NOTE TO USERS

USING THE ECOLOGICAL RISK/PROTECTIVE THOERY TO EXAMINE HIV-RELATED RISK/PROTECTIVE FACTORS AMONG AFRICAN-AMERICAN ADOLESCENTS

By

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APPROVAL PAGE

USING THE ECOLOGICAL RISK/PROTECTIVE THOERY TO EXAMINE HIV-RELATED RISK/PROTECTIVE FACTORS AMONG AFRICAN-AMERICAN ADOLESCENTS

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ABSTRACT

The Ecological Risk/Protective Theory has been commonly used to understand problematic and protective behavior in youth. To date, several studies have examined differences in risk/protective factors that influence sexual initiation and risky behaviors between majority and minority populations; however, little is known about testing the theory among a population comprised solely of minority youth. The purpose of this study was to utilize the Ecological Risk/Protective Theory to examine risk/protective factors that are related to African-American adolescents.

Data were collected from 456 African-American adolescents in the urban high schools of Nashville. Thirteen survey items provided information on reported sexual behavior, demographics, and risk/protective factors. The dependent variable consisted of three levels of sexual activity reported by those who demonstrate: primary abstinence (n = 131), secondary abstinence (n = 54), and sexually active (n = 148). All participants with missing data on the outcome variable were excluded from the data set, thus, a total of 333 participants' data were utilized in the final analysis.

The data was analyzed using SPSS Answer Tree Version 3.1 with the exhaustive CHAID (Chi-squared Automatic Interaction Detection) method. The

CHAID method employs either χ^2 or F statistics to identify sexual activity group characteristics based on relationships between risk/protective factors and self-reported sexual behavior. Five factors were identified as predictors of youth sexual behavior. In the primary abstinent and secondary abstinent groups, three protective factors (no intentions to have sex in the next six months, age, and gender) and two risk factors (intentions to have sex before marriage and beliefs about peers having sexual intercourse) were identified. In the sexually active group, three risk factors (intentions to have sex in the next six months, intentions to have sex before marriage, and beliefs about peers having sexual intercourse) were identified.

Further analysis revealed that the model correctly predicted 75% of the cases correctly with a risk estimate of 0.25. Overall, the Ecological Risk/Protective Theory was viable in explaining variables related to sexual behavior among African-American adolescents. Considering these risk/protective predictors identified in the study, meaningful interventions can be designed to reduce the risk of HIV infection among African-American adolescents.

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CHAPTER I

INTRODUCTION

In the past two decades, the numbers of Human Immunodeficiency Virus (HIV) cases have been on a steady rise in the United States. In 2000, the Centers for Disease Control and Prevention [CDC] (2002a) reported that 40,000 new HIV infections occur every year. Currently, it is estimated that between 800,000 and 900,000 Americans currently are living with HIV (CDC). Recent reports state that the total number of youth in the U.S. who have been infected with HIV is unknown, but public health officials believe that 20,000 people between 13 and 24 years of age are infected with HIV every year (White House, 2000).

Young adults and youth are at increased risk for acquiring HIV. This increase in risk may be due in part to the fact that the majority of youth are unaware of their HIV status. Latest estimates indicate that 180,000 to 280,000 of those infected are unaware of their status (Department of Health and Human Services [DHHS], 2003). Moreover, it is estimated that young Americans between the ages of 13-24 are contracting HIV at the rate of 2 per hour (White House, 2000). As a result, youth who do not know their HIV status are transmitting the HIV disease to their sexual partners.

Due to the escalating rates in HIV infection, one goal of Healthy People 2010 is to establish a 50% increase in the proportion of adolescents who abstain from sexual intercourse. Another goal is to increase the numbers of adolescents (from 85% to 95%) who use condoms, if they are sexually active (DHHS, 2000).

While there has been an overall drop in sexual risk behaviors and an increase in condom use among sexually active high school students (White House, 2000), the prevalence of HIV is still spreading rapidly among African-American adolescents. Several studies have suggested that minority adolescents are at an increased risk for acquiring HIV. According to O'Donnell, O'Donnell, and Stueve (2001), minority adolescents tend to reside in communities where the prevalence of HIV is disproportionately high, thus making high levels of sexual risk-taking especially dangerous. DiClemente (1992) concurs that some adolescents are clearly at an increased risk and their high-risk status may be a reflection of geography.

It has become apparent that African-American adolescents are at increased risk for acquiring HIV. In 2001, African-American adolescents accounted for a majority of the cases of HIV infection among males and females ages 13 to 19 (Leigh & Andrews, 2002). Leigh and Andrews stated that 52.1 % of new cases of HIV infection were reported among African Americans, even though African Americans make up only about 13 % of the U.S. population. Consequently, African American males, aged 13-19, represented 3% and females, aged 13-19, represented 9% of the newly diagnosed cases (CDC, 2001a).

To reduce the risk and prevent further instances of HIV infection in the African-American community, it is important to identify and understand the common factors associated with HIV-related risk behaviors among African-American adolescents.

Rationale for the Study

The purpose of this study was to examine common risk/protective factors that are related to African-American adolescents who report primary abstinence (PAb), secondary abstinence (SAb), and sexually active (SAc). By identifying factors related to African-American adolescents sexual behavior, this research contributes to the development of culturally based HIV prevention strategies and programs.

A rather large body of literature has identified various risk and protective factors that may influence youth development and behaviors leading to health risks (Bronfenbrenner, 1986; Corcoran, 2000; Jessor, 1991; Oman, Vesely, Kegler, McLeroy, & Aspy, 2003). In addition, several studies have examined differences in risk and protective factors that influence sexual initiation and risky behaviors between majority and minority populations (Langer, Warheit, & McDonald, 2001; Oman, Vesely, Aspy, McLeroy, & Luby, 2004; Miller, Forehand, & Kotchick, 2000). However, none have tested the Ecological Risk/Protective model among a population comprised solely of minority youth.

This study utilized the Ecological Risk/Protective theoretical model to understand variables related to sexual behavior within African-American adolescents. The Ecological Risk/Protective Theory contends that human

development is shaped by a myriad of processes, and that these processes must be identified in multiple levels of the human ecology (Bogenschneider, 1996). The Ecological Risk/Protective model is composed of two theories to help explain youth development and problematic behaviors: the ecological theory of human development (Bronfenbrenner, 1986) and the developmental contextual model (Lerner, 1991). According to Bogenschneider (1996), the ecological theory suggests that it is necessary to identify risk and protective processes at several levels of the human ecology, including individual, family, peer, school, work, and community settings. Bogenschneider stated that developmental contextualism emphasizes how these processes may vary as the youth matures and settings change.

The Ecological Risk/Protective theory provides a framework for understanding youth risk and protective factors while establishing the extent of their impact on African-American adolescents. Bogenschneider's (1996) studies have documented that the more risks, the greater the danger, and the more protective processes, the greater the likelihood a young person will be able to resist hazards. Jessor (1991) specifically stated that negative health behavioral outcomes are most likely to occur when an adolescent experiences multiple risks and has few protective factors to help mitigate the impact of those risks. In general, risk factors can potentially mitigate youth development, whereas protective factors can magnify the likelihood of positive development (Bogenschneider, 1996).

This study focused on risk/protective factors to better understand youth development and problematic behaviors that occur within a population of African-American adolescents. In the current study, based on the literature, eight factors were examined to better understand factors that lead to risky sexual behavior in adolescents, as well as factors that help adolescents avoid or abstain from sexual activity. These eight factors can be divided into behavioral and cognitive factors. The behavioral factors are alcohol use, marijuana use, and communication with parents about HIV. The cognitive factors are intentions to use a condom with a partner, self-perceived risk for HIV, intentions to have sex in the next 6 months, intentions to wait until marriage to have sex, and beliefs about peers having sexual intercourse. The presence or absence of each factor in this study was used to represent a risk or protective factor. Table 1 describes the role of each factor used in this study. Because of the well-documented differences between male and female sexual risk behaviors and youth age groups, these (age and gender) variables were also included in the analysis (Oman, McLeroy, Vesely, Aspy, Smith, & Penn, 2002; Gore-Felton et al., 2003).

The use of convenience samples and the limited number of subjects has flawed prior research studies that focused on the risk/protective factors among minority adolescents. The evidence supporting the existence of risk and protective factors for HIV among African-American adolescents' sexual behavior is inconclusive. By studying the impact of risk/protective factors associated with African-American adolescents' sexual behaviors, the current study adds to the

limited selection of literature available on HIV/AIDS preventive behaviors for African-American adolescents.

Table 1

Description of Factors

	Risk Factors	Protective Factors
Behavioral Factors	Alcohol Use	
	Marijuana Use	
		Communication with parents about HIV
Cognitive Factors	Intentions to have sex in the next 6 months	
	Believes most of their peers are having sexual intercourse	
		Intentions to use a condom with partner
		Self-perceived risk for HIV
		Intentions to wait until marriage to have sex

Research Questions

1. What are the relationships between risk/protective factors and self-reported sexual behaviors among African-American adolescents?

Hypotheses

1. Youth in the primary abstinence group will report more protective factors than risk factors.
2. Youth in the secondary abstinence group will report more protective factors than risk factors.
3. Youth in the sexually active group will report more risk factors than protective factors.

Delimitations

1. All of the participants in this study will be between the ages of 15-19 years old.
2. The questionnaire items will strictly identify the participant's risk and protective factors.

Assumptions

1. The participants submitted honest answers on the questionnaire.

Definition of Terms

1. In this study, the terms "youth," "teens," and "adolescents" are interchangeable.
2. Risky Sexual Behavior – Regarded as sexual intercourse before the adolescent is cognitively, emotionally, and physically prepared. Examples of risky sexual behaviors include early initiation of sexual

intercourse, unprotected sexual intercourse and having sex with multiple partners.

3. Risk Factors – Increases the likelihood of a negative outcome. (Refer to Table 1).
4. Protective Factors – Increases the likelihood of a positive outcome. (Refer to Table 1).
5. Primary abstinence – Completely abstaining from sexual intercourse during adolescence.
6. Secondary abstinence – Represent individuals who engaged in sexual intercourse in the past, but have reverted to abstinence in the last 6 months.
7. Sexually active – Individuals who engaged in sexual intercourse in the last six months.

CHAPTER II

REVIEW OF LITERATURE

This chapter contains a review of literature that will begin by exploring the Ecological Risk/Protective Theoretical Framework. Next, this chapter will explore the impact of HIV on various aspects of the society and evaluate the present-day goals for prevention efforts. Finally, an overview of risk/protective factors that are related to adolescents' sexual behavior and an analysis of risk/protective factors for risky sexual behavior will be reviewed.

Ecological Risk/Protective Theoretical Framework

Karen Bogenschneider introduced the Ecological Risk/Protective theoretical framework in 1996. The Ecological Risk/Protective Theory is proposed as a framework for understanding human development (Bogenschneider, 1996). As described in the previous chapter, the Ecological Risk/Protective Theory assumes that human development is shaped by a myriad of processes, and that these processes must be identified in multiple levels of the human ecology.

Much of the protective factor framework was developed in the area of children living under adverse conditions, such as poverty, abandonment, parental abuse, alcoholism, war, mental illness, physical disabilities, discord, and divorce (Bogenschneider, 1996). The risk-focused approach was originally developed to

prevent heart and lung disease by targeting factors that increase the risk of high blood pressure, smoking, and too little exercise (Bogenschneider, 1996).

