervasiveness of health beliefs on a longitudinal level. Although this study focused on the relationship between beliefs and behaviors, further research could delve deeper into the strength of association between the variables.

Students who possessed correct knowledge of safer sex in high school did report more positive health beliefs, however, the influence of correct knowledge of safer sex behaviors was not mediated by health beliefs as evidenced ty the inclusion of the health belief constructs in the multivariate analysis not changing the positive association between correct knowledge and safer sex behaviors. In fact, it was noted that a majority of the health belief constructs did not maintain statistical significance in the longitudinal multivariate analysis. The only construct that did indicate a positive relationship was perceived susceptibility of STDs and self-efficacy in sexual decision making when students were in high school but at a longitudinal level only self-efficacy seemed remain pervasive for positive health behaviors but did not maintain its statistical significance for condom use. This finding is somewhat supported by past research on this topic albeit at a cross sectional level where self-efficacy was found to be a strong predictor for health behaviors particularly around condom use and HIV testing practices among college-aged students (Downing-Matibag et al., 2009; Maguen et al., 2000; Addoh et al., 2017). However, it must be noted that our study's population were high school aged students that included an examination into this relationship at the longitudinal level. Another interesting point to note is that students who had an increased perceived severity of STDs did not indicate positive health behaviors when they were in high school, but in young adulthood, their use of condoms did to increase. Once again, research on this topic has

indicated a positive predictive value of perceived severity of disease to health behaviors among older adults (Zhao et al., 2012; Liau et al., 2000; Maguen et al., 2000; Wulfert et al., 1995; Zak-Place et al., 2004), and further research on this specific relationship is needed. In fact, many of the study's findings warrant further research on the effect of all health belief constructs – including perceived benefits and perceived barriers - over-time which to provide replicability and contextual placement of the findings.

During the initial assessment in Wave One, students who scored higher on the correct knowledge scale, were found to be more sexually active but it must also be noted that in addition to being more sexually active, they were also more likely to report contraception and condom use. When the students in high school had reached young adulthood, the findings remained similar. Those who had more correct knowledge of Safer Sex in high school, were still found to be more sexually active in young adulthood and also more likely to use condoms and contraception. Thus, ensuring that students who are educated on sex education in high school, can be shown to lead to positive health outcomes in high school and continue through to young adulthood. Advocacy efforts around the need for sex education in schools have been largely driven by similar findings in other studies that have indicated that sex education should not be viewed as a means to promote sexual initiation among youth but in fact ensuring that safer sex decisions are made when youth do initiate sex (Finer et al., 2013, CDC, 2018, Stanger-Hall et al., 2011, McKeon et al., 2006, Kirby, 2002., Bearman et al., 2001). These findings also compliment some of the more recent safer sex social marketing campaigns around the US which focus on an approach on reducing stigma around sex and sexuality but in fact

integrate safer sex decision making within a sex positive norm among youth (Advocates for Youth., 2018).

Although, we see that health beliefs are improved because of the possession of correct knowledge of safer sex, the constructs do not indicate a strong relationship on positive behavioral outcomes at a cross-sectional level nor at a longitudinal level. Thus, the study demonstrates that health belief constructs do not mediate the influence of correct knowledge of safer sex on behaviors and therefore are not pervasive at the longitudinal level. The only health belief construct that demonstrated a positive relationship with safer sex behaviors in high school and remained to be a positive predictor on safer sex behaviors in young adulthood was self-efficacy in sexual decision making as was confirmed by a review of past literature on the topic (Downing-Matibag et al., 2009; Maguen et al., 2000; Addoh et al., 2017). A primary reason for this could possibly be that self-efficacy is a skills-based construct which allows for respondents to feel that they were in control of their sexual choices. Skills learned in high school could possible prove to remain pervasive over time in addition to knowledge. The connection between learned skills and adopted behavior have been confirmed by studies in the past as well (Downing-Matibag et al., 2009; Maguen et al., 2000; Addoh et al., 2017).

