RURAL AFRICAN AMERICAN ADOLESCENTS AND FACTORS AFFECTING
CONDOM USE: A PATH ANALYSIS STUDY

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ABSTRACT

TASHUNA D. ALBRITTON: Rural African American Adolescents and Factors
Affecting Condom Use: A Path Analysis Study
(Under the direction of Dr. Kathleen Rounds)

The purpose of this dissertation was to assess factors affecting condom use among

rural African American adolescents. Data from the National Longitudinal Study of

Adolescent Health was used to conduct the study. Condom use behavior was examined

with a sample of 539 sexually active rural African American adolescents ages 15 to 18

years. The Health Belief Model was used to inform the conceptual framework of this

study. Several factors that were associated with condom use among adolescents were

examined. These factors included perceived susceptibility to HIV/AIDS and other STIs,

perceived barriers to protect self from infections, parent-child sex communication,

parental attitudes toward sex communication, and condom knowledge.

Path analysis using the structural equation modeling framework was used to

assess the models. The results revealed that being female was related to condom

knowledge, perceived susceptibility, and parent-child sex communication. Parent-child

sex communication mediated the relationship between parental attitudes toward sex

communication and perceived barriers. Finally, none of the factors were related to

condom use.

Several implications for future research with this population are provided. First,

other individual-level factors and contextual-level factors that were not measured in this

study should be assessed. Second, future studies should include the assessment of parent-child sex communication with fathers and other guardians in addition to mothers. Last, future studies should include sexual minority adolescents, as sex communication about protective behaviors may differ for this population of adolescents.

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BACKGROUND AND SIGNIFICANCE

Statement of the Problem

One objective outlined in *Healthy People 2020*, the nation's blueprint for health and well-being, calls for the elimination of health disparities related to HIV and other sexually transmitted infections (STI). Currently, although African American adolescents constitute only 15% of the U.S. adolescent population (i.e., age 13 to 19 years) they represent 75% of all HIV infections and 71% of AIDS cases reported in the U.S. for that age group (Centers for Disease Control and Prevention [CDC], 2010a). The persistent nature of this disparity has been seen over time in HIV prevalence rates that have either decreased or remained stable in the overall population, but remained substantially higher among African Americans than among Whites (CDC, 2001).

According to the CDC, adolescents (i.e., ages 15 to 19 years old) and young adults (i.e., 20 to 24 years old) represent 25% of the sexually active population (2010a). **These combined age groups are burdened with nearly half of the approximately 19** million new STIs diagnosed in the U.S. each year (CDC, 2011). The high rates in HIV and STI prevalence rates among African American adolescents are a persistent problem, which is discussed in detail later in this chapter. Researchers have had some success in implementing interventions to reduce HIV and STI risk behaviors, but these behavioral changes are often not maintained over time.

Previous studies have attributed the higher HIV prevalence rates among the African American adolescent and young adult populations to individual risk behaviors such as early initiation of sexual activity (Coker et al., 1994; Kaestle, Halpern, Miller, & Ford, 2005). Consequently, for the past two decades, interventions targeted toward African American adolescents were focused on reducing individual risk behaviors (DiClemente et al., 2004; Jemmott, Jemmott, & Fong, 1992; St. Lawrence, Brasfield, Jefferson, Alleyne, & O'Bannon, 1995; Stanton, Li, Ricardo, Galbraith, Feigelman, & Kaljee, 1996; Wu et al., 2003). However, researchers are increasingly exploring the role of community context in HIV transmission (Adimora, Schoenbach, & Doherty, 2006; Hallfors, Iritani, Miller, & Bauer, 2007; Morris, Kurth, Hamilton, Moody, & Wakefield, 2009). This research has shown a community context associated with HIV and STI risk typically lacks resources, such as recreational outlets (Adimora et al., 2001; Akers, Muhammad, & Corbie-Smith, 2011), but has high levels of HIV and STI risk characteristics, including a large percentage of single-parent households (McIntosh, Moore, & Cinar, 2009; Ramirez-Valles, Zimmerman, & Newcomb, 1998), high rates of incarceration, and high rates of unemployment (Adimora et al., 2001; Adimora et al., 2006). The transition from targeting individual risk behaviors to targeting contextual factors addresses the understanding that individual behaviors alone do not fully explain the health disparities that exist between African Americans and Whites.

Even though researchers have identified individual and contextual factors affecting African American adolescents, little has been done to translate those research findings into effective prevention interventions that address risk factors among this population. The research that does exist is largely confined to African American

adolescents living in urban areas. To date, most behavioral interventions have focused on urban African American adolescents, and studies exploring neighborhood contextual factors and their impact on adolescent sexual behaviors have been largely confined to samples of urban adolescents (Nebbit, Lombe, Sanders-Phillips, & Stokes, 2010). Limited behavioral intervention research has been conducted with rural adolescents, and these interventions did not address contextual risk factors (Smith & DiClemente, 2000; Stanton et al., 2006). The scope of this dissertation study does not include contextual risk factors. This study examines several empirically supported individual-level protective factors that influence condom use among African American adolescents, as condom use is considered a primary form of protection from HIV transmission. Specifically, this study explores the impact of these factors on adolescents residing in rural communities, which is an understudied population. However, before presenting the details of the current study, I provide an overview of HIV/AIDS and STI prevalence among all African American adolescents and HIV/AIDS prevalence among rural African American adults and adolescents. Individual and contextual risks for African Americans are discussed in this chapter as well. Finally, I discuss the health and psychosocial impact of STIs and HIV on adolescents.

HIV/AIDS and STI Prevalence Among African American Adolescents

According to the CDC, from 2005 to 2008, African American adolescents and young adults ages 13 to 24 years accounted for the largest estimated percentage of diagnoses of HIV infection each year compared to other racial groups within the same age group (CDC, 2010a). In 2008, African Americans ages 13 to 24 years represented 64% of new HIV diagnoses (CDC, 2010a). By the end of 2007, African American males

comprised 62% of males between ages 13 to 24 years living with a diagnosis of HIV, whereas Hispanic, White, and multiracial males represented 20%, 16%, and 1% of males living with a diagnosis of HIV, respectively (CDC, 2010a). Among female adolescents between ages 13 to 24 years old living with a diagnosis of HIV infection, African American females represented 65%, followed by Hispanic (18%) and White (15%) females (CDC, 2010a). In 2008, the racial distribution of AIDS diagnoses among adolescents ages 13 to 19 years revealed that African American youth represented 71% of AIDS diagnoses; AIDS diagnoses for the remaining racial groups were among Hispanic (17%) and White (10%) adolescents (CDC, 2010a).

However, the CDC's estimates of HIV/AIDS prevalence are likely an underestimation of the actual number of African American adolescents infected with HIV. That is because the document on which these estimates are based—the CDC's epidemiological report *HIV Surveillance in Adolescents and Young Adults* (CDC, 2010a)—was based on data collected from adolescents who received HIV tests; these data did not include youth who were HIV-positive but unaware of their status. In addition, some estimates are based solely on data obtained from the 37 states required by law to report confidential name-based HIV cases, and thus exclude the HIV and AIDS prevalence rates among adolescents in the other 13 states.

The CDC surveillance report of HIV among adolescents and young adults (CDC, 2010a) also indicated the mode of HIV transmission among adolescents and young adults. Although the report categorized transmission by gender, transmission was not categorized by racial/ethnic group. Similar to the reported modes of HIV transmission within the adult population, most adolescent and young adult males reported contracting

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the virus through male-to-male sexual contact (70%), whereas the majority of females (60%) reported that the infection was transmitted through heterosexual contact (CDC, 2010a).

In addition to HIV, other STIs have created an overwhelming and ongoing impact on the health of African American adolescents. The United States has high incidences of chlamydia, gonorrhea, human papillomavirus (HPV), and trichomoniasis (CDC, 2011). African American adolescents experience disproportionately high rates of STIs compared to adolescents from other racial/ethnic groups. These disparities exist across most STIs, including genital herpes and syphilis (CDC, 2011). However, the African American population tends to be hardest hit by gonorrhea and chlamydia, especially young African American females (CDC, 2011).

Gonorrhea. According to the CDC's (2010b) surveillance report of STI prevalence, gonorrhea rates were highest among African Americans ages 15 to 19 and 20 to 24 years compared to other racial groups within these age groups (2010b). Specifically, African American females ages 15 to 19 years had a gonorrhea infection rate of 2,613.8 cases per 100,000 population, which was 16.7 times greater than the rate among White females of the same age group. Moreover, African American males ages 15 to 19 years had rates of gonorrhea infection 38.3 times greater (1,316.4 cases per 100,000 population) than White males of the same age group (CDC, 2010b). Although high rates of gonorrhea infection are well-documented among both sexes, screening for this infection is especially recommended for women considered at high risk of infection because gonorrhea is often asymptomatic in females (Miller et al., 2004). Given the lack of symptoms in females, many cases of gonorrhea remain undetected and therefore go

unreported. In fact, previous estimates have assumed a 50% rate of under-diagnosis and underreporting for gonorrhea infection in the U.S. (Weinstock, Berman, & Cates, 2004).

       Chlamydia. Similar to other STIs, the young African American population has also experienced significantly higher rates of chlamydia infection compared to other racial/ethnic groups. Among African American adolescents and young adults, the rate of chlamydia infection in 2009 was 8 times greater (1,559.1 cases per 100,000 population) than that of their White age counterparts (CDC, 2010b). African American females ages 15 to 24 years were significantly affected, with a 1:10 ratio of reported chlamydia cases for African American females in this age group (CDC, 2010c). Further, a study that used data from the National Longitudinal Study of Adolescent Health (Add Health) to examine STIs among young adults ages 18 to 26 years showed a significantly greater prevalence of chlamydia infection among African Americans as compared to Whites—12.9% vs. 1.9%, a six-fold difference (Newman & Berman, 2008).

       Chlamydia is the most common bacterial STI in the United States, with an estimated 3 million new cases reported every year (CDC, 2010c). Typically, both men and women infected with chlamydia remain asymptomatic; therefore, screening plays a major role in detecting chlamydia infection. Because quality of care measures set by managed care organizations recognize the importance of routine screenings for women, females are more likely to be screened for STIs, including chlamydia. The adoption of these screening measures has been less consistent for males (Miller et al., 2004). Consequently, because of incomplete screenings and underreporting, current figures more than likely reflect a significant underestimation of the true incidence of chlamydia (Weinstock, Berman, & Cates, 2004), especially among males.

Human papilloma virus. HPV is the most commonly acquired viral STI in the United States, totaling almost 5.5 million new infections each year (CDC, 2007b; D'Urso, Thompson-Robinson, & Chandler, 2007). An estimated 50% of sexually active men and women can expect to contract an HPV infection in their lifetime (CDC, 2010d). Unlike other STIs, HPV is transmitted by skin-to-skin contact; therefore, latex condoms are not a proven method for preventing the transmission of HPV because the virus can be present on areas of the skin not covered by a condom (CDC, 2010d). In addition, HPV has multiple strains, but the HPV-16 and -18 strains are the greatest health concerns because these infections have been linked to cervical cancer (CDC, 2010d; Dunne et al., 2007).

Despite its association with negative health outcomes, HPV infection is not a disease that federal and state laws require health care providers to report. Thus, case report data are not available, and there are no data on the prevalence of HPV across a broad age range of the U.S. population. Therefore, prevalence rates and racial disparities in HPV infection rates have to be pieced together from small or isolated studies. The available data show that African Americans experience higher rates of some HPV infections compared to other racial/ethnic groups. For example, one study reported that HPV-16 was found in 19.1% of African American women compared to 12.5% of White women (D'Urso et al., 2007).

In most cases, HPV is benign, causing no health problems and sometimes even resolving without intervention within one to two years (CDC, 2010d). The only approved HPV screening test is part of cervical cancer screening for women, and this test detects only the HPV strains that have higher risk of progressing to cancer (CDC, 2010d).

Currently, no test is available to test for HPV infection in males, and no test is available for either sex that screens for overall HPV status.

HIV/AIDS in Rural Populations

The majority of AIDS cases reported in 2008 among adults and adolescents were reported in major metropolitan areas (i.e., areas with populations greater than 500,000 persons as designated by the Office of Management and Budget; CDC, 2009a). However, areas designated as *small metropolitan* (50,000 to 500,000 persons) and *nonmetropolitan/rural* (fewer than 50,000 persons), especially in the South, share a substantial burden of the AIDS epidemic (CDC, 2009a). According to the Southern AIDS Coalition (SAC, 2008), the Southern region of the United States has the highest rate of new AIDS cases and the highest number of adults and adolescents living with and dying from AIDS. A large proportion of the Southern population lives in rural areas, and the majority of HIV/AIDS cases in the South are concentrated in these areas, with 65% of all AIDS cases in the South being among rural populations (SAC, 2008). In rural areas, the estimated number of African American adults and adolescents living with a diagnosis of HIV infection at the end of 2007 was 23,103 persons (rate, 714.6; CDC, 2009a). In 2008, African American adults and adolescents represented almost half (48%) of the reported AIDS diagnoses in rural areas (CDC, 2009a).

Regardless of the population of their area of residence, African Americans account for the greatest number of HIV infection diagnoses and AIDS diagnoses in the U.S. population. The *HIV Surveillance in Urban and Nonurban Areas* has shown that in 2008, the distribution of age at HIV diagnosis among adults and adolescents did not differ by population of area of residence, not accounting for race (CDC, 2009a). In 2008,

regardless of the population of residence and racial group, diagnosis of HIV infection among persons, ages 13 to 24 years, accounted for 18% to 19% of the diagnoses (CDC, 2009a). However, because the data presented in the CDC's surveillance report represent only persons who have been tested for HIV and are based exclusively on the 37 states with required confidential name-based HIV infection reporting, the actual number of rural adults and adolescents infected with HIV is likely higher than the numbers reported (CDC, 2009a).

Health Disparities

As indicated in the previous section, African American communities throughout the United States have experienced disproportionately high rates of HIV/AIDS and STIs. Although individual risk behaviors contribute to HIV and STI risk, the differences in prevalence of HIV/AIDS and STIs among population groups can overwhelm the effects of individual sexual behaviors (Hogben & Leichliter, 2008). According to a review of HIV and STI racial disparities using Add Health data, young Blacks of both sexes are at risk for STIs and HIV/AIDS even if they practice normative sexual behaviors, which are defined as practices perceived as the norm among peers or within the social context (Brooks-Gunn & Furstenberg, 1989; Crosby et al., 2000; Hogben & Leichliter, 2008). Thus, even when a male adolescent's normative behaviors consist of low-risk sexual behaviors (e.g., abstaining from alcohol, consistent condom use), the adolescent's social context can exert an influence that is capable of eroding those normative behaviors, causing the adolescent to be at high risk. Areas with high prevalence rates of STIs often contain individuals who have histories of repeated infections and who live in close proximity to each other (Hogben & Leichliter, 2008). Because most partner selection is

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likely to occur within the community, these community characteristics increase the adolescent's likelihood of partnering with someone who is infected (Hogben & Leichliter, 2008).

The premise that community context affects STI prevalence appears to be supported by the fact that African American women appear to be at greater risk of STIs compared to their White counterparts (Hogben & Leichliter, 2008). This finding is puzzling given that studies have shown few differences in sexual behavior patterns among White and African American females, ages 15 to 44 years (Hogben & Leichliter, 2008). These findings warrant an exploration of other factors that are likely to influence rates of infection. Behavioral scientists have begun investigating the role of social determinants in HIV and STI disparities, which is a first step toward addressing the assessment of the influence of contextual factors on STI risk. For example, women living in poverty are subjected to unstable housing or homelessness, which increases their risk for potential victimization (e.g., sexual assault, physical abuse) and HIV (Riley et al., 2007). Because of economic crises, women may exchange sex to meet basic needs (e.g., shelter, food, money) for themselves or their family; sex exchange is associated with HIV risk (Riley et al., 2007). In situations where sex exchange occurs, women are less likely to negotiate safe sex practices with a partner because the more immediate need for shelter, food, and money may outweigh the distal threat of infection (Riley et al., 2007; Wenzel & Tucker, 2005). In fact, women who are dependent upon men (in non-sex exchange relationships) for their subsistence are less likely to be able to negotiate safe sex practices and are more likely to experience violence at the hands of their partner (Riley, et al., 2007). Violence has also been associated with HIV risk (Wenzel & Tucker,

2005). Hence, impoverished women may have situational constraints that make it improbable to self-protect against infections. Instructing women about how to use condoms correctly may be "insufficient for women who are in power-imbalanced relationships with men and facing the risk of violence" (Wenzel & Tucker, 2005, p. 154). The social contexts (e.g., poverty, unstable housing) in which women find themselves are factors affecting the epidemic. The impact of poverty and unstable housing on infection rates will be discussed in greater detail in the next section, as will other factors that impact rates of STI and HIV.

Sexual networks. It is important to note that sexual behaviors alone do not explain health disparities. The risk of infection is also a product of an individual's sexual network. The term or concept of a *sexual network* has defining characteristics such as the extent of concurrent partnerships,[1] the size of the core group, the average risk level of behaviors in which the core group engages, the extent of sexual interaction between core group and the general population, and the extent of sexual interaction between the core group and other high-risk subpopulations (Adimora et al., 2006). Concurrent partnerships create an environment that permits rapid transmission of infection (Adimora et al., 2006). Members of a sexual network with many concurrent partnerships and a high prevalence of STIs are at increased risk of infection because when a concurrent partner contracts an infection, that infection is likely to be transmitted to a third person without the delay involved with ending the first relationship and beginning the next (Adimora et al., 2006). These network patterns play an important role in the transmission of HIV and other STIs throughout a population (Adimora et al., 2006). Researchers have shown that the

[1] *Concurrent partnerships* are multiple, simultaneous sexual relationships or sexual relationships that overlap in time (Adimora et al., 2006; Morris & Kretzschmar, 1995).

concurrent partnerships in a sexual network pose equally high STI risks for partners involved in the early phases of the network as well as partners involved in the network later. The concept of sexual networks examines the pattern of population exposure to infection rather than limiting the examination to risks attributed to individual behaviors (Adimora et al., 2006; Aral, 1999).

In addition to individual risk behaviors and sexual networks, evidence has shown that societal factors also affect HIV/AIDS and STIs prevalence rates. Race and ethnicity are highly correlated with other health determinants such as poverty, access to quality health care, health care-seeking behavior, illicit drug use, and living in communities with high prevalence of STIs—all of which offer potential explanations for the existence of these disparities (CDC, 2008; Hogben & Leichliter, 2008). Socioeconomic status (SES) is among the most important social determinants of health because SES can limit access to high-quality health care, housing, and HIV prevention education (CDC, 2008). Researchers have estimated that 1 in 4 African Americans were living in poverty in 1999 (CDC, 2008), which may explain some of the disparity found in STI rates as discussed earlier with women living in poverty. For example, Newman and Berman (2008) reported that African American female adolescents from low-SES households (i.e., parents were unemployed) were twice as likely to report a history of gonorrhea. In addition to low SES, the lack of health insurance for preventive care has been associated with chlamydia infection among adolescents (Hogben & Leichliter, 2008).

The overall impact of social and economic forces (e.g., segregation, incarceration, violence, unemployment) creates racial differences in sexual network formation. Communities with high concentrations of poverty are associated with a geographical

concentration of health disparities, including HIV/AIDS and STIs (Fullilove, 2006).

Individuals living in poor and segregated communities tend to select sex partners from

within the same community. In such communities, the sexual network structure is

essentially a *core* model which consists of densely interconnected individuals passing

infection to one another (and hence causing re-infection for treatable STIs; Bearman,

Moody, & Stovel, 2004). This core model can apply to rural isolated communities as

well, where persons select sexual partners from within the community. As previously

discussed, these sexual networks tend to promote and sustain elevated STI rates among

African Americans (Andrinopoulos, Kerrigan, & Ellen, 2006).

Societal Factors Affecting HIV/AIDS and STI Rates

Most risk factors for HIV/AIDS and other STIs have been observed by examining

individual-level behaviors. However, some researchers have argued that racial/ethnic

disparities in STI prevalence rates cannot be fully explained by risk behaviors alone

(Newman & Berman, 2008). These researchers have suggested that larger societal factors

contribute significantly to the disproportionate rates of infection in African American

communities (Adimora & Auerbach, 2010; Adimora et al., 2001; Hogben & Leichliter,

2008). Historically, African Americans have experienced various forms of discrimination

(e.g., employment, housing, health care) that have had a cumulative negative effect on

health outcomes. Institutionalized discrimination negatively affects the quality of living

and the economic stability for African Americans.

Although most studies that examine the relationship between social problems

within American society and health outcomes for African Americans have been

conducted with adults, it is important to recognize the challenges that adolescents face as

they transition into young adulthood. These societal-level factors are a threat to African American adolescents as well. The research examining the impact of societal challenges has presented a new perspective on the HIV/AIDS and STI epidemic among African Americans. This perspective calls for researchers to begin exploring structural interventions in addition to behavioral interventions. In the following section, I discuss several societal-level factors or social determinants of health that have been shown in recent research to be associated with disparate infection rates among African Americans.

Poverty. High rates of STI infection tend to found in countries with high levels of income inequality (Hogben & Leichliter, 2008). The United States is no exception to this phenomenon because it remains a racially and economically segregated nation. HIV prevalence is high among economically disadvantaged African American and Hispanic populations (Fullilove, 2006). Poverty decreases the likelihood of attaining health care services, thereby delaying treatment for STIs, and untreated STIs facilitate HIV transmission (Adimora & Auerbach, 2010). Disparity in access to health care is much greater in the United States than in other industrialized nations, which contributes to the remarkable racial/ethnic disparities in rates of chronic diseases such as HIV (Adimora & Auerbach, 2010).

Further, when opportunities for employment are limited, communities will continue to experience high numbers of persons without medical insurance or with inadequate insurance coverage (i.e., medically underinsured). One focus group study with rural African American adults found that study participants perceived racial discrimination to be so prevalent that it would be difficult for African Americans to acquire "good employment" even with higher levels of education (Adimora et al., 2001,

p. 71). Participants in these focus groups also communicated that their communities had no job opportunities for young people, and that among the few positions that were available, most were "dead end" jobs with low pay, such as work in restaurants, farming, sewing, and babysitting (Adimora et al., 2001, p. 71). These job categories tend to offer no health coverage to employees, which create a barrier to accessing care.

Housing. The poor are also subject to experience housing instability and homelessness, which have been associated with increased likelihood of HIV risk behaviors (Adimora & Auerbach, 2010; Hogben & Leichliter, 2008). Both adolescents and adults with extended periods of housing instability or homelessness are at risk for engaging in risky behaviors such as *survival sex* (i.e., sex for shelter, food, money; Slesnick, Bartle-Haring, Dashora, Kang, & Aukward, 2008). Evidence has shown that residential stability is effective in reducing HIV risk behaviors, increasing access to care, and improving adherence to antiretroviral medication regimens (Adimora & Auerbach, 2010; Wolitski et al., 2010).

African Americans continue to experience racial discrimination in the housing market, which hinders their movement out of impoverished areas (Fullilove, 2006). The decreasing supply of affordable housing has forced African Americans to live in residentially segregated communities. Residential segregation is one social determinant of STI disparities (Hobgen & Leichliter, 2008). However, segregation alone does not explain the disparities seen in both urban and rural communities. Social segregation often overlaps with other determinants of health such as health care access, SES, and incarceration (Hobgen & Leichliter, 2008).

Incarceration. Previous studies have found that inmates in correctional facilities view themselves as having low to no risk for acquiring HIV (Hodder et al., 2010). However, the HIV prevalence among the prison population is 2.5 times greater than in the general U.S. population (Hodder et al., 2010). Approximately one quarter of all those living with HIV have passed through the U.S. correctional system (Hammett, Harmon, and Rhodes, 2002). In 2003, the U.S. Department of Justice found that 2% of state prisoners and 1.1% of federal prisoners were HIV-positive (Fullilove, 2006). Inmates may also be at risk for infection while incarcerated due to high-risk behaviors such as unprotected sex and intravenous drug use in prison (Fullilove, 2006). Because policies for HIV testing of inmates vary across states, the percentage of seroconversions (i.e., converting from a negative HIV status to a positive status) that occur in jails and prisons is unknown.

Although published statistics about the prevalence of HIV among prisoners typically do not capture race/ethnicity, the disproportionate rates of imprisonment among African Americans suggest that they bear the burden of infections. The incarceration rate of African Americans is nearly 6 times that of Whites (Mauer & King, 2007). A major factor contributing to this high rate is racial disparity in the sentencing of drug-related offenses as well as other types of convictions (Adimora & Auerbach, 2010). According to Bureau of Justice statistics for 2001, 1 in 6 Black men had been incarcerated in their lifetime (Mauer & King, 2007). An alarming percentage of young African American men are currently imprisoned; 1 in 9 Black men between ages 20 and 34 is incarcerated compared to 1 in 30 U.S. men in the same age group (Hodder et al., 2010). The incarceration of large numbers of African American males has far-reaching implications,

including impoverished individuals and communities, altered sexual networks, and imbalanced gender distribution in the community (Adimora & Auerbach, 2010).