Recent studies have focused on examining the Ecological Risk/Protective Theory in the area of youth sexual behavior. Oman et al. (2003) and Oman et al. (2004) illustrated that the Ecological Risk/Protective Theory was utilized to explain youth sexual behaviors and problematic behavior among adolescents. Furthermore, in the alcohol and marijuana use studies, the Ecological Risk/Protective Theory was applied to promote youth assets in a community sample of adolescents (Oman, Vesely, Aspy, McLeroy, Rodine, & Marshall, 2004). Bogenschneider (1996) suggested that the Ecological Risk/Protective Theory could be valuable for developing principles to guide the design, delivery and evaluation of prevention programs.

By choosing an Ecological Risk/Protective Factor framework, the researcher will have the opportunity to examine youth sexual behavior in the context of environmental settings and human development. Specifically, the Ecological Risk/Protective Theory is based on two prominent theories, one being the ecological theory of human development and the other being the developmental contextualism theory.

Bronfenbrenner (1986) has identified four ecological systems that influence human behavior. The multisystemic levels include: (1) individual factors, such as the roles and characteristics of the developing individual (the microsystem); (2) the immediate social environment, such as the peer group, the school, the family, and religious institutions (the mesosystem); (3) the social

environment which impacts development with which the individual does not interact directly, such as parental employment setting and school administrative issues (the exosystem); and finally, at the outermost level, (4) the macrosystem which consists of broad societal factors, such as socioeconomic status (SES) and culture (Corcoran, 2000).

In an ecological perspective, the potential to change individual risk behavior is considered within the social and cultural context in which it occurs (Goodman, Wandersman, Chinman, Imm, & Morrissey, 1996). Therefore, the ecological theory has been used as an organizing framework to understand youth sexual behavior. Miller et al. (2000) suggested that multiple systems must be taken into account when attempting to understand and change adolescent sexual behavior.

In 1999, the ecological theory was implemented to understand factors associated with adolescent pregnancy (Corcoran, 1999). Miller et al. (2000) utilized the ecological theory to predict factors associated with adolescent sexual activity. For example, Miller and her colleagues employed a multisystem model in a sample of 907 male and female adolescents (Black and Hispanic, aged 14-17) to determine which variables from within the three systems (self, family, and extra-familial) serve as predictors of adolescent sexual behavior and the potential risk factors of each system. Their findings indicated that as the number of systems at risk increased, adolescent sexual activity increased. Support from the ecological theory provides an opportunity to understand youth sexual behavior within a social and cultural context.

Individual characteristics related to sexual behaviors. In addition to the four ecological systems that influence human behavior, age and gender have also been shown to be associated with sexual risk behaviors among adolescents. For example, Oman et al. (2002) documented that youth risk behaviors vary across the adolescent age span. The authors stated that risk behaviors increase with age.

Likewise, several investigators have been interested in determining if male adolescents are more likely to engage in risky behavior than female adolescents. For instance, Gore-Felton et al. (2003) found gender as a significant factor for predicting sexual risk behavior among adolescents. Gore-Felton et al. also concluded that male adolescents are more likely to report multiple sexual partners than female adolescents. A study conducted by O'Hara, Parris, Fichtner, and Oster (1998) noted that male adolescents were more likely than females to use alcohol and marijuana before having sex and were more likely to have had sex with two or more partners. Based on these findings, this study will consider age and gender when interpreting the results of this study.

A second theory that influences development of the Ecological Risk/Protective framework is the developmental contextualism theory. Walsh, Galassi, Murphy, and Park-Taylor (2002) indicated that developmental-contextualism provides a broader framework for understanding development across the life span. More specifically, Bogenschneider (1996) noted that the developmental contextualism moves the ecological model through time and space by emphasizing the dynamic, reciprocal nature of development. As

children mature, society changes, and history moves forward; the influence of that development may vary as well.

Walsh et al. (2002) implemented the developmental contextualism framework in a study in order to understand the way change occurs over the course of development with regards to children, adolescents, and parents. The developmental contextualism framework has also been used to describe how school-to-work programming in schools can effectively prepare youth for the school to work to life transition (Solberg, Howard, Blustein, & Close, 2002). Furthermore, Lerner and Simi (2000) employed the developmental contextualism framework to explain how risk and protection during the adolescent period depend on the changing relationships between individuals and their particular contexts (families, peers, schools, and communities). The ecological and developmental contextual theories of human development support the notion that youth behaviors are shaped by their attributes and environments.

In summary, a number of studies have examined the two theories, which make up the Ecological Risk/Protective framework with relationship to sexual activity and the adolescents' cultural context. However, none of these studies have included a population comprised solely of minority youth. In an effort to reduce and to eliminate racial disparity, it is important to understand the risk and protective factors of sexual behavior that will reduce HIV prevalence among our nation's youth within the context of gender, race, and age.

Impact of HIV

HIV infection among African-American adolescents is an important health problem. Currently, the HIV epidemic is growing at an alarming rate among African-American adolescents. In 2000, the CDC reported that there were about 3,718 new HIV infections among African-American adolescents between the ages of 13 and 19 years old (CDC, 2001b).

There are a number of explanations as to why African-American adolescents are being exposed to HIV (Meschke, Bartholomae, & Zentall, 2002). Rotheram-Borus, Keefe, Kracker, & Foo (2000) stated that most heterosexual, HIV-positive youth acquire HIV primarily because of geography. They live in an urban inner city with a high neighborhood seroprevalence rate, typically resulting from high rates of drug use and drug dealing. Another study (O'Donnell et al., 2001) concluded that minority adolescents tend to reside in communities where the prevalence of HIV is disproportionately high, thus sexual risk taking places them at a higher risk of contracting HIV. Several scholars have hypothesized that adolescents do not have adequate knowledge or experience to appreciate the risks involved in their actions, and their cognitive limitations make it difficult for them to learn from the experiences of others. As a result, they may become vulnerable to risky sexual behavior (Beyth-Marom, Austin, Fischoff, Palmgren, & Jacobs-Quadrel, 1993; Whaley, 1999).

For adolescents, sexual transmission is the most commonly noted method of contracting HIV (Meschke et al., 2002). The CDC (1998) reported that for male adolescents, 49% of the diagnosed HIV cases were attributed to sex with other

men, while 37% of female adolescent HIV cases were contracted via heterosexual contact, primarily with older men.

Goals for Prevention Efforts

Promoting responsible sexual behavior among adolescents is crucial for reducing HIV infection. Healthy People 2010 [Objective 25-11] targets three protective behaviors to reduce the risk of HIV infection (DHHS, 2000). The protective behaviors of interest are (1) completely abstaining from sexual intercourse during adolescence (primary abstinence), (2) reverting to abstinence for long periods of time after having had intercourse in the past (secondary abstinence), and (3) using condoms consistently and correctly if regular intercourse is occurring (DHHS, 2000).

The Healthy People 2010 framework is designed to achieve two overarching goals: to increase the quality and years of healthy life and to eliminate health disparities. The first goal, to increase life expectancy and years of healthy life, is based on the fact that at least 18 countries rank ahead of the U.S. in life expectancy (Hixon & Chapman, 2000). The second goal, to eliminate health disparities, recognizes the fact that gender, race and ethnicity, income and education, disability, sexual orientation and rural location are major factors that affect health disparities in the United States (Hixon & Chapman, 2000).

These two goals are essential to help the American public achieve the targets for adolescents as defined by HP 2010. The federal government, states, local governments, policymakers, health care providers, professionals, business executives, educators, community leaders, and the American public have been

encouraged by HP 2010 to inculcate responsible sexual behavior and reduce risky sexual practices (DHHS, 2004). Inherently, the need for health improvements, such as those promoted by HP 2010 have encouraged researchers to identify those factors that influence adolescent sexual risk behaviors so that meaningful HIV prevention and intervention programs may be developed (Kotchick, Shaffer, & Forehand, 2001).

Overview of Risk/Protective Factors

In a comprehensive review of the literature on this topic, several researchers identified various factors that contribute to adolescent sexual risk-taking behaviors and risk reduction practices (Kotchick et al., 2001; Langer et al., 2001; Oman et al., 2003). Some of these factors have been identified as risk factors and others as protective factors (Langer et al., 2001). These factors are believed to either increase or decrease the chances that individuals will experience undesirable outcomes as a result of their sexual activities (Langer et al., 2001). The results of these studies have concluded that risk and protective factors can be identified as having an influence on adolescent sexual behavior.

Variables related to risk/protective factors. Five risk factors that may influence sexual risk-taking behavior among adolescents have been reported by several researchers (Ben-Zur, 2003; Jessor, 1991; Langer et al., 2001). Risk factors related to sexual risk taking behavior may include alcohol use, marijuana use, unsafe peer norms, intentions not to use a condom with partner, and perceptions they are not at risk for HIV.

Alcohol use. Studies have documented that alcohol use is significantly related to risky sexual behavior in adolescents (Cooper, 1992; Piercy, Fontes, & Choice, 1998; Strunin & Hingson, 1993). In addition, evidence suggests that young people often combine alcohol and sex, especially prior to their first sexual experience (Donovan & McEwan, 1995). In the Cooper, Peirce, & Huselid's (1994) study of 1,259 black and white participants between the ages of 13-19 years old, 73% of males and females reported alcohol use during their first occasion of sexual intercourse.

Furthermore, LaBrie, Schiffman, and Earleywine (2002) noted alcohol use may increase the likelihood of HIV and other sexually transmitted disease (STD) by decreasing the likelihood of using a condom during sex. The use of alcohol is thought to impair cognitive processes, including the ability to make clear judgments and decisions, thereby reducing the likelihood that condoms would be used during sexual intercourse (Halpern-Felsher, Millstein, & Ellen, 1996). Laksmana's (2003) study concluded that alcohol use was the strongest predictor of sexual activity among 461 male and female students between the ages of 18-23 years old.

Marijuana use. It is well established that marijuana use among adolescents contributes to risky sexual behavior. For example, in a sample of 2,657 students in grades 9-12, Ramisetty-Mikler, Caetano, Goebert, and Nishimura (2004) found drug use as a consistent predictor of risky sexual behavior. Another study, in a sample of 1,190 African-American and Puerto Rican urban adolescents, showed drug use increased the odds of having multiple

sex partners by 2.8 ($p < .001$) (Brook et al., 2004). The researchers also showed that early drug use was associated with inconsistent condom use. The drugs reported in both studies included marijuana, methamphetamines, hallucinogens, heroin, inhalants, ecstasy, crack, and cocaine. Even more disturbing, data from the 2001 Youth Risk Behavior Surveillance System (YRBSS) revealed that, overall, students in grades 9 and 10 (11.6% and 12.1%, respectively) were significantly more likely than students in grade 12 (7.8%) to have used marijuana before age 13 years, and students in grade 10 (12.1%) were significantly more likely than students in grade 11 (8.5%) to have tried marijuana (CDC, 2002b). In 2003, the prevalence of having tried marijuana before age 13 years was higher among black (12.1%) than white (8.7%) students and higher among black male (18.5%) than white male (10.5%) and Hispanic male (13.0%) students (CDC, 2004a).

Consequently, drug users have high rates of promiscuous behavior and low condom use (Dengelegi, Weber, & Torquato, 1990). Talashek, Norr, and Dancy (2003) concluded that drug use and risky sexual behaviors put alarming numbers of youths at risk for sexually transmitted infections, including HIV. Because of the probable relationship between risky sexual behavior and marijuana use, an adolescent's marijuana use will be considered when interpreting the findings of this study.