The bivariate analysis revealed that racial minority youth and those who lived in urban areas not only reported poor correct knowledge of safer sex but also felt that they did not have the skills and self-efficacy to make the right choices with regard to their safer sex behaviors. These findings are in line with what the review of literature revealed on the topic as well that minority youth are less likely to receive sex education in schools and more likely to engage in unprotected sexual behavior as compared to their Caucasian

peers (CDC, 2018). These findings also raise two important points around sex education and safer sex behavioral outcomes. The first point to note is that youth should certainly be exposed to sex education in school as it has a positive effect on behavioral outcomes not just in high school but maintained years later. Secondly, interventions with youth that focus on skills-based constructs such as self-efficacy should be enhanced to a greater extent than other health belief constructs as it was the only construct which seemed to have a positive influence on behavioral outcomes in this study. These study findings support the need for interventions to be implemented in schools across all metropolitan locations which include inner-city and urban schools and tailored and adapted in a culturally sensitive way to reach minority (racial and sexual) youth as well.

Study Strengths and Limitations

The first limitation in this study was the fact that the study employed secondary data analysis and although there are advantages to working with secondary data, there are also certain limitations to bear in mind as well. Since the data was not collected specifically for this study's research questions, certain indicators in the Add Health survey were not specific to the hypotheses. It is important to mention, however that that some of the variables - particularly the independent/predictor variable and the outcome variables - were reconstructed in a way to best answer the study's research questions. The independent variable for the study was constructed as a five-point scale using knowledge-based questions around safer sex decisions. This variable was then constructed as an ordinal variable to test where youth fell on the newly constructed knowledge scale from no knowledge to very high knowledge. Future research should collect primary data and

include valid and reliable measures created specifically to measure health belief constructs as that could anticipate yielding more accurate findings.

Another point to note is that this study utilized a longitudinal dataset and since the study data was collected over a period of several years, the sample as well as the findings were subject to a history bias. The level of correct knowledge among respondents and their health beliefs were assessed in 1994-1995 when they were in high school. Although this could prove to show an adequate influence of correct knowledge on safer sex behaviors at a cross-sectional level, there may have been certain events that could have affected and changed health behaviors over the course of the eight-year span besides just level of correct knowledge and health beliefs. There was an increase of social marketing campaigns across the country regarding safer sex which could have also led to a change in safer sex behaviors over the years (Advocates for Youth., 2018). This study acknowledges the potential for that bias, and that is why the study's research questions included both the cross-sectional analysis as well as the longitudinal analysis. Cross-sectional findings are less susceptible to a history bias and thus, this study was able to answer all the research questions which examined the influence at a cross-sectional level. In other words, the study was able to show that at the same point in time, respondent's levels of correct knowledge do have a positive influence on behavior change. With regard to the study's longitudinal findings, it is important to note that it is very difficult to control for history bias over such large time- gaps in data collection. Future research should collect primary data more frequently (annually) instead of an eight-year gap and also include possible measures for external confounders. Questions around social marketing and social media campaigns can also be included in the analysis to examine

the influence that factors external to the school environment may also play in shaping health beliefs and influencing safer sex behaviors.

In addition to a history bias, this study should also account for maturity bias when reviewing the findings. Over the eight-year span from when students were in high-school to when they reached young-adulthood, their knowledge of safer sex could have increased with age. Also, the study does not account for those individuals who may have been in monogamous relationships, and thus less likely to use condoms and contraception in young-adulthood even if they scored high on the correct knowledge scale in high school. The justification for the inclusion of a research question which measured behavior change at the cross-sectional level in addition to the longitudinal level was to first and foremost assess the influence of our independent/predictor at the same point in time. Once that was established, the other research questions aimed to determine the influence of the independent/predictor variables on behaviors over time where maturity bias could have occurred. It is important to note however, that behavioral outcomes at cross-sectional level already showed a positive relationship. In addition, as mentioned earlier, a way to address this would be to collect data annually – instead of after an eight-year gap. This would allow the researcher to closely monitor the specific points in time that behaviors began to change and examine possible external factors which may have either increased their knowledge or improved their health beliefs.