Incarceration disrupts stable sexual partnerships (Adimora & Auerbach, 2010; Hodder et al., 2010). High incarceration rates have been associated with behaviors such as concurrent partnerships and *disassortative mixing* (i.e., partnership between higher- and lower-risk people) that promote the transmission of HIV and other STIs (Doherty, Schoenbach, & Adimora, 2009; Hodder et al., 2010). The partner remaining in the community may establish sexual relationships with other partners while the main partner is incarcerated, especially if the main partner experiences frequent incarceration (Adimora et al., 2006). Gorbach and colleagues referred to this type of concurrent partnership as *separational concurrency* (Gorbach, Stoner, Aral, Whittington, & Holmes, 2002). These concurrent partnerships may continue once the main partner returns to the community. As discussed previously, having concurrent partners increases the risk of HIV and STI transmission.

Sex ratio imbalance. The ratio of men to women in the typical African American community has been affected by a number of factors, including high incarceration rates; high mortality rates of African American male infants, children, and adults; and emigration (Adimora, Schoenbach, & Doherty, 2006). A study conducted in rural North Carolina found that some African American men moved to urban areas because of changing economic and agricultural trends, which altered the partner-selection pool for African American women who remained in their rural communities (Thomas et al., 1999). Some researchers have proposed that the shortage of African American males has

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contributed to both low marriage rates and high divorce rates (Adimora & Schoenbach, 2002).

The gender imbalance may also influence the sexual behaviors of African American men and women. For instance, low-risk women (e.g., women who reside in low prevalence rate communities, have no substance use, have fewer sexual partners) may be more likely to partner with high-risk men. In a qualitative study conducted with rural African American adults, the women reported that unmarried men regularly participated in concurrent partnerships (Adimora et al., 2001), and this behavior was tolerated because of the limited pool of men and the existing socioeconomic challenges experienced by both sexes (Adimora et al., 2001; Adimora et al., 2006). Persistently high rates of unemployment among African American men decrease their financial capacity to support a family. Consequently, these men tend to choose not to marry or are not considered candidates for marriage. Previous research has shown that unmarried men are likely to be involved in concurrent partnerships; thus, the women who partner with these men are at increased risk for exposure to STIs (Adimora & Schoenbach, 2002).

Contextual Factors Affecting Small Communities

This section focuses on community-level factors that influence HIV/AIDS and STI rates, particularly among those residing in less densely populated areas. Researchers have identified contextual factors within small communities that they think play a significant role in the disparate infection rates among minorities. Some of these community-level challenges mirror those discussed as societal-level factors, such as economic hardship, racial/ethnic discrimination, and gender imbalance, all of which contribute to increases in concurrent sexual relationships. Other factors that might be

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unique to rural communities are lack of accessibility to clinics and community resistance to prevention efforts. I begin by discussing the ways in which societal-level factors, economic hardship, and gender imbalance affect small communities. The remaining contextual factors focus specifically on the challenges in rural communities as identified in the literature. Although all these factors may not be unique to rural African American adolescents, the discussion of these factors is relevant to understanding the spread of HIV/AIDS in rural areas.

Economics. Research has shown that economic and employment challenges are common among rural African American young and middle-aged adults (Adimora et al., 2001; Thomas et al., 1999). Thomas et al. (1999) found an association between lack of employment opportunities and increased rates of syphilis among minority populations in rural communities. Adimora and colleagues (2001) conducted focus groups with African Americans residing in rural counties with high rates of HIV and STIs, and found that African American residents were concerned with the lack of jobs in their local areas. These respondents also expressed worry about having access to only low-paying jobs, which were usually in the service industry and offered no opportunity for advancement (Adimora et al., 2001). Residents reported that they were forced to travel long distances to work or to emigrate for better employment opportunities (Adimora et al., 2001; Thomas et al., 1999).

Sex ratio imbalance in smaller communities. As previously mentioned, the gender imbalance in the African American community has influenced partner selection for African American women in both urban and rural settings. Women residing in rural areas have reported finding few potential partners with whom they could establish long-

term monogamous relationships. An interesting insight into partnerships within rural communities was presented in a qualitative study conducted with rural HIV-positive African American women. The women in this study characterized romantic partners as "those to whom they had emotional attachment and with whom they had been in long-term, but not necessarily exclusive, relationships" (Mallory, 2008). Some women living in rural areas perceived that the shortage of men made women more tolerant of a male partner's high-risk sexual behaviors, including a partner's "side relationships" or concurrent sexual partnerships (Adimora et al., 2001, p. 74). One 18-year-old male reported, "Basically, most people have someone on the side. That way, in case one messes up, you have somebody to fall back on. It's what you call having a side shot" (Adimora et al., 2001, p. 74). Involvement in this type of high-risk behavior puts both men and women at risk for HIV and other STIs.

Access to care. In addition to the economic and gender-balance disadvantages that are thought to contribute to high rates of HIV infection, structural factors within smaller communities have also been associated with disparate rates of STI and HIV infection. Several of these factors were discussed in a study that examined the variability in syphilis rates across multistate counties (Thomas et al., 1999). The researchers discovered that in most instances, rates of syphilis infection were higher among minorities when access to the health department STI clinic was limited (Thomas et al., 1999). Dimensions of accessibility included the physical location of the STI clinic and the capacity of the clinic to treat patients in a timely manner. In the counties with high rates of syphilis, the health department STI clinics were located the greatest distance from the communities most affected by STIs (Thomas et al., 1999). These researchers found

the opposite to be true among counties with lower rates of infection. Accessibility to clinic locations was further complicated by the absence of public transportation in rural counties (Thomas et al., 1999). The lack of transportation to medical care facilities has been a long-standing challenge for rural residents who must travel to urban areas to receive care for STIs and HIV/AIDS (Rounds, 1998).

Moreover, the counties reporting high rates of syphilis were the same counties that were more likely to offer limited schedules for STI clinics, often restricting such clinics to one or two days per week and only a few hours on those days (Thomas et al., 1999). In contrast, the counties with lower rates of syphilis infection typically provided health department STI clinical services 5 days per week for at least 7 hours per day (Thomas et al., 1999).

Beyond limiting access, the restricted clinic hours also affected patient confidentiality. For those who were seen at the clinic on specific days and times, it was assumed that they were there to be treated for a suspected STI (Thomas et al., 1999). In addition, some clinics required patients to request care for STIs in open reception areas, and some of the clinic rooms were separated by partitions that permitted others to hear the conversation between the clinician and the patient (Thomas et al., 1999).

Lack of confidentiality was a major concern expressed by participants in another study that examined barriers to care for rural individuals with AIDS and their families (Rounds, 1998). Structured interviews with various service providers (e.g., social workers, nurses, health educators, administrators, hospice care) revealed a recurring theme that confidentiality and fear of disclosure hindered service delivery to individuals

with AIDS (Rounds, 1998). These providers consistently stated, "In rural communities everyone knows everyone, and everyone knows your business" (Rounds, 1998, p. 271).

Outreach. Prevention efforts in rural communities may also be affected by the lack of community outreach from local health departments. For example, Thomas et al. (1999) found that in counties with high rates of syphilis, local health department staff seldom engaged with disproportionately impacted communities outside of routine clinic services. The researchers also discovered that in high-rate counties, the health departments' STI staff were less familiar with agencies providing other types of social services and health care services in the community (Thomas et al., 1999). This was true even among more senior STI staff members who had 15 years or more of work experience. In addition, poor collaboration between health department outreach workers and their regional disease intervention specialist (DIS) was noted (Thomas et al., 1999). DISs play a critical role in disease prevention because their primary responsibilities are to notify sex partners of those infected with syphilis and HIV/AIDS, and to assist HIV-positive clients in notifying their sex and needle-sharing partners (NC HIV/STD Prevention and Care, 2008). Local health department staff and DISs essentially serve the same patients within their assigned counties. Theoretically, collaboration between the two facilitates a continuity of care for patients. In some cases, however, DISs were unacquainted with the local HIV and STI prevention staff in their region (Thomas et al., 1999). This lack of community engagement by the local health departments and poor collaboration between agencies could hinder prevention efforts in communities at greatest risk for disease transmission.

Social acceptability and stigma. Another potential obstacle to promoting risk reduction behaviors in smaller communities is posed by the lack of social acceptance of discussing risk behaviors and STIs. Thomas et al. (1999) found that school boards and some churches in most high-syphilis-rate counties were opposed to school-based comprehensive sex education. The boards favored an abstinence-only curriculum, which would not permit health educators to advise students about any protective methods for preventing pregnancy and STIs (Thomas et al., 1999).

Further, the stigma associated with HIV/AIDS transmission could affect community outreach and other prevention programming, such as HIV/AIDS and STI education and testing, within these rural communities. McKinney (2002) referred to existing "community prejudices" as barriers to accessing preventive services. Community members may be fearful that participation in these programs will label them as having HIV/AIDS. Equally important, issues around maintaining anonymity and confidentiality are often primary concerns among rural residents, which may limit outreach efforts (McKinney, 2002). The chances of encountering known persons from the community are greater in geographically isolated areas.

Limited recreation. The factors discussed thus far have primarily pertained to rural African American of all ages. There are additional concerns that pertain specifically to AA adolescents. Many young and middle-aged adults have expressed concern about the risk behaviors of rural African American adolescents and the factors that may have a direct impact on their behavior. Some rural African Americans have attributed STI risk behaviors among adolescents to the lack of recreational outlets in the surrounding communities (Adimora et al., 2001; Brown & Waite, 2005). In counties heavily burdened

by high rates of HIV and STIs, particularly among African Americans, adults were concerned that excessive leisure time and boredom could lead to sexual experimentation among adolescents (Adimora et al., 2001).

The association between lack of recreational opportunities and increased sexual risk behaviors emerged in another qualitative study using focus groups conducted with rural African Americans (Akers, Muhammad, & Corbie-Smith, 2011). The focus groups were conducted with adolescents and adults as part of a community needs and assets assessment in counties with severely high rates of HIV and STIs. The adolescent participants discussed the social and structural challenges within their communities as they pertained to recreation. Some of the challenges included a lack of safe places to "hang out" with friends without being harassed by gangs or the police. In addition, the youth discussed the difficulties of dating and lacking a variety of recreational options from which to choose (Akers et al. 2011). These rural youth articulated that the absence of recreational options in their communities led to their engaging in high-risk behaviors such as drinking, drugs, and sex harms (Akers et al., 2011). As reported by Akers et al. (2011), one adolescent female shared the following comment:

> If you live here your whole entire life, there's really nothing to do.
> If you're 14, 15 years old you have nothing to preoccupy your time.
> So, you just basically sit around and talk about sex. And, if you talk about it long enough you're going to end up doing it. And, if you end up doing it, you don't care who you're doing it with. (p. 95)

The data presented by Akers et al. support the idea that neighborhood structure and context impact adolescent sexual behaviors. What is clearly communicated by these adolescents is that the lack of recreation and other forms of entertainment creates an environment in which adolescents experiment with other activities that could put them at

risk for STIs. For example, as reported by Akers et al. (2011), one adolescent female

shared the following comment:

> Me and my boyfriend, when we plan a date we'll go out to eat. We'll go to the movies. And we're looking for other stuff to do besides just go get a room. I mean that ain't even like what we made plans to do, just go get a room and have sex. But because there's nothing else to do we end up either at his house or my house and, you know, that's just what happens. But if we had other stuff to do and to occupy our time . . . . (p. 96)

The findings of Thomas et al. (1999) and Akers et al. (2011) study emphasized the

unique contextual factors of rural communities that are potential contributors to high rates

of STIs and HIV infection among adolescents and young adults. These studies

emphasized the importance of qualitative research for uncovering community-level issues

that might not have been captured using quantitative approaches. The adolescents in the

Akers et al. (2011) study expressed that they have constrained choices for recreational

opportunities. It is clear from the quotes above that adolescents in rural communities do

not intend to engage in sexual behaviors, but because of the lack of other recreational

opportunities, they find themselves engaging in sexual opportunities available to them.

Behaviors Contributing to High HIV and STI Prevalence Rates

In this section, I focus on individual-level behaviors that put adolescents at risk

for infections. However, before discussing specific behaviors, I briefly discuss gender

differences and the risk of infection. Immediately following the discussion on gender

differences, I discuss types of sexual practices and the associated risk of infection.

In 2004, HIV/AIDS was the leading cause of death for African American women

ages 25 to 34 years (CDC, 2009b). Hidden within the alarming rates of HIV infection

among African American adolescents is the fact that physiology places adolescent

females at greater risk of HIV infection than males. This greater risk is the result of

adolescent females' increased cervical ectopy, making them more susceptible to infection than their male counterparts (CDC, 2007b). In addition, certain STIs such as syphilis infection can increase the likelihood of becoming infected with HIV two- to five-fold (CDC, 2009b; Fleming & Wasserheit, 1999). As Fleming and Wasserheit (1999) noted, medical treatment of STIs can decrease the incidence of HIV at the community level.

Although only a small portion of the U.S. population is composed of gay and bisexual men, 53% of the new HIV infections reported in 2006 were transmitted by men who have sex with men (MSM), of which 19% were accounted for by African American MSM of all age groups (CDC, 2009c). In 2008, 68% of HIV infection diagnoses for adolescents and young adults, ages 13 to 24 years, were attributed to MSM contact (CDC, 2010a). According to the CDC, there are more new HIV infections among African American MSM ages 13 to 29 years than among any other age and racial group of MSM (CDC, 2010f). The number of new infections among African Americans within this age group is nearly twice that of their White and Hispanic counterparts (5,220 infections in African Americans versus 3,330 among Whites and 2,300 among Hispanics; CDC, 2010f).

Regardless of gender or sexual orientation, adolescents need to know how to protect themselves from disease and that disease can be transmitted through different types of intercourse: vaginal, oral, and anal. Although oral intercourse generally represents a lower risk of becoming infected with HIV than either anal or vaginal intercourse, multiple studies have shown that HIV and other STIs can be transmitted through oral sexual practices (CDC, 2009c). According to the CDC, measuring the exact risk of HIV transmission through oral sex is challenging because most sexually active

individuals reported they were practicing vaginal or anal sex in addition to oral sex when transmission occurred (CDC, 2009c).

Studies using nationally representative samples of adolescents have suggested that between 39% and 61% of adolescents have engaged in oral sex (Dake, Price, Ward, & Welch, 2011). Adolescents are more likely to report engaging in oral sex than vaginal intercourse, and are more likely to report more oral sex partners than coital partners (Dake et al., 2011). The literature indicates that engaging in oral sex is a behavior that can be socially influenced by peers. One study has shown that perceptions of friends' behaviors were more strongly associated with adolescents' engagement in oral sex than in sexual intercourse (Prinstein, Meade, & Cohen, 2003). Existing data also suggest that many adolescents who engage in oral sex do not consider such activity to be "sex" (CDC, 2009c). Adolescents have also reported that oral sex was a substitution for intercourse, particularly when they are not yet ready to engage in vaginal intercourse (Remez, 2000). This misconception leads adolescents to perceive oral sex as a safe or risk-free sexual practice (Remez, 2000), and that by engaging in oral sex exclusively, they can avoid risks associated with other sexual behaviors (Prinstein et al., 2003). Such responses are indicators that adolescents lack knowledge about the risks associated with oral sex. A national survey of adolescents conducted by the Kaiser Family Foundation reported that 26% of sexually active 15- to 17-year-olds respondents agreed with the statement "You cannot become infected with HIV by having unprotected oral sex," and an additional 15% of respondents did not know whether the statement was true or false (CDC, 2009c).

As with oral intercourse, the research on anal sexual practices among adolescents is limited. However, the available research includes more detailed information about the

risk of HIV transmission from anal sexual practices. Studies of MSM have added greatly to the understanding of infection risk associated with anal intercourse. Further, the National Survey of Family Growth, a study that examined heterosexual anal intercourse and adolescents, found that 8% of adolescent males (i.e., ages 15 to 17 years) and 6% of adolescent females reported having had heterosexual anal intercourse (Lescano et al., 2009). In a study that explored the correlates of heterosexual anal intercourse in a racially diverse sample of 1,386 at-risk adolescents and young adults, Lescano and colleagues (2009) found that 16% of the sampled participants had engaged in unprotected heterosexual anal intercourse in the past 90 days. These researchers also found that females who engaged in anal intercourse used condoms during vaginal intercourse only half the rate (22%) as those who did not engage in anal intercourse (39%; Lescano et al., 2009).

From these findings, it is apparent that HIV/AIDS and STI prevention information should include safe sex practices related to oral and anal intercourse in addition to vaginal intercourse. Many studies have been conducted with adolescents to observe patterns of sexual behaviors and risk behaviors, particularly among at-risk populations. However, few studies have looked specifically at oral and anal sexual behaviors and their association with HIV and STI acquisition.

Individual-Level Behaviors

Over the past several decades, the focal point of HIV/AIDS and STI prevention intervention efforts have been individual-level behavioral interventions. Reducing sexual risk behaviors is an integral part of combating the spread of infection. This section

discusses several of the behaviors that put adolescents at risk for infection, such as early sexual debut, multiple sex partners, inconsistent condom use, and substance use.

Early sexual debut. An individual's current STI status and history of STIs have been shown to be associated with early sexual debut (Kraut-Becher et al., 2008). Early sexual activity increases adolescents' experiences of pregnancy, STIs, and the likelihood of engaging in riskier sexual behaviors (Kaestle, Halpern, Miller, & Ford, 2005). Further, adolescents who become sexually active at an early age tend to have a greater number of sex partners during their lifetime, increasing the likelihood of contracting STIs. Previous studies have shown that African Americans initiate sexual activity at younger ages than their White peers. For example, according to the 2007 Youth Risk Behavior Survey (YRBS), 16.3% of African American students reported having sexual intercourse before age 13 years as compared to 4.4% of White students and 8.2% of Latino students (CDC, 2009b). This finding is consistent with that of Milhausen and colleagues (2003), who examined the STI and HIV risk behaviors of rural and nonrural African American high-school students and found the median age of first sexual activity (i.e., intercourse) was 13 years for males and 14 years for females (Milhausen, Crosby, Yarber, DiClemente, Wingwood, & Ding, 2003).

Although early sexual debut is considered an individual-level risk behavior, contextual factors have the potential to fuel individual-level behaviors. Family contextual factors were shown to affect adolescents' sexual activity in a study conducted by McIntosh and colleagues that explored multiple factors predisposing adolescents to early sexual behavior (McIntosh, Moore, & Elci, 2009). This study examined a large sample of students ($N = 410$) in both rural and urban settings in Eastern North Carolina. McIntosh

and colleagues discovered that African American students from single-parent households or households without a biological parent were more likely to report ever having sex than their peers from two-parent households or households with at least one biological parent. Moreover, McIntosh and colleagues found that adolescents who reported a history of abuse (i.e., physical, sexual, or verbal) were more likely to engage in sexual activity at an early age. The literature has shown that victims of abuse, particularly sexual abuse, may have difficulties setting boundaries or sexual limits and may feel powerless to stop sexually aggressive males due to the trauma from the sexual abuse (Kenney, Reinholtz, & Angelini, 1997). In fact, reports of early sexual initiation may actually be reports of coercive sex or nonconsensual sexual experiences for some adolescents (Kenney et al., 1997).

Multiple sex partners. Sexual relationships with multiple partners, particularly when such activity occurs within a short period (e.g., several months), increases the risks of acquiring bacterial and viral diseases (Yarber & Parrillo, 1992). Of the African American students (grades 9 to 12) in the 2007 YRBS, 27.6% of those students reported having sexual intercourse with four or more persons during their lifetime as compared to 11.5% of White students and 17.3% of Latino students (CDC, 2009b). The reasons for multiple sex partners may vary. As stated earlier, in some cases, adolescents may have experienced coercive or nonconsensual sex, resulting in multiple lifetime sex partners even though they did not select some or all of these partners. Other researchers have suggested additional reasons for having multiple sexual partners. Andrinopoulos and colleagues (2006) conducted semi-structured, in-depth interviews with inner-city African American adolescents ($N = 50$) to gain a better understanding of the psychosocial

processes related to mate selection. Their findings showed that among the male adolescents, having multiple sex partners was a way to gain status among their male peers. Females, on the other hand, looked for a sex partner who they perceived as faithful and emotionally committed, according to this research (Andrinopoulos et al., 2006). Consequently, young African American females may be subject to having multiple sex partners over time as they seek to find a mate to fulfill their need for a stable, monogamous relationship.

Inconsistent or incorrect condom use. According to the CDC, the correct and consistent use of a male latex condom reduces the risk of STIs and HIV infection (CDC, 2010e). However, the CDC also advises that no method of protection is 100% effective, and thus condom use cannot guarantee protection from either STI or pregnancy. The YRBS reported that among students who self-identified as being currently sexually active, approximately 33% of African Americans (26% of males; 39.9% of females) reported they did not use a condom during their last sexual intercourse, compared to 40% of Whites (33.6% of males; 46.1% of females; CDC, 2009b). From these statistics, it is evident that African American students are more likely to use condoms than Whites in the same age group. Yet, African American adolescents continue to experience higher rates of STIs. For African American adolescents, individual protective factors such as condom use may be attenuated by environmental factors, as discussed earlier in this chapter.

Condoms alone do not protect against STIs and HIV; they only work if they are used correctly and consistently. Incorrect and inconsistent condom use may be a result of issues of poor condom fit. Males have reported functional challenges with condom use,

such as condom breakage, slippage, and leakage (Crosby, Graham, Yarber, & Sanders, 2003). In a study conducted with sexually active African American males ranging in age from adolescence through young adulthood, respondents reported that condoms tend to break or slip during sexual intercourse because of improper fit. Males also emphasized the importance of proper condom fit in maintaining an erection (Crosby et al., 2003). Respondents reported that if the condom was ill-fitting—usually described as "too tight," "dry," or "pinching"—then the male was more likely to remove the condom and continue with sexual intercourse (Crosby et al, 2003, p. 307), putting him and his partner at risk for STIs. Other common mistakes with condom use included using Vaseline and other petroleum-based products instead of water-based lubricants, opening packets with teeth or sharp fingernails (thus tearing the condom), and improper unrolling of the condom (Crosby et al., 2003).

Researchers have explored the barriers to condom use and have developed prevention interventions to promote condom use among high-risk adolescents. Crosby et al. (2003) found that perceived barriers toward condom use (e.g., acquisition barriers, interference with sexual sensation) and peer norms predicted subsequent condom use for high-risk African American females. Conversely, the same researchers found that attitudes toward condom use, condom negotiation self-efficacy, and knowledge about STI and HIV prevention were *not* predictors of subsequent condom use. Kennedy and colleagues (2007) conducted a study with African American males ($N = 136$) and found that some men were unlikely to use condoms because of reported reductions in physical pleasure, embarrassment associated with purchasing condoms, perception of condom use as an indication of infidelity and HIV-seropositive status, condom cost, and condom

unavailability (Kennedy et al, 2007). Brown and colleagues (2005) conducted focus

groups with 21 rural African American adolescents and found that some explanations for

not using condoms included forgetting to use condoms, choosing not to use a condom

because the condom reduces physical pleasure, inability to afford to buy condoms,

embarrassment about using condoms, and, alarmingly, wanting to die from AIDS because

of stresses in life. The results for these rural adolescents are similar to those for urban

adolescents (Shafii, Stovel, Davis, & Holmes, 2004).

Substance use. Regardless of adolescents' socio-demographic characteristics, the

use of drugs and alcohol has been shown to have a positive association with risky sexual

behaviors, such as early sexual debut (McIntosh et al., 2009). Substances may decrease

inhibitions and impair the use of situation-dependent contraceptives, such as a condom or

a diaphragm (Santelli & Beilenson, 1992).

Among students who self-identified as currently sexually active, 16.4% of African

Americans also reported that they drank alcohol or used drugs prior to their last sexual

intercourse as compared to 24.8% of Whites and 21.4% of Latinos (CDC, 2009b). Again,

this is another example of African American adolescents engaging in greater protective

behaviors, but the STI rates among this group do not reflect this. Krault-Becher and

colleagues (2008) reported that in previous studies that examined risk behaviors by race,

Whites have consistently reported substantially higher rates of risk behaviors such as

alcohol or drug use before sexual intercourse. Even though African American youth have

lower rates of substance use prior to sexual intercourse, the subpopulation has

experienced persistently high rates of STI prevalence as compared to other racial/ethnic

groups (Krault-Becher et al., 2008). Because of this inconsistency, it is important to

include an exploration of covarying risk factors (e.g., mate selection in high prevalence population, low SES) in intervention research focused on reducing infection rates among African American adolescents (Crosby et al., 2000; Halpern et al., 2004).

Summary

In this chapter, I discussed the disproportionately high prevalence rates of HIV/AIDS and STIs among African American adolescents. Although the disparities in STI and HIV have been attributed to individual risk behaviors, recent epidemiological perspectives of transmission have provided opportunities for researchers to explore the contextual and societal factors that affect behavior and, in turn, prevalence rates. To date, the literature regarding contextual factors influencing prevalence rates among rural adolescents of any racial or ethnic group has been limited. Consequently, much of the content provided in this chapter was based upon studies with rural African American adults.

At this point, it cannot definitively be concluded that the disproportionally high infection rates among African American adolescents and young adults are based solely on their individual behaviors. Even fewer conclusions can be drawn about the steadily increasing infection rates among rural African American adolescents, because the research from which these conclusions might be drawn is quite sparse. However, there is literature to support the idea that neighborhood context influences adolescent sexual behaviors; thus, the context in which African American adolescents operate cannot be ignored in research about efforts to reduce infection rates. Strategies to reduce infection rates must address multilevel factors that contribute to the epidemic.