Intentions not to use a condom with partner. The most common mode of HIV transmission is unprotected sexual contact (Jones, 2004). According to Jones (2004), high-risk sexual behavior conducive to transmission of HIV

includes engaging in vaginal and anal sex without the use of a latex condom. Brown, Diclemente, and Park (1992) asserted that unprotected sexual intercourse places a substantial number of adolescents at risk for STD and HIV. In 2001, the CDC (2002b) reported that 42.1% of sexually active high school students had not used a condom during their last act of sexual intercourse. Hispanics (57.4%) in grades 9-12 are the least likely to have used a condom when compared to Black (72.8%) and White (62.5%) students (CDC, 2004a).

The percentage of currently sexually active high school students who used a condom during sexual intercourse increased significantly (from 46.2% to 58%) between the years 1991-1999. The total number of sexually active high school students who used a condom at last sexual intercourse leveled off by 2001 (from 58% to 57.9%). The downward trend may be explained by the infrequent and inconsistent condom use among adolescents. For example, in a survey done by Chapin (2001) 27% of the 225 students, between the ages of 10 and 17, reported having unprotected sex at least once. Furthermore, a study by Bailey, Camlin, and Ennett (1998) indicated that only half of their sample of 327 youth between the ages of 14-21 years used condoms. This inconsistency in condom use among adolescents is of concern; therefore, adolescents who do not intend on using a condom with their partner will be considered when interpreting the findings of this study.

Unsafe peer norms. Recent research has demonstrated that the role of peer attitudes and behaviors may be linked to risky sexual behavior among adolescents. Manlove et al. (2002) indicated that adolescents who believe their

friends are having sex are more likely to have sex at an early age. Moreover, Winslow, Franzini, and Hwang (1992) studied 1,035 male and female undergraduate students and concluded that perceived attitudes and behavior of friends were found to be the major predictor of an individual's sexual risk behavior. Furthermore, in a sample of 1,389 male and female adolescents between the ages of 11-12 years found that the students who believed that most of their peers were having sex were 2.5 times more likely (CI = 1.79-3.56) to report having a high intention to initiate in the upcoming year (Kinsman, Romer, Furstenberg, & Schwartz, 1998). Whitaker and Miller (2000) also found among African American and Hispanic adolescents, between the ages of 14-16 years, that adolescents who believe that their peers do not use condoms, or that their peers do not like using condoms, are less likely to use them. Results from these studies support the hypothesis that peer norms contribute to risky sexual behavior.

Self-Perceived risk for HIV. A substantial body of research has shown that adolescents who do not consider themselves to be at risk for HIV are more likely to practice risky sexual behavior than those who consider themselves at risk for HIV. According to Kotchick et al. (2001), an adolescent who engages in risky sexual practices may be doing so because he or she does not consider themselves to be at-risk; in this instance, a reduced level of personal vulnerability may contribute to greater risk-taking behavior. Moreover, Millstein and Halpern-Felsher (2002) pointed out that the perceptions of risk have been found to be lower among people who engage in risky sexual behaviors. A sample of 225

minority, at-risk youth, between the ages of 10 and 17, revealed that intention to become sexually active in high school was best predicted by adolescents who saw themselves at very low risk (Chapin, 2001). Vollrath, Knoch, and Cassano's (1999) study of 683 male and female students found that when adolescents did not feel that they were susceptible to HIV there was a strong correlation (p <0.05) with risky sexual behaviors. These finding support the notion that many adolescents do not perceive themselves as being at risk for HIV, and, when they believe they are less vulnerable to HIV, they may be more likely to participate in risky sexual behavior.

Researchers have identified numerous protective factors that may influence sexual behavior among adolescents. There are eight protective factors identified in the literature that lead to positive behavior among adolescents. These include: nonuse of alcohol, nonuse of marijuana, intentions to use a condom with sexual partner, fear of HIV, positive peer norms, communication about HIV with parent, no sex in the next six months, and plans to wait to have sex until marriage. These eight protective factors may lead to positive behavior among adolescents (Chewning et al., 2001; Jessor, 1991; Langer et al., 2001; Oman et al., 2004; Oman, Vesely, Aspy, McLeroy, Rodine et al., 2004).

Although there is limited empirical evidence linking protective factors to youth behavior, several researchers are now beginning to investigate the relationship between protective factors and youth sexual behavior. In the following section, studies that examined the potential protective factors related to adolescents' sexual behavior are presented.

Positive peer norms and nonuse of alcohol/marijuana. Positive peer norms have been studied as a factor contributing to responsible sexual behavior among adolescents. Chewning et al. (2001), for example, surveyed 484 adolescents in grades 6-12 and concurred that if students perceived their friends as abstaining from sexual activity and drugs, they were more likely to abstain from sexual intercourse. Furthermore, Ben-Zur's (2003) study of 1051 adolescents found a significant correlation between perceived risk behavior of peers and participants risk behavior. Reid, Martinson, and Weaver (1987) revealed in a sample of 873 fifth through eighth grade students that peer non-use normative expectations and peer reinforcement for non-use are negatively related to alcohol and drug use. DiClemente (1996) similarly affirmed that adolescents and young adults between the ages of 12 and 21 years who perceived peer norms as supportive of condom use were more than 4 times as likely to be consistent condom users than those who did not perceive condom use as supportive by peers.

Intentions to use a condom with partner. Consistent condom use among adolescents has been seen as a factor that reduces risky sexual behavior. Boyd and Wandersman (1991) noted individuals who expect more positive outcomes and fewer negative outcomes when using condoms are more likely to plan on using a condom in the near future. In a sample of 388 undergraduate students between the ages of 17 and 27, Langer et al. (2001) further noted that students with positive attitudes/ behaviors regarding condom use had significantly lower risk behavior scores than their counterparts. Wingood and DiClemente (1998)

revealed in a sample of 128 African American women between the ages of 18-29 that consistent condom use is associated with less risky sexual behavior.

Self-perceived risk for HIV. Researchers have reported that those who perceive themselves as being at risk for HIV are less likely to engage in risky behaviors than those who discount and/or disregard their chances of getting AIDS (Langer et al., 2001). For this reason, Gerrard, Frederick, and Bushman (1996) hypothesized that the primary motivation for the avoidance of risky behavior among adolescents is acknowledging his or her vulnerability for HIV. Surprisingly, Kline and Strickler's (1993) study found that in a sample of 242 women 84% believe that it is very unlikely or somewhat unlikely that they will get infected with the HIV/AIDS virus. Whereas, Prochaska, Albrecht, Levy, Sugrue, and Joung-Hwa (1990) found, in a sample of 1,560 males and females between 18 to 60 years of age, 44%(703) perceived themselves as being at risk for HIV. The Prochaska et al. (1990) study also revealed that people perceived themselves to be at risk for HIV/AIDS even if they have adopted safer sex practices. These findings support the notion that adolescents who perceive themselves as vulnerable to HIV are more likely to engage in responsible sexual behavior.

Communication about HIV with parent. The impact of parent-adolescent sexual communication may lead to responsible sexual behavior as well. Lefkowitz, Kahlbaugh, Kit-fong Au, and Sigman (1998) indicated that parent-adolescent communication is the primary context in which adolescents acquire much of their information and their sense of values. Halcon et al. (2003) study

surmised that, among teenagers younger than 16 years of age, connectedness to parents was strongly associated with the delay of sexual activity. Furthermore, Hutchinson (2002) noted in a sample of 234 young women (65 Hispanic-Latinas, 78 African- Americans, and 91 Whites), between the ages of 19 and 20, early parent-adolescent sexual communication (discussions that occurred before the onset of adolescent sexual activity) were significantly related to consistent condom use ($p < .01$) during adolescence.

In Jaccard, Dittus, and Gordon's (1996) study of 751 black youths, between the ages of 14 and 17 years old, youths were significantly ($p < .001$) more likely to practice sexual abstinence, if they were satisfied with the relationship with their parents and perceived their parents as being opposed to premarital sex. In general, Jordan, Price, and Fitzgerald (2000) concluded that peer norms are likely to be the sexual standards for many teens, when parent-adolescent communication is absent. For this reason, parent-adolescent communication is vital with regards to introducing responsible sexual behavior among adolescents.

Analysis of Risk/Protective Factors for Risky Sexual Behaviors

Several researchers have identified numerous risk/protective factors that are associated with youth sexual behaviors. For example, Jaccard et al. (1996) study determined that youth who were satisfied with the relationship with their parents, and youth who perceived their parents as being opposed to premarital sex, were more likely to practice sexual abstinence. Whereas, in Kinsman et al. (1998) study, youth who believed that most of their peers have had sex were

more likely to report having a high intention to initiate sex in the upcoming year. In general, many researchers have made an attempt to identify various risk/protective factors that may contribute to youth sexual behaviors.

In recent years, the CDC has become increasingly interested in monitoring youth's sexual behaviors. For this reason, the CDC developed the Youth Risk Behavior Survey [YRBS] (2004b) to assess and monitor risk behavior among youth. In general, the YRBS employs six focus areas, in which two of the areas address sexual behaviors that contribute to HIV infection and the use of alcohol/marijuana. Also, a number of questions on the survey assess the prevalence of sexual practices, alcohol and other drug use, and peer norms.

A short time ago, Brener et al. (2002) conducted a reliability study of the YRBS survey questionnaire. They found that risk behavior items related to alcohol and other drug use (mean Kappa = 63.4%) and those related to sexual behavior (mean Kappa = 62.7%) demonstrated substantial reliability. Statistical decision-tree algorithms have been used in this area to develop and classify youth risk behaviors. For example, Oman et al. (2003) used tree algorithms to develop a profile of variables related to youth sexual abstinence using youth protective factors as potential profile variables. The Oman et al. results revealed four protective factors (Use of Time, Religion, Peer Role Models, and Aspirations for the Future) as important discriminators for determining youth most likely to abstain from sexual activity. As such, the tree-growing algorithms appear to be very informative for analyzing the data and organizing results pertaining to

risk/protective factors among youth. The current study will utilize decision-tree algorithms to identify risk/protective factors pertaining to youth sexual behaviors.

CHAPTER III

METHODOLOGY

The purpose of this study was to examine risk/protective factors of sexual activity among African-American adolescents. Specifically, the study was designed to identify and describe how risk/protective factors are related to sexual behavior among African-American adolescents. This chapter outlines the study's design, participants, instrumentation, procedures and data analysis.

Study Design

A cross-sectional design was used to investigate the relationships between risk/protective factors and sexual behavior among African-American adolescents. Phase 1 of the study (as shown by Figure 1), involves dividing the sample into three groups, based on their self-reported level of sexual activity. The three groups are those who report primary abstinence (PAb), secondary abstinence (SAb), or sexual activity (SAc). In phase 2, the configuration of risk/protective factors for each of the three groups are presented.