Another notable limitation of the study is the reliance on the self-reporting of youth for their health beliefs as well as their safer sex behaviors. Due to this limitation, social-desirability bias may have played a role in the data collection where respondents were more likely to report safer sex behaviors even if that were not the case. The study

acknowledges this bias, however the only way to collect data on sexual behavior is through self-report surveys and thus, this limitation is always taken into account when presenting such findings. Despite this limitation, the bias was somewhat addressed in its original data collection where unique identifiers were assigned to all respondents in order to anonymize data across all waves. This was done primarily to ensure confidentiality for the respondents and thus aim to minimize social desirability bias. Although health behavior outcomes would continue to rely on self-report measures in the future, a follow-up study which includes bio-specimen indicators particular to HIV and STD could show more accurate outcomes among the cohort. It is important to mention that, Wave Three data did collect urine and saliva assays for HIV and STDs, however bio-specimen data was not requested from the North Carolina Population Center since it required further IRB approval and the hypothesis for this particular study aimed to only measure behavior change. Further research should aim to measure the effect of correct knowledge on actual disease outcomes.

Another limitation to note is that in order to conduct a true mediator analysis, it is highly recommended for data collection to follow a temporal process with three different data collection points (Cole et al., 2003). However, it must be noted that in this study the relationship between our independent variable and our mediator variables are bi-directional to show their association with each other as well (PATH A). Furthermore, David Cole and Scott Maxwell, published an extensive meta-analysis to point out different biases that may occur in cross-sectional analysis of longitudinal data (Cole et al., 2003). Although the article recommended that in order to test a true mediating hypothesis, analysis at three different time points is preferred. The meta-analysis also

found that 38 studies were conducted in 2005 alone which were similar to this study insofar that longitudinal analyses were conducted to test for mediation but with where time elapsed either between the causal variable and the mediator variable or with the causal variable and the dependent variable (Cole et al., 2003). These studies were published in *The Journal of Personality and Social Psychology, Journal of Consulting and Clinical Psychology, Journal of Applied Psychology, Health Psychology and Developmental Psychology*. The article concluded that in order to conduct a true mediational analysis, multiple waves of data collection is highly preferred, however bias can be minimized in instances where two of the three variables of interest are collected concurrently with a second wave of data collection conducted at a later point in time which in this particular study was collected at Wave Three (Cole et al., 2003).

Contributions of Study

Although there are limitations to the study as noted above, this dissertation does add to the current research on the importance of sex education and safer sex interventions grounded in behavior theory and their effects on safer sex behaviors in the short-term as well as long-term. A selection of the research, practice and policy recommendations and implications of the study are discussed below.

Research Recommendations. Findings from this study supports the need for renewed commitment to additional research around the effect of sex education on long term behavioral outcomes. Although, in this study, health belief constructs were not found to be pervasive in the long-term, additional research on the effect of skill-based interventions that increase self-efficacy may be beneficial to understanding which behavior change interventions may be most effective. Past studies on this topic have

found that certain health belief constructs, especially self-efficacy, have a strong predictive value for health behaviors at least at the cross-sectional level (Downing-Matibag et al., 2009; Maguen et al., 2000; Addoh et al., 2017). Keeping in mind, the limitation mentioned above that this study employed a secondary analysis, a recommendation to further elucidate and explore these findings through primary research – qualitative as well as quantitative – would be extremely beneficial. With primary qualitative studies, future researchers could also explore the emergence of additional theoretical constructs besides health beliefs constructs and through quantitative studies, future researchers could use actual valid and reliable indicators to measure each health belief construct specifically.

As mentioned earlier, this study focused primarily on Health Belief constructs as possible mediators for positive behavioral outcomes. Additional research around other theoretical constructs and their effect - direct and indirect - on positive health outcomes would be beneficial. Furthermore, additional constructs within the Health Behavior Model of perceived barriers and perceived benefits were not included in this study as measures for these particular constructs were not found in the In-Home Interview survey. It would be beneficial for future researchers to also collect measures of not only these constructs but whether they also play a mediating influence on the relationship between knowledge and safer sex behaviors over time.

The Wave One sample was collected more than a decade ago in 1994-1995 when sex education resources for youth were also limited. As the social and political environment has changed from focusing primarily on abstinence to now allowing a more open discussion on safer sex and sexuality in schools; there is need to conduct more

research with a more recent sample of youth. This may also shed light around how correct knowledge may continue to improve positive behavioral outcomes at both the cross-sectional level as well as longitudinally. It was discussed in the review of literature earlier that more and more States have begun to slowly incorporated sex education topics instead of a primarily abstinence only curriculum over the years (Planned Parenthood 2018; CDC 2014). It would be beneficial to see how long-term safer sex behaviors have continued to improve due to this progress. Over the years, there has been an increase in safer sex promotion in addition to school curriculums. There have been nationwide media advocacy campaigns, national social marketing campaigns, in-school STD testing initiatives and increased condom availability with school-based health centers in certain parts of the country (Advocates for Youth., 2018). Future research, should take these advancements into account to see the effect that such nationwide campaigns have also had on not just individual health beliefs but also safer sex behaviors.