CHAPTER 2

THEORETICAL FRAMEWORK AND
EMPERICAL REVIEW OF THE MODERATING VARIABLES

In this chapter, I describe the constructs of the health belief model (HBM) and present the conceptual model for the current study. With perceived susceptibility being one of the core constructs for the HBM, I have included a section on adolescents' perception of risk. I also discuss prior studies that have used the HBM to predict condom use in adolescent and young adult populations.

My conceptual model introduces three moderating variables: parent-child sex communication, parental attitudes towards sex communication, and condom knowledge. These three variables are evaluated in the analytic model to assess moderating and mediating relationships between these and other variables. In this chapter, I also discuss each of the moderating variables in detail with the overall goal of providing the importance and relevance of each of the variables in HIV/AIDS and STI prevention intervention research. I accomplish this goal by providing examples of earlier studies that have incorporated these variables or similar measures.

Health Belief Model

Hochbaum, Leventhal, Kegeles, and Rosenstock, researchers with the U.S. Public Health Service, developed the HBM in the 1950s (Maiman & Becker, 1974). These investigators, who were applied social psychologists, developed the HBM from their

independent applied research. They wanted to understand why people did not participate in disease prevention and disease screening programs (e.g., tuberculosis screenings) and what posed barriers to participation (Fisher & Fisher, 2000; Rosenstock, 1974). The HBM was oriented toward prevention; model development was based primarily upon individuals who were not suffering from a disease (Rosenstock, 1974), and thus focused on circumscribed preventive behaviors such as immunization behaviors (Cummings, 1979) and health screenings (Maiman & Becker, 1974; Taylor, 1979). However, in the 1970s, the HBM was extended to account for the reasons why people did not seek medical attention when symptomatic and why people did not follow the recommended medical course of treatment (Janz, Champion, & Strecher, 2002). Since this expansion of the HBM, the range of investigated health behaviors has broadened to include weight loss (Kirscht, 1978), AIDS-protective behaviors (Maguen, Armistead, & Kalichman, 2000), and condom use behavior (Basen-Engquist, 1992; Janz et al., 2002; Lollis, Johnson, & Antoni, 1997), which is the application of the model in this dissertation study.

In general, the HBM assumes that an individual must be motivated to perform a behavior. The concept of motivation is defined in the model as "psychological readiness to perform the behavior and its benefits" (Maiman & Becker, 1974, p. 21). Maiman and Becker (1974) stated that the HBM proposes that:

> (1) the individual must be psychologically ready to take action as it pertains to a particular health condition, determined by both the person's *perceived susceptibility* or vulnerability to the particular condition, and by his perceptions of the *severity* of the consequences of contracting the condition;
> (2) the individual's evaluation of the advocated health action in terms of its feasibility and efficaciousness (i.e., his estimate of the action's potential *benefits* in reducing actual [or perceived] susceptibility and/or severity), weighed against his perceptions of psychological and other *barriers* or costs of the proposed action (including the work involved in taking action); and

(3) an internal or external stimulus, known as *cues to action*, takes place to trigger the desired health behavior. (p. 21-22)

More information about operationalization of the model's constructs is discussed in Chapter 3.

As Maiman and Becker (1974) have noted, the HBM uses socio-psychological variables to explain preventive health behavior. With this model, investigators could analyze "an individual's motivation to act as a function of the expectancy of goal attainment in the area of health behavior" (Maiman & Becker, 1974, p. 21). Rosenstock, one of the developers of the HBM, stated that the HBM was modeled after Lewinian theory, a social psychological theory (Maiman & Becker, 1974). Lewin hypothesized a goal-setting model (in the *level of aspiration situation*) in which behavior was dependent upon two factors: (a) the value that the individual assigned to the outcome behavior, and (b) the individual's estimate that the action taken will result in the desired outcome (Maiman & Becker, 1974). The *level of aspiration* is defined as "the level of future performance in a familiar task which an individual, knowing his level of past performance in that task, explicitly undertakes to reach" (Maiman & Becker, 1974, p. 10). Maiman and Becker (1974) suggest that Lewinian theory influenced the development of HBM in that the model includes the following:

> (a) a desire to attain or maintain a positive state of health, or to reduce susceptibility and severity, which relates to positive valence of future success;
> (b) a desire to prevent a state of illness or to avoid higher susceptibility and severity, which relates to negative valence of future failure;
> (c) positive estimation of benefits can be regarded as the probability of success minus the probability of failure; and
> (d) costs may be analogous to an estimation of expected difficulty of attaining the goal. (p. 23)

Other contributing founders of the HBM, such as Becker, have proposed that the HBM be categorized as a value-expectancy theory, which attempts to explain behavior or decision-making when conditions are uncertain (Maiman & Becker, 1974). Maiman and Becker (1974) described the HBM as a model that was not only molded by Lewin's theoretical perspective, but also molded by several other post-Lewinian predictive models. These authors discussed five predictive and parallel models that have attempted to explain varying levels of risk taking or decision-making under uncertain conditions. According to Maiman and Becker (1974), these models include:

> (1) Tolman's analysis of performance behavior, (2) Rotter's concept of reinforcement or social learning, (3) Edwards' decision theory model of Subjective Expected Utility, (4) Atkinson's view of risk-taking behavior as a theory of achievement motivation, and (5) Feather's analysis of decision making under uncertainty. (p. 9)

Maiman and Becker's (1974) main argument held that the basic theoretical components of the HBM paralleled those of existing psychological models; consequently, the existing models significantly influenced the development of the HBM's core constructs.

As mentioned previously, the original purpose of the HBM was to examine behaviors that did not require ongoing lifestyle behavioral changes. However, this limitation made it difficult to assess behaviors that required long-term behavior changes such as smoking and safe sexual practices. To address this limitation, the model was modified to include Bandura's construct of self-efficacy (Bandura, 1994; Baranowski, Perry, & Parcel, 2002). The self-efficacy construct was adapted from Bandura's social learning theory (Janz et al., 2002) and was defined as a person's confidence in his or her ability to successfully perform a particular behavior to produce the expected outcome (Bandura, 1977). Adding the self-efficacy construct enabled investigators to evaluate the

individual's perception of his or her ability to confidently and successfully maintain

lifestyle behavior changes.

Building from this background information on the HBM, I briefly define the six

constructs of the original model (shown in Figure 2.1). Each construct is defined

following the figure.
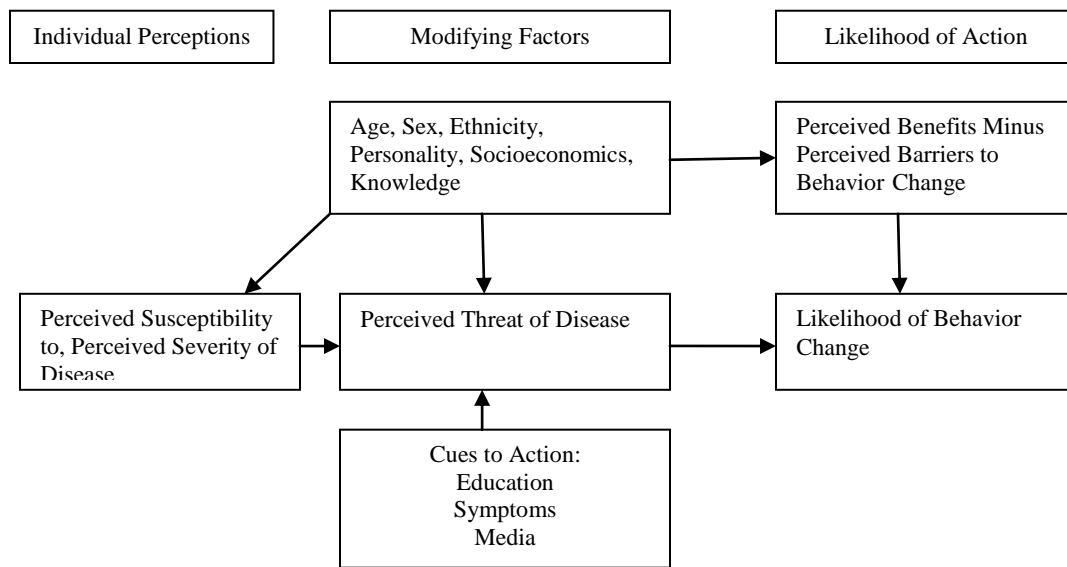
Figure 2.1. Health Belief Model. Adapted from the Health Belief Model in *Health Behavior and Health Education* (Glanz, Rimer & Lewis, 2002).

Perceived susceptibility. The HBM defines *perceived susceptibility* as an

individual's subjective perception of the risk of contracting a health condition (Glanz et

al., 2002). This construct is primarily viewed as a predictive indicator that the protective

health behavior will be adopted (Basen-Engquist, 1992; Simon & Das, 1984).

Perceived severity. *Perceived severity* is the individuals' evaluation of the

seriousness of having a particular health condition and the potential physical and social

consequences of the health condition (Glanz, Rimer & Lewis, 2002). This construct is not

frequently measured because previous studies have shown that perceived disease severity

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is not predictive of an individual engaging in preventative health behaviors such as condom use (Lollis, Johnson, & Antoni, 1997).

Perceived threat. Susceptibility and severity combined is defined as *perceived threat* (Glanz et al., 2002). An important characteristic of perceived threat is whether the individual's perceived threat creates worry (Crosby et al., 2001). Worry suggests dissonance, which may be a strong motivator for behavior change (Crosby et al., 2001).

Perceived benefits. *Perceived benefits* is defined as the individual's belief that performing the advised health protective behavior will reduce the susceptibility or the severity of the health condition (Glanz, Rimer & Lewis, 2002). If the individual believes in the relative effectiveness of the available preventive action, this is likely to lead to behavior change (Rosenstock, 1974).

Perceived barriers. *Perceived barriers* are defined as the individual's perception of the negative impacts that could result from performing the preventive health behavior. Perceived barriers are also the perceived difficulties in performing the behavior. Similar to the construct of perceived susceptibility, perceived barriers are also primarily thought of as predictive indicators of preventive health action (Basen-Engquist, 1992; Simon & Das, 1984). In the original HBM, the perceived benefits and the perceived barriers constructs were combined because their sum represented an individual's assessment of the benefits versus costs of engaging in the recommended health behavior (Janz et al., 2002). Thus, if the perceived benefits (e.g., reduced chance of contracting HIV/AIDS and STIs) outweigh the perceived barriers (e.g., hassle to use condoms) of the recommended health behavior, the individual is more likely to take preventive action (Janz et al., 2002; Simon & Das, 1984).

Cues to action. *Cues to action* are internal or external stimuli or triggers assumed to be helpful in activating preventive behaviors (Janz et al., 2002). This construct has not been systematically studied to date because it has been challenging to study cues to action using explanatory survey data (Fisher & Fisher, 2000; Janz et al., 2002).

Self-efficacy. *Self-efficacy* is an individual's confidence in his or her ability to successfully perform a behavior (Bandura, 1977; 1994; 1998). This construct was adopted from Alberta Bandura's social learning theory (Janz et al., 2002).

The HBM also includes sociodemographic variables (i.e.., age, sex, race, socioeconomics, personality, knowledge) that may influence an individual's perceptions, and thereby, indirectly influence health behaviors. These variables may vary depending upon the population and the health outcome. As shown in Figure 2.1, the demographic variables (e.g., age, sex) have a direct impact on *perceived susceptibility*, *perceived benefits minus perceived barriers*, and *perceived threat*. The demographic variables indirectly affect the *likelihood of behavior change* through two mediating constructs, *perceived benefits minus perceived barriers* and *perceived threat*. *Perceived susceptibility* has a direct relationship to *perceived threat*. *Perceived threat* mediates the relationship between *perceived susceptibility* and *likelihood of behavior change*. *Cues to action* have a direct impact on *perceived threat*, and *perceived threat* mediates the relationship between *cues to action* and *likelihood of behavior change*.

The HBM guides the conceptual model created for this dissertation study (see Figure 2.2). The model contains three constructs adopted from the HBM: *perceived susceptibility*, *perceived barriers*, and other sociodemographic (modifying) variables, including *gender* and *age*. *Perceived susceptibility* and *perceived barriers* directly

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influence the *likelihood of condom use*. The model also contains two moderating

variables: *condom knowledge* and *parent-child sex communication*. Moderators

strengthen or increase the relationship path between two variables. In this case, *condom

knowledge* and *parent-child sex communication* strengthen the path between *perceived*

susceptibility and *likelihood of condom use*. The model also displays a mediated

moderation relationship: *parental attitudes towards sex communication* directly influence

parent-child sex communication, which moderates the relationship between *perceived*

susceptibility and *likelihood of condom use*. In addition, p*erceived barriers* mediate the

relationship between the modifying variables (sociodemographic variables) and the

likelihood of condom use, which is the outcome variable. The importance of condom use

is discussed in Chapter 1. The empirical support for the inclusion of the moderating

variables is discussed later in this chapter.

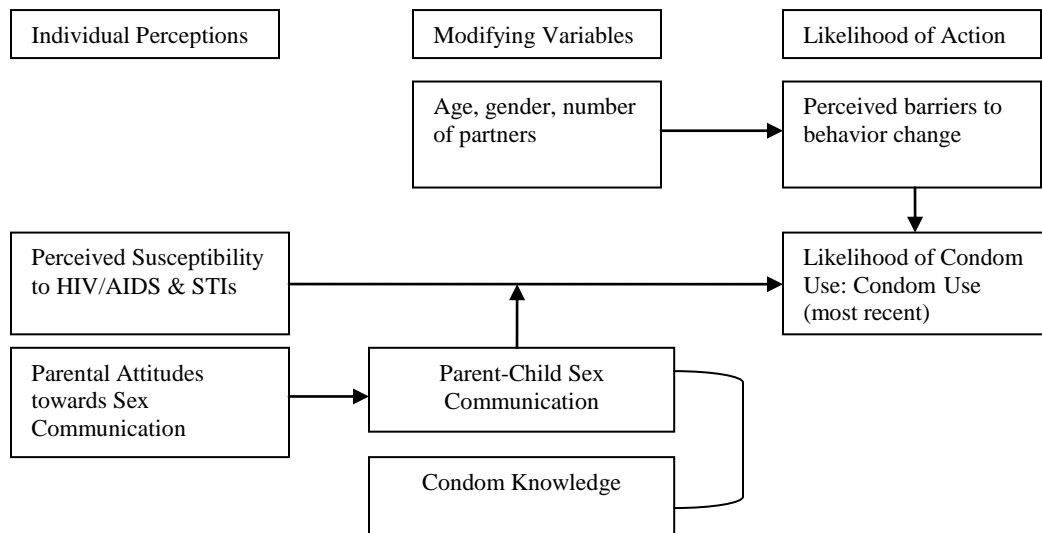| Individual Perceptions	Modifying Variables	Likelihood of Action
	Age, gender, number of partners	Perceived barriers to behavior change
Perceived Susceptibility to HIV/AIDS & STIs		Likelihood of Condom Use: Condom Use (most recent)
Parental Attitudes towards Sex Communication	Parent-Child Sex Communication	
	Condom Knowledge	

Figure 2.2. HIV/AIDS and STI Prevention Conceptual Model

All constructs of the HBM were not included in the current study because my data

did not contain measurements for some of the HBM elements. The Add Health data do

not contain a measurement item for assessing perceived benefits to condom use, so, I was unable to include the construct *perceived benefits minus perceived barriers* used in the original model. Instead, I measured perceived barriers using a single item and altered the model accordingly. To create the *perceived threat* construct, I combined a single item measuring perceived severity of having AIDS with two items measuring perceived susceptibility of HIV/AIDS and other STIs. I later decided to remove the perceived severity item, however, because the variable had low scale reliability. In addition, the construct did not assess the level of worry. As mentioned earlier, worry suggests dissonance, which may be a strong motivator for behavior change. With the removal of that item, the reliability score increased significantly, making the scale both reliable and acceptable for the proposed analytic plan. Because perceived severity has low predictive value, the removal of this item was not considered a significant loss to the model.

I was also unable to include the HBM's *cues to action* construct in my model because the measures in the Add Health data did not assess for cueing in ways typically described in the literature. The literature describes a variety of cues including as the perception of bodily states, interpersonal interactions, impact of media campaigns, and receiving a reminder notification from a medical provider. Nonetheless, the construct *cues to action* has not been systematically measured in previous studies. This could be due to the inherent difficulty in measuring cues. Rosenstock (1974) described this difficulty when he stated that "the required intensity of a cue that was deemed sufficient to trigger behavior presumably varied with differences in the levels of susceptibility and severity" (p. 6). Hence, the factors necessary for properly assessing *cues to action* were not available in the data used to conduct this study.

Finally, I was unable to include the *self-efficacy* construct in my model because I had no way to measure it. The Add Health data did not contain any item that measured confidence in the individual's ability to use a condom correctly or consistently.

Based on the literature and the measures available in the Add Health data, I focused my study on two HBM constructs, *perceived susceptibility* and *perceived barriers*. As mentioned earlier, both of these constructs have been tested and shown to predict condom use. Because the HBM states that *perceived susceptibility* indicates psychological readiness to perform the behavior and the literature has associated individuals' perceived susceptibility with their actual condom use, it is important to examine how adolescents perceive their susceptibility to STIs and HIV. Notably, variations in the language for the construct of *perceived susceptibility*, including *perceived risks* or *perceived vulnerability*, are used interchangeably throughout the literature; however, the measures used with these interchangeable terms tend to be consistent across studies. The next section discusses how adolescents perceive risks and how risk perception influences adolescents' behavior.

Adolescents and Perceptions of Risk

Perception of risk or perceived susceptibility is a fundamental component of the HBM and other theoretical models of health and risk behaviors, such as the theory of planned behavior (Ajzen, 1991) and social cognitive theory (Bandura, 1994). As indicated earlier, an individual must be psychologically ready to perform a health action. Part of this psychological readiness is the person's ability to perceive his or her susceptibility to a particular disease and the consequences of the disease. Adolescents may underestimate their risk for diseases and engage in high-risk behaviors and, as a

result, tend to forego preventive or risk-reducing behaviors. Other adolescents may engage in risky behaviors because they feel so vulnerable that they lose hope in the efficaciousness of the health action (Nightingale & Fischhoff, 2001). Both perceived invulnerability and the inability to perceive the benefits of preventive behaviors put youth at risk for disease.

It is vitally important for researchers and practitioners to understand adolescents' perception of risk and vulnerability to HIV/AIDS and STIs. Specifically, researchers need to know what factors influence adolescents' ability to assess risk and how such assessment influences their behavior. Understanding the reasons why adolescents engage in behaviors that put them at risk for infection can guide the development of interventions to prevent and reduce infection rates among adolescents, particularly among African American adolescents who continue to carry a disproportionate disease burden.

Adolescent perception of risk or vulnerability has been conceptualized and measured in different ways. For example, survey questions have examined risk from the perception of personal risk (e.g., "What is your chance of getting an STI?") and relative risk (e.g., "How does your risk of getting a disease compare to others?"; Millstein & Halpern-Felsher, 2001). Adolescents' risk judgment has also been assessed using questions that focus on the adolescent's ability to judge situations (e.g., "Is having sex without using protection dangerous?"; Millstein & Halpern-Felsher, 2001). As Millstein and Halpern-Felsher (2001) stated, each of the ways in which adolescent perceptions is measured provides some insight into "their sense of risk and vulnerability" (p. 18).

Previous studies have shown that adolescents feel of vulnerable to experiencing negative health outcomes. For example, 53% of sexually inexperienced seventh- and

ninth-grade students reported they would be *worried or concerned* about getting an STD if they had sex without using a condom, and another 26% reported they would feel *somewhat worried* (Millstein & Halpern-Felsher, 2001). Age appears to influence adolescents' perceptions of their vulnerability. In a cross-sectional study, Millstein and Halpern-Felsher (2001) found a negative relationship between age and feelings of vulnerability to alcohol ($r = -0.30$) and sex risks ($r = -0.35$) among middle and high school students. In other words, as adolescents become older, they feel less and less vulnerable to STIs. These findings are supported by several other studies. For example, a longitudinal analysis showed that among seventh and ninth graders who were sexually inexperienced, worry about getting an STI due to unprotected sex decreased significantly over a 6-month period (Millstein & Halpern-Felsher, 2001). A study using data from the National Survey of Adolescent Males showed that adolescent males' (ages 15 to 19 years) worry about AIDS decreased over a 2-year period (Pleck et al., 1993). Wildsmith, Schelar, Peterson, and Manlove (2010) found low perceptions of risk for STIs among young adults ages 18 to 26 years who tested positive for an STI. In that study, approximately 75% of young adults with a positive STI test did not perceive themselves to be at risk of having an STI (Wildsmith et al., 2010). Interestingly, the African American and Hispanic young adults in this study were more likely to perceive themselves at risk for contracting an STI compared to their White age peers, (Wildsmith et al., 2010). These findings suggest that as adolescents age, their judgment of risk is lowered. This phenomenon may be explained by the combination of cognitive and psychosocial development and influences from the social environment. If the change in perception of risk follows a developmental trajectory, there would be a natural

progression for lower risk judgment over time (Millstein & Halpern-Felsher, 2001).

However, this progression of lower risk judgment does not necessarily imply an increased participation in high-risk behaviors as adolescents mature.

Furby and colleagues (1997) found that adolescents were able to identify negative consequences of engaging in risky behaviors such as sex without condom use. In open-ended interviews with 48 sexually experienced adolescents ages 15 to 19 years, the adolescents provided numerous consequences to engaging in unprotected sex, such as unintended pregnancies and STIs (Furby et al., 1997). In a study conducted with adolescents who suspected an unplanned pregnancy, both younger adolescents (ages 13 to 15 years) and older adolescents (ages 16 to 17 years) showed no differences in recognizing the negative consequences associated with teen pregnancy and unprotected sex (Millstein & Halpern-Felsher, 2001). This research shows that young and older adolescents are capable of identifying risks. However, these studies do not suggest that adolescents are just as capable of identifying risks and foreseeing consequences as adults. Rather, these studies indicate that adolescents have the cognitive ability to recognize risky situations and consequences, but that ability does not guarantee that adolescents will have the capacity to act in ways that them from harm. The literature supports that adolescents are less competent than adults in recognizing and identifying risk (Millstein & Halpern-Felsher, 2001), which suggests that adolescents need the continued guidance and support from adults as they encounter risky situations.

In general, research has shown that adolescents view their personal risk as lower than the risk of others similar to them (Whalen, 1994). Adolescents' cognitive and experiential limitations contribute to their overall perception of invulnerability (Whalen,

1994). Perception of risk and vulnerability also varies by demographic factors. For instance, female adolescents are more likely to report thinking more about health and having health concerns compared with male adolescents (Millstein & Halpern-Felsher, 2001). Female adolescents have higher perceived risk than their male counterparts in general. In a comparison of adolescent males and females, Parsons and others (1997) found that female adolescents (17 to 20 years) perceived higher risks and fewer benefits related to drug and alcohol use and sexual behavior (Parsons, Siegel, Cousins, 1997).

Relatively few studies with adolescents have explored the racial and ethnic differences in perceptions of risk and even fewer studies have sorted out the effects of social class and economic status (Millstein & Halpern-Felsher, 2001). However, the limited research available has shown that compared with White adolescents, African American adolescents thought more about their health, had more health concerns, were more concerned about future illness, and believed they were more susceptible to specific health outcomes (Millstein & Halpern-Felsher, 2001).

Regardless of any gender, racial, and economic differences in adolescent perception of risk, ongoing research efforts are trying to understand how perceived susceptibility influences adolescents' behavior. From the literature, it appears that judgment of risk as well as experience with negative outcomes plays a role in how individuals perceive their risk. Although perceiving personal risk is a motivating factor to engage in preventive behavior, perception of risk alone does not prevent adolescents from taking risks. Additional influences other than perceived risk and perceived susceptibility seem to determine adolescent behavior. Conceptual models such as the HBM propose

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that perceived benefits, in addition to perceived susceptibility, motivate individuals to engage in preventive behaviors.

From a developmental perspective, cognitive skills are needed to integrate new information and to make causal links between activities that precede a particular consequence (Millstein & Halpern-Felsher, 2001). Typically, younger adolescents are limited in coordinating information, are attentive to smaller portions of available information, and are more apt to think in fewer dimensions than older adolescents (Millstein & Halpern-Felsher, 2001; Piaget, 1971). As adolescents mature, they have an increased capacity to process the knowledge that situations can have more than one outcome, and thus, are better equipped to negotiate situations that might have alternative outcomes. Older adolescents are able to think more systematically about causal relationships; younger adolescents who are just beginning to think about theories of causality have a more difficult time integrating information and identifying possible outcome scenarios in various situations than do older adolescents (Millstein & Halpern-Felsher, 2001). Younger adolescents are just beginning to question what they have been taught. However, as maturation continues, individuals process consequences in ways that reflect their underlying theories of causality (Millstein & Halpern-Felsher, 2001). They will accept behaviors that align with their views of perception of risk and are likely to reject views that are contrary to their own. This notion suggests that even when an individual is confronted with negative consequences of a behavior, he or she will maintain his or her "theories of low perceived risk rather than to react with judgments of increased risk" (Millstein & Halpern-Felsher, 2001, p. 38).