Participants

This study includes data collected from an HIV prevention study conducted in Nashville, Tennessee. The database includes data collected from

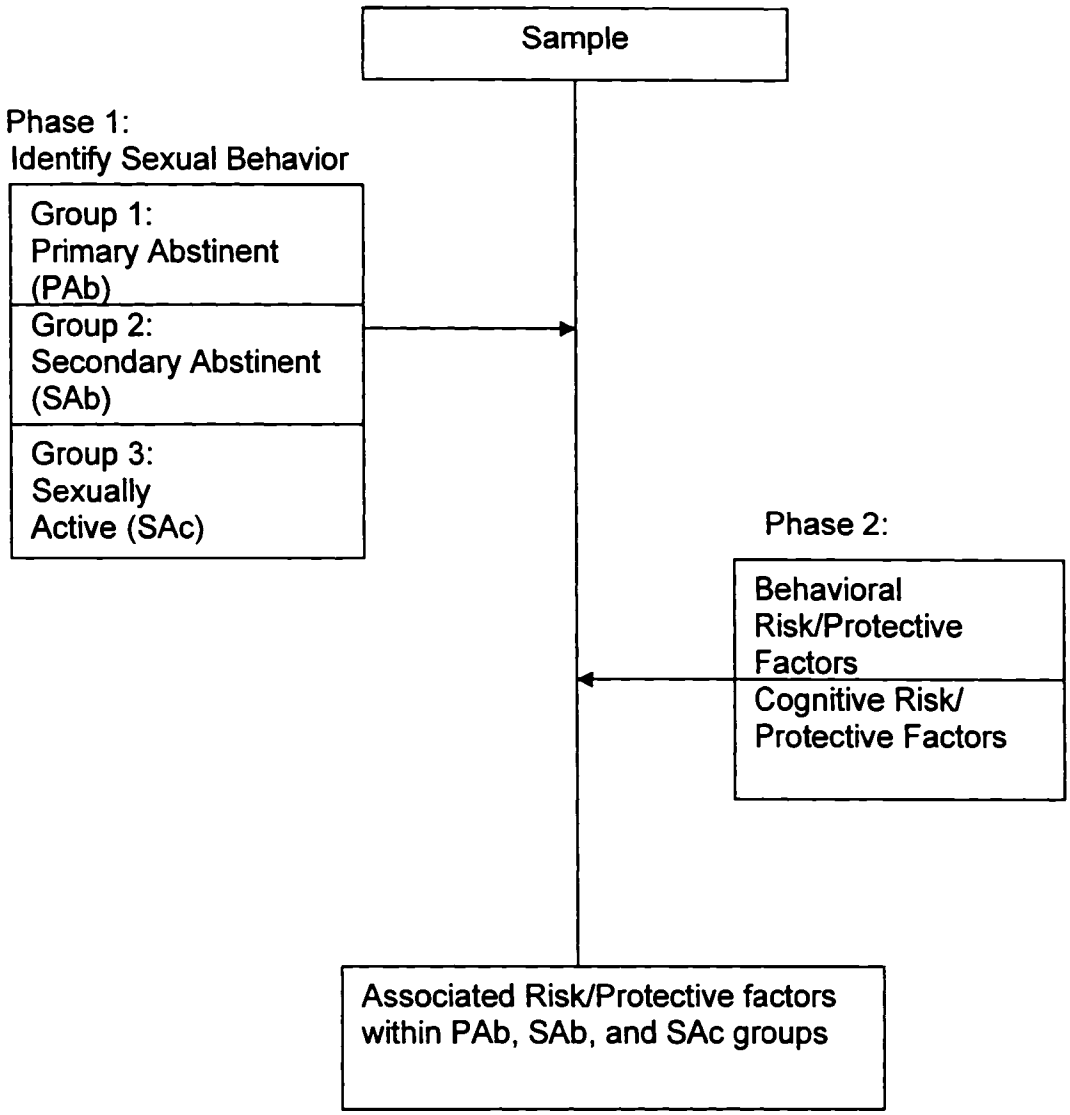

Figure 1. Study Design

Table 2

Level of Sexual Activity and Youth Outcome

Outcome Variable	Level of sexual activity
Primary Abstinent	Never engaged in sexual intercourse
Secondary Abstinent	Had sexual intercourse in the past, but have reverted to abstinence in the last 6 months
Sexually Active	Engaged in Sexual activity in the last 6 months

456 male and female African-American adolescents between the ages of 15 and 19 years old who attended two high schools. The schools chosen for study were both located in the urban area of Nashville.

Procedures

The HIV prevention study was part of a funded research project between Meharry Medical College and the National Institute of Health (Office of Minority Health) conducted between 2000 and 2004. Meharry Medical College's Institutional Review Board (IRB) granted the investigators approval to conduct the proposed study. Following IRB approval from Meharry Medical College, the investigators obtained approval from the IRB at Middle Tennessee State University (protocol#05-116 [see Appendix A]).

Instrumentation

The HIV prevention study was designed to increase knowledge of HIV/AIDS and assess high-risk sexual behaviors among high school students. A survey was developed for this study based primarily from the CDC YRBS questionnaire (CDC, 1999). Thirteen survey items provided information on reported sexual behavior, demographics, peer norms and attitudes, and alcohol/marijuana use. Additional questions addressed communication about HIV and perceived risk for HIV (see Appendix B).

The demographic variables used in this study include gender, age, and race. The outcome variable measured in this study represents participant's level of sexual activity. Table 2 presents the outcome variable with three categories: PAb, SAb, and SAc. Participant's level of sexual activity was based on self-report responses to two questions that asked "Have you ever had sexual intercourse?" and, "Have you had sexual intercourse in the last 6 months?" The participants who recorded "no/present" were coded as "1" and "2" for "yes/not present."

In this analysis, risk/protective factors are the independent variables (IV) and these variables were coded as nominal or ordinal variables (present or not present). To measure participants' intention to have sex in the next 6 months, the following item "Do you think you will have sexual intercourse in the next 6 months?" was assessed. On this item the response "no/present" was coded as "1" and "yes/not present" was coded as "2".

Seven items on the survey were originally designed for multiple-choice with 4 (or 6, in one case) responses. These items included intentions to use a

condom with a partner, self-perceived risk for HIV, communication with parents about HIV, intentions to wait until marriage to have sex, beliefs about peers having sexual intercourse, alcohol use, and marijuana use.

To measure the degree to which participants intend to use a condom with a partner the following survey item "Do you intend to make sure that you or your partner use a condom every time you have sex from now on?" was assessed. Participants who answered "yes/present" were coded as "1" and "no/not present were coded as "2". On this item, if participants noted "still thinking about it or do not intend to have sex with a partner until marriage", they were excluded.

To assess participants' self-perceived risk for HIV the following survey item "Do you think you might get HIV?" was measured. Participants who answered "definitely yes/present" were coded as "1" and "probably not/not present" were coded as "2". Participants were excluded if they reported "probably" on this item.

To determine participants' communication about HIV the following survey item "Do you talk about sex issues with your ____?" was measured. Participants who reported that they talk with their parents, family, friends, or adults about sex issues were coded as "1" for "yes/present". Those who reported no communication about HIV were coded as "2" for "no/not present."

To examine the degree to which participants intend to wait until marriage to have sex the following survey item "I plan on waiting to have sexual intercourse until____?" was measured. Participants who reported that they intend to wait until marriage to have sex were coded as "1" for "yes/present". Those who

answered "serious relationship, emotionally ready/ but not necessarily based on a relationship type, and not applicable/already sexually active" were coded as "2" for "no/not present."

To assess the extent to which participants' perceive their peers as having sexual intercourse the following survey item "How many of your friends do you think are having sexual intercourse?" was measured. Participants who reported that almost none or few of their friends are having sexual intercourse were coded as "1" for "present". Those who answered "almost all, most, and half" were coded as "2" for "not present."

To determine the extent to which participants use alcohol the following survey item "During your life, on how many days have you had at least one drink of alcohol?" was measured. Participants who reported 0 days of alcohol use were coded as "1" and those who reported 1-2 days were coded as "2" for "present". Those who answered 3 to 9 days were coded as "3", 10 to 19 days were coded as "4", 20 to 39 days were coded as "5", 40 to 99 days were coded as "6", and 100 days or more were coded as "7" for "not present."

To determine the extent to which participants use marijuana the following survey item "During your life, how many times have you used marijuana?" was measured. Participants who reported 0 days of marijuana use were coded as "1" and those who reported 1-2 days were coded as "2" for "present". Those who answered 3 to 9 days were coded as "3", 10 to 19 days were coded as "4", 20 to 39 days were coded as "5", 40 to 99 days were coded as "6", and 100 days or more were coded as "7" for "not present."

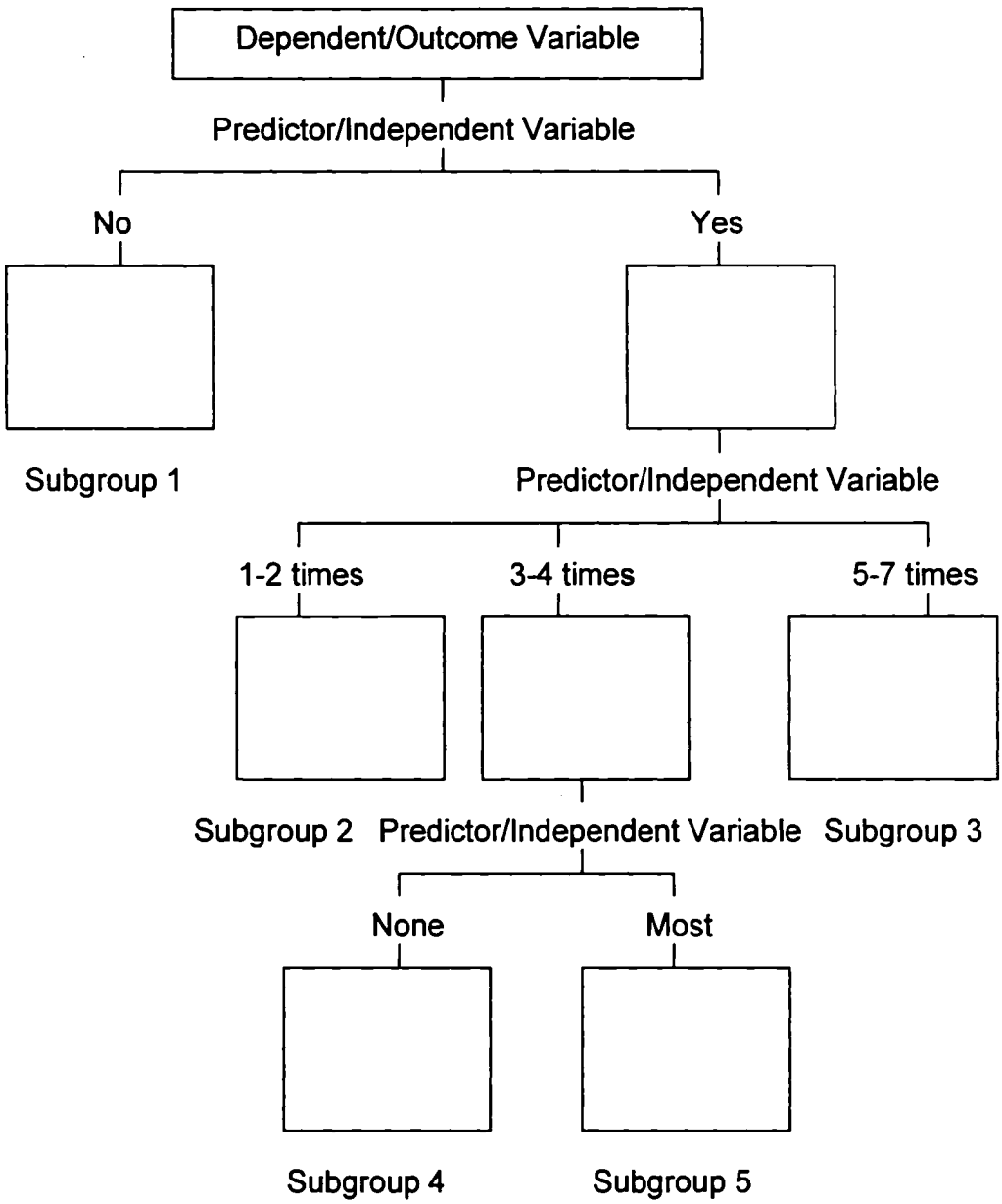

Figure 2. Example of Chi-squared Automatic Interaction Detection Tree

Data Analysis

An SPSS (Statistical Package for the Social Sciences) program utilizing (SPSS Answer Tree Version 3.1), exhaustive CHAID (Chi-squared Automatic Interaction Detection) was used to analyze the data for this study (SPSS, 2004). The CHAID analysis is a statistical procedure that categorizes a sample of heterogeneous individuals and creates homogenous groups based on several nominal, ordinal or continuous variables in a particular data set. The CHAID analysis employs χ^2 statistics (*F* statistics for continuous variables) to measure the association between the dependent variable and independent variables (Thomas & Galambos, 2004). As shown in Figure 2, the CHAID constructed tree begins with one "node," or group, containing the entire sample, called a parent node (dependent variable) and then branches into 2 descendant nodes, called child nodes (independent variables); (Levin & Zahavi, 2001).