In summary, this study should be followed up with primary research – qualitative and quantitative – which include more constructs from the Health Belief Model in addition to other theoretical constructs to be able to deduce a more direct influence. It should also be noted that although sexual orientation was not a demographic variable that was collected in Wave One and it did not seem to have a statistically significant relationship with health belief constructs in young adulthood in this particular study, further research with a recent sample should be conducted to assess the difference in health beliefs between LGBQ and heterosexual youth cross-sectionally when they are in high school and then overtime. This study did find that LGBQ youth were found to be almost twice as more likely to be sexually active than their heterosexual peers at young

adulthood and this calls for future research where sexual orientation demographics are collected at the high school level to see their safer sex behaviors at both cross-sectional and longitudinal level as well as their level of correct knowledge and their health beliefs regarding HIV and STDs. This is particularly important because more current research has found that LGBQ youth – especially LGBQ youth of color – are found to engage in unprotected sex more than their heterosexual peers (Warren et al., 2008). It would be important to examine their individual health beliefs and level of correct knowledge and their role – if any – on their safer sex practices.

Practice Recommendations. This study aimed to assess the short-term and long-term influence of improved knowledge of safer sex and positive health beliefs on safer sex behaviors. As mentioned earlier, the Wave One sample was collected in 1994-1995, when there was a decreased emphasis on comprehensive sex education imparted in high schools. The sex education programs that were in existence were vastly different and ranging from abstinence only to some schools even discussing topics of sexual orientation (Landry et al., 2003). Regardless, this study advocates for the importance of comprehensive sex education in schools as it has been shown to predict better sexual behavior outcomes at both the cross-sectional level and even when the sample reached young adulthood in 2002. Advocacy for comprehensive sex education has in existence since the early nineties (Stanger-Hall et al., 2011., Advocates for Youth., 2007 Haffner., 1997) and although some progress has been made, States continue to differ on their adoption of a universal curriculum of sex education which includes skills-based topic around the proper use of condoms, condom negotiation with partners and communication

with partners around making healthier choices (Inman et al., 2011; Zinth et al., 2007; Landry et al., 2003).

Programs and interventions that are a combination of knowledge-based and skill-based curriculums should ideally be implemented among youth to ensure more positive behavioral outcomes that may also be maintained overtime from high school to young adulthood. In our study we found that among the different health belief constructs that were included in the analysis, self-efficacy had a positive influence at the cross-sectional level and somewhat of a positive influence at the longitudinal level. These findings are in line with published research on the topic which also indicated that self-efficacy seems to have a strong predictive value – at the cross-sectional level – on positive health behaviors (Downing-Matibag et al., 2009; Maguen et al., 2000; Addoh et al., 2017). In light of these findings, it is important that future interventions with youth should not only focus on improving their knowledge but also improve their capacity and skills in making healthier choices.

Another practice recommendation for schools that implement a uniform sex education curriculum is to ensure that sex education interventions are implemented by trained health educators hired specifically for this purpose instead of delegating it as an extra task for teachers. This would ensure that the staff could implement these interventions diligently and in a culturally sensitive manner. During our review of the literature, a challenge around implementing sex education in schools was the fact that the implementation of any form of sex education was delegated to teachers or administrators who already had a heavy workload (Lloyd et al., 2012; Darroch et al., 2000). This was shown to be challenging in not only implementing the curriculum with fidelity but also in

gaining support for such programs. Training should be held with school nurses around the importance of sex education interventions and as schools slowly move towards establishing school-based health centers, health educators should be hired to not only spearhead such efforts but also make sure that programs are implemented in a cultural sensitive manner and with fidelity.

In the bivariate analysis, racial minority youth and those who lived in urban settings had reported lower on the correct knowledge scale and had also reported lower self-efficacy in sexual decision making. This was also confirmed by our review of literature prior to our study that minority youth are found to have less opportunities for sex education interventions and also have higher rates of unprotected sex (Inungu et al., 2009). Thus, more efforts should be put into place to implement culturally sensitive and specific sexual health interventions with racial minority youth and urban youth in order to ensure not only that they are correctly educated on the benefits of safer sex but also to improve their skills in making healthier decisions in regards to safer sex.