The actions that adolescents take are influenced by their developmental stage, the social environment, and their experiences with the behavior (benefits and costs). As adolescents mature, they transition from the magical-thinking phase and are better able to understand the consequences of their actions. However, adolescents at all ages retain the notion of invincibility, which is a lowered perception of personal risk (i.e., It won't happen to me). The ongoing challenge for increasing adolescents' sense of personal risk is one that parents, schools, health providers, and other sectors of the community are addressing to keep adolescents safe from harmful behaviors and negative health outcomes.

HBM and Condom Use Studies

This section provides a review of studies that used the HBM framework in assessing condom use among minority adolescents. Traditionally, the HBM has mainly been used to predict condom use among predominantly White college populations and White homosexual males (Baldwin & Baldwin, 1988; Carroll, 1988; Lollis, Johnson, & Antoni, 1997). Several studies that used the HBM to predict condom use among college students have produced inconsistent results (Baldwin & Baldwin, 1988; Basen-Engquist, 1992; Carroll, 1988; Lollis et al., 1997). Basen-Engquist (1992) found that college students' perceived susceptibility and perceived barriers were related to intention to use a condom and condom use. This investigator also found that in general, condom use and intention to use a condom were more closely associated with health beliefs than other non-HBM constructs measured in the model, such as monitoring and social support. On the other hand, Lollis and colleagues (1997) found that the HBM constructs (i.e., barriers, benefits, and susceptibility) did not predict condom use among college students, which is

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similar to findings from other studies (Carroll, 1988; Baldwin & Baldwin, 1988).

However, the HBM did predict other risky sexual practices such as drug use prior to

engaging in sexual intercourse and having multiple sexual partners, according to the

findings of Lollis and colleagues (1997).

The findings from these studies were based on samples of adolescents and young

adults who were predominantly White. Fewer studies employing the HBM as a

framework have been conducted with African American adolescents (DiClemente et al.,

1992; Orr & Langefeld, 1993; Walter et al., 1993); no studies with a rural African

American adolescent sample were found in the literature.

In one study that used the HBM with a sample of minority urban adolescents, the

investigators examined the influence of demographic, behavioral, and psychosocial

factors on the use of condoms among inner-city junior high school students ($N = 1,899$).

The students ranged in age from 11 to 16 years, with 61% between ages 13 and 14

(DiClemente et al., 1992). The study results were based on an 82-item self-administered

survey that was designed using the HBM as a theoretical framework to conceptualize

variables to include in the survey (DiClemente et al., 1992).

Similar to other studies using the HBM framework, DiClemente and colleagues'

study did not attempt to measure all of the constructs in the model. Rather, they measured

the two most relevant factors concerning condom use: adolescents' perceived costs of

condom use (barriers) and perceived condom effectiveness (benefits) in preventing HIV

transmission. *Perceived costs* were assessed using an eight item scale: "Sex doesn't feel

as good when you use a condom"; "Having to stop sex to put on a condom takes the fun

out of sex"; "It's embarrassing to buy condoms"; "Condoms are physically

uncomfortable"; "It's hard to find places to buy condoms"; "Choosing which kind of

condom to buy can be confusing"; "It's embarrassing to talk about condoms with a sex

partner"; and "Sex partners often disagree about whether or not to use condoms"

(DiClemente et al., 1992). Many of these items can be interpreted or summarized as

hassle to use condoms, which is the item used in the current study to measure perceived

barriers to condom use during most recent sex.

Perceived effectiveness was assessed by using a 4-point Likert scale. The authors

did not provide the measure, but the scale anchors were as follows: *Condoms work very*

well to prevent AIDS; Condoms work pretty well ; Condoms work only slightly; and

Condoms don't work at all (DiClemente et al., 1992). The adolescents' responses were

recoded into two categories. The first two responses represented high perceived condom

efficacy, whereas the second two responses represented low perceived condom efficacy.

It is likely that DiClemente and colleagues (1992) selected the items for *perceived*

effectiveness of condom use to assess the construct of *perceived benefits*. As stated

earlier, *perceived benefits* is defined as an individual's belief that performing the advised

health protective behavior (in this case, condom use) will reduce the susceptibility or the

severity of a given health condition.

The outcome variable, *condom use*, used a 4-point Likert scale ranging from

always to *never*. Perceived costs of condom use and perceived effectiveness of condoms

to prevent AIDS were significantly associated with consistent condom use (i.e., reporting

always to condom use; DiClemente et al., 1992). The bivariate analyses showed that

adolescents reporting low perceived barriers to condom use were more likely to be

consistent condom users (42.1%) as compared with those reporting high perceived

barriers (25.7%). Adolescents who perceived condoms as an effective method for preventing AIDS were also more likely to be consistent condom users (43.5%) as compared with those who reported low perceived effectiveness (22.2%; (DiClemente et al., 1992). Using multivariate logistic regression, the investigators found that adolescents reporting low perceived costs were almost twice as likely to be consistent condom users compared to adolescents reporting high perceived costs ($OR = 1.9$; 95% CI = 1.1 to 3.3; DiClemente et al., 1992). Perceived condom effectiveness in preventing AIDS was the greatest predictor of consistent condom use ($OR = 2.21$; 95% CI = 1.2 to 4.2; DiClemente et al., 1992).

The second study using the HBM with a sample of minority adolescents was conducted with sexually active inner-city adolescent males ($N = 116$) who were between ages 15 and 19 years (Orr & Langefeld, 1993). The sample, which was recruited from three health clinics, consisted primarily of African Americans (69%). The study's purpose was to identify predictors of condom use. The condom use variable was based on responses to four items. Three questions asked about the frequency of condom use (*always, sometimes, never*) for the prevention of STIs, AIDS, and pregnancy, respectively. A fourth question was a dichotomous *yes/no* question that inquired whether a condom was used at most recent intercourse (Orr & Langefeld, 1993). This dissertation study uses a question similar to the fourth question regarding condom use at most recent intercourse.

Orr and Langefeld (1993) measured the perceived threat and seriousness of STIs using an STI attitudes scale and an STI risk scale, both of which had been used in a previous study assessing condom use (Orr et al, 1992). The three-item STI attitudes scale

included the following statements: "Demonstrating love is worth risking STI"; "It is embarrassing to talk about STI"; and "A transfusion would be refused because of AIDS fear" (Orr & Langefeld, 1992). The two-item STI risk scale consisted of these statements: "Number of sexual partners per year affects degree of risk" and "Avoid intercourse with strangers to reduce risk" (Orr et al., 1992). The authors did not provide the response options to the scale items.

The findings from the Orr and Langefeld (1993) study indicated that half of the adolescents reported inconsistent condom use (i.e., *sometimes* or *never* used condoms) for STI prevention, whereas 8% reported *always* using condoms for STI prevention. Similarly, 60% of adolescents reported inconsistent condom use for AIDS prevention, and 9% of adolescents reported *always* using condoms for this reason. Fifty-four percent of the adolescents reported that they *sometimes* used condoms as a form of contraception, whereas 17% reported *always* using condoms to prevent pregnancy (Orr & Langefeld, 1993). These findings suggest that adolescents might be more concerned with preventing pregnancy than STIs and HIV/AIDS. Twenty-three percent reported using a condom at most recent intercourse (Orr & Langefeld, 1993). Adolescents who reported using condoms were likely to use them for more than one reason. The gamma coefficients were as follows: use for contraception with use for STI prevention = .51 (95% CI = .26 to .77); contraception use with AIDS prevention use = .20 (95% CI = -.14 to .54); and STI prevention use with AIDS prevention use = .65 (95% CI = .40 to .89; Orr & Langefeld, 1993). In addition, adolescents who reported condom use for STI prevention engaged in fewer risky behaviors such as drug and alcohol use (Γ = .53, 95% CI = .36 to .78, $p <$ .001) and fewer STI risk behaviors such as fewer sexual partners (Γ =.65, 95% CI = .45

to .96, *p* = .03) (Orr & Langefeld, 1993). Adolescents who reported using condoms for

AIDS prevention were less likely to engage in risky behaviors (Γ = .62, 95% CI = .42 to

.92, *p* = .02) and engaged in fewer STI risk behaviors (Γ = .67, 95% CI = .45 to .99, *p* =

.04; Orr & Langefeld, 1993).

Now that I have discussed the use of the HBM framework in studies of African

American adolescents, I discuss the moderating variables as used in other studies.

Although these studies did not use the HBM, they examined the impact of the variables

that are used in the analytical model for the current dissertation study.

Em*p***irical Review of Moderating Variables**

P**arent-Child Sex Communication**

Parents as sex educators. Prior to explaining the empirical justifications for

studying the variable *parent-child sex communication*, I briefly discuss the fundamental

importance of parents as sex educators. Parents play a central role in adolescent's

education in that sex communication with their child helps prepare the adolescent for

adult life, conveys the family values and expectations about adolescent sexual behavior,

and enhances the adolescent's sexual knowledge to improve sexual decision-making

(Feldman & Rosenthal, 2000; Miller, Levin, Whitaker, & Xu, 1998). Parents have

substantial control over the content of sexual information communicated during parent-

child sex communication. However, as the literature indicates, parents are likely to limit

sexual communication to topics such as developmental changes, sexual reproduction, and

the dangers of engaging in sex (e.g., unintended pregnancies and HIV/AIDS and other

STIs; Feldman & Rosenthal, 2000).

Parents are often uncomfortable, uncertain, and embarrassed to bring up the topic of sex. Consequently, the more personal aspects of sexuality, such as masturbation or nocturnal emissions, are often avoided (Feldman & Rosenthal, 2000). Parents tend to talk about more practical aspects of sexuality, such as obtaining contraceptives or sexual decision-making (Feldman & Rosenthal, 2000). Regardless of the parents' and youth's discomfort with the topic of sex, research has shown that adolescents prefer to obtain sexual information from their parents and trust the information they receive from their parents over that from other sources (Rosenberger, Bell, McBride, Fortenberry, & Ott, 2010).

In most cases, mothers (rather than fathers) are the primary source of sexual information, and they are also more likely than fathers to initiate sex communication with their child, regardless of the adolescent's gender (Feldman & Rosenthal, 2000; Miller, Kotchick, Dorsey, Forehand, & Ham, 1998). However, research has shown that overall, parent-child sexual communication tends to follow gender lines; that is, mothers are more likely to communicate with daughters, and fathers are more likely to discuss sexual topics with sons (Miller et al., 1998; Warren & Neer, 1986). In addition, Miller and colleagues (1998) found that an adolescent's gender influenced the types of sexual topics communicated by the parent or parents. Whether parent-child sex communication occurs with the mother or father, research has shown that the more open and receptive the communication is between the parent and adolescent, the more likely the adolescent is to remember the content discussed and to agree with the message presented by the parent (Miller et al., 1998). Further, when parents have been open and supportive when engaging their youth in sex discussions, these adolescents have reported a high level of

satisfaction with the discussion, particularly adolescents who initiated sex discussions with their parent (Warren & Neer, 1986).

Empirical Support for Parent-Child Sex Communication

The impact of parent-child sex communication on adolescent sexual behavior has been widely recognized in the literature. The significance of parent-child sex communication has been explored primarily with youth in the middle adolescence developmental stage (ages 15 to 18 years) because this stage is when sexual intercourse is often initiated (Watts & Nagy, 2000). The discussions about sexuality that occur between the parent and the child have been found beneficial in that this type of communication serves as a protective factor, reducing the child's sexual risk-taking behaviors (Watts & Nagy, 2000; Whitaker & Miller, 2000). For example, as compared with adolescents who discuss sexual topics with peers only, adolescents who reported having discussions about sex with a parent were more likely to believe that it was acceptable for adolescents their age to say no to sex and that individuals their age should not have sexual intercourse (Watts & Nagy, 2000). Other sexual risk protective factors noted among children who talk about sex with a parent include having fewer sexual partners (Holtzman & Rubinson, 1995), fewer episodes of sexual intercourse (Hutchinson, Jemmott, Jemmott, Braverman, & Fong, 2003), and consistent use of condoms (Miller, Levin, Whitaker, & Xu, 1998).

However, there has been some inconsistency in the literature about whether parent-child sex communication has a significant influence on adolescent attitudes and behaviors towards sex. For example, Jaccard and Dittus (1993) found parent-child sex communication was less influential among adolescents who had already initiated sexual intercourse and those who reported poor quality relationships with their parent. However,

Whitaker and Miller (2000) argued that the inconsistency in the findings was related to how parent-child communication was conceptualized. These researchers suggested that the conceptualization of parent communication is often overly simplified—the parent has either discussed sex with their child or not (Whitaker & Miller, 2000). This level of oversimplification fails to consider the importance of communication timing, content, parental responsiveness, and permissive or conservative expressed views (Eisenberg, Sieving, Bearinger, Swain, & Resnick, 2006; Miller, Levin, Whitaker, & Xu, 1998; Whitaker & Miller, 2000). Whitaker and Miller (2000) also suggested that inconsistencies in findings may be a result of parental communication interacting with peer norms, causing an unclear relationship between adolescent sexual behavior and parental communication. In spite of the recognized inconsistencies, there are studies that show that parent-child sex communication modifies adolescent sexual behaviors (Watts & Nagy, 2000; Whitaker & Miller, 2000; Whitaker, Miller, May, & Levin, 1999), resulting in a reduction in risky sexual behaviors.

To illustrate the protective nature of sex communication between a parent and child, I provide a review of a study conducted by Whitaker, Miller, May, and Levin (1999). In this study, Whitaker et al. (1999) examined mother-child communication and partner communication as well as the association of these types of communication with condom use during most recent sexual intercourse and adolescent lifetime condom use. The investigators conducted face-to-face interviews with 982 Puerto Rican (47%), African American (43%), and other Hispanic (6%) and Black (4%) mother-child pairs (Miller et al., 1997); the mother and child interviews were conducted separately (Whitaker et al., 1999).

Whitaker et al. found that *partner communication* (discussion between adolescent partners of topics such as birth control, condoms, STIs, and HIV/AIDS) was marginally associated with condom use during most recent sexual intercourse ($b = .172$, $p = .07$). However, greater partner communication (i.e., the more topics the adolescent discussed with his or her partner) was significantly associated with greater lifetime use of condoms (b=.203, *p*=.001; Whitaker et al., 1999). For mother-child communication, the interaction of *risk discussions* (e.g., discussions about condoms, HIV/AIDS, STIs, and choosing sex partners) and *responsiveness* (e.g., mothers' openness, skill, and comfort in discussing sexuality and risk discussions) was significantly associated with increased condom use at most recent intercourse ($b = .070$, $p = .001$) and lifetime condom use ($b =.032$, $p = .008$; Whitaker, Miller, May, & Levin, 1999). The interaction between mother-child *sexuality discussion* (when to start having sex, birth control, physical and sexual development, menstruation, masturbation, reproduction, and handling pressure to have sex) and maternal responsiveness was significantly associated with likelihood of condom use during most recent intercourse ($b =.052$, $p = .001$) and lifetime condom use ($b = .023$, *p*=.006; Whitaker et al., 1999). The researchers also tested whether partner communication mediated the relationship between mother-child sex communication and condom use; the findings indicated that the relationship between mother-child sex communication and condom use was direct and independent of partner communication (Whitaker et al., 1999).

The Whitaker et al. study (1999) found that sex communication with a partner as well as the mother can influence condom use behavior; the significance of partner communication was marginal, however. These results emphasized the importance of

parent-child sex communication. A parent, who has the ability to skillfully and comfortably discuss sexual topics with their child, can promote the use of condoms, thereby reducing the child's risk for STIs and HIV. Communication between the parent and child about general sexuality topics and risk discussions can also increase the likelihood that the child will discuss protective behaviors with his or her partner (Whitaker et al., 1999), and in this study, such communication led to a increase in reported lifetime condom use. Although the impact of parent-child sex communication on the likelihood of the child discussing sexual topics with a partner is important, it is beyond the scope of the current study to assess this variable.

To further explore the influence of parent-child sex communication, I will present the findings from the Whitaker and Miller (2000) study, which assessed parent-child communication about initiating sex as a moderating variable. The researchers hypothesized that the parent-child sex communication would decrease the influence of peer norms on the adolescent's sexual activity (i.e., initiating sex) and condom use (Whitaker & Miller, 2000). The data were collected from 907 minority 14 to 16 year old adolescents and their mothers who participated in a cross-sectional study, the Family and Adolescent Risk Behavior and Communication Study (FARBCS; Whitaker & Miller, 2000). The participants resided in Montgomery, Alabama; Bronx, New York; and San Juan, Puerto Rico. The sample consisted of 431 African Americans and 476 Hispanics; female adolescents represented 57% of the sample (Whitaker & Miller, 2000).

The measures for the Whitaker and Miller (2000) study assessed the following variables: parent-adolescent communication, peer norms for sexual activity, adolescent sexual activity, peer norms for condoms, condom use, and sources of information about

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sex. For *parent-adolescent communication*, the adolescents were asked "whether they had ever had a discussion with their mother/father about when to start having sex" and "whether they had ever had a discussion with their mother/father about condoms" (Whitaker & Miller, 2000). Items regarding *peer norms* required the adolescents to estimate the age of when other same-gender adolescents in their local community initiated sex, and they were asked to report the number of close friends who had ever had sex (Whitaker & Miller, 2000). *Sexual activity* measures included the adolescent's self-report of whether he or she had ever had sex, age of first intercourse, and number of lifetime sex partners (Whitaker & Miller, 2000).

     Peer norms for condoms was a perceived norm which was measured by asking adolescents if their friends thought that condom use was "too much trouble" and if most of their friends thought that condoms could protect them from getting the AIDS virus (Whitaker & Miller, 2000). The investigators created a perceived peer norms behavioral measure of peers' condom use by capturing the number of close friends who had always used condoms during sex. *Condom use* was assessed by adolescents' reports of condom use during their first sexual intercourse, during their most recent sexual intercourse, and lifetime condom use. The measure of consistent condom use was created from the response to the lifetime condom use item (Whitaker & Miller, 2000). Finally, the *source of information about sex* was an open-ended item asking adolescents from which source they thought they got the most useful information about sex (Whitaker & Miller, 2000).

     The researchers found that parent-adolescent communication about initiating sex and peer norms about sex both related to sexual behavior outcomes (i.e., whether the adolescent had had sex, age of sexual debut, number of partners; Whitaker & Miller,

2000). Parent-adolescent condom discussion was positively related to 3 of 4 condom use measures: greater condom use at most recent intercourse (75.7% vs. 51.4% among adolescents who reported less parent-adolescent condom discussion), greater lifetime condom use ($M = 3.86$ vs. 3.49), and greater consistency of condom use (44.6% vs. 31.9%; Whitaker & Miller, 2000). The findings supported the researchers' hypothesis that parent-adolescent communication about initiating sex and about condom use would decrease the impact of perceived peer norms on adolescent sexual behaviors and condom use.

A total of 12 regression models were computed for the interaction analysis (3 peer-norm predictors, each analyzed for 4 condom use outcomes; Whitaker & Miller, 2000). The interaction was significant in 6 of the 12 models, and two other models were marginally significant (Whitaker & Miller, 2000). *Peer norms for condoms* x *percentage of friends who use condoms* x *parent-adolescent communication* was significantly associated with lifetime condom use ($b = -.009$, $p = .05$) and consistent condom use ($b = -.018$, $p = .05$; Whitaker & Miller, 2000). *Peer norms for condoms* x *friends think condom use is too much trouble* x *parent-adolescent communication* was marginally associated with condom use at first intercourse ($b = .578$, $p = .10$) and consistent condom use ($b = .774$, $p = .10$; Whitaker & Miller, 2000). Finally, *peer norms for condoms* x *friends think condoms protect against AIDS* x *parent-adolescent communication* was significantly associated with condom use at first intercourse ($b = 1.045$, $p = .05$), condom use at most recent intercourse (b = .872, $p = .05$), lifetime condom use ($b = .712$, $p = .01$), and consistent condom use ($b = .907$, $p = .05$; Whitaker & Miller, 2000).

Whitaker and Miller (2000) also found that the adolescents who talked with parents about initiating sex and condom use thought of their parent as the best source of information about sex. This finding is supported by Rosenberger and colleagues (2010), who reported that adolescents thought of parents or other family members as the best source of information about condom use (Rosenberger, Bell, McBride, Fortenberry, & Ott, 2010). Gender did not prove to be significant when added as a third variable to the condom use interaction models (Whitaker & Miller, 2000). In sum, Whitaker and Miller's (2000) findings indicate that parent-child sex communication influences the way in which adolescents think of the importance of condom use in combating AIDS and influences sexual behaviors. These findings support the relevance of parent-child sex communication as a protective factor for reducing the rate of STI and HIV/AIDS among adolescents.

Although both the Whitaker et al. (1999) and Whitaker and Miller (2000) studies were cross-sectional, and thus causal inferences cannot be made, the findings were significant and warrant further consideration in STI and HIV/AIDS intervention research. These study results support the rationale for exploring this variable with a nationally representative sample of African American adolescents. This dissertation study consists of a nationally representative sample of rural African American adolescents and examines parent-child sex communication and how such communication affects the relationship between adolescents' perceived risk for STIs and HIV/AIDS, and condom use at most recent intercourse.

Parental Attitudes Toward Sex Communication

The literature on parental attitudes toward sex communication is often linked with studies that examine the effects of parent-child sex communication on adolescent sexual activity (DiIorio, Kelley, & Hockenberry-Eaton, 1999; Miller et al., 2009; Miller & Whitaker, 2001). Fewer studies have independently researched parental attitudes toward sex communication with their adolescent (Akers, Holland, & Bost, 2011; Aronowitz, Todd, Agbeshie, & Rennells, 2007). One particular challenge with finding studies that have assessed parental attitudes toward sex communication is the variety of language used in the literature. For instance, authors may refer to terms such as *predictors of parent-child sex communication* rather than parental attitudes towards communicating about sex (Miller & Whitaker, 2001). These predictors are usually measured as perceived parental *ability* to communicate about sex rather than parental *attitudes toward* such communication (Miller & Whitaker, 2001). Another study referred to parental attitudes towards sex communication as *communication extent;* those authors (Cox, Scharer, Baliko, & Clark, 2010) defined *extent* as the frequency and depth of communication between parent and child and inferred that the depth of communication reflected the parent's level of comfort around discussing sex with their child. Still other studies have used terms such as the mother's *comfort* about (DiIorio, Kelley, & Hockenberry-Eaton, 1999) and *responsiveness* to (Miller et al., 2009) discussing sexual topics.

Despite the differences in the terms used, the measures from these studies complement the measures used in the current dissertation study to assess parental attitudes toward sex communication. For example, Miller and Whitaker (2001) assessed mothers' ability to discuss sex and condoms with items that asked about mothers' comfort with discussing sex with their adolescent and whether mothers thought they

knew enough about sex topics to have a discussion with their child. Similarly, the measures for the parental attitudes variable in the dissertation study include items such as "It would be difficult for you to explain things if you talked with {NAME} about sex and birth control," and "You really don't know enough about sex and birth control to talk about them with {NAME}." Thus, the items essentially measure the same underlying construct. As previously mentioned, these two examples, predictors and extent, are not an exhaustive list of the terms used in this literature; however, they do reveal the nuances of how parental attitude is labeled and defined by researchers.

Now that I have discussed some of the different ways in which parental attitudes toward sex communication is referenced in the literature, I will present several studies that have included measures that evaluate these parental attitudes. To begin, I will briefly discuss a qualitative study conducted with rural African American mothers. In this study, focus groups were conducted with low-income rural African American mothers who had at least one child in middle school (grades 6 through 8; Cox et al., 2010). The investigators employed the five critical components of parent-adolescent communication formulated by Jaccard, Dittus, and Gordon (1998): content, extent, style, timing, and context (Cox et al., 2010). As mentioned earlier, *extent* was defined as the frequency and depth of communication between parent and child (Cox et al., 2010). Cox et al. measured extent with the question: "Do you believe you know enough about sex, STDs, and related topics to have discussions with your children?" Although the terminology is different, this construct of extent closely resembles the parental attitude measures in this current dissertation study.

Cox et al.'s findings regarding communication extent showed that some mothers had less-detailed conversations with their child about sex because they did not feel comfortable discussing certain topics, particularly with their adolescent sons (Cox et al., 2010). They reported that sexual communication with their child was sometimes embarrassing for them as well as for the child. In some cases, mothers reported that they did not discuss sex with their children because they wished to avoid discomfort (Cox et al., 2010). Other mothers reported that they had extensive and frequent conversations with their child and had no concerns with "sitting everything on the table" (Cox et al., 2010, p. 190). These mothers reported that they discussed all sexual topics with their child, and the mothers sometimes used their own sexual experiences in their discussion (Cox et al., 2010).

The research also indicates that parental attitudes toward sex communication may vary depending on the values held by the parent (Aronowitz, et al., 2007). For example, a qualitative study using focus groups of 28 dyads of African American mothers and daughters (ages 11 to 14) found that some mothers had positive attitudes toward sex communication whereas other mothers possessed more conservative beliefs regarding sex communication with their child (Aronowitz et al., 2007). Some mothers admitted to being very uncomfortable with discussing sex, especially the positive aspects of sex, for fear that their daughters would become curious and engage in sexual activity (Aronowitz et al., 2007).

On the other hand, some mothers expressed the viewpoint that sex was a natural part of life, and therefore, they needed to prepare their daughters—for example, by having their own condoms to protect themselves from disease (Aronowitz et al., 2007).