More specifically, the CHAID analysis splits the data into subgroups called terminal nodes to form the most accurate tree classifier by using the individual's risk/protective factors that are most similar to the individuals in a particular group membership. According to Kass (1980), the purpose of the CHAID analysis is to partition the data into mutually exclusive, exhaustive, subsets that best describe the dependent variable. In this study, the researcher systematically examined the individual's risk/protective factors and generated a tree algorithm based on group membership (PAb, SAb, and SAc).

The interpretation of results in the tree is straightforward with the assumption being that the "predictor" or independent variables (risk/protective factors) are associated with the dependent variable (PAb, SAb, and SAc). The CHAID algorithm will be used to illustrate the most common configuration of risk/protective factors in each of the three groupings of sexual activity (PAb, SAb, and SAc) within African-American adolescents between the ages of 15 to 19 years old.

It is important to note that before one can grow a CHAID constructed tree, one must specify several splitting rules (SPSS, 2004). The splitting rules determine when the tree should stop splitting child nodes and branches. First, as a rule, one must specify the number of levels to allow in the tree (splits to allow below the root/parent node). Generally, five levels below the root/parent node is selected. Secondly, the minimum number of cases that will be required to split the parent node and child node is determined.

When splitting the tree, one may also use the alpha criterion to find the best splits. The alpha criterion is used to detect significant interactions. The interactions must have a level of significance less than or equal to the specified value (e.g., 0.05) in order to split. In some cases the independent variables may split more than once in the event that there are a number of significant interactions discovered within the tree. The alpha criterion can be determined by the researcher or one can use the default value of 0.05.

In producing the tree, one may choose to use the Bonferroni adjustment measure to find the best split. The Bonferroni adjustment measure is used to

prevent the overall error rate from exceeding the alpha criterion due to multiple tests (SPSS, 2004). In essence, this measure is used to adjust the *P* value measure for multiple comparisons.

In addition, to find the best split a two-way crosstabulation table is generated with categories of independent variables as rows and the dependent variable as columns. When nominal or ordinal data is used, one must choose between the Pearson chi-square test or the likelihood ratio chi-square test to find the best splits. When the Pearson chi-square method is chosen the program finds splits that have a chi-square distribution that is based on differences between observed and expected cell frequencies (SPSS, 2004). Whereas, the likelihood ratio chi-square method finds splits that have a chi-square distribution based on ratios of likelihood between related models (SPSS, 2004). When using continuous data, one can employ the *F* statistic to find the best split. The *F* statistic is used to test differences on a continuous target between groups (SPSS, 2004).

Once the trees are grown, it is important to consider the accuracy of the tree. Accuracy refers to how well the tree predicts outcomes or classifies individuals (SPSS, 2004). This prediction is observed through the use of risk statistics. The risk statistics includes the misclassification risk estimate and the standard error of risk estimate. The misclassification risk estimate gives the proportion of cases classified as incorrectly (SPSS, 2004).

One may choose to use the cross-validation estimate to generalize the tree classifications. This estimate is produced from the cross-validation

procedure. The cross-validation procedure validates the tree by splitting the data into subsamples (called folds), and for each fold a model is generated from data in all of the other folds and is tested on the original fold (SPSS, 2004).

In the current study, the CHAID algorithm was constructed using the splitting rules as mentioned above. The CHAID constructed tree in this study was generated to determine risk/protective factors within the (PAb, SAb, and SAc) groups. Through assessing relationships between risk/protective factors and sexual behaviors the current study aids in understanding sexual behavior among African-American adolescents.

CHAPTER IV

RESULTS

The purpose of this study was to examine common risk/protective factors that are related to African-American adolescents who demonstrated PAb, SAb, and SAc. Data from the structured questions generated from the CDC YRBS questionnaire (1999) was analyzed to describe the relationship between risk/protective factors and sexual behaviors among African-American adolescents. This chapter is organized to present the results under the following main sections: description of participants, statistical description, organization of findings, overall findings involving the CHAID analysis, tree involving youth in the primary abstinence group, tree involving youth in the secondary abstinence group, tree involving youth in the sexually active group, and observation of risk/protective factors.

Description of Participants

The participants in this study were African-American adolescents, enrolled in grades 9 through 12 from two high schools in Nashville, TN. All participants were part of an HIV prevention study and provided a total sample size of 456 adolescents. A demographic description of participants is included in Table 3. The mean age of students was 16.3 years with a standard deviation of .93. Three

hundred and seventy six participants were between 15-17 years old and eighty participants were in the 18-19 year old age range. There were a total of 91

Table 3

Demographic Characteristics of the Study Sample (N = 456)

Characteristics	Frequency	Percentage
Demographics		
Gender		
Female	275	60.3
Male	181	39.7
Age		
15-17 Years Old	376	82.5
18-19 Years Old	80	17.5
Grade Level		
9th Grade	35	7.7
10th Grade	165	36.3
11th Grade	135	29.7
12th Grade	118	25.9
Graduated	2	.4
Youth Risk Behavior		
Alcohol Use	281	63.4
Marijuana Use	183	41.2
No Parent communication	159	47.5

Table 3 Continued

Demographic Characteristics of the Study Sample (N = 456)

Characteristics	Frequency	Percentage
Youth Risk Behavior		
No Condom Use[a]	53	11.8

[a]No condom use among those who report they have had, or currently engage in sexual activity.

participants excluded from the survey item "do you intend to make sure that you or your partner use a condom every time you have sex from now on?" and 29 participants were excluded from the self-perceived risk for HIV item. All participants with missing data on the outcome variable were excluded from the data set, thus a total of 333 participants data were included in the final analysis in the study. Table 4 provides information on the three categories regarding the outcome variable (PAb, SAb, and SAc).

Statistical Description

To analyze the relationship between risk/protective factors and sexual behaviors, exhaustive CHAID (Chi-squared Automatic Interaction Detection) was performed using SPSS for Windows 10.0 and SPSS Answer Tree Version 3.1 (SPSS, 2004). In attempting to attain the most accurate tree classifier, the CHAID constructed tree was assigned a maximum tree depth of 5 levels below the root. The tree was validated using cross-validation with 10 sample folds.

Table 4

Summary of Participants Level of Sexual Activity by Outcome Variable

(N = 333)

Outcome Variable	Frequency	Percentage
Primary Abstinence	131	39.3
Secondary Abstinence	54	16.2
Sexually Active	148	44.4
Total	333	100.0

In addition, the investigator selected a minimum number of 25 cases in the parent node (root/target variable) to be split and 10 cases in the child node (descendant node). The alpha criterion was set at 0.05 and the bonferroni adjustment measure was chosen. Lastly, the Pearson chi-square method was selected to find the best splits.

Organization of Findings

First the investigator discusses the overall findings involving the CHAID analysis. Second, the investigator discusses the findings involving the CHAID constructed tree with respect to the primary abstinence youth and secondary abstinence youth. The findings of the CHAID constructed tree involving sexually active youth will follow. Third, an observation of risk/protective factors is examined.

Overall findings involving the CHAID Analysis

The results of the CHAID analysis showed that the data split 6 times to form 7 subgroups with varying proportions of youth sexual activity. The results of the tree also showed how specific factors interact to create these groups. Of the ten factors entered into the analysis, five were found to be associated with youth sexual activity. These factors are: sex in the next six months, age, beliefs about peers having sexual intercourse, gender, and waiting to have sex until marriage. The misclassification risk estimate was 0.25 with a standard error of .02, indicating that 75% of the cases are correctly classified. More details about the misclassification risk estimate and the standard error of risk estimate are found in Appendix D. The average of the cross-validation risk estimates for 10 subsamples was 0.27 with a standard error of .02, which supports the generalization of the tree classification with 73% of the cases classified correctly. Generally speaking, a risk estimate is better if smaller, but no criteria (e.g., *p*-value) are available regarding characteristics of the index in the analysis of tree. There is a need to find some kind of value of how significant a particular risk estimate is. It may be a reasonable approach to compare the index with previous literature. Heikkonen and Varjo's (2004) study reported classification accuracies varying from 63.8% to 87.2% and a Lemon, Rakowski, Clark, Roy, and Friedman (2004) study reported a misclassification risk estimate of 0.28. Overall, to some extent these findings are consistent with the statistical results revealed in this study.

Tree involving Youth in the Primary Abstinence Group

Figure 3 displays a CHAID constructed tree which models how the independent variables (risk/protective factors) are related to youth participants who are classified as primary abstinence. In this analysis, there were a total of 131 primary abstinence participants.

Table 5 displays seven subgroups. Sex in the next six months was the strongest predictor of youth in the primary abstinence group. Approximately, 67% of youth in the primary abstinence group demonstrated no intentions to have sex in the next six months compared to 6% of youth in the primary abstinence group who intend on having sex in the next six months.

Age emerged as the next strongest predictor, which means that in the primary abstinence group 70% of youth between the ages of 15-17 years old have no intentions to have sex in the next 6 months compared to 31% of youth who are 18 years or older. Furthermore, the primary abstinence tree revealed that youth who demonstrated intentions to have sex in the next 6 months were more likely to report that none of their peers are engaging in sexual intercourse. Moving further down the tree, 75% of youth who are between the ages of 15-17 years old and have no intentions to have sex in the next 6 months were females and 49% were males.

To summarize, in the primary abstinence group female youth between the ages of 15-17 years old who have no intentions to have sex in the next 6 months were more likely to wait until marriage to have sex (subgroups 4 and 5, 90% vs 66%). Whereas, male youth between the ages of 15-17 years old who have no

intentions to have sex in the next 6 months were more likely to demonstrate that almost none of their peers are having sexual intercourse.

Tree involving Youth in the Secondary Abstinence Group

Figure 4 displays a CHAID constructed tree which models how the independent variables (risk/protective factors) are related to youth participants who are classified as secondary abstinence. In this analysis, there were a total of 54 secondary abstinence participants.

Table 6 displays seven subgroups. Sex in the next 6 months was the most important factor related to youth in the secondary abstinence group. Nineteen percent of youth in the secondary abstinence group demonstrated no intentions to have sex in the next 6 months compared to 13% of youth in the secondary abstinence group who intend on having sex in the next 6 months.