Policy Recommendations. Comprehensive sex education advocates have been demanding policy implementation for a universal curriculum for comprehensive sex education since the early nineties (Stanger-Hall et al., 2011., Advocates for Youth., 2007 Haffner., 1997). Although school districts have made certain strides around introducing sex education into their school programming, the curriculums and the content remain to be vastly different across different regions of the United States. Findings from the study confirm that policy makers need to continue to advocate for a universal curriculum of comprehensive sex education which would not only increase correct knowledge of safer sex among youth in high schools but also integrate skill-building with regard to making

healthier sexual decisions. Since knowledge had a positive influence on safer sex behaviors at a cross-sectional level and remained pervasive into young adulthood, this study sheds light on the value of sex education at the time youth are initiating sex. Furthermore, self-efficacy was also found to have a positive influence and thus, all educational interventions should integrate topics around skill building as well.

As mentioned earlier, one of the findings in the bivariate analysis was that racial minority youth and those who lived in urban settings had scored lower on the correct knowledge scale and has also indicated lower self-efficacy in sexual decision making. Past research on the subject also revealed similar findings that not only do minority youth are less exposed to sex education but they are also known to engage in unprotected sex at a higher rate than their Caucasian peers (Inungu et al., 2009). Thus policy-makers and sex education advocates need to ensure that a universal and skills-based curriculum is taught in school across metropolitan locations so that minority students enrolled in public schools in urban areas are able to gain the same knowledge and skills as their White peers in suburban schools.

In Chapter Two, we examine the average age of sexual initiation in the United States and found that an individual was most likely to initiate sex between the ages of 15-19 years of age – 17 years on average - or during the 9^{th} and 12^{th} grade – which is when they are in high school (CDC, 2018). This raises an important need for sex education earlier than high-school so when youth are first initiative sex, they are already well informed and knowledgeable around safer sex practices. Thus, policy makers and sex education advocates could argue for sex education as well as STD/AIDS education interventions to be taught as early as middle-school in order to ensure that youth are

prepared to make the right decisions when they reach high-school. In addition, a push for youth focused and skill building interventions that aim to increase self-efficacy and negotiation skills around sexual decision making, need to be integrated within sex education curriculums so youth can practice safer sex behaviors while in high school and possibly even during adulthood.

Certain schools in the United States, particularly in States such Idaho, Louisiana, Texas and Virginia continue to rely heavily on abstinence-only education as the only option for safer sex (Landry et al., 2003). However, in light of this study's findings, schools should be encouraged to include additional methods of safer sex such as condom use and condom negotiation as well. In addition, sexuality education should be integrated within all sex education curriculums in order to ensure that the interventions are more culturally sensitive and are able to include students who are LGBTQ and needs sex education interventions which are tailored to their own needs as well. Our study did find that LGBQ respondents were more sexually active during adulthood – and this demographic indicator was not collected during Wave One – and thus it is imperative to ensure that sex education curriculums address the needs of sexual minority youth, especially since our review of literature also found that sexual minority youth are found to at higher risk for STD and HIV transmission (Inungu et al., 2009).

Conclusion

Lack of awareness around sexual risk-taking at a young age can result in continued engagement in unsafe sex behaviors and thus increase the likelihood of being exposed to infections and diseases such as HIV/AIDS. This study aimed to theoretically assess whether correct knowledge of safer sex among high-school aged youth

significantly increased the maintained adoption of safer sex behaviors in the short-term as well as the long term. The study's theoretical driven analysis also aimed to assess whether the above influence was mediated by health beliefs such as perceived severity of STDS and HIV, perceived susceptibility of STDs and HIV and self-efficacy in sexual decision making.

The study findings supported the role of correct knowledge of safer sex significantly contributing to safer sex behaviors not just in high school but also when young adulthood was reached. However, the study findings did not support the mediating role of health belief constructs on the relationship between correct knowledge of safer sex on sexual behaviors. Based on the findings of this study, recommendations were made for the support of increased sex education in US high school educational system. This would ensure that youth in the US engage in safer sex throughout their lifetime in order to reduce their risk for STDs and HIV/AIDS.

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