Other mothers were concerned with the amount of highly sexualized content that children were exposed to and felt that they had no choice but to educate their daughters on all of the facts (Aronowitz et al., 2007). Although this sample of adolescent females was younger (ages 11 to 14) than the sample for the current dissertation study (ages 15 to 18), Aronowitz and colleagues' findings nonetheless provide insight into parental attitudes for older adolescents.

As suggested by these two qualitative studies, parental attitudes definitely affect whether parent-child sex communication occurs and the topics discussed. In a quantitative study exploring rural mothers' ($N = 374$) communication with their child about sexual issues, 20% of mothers reported that they felt *uncomfortable* or *very uncomfortable* talking with the adolescents about sexual issues, while 65% percent of mothers reported being *somewhat comfortable* or *very comfortable* with discussing sex (Jordan, Price, & Fitzgerald, 2000). Almost a quarter of the sampled mothers (22%) believed that their adolescent had no interest in talking about sexual issues with them, whereas 17% of participating mothers were not sure if their adolescent had any interest in discussing sexual issues (Jordan et al., 2000).

Regardless of the mother's level of comfort in discussing sexual topics with her child, an overwhelming 80% of these rural mothers indicated that their preferred method of educating their child about sexual issues was to have the family provide the majority of education, supplemented by outside organizations (Jordan et al., 2000). Ninety-two percent of the mothers believed that outside organizations (e.g., schools) that provide formal sex education should cover birth control methods, and 91% believed that condom use and education about STIs and HIV/AIDS should be covered as well (Jordan et al.,

2000). These findings suggest that rural mothers are in favor of having discussions about sex with their children, and they support other educational opportunities for their children to learn about the consequences of sexual risk taking and ways to prevent disease. These results also indicate that it is likely that some level of sex communication occurs between the parent and child despite parental concerns about comfort level and skills of engaging with their child.

Although rural residents in general—and rural African Americans in particular-- have traditionally been perceived as having religious and social viewpoints that are more conservative, especially regarding sexuality issues (Dillon & Savage, 2006), the study by Jordan and colleagues (2000) suggested a less traditional position on sexuality. This finding is supported by an earlier study conducted by Horner and colleagues (1994), which found that a rural sample reported attitudes towards sex communication and education that could be described as more liberal. In a study of 801 rural mothers, Horner, Kolasa, Irons, and Wilson (1994) found that both rural White and rural African American mothers were more likely to support school-based sex education (94% and 98%, respectively). Most of the mothers favored school-based preventive education on safer-sex practices such as condom use (Honer et al., 1994). Both White (93%) and African American (92%) mothers supported school-based birth control education for girls; 89% and 93%, respectively, supported birth control education for boys (Horner et al., 1994). Further, rural African American mothers had less conservative attitudes towards sex communication and the venues in which their adolescent should receive information than did rural Whites (Horner et al., 1994). African American mothers were also more accepting of programs that would provide general health care and care related

to sexuality (e.g., pregnancy testing) compared with rural Whites (Horner et al., 1994).

Both rural African American and White mothers believed that sex and AIDS education

should begin before high school; 50% indicated that instructions should begin in middle-

school grades (Horner et al., 1994). Although Horner and colleagues' findings cannot be

generalized to the larger population, the study nonetheless suggested that rural African

American mothers were receptive to having conversations about sex with their children

and to having their children receive preventive education. Rural African American

mothers may be less likely to actually *have* these conversations, however, because of

their perceived lack of knowledge and skills to effectively communicate about sex.

Empirical Support for Parental Attitudes towards Sex Communication

As mentioned earlier, the evaluation of parent-child sex communication and

parental attitudes towards sex communication overlap in the literature. Many of these

overlapping studies inquired about parents' level of parental comfort, skills, and

knowledge in discussing sexual topics with their child, measuring the underlying

construct of parental attitudes toward sex communication. Each of the studies (i.e.,

Whitaker, Miller, May, & Levin, 1999; Whitaker & Miller, 2000) discussed in the parent-

child sex communication section as well as the studies discussed in the upcoming section

measured parental attitudes toward sex communication in varying forms. All of these

studies provide empirical support that parents who communicate with their adolescent

about sex, regardless of their comfort level, impact condom use and other sexual

behaviors among adolescents. The current dissertation study allows for further

exploration of the influence of parental attitudes toward sex communication using a

nationally representative sample of rural African Americans, which will add to this body

of literature and offer more insight on how to create STI and HIV/AIDS prevention interventions for rural adolescents.

Condom Knowledge

For the purpose of the current study, *condom knowledge* is defined as the amount of accurate, factual information the adolescent possesses about using condoms. This factual information includes knowledge about actual condom application, the least protective condom material, and lubricants to avoid with condom use. Many studies have emphasized the importance of consistent and correct use of condoms (Crosby, DiClemente, Wingood, Lang, & Harrington, 2003; Crosby et al., 2001; Warner, Clay-Warner, Boles, & Williamson, 1998), but fewer studies have actually explored the level of condom knowledge among adolescents (Bankole, Ahmed, Neema, Ouedraogo, & Konyani, 2007; Crosby & Yarber, 2001). Further, while HIV/AIDS and STI interventions targeting African American adolescents have focused on condom application skills as a way to reduce infection rates (Jemmott et al., 2005; Jemmott, Jemmott, & Fong, 1992; St. Lawrence et al., 1995), none of these studies has assessed condom knowledge in addition to condom application skills. The primary outcome in most interventions has been the reported use of condoms, but the results are less meaningful if the adolescents are not using the condom properly and thereby continuing to put themselves at risk for disease. Therefore, I argue that adolescents should be educated on the mechanics of condom use, which would include an understanding of when condoms are most effective in addition to information on how to correctly apply a condom.

Organizations such as the CDC (2010e) and the American Academy of Pediatrics (2001) have advocated for consistent and correct condom use as a means to reduce

infection rates. However, uncertainty remains about who is responsible for educating adolescents about condom use. Many U.S. schools teach abstinence-only sex education programs, which typically do not include information about condom use or any other forms of birth control for fear that information about birth control methods will encourage adolescents to experiment and initiate sexual intercourse (Isley et al., 2010). Although school-based sex education programs have the capacity to provide millions of adolescents the knowledge and skills to make healthy decisions about sexual behaviors, abstinence-only education has increased in this country, and education about birth control methods has decreased, since 1995 (Isley et al., 2010). The STI rate among adolescents, particularly African American adolescents, suggests that more prevention education is needed. It is possible that adolescents are using condoms but are undereducated about how to properly use condoms to receive maximum protection. A study conducted by Crosby and Yarber (2001) illustrated the discrepancies between adolescents' perceptions of their knowledge of correct condom use and their actual knowledge about correct condom use. The discrepancies shown in the Crosby and Yarber (2001) study indicate the need to better educate adolescents about condom use.

Crosby and Yarber (2001) examined whether the prevalence of condom misconceptions varied by gender, sexual intercourse experience, experience with using condoms, and the relationship between actual knowledge and perceived knowledge about correct condom use. The investigators used the National Longitudinal Study of Adolescent Health (Add Health) dataset to examine common condom use misconceptions among adolescents. Crosby and Yarber used data from the Add Health Wave I In-Home adolescent questionnaire collected in 1995, which consisted of 16,677 respondents age 15

years or older. Whites comprised 60.8% of the sample, followed by Blacks (22.8%),

American Indians (3.4%), Asians (8.2%), and other races (1%; Crosby & Yarber, 2001).

Crosby and Yarber (2001) used three dichotomous *yes/no* items to assess condom

knowledge: (a) "When putting on a condom, it is important to have it fit tightly, leaving

no space at the tip"; (b) "Vaseline can be used with condoms, and they will work just as

well"; and (c) "Natural skin (lamb skin) condoms provide better protection against the

AIDS virus than latex condoms" (p. 416). These items represent common misconceptions

about condom use; all three of the statements are actually false. These condom

knowledge items, plus one additional item, are used in the current study. Crosby and

Yarber used a single item to evaluate the relationship between actual knowledge and

perceived knowledge about correct condom use: "You are quite knowledgeable about

how to use a condom correctly" (2001). The response options ranged from *strongly agree*

to *strongly disagree*. This variable was later dichotomized to separate the adolescents

who indicated *strongly agree* from those providing other responses on the Likert scale;

the investigators assumed that responses other than *strongly agree* indicated doubt about

their condom knowledge (Crosby & Yarber, 2001). The analyses compared the

prevalence of condom misconceptions between adolescents claiming to be very

knowledgeable about condom use to those who were less certain about the extent of their

condom knowledge.

To assess the prevalence of condom misconceptions and the associations between

the misconceptions and perceived knowledge, Crosby and Yarber (2001) divided their

sample into three groups: (a) ever had sexual intercourse and used a condom at least once

(Group 1); (b) ever had sexual intercourse and have never used condoms (Group 2); and

(c) never had sexual intercourse (Group 3; Crosby & Yarber, 2001). Chi-square analysis showed that Groups 1 and 2 had significantly fewer incorrect responses to the condom knowledge questions than adolescents in Group 3 ($p \le .001$), who were sexually inexperienced (Crosby & Yarber, 2001). Chi-square analysis also showed that the number of incorrect responses differed significantly ($p \le .001$) not only for each of the three groups but also between female and male respondents (Crosby & Yarber, 2001). In general, more males than females had condom use misconceptions. Among the group of adolescents with histories of sexual intercourse and condom use (Group 1), about one-third to about one-half thought the properly applied condom should not have space at the tip. Approximately one-third of all adolescents thought it was appropriate to use Vaseline with condoms, and about one-fifth believed that lambskin condoms offered better protection from the AIDS virus than latex condoms (Crosby & Yarber, 2001).

In all, six 2 x 3 chi-square tests were conducted to identify significant relationships between the level of perceived knowledge about condom use and the (level of actual knowledge) about each of the three groups by gender (Crosby & Yarber, 2001). For Group 1, perceived knowledge about correct condom use was not related to actual knowledge for either gender. For adolescents who had sexual intercourse but no condom use (Group 2), perceived knowledge was related to actual knowledge of the importance of using latex condoms as opposed to lambskin condoms for males, but not for females (Crosby & Yarber, 2001). The investigators also found that for Group 2, perceived knowledge was related to actual knowledge about not using Vaseline with latex condoms for females, but not for males (Crosby & Yarber, 2001). Finally, for females and males who reported never having sexual intercourse (Group 3), perceived knowledge was

related to actual knowledge about the importance of leaving space at the tip of the condom (Crosby & Yarber, 2001).

Empirical Support for Condom Knowledge

The Crosby and Yarber (2001) study illuminated how education about condom use is critical in preventing STIs and HIV/AIDS among adolescents. The findings from this study indicated that adolescents' actual knowledge is less than their perceived knowledge. In other words, adolescents know far less than what they think they know about condom use. Similarly, findings among a sample of 1,658 urban African American adolescents from the Northeastern and Southeastern United States showed that approximately 60% of the sample thought it was appropriate to use oil-based lubricants with latex condoms and 75% thought it appropriate to use natural skin condoms to reduce HIV/AIDS transmission (Swenson et al., 2010). These findings support the claim that all adolescents—regardless of their sexual activity status—should receive education on the correct use of condoms.

Given these condom use misconceptions, adolescents are unknowingly putting themselves at risk for transmission of HIV and other STIs. The Crosby and Yarber (2001) study is only one of two studies found in the literature that investigated condom knowledge; further exploration is clearly warranted. An investigation of condom knowledge among rural African American adolescents will certainly add to the literature. To date, most studies with rural adolescents have primarily focused on HIV/AIDS knowledge (DiClemente, Brown, Beausoleil, & Lodico, 1993; Durant et al.,1992; Milhausen et al., 2003; Stanton et al., 2006) and attitudes toward condom use (Kogan et al., 2010; Stanton et al., 2006), but not condom knowledge per se. One objective of the

current study is to examine rural African American adolescents' level of condom knowledge and whether this knowledge affects the relationship between adolescents' perceived susceptibility to HIV/AIDS and STIs and their use of condoms.

Summary

In this chapter, I discussed the HBM as the conceptual framework used to guide the current study. The development of the model was reviewed as well as the underlying influences of other social-psychological models. Each of the six constructs within the HBM was defined, and the model for the current study was introduced, along with the justification for not measuring the full model. Next, I discussed adolescents' perceptions of risk, one of the key constructs in the HBM and other behavior change theories. The literature showed that perception of risk and other psychosocial factors helps to predict adolescent health behavior. Then, a review of studies that employed the HBM to evaluate condom use among adolescents was presented. Following the review of the HBM studies was a section on the empirical support for the use of the proposed moderating variables. Examples of studies examining these variables explained how each variable related to the outcome behavior of condom use. The empirical review of the moderating variables also showed the variety of items that could be used to measure the same variable. The next chapter describes the research methods used to conduct the current study.

CHAPTER 3

METHOD

Study Design

This study uses data from Wave I of the National Longitudinal Study of Adolescent Health (Add Health). Add Health is a longitudinal study of adolescents in grades 7 through 12. The Wave I (*N*=20,745) data were collected in the 1994-1995 academic year (Chantala, 2006). Data collection is ongoing, with the most recent wave collected in 2008. I decided to use the Add Health data because I could obtain a nationally representative subsample of rural African American adolescents from that dataset to use for my analysis. In addition, the data contained the measures that would enable examination of the relationships I hypothesized among the variables.

The Add Health study uses a cluster design. A list of U.S. high schools was sorted by enrollment size; school type (public, Catholic, or private); region (Northeast, Midwest, South, and West); level of urbanization (urban, suburban, rural); and percentage of White students (Add Health, n.d.). Schools were eligible for sample inclusion if the school included an 11th grade and had an enrollment of at least 30 students. The term *feeder school* refers to a middle school with seventh and eighth grades; once finishing at the middle school, the students become part of the incoming class of a high school included in the Add Health survey. A feeder school or middle school was eligible for inclusion if the school sent its graduates to a high school selected for data collection and included a 7th grade. This list of schools was then divided into subgroups for sampling. The

stratified random sample consisted of 80 high schools and 52 middle schools in the United States. The school is the cluster identifier or primary sampling unit (PSU). The clusters were sampled with unequal probability (Add Health, n.d.).

The students attending the selected schools were eligible for selection into one or more of three panels of data: the In-School Questionnaire (1994-1995), the Wave I In-Home Questionnaire (1995), and Wave II In-Home Questionnaire (1996). Students enrolled in the participating schools completed the In-School Questionnaire. Those students who completed the In-School Questionnaire and samples of students taken from the school rosters were selected to fill out the In-Home Questionnaire for Waves I and II. A total of 15,356 adolescents from the Wave I in-home respondents also have in-school data. Add Health has oversampled certain racial/ethnic groups such as Puerto Ricans, Chinese, Cubans, as well as Black students from high-education households (i.e., parents with a college degree; Chantala, 2006; Chantala & Tabor, 1999).

The In-Home Questionnaire was completed using software designed to assist in collecting sensitive data (i.e., Computer-Assisted Personal Interview [CAPI]/Audio Computer-Assisted Self Interview [ACASI]). Portions of the questionnaire were administered by research staff. The questionnaire consisted of 41 sections encompassing a range of topics, including general health; daily activities; pregnancy, HIV/AIDS and STI risk perceptions; self-efficacy; relationship with parents; friendships, romantic relationships, delinquent behaviors; and protective factors (Chantala, 2006; Chantala & Tabor, 1999).

Sample

The Add Health in-home dataset had 20,745 respondents. The subpopulation used for this dissertation study consists of 539 adolescents, of which 298 were males and 241were females. The sample was defined by the following criteria: self-identified as African American race/ethnicity; self-reported having engaged in sexual intercourse; 15 to 18 years old; and resident of a rural area. For the sexual intercourse criterion, respondents were included in the sample if they answered yes to the question: "Have you ever had sexual intercourse? When we say sexual intercourse, we mean when a male inserts his penis into a female's vagina." The ages range from 15 to 18 years, and the mean age is 16.5. This age frame was chosen because adolescents and young adults between the ages of 15 to 24 years are more likely to be sexually active or diagnosed with an STI (Weinstock, Berman, & Cates, 2004), indicating engagement in some form of sexual activity. In addition, early exploration of the data indicated that few respondents younger than age 15 years reported being sexually active.

The Add Health contextual data file was used to create a rural African American sample; the file consisted of data from the Census of Population and Housing, 1990 (Add Health Contextual Codebook, 1998). Using the 8-character respondent identification number, respondents who identified as African American were matched to the census code (URBAN), which specified whether the respondent resided in an urbanized or partly rural geographic location. The Bureau of Census defines an urbanized area as follows: "An urban area comprises one or more places ('central place') and the adjacent densely settled surrounding territory ('urban fringe') that together has a minimum of 50,000 persons" (Add Health Contextual Codebook, 1998, p. 9). Respondents who did not reside in an urbanized area were selected.

Finally, every respondent in the sample had a parent or guardian who participated in the parent in-home parent questionnaire. According to the Add Health Parent Questionnaire Code Book, the adolescent's mother or other female head of the household was the desired respondent to complete the questionnaire "because mothers are generally more familiar than fathers with the schooling, health status, and health behaviors of their children" (Carolina Population Center, 2008, para 1). If the mother did not reside in the household with the adolescent, interviewers administering the parent questionnaire were instructed to complete the questionnaire with the first person on the following list who lives with the adolescent: (1) stepmother; (2) other female guardian, such as a legal guardian or grandmother; (3) father; (4) stepfather, and (5) other male guardian, such as a legal guardian or grandfather (Carolina Population Center, 2008). The adolescent and his or her parent/guardian were matched using the adolescent respondent's identification number and the parent-specific data code (i.e., PQPARENT) retrieved from Add Health Disposition Files. Being able to match adolescent respondents to parental responses on the in-home questionnaire was an important aspect of this study because some measures used in the analytic model are from the parent responses.

The parent questionnaire had a 16-category item which asked "What is your relationship to {Name}?" The category response options are as follows: biological mother, step mother, adoptive mother, foster mother, grandmother, aunt, other female relative, other female non-relative, biological father, step father, adoptive father, foster father, grandfather, uncle, other male relative, and other male non-relative. For this subsample of adolescents, mothers were the primary respondents to the parent questionnaire. With the exception of the biological mother category, the other 15

categories had small cell sizes. These 15 categories were combined and labeled as other parent/guardian.

Measures

This section describes the dependent, independent, and control variables used in the analytic model. The *perceived susceptibility, perceived barrier, condom knowledge,* and *condom use (most recent)* variables are from the Wave I adolescent in-home questionnaire. The *parent-child sex communication* and *parental attitudes toward sex communication* variables are from the in-home parent questionnaire. The descriptive statistics for each item and composites are also included (see Table 3.1).

Dependent variable

Condom use (most recent). Respondents' most recent condom use was measured with a dichotomous (1 = *yes*, 0 = *no*) dependent variable. Other studies have also assessed condom use at most recent sexual intercourse (Orr & Langefeld, 1993; Sonenstein, Pleck, & Ku, 1989). For example, Orr and Langefeld (1993) assessed condom use at last intercourse (*yes/no*) with a group of urban sexually active African American adolescent males. The *condom use* (*most recent*) variable for this study was constructed using the mean of three identical items assessing birth control use at most recent sexual intercourse.

Independent Variables

Perceived susceptibility. Two ordinal variables were used to measure a respondent's perceived susceptibility to HIV/AIDS and other STIs. Responses to the two items listed below were assessed using a 5-point Likert scale that ranged from *very high* (1) to *none* (5).

What do you think your chances are of getting AIDS?

What do you think your chances are of getting another sexually transmitted disease, such as gonorrhea or genital herpes?

The composite was created using the mean of the responses to the two items. The two items were combined specifically for the purposes of the current study. The Cronbach's alpha reliability estimate for perceived susceptibility is 0.78. An alpha of 0.70 or higher is considered a good alpha score (DeVellis, 2003). The alpha score was computed using the sample for this study.

Perceived barriers. To assess perceived barriers, a single-item measure was used: "It would be a big hassle to do the things necessary to completely protect yourself from getting a sexually transmitted disease." This item was an ordinal variable with a 5-point Likert scale ranging from *strongly agree* (1) to *strongly disagree* (5).

Parental attitudes toward sex communication. This average composite was created using four ordinal variables. The 5-point Likert scale ranged from *strongly agree* (1) to *strongly disagree* (5). These four items, which were combined specifically for the purpose of the current study, are listed below.

You really don't know enough about sex and birth control to talk about them with {NAME}.

It would embarrass {NAME} to talk to you about sex and birth control.

It would be difficult for you to explain things if you talked with {NAME} about sex and birth control.

{NAME} will get the information somewhere else, so you don't really need to talk to (him/her) about sex and birth control.

The Cronbach's alpha reliability estimate for parental attitudes toward sex communication is 0.80. The alpha score was computed using the sample for this study.

Moderators

Parent-child sex communication. The mean responses of four ordinal variables were used to create the parent-child sex communication composite. The response items for each variable range from *not at all* (1) to *a great deal* (4). The items are as follows:

How much have you and {NAME} talked about (his/her) having sexual intercourse and . . .

. . . the dangers of getting a sexually transmitted disease?

. . . the negative or bad impact on (his/her) social life because (he/she) would lose the respect of others?

. . . the moral issues of not having sexual intercourse?

How much have you talked to {NAME} about sex?

The composite was created using the mean of the responses to the four items. The four items were combined specifically for the purposes of the current study. The scale of the resulting variable was from 1.375 (low parent-child communication) to 4 (high parent-child communication). The Cronbach's alpha reliability estimate for parent-child sex communication is 0.83.

Condom Knowledge. Condom knowledge was a count composite consisting of four dichotomous variables. The variable response items are *true* (1) and *false* (2). The correct answer for each item is *false*. The items are as follows:

Natural skin (lamb skin) condoms provide better protection against the AIDS virus than latex condoms.

When putting on a condom, it is important to have it fit tightly, leaving no space at the tip.

Vaseline can be used with condoms, and they will work just as well.

As long as the condom fits over the tip of the penis, it doesn't matter how far down it is unrolled.

An alpha value was not calculated for this variable because a count index does not

require an alpha score (Bollen, 1989). Table 3.1 provides the percent, frequency, mean,

and standard deviation (*SD*) for each item discussed. Table 3.2 provides the mean, *SD*,

and Cronbach's alpha score for each composite.

Table 3.1

Descriptive Statistics for Items

Independent Variables	Response Categories	N (%)	Mean (*SD*)	Range
Perceived Susceptibility:				
What do you think your chances are of getting AIDS?	Very High	20 (4)	4.00 (1.02)	1-5
	High	28 (5)		
	Low	106 (19)		
	Very Low	187 (35)		
	None	198 (37)		
What do you think your chances are of getting another sexually transmitted disease, such as gonorrhea or genital herpes?	Very High/High	51 (9)†	4.10 (1.07)	1-5
	Low	89 (17)		
	Very Low	154 (29)		
	None	245 (45)		
Perceived Barriers:				
It would be a big hassle to do the things necessary to completely protect yourself from getting a sexually transmitted disease.	Strongly Agree	75 (14)	3.48 (1.42)	1-5
	Agree	103 (19)		
	Neither Agree Nor Disagree	29 (5)		
	Disagree	166 (31)		
	Strongly Disagree	166 (31)		
Parental Attitudes toward Sex Communication:				
You really don't know enough about sex and birth control to talk about them with {NAME}.	Strongly Agree/Agree	55 (10)†	4.15 (1.01)	1-5
	Neither Agree Nor Disagree	28 (6)		
	Disagree	239 (44)		
	Strongly Disagree	217 (40)		
It would embarrass {NAME} to talk to you about sex and birth control.	Strongly Agree/Agree	109(20)†	3.82 (1.22)	1-5
	Neither Agree Nor Disagree	27 (5)		
	Disagree	228 (42)		
	Strongly Disagree	175 (33)		
It would be difficult for you to explain things if you talked with {NAME} about sex and birth control.	Strongly Agree/Agree	50 (9)†	4.14 (0.99)	1-5
	Neither Agree Nor Disagree	20 (4)		
	Disagree	260 (48)		

	Strongly Disagree	209 (39)		
{NAME} will get the information somewhere else, so you don't really need to talk to (him/her) about sex and birth control.	Strongly Agree/Agree Neither Agree Nor Disagree Disagree Strongly Disagree	60(11)† 39 (7) 231 (43) 209 (39)	4.11 (1.04)	1-5

Condom Knowledge:

Natural skin (lamb skin) condoms provide better protection against the AIDS virus than latex condoms.	True/False	426 (79)	0.78 (0.42)	0-1
When putting on a condom, it is important to have it fit tightly, leaving no space at the tip.	True/False	298 (55)	0.56 (0.50)	0-1
Vaseline can be used with condoms, and they will work just as well.	True/False	365 (68)	0.68 (0.47)	0-1
As long as the condom fits over the tip of the penis, it doesn't matter how far down it is unrolled.	True/False	456 (85)	0.84 (0.36)	0-1

Parent-Child Sex Communication:

How much have you and {NAME} talked about (his/her) having sexual intercourse and . . .