Age emerged as the next strongest predictor, which means that in the secondary abstinence group 18% of youth between the ages of 15-17 years old have no intentions to have sex in the next 6 months compared to 23% of youth who are 18 years or older. Furthermore, the secondary abstinence tree revealed that youth who demonstrated intentions to have sex in the next 6 months are more likely to have peers who do not engage in sexual intercourse. Moving further down the tree, 13% of youth who are between the ages of 15-17 years old and have no intentions to have sex in the next 6 months were females and 39% were males.

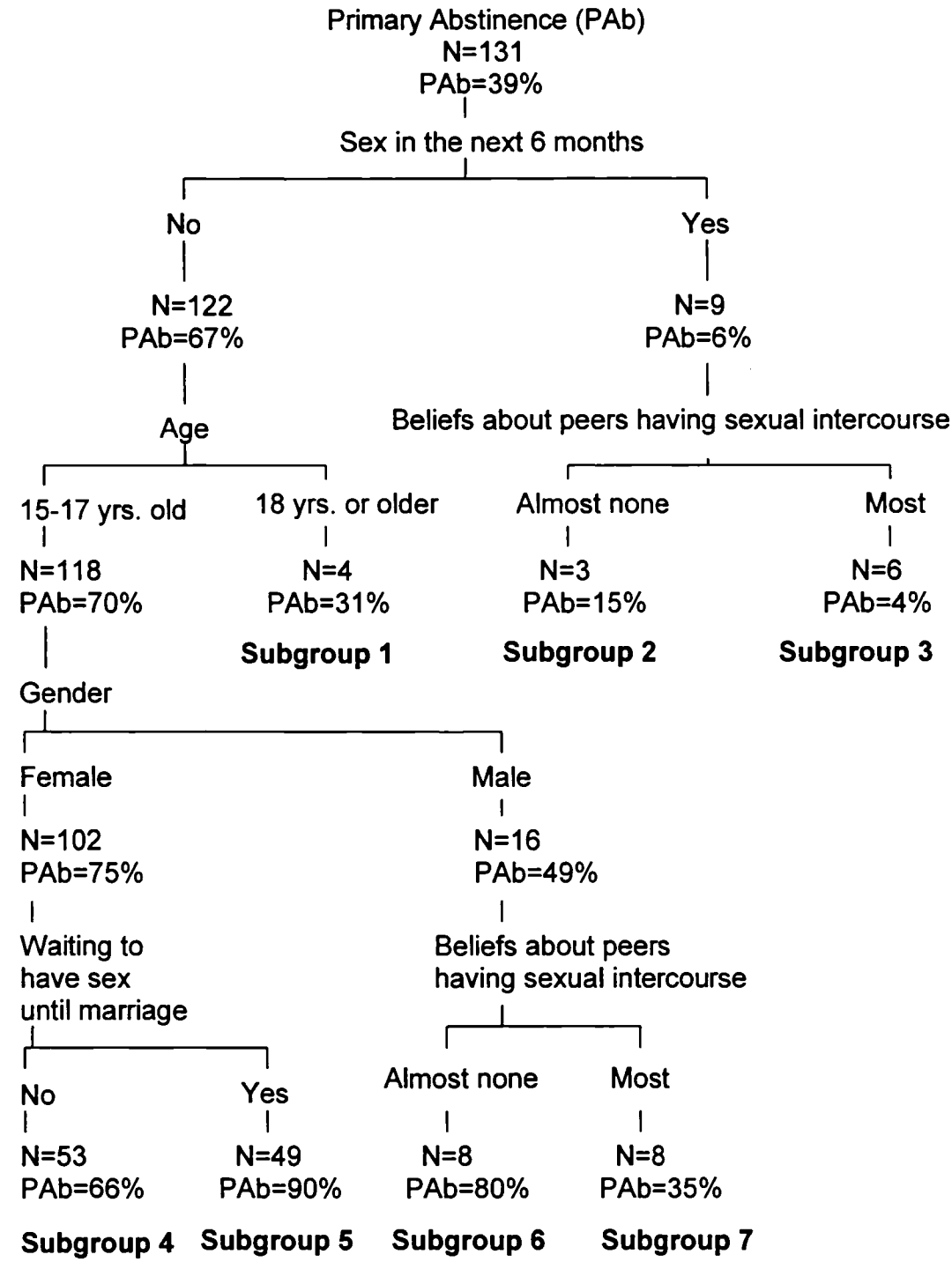

Figure 3. Tree involving Youth in the Primary Abstinence Group

Table 5

Summarization of Subgroups Obtained from the Tree involving PAb Youth

Subgroup	Youth Factors	Percentage of PAb Youth Compared to other Groups
1	No intentions to have sex in the next 6 months + 18 years or older	31
2	Intentions to have sex in the next 6 months + Believes almost none of their peers are having sex	15
3	Intentions to have sex in the next 6 months + Believes most of their peers are having sex	4
4	No intentions to have sex in the next 6 months + 15-17 years old + female youth + No intentions to wait until marriage to have sex	66
5	No intentions to have sex in the next 6 months + 15-17 years old + female youth + Intentions to wait until marriage to have sex	90
6	No intentions to have sex in the next 6 months + 15-17 years old + male youth + Believes almost none of their peers are having sex	80
7	No intentions to have sex in the next 6 months + 15-17 years old + male youth + Believes most of their peers are having sex	35

Interestingly, in the secondary abstinence group female youth between the ages of 15-17 years old who have no intentions to have sex in the next 6 months were more likely to have sex before marriage. Whereas, male youth between the ages of 15-17 years old who have no intentions to have sex in the next 6 months were more likely to demonstrate that most of their peers are having sexual intercourse.

Tree involving Youth in the Sexually Active Group

Figure 5 displays a CHAID constructed tree which models how the independent variables (risk/protective factors) are related to youth participants who are classified as sexually active. In this analysis, there were a total of 148 sexually active participants.

Table 7 displays seven subgroups. Sex in the next 6 months was the most important factor related to youth in the sexually active group. Approximately, 81% of youth in the sexually active group demonstrated intentions to have sex in the next 6 months compared to 14% of youth in the sexually active group who do not intend on having sex in the next 6 months.

Age emerged as the next strongest predictor, which means that in the sexually active group 12% of youth between the ages of 15-17 years old have no intentions to have sex in the next 6 months compared to 46% of youth who are 18 years or older. Furthermore, the sexually active tree revealed that youth who demonstrated intentions to have sex in the next 6 months are more likely to have peers who engage in sexual intercourse. Moving further down the tree, 12% of

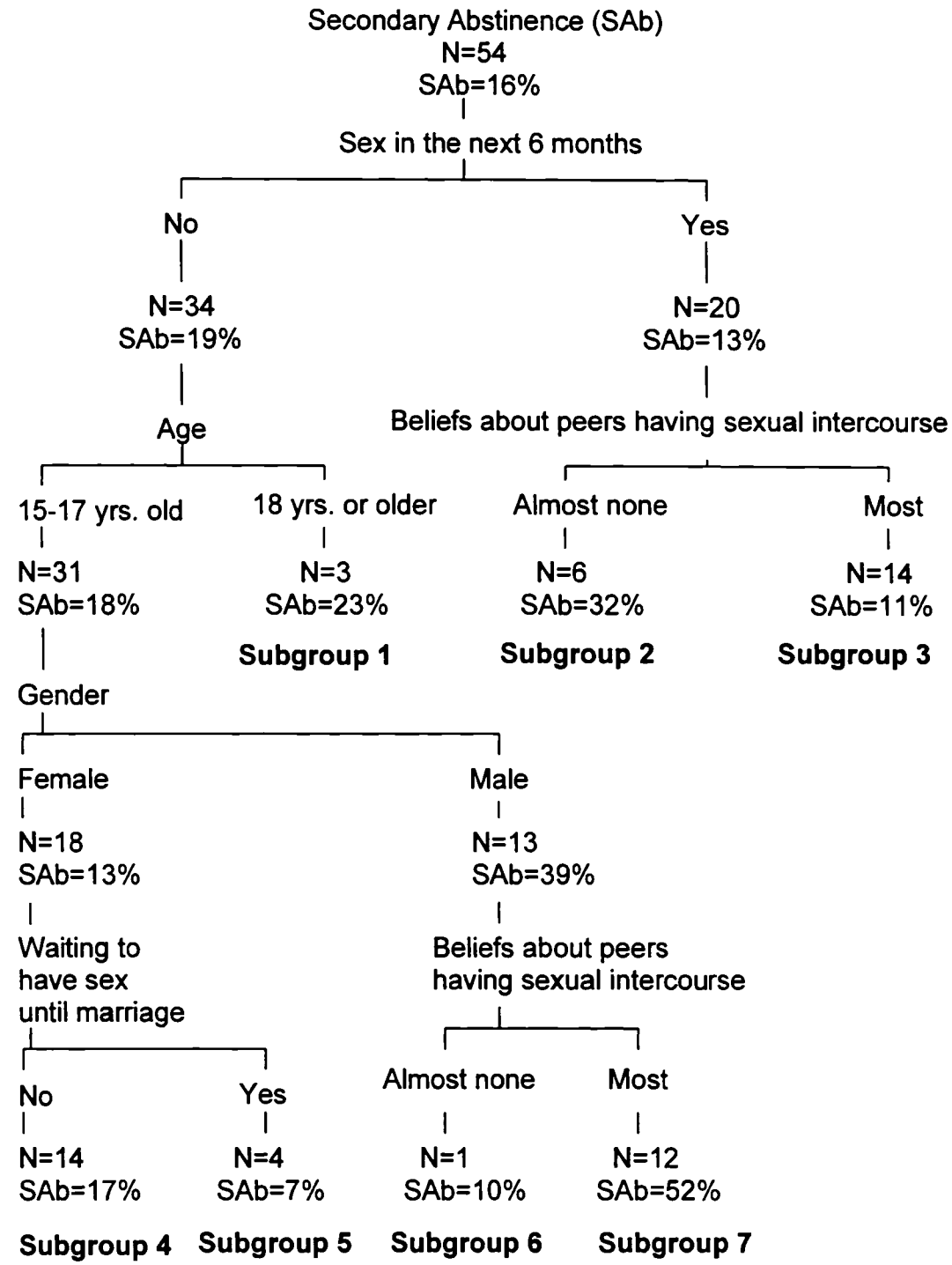

Figure 4. Tree involving Youth in the Secondary Abstinence Group

Table 6

Summarization of Subgroups Obtained from the Tree involving SAb Youth

Subgroup	Youth Factors	Percentage of SAb Youth Compared to other Groups
1	No intentions to have sex in the next 6 months + 18 years or older	23
2	Intentions to have sex in the next 6 months + Believes almost none of their peers are having sex	32
3	Intentions to have sex in the next 6 months + Believes most of their peers are having sex	11
4	No intentions to have sex in the next 6 months + 15-17 years old + female youth + No intentions to wait until marriage to have sex	17
5	No intentions to have sex in the next 6 months + 15-17 years old + female youth + Intentions to wait until marriage to have sex	7
6	No intentions to have sex in the next 6 months + 15-17 years old + male youth + Believes almost none of their peers are having sex	10
7	No intentions to have sex in the next 6 months + 15-17 years old + male youth + Believes most of their peers are having sex	52

youth who are between the ages of 15-17 years old and have no intentions to have sex in the next 6 months were females and 12% were males.