. . . the dangers of getting a sexually transmitted disease?	Not At All Somewhat Moderate Amount Great Deal	25 (5) 48 (9) 103 (19) 363 (67)	3.48 (0.84)	1-4
. . . the negative or bad impact on (his/her) social life because (he/she) would lose the respect of others?	Not At All/Somewhat Moderate Amount Great Deal	159(30)† 136 (25) 244 (45)	3.06 (1.06)	1-4
. . . the moral issues of not having sexual intercourse?	Not At All/Somewhat Moderate Amount Great Deal	141(26)† 125 (23) 273 (51)	3.17 (1.02)	1-4
How much have you talked to {NAME} about sex?	Not At All/Somewhat Moderate Amount Great Deal	92(17)† 123 (23) 324 (60)	3.35 (0.93)	1-4

Note. †The smallest two response categories were combined to prevent collinearity errors during multiple imputation procedures.

Table 3.2

Mean, Standard Deviation, and Alpha for Composites

Composites	Mean(*SD*)	Cronbach's Alpha
Perceived Susceptibility	4.06 (0.96)	0.78
Parental Attitudes Toward Sex Communication	4.05 (0.84)	0.80
Parent-Child Sex Communication	3.27 (0.77)	0.83
Condom Knowledge	2.86 (1.09)	--

Note. The dash (--) represents data that is not presented.

Control Variables

The analysis includes three control variables associated with condom use among African American adolescents living in both urban and rural areas. These variables are *age*, *gender*, and *number of sexual partners*. From a developmental standpoint, the older the adolescent, the more likely that he or she will use a condom (Durant et al., 1992; Gillmore, Chen, Haas, Kopak, & Robillard, 2011). Males are more likely to report condom use than females (Crosby et al., 2003; Robertson, Stein, & Baird-Thomas, 2006; Swenson et al., 2009; Yan, Chiu, Stoesen, & Wang, 2007). Previous research has shown that the number of lifetime sexual partners is negatively associated with condom use (Gillmore et al., 2011). My conceptual model defined these variables as modifying variables; however, these variables will be used as controls in this study. Table 3.3 provides the descriptive statistics for the three control variables.

Table 3.3

Descriptive Statistics for Control Variables

Variable	% (N)	Mean (*SD*)	Median	Range
Age:				
15	19 (105)	16.5 (1.05)	16	15-18
16	28 (150)			
17	28 (153)			
18	25 (131)			
Gender:				
Male	55 (298)	--	--	0-1
Female	45 (241)			
Number of		4.88 (11.34)	2	1-500
Partners:		1.36 (0.78)[a]		

Note. [a] Represents the transformed variable statistic using logarithmic transformation.

Data Management

Data management was completed using Stata version 11. Prior to conducting

analyses the data were screened for normality, linearity, outliers, and missing data.

Variables that were markedly positively skewed were transformed using logarithmic

transformation (Howell, 2002). The transformed variables are as follows: *number of*

partners, number of friends with an STI, and number of friends with AIDS. I employed

the variance inflation factor (VIF) to screen for multicollinearity. Although there is no

formal cut-off for the VIF, Allison (1999) stated that problems are likely to exist when

the VIF is over 2.5. The VIF values for *perceived susceptibility* (1.00), *perceived barriers*

(1.06), *parent-child sex communication* (1.21), *parental attitudes toward sex*

communication (1.23), and *condom knowledge* (1.06) were all within acceptable range.

Thus, the VIF values for the variables indicated that there was no reason for concern

regarding multicollinearity. In terms of missingness, the variables had less than 10%

missing data on any given variable, meaning that the extent of missing data was not

extensive (Fox-Wasylyshyn & El-Masri, 2005). In this case, the literature indicated that

all variables and cases should be retained and that the missing data should not simply be deleted but handled in some way (Fox-Wasylyshyn & El-Masri, 2005).

Next, the pattern of missingness was assessed using the Little's MCAR test in SPSS version 18.0. (Little's MCAR test is not available in Stata.) This test determines whether data are missing completely at random (MCAR). The significance value of the Little's MCAR test was less than 0.05, which meant that the data were *not* MCAR (SPSS Missing Values, 2007). Multiple imputation (MI) is recommended for handling data not MCAR (SPSS Missing Values, 2007). The variables used in the analytic model have minimal missingness on each item (0 to 4%). I used the MI procedure to treat the data because this method maintains sample size integrity and makes use of all variables in the data (Fox-Wasylyshyn & El-Masri, 2005). Also, the MI procedure is preferred over listwise deletion, pairwise deletion, and means substitution to avoid obtaining biased estimates (Allison, 2002). Finally, the MI procedure is robust to violations of non-normality of the variables (Fox-Wasylyshyn & El-Masri, 2005) and is considered more flexible than fully parametric methods such as maximum likelihood (Marchenko, 2009).

MI is a three-step procedure in which multiple complete datasets are simulated, each dataset is analyzed separately to obtain a set of completed data estimates, and the results of all analyses are pooled together to provide one result that accounts for variability between imputations and variability within the analyses (Fox-Wasylyshyn & El-Masri, 2005; Marchenko, 2009). The number of datasets depends largely on the percent of missing data. It is suggested that three to five datasets are sufficient when the degree of missingness does not exceed 20% (Fox-Wasylyshyn & El-Masri, 2005). The amount of missingness for the current study does not exceed 20%. However, "variability

of solutions across multiple imputations provides the basis for estimating standard errors, and thus iterations should continue as long as they continue to produce significantly different estimates" (Fox-Wasylyshyn & El-Masri, 2005, p. 493). A total of 25 imputed datasets were created for this study.

Data Analysis Plan

I tested six models: four mediation effect models and two moderation effect models. Four aims and hypotheses were proposed for this study:

Aim 1: Examine the relationship between perceived susceptibility to HIV/AIDS and other STIs and condom use.

> **Hypothesis 1:** The greater their perception of susceptibility for HIV/AIDS and other STIs, the more likely rural African American adolescents are to use condoms.

Aim 2: Examine the strength of the relationship between perceived susceptibility to HIV/AIDS and other STIs and condom use when moderated by parent-child sex communication.

> **Hypothesis 2:** Parent-child sex communication modifies the relationship between perceived susceptibility and condom use such that the relationship is stronger for adolescents with more communicative parents.

Aim 3: Examine the strength of the relationship between perceived susceptibility to HIV/AIDS and other STIs and condom use when moderated by condom knowledge.

Hypothesis 3: Condom knowledge modifies the relationship between

perceived susceptibility and condom use such that the relationship is

stronger for adolescents with high condom knowledge.

Aim 4: Examine a possible mediator of the effect of parental attitudes towards

sex communication on other variables.

Hypothesis 4: Parent-child sex communication mediates the relationship

between parental attitudes toward sex communication and perceived

susceptibility, condom knowledge, perceived barriers, and condom use.

I used path analysis in the structural equation modeling (SEM) framework to

conduct the study. Many path analysis studies are conducted with concurrent measures,

thereby making path analysis a reasonable analytic technique (Kline, 2005). The SEM

approach of path analysis is superior to the multiple regression approach because it

allows for the simultaneous modeling of several related regression relationships, whereas

the conventional regression approach allows the modeling of only one regression

equation at a time and one dependent variable at a time (Holmbeck, 1997; Muthén &

Muthén, 2007). I employ a robust weighted least squares estimator for this type of

regression analysis because the estimator handles regression models well when the

standard deviation of the random errors in the data is not constant across all levels of the

explanatory variables (Engineering Statistics Handbook, 2010; Muthén & Muthén, 2007).

The study has a sufficient sample size ($N = 539$) to conduct a path analysis

procedure; an n greater than 200 is considered large for most SEM estimation models

(Kline, 2005). Each model was a recursive model, meaning the model had uncorrelated

disturbances and unidirectional causal effects (Kline, 2005). I used Mplus version 6

statistical software to perform the analysis. There are several benefits to using Mplus with path modeling. First, Mplus can handle complex survey data features including stratification, clustering, unequal probabilities of selection (sampling weights), and subpopulation analysis. Second, the software can handle categorical and binary variables (Muthén & Muthén, 1998-2007). Third, Mplus will allow multigroup analysis, but this dataset did not permit such analysis; therefore, interactions were modeled as product terms instead of multigroup analysis. Below are brief descriptions of each model and a diagram of the path model.

Path Model 1. The first model examines the mediating relationships between all variables: *parental attitudes toward sex communication*, *parent-child sex communication*, *perceived susceptibility*, *condom knowledge*, *perceived barriers*, and *condom use* (*most recent*). Mediating effects specify how a given effect occurs (Holmbeck, 1997). It is generally hypothesized that the independent variable causes the mediator, and the mediator causes the outcome (Holmbeck, 1997). The mediator is responsible for at least part of the changes in the dependent variable. This type of relationship involves at least three variables: the independent variable (*parental attitudes towards sex communication*), the mediator (*parent-child sex communication*), and the dependent variable (*condom use*). Path Model 1 has four mediated paths and four dependent variables (e.g., *perceived susceptibility*, *condom knowledge*, *perceived barriers*, and *condom use*), all of which are mediated by the parent-child sex communication variable.

Next, I describe the meaning of the symbols in the model. Path Model 1 has one exogenous independent variable, *parental attitudes toward sex communication*. The cause of exogenous variables is unknown (Kline, 2005) and therefore I did not depict it in

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the model. As shown in Figure 3.1, there is no arrow pointing into the variable, indicating no influence from any other variable. However, SEM assumes unanalyzed associations among exogenous variables. Unanalyzed association means that two variables are assumed to covary, but the reasons why they covary are unknown (Kline, 2005). It is unknown whether the two variables affect one another or if they have common causes (Kline, 2005).

In this case, an intuitive covariance between variables was chosen to support tested variable associations in the literature. To reflect this unanalyzed association, a double-headed arrow indicates covariance between *parental attitudes toward sex communication* and the control variables *gender* and *age*. Although the control variables are not predictors in the model, they are considered exogenous variables since they are not influenced by other variables. The endogenous variables are depicted by the arrows pointing toward the respective observed variable. These variables have a presumed cause. All endogenous variables have a *disturbance* or error term, which is typically represented by the letter *D* encircled (Kline, 2005). The disturbances represent the unexplained variance or any omitted causes of the endogenous variable. The disturbance path coefficient is fixed at 1, which is common in standardized and unstandardized solutions (Kline, 2005).
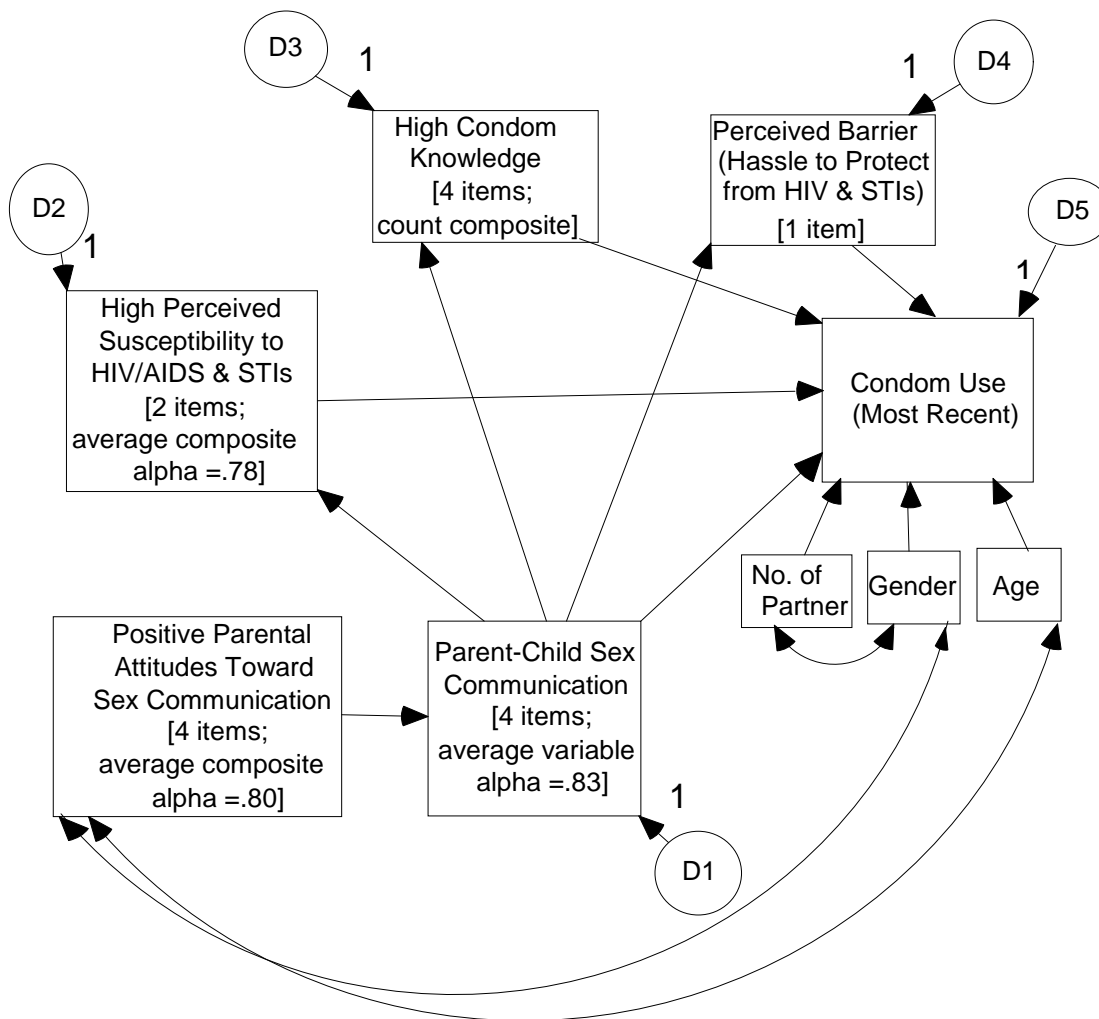
Figure 3.1. Mediation Effects of the Full Model.

       This model consists of 45 variances and covariances among observed variables or

45 pieces of information; *v* is the number of observed variables:

    $v(v+1)/2$

    $9(9+1)/2 = 45$

The pieces of information in the model cannot exceed the number of estimated

parameters. If the number of parameters exceeds the pieces of information in the model,

the model is not identified and each unique parameter in the model cannot be estimated.

The number of model parameters (paths and variances) to be estimated is 22. The difference between the pieces of information and the number of parameters (i.e., 45-22=23) is the model degrees of freedom (df_m; Kline, 2005). The model is said to be identified if $df_m > 0$ (Kline, 2005).

Path Model 2. In the second model, *parent-child sex communication* acts as a moderating variable. A moderator has two main attributes. The first attribute is that it can specify the condition in which a given effect occurs. Second, it can specify the condition under which the direction or strength of the effect varies (Holmebeck, 1997). In this case, I hypothesized that the moderator would strengthen the path or relationship between *perceived susceptibility* and *condom use (most recent).* A moderating relationship has at least three variables. In Path Model 2, the moderating relationship includes *perceived susceptibility*, *condom use (most recent)*, *parent-child sex communication*, and an interaction term that is the product of *perceived susceptibility* and *parent-child sex communication*. Essentially, I tested whether the path coefficient of *perceived susceptibility* varied over the range of the interaction term. If so, the interaction term is said to moderate the relationship between *perceived susceptibility* and dependent variable, *condom use (most recent).* Figure 3.2 displays a diagram of Path Model 2.
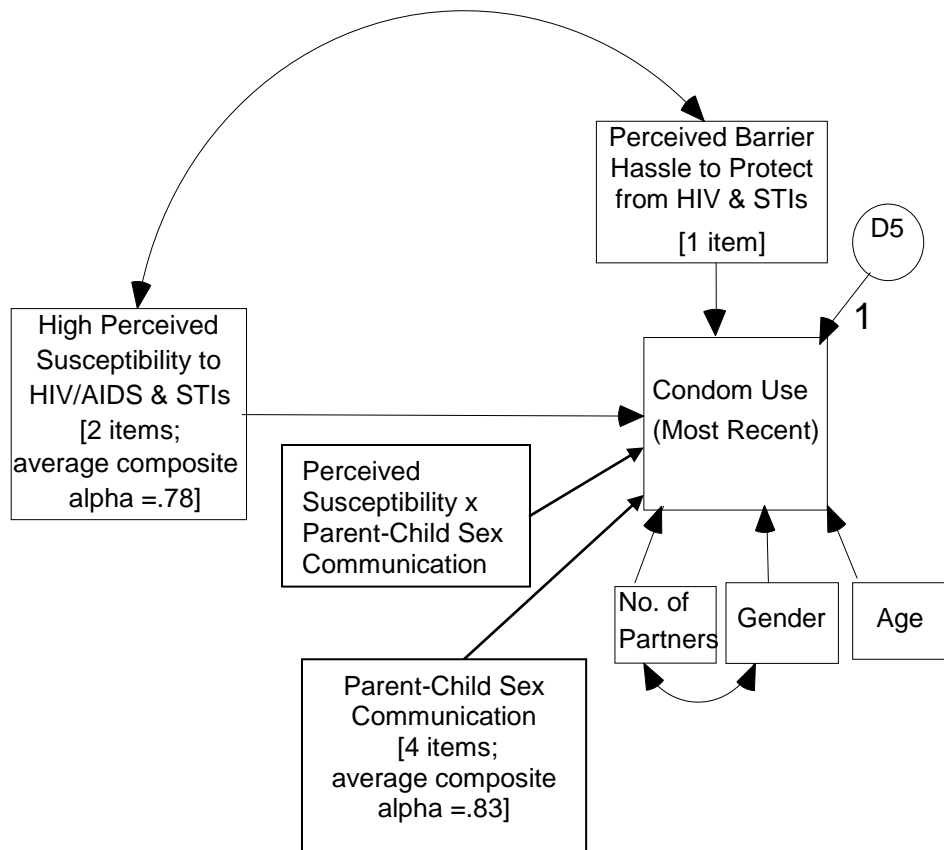
Figure 3.2. Moderation Effects of Parent-Child Sex Communication on Relationships between Perceived Susceptibility, Hassle to Protect (Barriers), and Most Recent Condom Use.

This model, which includes the interaction term, consists of 36 variances and covariances among observed variables or 36 pieces of information:

$$\upsilon(\upsilon+1)/2$$

$$8(8+1)/2 = 36$$

The total number of parameters to be estimated was 15 parameters. The difference between the pieces of information and the number of parameters equals 21 df_m. The model is said to be identified if $df_m > 0$ (Kline, 2005).

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Path Model 3. In the third path model, *condom knowledge* acts as a moderating variable. I hypothesized that the moderator would strengthen the path or relationship between *perceived susceptibility* and *condom use (most recent).* In Path Model 3, the moderating relationship includes *perceived susceptibility*, *condom use (most recent)*, *condom knowledge*, and an interaction term that is the product of *perceived susceptibility* and *condom knowledge*. I tested whether the path coefficient of *perceived susceptibility* varied over the range of the interaction term. If so, the interaction term is said to moderate the relationship between *perceived susceptibility* and dependent variable, *condom use (most recent).* Figure 3.3 displays a diagram of Path Model 3.
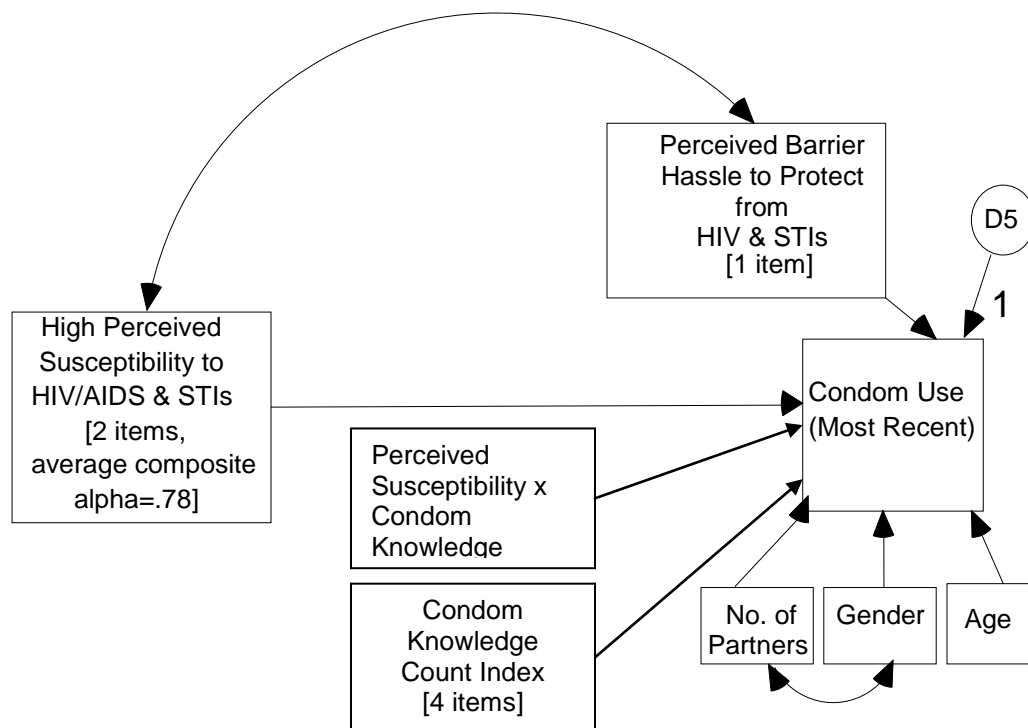
Figure 3.3.
Moderation Effects of Condom Knowledge on Relationships between Perceived
Susceptibility, Hassle to Protect (Barriers), and Most Recent Condom Use.

This model, which includes the interaction term, consists of 36 variances and

covariances among observed variables or 36 pieces of information:

$\upsilon(\upsilon+1)/2$

$8(8+1)/2 = 36$

The total number of parameters to be estimated was 15 parameters. The difference

between the pieces of information and the number of parameters equals 21 df_m. The

model is said to be identified if $df_m > 0$ (Kline, 2005).

Analysis plan for moderation effect models. *Parent-child sex communication*

and *condom knowledge* were quantitative moderators, making the addition of interaction

variables the appropriate way to assess moderation. Even if these moderators were

dichotomized, Mplus software did not allow multiple group analysis for testing

moderation while analyzing data using the "subpopulation" command. This meant that I

could not perform multigroup analysis to test whether the amount of *parent-child sex*

communication (i.e., high versus low) moderated the relationship between *perceived*

susceptibility and *condom use (most recent).* This also meant that I could not perform

multigroup analysis to test the impact of high versus low condom knowledge on the

relationship between the two variables. In light of these limitations, I introduced two

interaction variables to test for moderation effects. The interaction variables were the

product of the independent variable *perceived susceptibility* and *parent-child sex*

communication (for Path Model 2) and the product of *perceived susceptibility* and

condom knowledge (for Path Model 3).

Assessing model fit. Once the model has been specified and estimated, model fit

is assessed. Many different fit indexes are available to assess overall model fit. I chose

the following fit indexes to assess the model fit: chi-square (χ^2), comparative fit index

(CFI), Tucker-Lewis index (TLI), root mean square error of approximation RMSEA), and

weighted root mean square residual (WRMR). The desirable χ^2 should be non-significant,

which is opposite from the usual reject or support criterion for most statistical test (Kline,

2005). In the case of χ^2, it is the failure to reject the null hypothesis that supports the

specified model (Kline, 2005). The estimation of χ^2 is largely affected by sample size and

the number of variables in the model (Kline, 2005), which is why I assessed other fit

indexes in addition to χ^2.

The CFI and TLI assess the relative improvement in fit of the researcher's model

compared with the baseline model (Kline, 2005). The baseline model, also known as the

null model, assumes zero population covariances among the observed variables (Kline, 2005). The null model assumes uncorrelated variables (e.g., a covariance matrix with 0's in the off-diagonals) therefore, the value of its model χ^2_B is often significantly larger compared with the researcher's model χ^2_M (Kline, 2005). When the χ^2_M is less than the χ^2_B, then the researcher's model is an improvement over the null model (Kline, 2005). CFI and TLI values that are greater than 0.90 indicate that the researcher's model has a reasonably good fit (Kline, 2005).

The RMSEA is a "badness-of-fit' index, meaning "a value of zero indicates the best fit and higher values indicate worse fit" (Kline, 2005, p. 138). As indicated by its name, the RMSEA estimates the amount of error of approximation per model degree of freedom and sample size (Kline, 2005). According to Kline (2005), RMSEA ≤ 0.05 indicates close approximate fit; values between 0.05 and 0.08 suggest reasonable error of approximation and values ≥ 0.10 suggests poor fit. The last fit index I used to assess model fit was WRMR. A value that is lower than 0.90 indicates good fit (Muthen & Muthen, 2001). Although the WRMR has its utility, this fit index is not well-studied and has a history of inconsistent performance (Muthen & Muthen, 2008).

Model re-specification procedures. I used two model re-specification criteria to modify the full mediation model. Specific re-specifications are discussed in Chapter 4. Once the model was estimated, I used both empirical and theoretical guides to assist with model re-specification. In this context, re-specification is the adding or dropping of paths or variables in the model. Empirical re-specification is typically driven by statistical significance of paths, residual covariances, and modification indices (Kline, 2005). A theoretical re-specification is driven by theory; changes made to the model are theory

driven (Kline, 2005). I used correlation residuals as one of the empirical guides to re-specifying the model. The correlation residual is the difference between the observed and predicted covariances (Kline, 2005). Correlation residuals greater than 0.10 suggest that the model does not adequately explain the corresponding observed correlation well (Kline, 2005). The other empirical guide I used to re-specify the model was modification indices. The modification index estimates the chi-square difference for adding a path (Kline, 2005). A greater modification index predicts that the overall model will improve if the path were added to the model (Kline, 2005). The large correlation residuals usually coincided with the larger modification indices. However, the correlation residuals and the modification index were not acted upon if the suggestion to add a path or correlate variables did not support the tenets of the HBM or support the existing literature regarding relationships between variables.

Summary

In this chapter, I described the data used to conduct all analyses for the dissertation study and provided details of the Add Health study design and the criteria for the subpopulation sample. Each variable used in the analytic model is also described. Descriptive statistics for all items and composites are presented as well. Then, I described data management techniques, which included the method used for handling missing data, which was multiple imputation. Finally, I discuss the data analysis plan, including assessing model fit and model re-specification. Chapter 4 will include the results of the proposed analytic models described here.

CHAPTER 4

RESULTS

Sample

Slightly more than half of the adolescents in the sample were males (55%) and the mean age was 16.5 years (range: 15 to 18 years). Most of the respondents were presently enrolled in school (97%). The majority of respondents lived in the Southern region (96%) of the United States, and 13% resided in the Midwest. Slightly less than 1% of respondents were from the Northeastern (0.7%) and the Western (0.9%) regions of the country.

Approximately 13% of the respondents reported having been tested or treated for an STI or AIDS within the past year. The majority of respondents reported condom use as the method of birth control used during most recent intercourse (61%), and 9% reported using another form of birth control (e.g., birth control pills, diaphragm, foam) during most recent intercourse. The remaining 30% reported not using any form of birth control at most recent intercourse. On average, respondents reported knowing at least two individuals with an STI ($M = 2.46$, $SD = 6.25$). Almost no respondents reported knowing individuals with AIDS ($M = 0.69$, $SD = 1.66$).

The parent respondents consisted primarily of mothers (86%). Almost half (47%) of the parents reported being married. Approximately 19% of the parents reported receiving Medicaid. Most of the parent respondents thought that their adolescent had engaged in sex (56%). Sample charactersitics are presented below in Table 4.1.

Table 4.1

Characteristics of Sexually Active Rural African American Adolescents and Their Parents

Variable	Value
Male	
N (%)	298 (55)
Age	
Mean (*SD*)	16.5 (1.05)
Median	16
Range	15-18
Presently in school	
N (%)	522 (97)
Region	
N (%)	
Northeast	4 (0.7)
Midwest	13 (2.3)
South	517 (96)
West	5 (0.9)
Tested/Treated for STI or AIDS	
N (%)	72 (13)
Number of People You Know Who Have an STI	
Mean (*SD*)	2.46 (6.25)
	0.73 (0.88)[a]
Range	0-30
Number of People You Know Who Have AIDS	
Mean (*SD*)	0.69 (1.66)
	0.31(0.56)[a]
Range	0-90
Condom Use	
N (%)	
Condom user	330 (61)
Other birth control (excluding condom use)	50 (9)
No use of birth control	159 (30)
Parents	
Relationship to Adolescent: Mother	
N (%)	463 (86)
Marital Status: Married	
N (%)	255 (47)
Receiving Medicaid	
N (%)	104 (19)
Do you think the adolescent has ever had sex: Yes	
N (%)	303 (56)

Note. [a] Represents the transformed variable statistic using logarithmic transformation.

Full Model with Mediators

Although Mplus can analyze multiple datasets with imputed data, at this time fit statistics have not yet been developed for multiple imputations, except for maximum likelihood (ML; L. K. Muthen, personal communication, June 23, 2011). The Mplus software gives the average over the imputations. For example, χ^2 conducted with multiple imputed data was inflated with a value of 1433.72 (p=0.00). This χ^2 estimate is much larger than the correct χ^2 estimate. Thus, I could not assume that the average is close to the true estimate of χ^2 (L.K. Muthen, personal communication, June 23, 2011). It is also unknown if the other fit indices used in this study provide estimates true to value. I was unaware of the challenges with ascertaining fit statistics for multiple imputation prior to conducting this analysis; future research using multiple imputed data analysis should be conducted using ML. However, to ascertain the most accurate fit indices, I reported results from one of the five imputed data sets. To ensure that these reported results are representative of all five of the imputed data sets, I conducted analyses with each of the individual data sets. The results were consistent across the individual five data sets. The findings of the model are presented below.

First, I will begin by discussing the results from the full mediation model. The goodness-of -fit indices for the model were poor. The model indicated high residuals and large modification indices values for the control variable *number of partners*. Multiple modification indices suggested that the *number of partners* variable be regressed on other variables within the model and should also covary with other variables. However, *number of partners* was not statistically significant when regressed on *condom use* or when it covaried with other variables within the model. In addition, several of the suggested

modification indices for this variable were not theoretically supported or were

conceptually counterintuitive. Based on these results, I concluded that *number of partners*

was a poor performing variable within the model, and thus, made a decision to trim the

model by removing the variable to improve model fit.

The removal of the *number of partners* variable improved the model fit

somewhat, but the fit indices still did not indicate a good model fit. The model was re-

specified by adding new paths within the model. The re-specification of the model was

guided by the modification indices and residual correlations. The new paths added to the

original model are drawn with dotted lines as shown in Figure 4.1. The new paths

included a direct path from *gender* to *parent child-sex communication*, a direct path from

gender to *condom knowledge*, and a direct path from *condom knowledge* to *perceived*

susceptibility. The re-specification of the model demonstrated excellent fit indices. The

overall chi-square fit probability value was 0.30; hence, the chi-square value ($\chi^2 = 13.962$,

df = 12) is non-significant, indicating that the model fits the data. The CFI and the TLI

were 0.97 and 0.94, respectively, supporting the assessment of excellent fit. The RMSEA

was also an excellent fit, with a value of 0.003. The WRMR was 0.51, indicating
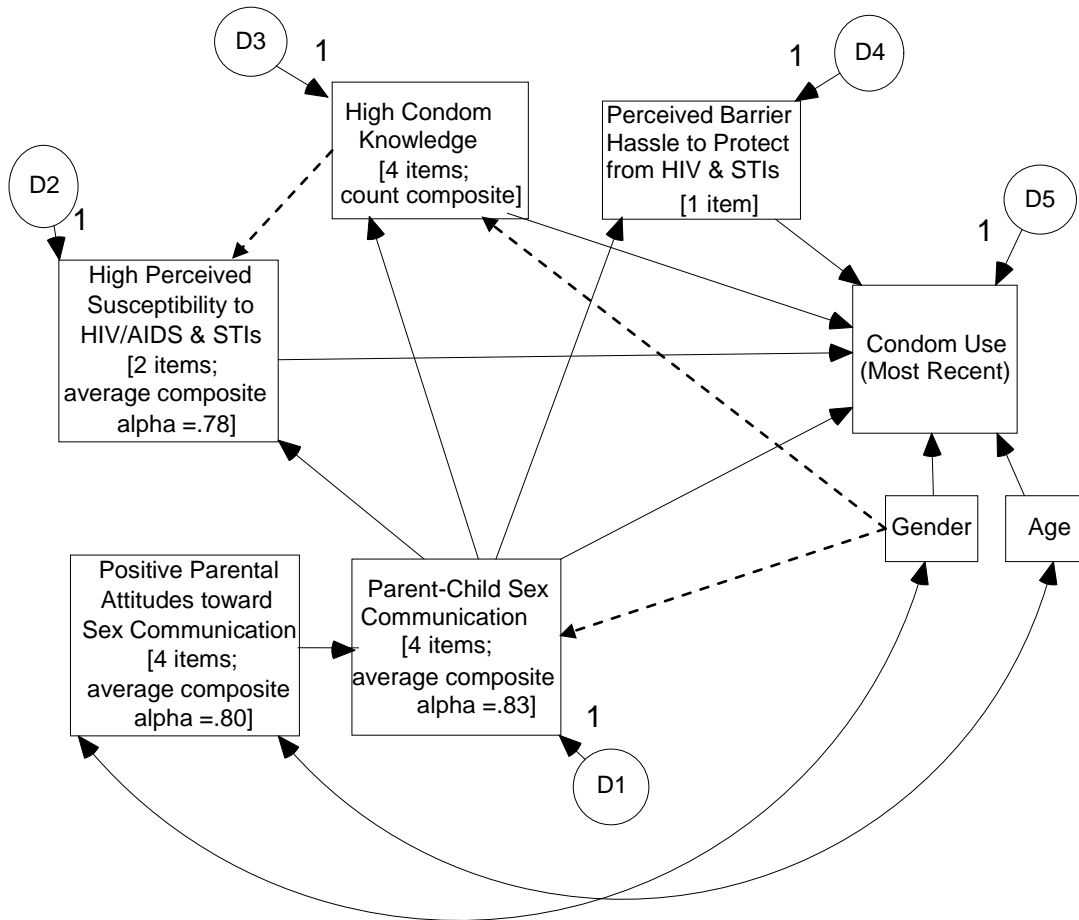
excellent fit.

Figure 4.1.
Full Tested Model with Mediation Effects.

Mediation effects. Four mediation paths were tested for statistical significance.

The four paths from *parental attitudes toward sex communication* were mediated by the

parent-child sex communication variable. In Figure 4.2, the four direct paths from

parent-child sex communication—that is, the paths to *perceived susceptibility* (b1),

condom knowledge (b2), *perceived barriers* (b3), and *condom use (most recent)* (b4)—

were tested. The path between *parental attitudes toward sex communication* and *parent-*

child sex communication is labeled *a*. The product of a*b1, a*b2, a*b3, a*b4 represent

mediation effects. The significant indirect path, shown as a bolder set of arrows, along

with the other parameter estimates is shown in Figure 4.2. The indirect effects results are

shown below in Table 4.2.

Table 4.2

Mediation Effects of Parental Attitudes Toward Sex Communication on Various Outcomes

Variables	Indirect Effect (*p*-value)
Parental Attitudes→Parent-Child Sex Communication→	
Perceived Susceptibility	-0.0005 (0.919)
Condom Knowledge	0.0008 (0.955)
Perceived Barriers	0.0449 (0.045)*
Condom Use (Most Recent)	0.0277 (0.282)

Note. *p* < 0.05

The Wald Test of parameter constraints was used to test the significance of each

of the four mediation effects. Only one significant mediation effect was found: the

product of path *a*b3* (*b* = 0.0449, *p* = 0.045). Therefore, the null hypothesis was

accepted—that is, that parent-child sex communication does mediate the relationship

between parental attitudes towards sex communication and perceived barriers. Also, the

re-specified model shown in Figure 4.1 created new mediating paths. Only one of the six

new mediated paths (i.e., *c1*c2*) was significant, as is shown in Figure 4.2. Condom

knowledge mediated the relationship between gender and perceived susceptibility. The

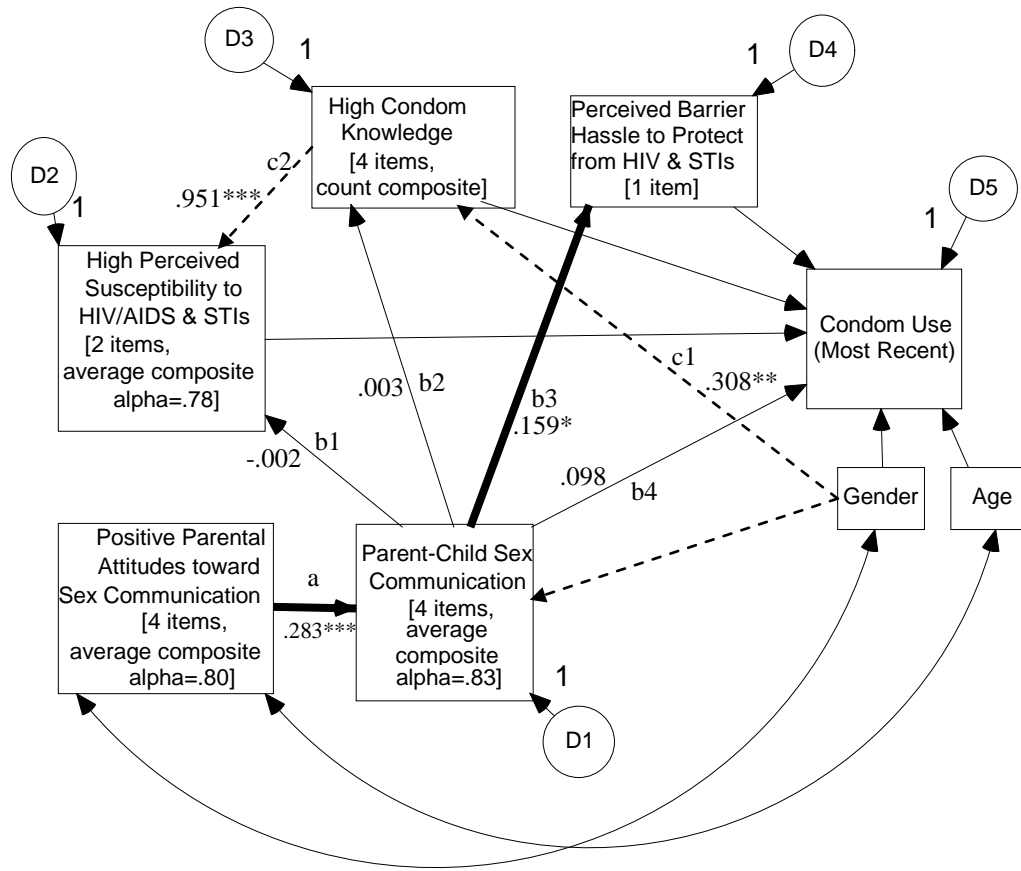Wald Test was statistically significant (*b* = 0.292, *p* = 0.006).

Figure 4.2. Mediation Effects of Parental Attitudes Toward Sex Communication on Various Outcomes.
Note. *p<0.05   **p<0.01   ***p<0.001

The results of the direct effects are shown in Table 4.3. I report the

unstandardized coefficients, standard error (*SE*), and *p*-values of the model. As shown in

the Table 4.3, the direct effects between the predictors or independent variables and most

recent condom use are not significant. Thus, for Hypothesis 1, the null hypothesis was

not accepted—that is, that perceived susceptibility does not predict condom use at most

recent intercourse. However, there were several significant paths in the model which are

reported below. Figure 4.2 labels the significant direct effect paths with their

unstandardized coefficients.

Table 4.3

Parameter Estimates for the Full Tested Model

Predictor Variables	**Outcome Variables**				
	Perceived Susceptibility	Parent-Child Sex Communication	Condom Knowledge	Perceived Barriers	Condom Use
Gender	--	0.183** (0.072)	0.308** (0.111)	--	--
Age	--	--	--	--	--
Parental Attitudes	--	0.283*** (0.051)	--	--	--
Perceived Susceptibility	--	--	--	--	--
Condom Knowledge	0.951*** (0.019)	--	--	--	--
Perceived Barriers	--	--	--	--	--
Parent-Child Sex Communication	--	--	--	0.159* (0.068)	--
Condom Use	--	--	--	--	--
Intercept	0.155	2.125	3.855	3.310	--
R^2	0.820***	0.119***	0.023	0.017	0.091

Note. The double dash line (--) indicates that data are not reported.
The number within parentheses is the standard error.
*$p < 0.05$ **$p < 0.01$ ***$p < 0.001$

Gender had a significant effect on parent-child sex communication and condom knowledge. Adolescent female respondent scores were higher by 0.183 points on the parent-child sex communication scale compared to males ($p = 0.011$). Also, female respondent scores were higher by 0.308 points on the condom knowledge scale compared to males ($p = 0.006$). The results also show that as the parental attitudes towards sex communication scale increased by one, the parent-child sex communication scale increased by 0.283 points ($p = 0.001$). As the condom knowledge scale increased by one, the perceived susceptibility scale increased by 0.951 points ($p = 0.001$). Finally, as the parent-child sex communication scale increased by one, the perceived barriers scale increased by 0.159 points ($p = 0.020$).

Next, I report the percentage of variance explained in all endogenous variables. For *perceived susceptibility*, 82% of the variation was explained by parent-child sex communication and condom knowledge. For the variable *parent-child sex communication*, 11.9% of the variation was explained by parental attitudes towards sex communication and gender. For the variable *condom knowledge*, 2.3% of the variation was explained by parent-child sex communication and gender. Only 1.7% of the variation in *perceived barriers* was explained by parent-child sex communication. For the *condom use (most recent),* 9.1% of the variation was explained by perceived susceptibility, condom knowledge, perceived barriers, parent-child sex communication, gender, and age.

Moderation effect models. The moderation effects in Path Models 2 and 3 were not significant. This means that for both Hypotheses 2 and 3, the null hypothesis was not accepted—that is, that parent-child sex communication (Hypothesis 2) and condom knowledge (Hypothesis 3) do not moderate the relationship between variables. Because the moderation effect was not significant, the full mediation model—that is, the one displayed in Figure 4.1—is the final model for analysis.

Summary

This chapter presented the path analysis findings for this study. First, the descriptive statistics for the sample were presented. Next, the model fit and the model re-specification were described. The model re-specification confirmed the model that would be used to conduct the proposed hypothesis tests, which was the model with the best fit. The findings of the hypothesized mediation effects were presented. One of the mediated paths was significant. The six new mediated paths introduced as a result of model re-specification were tested, and one of these new six mediated paths was significant. Direct

paths from the *perceived susceptibility*, *condom knowledge*, *perceived barriers*, and *parent-child sex communication* variables to most recent condom use were not significant. However, some of the variables that were regressed on other variables within the model were significant. Finally, the moderation effect models were also not significant. In the next chapter, I will discuss in detail what these results mean for this sample of adolescents. I will also discuss implications for research.

CHAPTER 5

DISCUSSION AND RESEARCH IMPLICATIONS

In this chapter, I begin with a discussion of the limitations of this study before turning to a discussion of the findings. The discussion of the findings includes an assessment of how well the HBM constructs and other variables performed to understand condom use in this population of adolescents. Lastly, I discuss the study's implications for intervention research.

Limitations

This study has six major limitations. The first limitation is that the study used a cross-sectional design, which by definition includes only one point of data from each individual in the study sample. Analyzing data from a single time point prevents researchers from establishing causal relationships because time order is impossible to demonstrate (Hulley & Cummings, 1998; Yegidis & Weinbach, 2009). For example, we do not know when parent-child sex communication took place. In the model, parent-child sex communication was significant and positively associated with perceived barriers. However, because of the issue of temporality, it cannot be known whether sex communication with parents caused a change in perceived barriers or if, instead, adolescents already had low perceived barriers to condom use prior to parental communication. Consequently, it cannot be assumed that parent-child sex communication predicts or causes low perceived susceptibility. In a temporal model, I may have been able to detect a change between these two variables, but without being able to test this

relationship, I cannot determine the direction of the relationship. In addition, a temporal model could have allowed me to assess the impact of parent-child communication on perceived barriers, but again, without testing this type of model, I cannot determine if the impact would be positive or negative. Future studies should include a longitudinal design to establish causal relationships among variables. A longitudinal design also would have allowed me to examine changes in condom use behavior and perceptions of susceptibility to HIV/AIDS and STIs over time. For example, if I had been able to assess the behaviors and perceptions among the respondents six years later when Wave III data were collected, this would allow me to observe any changes in perception, condom knowledge, and condom use behavior as the respondents transitioned from adolescence to young adulthood.

A second limitation of this study is the use of self-report measures and the use of face-to-face interviews. The use of self-report measures raises questions about the reliability and validity of the responses, particularly those pertaining to sensitive issues such as sexual behaviors (Clark et al., 1997). For example, males tend to over-report their number of sexual partners compared with females (Catania, Gibson, Chitwood, & Coates, 1990), and those inflated numbers could skew the data. This limitation is slightly mitigated by the fact that the Add Health data collection team used audio computer-assisted interviewing (ACASI) for survey sections with sensitive content. The use of ACASI has been credited with reducing socially desirable responding and producing significantly higher reported frequencies of sensitive behaviors among high-risk groups, including adolescents (Macalino, Celentano, Latkin, Strathdee, & Vlahov, 2002; Turner et al., 1998). While it is not apparent if increased privacy during data collection

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decreases socially desirable responses across different types of sexual behavior questions and different subpopulations (Catania et al., 1990), the use of the ACASI software to collect the adolescent data could have increased self-report accuracy and validity among the Add Health respondents. However, because HIV/AIDS prevention among minority populations, particularly African Americans, has been the focus since the mid 1990s (Catania et al., 1990), it is still quite possible that this subsample of adolescent respondents may have provided responses deemed to be socially desirable in terms of reporting protective behaviors, such as condom use.

Unlike the adolescent in-home questionnaire, the parent questionnaire was administered entirely by an interviewer (i.e., without the use of ACASI). Although the parent questionnaire does not include items assessing parent sexual behaviors, the questionnaire does include items that elicit information about parents' relationship with the adolescent and their overall parenting style. The parent questionnaire also requests sensitive information concerning adolescent behaviors, including sexual behavior. Face-to-face interviews could have increased the likelihood of parents providing responses that they viewed as socially acceptable (i.e., social desirability bias). Earlier evidence has shown that face-to-face interviews produce more measurement error than other modes of data collection (Catania et al., 1990). This being said, face-to-face data collection could have biased the results in an upward direction, in that parents' responses could have been based on social desirability. For example, parents may over-report that they have discussed the dangers of getting an STI with their adolescent to reflect the underlying values of the culture or the purpose of the Add Health study. On the other hand, face-to-face interviews provide parents the opportunity to correct any misperceptions about

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questions and establish a level of trust with interviewers, which could counteract the effects of social desirability bias. The impact of the face-to-face mode of data collection on this subpopulation of African American parents is not known.

The third limitation of this study is that it did not measure all the constructs of the HBM. The Add Health data did not contain items that would have allowed me to measure perceived benefits and self-efficacy. For example, because the *perceived benefits* variable was not measured, I could not assess the benefits and barriers relationship described by the founders of the model. The original HBM purports that individuals weigh the benefits and barriers of performing a given behavior. If the perceived benefits outweigh the perceived barriers, the individual is likely to perform the behavior. Without a measure to assess perceived benefits, it was not possible to assess whether benefits and barriers would have been significantly related to condom use. I was also unable to measure self-efficacy and its relationship to condom use. Although the literature indicates that self-efficacy is related to condom use, without a measure to properly assess that construct, I am unable to determine the impact or the significance the variable would have had on the other variables in the study.

The fourth limitation of this study was that it used the same subsample to test multiple model re-specifications. Researchers may test several competing models to determine the most parsimonious model. The models are usually tested with a sample that has characteristics similar to the population of interest. The first proposed model for this study (see Figure 3.1) was modified several times prior to achieving a model that best fit the data. Specifically, the first model was re-specified and a direct path was added from gender to parent-child sex communication. However, the same subsample of adolescents

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was used to test this re-specified model. The consequence of using this same subsample was the inability to determine if the model would have produced similar path estimations with a sample with characteristics similar (but not identical) to the population of interest. Using a subset of the subsample of interest to test models as they were re-specified would have allowed me to detect possible nuances in the sample that could have impacted model fit. If the model had been tested with a subset of the subsample, I could have determined whether characteristics unique to certain adolescents impact the relationship between variables in the model, and consequently, how the relationship between variables impacts condom use among rural African American adolescents.

A fifth limitation is that the study examined adolescent condom use behavior only among those reporting heterosexual sexual activity. The Add Health adolescent questionnaire defined sexual intercourse as when a male inserts his penis into a female's vagina. My subsample included only those Add Health participants who self-reported having engaged in sexual intercourse using the above definition. Because Add Health's definition of sexual intercourse excluded adolescent males who have had sex only with other males, these adolescent MSM were automatically excluded from this study. It is possible that some of the MSM respondents could have also had sexual intercourse with a female at some point, but Add Health's use of this heterosexual definition of intercourse likely eliminated at least some MSM adolescents from this study.

In addition to excluding MSM adolescents from this study, adolescent females who identify as bisexual or lesbian may have also been excluded. Adolescent females who identify as bisexual or lesbian are at high risk for infections as well. Although the literature is limited regarding the risk behaviors of bisexual and lesbian adolescent

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females, research with young adult bisexual and lesbian women indicated that they have a higher prevalence of HIV infection than heterosexual women (Rosario, Hunter, Mahler, & Gwadz, 1999). Bisexual and lesbian women are also likely to have a history of engaging in unprotected sex with men, including gay and bisexual men (Rosario et al., 1999). These women may also engage in unprotected oral sex and other risky behaviors with women, including *vaginal fisting* and sharing dildos (Rosario et al., 1999). In general, sexual minority adolescents are more likely to report sexual risk behaviors and other risk behaviors such as substance abuse compared to heterosexual adolescents. However, sexual minority adolescents may be less likely to received HIV/AIDS prevention education or education on correct condom use compared to heterosexual adolescents (Blake et al., 2001; Rosario et al., 1999). Future research should include sexual minority adolescents to assess risk behaviors and to inform the development of prevention education programs that address the specific needs of this particular population of sexually active adolescents.

The last limitation is that the Add Health Wave I data is 15 years old. It is possible that condom use behavior could be different in a more recent sample. An adolescent's perceived susceptibility may differ as well. In comparing condom use in this sample of Add Health adolescents with the CDC's 2007 YRBS sample of African American adolescents, I found that the rate of condom use during most recent intercourse was 67.5% among all African American adolescents who completed the YRBS. That rate was 61% for the rural African American adolescents sampled in this dissertation study. Ideally, a more recent sample could tell us more about condom use among rural African American adolescents.