In the sexually active group, female youth between the ages of 15-17 years old who have no intentions to have sex in the next 6 months were more likely to have sex before marriage. Whereas, male youth between the ages of 15-17 years old who have no intentions to have sex in the next 6 months were more likely to demonstrate that most of their peers are having sexual intercourse.

Organization of Risk/Protective Factors

Though previous studies used the same approach to interpret the trees as mentioned above, one may detect several discrepancies. For example, in this study the CHAID analysis produced one tree in which the parent node (dependent variable) contained 3 groups (PAb, SAb, and SAc). There were a total of 131 youth in the primary abstinence group, 54 youth in the secondary abstinence group, and 148 youth in the sexually active group. When the CHAID analysis was carried out the groups with the most representation (e.g. PAb, SAc) had the highest percentages relating to the child nodes (independent variables) and the group with the least representation had the lower percentages relating to the child nodes.

As a result the interpretations involving the child nodes may be limited, which may cause one to reach complicated conclusions. To allow for a fair comparison between the child nodes, one may use the following approach. If the child node has majority (e.g. 50% or more) of the group representation relating to the parent node then the factor will be considered as a risk or protective factor.

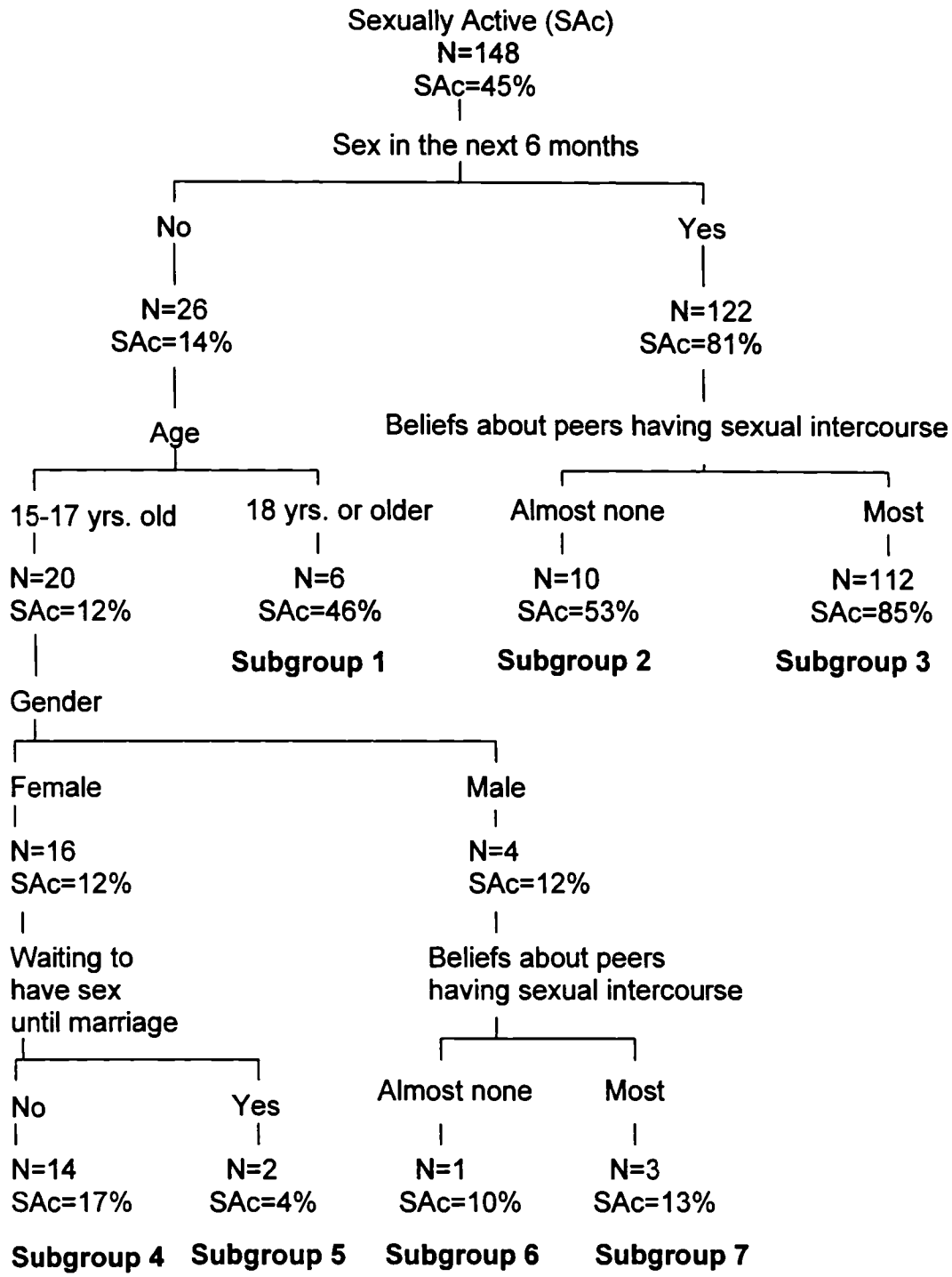

Figure 5. Tree involving Youth in the Sexually Active Group

Table 7

Summarization of Subgroups Obtained from the Tree involving SAc Youth

Subgroup	Youth Factors	Percentage of SAc Youth Compared to other Groups
1	No intentions to have sex in the next 6 months + 18 years or older	46
2	Intentions to have sex in the next 6 months + Believes almost none of their peers are having sex	53
3	Intentions to have sex in the next 6 months + Believes most of their peers are having sex	85
4	No intentions to have sex in the next 6 months + 15-17 years old + female youth + No intentions to wait until marriage to have sex	17
5	No intentions to have sex in the next 6 months + 15-17 years old + female youth + Intentions to wait until marriage to have sex	4
6	No intentions to have sex in the next 6 months + 15-17 years old + male youth + Believes almost none of their peers are having sex	10
7	No intentions to have sex in the next 6 months + 15-17 years old + male youth + Believes most of their peers are having sex	13

Through this process, as shown in Table 8 the CHAID constructed tree illustrates that there are a number of relationships between risk/protective factors and sexual behaviors among African-American youth.

Table 8

Overall Results from Each Tree

	PAb	SAb	SAc
Age	+	+	+
Gender	+	+	+
Intentions to have sex in the next 6 months	+	+	-
Waiting until marriage to have sex	-	-	-
Beliefs about peers having sexual intercourse	-	-	-
Communication with parents about HIV	o	o	o
Intentions to use a condom with partner	o	o	o
Self-perceived risk for HIV	o	o	o
Alcohol Use	o	o	o
Marijuana Use	o	o	o

Note. (+) = protective factors; (-) = risk factors; (o) = neutral (factors that were unpredictable in the tree).

CHAPTER V

DISCUSSION

The current study sought to extend our understanding of sexual activity among African-American adolescents by examining common risk/protective factors. Specifically, this study serves to identify the relationships between risk/protective factors and reported sexual behaviors among African-American adolescents. In the following three sections, the investigator discusses the relative importance of risk/protective factor as single characteristics within participant's sexual behavior (PAb, SAb, and SAc). Conclusions and recommendations for further study are presented at the end of this chapter.

Primary Abstinence Youth and Risk/Protective Factors

The first hypothesis of this study was that youth in the primary abstinence group will have more protective factors than risk factors. This hypothesis was supported in this study when risk/protective factors were examined among youth who demonstrated primary abstinence. Results revealed that three protective factors (no intentions to have sex in the next six months, age, and gender) were related to youth who demonstrated primary abstinence.

In light of this finding, no intentions to have sex in the next six months, age, and gender can be perceived as protective factors among primary abstinence youth. This result was consistent with findings from Howard, Davis,

Evans-Ray, Mitchell, and Apomah (2004) which concluded that intentions to say "no" to sexual intercourse in the future was related to African-American male adolescents who have not had sexual intercourse. In this case, a number of male youth in this study who demonstrated primary abstinence have no intentions to have sex in the next 6 months. This finding is of particular importance for health professionals with hopes of promoting responsible sexual behavior among male youth.

The analysis also identified two risk factors that were related to youth who demonstrated primary abstinence (intentions to have sex before marriage and beliefs about peers having sexual intercourse). It is important to note that the factor "beliefs about peers having sexual intercourse" appeared twice in the tree, although, one of the splits was cancelled out due to a 50% split. This result may be explained by the fact that a number of youth who demonstrated primary abstinence have intentions to engage in sexual activity once they are in a serious relationship (see Appendix C). Somers and Surmanns (2004) study noted that many adolescents do not perceive any viable reason for postponing intercourse. Therefore, adolescents are more likely to initiate sex before marriage. This finding is of interest because intentions to have sex before marriage was identified among youth who demonstrated primary abstinence.

Secondary Abstinence Youth and Risk/Protective Factors

The second hypothesis of this study was that youth in the secondary abstinence group will have more protective factors than risk factors. Specifically, the analysis found three protective factors (no intentions to have sex in the next 6

months, age, and gender) that were associated with youth who demonstrated secondary abstinence. This observation is an important one. In this study youth between the ages of 15-17 years old who demonstrated secondary abstinence (57%) have no intentions to have sex in the next 6 months, which suggests that it is possible for youth to practice healthy behavior although they have engaged in risky behavior in the past.

There are two risk factors (intentions to have sex before marriage and beliefs about their peers having sexual intercourse) that were significantly associated with youth who demonstrated secondary abstinence. In particular, this study concluded that secondary abstinence youth intend on engaging in sex before marriage and most of their peers are having sexual intercourse. Even though there are a number of youth in the secondary abstinence group who intend to engage in sex before marriage, the previous findings suggested that they plan to abstain from sex in the next six months. This finding is consistent with previous literature that suggests youth are more likely to engage in sexual intercourse when their peers are having sex.

This finding is of interest not only because youth in the secondary abstinence group are intending to have sex before marriage, but also because these youth reported intentions to abstain from sexual intercourse until a serious relationship (see Appendix C). Overall, this hypothesis was supported by the data when examining the numbers of risk/protective factors among youth who are secondary abstinent.

Sexually Active Youth and Risk/Protective Factors

The third hypothesis of this study was that youth in the sexually active group will have more risk factors than protective factors. This hypothesis was supported by the data when examining risk/protective factors among youth who are sexually active. There were three risk factors that were associated with youth who are sexually active.

In this analysis, intentions to have sex in the next six months, sex before marriage, and beliefs about their peers having sexual intercourse appeared as risk factors among youth who are sexually active. These findings suggest that a number of youth who are sexually active have intentions to engage in sexual intercourse in the forthcoming months. These findings are consistent with the previous literature that suggest youth who believed that most of their peers are having sex were more likely to report having a high intention to initiate sex in the upcoming year (Kinsman et al., 1998). In addition, these findings lend support to the contention that youth are more likely to engage in sexual intercourse when they think their peers are having sexual intercourse.

Limitations of the study

The current study included African-American adolescents who ranged in age from 15-19 years of age. Previous studies have suggested that the prevalence of sexual activity among African-American adolescents who range in age (13-14 years old) is an issue of concern. It may be beneficial, in further studies, to expand the age range (13-19 years old).

Also, the current sample was collected from two urban high schools, which suggest that the study data may not be generalized among youth outside this population. In addition, the questionnaire data entailed a limited number of risk/protective factors, thus additional studies may need to look at more risk/protective factors to obtain more conclusive findings.