Discussion of Findings

        I will begin by addressing the findings about the two HBM variables in the model, *perceived susceptibility* and *perceived barriers*. These two constructs did not hold to the assumptions of the HBM for this sample of sexually active, rural African American adolescents. The *perceived susceptibility* variable was not significantly related to the *most recent condom use* variable in my findings. This means that according to my findings, the perception of personal risk for HIV/AIDS and STIs is not related to condom use. According to the HBM, perceived susceptibility is a key predictor of behavior change. Maiman and Becker (1974) proposed that perceived susceptibility determines psychological readiness to take action in performing a preventive behavior. The rural African American adolescents in this sample did not report high perceptions of susceptibility for HIV/AIDS and other STIs (see Table 3.1). In fact, adolescents reported that their chances of getting AIDS were either *very low* (35%) and *none* (37%), and nearly half (45%) reported their chances of getting another kind of STI were *none*. Despite the fact that the adolescents reported low perceived susceptibility to infection, this did not translate into an increase in condom use or not during most recent sexual intercourse. However, because there have been no other studies employing the HBM with sexually active rural African American adolescents, it cannot be assumed that perceived susceptibility is the primary determinant of condom use for this population. It is possible that perceived susceptibility is not a motivator for a behavior change such as condom use among adolescents and young adults, a possibility which is supported by the findings of several studies conducted with predominantly White college students (Baldwin & Baldwin, 1988; Carroll, 1998; Lollis et al., 1997).

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However, it is also possible that perceived susceptibility is indeed a predictor of condom use, but only when perceived benefits to condom use and self-efficacy are present in the model as well. In previous studies using the HBM, the *perceived benefits* and *self-efficacy* variables were typically measured in addition to perceived susceptibility. In several studies that measured perceived susceptibility in addition to perceived benefits and self-efficacy, researchers found that perceived susceptibility was related to condom use (Basen-Engquist, 1992; Mahoney, Thombs, & Ford, 1995; Orr & Langefeld, 1993); however, other studies did not find that perceived susceptibility predicted or was related to condom use when perceived benefits and self-efficacy were measured (Orr & Langefield, 1993; Steers, Elliott, Nemiro, Ditman, & Oskamp, 1996; Walter et al., 1993). The subsample of African American adolescents used in this dissertation study may require a model that includes perceived benefits and self-efficacy measures to demonstrate a significant relationship between perceived susceptibility and condom use. In other words, the constructs of *perceived susceptibility*, *perceived benefits minus perceived barriers*, and *self-efficacy* may collectively play a role in the psychological readiness to engage in condom use for rural African American adolescents. Future research should test the full model to answer the proposed questions. It is also possible that the HBM lacks the ability to measure behaviors with this subsample and that the model must be revised to relevancy in this group.

Similar to perceived susceptibility, the construct of *perceived barriers* was not significantly related to condom use in this dissertation study. These rural African American adolescents did not have high perceived barriers to protecting themselves from STIs, but this perception was not related to higher condom use during most recent sexual

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intercourse. My findings are in contrast with those of another study conducted with inner-city African American adolescents. In that study, by DiClemente and colleagues (1992), adolescents with high perceived barriers were less likely to report condom use compared to those reporting low perceived barriers. It is unclear why the low perceived barriers among the rural African American adolescents in this study are not significantly related to higher condom use. It is possible that the adolescents in this study may have required higher perceived susceptibility to infection in order for low perceived barriers to have become significantly related to condom use.

Another possible reason for the non-significant relationship between perceived barriers and condom use may again be the missing measures of perceived benefits and self-efficacy in this model. Because the Add Health data did not measure perceived benefits and self-efficacy, I could not include those things in my model. As a result, *perceived susceptibility* acted as the only theoretical determinant of the adolescent's decision to use condoms. Rosenstock, one of the developers of the HBM, offers some insight into how perceived susceptibility and perceived barriers theoretically function together. Rosenstock (1974) discussed the individual's conflict to engage in preventive behavior when he or she has high readiness to act and has high perceived barriers within the HBM framework. He proposed that an individual may engage in a preventive behavior only once to relieve the perceived health danger (Rosenstock, 1974); however, his model does not suggest a resolution for individuals who need to maintain a preventive behavior over an extended period. Rosenstock's theory does not seem to explain behaviors of the adolescents in this study who were theoretically assumed to have low readiness to act and low perceived barriers, as the HBM does not provide a resolution for

initiating or maintaining preventive behavior. In general, there simply may be adolescent characteristics that are not measured in this model, such as experiencing trauma, violence, and lack of perceived behavioral control. These are all factors that could be potential moderators in determining condom use behavior.

The inability of my model to assess the tension between the adolescents' perceived benefits and perceived barriers notwithstanding, it is possible that my perceived barriers variable could have simply been a poorly performing variable. The single item used to measure perceived barriers was not specific to barriers to condom use. Rather, the item was a broad statement that indicated it would be a "hassle" to do the things necessary to completely protect ones' self from getting an STI. The adolescents could have interpreted this item in a variety of different ways. With primary data collection, it is recommended that the investigators test their survey measures by conducting cognitive interviews (Tourangeau, Rips, & Rasinski, 2000) with a representative sample of the population of interest. Cognitive interviewing allows the researcher to determine if the respondent has a clear understanding of the question and if the respondent's understanding coincides with the researcher's intended purpose. Because this dissertation used secondary data for analyses, I could not test adolescents' understanding or interpretation of perceived barriers. Thus, it is possible that the adolescents' perceived barriers to protecting themselves from STIs were not specific to condom use, thereby resulting in a non-significant relationship with the condom use variable.

My results also showed that parent-child sex communication significantly mediated the relationship between parental attitudes towards sex communication and

perceived barriers. This finding could suggest that parents who communicate with their

adolescents about sex may also educate them about protecting themselves from

HIV/AIDS and STIs. It could also suggest that the parents who engage in communication

about sexual health behaviors with their adolescent may display parental openness and

support, which could in turn reduce adolescents' perception of barriers to protecting

themselves from infection.

The other variables in my model also were not related to condom use. For

example, parent-child sex communication was not related to condom use. The lack of

significance in this path was an unexpected finding, as the literature is consistent in

supporting the importance of parent-child sex communication and its influence on

condom use (Miller et al., 1998; Whitaker & Miller, 2000). The results could support the

Jaccard and Dittus (1993) findings, where they found parent-child sex communication to

be less influential among those adolescents who had already initiated sexual intercourse.

Because this study included a sexually active sample of adolescents, parent-child sex

communication could have been less influential on condom use among this sample. Other

researchers have argued that the issue is not that adolescents are already sexually active,

but that behavior change depends on the timing and content of the parent-child sex

communication, as well as parental responsiveness and whether the parent has permissive

or conservative views about sex (Eisenberg et al., 2006; Miller et al., 1998; Whitaker &

Miller, 2000). Unfortunately, this study did not allow for the assessment of such factors

as parental responsiveness and communication timing. The items used to compose the

parent-child sex communication variable covered a wide range of discussion points (e.g.,

dangers of getting an STI, sex and the negative impact on social life, moral issues for not

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having sex, etc.), and the descriptive statistics (see Table 3.1) indicate that most parents

discussed the different topics represented by each item *a moderate amount* to *a great*

deal. However, the impact of each individual item on condom use is unknown due to

issues of temporality inherent in the study's cross-sectional design.

My results also showed that parent-child sex communication did not mediate

other relationships in the model beyond perceived barriers. Parent-child sex

communication was not significantly related to perceived susceptibility, condom

knowledge, or condom use. These findings suggest that there are other factors not tested

in the model that are related to these other variables (i.e., perceived susceptibility,

condom knowledge, and condom use). In addition to the possible psychosocial factors

listed earlier (trauma, violence, perceived behavioral control), another possible factor

may be the historical events that happened during the 1990s that could have shaped the

perceptions and behaviors of individuals, which would have occurred around the time

that the Wave I Add Health data were collected.

A brief overview of the history of HIV/AIDS in the United States may provide

some insight into why relationships among variables in the model were not found to be

significant. Throughout much of the 1980s, AIDS was believed to be a "gay disease"

(Avert, 2011). However, researchers later discovered that intravenous drug users and

hemophiliacs were at risk for the disease as well. Researchers also discovered that there

were small groups of heterosexual men and women with the disease; nonetheless, it was

still mainly viewed as a disease among gay men (Avert, 2011) until well into the 1990s.

During the early years of the 1980s, many of the newly diagnosed cases of AIDS were

among gay men living in large metropolitan areas such as Los Angeles, New York City,

and San Francisco (Avert, 2011). It was not until 1986 that the U.S. Surgeon General released a report regarding the state of the AIDS in the United States; among the many recommendations in this landmark report was that parents and schools have "frank" and "open" discussions about AIDS (Avert, 2011). In 1988, a national AIDS education campaign was launched in which brochures were mailed to all 107 million American households (Avert, 2011). This was the first national effort to educate all Americans about AIDS. In 1991, renowned basketball player Ervin "Magic" Johnson announced that he was HIV-positive. In the month following Johnson's announcement, HIV testing increased by almost 60% in New York City (Avert, 2011). His announcement had a significant impact on public AIDS awareness.

This brief overview pinpoints several key issues that impacted all Americans, but I will continue to focus on the potential impact of HIV/AIDS on this dissertation's subsample of rural African American adolescents. First, HIV/AIDS was thought to be a disease affecting only gay men, which probably gave a false sense of safety from the disease for individuals who were not gay. Consequently, some of the parents in this study may not have expressed grave concern about HIV/AIDS when communicating with their adolescent about sexual health behaviors, particularly if they presumed that their adolescent was not gay. Further, if any the adolescents in this dissertation study were gay, the stigma surrounding both homosexuality and having AIDS would have presented challenges for gay adolescents to discuss their personal concerns about protecting themselves from the disease. In addition, gay adolescents may have faced challenges in accessing confidential healthcare that targeted the adolescent population. As mentioned in Chapter 1, rural residents already face challenges with healthcare confidentiality in

rural communities, which impact healthcare seeking behaviors. For rural adolescents who feared the stigma of being stigmatized as being gay or having AIDS, these challenges may have been insurmountable.

Second, because most of the reported cases of HIV/AIDS were in large cities, little attention was given to rural areas until the 1990s, when the rate of HIV diagnoses among young African American women in rural areas began to climb (Doherty et al., 2009). From this perspective, rural parents and adolescents could have perceived that they were less susceptible to infection because the disease had been presented as a disease that affected those residing in "big cities," which could explain the low perceived susceptibility among adolescents in this study. The data did not contain a measure that assessed the parent's perceived susceptibility to HIV/AIDS or other STIs.

Nonetheless, low perception of susceptibility to infection in rural areas could have influenced the content of sex communication between the parents and adolescents in this study, in that parents could have placed less emphasis on adolescents protecting themselves from HIV/AIDS. This low perception of susceptibility could have also resulted in parents providing less information about condom use while focusing more on the general dangers of getting STIs, the social consequences of having sex, and avoiding pregnancy or getting someone pregnant. In this subsample, the actual content of the parent-adolescent sex discussion is not measured. The given measures of parent-adolescent sex communication may not reflect the communication that occurs among this population. Further, the Add Health data does not provide the dosage of parent-child sex communication; the amount of sex communication received could affect behavior. Last, the HBM may not be helpful in assessing behavior change when guidance is introduced.

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Third, the U.S. government's lack of urgency and aggressiveness in increasing public awareness about HIV/AIDS could have also led to misconceptions about the enormity of the epidemic in the U.S. and the health consequences of the disease. The government's response to HIV/AIDS more than likely affected healthcare policy as well as providers' response to HIV/AIDS, in that educating and testing may not have been emphasized for patients presumed to be at low risk (i.e., patients who were not identified as homosexual men and had no history of intravenous drug use). Consequently, many rural African Americans may not have received information about HIV testing and AIDS prevention, including information about condom use as a method of reducing the spread of disease. Again, all of these events could certainly have impacted individuals' perceived susceptibility to infection, their amount of condom knowledge and rate of condom use, and the likelihood, frequency, and content of parents' sex communication with their adolescents. The factors listed here could offer some explanation as to why parent-child sex communication was not found to be related to any of the other variables in the model except perceived barriers. However, without the ability to measure the impact of these historical events, the amount of influence these factors had on parent-child sex communication remains unknown.

In addition to all the other possible factors affecting the relationship of parent-child sex communication to condom use, the actual performance of the variable could be a problem as well. The measures used to construct the parent-child sex communication variable did not pertain specifically to condom use. The measures asked if parents talked with their adolescent about the overall dangers of getting an STI, the moral issues of not having sex, and the social consequences of having sex. As such, the parent-child sex

communication variable may not have been an adequate means to assess the relationship of parent-child sex communication to condom use or its relationship to perceived susceptibility and condom knowledge.

Another interesting finding regarding parent-child sex communication resulted from the new path introduced by the model re-specification. This new path introduced gender as a predictor of parent-child sex communication. The path was statistically significant and strong. This finding means that female youth have more parent-child sex communication than male youth. This relationship is supported by the current literature which indicates that parent-child sexual communication tends to follow gender lines. In this study, more than 80% of the parent respondents were mothers. The literature has shown that mothers are more likely to communicate with their daughters about sexual topics than with their sons (Miller et al., 1998; Warren & Neer, 1986). However, as stated in Chapter 2, mothers are usually adolescents' primary source of sexual information and are more likely to initiate sex communication with their adolescent regardless of the adolescent's gender (Feldman & Rosenthal, 2000; Miller, Kotchick, Dorsey, Forehead, & Ham, 1998).

Parental attitudes towards sex communication had a significant effect on parent-child sex communication. The descriptive statistics of the items used to compose the parental attitudes variable (see Table 3.1) showed that the majority of parents were in favor of talking about sexual topics with their adolescents. Although I did not hypothesize the relationship between parental attitudes towards sex communication and parent-child sex communication, I expected to find that positive parental attitudes towards communicating with adolescents about sex would be related to increased parent-

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child sex communication. Parents who support talking with their adolescent about sexual behaviors are likely to actually engage in such conversations. Though the content and depth of the conversation may vary, parents with positive attitudes toward sex communication may possess more willingness to have these conversations than parents who have less positive attitudes. However, the literature has shown that parents with more conservative views about sex education prefer to educate their adolescent about sexual topics but also support sex education from outside institutions (Jordan et al., 2000). Parents who decide to take it upon themselves to educate their adolescent about sex (i.e., instead of relying on outside institutions) can control the content of that education. Parental control over content may allow parents to feel more at ease with discussing sensitive topics with their adolescents. This study has shown that rural African American parents are similar to other African American parents in that they are in favor of parent-child sex communication. But again, the actual content of the sex communication that the parents may have had with their adolescent is not provided in Add Health data.

Parents' positive attitudes towards sex communication could be a result of their ability to discuss sexual topics with ease and that are within the parent's comfort zone. The questions used to create the *parental attitudes towards sex communication* variable did not ask specifically about the parent's ability to discuss proper condom use or condom knowledge, or how to explain to their adolescent their risk getting HIV/AIDS and other STIs. It is unknown if parental attitudes towards sex communication would still be significantly related to parent-child sex communication had parents been asked more

specific questions about discussing condom use or explaining to adolescents their risk for infection.

The *condom knowledge* variable was not related to condom use. However, gender was strongly related to condom knowledge, and the relationship between these two variables was significant. Sexually active females have higher levels of condom knowledge compared with sexually active males. Previous research has noted that adolescent females may be more knowledgeable about condom use and their overall risk for infection because they are more likely to receive healthcare services than male adolescents (Committee on Adolescence, 2001). Females' access to healthcare services is likely to provide them with greater exposure to correct condom knowledge. The adolescent females in this study may be no different from adolescent females in the general population in terms of having greater access to healthcare services where they are likely exposed to information about reproductive health and condom use information. The findings of this dissertation study are supported by a previous study that found that male adolescents ages 15 to years were consistently more likely than females in the same age group to have misconceptions about correct condom use (Crosby & Yarber, 2001). Crosby and Yarber (2001) found that even among the sexually inexperienced males and females, females had higher condom knowledge. Crosby and Yarber (2001) suggested that without condom knowledge adolescents will potentially engage in ineffective condom use.

Condom knowledge was strongly related to perceived susceptibility, and the relationship was statistically significant. In this sample of rural African American adolescents, respondents answered more than half of the condom knowledge questions

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correctly. In this sample, higher condom knowledge resulted in higher perceived

susceptibility to HIV/AIDS and other STIs. This finding may be particularly true for the

female respondents in this study since gender was found to be related to condom

knowledge and females generally are more likely to have exposure to information about

reproductive health and prevention of STIs. In addition, the statistically significant

mediated path between gender and perceived susceptibility through condom knowledge

suggests that females have higher perceived susceptibility compared with males because

of females reported higher condom knowledge. Gender was also found to be significantly

related to parent-child sex communication in this study, with females having higher

levels of communication with their parent(s). This may mean that female adolescents

received information about their risk for infections during sex communication with their

parent. In general, whether male or female, adolescents who have high condom

knowledge may also have been exposed to information about their risk for infections, but

in this dissertation study female adolescents may have greater perceived susceptibility to

infection than male adolescents.

Summary

      Overall, the model had an excellent fit. However, the HBM framework did not

hold in the model with this sample. The two main constructs from the HBM, perceived

susceptibility and perceived barriers, were not found to be related to condom use. None

of the other variables was related to condom use directly or indirectly. However, the

model does support existing literature which states that that parents who look favorably

upon parent-child sex communication are likely to engage their adolescents in

conversation about different sexual topics. Age was not significantly related to any of the

variables in the model. Gender, on the other hand, was related to parent-child sex communication and condom knowledge. Gender was also indirectly related to perceived susceptibility. Rural African American females were more aware of the risks for infections and had more correct knowledge than males.

Although the relationships between some of the variables were significant, path analysis cannot establish causality. Path analysis simply suggests that one variable is related to another variable as specified in the model. Despite this lack of causality, some of the findings were supported by the current literature. In general, most African American parents, regardless of geographic residence, have positive attitudes towards sex communication and are likely to engage in some form of sexual discussion with their adolescents. This study showed that rural parents are no exception. Parents continue to play an important role in educating their adolescents about sexual risk behaviors. Mothers are more likely to engage their adolescents in parent-child sex communication, and typically with their daughters, which may be one of the reasons why females are more aware of their susceptibility to infection than males.

This sample of rural sexually active adolescents had a moderate amount of condom knowledge, but having condom knowledge was not related to condom use directly or indirectly. Again, my inability to measure perceived benefits to condom use and self-efficacy in condom use may have influenced the relationship between condom knowledge and condom use. For example, measuring the relationship of self-efficacy to condom use could have influenced the estimates between condom knowledge and condom use to show a significant relationship. Assessing condom knowledge alone may not have been sufficient to lead to condom use behavior. Nonetheless, possessing the

skills to use a condom has been shown in the literature to be related to condom use. Data limitations did not allow me to assess both condom knowledge and self-efficacy together.

To my knowledge, there are no reports in the literature of assessment of condom knowledge among rural African American adolescents. Thus, I was unable to identify and compare any unique characteristics that may exist within this subsample of rural African American adolescents and their amount of condom knowledge to other studies with rural African American adolescents. Another study conducted with adolescents living in rural areas of California found that AIDS knowledge did not increase the likelihood that an individual would engage in a particular protective behavior (Durant et al., 1992). However, that study consisted of a sample of adolescents who were either White or Asian. The Add Health data did not contain questions specific to AIDS knowledge; therefore, I could not assess whether the amount of AIDS knowledge was related to condom use. Nevertheless, these current findings from this dissertation study provide implications for future research on HIV/AIDS and STI prevention intervention among rural African American adolescents.

Implications for Intervention Research.

The findings of this study show that parents play an important role in communicating with adolescents about sexual topics. I have identified five implications for future intervention research. First, effective HIV/AIDS and STI prevention intervention research with rural African American adolescents should involve parents in the intervention as well. Involving parents in intervention research will give them an opportunity to increase their personal knowledge about sexual health topics, which may allow them to feel more comfortable when discussing sensitive topics such as sexual

behaviors with their adolescents. Parents may also gain skills to help them more effectively communicate these topics.

Second, interventions should specifically target fathers to participate in intervention with their adolescents. Because fathers are more likely to discuss sexual topics with their sons, having paternal involvement may increase father-son sex communication and ultimately increase adolescent males' perceived susceptibility, condom knowledge, and condom use. The intervention should also include effective sex communication skills for fathers. This dissertation study did not measure father-adolescent sex communication because the Add Health data did not include this measure. However, in general, the current literature is less likely to include information about father-adolescent sex communication. Therefore, less is known about the father's level of comfort and skills to effectively communicate with their adolescents about sexual risk behaviors. Even less is known about father's comfort and ability to discussion topics about sex with their opposite sex adolescent. Improving the father's level of comfort and ability to discuss sexual topics with their adolescent may increase the likelihood of them taking a more active role in discussing sexual risk behaviors and protective behaviors with their adolescents.

In this dissertation study, the *parent-child sex communication* variable did not distinguish between mothers and fathers; however, mothers represented the majority of responding parents among this sample (see Table 3.1). Nearly half of the parents in the sample reported that they were married; assuming that the husband or father resides in the family home, then almost 50% of fathers are available to educate the adolescent about safe sex behaviors. In some of these cases the father may actively take part in sex

communication with their adolescent, but as the literature has pointed out, mothers are still more likely to initiate sexual behavior discussions. Paternal involvement should include non-residential fathers as well. Today, most African American households are headed by single African American women (Annie E. Casey Foundation, 2009; Brody & Flor, 1998; Jarrett, 1994). However, even fathers who don't live with their children can still share the responsibility of educating their adolescent about protecting themselves from HIV/AIDS and other STIs.

Third, special consideration should be given to adolescent males who have lower levels of condom knowledge, a contraceptive primarily marketed to and used by males. Public health prevention programs and intervention research must seek to improve condom knowledge among adolescent males. Educational materials should include information on condom use facts, including the types of condoms that effectively prevent infection and the types of lubricant to use, in addition to proper condom application. To ensure that parents will be able to provide accurate information about condom use and application to their children, training and awareness efforts should be targeted not just to adolescents but also to their parents as well.

The fourth implication of this research is that interventions should address not only personal-level risk of contracting HIV and STIs but also community-level risk. Future intervention researchers should develop and test an innovative approach to increasing protective behaviors (e.g., condom use) by increasing awareness among adolescents and their parents about their community-level risk for infections. The goal of this approach is to encourage adolescents to assess their relative risk for infections (i.e., How does your risk of getting a disease compare to others?) in addition to their personal

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risk (i.e., What is your chance of getting an STI?). I believe this approach will be especially useful in rural communities with high prevalence rates of HIV/AIDS and STIs. Understanding community-level risks will allow adolescents to see that any person in their community could be infected, and that therefore, no individual is excluded from risk of becoming infected. Practical ways of increasing awareness of relative risk include the increasing adolescents' understanding of sexual networks and patterns of infection transmission (Adimora et al., 2006). This approach should also include more HIV/AIDS and STI awareness campaigns in rural communities and within school settings. Adolescents and parents should receive up-to-date information about HIV/AIDS and STI rates within their community from their local health departments. Sexual health educators would be responsible for providing accurate information and access to care, especially for those who traditionally are underserved.

For a community-level approach to intervention, the HBM may not be applicable. The HBM is a model that evaluates behavior change at the individual level. Although community-level interventions aim to reduce the spread of infection among individuals, reducing community-level risk will require a community-level theoretical framework. Two theoretical frameworks would provide effective models for a community-level approach to intervention: community organization and social cognitive theory. Community organization allows the community to identify a problem and then outline goals for the community, mobilize its resources, and develop and implement procedures to achieve the community goals (Minkler & Wallerstein, 2002). This model coincides with one of the key principles of social work in that this framework "starts where the people are." Community organization includes social involvement and participation,

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which can lead to increased perceived behavioral control and improved health behaviors (Minkler & Wallerstein, 2002). This theoretical approach may also be beneficial in maintaining community-wide investment in improving the health of the community. The second theory I would use in the community-level approach is social cognitive theory. Social cognitive theory is an interpersonal-level theory which states that the characteristics of the person, the person's behavior, and environment in which the behavior is performed interact together (Baranowski, Perry, & Parcel, 2002). Applying this framework to community-level disease prevention, adolescents and adults would obtain knowledge and skills to perform protective behaviors, learn how to confidently perform these behaviors by observing trained professionals and then modeling that behavior, and obtain information about the value of condom use and how using condoms is beneficial not only to their own health but to other community members as well.

Finally, reducing infection requires addressing structural risk factors, such as the lack of recreational outlets for adolescents (Adimora et al., 2010) that was discussed in Chapter 1. Employment opportunities and poverty rates are structural factors that communities can address and that could impact the overall health of the community. This approach is an indirect way of reducing the STI epidemic and other health disparities in the African American community in that intervening at the structural level focuses on the societal or systemic problems that contribute to the HIV/AIDS epidemic. Structural interventions require the involvement of many individuals, organizations, and various sectors of the community (e.g., medical providers, school administrators, local and state government, the legal system). This type of intervention also requires a community-wide and state-wide investment in reducing infection rates. This approach may demand more

time and financial commitment from communities, but the long-term benefits could

outweigh earlier costs.

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