Finally, the findings involving several survey items on the questionnaire were limited due to the re-coding process and the exclusion of subjects. For example, a substantial number of subjects on the survey item "intentions to use a condom with partner" were excluded because they answered unsure or waiting to have sex until marriage. It is possible that those who answered "waiting to have sex until marriage" do not plan on using a condom because they intend on being married at the time they initiate sex. Therefore, the interpretations regarding condom use may be limited.

Conclusions

In the current study, the Ecological Risk/Protective Theory (Bogenschneider, 1996), was essential in explaining variables related to sexual behavior in African-American adolescents. This study found many relationships between risk/protective factors and sexual behaviors. The risk factors identified in the current study may increase the likelihood of persons practicing risky sexual behavior and enduring negative outcomes. For example, youth who report most of their peers are having sex may report intentions to have sex in the next six months.

Protective factors in this study may increase the likelihood of preventing problematic behavior. For example, persons who believe that most of their peers do not engage in sexual intercourse may report no intention to have sex in the next six months. The findings of this study support the belief that there are a number of risk/protective factors that increase the likelihood of negative outcomes or prevent problematic behaviors.

Identifying and understanding these risk/protective factors is imperative to reduce the risk of HIV infection among African-American adolescents. This study was designed to identify risk/protective factors that were related to African-American adolescents who are primary abstinent, secondary abstinent, and sexually active. The results generally suggest that the risk factor, intentions to have sex in the next six months is most strongly related to persons who are sexually active. No intentions to have sex in the next six months appeared as a protective factor among persons who are primary abstinent and secondary abstinent. In light of this fact, it is possible that youth who have no intentions to have sex in the next six months are likely to be characterized as primary abstinence or secondary abstinence.

By recognizing the relationship between risk/protective factors and sexual behaviors, meaningful interventions can be designed to reduce risky sexual behavior among African-American adolescents. This study has added to the existing literature by providing information about common factors that influence sexual behavior in African-American adolescents. In addition, it extended the literature by focusing on risk/protective factors among African-American

adolescents, providing information that may reduce the infection of HIV in this population.

Recommendations for Further Study

Since this research only included African-American adolescents, one may choose to replicate this study with other minority groups. Additionally, one might choose to carry out this study with African-American adolescents who reside in different geographic locations. While this study chose risk/protective factors that are most substantiated in the literature, examination of additional and/or other specific risk/protective factors may yield additional information.

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APPENDICES

APPENDIX A

Institutional Review Board Approval

APPENDIX A

Institutional Review Board Approval Letter

Institutional Review Board
P.O. Box 124
Middle Tennessee State University
Murfreesboro, Tennessee 37132
Office: (615) 898-5005

MIDDLE TENNESSEE STATE UNIVERSITY

IRB expedited approval

12/06/04
Protocol Title: An examination of Protective Factors and HIV-related Risk Behaviors among African-American Adolescents Using the Ecological Risk/Protective Theory Framework
Protocol Number: 05-116
Charles Brown
cb2a@mtsu.edu

Faculty Supervisor: Dr. Peggy O'Hara-Murdock
pohhara@mtsu.edu

Dear Charles Brown,

The MTSU Institutional Review Board, or representative of the IRB, has reviewed your research proposal identified above. It has determined that the study poses minimal risk to subjects and qualifies for expedited review under 45 CFR 46.110 and 21 CFR 56.110.

Please note that any unanticipated harms to subjects or adverse events must be reported to the Office of Sponsored Programs at (615) 898-5005.

Approval is granted for one (1) year from the date of this letter for 600 subjects

You will need to submit an end-of-project report to the Office of Research and Sponsored Programs upon completion of your research.

Please note that any change to the protocol must be submitted to the IRB before implementing this change.

Sincerely,

Robert Hood Kevin Collins

Robert Hood, Ph.D.
Chair, Institutional Review Board
Associate Professor
Department of Philosophy
Middle Tennessee State University

APPENDIX B

Risk Behavior Survey

APPENDIX B

Risk Behavior Survey

DEMOGRAPHICS

1. How old are you?
   a. 12 years old or younger
   b. 13 years old
   c. 14 years old
   d. 15 years old
   e. 16 years old
   f. 17 years old
   g. 18 years old or older

2. What is your sex?
   a. Female
   b. Male

3. How do you describe yourself?
   a. White, not Hispanic
   b. Black, not Hispanic
   c. Hispanic
   d. Asian or Pacific Islander
   e. Native American or Alaskan Native
   f. Other (specify _____)

4. In what grade are you?
   a. 8th grade
   b. 9th grade
   c. 10th grade
   d. 11th grade
   e. 12th grade
   f. graduated
   g. Completed GED
   h. Dropped out

AIDS EDUCATION & INFORMATION

5. Have you ever been taught about AIDS or HIV infection in your school?
   a. Yes
   b. No

6. Have you ever talked about AIDS or HIV infection with your parents or other adults outside of school?
   a. Yes
   b. No

7. Do you think that getting information from someone your age can help you solve problems about sex or drugs?
   a. Yes
   b. No

8. Do you think that you are at risk of getting AIDS or HIV infection?
   a. Yes
   b. No
   c. Not sure

Please explain briefly why you answered Yes, No, or Not Sure in Question 8

_____

_____

_____

SEXUAL BEHAVIOR

9. How many of your friends do you think are having sexual intercourse?
   a. Almost all
   b. Most
   c. Half
   d. Few
   e. Almost none

10. Have you ever had sexual intercourse?
   a. Yes
   b. No

11. Have you had sexual intercourse in the last 6 months?
   a. Yes
   b. No

12. Do you think you will have sexual intercourse in the next 6 months?
   a. Yes
   b. No

13. I plan on waiting to have sexual intercourse until...[check only one]
   a. I am married
   b. I am in a serious relationship
   c. I feel I am emotionally ready, but not necessarily based on a relationship type
   d. NOT APPLICABLE; I'M ALREADY SEXUALLY ACTIVE

14. In your entire life, with how many different people have you had sexual intercourse?
   a. I have never had sexual intercourse
   b. 1 person
   c. 2 people
   d. 3 people
   e. 4 people
   f. 5 people
   g. 6 or more people

15. Did you drink alcohol or use drugs before you had sexual intercourse the last time?
   a. I have never had sexual intercourse
   b. Yes
   c. No

16. How many times have you been pregnant or gotten someone pregnant?
    a. 0 times
    b. 1 time
    c. 2 or more times
    d. Not sure

17. Have you ever been told by a doctor or nurse that you had a sexually transmitted disease such as genital herpes, genital warts, chlamydia, syphilis, gonorrhea, AIDS or HIV infection?
    a. Yes
    b. No

HIV PREVENTION AND CONDOM USE

18. The last time you had sexual intercourse did you or your partner use a condom?
    a. I have never had sexual intercourse
    b. Yes
    c. No

19. In past 3 months, how often did you ask a sex partner to use a condom?
    a. I have never had sexual intercourse
    b. Every time
    c. Sometimes
    d. Never

20. Do you talk about sex issues with.... [check all that apply]
_____ Your friends
_____ Your parents
_____ Adults besides your parents
_____ Family members besides parents

21. In past year, how often did a sex partner ask you to use a condom?
    a. I have never had sexual intercourse
    b. Every time
    c. Sometimes
    d. Never

22. Do you intend to change any of your behaviors to protect yourself from getting HIV/AIDS? (behaviors may include tattooing, sharing needles, unprotected contact with body fluids, sexual intercourse) [if you answer NO, please choose appropriate response below]
    a. Yes
    b. No
    c. No, I do not believe I practice unsafe behaviors, so I will not change

23. Do you intend to make sure that you or your partner use a condom every time you have sex from now on?
    a. Yes
    b. No
    c. I'm still thinking about it
    d. I do not intend to have sex with a partner until marriage

24. How easy would it be for you to talk with a new partner about using a condom before having sex?
    a. Very easy
    b. Somewhat easy
    c. Not easy at all

25. Sometimes there might not be any condoms around when you want to have sex. If this happens, how sure are you that you can put off having sex?
    a. Very sure I can
    b. Pretty sure I can
    c. Maybe I can
    d. Pretty sure I cannot
    e. Very sure I cannot

26. Have you ever been tested for an STD or the HIV virus?
    a. Yes
    b. No

The next 2 questions ask about drinking alcohol. This includes drinking beer, wine, wine coolers, and liquor such as rum, gin, or vodka or whiskey. For these questions, drinking alcohol does not include drinking a few sips of wine for religious purposes.

27. During your life, on how many days have you had at least one drink of alcohol?
    a. 0 days
    b. 1 or 2 days
    c. 3 to 9 days
    d. 10 to 19 days
    e. 20 to 39 days
    f. 40 to 99 days
    g. 100 or more days

28. During the past 30 days, on how many days did you have at least one drink of alcohol?
    a. 0 days
    b. 1 or 2 days
    c. 3 to 5 days
    d. 6 to 9 days
    e. 10 to 19 days
    f. 20 to 29 days
    g. All 30 days

29. During your life, how many times have you used marijuana?
    a. 0 days
    b. 1 or 2 days
    c. 3 to 9 days
    d. 10 to 19 days
    e. 20 to 39 days
    f. 40 to 99 days
    g. 100 or more days

30. During the past 30 days, how many times did you use marijuana?
    a. 0 times
    b. 1 or 2 times
    c. 3 to 9 times
    d. 10 to 19 times
    e. 20 to 39 times
    f. 40 or more times

31. I believe that alcohol and drugs...
    a. are things I can stay away from
    b. are things that I must try
    c. are things I don't want to try, but will probably do so if others are using them
    d. are things I have not thought about

32. When I want to use alcohol or drugs the feeling is usually set off by...
    a. a person, place or time other than myself
    b. feelings and perceptions about myself
    c. being in a certain place or doing a certain activity
    d. I never have the feeling that I want to use alcohol or do drugs

33. I think I can make decisions to stay way from using alcohol and drugs...
    a. by thinking about what triggers wanting to get high
    b. by willing it not to happen
    c. by thinking about enjoyable alternatives to getting high
    d. by thinking about both the immediate and lasting consequences of becoming a drug and alcohol user

34. Do you believe that you may have unprotected sex when you've been drinking or doing drugs?
    a. Yes
    b. No

35. People who consider using alcohol or drugs but decide against it are...
    a. avoiding possible trouble
    b. dull
    c. unattractive
    d. difficult to understand

36. How honestly did you answer this survey?
    a. Very honestly
    b. Somewhat honestly
    c. Not honestly

END OF SURVEY

Thank you for completing the survey. If you have time, please write any comments below.

APPENDIX C

Cognitive Factors involving PAb, SAb, and SAc Groups

APPENDIX C

Cognitive Factors involving PAb, SAb, and SAc Groups

Cognitive Factors involving PAb, SAb, and SAc groups (N=333)

Factors	PAb = n	SAb = n	SAc = n
Intentions to have sex in the next 6 months			
Yes	9	20	122
No	122	31	25
Beliefs about peers having sexual intercourse			
Almost none	58	14	17
Most	71	40	131
Intentions to use a condom with partner			
Yes	44	48	128
No	4	1	9
At risk for HIV			
Yes	15	5	39
No	109	44	87
Waiting to have sex until			
Married	57	10	3
In Relationship	54	26	24
Emotionally Ready	18	4	9

APPENDIX D

Results from the CHAID Analysis

APPENDIX D

Results from the CHAID Analysis

Results from the CHAID Analysis

	Risk Statistics	Cross-Validation
Risk Estimate	0.249249	0.27027
Standard Error of Risk Estimate	0.0237051	0.0243365